

**NOBLES GRADE 3-D  
SEISMIC SURVEY  
BIG CYPRESS NATIONAL PRESERVE AND  
BIG CYPRESS NATIONAL PRESERVE ADDITION  
PLAN OF OPERATIONS**

**NON-CONFIDENTIAL COPY**

**Revised December 2014**

Prepared For:



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## 1.0 INTRODUCTION/OVERVIEW

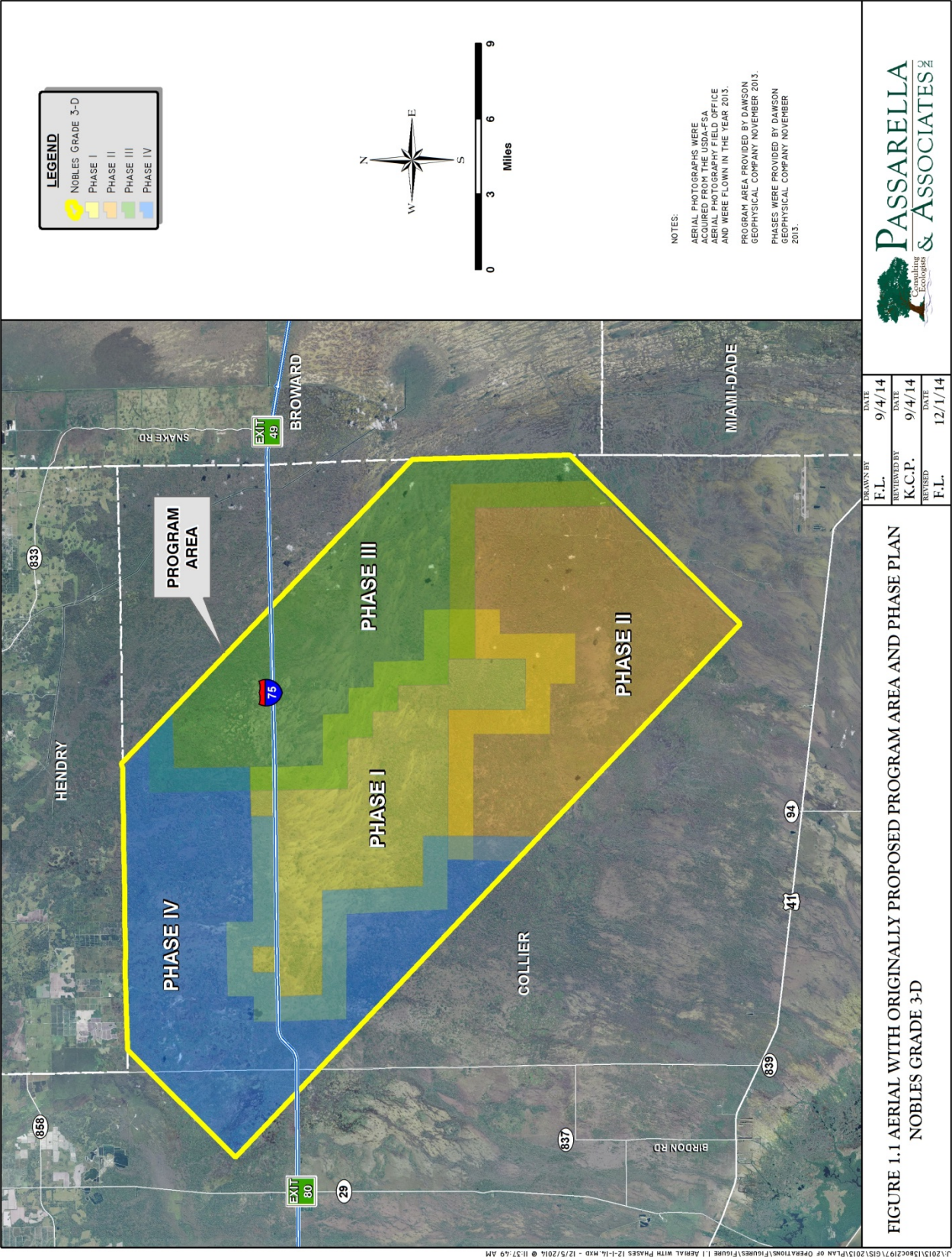
### 1.1 National Park Service Unit/Area of Operations

Pursuant to *Title 36 Code of Federal Regulations Part 9 Subpart B – Non-Federal Oil and Gas Rights* (36 Code of Federal Regulations (CFR) 9B regulations), the Big Cypress National Preserve Mineral Management Plan (1992), and the “Agreement among the United States of America, Collier Enterprises, and Barron Collier Company” (1988), Burnett Oil Co., Inc. (BOCI), also known as the “Applicant” and “Operator” (see Exhibit 1), seeks approval for the following *Nobles Grade Three Dimensional (3-D) Geophysical Seismic Survey Plan of Operations* (NG3-D) from the United States Department of the Interior – National Park Service (USDOI-NPS) Big Cypress National Preserve (BCNP). Pursuant to agreements with Collier Resources Company, LLP (CRC) and other private mineral interest holders within the BCNP and the BCNP Addition (BCNP-A) (collectively known as “the Preserve”) shown in Exhibit 2, BOCI, as Applicant and Operator, intends to pursue exploration for new oil and gas accumulations in the Preserve through the proposed Nobles Grade 3-D (NG3-D) seismic survey project.

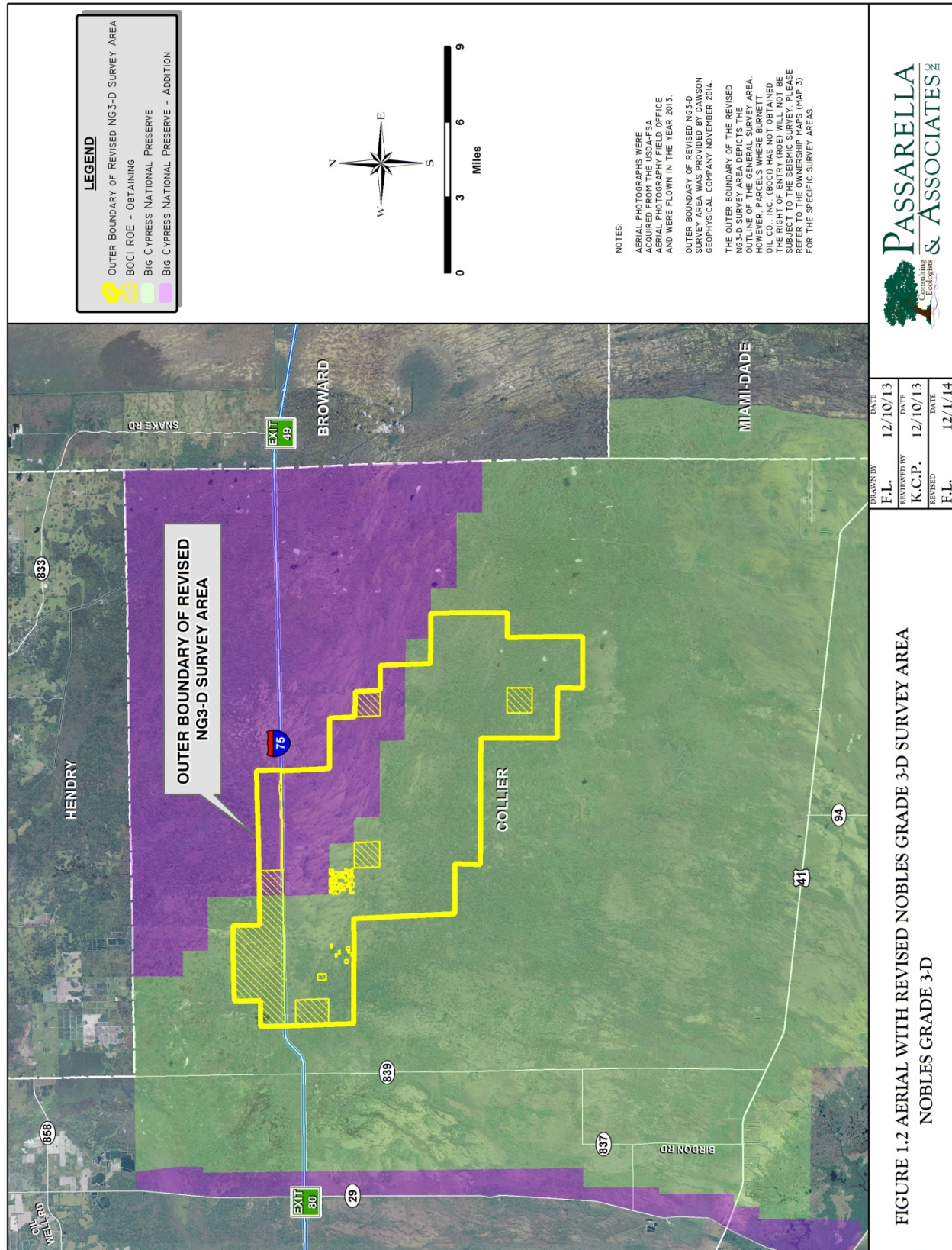
A Plan of Operations (POP) for the originally proposed NG3-D seismic survey was submitted to the USDOI-NPS on January 16, 2014. This submittal requested approval to conduct seismic operations within a 366± square mile area (i.e., Program Area) which was proposed to be broken down into four phases (i.e., Phases I, II, III, and IV) (Figure 1.1). The overall phasing plan was designed so that operations would be limited to the dry season and spread over four years to reduce potential effects on the Preserve. However, the project has been revised to only include Phase I at this time based on Comment No. 5 of a USDOI-NPS letter dated July 28, 2014 regarding their review of the January 2014 POP. The current POP reflects an approximate 75 percent reduction in survey activities proposed under this application.

This revised POP seeks approval only for the first phase of the NG3-D Seismic Survey under this application (Figure 1.2). NG3-D Phase I survey area encompasses 110± square miles (70,454± acres of which approximately 75 percent is located in the BCNP and 25 percent is located in the BCNP-A. BOCI is no longer seeking approval for Phases II, III, and IV that were identified in the original POP. Those phases are no longer part of this POP; they will be addressed in separate POPs at a later date. Although this revised POP in places refers to the survey area as “Phase I,” that simply reflects that the revised survey area formerly was just Phase I of the original POP and it is not intended to imply that approval of this reduced survey area necessarily will result in approval of any later POPs for the subsequent phases. By reducing the size of the survey area, the USDOI-NPS will be able to focus strictly on the current Phase I approval which will eliminate some of the uncertainty of authorizing the proposed seismic survey to occur over the entire Program Area. Just as this POP is built upon the positive real-world experience of prior seismic surveys in the Preserve, future phases will reflect the avoidance and mitigation experiences of the revised POP, likely producing improvements in best practices for future phases.











The NG3-D Seismic Survey is designed to evaluate the subsurface geologic structure and geophysical conditions pertaining to accumulations of commercial quantities of crude oil and natural gas in the Sunniland Oil Trend beneath the survey area. It will do this by using small, portable seismic receivers (geophones) and recording devices, which measure and record subtle vibrations in the ground. Each receiver point will consist of three geophones, a recording box and battery. In this POP, no explosives will be used to create the vibrations or seismic acoustical signals, and there will be no ground disturbances from detonations. Instead, vibrations will be created using mobile plates attached to special off-road vehicles (ORVs) which are placed against the ground, vibrated, and then moved on to the next location. These vibration devices, and the geophones which receive the return seismic signals from the subsurface geology, will be oriented in a “source” and “receiver” line grid that will allow BOCI to map the subsurface geology.

Once the seismic acquisition is completed, the locations where vibrating occurred and receivers were placed on the ground will be returned to their pre-existing condition. While the overall revised POP involves a survey of 110± square miles, only approximately 2½ square miles will be affected by vibroseis operations (vibrating and data acquisition) on any given day while at the same time less impacting, on-foot and helicopter assisted geophone deployment and retrieval operations will occur in other areas (see Sections 4 and 5 for a more detailed description of proposed operations). At any given vibration location, the survey will require only a few minutes of occupancy, which means that the Operator’s presence at any given point in the 2½ square mile area during a day of work will be temporary. Equipment needed for the survey will be staged using previously disturbed areas (abandoned road access points and well drill pad) and open areas next to existing or newly constructed recreational parking areas; no new construction or fill activities are planned in the Preserve. As such, the overall plan will have only ephemeral effects on the survey area, and leave little or no trace that the survey has taken place.

The preliminary layout for the NG3-D seismic survey consists of 64± source lines and 168± receiver lines oriented at right angles to each other in a modified industry standard “orthogonal” pattern. As indicated above, these source and receiver lines describe the temporary placement of vibrating points and the seismic recording devices, respectively and will not produce permanent impacts on the landscape. These lines have been modified based on high resolution aerial imagery to occupy roads, trails, open areas, and other areas of existing or previous disturbances to the extent feasible, in order to avoid or mitigate potential impacts to sensitive areas (i.e., dense forested systems, documented protected species locations, known archaeological resources, etc.) (see Section 5.10.2).

Access routes will be further modified in the field as determined by scouting crews, ecologists, and archaeologists. The responsibilities of supporting ecologists and archaeologists are very different; as such, they will not be performed by one person functioning in both capacities. This group will be professionally trained with local experience with the flora, fauna, and cultural resources of the Preserve and accompany the daily scouting in direct coordination with the USDOI-NPS. These entities will be professionally trained with local experience with the flora, fauna, and cultural resources of the Preserve. An ecologist, as well as a professional archaeologist, will be present with each survey crew to scout proposed source lines concurrently with the survey operations. Additional aerial scouting will be conducted by an ecologist to



identify potential species habitat that could be affected by receiver line placement (i.e., red-cockaded woodpecker (*Picoides borealis*) (RCW) habitat, wading bird rookeries, etc.). Additional groundtruthing will be conducted by the ecologist (if needed) in conjunction with the USDOI-NPS and/or the U.S. Fish and Wildlife Service (USFWS) to avoid protected species locations along the receiver lines, if identified. Flexibility has been built into the operations plan to accommodate unanticipated encounters.

This POP contains full information for activities being proposed in the scaled-back NG3-D seismic survey including initial design Modification Protocols for avoiding and minimizing seismic survey impacts to the important resources and threatened and endangered species of the Preserve. In summary, the proposed seismic survey is anticipated to result in “minimal” and “temporary” impacts. “Minimal” impacts refer to the least amount of detrimental impact to a given parameter to achieve the desired goal. For example, 1) minimal vegetation trimming would include trimming or cutting of vegetation to allow for the safe passage of an on-foot receiver layout/pickup crew member or a vehicle, but would not be conducted to the extent that natural regrowth could not occur; and 2) minimal soil impacts refer to potential soil disturbance that could be easily restored through hand reclamation efforts to pre-disturbance conditions. The term “temporary” impacts refer to potential impacts that do not cause long-term or permanent damage. The vegetation example above also applies to “temporary” since the vegetation will regrow naturally and no permanent impacts will occur. In addition, the soil impact example also applies to “temporary” since the soils will return to their pre-disturbance state post-reclamation (although it is expected that reclamation efforts will not be needed in most cases).

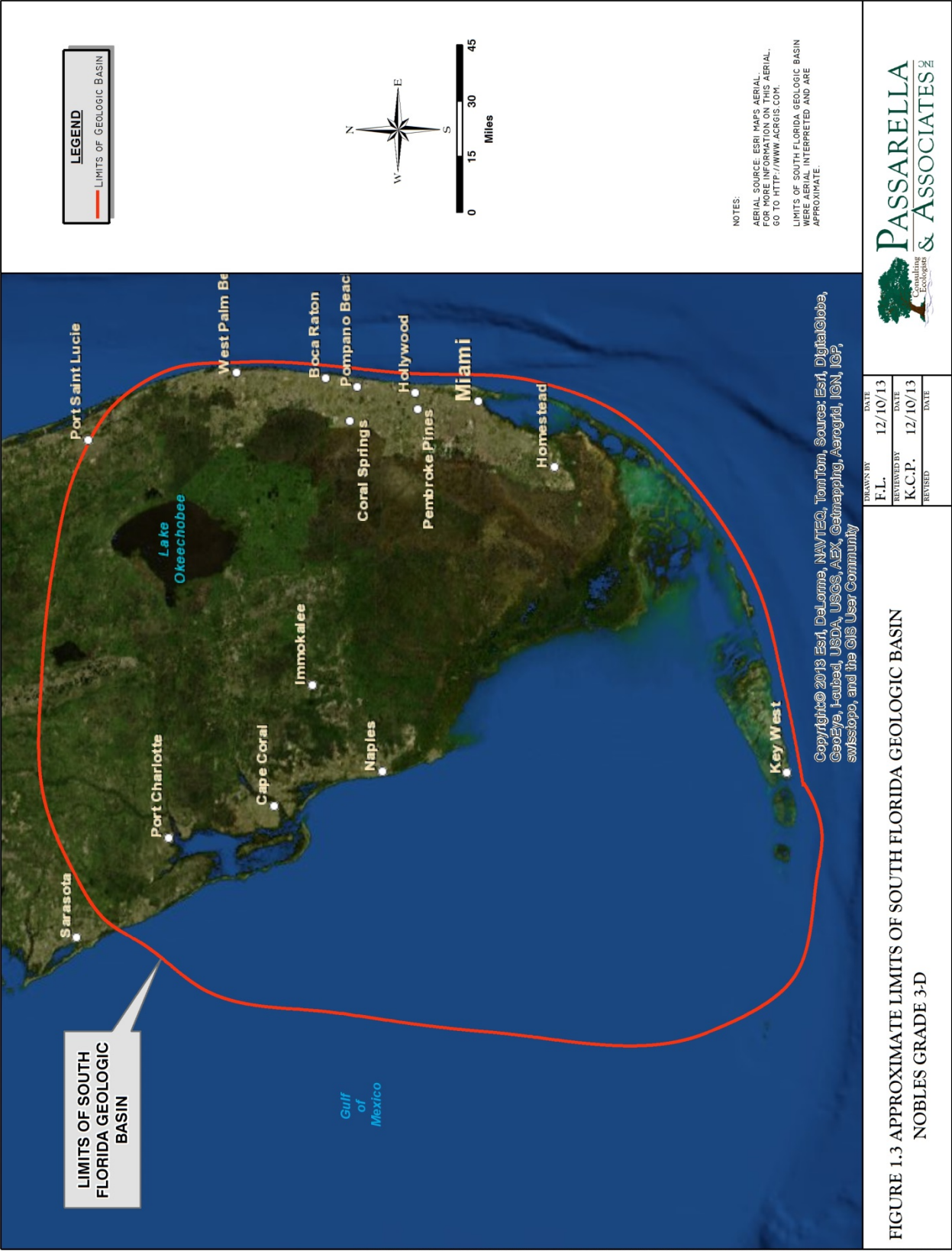
Due to the reduction in impacts that could potentially occur to a level of “minimal” and “temporary” as a result of employing the Modification Protocols discussed in Section 5.10.2, the proposed seismic survey project is anticipated to result in only *de minimis* impacts. To clarify, *de minimis* impacts further, survey operations are not expected to produce significant or permanent, detrimental impacts. The expectation of *de minimis* impacts is largely based on the fact that the vibroseis vehicles will be operating in dry conditions during the winter dry season. For those minor impacts that do occur in the survey area, full recovery is expected to be achieved within one to two growing seasons.

### **1.1.1 Oil and Gas Background**

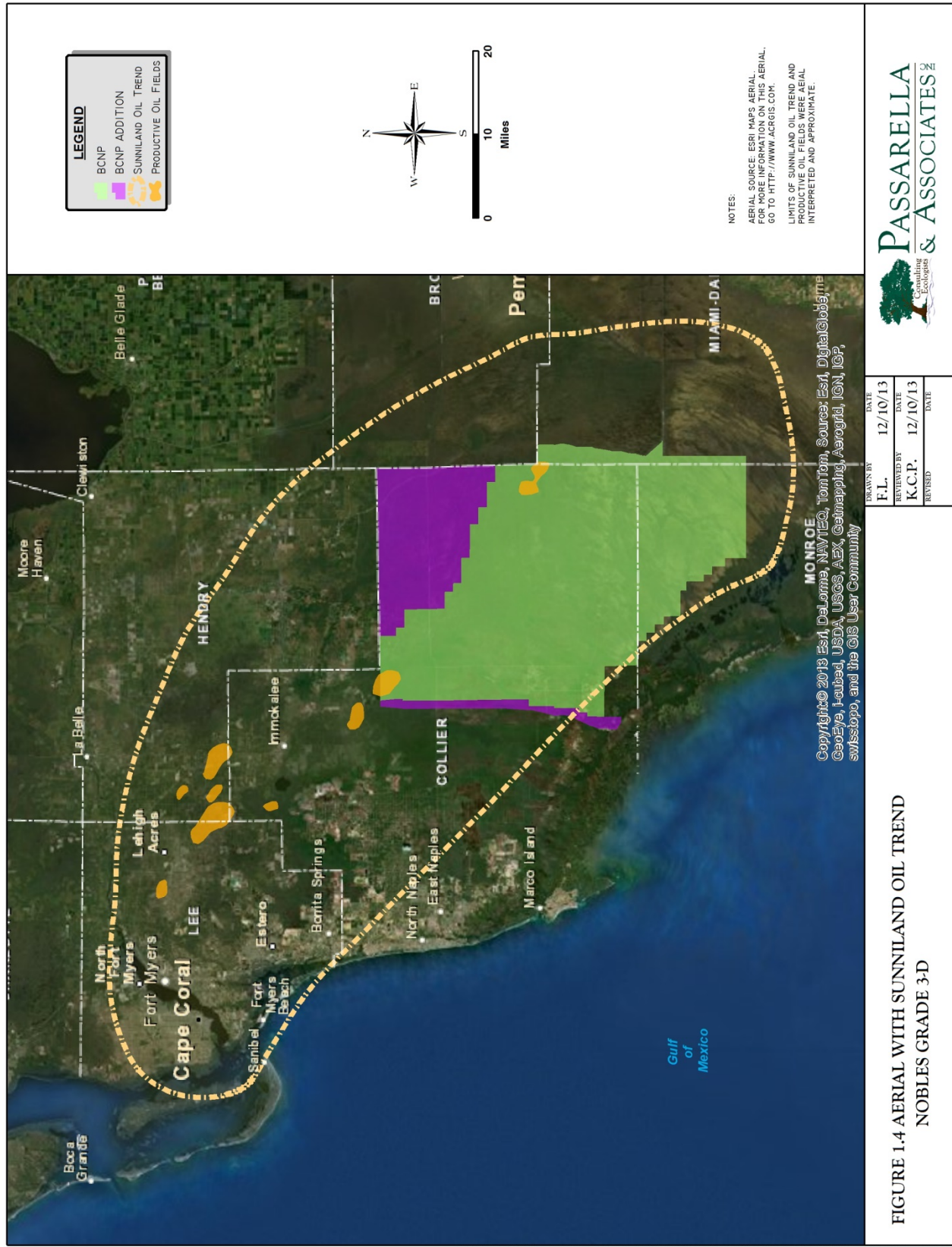
The Sunniland Trend (Trend) is part of the hydrocarbon-bearing South Florida Geologic Basin located beneath southwest Florida (see Figure 1.3). The Trend has produced over 120 million equivalent barrels of crude oil and non-commercial quantities of natural gas continuously since 1943 from the commercial oil fields shown on Figure 1.4.

Oil and gas activities in the greater Big Cypress Swamp predate the creation of the Preserve. Discovery of oil and gas in Southwest Florida dates back to the early 1940s. The first producing wells were drilled in 1943 and there have been producing oil and gas wells in the region ever since. Several oil production facilities have been installed in areas that are now within the boundaries of the Preserve. Specifically, oil production within the Preserve includes Exxon’s Bear Island field (discovered in 1972) with 23 wells











on 9 pads; and Exxon's Raccoon Point field (discovered in 1978) which included 17 wells on 5 pads (USDOI-NPS 1992). Most visitors to the Preserve are unaware that these facilities exist.

Multiple 2-D geophysical operations had been conducted in the Preserve (or partially within Preserve) as of 1992 which affected a total of 474 miles of seismic lines (USDOI-NPS 1992). This past survey area was far larger than the survey area proposed as part of the revised POP. Specifically, Mobil conducted seismic surveys from 1970 – 1971 which included 13 lines over 151 miles; Bass conducted seismic surveys in 1974 which included 7 lines over 64 miles; Exxon conducted seismic surveys from 1976 – 1977 which included 20 lines over 254 miles; and Shell conducted seismic surveys in 1988 which included 1 line over 5 miles. During this same time period, Exxon and Shell conducted miles of seismic surveys in what is today the BCNP-A. These pre-1992 survey operations were not limited to the dry season, as proposed in the revised POP. More recently (1999) in the Preserve, Calumet Florida, Inc. conducted a 16 square-mile 3-D seismic survey (the first in the Sunniland oil trend) at Raccoon Point oil field.

An exhibit from the 1992 General Management Plan (GMP) for the original Preserve which shows the locations of the known geophysical lines from 1970 – 1988 was modified to display this information along with the additional source lines from the 1999 Raccoon Point 3-D seismic survey (Figure 1.5). Although the 1992 GMP for the original Preserve states that many of the seismic lines from 1970 – 1977 were still visible on 1984 high altitude infrared aerial photographs, the GMP acknowledged that it was because these areas had subsequently been reused as ORV trails. The vast majority of the historic seismic lines that were not disturbed by repeated ORV uses not associated to the seismic surveys returned to their natural conditions and no permanent or long term impacts occurred. It should be noted that the USDOI-NPS now implements an ORV management plan that designates specific trails within the Preserve for ORV use. If additional seismic lines are shot in the future within the boundaries of the Preserve, the majority of the associated routes would not be open to the public for unrelated ORV use. The 1992 Minerals Management Plan (MMP) also implemented a stipulation that activities occur during the dry season, which reduces the potential for rutting of soils. As such, it is expected that these routes would quickly return to their natural state due to the inherent resilience of the Preserve which has been proven based on past recovery of this specific area.

Both the 1992 GMP for the original Preserve and the 2010 BCNP-A GMP contemplate a continuation of oil and gas activities in the Preserve and those activities have been subject to prior National Environmental Policy Act (NEPA) review. In particular, in 1992, the USDOI-NPS analyzed the potential environmental effects of oil and gas activities in the Preserve in the Environmental Impact Statement (EIS) which accompanied the GMP/MMP. The MMP represents an implementation plan of the original 1992 GMP and specifies the strategies that the USDOI-NPS adopted to manage the development of non-federal oil and gas rights in the Preserve. The 1992 EIS identified a series of measures which would minimize adverse environmental effects of oil and gas activities, and







identified an area of influence of oil and gas activities that the USDO-I-NPS concluded would be acceptable within the Preserve. This POP incorporates the applicable mitigation measures identified in the 1992 EIS and accompanying Record of Decision (ROD), and does not exceed area of influence limits determined in those documents. Nothing in the GMP for the original BCNP or BCNP-A affects the existing legal rights of mineral owners or changes the approved exploration plans and practices of operators.

3-D geophysical seismic technology was selected because it is the most effective and least environmentally-intrusive exploration tool available. The proposed survey method provides for a high level of subsurface mapping resolution (i.e., it allows more detailed imaging of the subsurface geology), to achieve the Applicant's purpose of gathering sufficient information to evaluate potential deposits. This will reduce the need for the Applicant to conduct future seismic survey operations in the same area, thereby reducing the time survey crews are in the Preserve.

## 1.2 Plan Submittals

The Applicant's *Nobles Grade 3-D Geophysical Seismic Survey Plan of Operations*, dated September 2014 is a revision to the original POP submitted to the USDO-I-NPS in January 2014. This September 2014 POP was reduced to apply only to the seismic surveying activities of NG3-D identified as "Phase I" in order to eliminate some of the uncertainty of the USDO-I-NPS authorizing the survey to occur over the entire original Program Area. This POP does not cover subsequent phases of seismic surveying, the installation of exploratory or production wells, pads, roads, pipelines, or other appurtenant facilities. Subsequent operations contemplated by the Applicant beyond those addressed in this POP will be the subject of separate POPs.

## 1.3 Big Cypress 3-D Program Legislative Background and Regulatory Oversight

In concert with the congressional intent tied to every unit of the National Park System, USDO-I-NPS differentiates a "national preserve" from a "national park" according to the uses and activities legislatively authorized in each.

***National Park:*** *These are generally large natural places having a wide variety of attributes, at times including significant historic assets. **Hunting, mining and consumptive activities are not authorized** [emphasis added].*

***National Preserve:*** *National preserves are areas having characteristics associated with national parks, but in which **Congress has permitted continued public hunting, trapping, oil/gas exploration and extraction** [emphasis added]. Many existing national preserves, without sport hunting, would qualify for national park designation (Designation of National Park System Units, <http://www.nps.gov/goga/planyourvisit/designations.htm>).*

The BCNP was established in 1974 by Public Law 93-440.



*The act and its legislative history identify the following six categories of use that are allowed within the preserve (subject to reasonable regulation):*

*uses associated with “improved properties”  
**exercise of rights associated with oil and gas** [emphasis added], hunting,  
fishing, trapping, and certain Indian rights*

*The act further directs that rules and regulations necessary and appropriate to limit or control the following uses be developed:*

*motorized vehicles, **exploration for and production of oil, gas, and other minerals** [emphasis added], grazing, the draining or constructing of works or structures that alter natural watercourses, agriculture, hunting, fishing and trapping, new construction and such other uses as may need to be limited or controlled (USDOI-NPS 1992).*

The USDOI-NPS addressed oil and gas operations in the original BCNP in the MMP incorporated as *Appendix C* of the 1992 *Big Cypress National Preserve General Management Plan and Environmental Impact Statement* (BCNP GMP/EIS).

In 1988, the BCNP was substantially expanded by the establishment of the BCNP-A, pursuant to Public Law 100-301. As with Public Law 93-440 that created the BCNP, Public Law 100-301 also allows oil and gas exploration and development by BCNP-A mineral owners. However instead of the BCNP MMP regulating oil and gas activity within the BCNP-A, contractual mandates agreed to by Congress and the Collier family as part of BCNP-A surface land acquisition negotiations require that BCNP-A oil and gas field operations be governed by the special stipulations incorporated as *Appendix 6: Agreement Governing the Exercise of Reserved Oil and Gas Rights of Collier Enterprises and Barron Collier Company the Agreement Among the United States of America, Collier Enterprises, Collier Development Corporation, and Barron Collier Company* (Addition Lands Agreement) dated May 1988 (see Exhibit 3) until the promulgation of regulations for oil and gas operations in the BCNP-A pursuant to the *Big Cypress National Preserve Addition Act*, Pub. Law 100-301 is complete.

In October 2010, USDOI-NPS published the *Big Cypress National Preserve – Addition Final General Management Plan/Wilderness Study/Off-Road Vehicle Management Plan/Environmental Impact Statement* (BCNP-A GMP) without any changes to the regulation of oil and gas exploration or the extraction of new resources from the BCNP-A (USDOI-NPS 2010). In particular, the BCNP-A GMP states that “[t]he Addition’s enabling legislation permits oil and gas exploration and development by mineral owners. Consequently, oil and gas operations in the Addition are allowed under all Addition management scenarios. None of the actions included in the General Management Plan would result in changes to oil and gas exploration or the extraction of new resources from the Addition” (USDOI-NPS 2010). The Record of Decision for the BCNP-A GMP similarly states “[n]othing in the selected action will affect the existing legal rights of mineral owners or change the approved plans and practices of operators” (USDOI-NPS 2011a). The proposed wilderness designation contained in the BCNP-



A GMP, by its own terms, therefore does not affect operations contemplated in the POP or its approval.

The current status of the development of oil and gas regulations in the BCNP-A is summarized by USDO-I-NPS within the BCNP-A GMP as follows:

Currently, oil and gas exploration in the Addition is managed in accordance with the “Agreement among the United States of America, Collier Enterprises, Collier Development Corporation, and Barron Collier Company” (Addition Lands Agreement) dated May 1988. A Preserve-wide oil and gas management plan is currently in preparation...when completed, this plan will provide guidance for oil and gas exploration for the entire Preserve, including the Addition (USDO-I-NPS 2010).

### **1.3.1 The BCNP GMP/EIS and Surface Occupancy**

The BCNP [“pre-Addition BCNP” discussed below] was authorized by Congress on October 11, 1974 (Public Law 93-440) and consisted of 582,000± acres. Circa 1989-1992, USDO-I-NPS developed the BCNP’s MMP to regulate oil and gas activities in the BCNP as part of the BCNP GMP/EIS in accordance with the NEPA. Promulgation of the BCNP GMP/EIS and MMP were the products of an extensive governmental/public review and commenting process.

Public Law 93-440 was amended on April 29, 1988, when Congress passed Public Law 100-301, the Big Cypress National Preserve Addition Act or “Addition Act,” to expand the Preserve by 147,000± acres. This expansion area is referred to as the “Addition” [BCNP-A] (USDO-I-NPS 2010). Pursuant to the Addition Act, the Collier entities conveyed most of the Addition Lands to the USDO-I-NPS, but reserved their oil and gas rights. The BCNP-A was officially conveyed to USDO-I-NPS and added to the BCNP management unit in 1996. Although the BCNP-A was conveyed after adoption and implementation of the BCNP GMP/EIS in 1992, Congressional ratification of the Addition Lands Agreement occurred prior to that in May 1988. Therefore, substantial portions of the Nobles Grade 3-D seismic survey field operations occupying BCNP-A surface lands are not subject to the oil and gas regulatory provisions of the BCNP GMP/EIS and BCNP MMP but rather the oil and gas stipulations contained in the Collier-DOI Exchange Agreement ratified by Congress in 1988.

Survey operations for the revised Nobles Grade 3-D survey area will require the temporary and intermittent occupancy of surface lands owned or managed by USDO-I-NPS and other private and public inholders. The Applicant anticipates an 18-week work period beginning in the 2014-2015 dry season. Field operations will be divided between the BCNP (75 percent) and BCNP-A (25 percent). Together, these areas comprise the boundaries of the Preserve as recognized today (see Figure 1.2).

The NG3-D field operations are subject to the 36 CFR 9B regulations regardless of whether they occur in the pre-addition BCNP or the BCNP-A. However, this instance of



divided surface occupancy requires USDO-I-NPS to recognize an additional, but slightly different BCNP-specific set of oil and gas standards to the field operations rather than just one (the BCNP-MMP) which, at some future date, may be the case.

In the case of NG3-D seismic survey, operations undertaken within the pre-Addition BCNP (75 percent) are subject to the BCNP-MMP's stipulations which are based on 36 CFR 9B, but tailored to the resources of the BCNP unit. However, the 1988 legislation that created the BCNP-A requires that 25 percent of the activity within the BCNP-A be governed by the special stipulations incorporated as Appendix 6 of the Addition Lands Agreement discussed above.

In order to allow USDO-I-NPS to regulate activity of the NG3-D survey in a consistent fashion wherever field operations occur, and to minimize or eliminate potential impacts to Preserve environmental and resource values and streamline plan review and approval, the Applicant has proposed field operations and plans to conduct both BCNP and BCNP-Addition area operations in conformance with the stringent standards encompassed in:

- *36 CFR Part 9 Subpart B – Non-Federal Oil and Gas Rights;*
- *Appendix C: Minerals Management Plan - 1992 Big Cypress National Preserve General Management Plan and Environmental Impact Statement;* and
- Applicable permitting, regulatory compliance and operational guidelines and suggestions available from the USDO-I-NPS Geologic Resources Division's *Applicants Handbook for Nonfederal Oil and Gas Development in Units of the National Park System*, dated October 2006 (2006 USDO-I-NPS Applicants Handbook) (USDO-I-NPS 2006a) (Exhibit 4).

#### **1.4 Technological and Impact Mitigation Innovations and Resource Protection Benefits**

The Applicant proposes to conduct a technologically advanced seismic survey with impact mitigation strategies that minimize environmental effects on the Preserve. The NG3-D seismic survey showcases a variety of environmentally-sensitive technological and impact mitigation strategy innovations that have evolved since the 1992 implementation of the BCNP GMP/EIS and BCNP MMP. Many of the following innovations serve to produce a more robust seismic picture of the targeted subsurface geology and expedite field operations while simultaneously minimizing, or in some cases eliminating altogether, potential environmental and resource value impacts traditionally associated with geophysical seismic surveys.

Global Positioning System (GPS) and Geographic Information System (GIS) technologies and mapping techniques were used extensively in the initial design phase of this survey and will continue to be used throughout pre-planning and design modification, surveying, scouting and daily operational planning of field operations (see Map 1, a GIS composite of the U.S. Geological Survey (USGS) 7.5 topographic map, and Maps 2 A-E depicting the pre-planned operational details of the survey).



From an operational standpoint the minor potential impacts attributable to the operations described in this plan are expected to be *de minimis* as a result of the following innovations and corresponding resource protection benefits.

**Innovation:** Deployment of buggy-mounted vibroseis vehicles that generates a localized, low to high frequency “thumping” or “vibrating” of the ground over a short 12 to 24-second period to produce a seismic signal (see Section 5.6). This equipment is highly maneuverable and utilizes low impact “balloon” or “flotation” tires that are designed to reduce ground tire pressure to 26 pounds per square inch (psi) (roughly 11 psi less than a pick-up truck).

**Corresponding resource protection benefit:** This non-explosive seismic signal source technology eliminates the need for drilling, placement and detonation of explosive charges to create a seismic signal. The vibration and sound generated by the vibroseis equipment is not as apparent and loud as explosive charges, can only be heard within 600 feet (two football field lengths) of the equipment, and occurs only for less than half of one minute. The low impact tires allow vegetation to fold over and minimize root disturbance.

**Innovation:** Use of up-to-date, geo-referenced, high resolution, ortho-rectified digital imagery as the foundation of survey planning operations.

**Corresponding resource protection benefit:** A highly detailed, accurate and reliable 3-D seismic survey design and operational plan (incorporating source point location modifications) accomplished with a significant reduction in planning-related field work. In other words, the technology to be used gives better information regarding surface conditions, allowing the Applicant to reduce the time it spends in the Preserve conducting reconnaissance activities.

**Innovation:** Impact minimization strategies that incorporate 3-D seismic survey Modification Protocols emphasizing to the extent feasible the use of previously disturbed areas for all aspects of field operations.

**Corresponding resource protection benefit:** Minimization of new impacts to soils, hydrology, vegetative cover and wildlife species by utilizing existing and former roads, trails, well pads, and open areas.

**Innovation:** Intensive serial computer seismic fold simulations to assess seismic data quality at multiple stratigraphic levels during the survey design process.

**Corresponding resource protection benefit:** Allows for application of Modification Protocols to the initial survey layout design in order to maximize the use of previously disturbed surface areas and minimize surface impacts while preserving enough survey design flexibility to accommodate unanticipated resources or access issues that may arise during field operations.

**Innovation:** Utilization of digital GPS satellite maps and existing roads and trails data supplied by the USDOI-NPS for survey layout operations and high order ground survey control; where vegetative cover precludes satellite acquisition, non-satellite and kinematic survey control systems will be used (with limited flagging) to provide rapid and highly accurate layout surveys.

**Corresponding resource protection benefit:** Minimizes/avoids placement of source point locations in important resource areas; reduces vegetative trimming and brush cutting for source point and geophone receiver repositioning; expedites field survey operations; minimizes potential impacts traditionally associated with human presence.



**Innovation:** Comprehensive in-the-field access scouting program of GIS-based source/receiver location coordinated with USDOJ-NPS on-scene representatives.

**Corresponding resource protection benefit:** Minimizes access impacts associated with vibrator source point placement and data acquisition operations; minimizes vegetation damage and surface impacts.

**Innovation:** Stakeless or minimal staking techniques (where canopy interference is encountered).

**Corresponding resource protection benefit:** Avoids ground disturbance, enhances wildlife safety, reduces potential for vandalism, facilitates concurrent clean-up operations, and helps minimize reclamation requirements.

**Innovation:** A “one pass” design objective underlying all source point locations and data acquisition planning operations.

**Corresponding resource protection benefit:** Minimizes vibrator buggy impacts by minimizing the number of times they pass through the survey area. Other types of survey methods might require more than one pass, which would prolong the presence of survey crews in the Preserve.

**Innovation:** Utilization of GPS field asset tagging technology for real-time monitoring of field equipment movement and helicopter support operations.

**Corresponding resource protection benefit:** Contributes significantly to minimization of flight times and in-field staging area requirements.

**Innovation:** Acquisition of long shelf life, high quality 3-D geophysical seismic data covering a large area that will be useful for many years and adaptable to anticipated data processing improvements.

**Corresponding resource protection benefit:** Potentially reduces the need for future geophysical surveys in the Big Cypress 3-D Program Area until the next substantial leap in technology.

**Innovation:** Clean-up and restoration operations conducted concurrently with the various segments of survey operations.

**Corresponding resource protection benefit:** Provides for the immediate identification of and response to potential impact to Preserve lands and resource values that may result from field operations. This will ensure not only comprehensive clean-up and restoration but also minimization of the temporal extent of exposed soils and hydrologic impacts.

**Innovation:** Application of a variety of Preserve-specific “Best Management Practices” based on the BCNP MMP, 2006 USDOJ-NPS Applicants Handbook and Industry Environmental and Land Safety Manuals.

**Corresponding resource protection benefit:** Minimizes potential impacts to all BCNP environmental and resource values identified in the 36 CFR 9B regulations, BCNP MMP, and 2006 USDOJ-NPS Applicants Handbook.



## **1.5 Environmental Risk Assessment – Prominent Local Concerns**

As discussed in Section 1.3.1, USDO-I-NPS approval of the NG3-D seismic survey is anchored by the 36 CFR 9B regulations and BCNP MMP, respectively. Beyond those, conformance with applicable guidelines and suggestions embodied in the 2006 USDO-I-NPS Operator's Handbook (Exhibit 4) has been and will continue to be a top priority in the pre-operational planning and design process and will continue to be a priority in field operations.

In adapting its environmental risk assessment to the environmental conditions and challenges specific to NG3-D seismic survey area, special attention has been given through the Applicant's design Modification Protocols to the environmental, cultural, and natural resource values identified in the BCNP GMP/EIS, BCNP MMP, and 2006 USDO-I-NPS Operator's Handbook and addressed mostly throughout on-going meetings and communications with the USDO-I-NPS, the lead agency for the NG3-D seismic survey, as well as other governmental agencies, non-governmental organizations, tribal administrations, and other interested parties (see Section 5.10.9.1).

Throughout the course of the Applicant's environmental risk assessment, five primary environmental and natural resource issues surfaced repeatedly – Florida panther (*Puma concolor coryi*) avoidance; RCW avoidance; wading bird rookery avoidance; archaeological, historical and cultural site protection; and reclamation/restoration. These identified environmental and natural resource protection issues have and will continue to be addressed at length during survey planning and design processes; however, these five were given prominent consideration. Each is incorporated in the Applicant's design Modification Protocols, addressed in detail in the initial planning for the proposed seismic survey, and summarized as follows.

### **1.5.1 Florida Panther Avoidance**

Protection of the Florida panther has been a long running environmental concern in Southwest Florida. There is little evidence that a transitory seismic survey will harm or affect the Florida panther. However, as part of the survey planning and design process, the Applicant assembled and mapped known Florida panther habitat, radio-collar tracking and reported sighting data, and met with State and Federal Florida panther management and research agencies. A detailed discussion of issues, concerns, and avoidance strategies reviewed in these meetings is provided in Section 10.0: Background Environmental Information. The Applicant will coordinate field operations with on-going, real-time State and Federal panther tracking efforts to avoid active denning activities. The NG3-D seismic survey planning allows sufficient operational flexibility to accommodate buffer zones around stationary panther activities (e.g., denning), should they be needed.

### **1.5.2 RCW Avoidance**

The RCW is also a species of prominent local concern. According to a review of the USDO-I-NPS, Florida Fish and Wildlife Conservation Commission (FWCC), and USFWS databases for the documented occurrence of protected species, no documented



RCW clusters exist in the revised survey area. However, documented locations do exist to the southwest of the revised survey area.

A detailed discussion of RCW issues, concerns and avoidance strategies is provided in Section 10.0: Background Environmental Information. For activity segments of the NG3-D seismic survey, the Applicant will coordinate field operations with on-going RCW location identification and tracking updates to avoid contact. In addition, field crew members will receive training in RCW cluster and habitat recognition prior to the start of field operations. Assessment of the revised NG3-D survey area for potential RCW habitat will continue through the completion of field operations. At the time of plan submittal RCW conflicts are not expected to be an issue should more colonies be identified. The NG3-D seismic survey planning allows sufficient operational flexibility to provide additional buffer zones, if needed.

### **1.5.3 Wading Bird Species and Rookeries**

Wading bird colonies were documented by FWCC as being historically located in the areas around the revised NG3-D survey area. GIS data supplied by the FWCC, which is current to 1999, was utilized to determine the location and status of these colonies. As of 1999, one active colony was documented approximately one mile south of the revised NG3-D survey area. Additional wading bird information was provided by the USDO-I-NPS but was not in a format to overlay on the survey area and did not include activity status. These areas will be scouted concurrently with the survey, and will be avoided (with appropriate buffers) if they are active at the time of the survey.

Wetlands within the revised NG3-D survey area are also utilized for wading bird foraging. Impacts from seismic survey activities are anticipated to be limited to temporary avoidance behavior while survey activities pass through an area. Should foraging forays enter into close proximity with survey operations, individual birds or flocks of birds are expected to respond by avoiding the immediate area until the passage of active equipment and human presence. The avoidance response is anticipated to be brief and the overall species effects to be minimal. Adverse effects are not anticipated.

In the event that nesting sites are observed prior to or during survey operations, observation reporting protocols will be initiated with USDO-I-NPS and FWCC so that appropriate setbacks and design modifications can be implemented.

### **1.5.4 Archaeological, Historical, Cultural Site Avoidance**

Pursuant to requirements of Section 106 (National Historic Preservation Act (NHPA) [U.S. Code (USC) 470] and implementing regulations 36 CFR *part* 800), Archaeological Resource Protection Act (ARPA) (16 USC 470), and the BCNP MMP Important Resource Area (IRA) Protection stipulation and geophysical operational stipulations #7, #10, #12, #14 and #20, the Applicant will ensure the protection of significant archaeological sites and IRAs by avoidance. The Applicant will continue to coordinate



with the USDOI-NPS Southeast Archaeological Center (SEAC), Preserve staff, and the State Historic Preservation Officer (SHPO).

The Applicant has retained qualified archaeologists to conduct the necessary archaeological research, develop a Site Avoidance Model, and undertake survey of routes, locations for placement of equipment, staging areas and any other areas that may be impacted by project activities which may occur in advance of and during seismic survey to avoid IRAs and other significant resources. The location of archaeological, historical and cultural sites will be kept confidential as required by the by the Seminole Tribe of Florida (STOF) and the Miccosukee Tribe of Indians (MTOI) and SHPO regulations, and the USDOI-NPS will consult with the tribes, as per federal regulations. This revised POP removes from the survey area those areas closest to the Seminole Tribe's Big Cypress Reservation and the Miccosukee Reserved Area. It is expected that the reduced survey area will avoid potential cultural sites of special importance to the STOF and MTOI.

### **1.5.5 Clean-Up and Restoration**

Pursuant to requirements of 36 CFR § 9.39, the Applicant will take steps to reclaim the natural conditions and processes existing prior to the start of field operations or to such other conditions agreed to by the Applicant and the Regional Director and Superintendent in an approved POP. The NG3-D seismic survey will cause little, if any, damage to the natural resources of the Preserve. In the event that field operations result in damage to Preserve lands or resources adjacent to survey area, those lands or resources will also be reclaimed in the manner described in Section 7.0 below.

Clean-up and restoration crews will be available and working concurrently with field operations. Post-operational restoration activities and any necessary monitoring requirements will be addressed by the Applicant and State and Federal agencies within 30 days of the completion of field operations. All performance bonds will remain in place until such restoration efforts, if needed, meet required standards.

## **1.6 36 CFR 9 Subpart B Compliance**

Seismic survey operations in the BCNP are regulated by 36 CFR Subpart B (see Exhibit 3). Operations in the BCNP-A on Collier mineral interests are subject to the stipulations detailed in Appendix 6 – Agreement Governing The Exercise of Reserved Oil and Gas Rights of Collier Enterprises and Barron Collier Company (see Exhibit 3). Exploration activities within the BCNP-A on non-Collier mineral interests that are in conjunction with activities on Collier mineral interests are subject to USDOI-NPS regulation and 36 CFR Subpart B. Since the contents of both 36 CFR Subpart B and Appendix 6 are similar with respect to POP requirements, information designed to satisfy the 36 CFR 9B essentially satisfies as well the POP requirements of Appendix 6. Summarized in the following Table 1.1 are the 36 CFR Subpart B POP requirements and the sections in which such information resides.



**Table 1.1 Required Plan of Operations Information**

<b>36 CFR Subpart B References</b>	<b>Summary Description</b>	<b>Relevant Sections in this POP</b>
9.36 (a)(1)	Names of operator and lessees	Section 2
9.36 (a)(2)	Copy of documents demonstrating operator right to explore	Section 2
9.36 (a)(3)	Map – Survey area	Sections 1 & 3
9.36 (a)(4)	Survey map with reference points	Not Applicable
9.36 (a)(5)	Description of major equipment	Section 5
9.36 (a)(6)	Timetable of operations	Section 4
9.36 (a)(7)	Geological name of surface formation	Section 10
9.36 (a)(8)	Proposed drilling depth; geological marker depths	Not Applicable
9.36 (a)(9)	Est. depths of water, brine, oil and gas	Not Applicable
9.36 (a)(10)	Nature and extent of known reservoir to be produced	Not Applicable
9.36 (a)(10)(i)	Well casing program	Not Applicable
9.36 (a)(10)(ii)	Casing setting depths and cementing programs	Not Applicable
9.36 (a)(10)(iii)	Pressure control equipment and specifications	Not Applicable
9.36 (a)(10)(iv)	Drilling fluids program	Not Applicable
9.36 (a)(10)(v)	Well logging program	Not Applicable
9.36 (a)(10)(vi)	Control of abnormal pressures and contingency plans	Section 6
9.36 (a)(11)	Description of steps to satisfy 9.41 (operating stds.)	Sections 1, 5, & 8
9.36 (a)(12)	Provisions for reclamation to comply with 9.39	Section 7
9.36 (a)(13)	Breakdown of costs for reclamation plan	Section 7
9.36 (a)(14)	Disposal methods for trash, waste, and contaminating substances	Section 5
9.36 (a)(15)	Affidavit of compliance with federal, state, and local laws and regulations	Sections 8 & 9
9.36 (a)(16)(i)	Description of natural, cultural, social and economic environments to be affected; description or map of abandoned oil and gas facilities within two mile radius of site	Section 10
9.36 (a)(16)(ii)	Anticipated direct and indirect effects on natural, cultural, social and economic environment	Section 10
9.36 (a)(16)(iii)	Steps taken to insure minimum surface disturbance and to mitigate any adverse environmental effects; discussion of impacts that cannot be mitigated	Section 5 Exhibits 5 & 12
9.36 (a)(16)(iv)	Measures to protect surface and subsurface waters by casing and cement	Not Applicable
9.36 (a)(16)(v)	All reasonable technologically feasible alternative methods of operations, costs and environmental effects	Section 5
9.36 (a)(16)(vi)	Effects of steps to be taken to achieve reclamation	Sections 5 & 7
9.36 (a)(17)	Other facets of proposed operations to be considered	Section 5



**Table 1.1 (Continued)**

<b>36 CFR Subpart B References</b>	<b>Summary Description</b>	<b>Relevant Sections in this POP</b>
9.36 (a)(18)	Additional information: for Superintendent - legal rights; effects on preservation, management and public use of unit; for Regional Director - recommendations regarding approval of POP; and performance bond for operations	Section 5 Exhibits 2 & 4



## **2.0 OWNERSHIP & CONTACT INFORMATION**

*Confidential Business Information / Trade Secrets / Exempt from Disclosure Under FOIA*



### 3.0 MAPS & PLATS

Pursuant to the 2006 USDO-I-NPS Operator's Handbook:

*The purpose of this section of a plan is to graphically show the operator's minerals tracts and the area of proposed activities in relation to the park, and the locations of man-made or environmental hazards that may affect the methods of operations. The scaled location plats are intended to clearly and accurately define the area that the operator has available for well operations and the area that the operator is responsible for reclaiming.*

#### 3.1 NG3-D Revised Survey Area Map

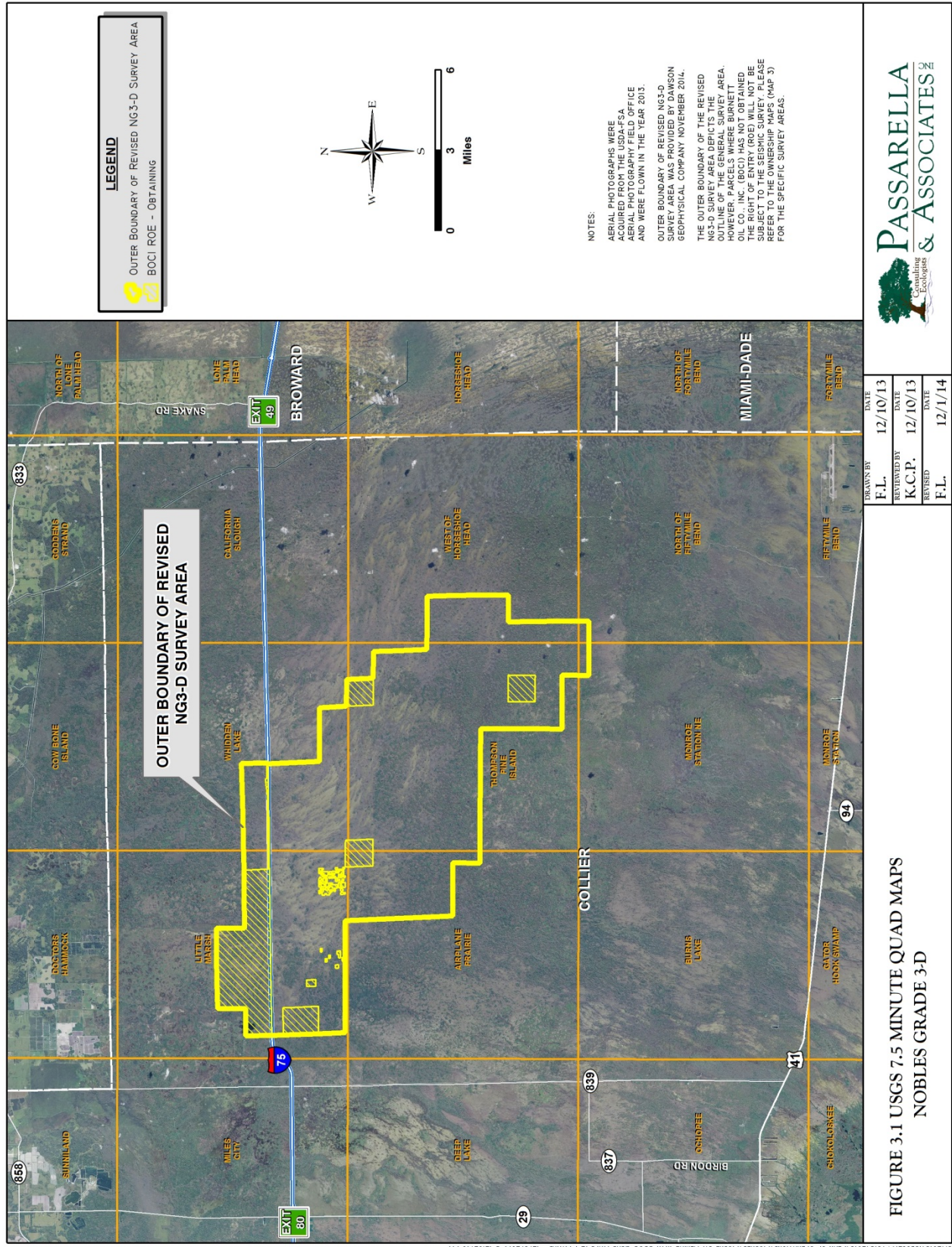
The revised NG3-D seismic survey area is depicted on the USGS (7.5 minute) quadrangle boundaries shown on Figure 3.1 and Map 1. The BCNP MMP and 2006 USDO-I-NPS Operator's Handbook both specify the use of USGS (7.5 minute) quadrangle maps. The five 2006 USDO-I-NPS Operator's Handbook geophysical "Operation Location Map" requirements are listed as follows:

1. USDO-I-NPS park unit boundary,
2. Each mineral tract or lease cross-referenced to the property right information provided in Section I. C.,
3. Proposed locations of source and receiver lines within the park,
4. Locations of pipelines, wells, or any other potential hazards within a one-mile radius of the proposed survey lines, and
5. Locations of environmentally sensitive areas that might require avoidance or other mitigation measures.

The USGS quadrangles available for the revised NG3-D survey area are a mixture of orthophoto and conventional topographic base maps. While arguably sufficient for regional-scale 2-D geophysical seismic surveys, in the context of the NG3-D plan their quality is inadequate, in terms of scale, level of detail and vintage, for the meaningful presentation of the data specified above.

To graphically present the best available NG3-D seismic survey information, the maps in this plan were formed by overlaying the various newly developed GIS databases, tied to the Florida section, township and range grid, on color rectified, digital aerial photographs. Purpose-built maps of this type, rather than the specified 7.5 minute quadrangles, more fully serve to satisfy 36 CFR 9B regulations, BCNP MMP and 2006 USDO-I-NPS Operator's Handbook compliance and conformance by presenting required NG3-D survey area data in the most up-to-date, accurate and useful way possible.







### **3.2 Description of Maps for the Revised NG3-D Seismic Survey**

Eleven E-size maps have been included in this plan and are listed below. A brief description of their respective content is provided in the following sub-sections.

Map 1:	Composite Topographic Map (USGS 7.5 Minute)
Map 2 (A-E):	Aerial with Modified Source and Receiver Lines
Map 3 (A & B):	Surface and Mineral Ownership (revised December 3, 2014)
Map 4:	National Park Service Land Cover Data
Map 5:	Soils Map
Map 6:	Documented Occurrences of Protected Species

Please note that electronic versions of these maps in PDF format are included at the end of this document. A full color printed map set has been provided to the Preserve staff under separate cover as part of the POP submittal for the purpose of regulatory compliance.

#### **3.2.1 Map 1: Composite Topographic Map (USGS 7.5 Minute)**

Map 1 depicts the USGS (7.5 minute) quadrangle topographic data for the revised NG3-D seismic survey area boundaries. This map has been included for the purpose of compliance with BCNP MMP map requirements, and conformance with the technical map specifications set forth in the 2006 USDOJ-NPS Operator's Handbook.

Specifically, Map 1 includes:

- BCNP and BCNP-A and Preserve Unit boundaries;
- The revised NG3-D survey area boundaries;
- Drainage areas; and
- Section, township, and range grid.

#### **3.2.2 Map 2 (A-E): Aerial with Modified Source and Receiver Lines**

Maps 2 (A-E) depict recent color rectified, digital aerial photographs with the modified source and receiver lines for revised NG3-D survey area. Maps 2A through 2E are presented at a scale of 1" = 900' which is sufficient in size to see general habitat features and aerial signatures for the NG3-D seismic survey area presented.

In terms of the 2006 USDOJ-NPS Operator's Handbook data requirements, Maps 2 (A-E) show:

- NG3-D source point and receiver line locations (with source point and receiver point locations individually identified).

The maps reflect the current NG3-D seismic survey design which was modified pursuant to the Modification Protocols (including best practices) described in Section 5.10 to minimize/avoid surface impacts to the extent feasible. These modified line locations will



be subject to “in the field adjustments” and further modified during field operations to incorporate real-time data to further avoid/minimize potential natural resource impacts.

### **3.2.3 Map 3 (A & B): Surface and Mineral Ownership**

Maps 3A and 3B (revised December 3, 2014) show surface and mineral ownership within the boundary of the revised NG3-D seismic survey area.

Depicted property ownership classes within the NG3-D survey area include:

- Surface Ownership (Overall);
- State-Owned Surface Lands;
- Private Surface (Inholder) Ownership;
- Collier and Non-Collier Mineral Ownership;
- Divided Mineral Interest Parcels within Sections Containing Undivided Collier Mineral Interests; and
- State-Owned Mineral Ownership.

The map legends provide a listing of surface and mineral owners by name. Each privately-owned (inholder) surface parcel is number coded and cross-referenced to the respective numbered parcels identified on the map. Applicant-controlled mineral acreage is highlighted in yellow on December 3, 2014 revised Map 3B’s listing.

### **3.2.4 Map 4: USDOI-NPS Land Cover Data**

Map 4 depicts the general vegetative cover types for the revised NG3-D seismic survey area and is presented in support of oil and gas stipulation compliance and as reference material for BCNP MMP and 2006 USDOI-NPS Operator’s Handbook environmental information requirements. These vegetative cover types were provided by the USDOI-NPS, BCNP staff on November 15, 2013.

The BCNP MMP includes an IRA Protection Stipulation which identifies several vegetative cover types as IRAs. Identified vegetative IRAs include:

- Cypress strands/mixed-hardwood swamps/sloughs and cypress domes;
- Marshes;
- Hardwood hammocks;
- Old-growth pinelands; and
- Mangrove forests.

Pursuant to the BCNP MMP IRA Protection Stipulation:

*The use of motorized vehicles for the conduct of geophysical exploration is not permitted in or on any cultural site or vegetative community identified as an important resource area, except old-growth pinelands as specified under geophysical operation Stipulation #14 (Exhibit 5).*



### **3.2.5 Map 5: Soils Map**

Map 5 depicts the soils mapping for the revised NG3-D seismic survey area and is presented in support of BCNP MMP and the 2006 USDO-I-NPS Operator's Handbook environmental information requirements. The soils information was obtained from the USGS website in November 2013 and was issued by the Soil Conservation Service in March 1954. Soil descriptions for the soil types found within the Project area are outlined in Exhibit 6.

### **3.2.6 Map 6: Documented Occurrences of Protected Species**

Map 6 depicts documented occurrences of protected species for the revised NG3-D seismic survey area that is currently available. Additional wading bird information was provided by the USDO-I-NPS but was not in a format to overlay on the survey area did not include activity status. This information will be included in the POP, once available. Also, per the USDO-I-NPS and USFWS request, the South Florida Water Management District (SFWMD) was contacted on August 14, 2014 in an attempt to obtain the more recent GIS wading bird nesting data from the annual South Florida Wading Bird Reports. However, as of the date of this POP, no response from the SFWMD has been received. The additional wading bird information will also be included in the POP if it becomes available. Please note that the bald eagle (*Haliaeetus leucocephalus*) nesting sites and Florida black bear (*Ursus americanus floridanus*) telemetry points were included on Map 6 because, although these species are no longer listed, they are still protected by the FWCC and/or the USFWS.

The BCNP MMP identifies the RCW, Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) habitat, active bald eagle nesting sites, and known Florida panther area as IRAs. Of these species, only the RCW and the Florida panther have been documented on or within the vicinity of the revised NG3-D seismic survey area.

The NG3-D survey area lies outside of the limits of the Cape Sable seaside sparrow USFWS consultation area and critical habitat zones which are located predominantly in Everglades National Park and in the southern most portion of the Preserve. No Cape Sable seaside sparrows have been documented within the NG3-D seismic survey area.

No bald eagle nests have been identified within revised NG3-D survey area; however, undocumented bald eagle nests could potentially occur in the survey area.

The protected species that were documented, as well as other protected species that have the potential to occur in the revised NG3-D survey area, are further discussed in Section 10.0 of this POP.



## 4.0 TIMELINE FOR OPERATIONS

Pursuant to the provisions of the 2006 USDO-I-NPS Operator's Handbook:

*The purpose of this section of the plan is to identify when operations will be conducted and how long they will last. Any proposals to avoid or modify operations due to seasonal timing restrictions should also be noted in this section.*

### 4.1 Discussion

Although implemented as a preliminary planning tool, the Applicant's actions to identify and evaluate environmental concerns are dynamic and will continue through field operations. As such, they serve as overriding environmental and natural values protection mechanisms governing the entire NG3-D seismic survey area rather than any specific operational work segment discussed below.

Conceptually, survey operations are best organized into nine operational or activity segments. Each operational segment is comprised of several related operations. Survey operations and their corresponding activity segments may occur discretely, continuously, intermittently or simultaneously and in many cases are likely to overlap each other to some extent depending upon where they occur. For example, field clean-up will be conducted continuously, overlapping activity segments of field operations rather than as a discrete operation occurring at the survey's conclusion. Helicopter operation is an example of an intermittent, overlapping field operation. Survey operations are not a rigid, progression of exclusive operations; instead, they are best characterized as a flow of activity that begins slowly, gains momentum steadily, levels off in the middle and then diminishes to a conclusion within the 18± week period of field operations.

NG3-D operational segments and a brief summary of activities that will occur in each are identified as follows:

1. NG3-D Survey Planning & Design – assembly of plan development team, identification of regulatory requirements, survey modeling and design, initial agency meetings, identification of environmental concerns/data gathering, development of GIS layers and mapping data, and plan development;
2. NG3-D Survey Review & Approval – plan completion and submittal, adequacy determination, public review and comment, USDO-I-NPS plan approval decision, and completion of USDO-I-NPS pre-operational requirements;
3. Interstate 75 (I-75) Survey Area Access Development – coordination with FDOT for preparation for access to/from I-75 pursuant to FDOT/Collier I-75 right-of-way (ROW) Purchase Agreement (see Exhibit 6);
4. Staging Area/Access Management & Mobilization Operations – staging area preparation, NG3-D survey area access planning and management, fuel storage and refueling, off-site



recording crew/vibrator/helicopter and support mobilization, security and coordination/management of transportation and NG3-D field operations, and clean-up;

5. 3-D Land Surveying & Layout Operations – field surveying of source and receiver point layout, vegetation trimming and brush cutting, preliminary access identification/field hazard identification, source/receiver point reconditioning, and clean-up;
6. Vibroseis Planning & Mobilization – operational planning, off-site mobilization, staging, and planning for further mitigation of environmental impacts;
7. Geophone Receiver Layout & Data Acquisition Operations – mobilization, layout, and retrieval of recording equipment, signal generation and recording, and downloading and processing of recorded data;
8. Demobilization, Clean-Up & Restoration/Reclamation Operations – retrieval/removal of all equipment from the NG3-D survey area, collection and removal of debris that may be present, and restoration/reclamation of damage resulting from field operations;
9. Final Inspection & Operator Clearance – NG3-D survey area inspection by USDO-I-NPS and FDEP (cleanup only – see Section 5.10) identification/documentation of areas requiring further attention, and applicable restoration/reclamation activities.

Survey operations fall into two broad categories – field operations and non-field operations. Field operations are those program operations that occur within the boundaries of the revised NG3-D survey area, excluding the I-75 ROW, during the 18± week period of field operations addressed in this plan. Non-field operations occur outside the boundaries of the survey area, generally well in advance of plan review and approval. Non-field operations correspond to activity segments 1 through 3 above and are addressed in other sections of this plan.

The timeline for field operations (Table 4.1) addresses activity segments 4 through 9. Detailed descriptions of field operations are provided in Section 5.0 – Description of Operations.

**Table 4.1 Estimated Timetable and Personnel**

Activity Segments	Personnel	Total Number	Weeks Active	Where
Staging Area Access Prep	<ul style="list-style-type: none"> <li>• FDOT Crews with Supervisor (2)</li> </ul>	10	Before Operations Start	I-75 FDOT ROW
Staging Area Prep	<ul style="list-style-type: none"> <li>• Project Manager</li> <li>• Preparation Crews (2)</li> </ul>	1 6	1-18 1-4	FDOT and BCNP
Mob and Surveying	<ul style="list-style-type: none"> <li>• Crew Chief</li> <li>• Survey Crews (5)</li> <li>• Brush Cutters</li> </ul>	1 10 3	1-10 1-10 1-10	BCNP and BCNP-A



**Table 4.1 (Continued)**

<b>Activity Segments</b>	<b>Personnel</b>	<b>Total Number</b>	<b>Weeks Active</b>	<b>Where</b>
Data Acquisition and Receiver Layout/Pickup	<ul style="list-style-type: none"> <li>• Supervision</li> <li>• Layout Crews (4)</li> <li>• Line View/Troubleshoot Crews (6)</li> <li>• Pickup Crews (4)</li> <li>• Equipment Maintenance</li> <li>• Survey Crew (1)</li> <li>• Staging Area Helpers</li> <li>• Helicopter Crew (1) <ul style="list-style-type: none"> <li>○ Pilot</li> <li>○ Coordinator</li> <li>○ Ops. Advisor</li> </ul> </li> </ul>	3 16 12 16 1 2 6 3	5-18 5-18 5-18 5-18 5-18 1-18 5-18 5-18 5-18 5-18	BCNP and BCNP-A
Data Acquisition – Vibroseis Operations	<ul style="list-style-type: none"> <li>• Crews (7)</li> <li>• Scout Crews (2)</li> <li>• Equipment Maintenance</li> <li>• Transportation Driver</li> <li>• Recording Crews (2)</li> </ul>	7 2 1 1 2	5-18 5-18 5-18 5-18 5-18	BCNP and BCNP-A
Clean-up	<ul style="list-style-type: none"> <li>• Crews (2 to 3)</li> </ul>	No Additional	1-18	BCNP and BCNP-A
Inspections	<ul style="list-style-type: none"> <li>• USDOJ-NPS</li> <li>• State</li> </ul>	1 1	1-18 1-18	BCNP and BCNP-A
Reclamation	<ul style="list-style-type: none"> <li>• TBD</li> </ul>	TBD	As Needed During 1-18	BCNP and BCNP-A

## 4.2 Geophysical Operational Stipulation #7

In the BCNP MMP, BCNP-NPS assigns 38 operational stipulations to geophysical seismic operations. Among the eight survey and scheduling restrictions specified in geophysical Stipulation #7 (see Exhibit 5), the last provides that:

*Geophysical operations are to be located or scheduled to avoid the following:*

*periods of high precipitation and/or with standing surface water (the wet season – normally May through October).*

The Applicant intends to conform to this restriction for their field operations in the NG3-D survey area.

## 4.3 Timetable for Field Operations

Table 4.1 depicts an estimated timeline for field operations. Field operations are expected to begin on the earliest USDOJ-NPS approved date available during the 2014-2015 dry season. Field operations will be conducted continuously for 18± weeks and require the successful



coordination and completion of a wide range of individual tasks occurring within the context of the six activity segments of field operations noted in Table 4.1 above.

The timeline depicted in Table 4.1 is based upon weeks pre- and post-commencement rather than specific dates.

#### **4.4 Daylight Operations**

NG3-D field operations are “daylight only” and assume full use of available daylight hours less one hour to accommodate compliance with applicable Federal Aviation Administration (FAA) helicopter flight regulations and International Association of Geophysical Contractors (IAGC) Land Safety guidelines that limit daily field activity to the hours between sunrise +30 minutes (earliest crew mobilization start time) and sunset -30 minutes (latest daily crew de-mobilization completion time).

The activity timeframes depicted in Table 4.1 will vary according to productivity and the variability of “daylight” hours between early December 2014 and late May 2015.

#### **4.5 Timeline - Specific Requirements**

Pursuant to the information presented above, responses to specific 2006 USDOJ-NPS Operator’s Handbook timeline requirements are as follows:

##### ***1. Estimated date to begin equipment transportation to the staging area.***

###### **Response**

Subject to dry season conditions mentioned above, transportation of staging area equipment, access management and hazard surveying, limited line clearance and surveying for station locations will begin within one week of the USDOJ-NPS approved commencement date. Transportation of crew, helicopter and vibrators, geophone layout and seismic data acquisition equipment and personnel will begin during the 5<sup>th</sup> week (approximately).

##### ***2. Estimated date to begin geophysical operations.***

###### **Response**

Geophysical operations are expected to occur within the dry season and begin with the initial layout of geophone receivers in week five (approximately). Seismic data acquisition utilizing vibrators as the source is expected to begin in the 8<sup>th</sup> week and geophone pick up will begin after the initial patch of 50 receiver lines is laid out and source points vibrated. The initial receiver patch will take approximately six days to layout. During this initial receiver patch layout, testing with the vibrators to fine tune their sweep/energy settings will be performed along a receiver line for approximately 50 stations. The Geospace Seismic Recorder (GSR) boxes (at each receiver station) will be picked up and re-deployed to evaluate the test. This



test will help determine the sweep (length of vibrating time) that will be used in the 3-D survey.

**3. *Estimated geographic sequence of operations for the 3-D seismic survey.***

**Response**

Although the Applicant intends to conduct operations generally from west to the east, the sequence of field operations is subject to the environmental conditions prevalent at the start of field operations, the Access Manager's determination and USDOI-NPS approval. The overall work sequence presented in Table 4.1 is expected to hold throughout field operations.

The overriding objective will be conducting vibrating and recording operations during the driest time in the most hydrologically sensitive parts of the NG3-D survey area (possibly south of I-75) commensurate with the Applicant's "one pass" field operations design philosophy. Dry conditions, thin soil, dormant vegetation, an abundance of near surface cap rock, and the relatively low ground pressure exerted by balloon (flotation)-tire Vibroseis Buggies are expected to translate to the lowest feasible level of surface impacts. Other important environmental considerations include the avoidance, minimization, or elimination of turbidity and potential impacts to local cypress domes and other hydrologically dependent IRAs.

**4. *Anticipated longevity of operations.***

**Response**

Revised NG3-D seismic survey field operations are expected to require 18± weeks to complete. Some change in the duration may occur due to the progress of field operations, size, and year-to-year variability in BCNP USDOI-NPS designated "dry seasons."

**5. *Estimate date when reclamation will begin.***

**Response**

Clean-up, restoration, and reclamation operations will be conducted concurrently with field operations in compliance with BCNP MMP geophysical operations Stipulation #38 (see Exhibit 5):

*Reclamation must be conducted on a contemporary basis with the operations, or no later than 30 days following the completion of operations, excepting inclement weather conditions.*



6. *Estimated time to complete reclamation.*

**Response**

Pursuant to the “dry season” contingencies discussed in #3 above, clean-up, restoration and reclamation operations will be conducted concurrently with survey field operations, require 18± weeks to complete, and are expected to end during the 18<sup>th</sup> week following the USDOI-NPS approved commencement date.



## **5.0 DESCRIPTION OF OPERATIONS**

Pursuant to the 2006 USDO-I-NPS Operator's Handbook:

*The description of operations should provide enough detail on the proposed methods, sequence, and equipment to assess the proposal's impacts on the environment. Thus, the amount of information in this section will vary depending both on the planned activities and the areas where they will be conducted. Address the following requirements as applicable, providing enough detail for the NPS to have a clear understanding of the proposal.*

### **5.1 Methods, Sequence of Work and Equipment**

The 1992 BCNP-GMP discussed two types of seismic survey methods with their respective and different sources of generating seismic signals: dynamite and vibration. Both seismic methods have been used in past 2-D surveys conducted prior to and after the 1974 creation of the BCNP with the vast majority having been dynamite surveys. Today, the industry's "gold standard" of seismic exploration is 3-D which produces essentially a picture of a subsurface cube for geo-scientists to evaluate. 3-D seismic surveys are routinely used with a high degree of success to identify presence and orientation of subsurface geological features, fluid content and fluid movement (multi-repeat surveys).

In this POP, the Operator has elected to use the vibration method of 3-D seismic exploration. Its examination of historical 2-D dynamite seismic surveys indicates that a greater degree of seismic survey quality or "fold" is required to image and successfully explore for and identify subtle geological features similar to those producing in the Sunniland Trend at approximately 12,000-foot depths and greater. In the Operator's opinion, vibroseis 3-D technology offers the opportunity to generate ten times the quality or resolution improvement over dynamite surveys with more traditional design. Such quality improvement holds the potential of providing the resolution capability to image and differentiate geological layers within the producing Sunniland interval rather than continuing the historical approach of approximating or inferring Sunniland structures from the structural evaluation of a dense anhydrite layer located 100 to 200 feet deeper. To raise the quality of a typical dynamite survey to that of the 3-D vibroseis survey proposed by the Operator in this POP would require a drastic increase in dynamite shot holes to generate the same magnitude and quantity of seismic signals, and a corresponding increase in survey time and activity in the BCNP.

One additional reason supporting the Operator's selection of the 3-D vibroseis method: environmental compatibility. First, vibroseis technology allows the acquisition of high resolution seismic data without penetrating the ground to produce a seismic signal. Second, today's Vibroseis Buggy (see discussion in Section 5.5 and Exhibit 7) utilizes "balloon" or "flotation"-type tires to substantially reduce surface impacts to approximately 26 psi (roughly 11 psi less than a pickup truck). The baseplate when engaged for vibrating is expected to exert a maximum ground pressure loading of no more than 15 psi, but could be less depending on sweep testing that will be conducted when the vibroseis buggies first arrive. BOCI believes that with its emphasis of operating in the dry season, avoiding standing water or saturated soil areas, and employing a "one pass" approach at source points, soil rutting can be kept to a minimum. In the



unlikely event that shallow or minor rutting occurs, restoration operations will occur concurrently with survey activities as outlined in Section 5.7 of the POP.

With its articulation features, the vibroseis buggy can maneuver in tight spots producing minimal surface impacts similar to that described in the 2006 USDO-I-NPS Operator's Handbook (see discussion of the Operator's December 2013 field testing of a vibroseis buggy in Exhibit 8). The Applicant's testing suggests that the buggy will simply lay over rather than up-root vegetation. The majority of the affected vegetation is expected to return to pre-survey conditions with the first wet-season and minimal (if any) soil disturbance.

This section addresses the methods, field staging, sequence of work and equipment the Operator will utilize in conducting the NG3-D seismic survey. Included are photographs and descriptions of vehicles and equipment, vibration source point and receiver point configurations (the 3-D design), and the use of Vibrators for the sourcing or generation of a seismic acoustic signal. This section also discusses in detail the Applicant's impact minimization/avoidance strategies which include seismic survey design Modification Protocols.

The Operator has identified nine work segments of survey operations which are described in Section 4.1 above. Each segment is comprised of several related operations. Survey operations and their corresponding segments may occur discretely, continuously, intermittently or simultaneously and in many cases may overlap each other to a greater or lesser extent depending upon where they occur in the broader continuum of the survey. For example, field clean-up will be conducted continuously, overlapping almost all activity segments of field operations rather than as a discrete operation occurring at the end of the survey.

This section addresses the "field operations" (segments 4 through 9) described in Section 4.1 above. Detailed descriptions of what USDO-I-NPS and other field representatives can expect to observe are provided for each activity segment.

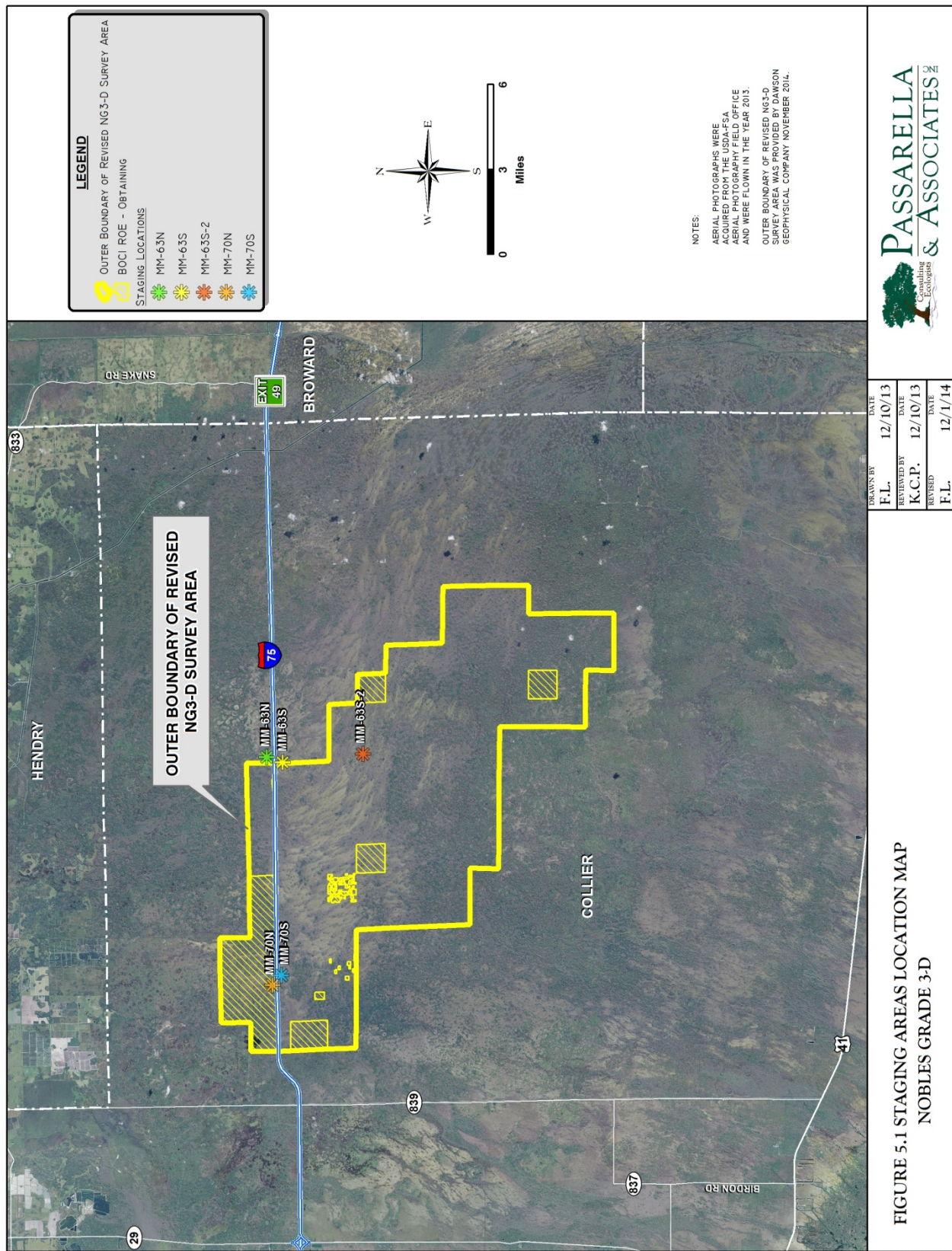
Refer to Section 4.0 for a discussion of the NG3-D survey timeline for each phase.

#### **5.1.1 Staging Area/Access Development and Mobilization Operations (Work Segment 4)**

##### **5.1.1.1 Staging Area Operations**

The revised NG3-D seismic survey area is bisected by I-75, an east-west interstate highway with limited access. Five staging areas will be required to efficiently support seismic field operations (see Figure 5.1). The Operator has twice met with the FDOT District 1 personnel (including a January 2014 field visit) to discuss the POP and coordinate selection of preferred points of access from I-75 highway into the seismic survey area (see Section 5.10.9.1). Under a 1987 agreement between the Collier mineral interest owners and FDOT (see Exhibit 6), access is to be provided by FDOT for Collier to exit at various points from I-75 into the Preserve to conduct of oil and gas exploration and development activities.







FDOT's preference for the survey is to utilize as much as possible existing I-75 exit points and Preserve ingress/egress infrastructure at the north and south recreational parking areas/back country access points located at Mile Marker (MM) 70 and the newly constructed north and south recreational parking areas/back country access points adjacent to the Collier County rest area located at MM-63. These two sites are positioned between Exits 49 (Miccosukee reservation) and 80 (State Road (SR) 29) as shown on Figure 5.1.

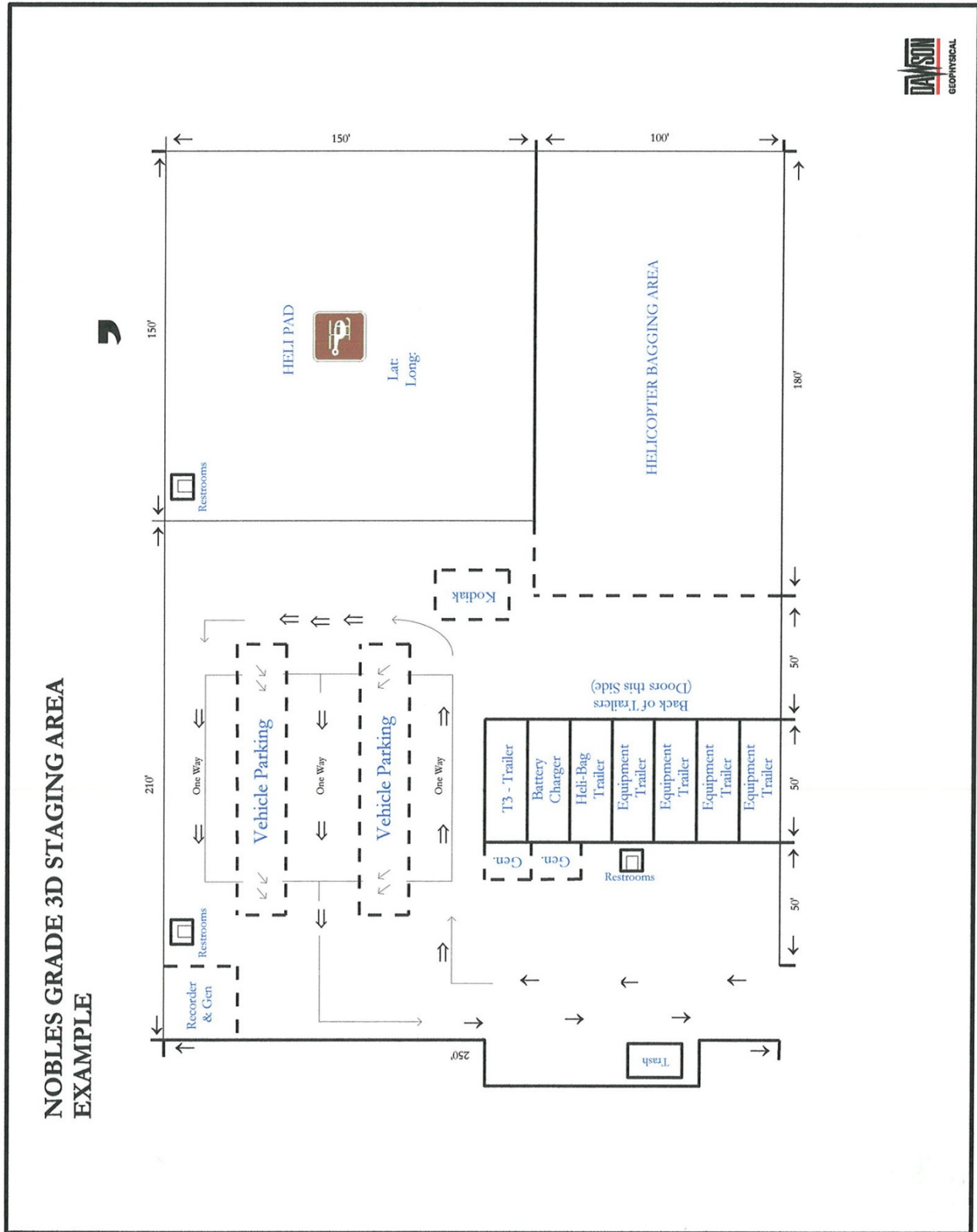
Field operations will be conducted from the main staging area, MM-63 South (S), located 0.4 mile south of I-75, to the immediate southeast of the Collier County Rest Area (just south of the eastbound service road and adjacent to the Florida Trail inside the BCNP-A). Re-construction of the entire rest area has just concluded and now includes two additional facilities, a Collier County emergency response structure and a sizeable recreational parking area with paved access directly onto the Florida Trail and into the BCNP-A.

The proposed MM-63S staging area will be located off of the Florida Trail and is sized to accommodate crew assemblies, support equipment, material storage, vibroseis and support equipment, receiver/GSR/battery truck trailers, receiver support equipment, receiver drop bag assembly for helicopter transport and a helicopter landing zone with support trailers and refueling capability. A schematic of a typical arrangement schematic for a main staging area is shown in Figure 5.2.

Field staging areas on both sides of I-75 are necessary in order to comply with FAA regulations and safety guidelines prohibiting helicopters transporting materials and/or long-line (sling) loads from flying over interstate highways. Staging areas MM-63S (see Figure 5.3) and MM-63 North (N) (see Figure 5.4) will facilitate field operations in the mid to eastern portions of the NG3-D survey area on the south and north sides of I-75, respectively. These staging areas will allow ground transfer of equipment from either side of I-75 via an existing traffic crossover that services the FDOT MM-63 rest area.

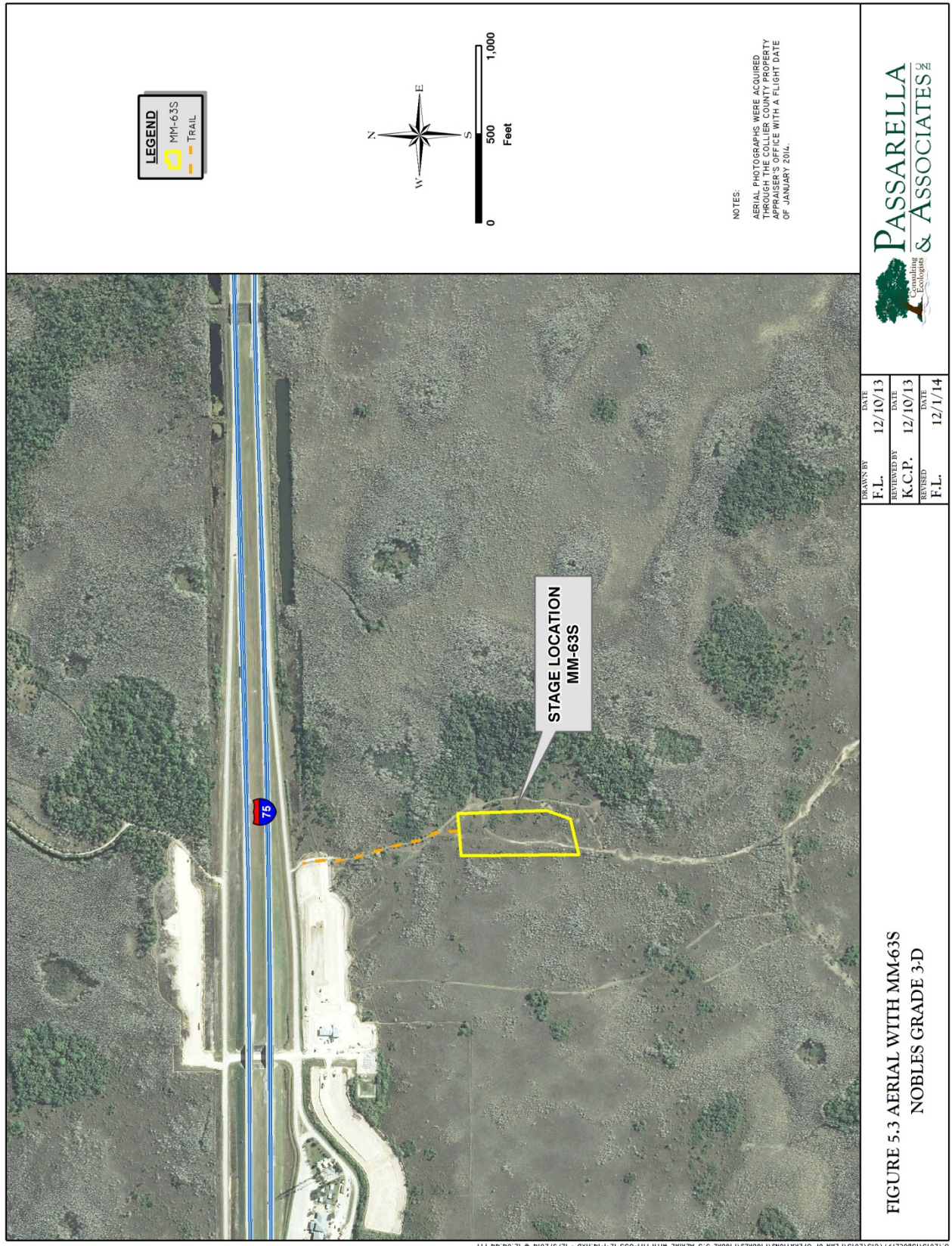
In total, five staging areas will be located in or immediately adjacent to the revised NG3-D seismic survey area (see Figure 5.1). As part of the Operator's surface impact minimization strategy, two of the five staging area sites will utilize abandoned former well pads and four of five sites will use existing roads or trails for access to the staging area sites (see Table 5.1). Should improvements to the staging areas be required, the Applicant will consider utilizing a composite mat system similar to the type shown in Exhibit 9. Staging sites were selected to maximize utilization of previously disturbed or open areas with short access from existing rest and recreational parking area service roads. The Applicant plans to avoid any discharge of dredged or fill material into wetlands as part of the survey. In particular, the current plan is to avoid filling of wetlands in or near the staging areas, and to avoid new impacts, by using existing roads, former well pad sites or





**Figure 5.2 Schematic of a Main Staging Area**









STAGE LOCATION  
MM-63N

**LEGEND**

MM-63N

TRAIL

0 500 1,000  
Feet

NOTES:  
AERIAL PHOTOGRAPHS WERE ACQUIRED  
THROUGH THE COLLIER COUNTY PROPERTY  
APPRAISER'S OFFICE WITH A FLIGHT DATE  
OF JANUARY 2014.

**PASSARELLA**  
Consulting  
Ecologists & Associates

DRAWN BY	F.L.	DATE	12/10/13
REVIEWED BY	K.C.P.	DATE	12/10/13
REVISED		DATE	
F.L.		DATE	12/1/14

**FIGURE 5.4 AERIAL WITH MM-63N  
NOBLES GRADE 3-D**



open areas. If the use of fill is needed, then the Applicant will obtain necessary approvals from relevant agencies prior to taking action.

The larger equipment gates leading to the staging areas will be locked when not in use. Next to each equipment gate is a narrow, double-gated and fenced passageway that remains unlocked for visitors, hikers, and other on-foot users. This arrangement will remain undisturbed during the 18-week NG3-D survey period. Those parties who are authorized to ingress and egress the Preserve with vehicles or equipment requiring the large gate to be unlocked will either have keys issued by USDOJ-NPS or participate in some other locking arrangement devised by USDOJ-NPS. No individual who has a legal right to enter the Preserve will be prevented from doing so. Because entry gates for large equipment will be locked, the Operator intends to leave equipment in the field at the end of each work day during the survey. However, to enhance security, the Operator will provide night security at the main staging area, MM-63S, and will lock storage area fuel storage tanks.

**Table 5.1 Staging Areas – Nobles Grade 3-D Seismic Survey**

Staging Area (Abandoned Well)	Location		Size (Acres)	Type of Area	Distance from I-75 (miles)	Access Distance from I-75 (miles)	Distance from Primary Staging Area (miles)	Remarks
	Longitude	Latitude						
MM-63N (P-562)	26.172413	-81.068839	3.44	Former well pad (P-562)	0.23	0.31	0.55 north- northeast	Will utilize newly constructed rec. parking area, paved access road & vehicle gate to old Nobles Grade road; adjacent to MM 63S staging area via rest area crossover
MM-63S	26.164450	-81.071719	3.57	Open area	0.28	0.38	Main Staging Area	Immediately adjacent to MM-63 Rest Area (south side of I-75); will utilize newly constructed rec. parking area, paved access road & vehicle gate to a short portion of Florida Trail (south of I-75)
MM-63S-2 (P-1059)	26.123177	-81.067034	1.97	Former well pad (P-1059)	3.1	3.4	2.82 south	Directly south of MM-63S; connects directly to MM-63S. Services mid to eastern portion of survey area south of I-75



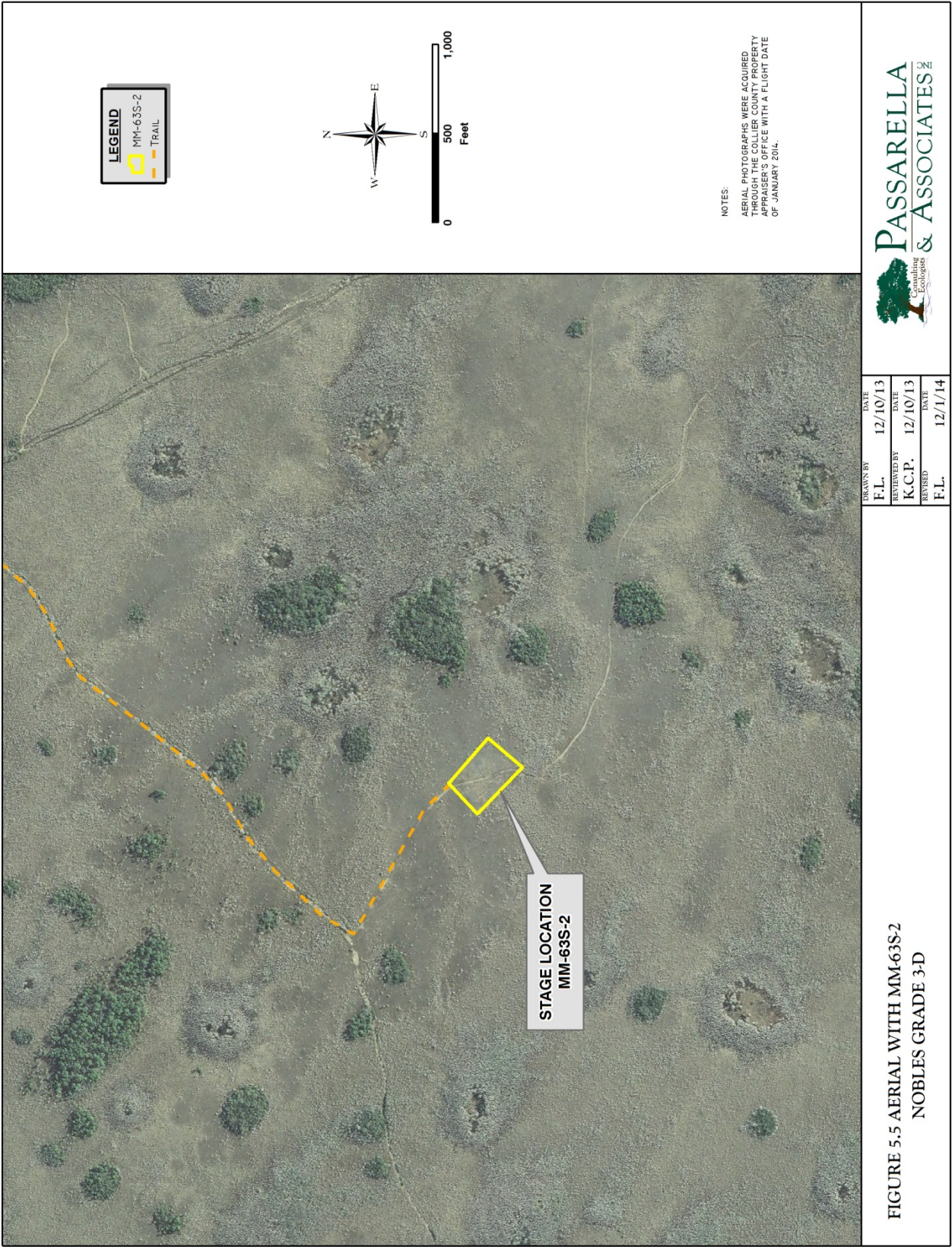
**Table 5.1 (Continued)**

Staging Area (Abandoned Well)	Location		Size (Acres)	Type of Area	Distance from I-75 (miles)	Access Distance from I-75 (miles)	Distance from Primary Staging Area (miles)	Remarks
MM-70N	26.169429	-81.198513	0.73	Open area	Alternative #1 – Via Recreational Area Access		7.9 west-northwest	Will utilize existing rec. parking area; short distance to open staging area; will require access path from parking area to fence & vehicle gate
					0.15	0.30		
					0.17	0.25		
MM-70S	26.164930	-81.192924	1.84	Open area	0.12	0.19	7.55 west	Will utilize existing rec. parking area; short distance to open staging area; will utilize newly-built short access connector from parking area to existing access path; no new vehicle gate required

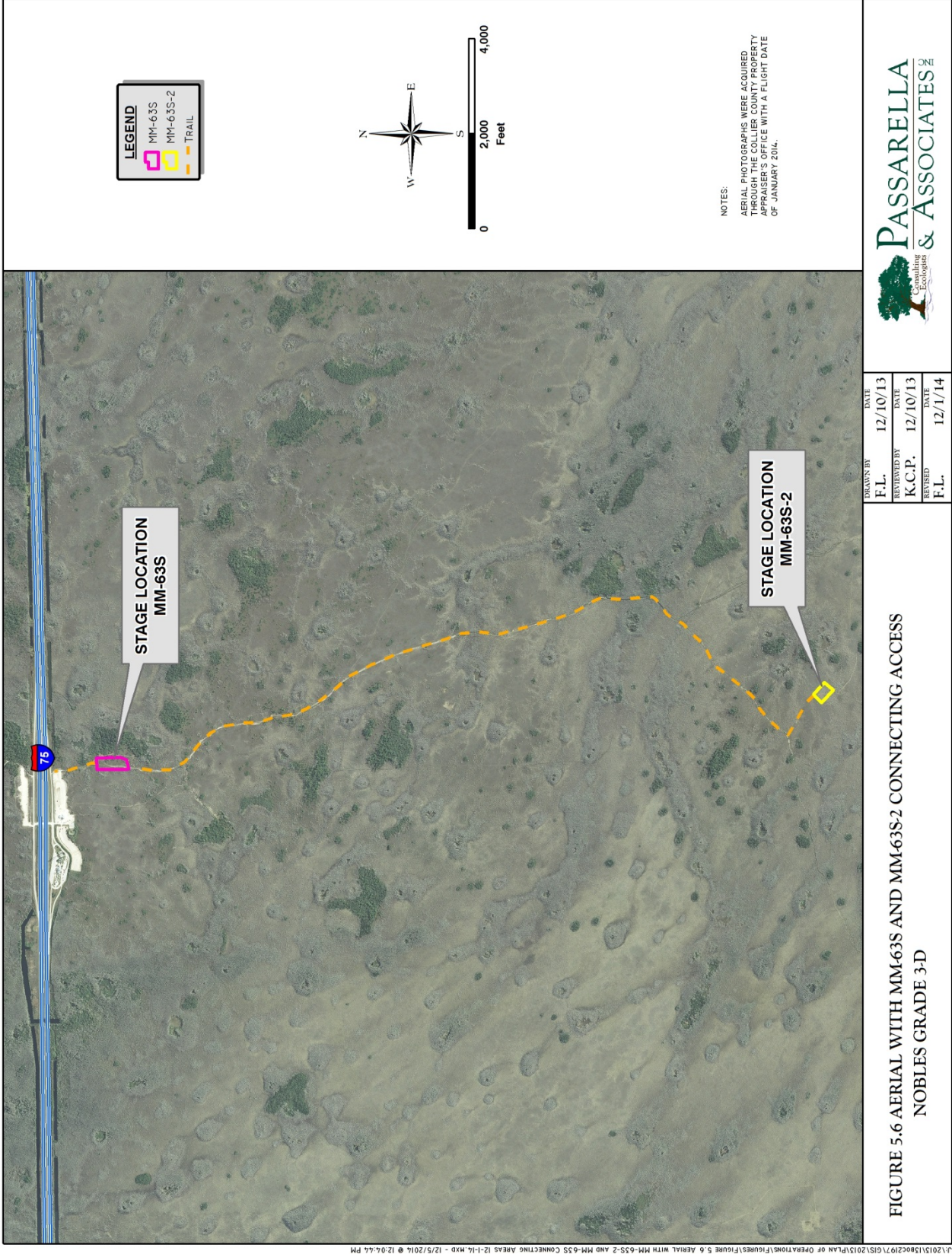
The following provides details on the four additional staging area sites will be required in addition to the main staging area (i.e., MM-63S):

- Staging area MM-63N will be located on portions of a 3.44± acre abandoned oil well pad (see Figure 5.4) constructed in 1972 and will service the mid and eastern portions of the NG3-D seismic survey on the north side of I-75. Access to MM-63N will be provided via Nobles Grade Road (an existing crushed, elevated lime rock road) from the newly constructed paved recreational parking area and back country entry gate located off of the westbound I-75 Rest Area off-ramp immediately north of the MM-63 rest area.
- Staging area MM-63S-2 (see Figure 5.5) will be located on a 1.97± acre abandoned oil well pad constructed in 1982 approximately 3.2 miles south of the main staging site at MM-63S. This staging area will service the central and southern portions of the NG3-D seismic survey on the south side of I-75. Access to MM 63S-2 will be provided via an existing access path to the main staging area, MM 63-S, as shown in Figure 5.6. Similar to accessing other staging areas, the access path identified for MM-63S-2 will utilize an established set of trails evident on aerial mapping. The actual route may vary slightly based on utilizing other less noticeable but more direct trails.
- Staging area MM-70N (see Figure 5.7) will be located on a 0.73± acre open area just north (0.06 mile) of the existing paved recreational parking



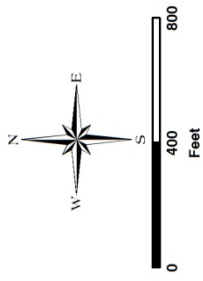






J:\2013\98062197\GIS\2013\PLAN OF OPERATIONS\FIGURES\Figure 5.6 AERIAL WITH MM-63S-2 AND MM-63S CONNECTING AREAS 12-1-14.MXD - 12/5/2014 @ 12:04:44 PM





NOTES:  
AERIAL PHOTOGRAPHS WERE ACQUIRED THROUGH THE COLLIER COUNTY PROPERTY APPRAISER'S OFFICE WITH A FLIGHT DATE OF JANUARY 2014.



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REVIEWED BY	K.C.P.	DATE	12/10/13
REVISED	F.L.	DATE	12/1/14

FIGURE 5.7 AERIAL WITH MM-70N  
NOBLES GRADE 3-D



area. This site will service the mid and western portions of the NG3-D seismic survey on the north side of I-75. Access to MM-70N will be provided via a recreational facility parking area located off of westbound I-75. Access will utilize a FDOT provided pathway to be temporarily constructed from the parking area north and through to the ROW fence and a new locked gate and further through a lightly wooded area on FDOT property and second ROW gate to the site location.

- Staging area MM-70S (see Figure 5.8) will be located on a 1.84± acre open area immediately adjacent to an existing recreational parking area and will service the mid and western portions of the NG3-D seismic survey on the south side of I-75. Access to MM-70S will be from the paved parking area located directly off of eastbound I-75 to an open area located 0.12 mile to the south. Access to the site will utilize a newly constructed (and safer) access connector from the parking area to the existing entry road and locked gate.

For four of the staging areas (not including MM-63S-2), I-75 ingress/egress for land vehicles will be controlled by locked gates. Fence cuts, gates and I-75 ROW access improvements, if required, will be provided by FDOT pursuant to the 1987 FDOT/Collier I-75 ROW Purchase Agreement (see Exhibit 6). It appears that new FDOT-provided temporary access will be minimal. All other field staging area facilities and temporary improvements (essentially at MM-70N) will be removed and reclaimed consistent with the 36 CFR Subpart 9B regulations, §9.39 and §9.40 and BCNP MMP geophysical Stipulations #35, #36, #37, and #38 (see Exhibit 5).

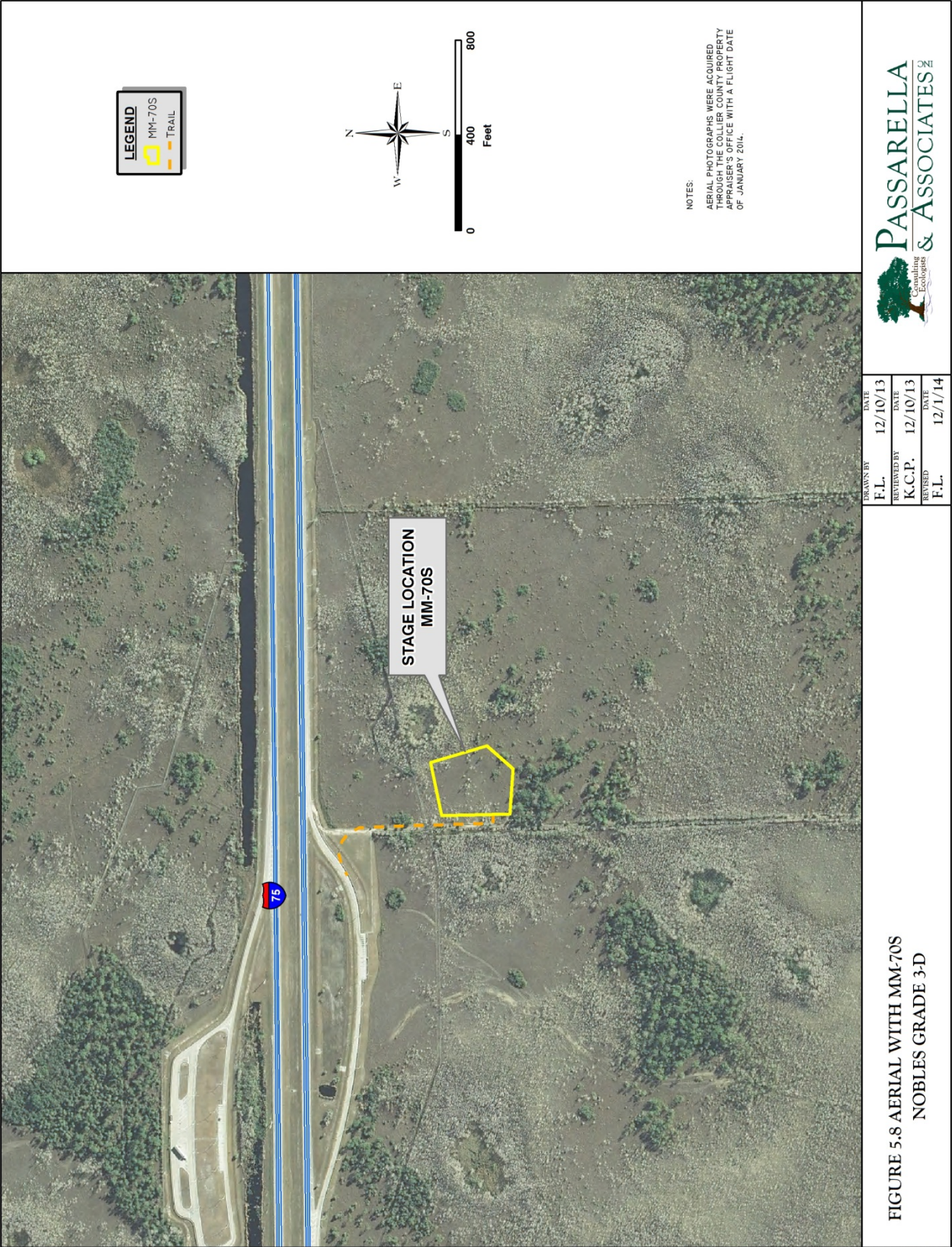
#### **5.1.1.2 Existing Conditions – Field Staging Areas (Work Segment 4)**

A site review was conducted with FDOT on January 24, 2014 to review the existing conditions of the field staging areas. Specifically, observations were made regarding the general location, the relative level of disturbance, and to existing vegetation. Specific information on soils was not collected; however, detailed descriptions of the 1954 soils data covering these areas can be found in Section 10.2.1.3.1.

##### **MM-63S**

The MM-63S staging area site was selected for its proximity to the I-75 rest area crossover, its proximity to the newly completed MM-63 Rest Area and existing, well-developed ingress/egress. The access route (0.38 mile) will be through the newly constructed recreational parking area and gate to an open area just south of the FDOT ROW fence. MM-63S will occupy portions of a 3.57± acre rectangular site 0.2 mile south of the I-75 ROW fence. Very little, if any, site preparation is anticipated. If soil conditions will not support heavy equipment to and within the

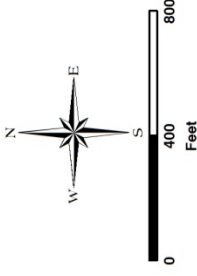




**LEGEND**

MM-70S

TRAIL



NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED THROUGH THE CALIFORNIA COUNTY APPRAISER'S OFFICE WITH A FLIGHT DATE OF JANUARY 2014.



DESIGNED BY	F.L.	DATE	12/10/13
REVIEWED BY	K.C.P.	DATE	12/10/13
REVISED	F.L.	DATE	12/1/14

FIGURE 5.8 AERIAL WITH MM-70S  
NOBLES GRADE 3-D

J:\2013\8062\97\GIS\2013\PLAN OF OPERATIONS\FIGURES\Figure 5.8 Aerial with MM-70S 12-1-14.mxd - 12/5/2014 @ 12:08:21 PM



proposed staging area, a support system, such as a composite interlocking mat system shown in Exhibit 9 may be utilized.

The existing conditions of the MM-63S field staging area are shown in Figure 5.9. MM-63S is mostly located in a wetland community type interspersed with small upland areas. Canopy cover in the upland areas includes scattered cabbage palm (*Sabal palmetto*). The sub-canopy includes cabbage palm, wax myrtle (*Myrica cerifera*), and myrsine (*Myrsine cubana*). The ground cover includes scattered saw palmetto (*Serenoa repens*).

Canopy cover in the wetland areas includes widely scattered cypress (*Taxodium distichum*). Sub-canopy cover includes clustered cypress, wax-myrtle, and corkwood (*Stillingia aquatica*). The ground cover includes panicgrass (*Panicum* sp.), beaksedge (*Rhynchospora* sp.), rush (*Juncus* sp.), lovevine (*Cassytha filiformis*), Asiatic pennywort (*Centella asiatica*), bushy bluestem (*Andropogon glomeratus*), and sawgrass (*Cladium jamaicense*).

Soil in the MM-63S area consists of Ochopee Fine Sandy Marl—Shallow Phase (see Section 10.2.1.3.1).

MM-63S is located in close proximity to high levels of ongoing human presence; including I-75, newly enlarged sewage treatment and constructed emergency response facilities, the reconstructed MM-63 rest area facility, and a 300-foot tall radio-telemetry transmission tower.

#### MM-63N

The MM-63N staging area site is located 0.18 mile north of the I-75 ROW adjacent to Nobles Grade road. The site was selected for its proximity to an I-75 rest area crossover, heavily impacted status, well-developed ingress/egress, and close proximity to other ongoing impacts including I-75, MM-63 Rest Area facilities.

Access to the staging area site will utilize the newly constructed recreational parking area that provides a direct, paved connection to the single-lane, crushed lime rock road that forks from the east side of Nobles Grade and terminates at MM-63N. MM-63N is a former exploratory well pad constructed and abandoned in 1972. The pad and access road are 1.5 to 2.5 feet above grade and appear to be high enough to provide all-weather access. At the time of its abandonment, the site was in private ownership and all oil and gas activities occurred prior to the creation and subsequent expansion of the BCNP. Site conditions as of early-2014 are shown in Figure 5.10.

The MM-63N field staging area is characterized by highly disturbed conditions and is located in a transitional habitat zone. Canopy coverage includes scattered





Access road from recreational parking to trail



Trail to proposed staging area



New gate from the south recreational parking construction into the Big Cypress National Preserve



Proposed staging area



Looking west onto the new south recreational parking area and emergency response center (far end)



Proposed staging area

**Figure 5.9      Staging Area MM-63S – Existing Conditions**





Entrance of new recreational parking area looking east; deceleration service road (west bound) is to the right.



Road to proposed staging area



East end of new recreational parking area looking west



Proposed staging area



East end of new parking area and intersection with Nobles Grade road and gate; looking north at new gate



Proposed staging area

**Figure 5.10 Staging Area MM-63N – Existing Conditions**



cabbage palm and a large cluster of Brazilian pepper (*Schinus terebinthifolius*) in the central portion of the area. The sub-canopy includes scattered cabbage palm, Brazilian pepper, and wax-myrtle. The sub-canopy also includes the exotic ornamental species red bottlebrush (*Callistemon viminalis*). The ground cover is dominated by wiregrass (*Aristida stricta*) and includes scattered Asiatic pennywort, white-top sedge (*Rhynchospora colorata*), lovevine, and Tracy's beaksedge (*Rhynchospora tracyi*). The exotic ornamental species oyster plant (*Tradescantia spathacea*) was found scattered throughout the ground cover.

Soil in the MM-63N area consists of Ochopee Fine Sandy Marl—Shallow Phase (see Section 10.2.1.3.1). However, soils in the area have been disturbed and include crushed lime rock, sand, and non-native fill material used to construct the access road and pad in 1972. The site is well drained and contains no areas where water stands for extended periods.

MM-63N is located in close proximity to high levels of ongoing human presence; including I-75, and ongoing recreation and research activities.

There are two elliptical culverts under the access road in the slough crossing between the upland habitat and pad. These culverts are still functional but may need reinforcement if heavy equipment is to be placed at the site. The Applicant does not anticipate positioning heavy equipment at this staging area. Should those plans change, the condition of the culverts will be reviewed with USDOJ-NPS prior to any equipment movement.

#### MM-63S-2

The MM-63S-2 staging area site is located 3.1± miles south of the I-75 ROW and approximately 2.82 miles south-southwest of the main MM-63S staging area (see Figure 5.6). The 1.97± acre staging area site was selected for its proximity to the central and southern portions of the revised NG3-D survey area south of I-75 and its direct trail connection to the main staging area, MM-63S, to the north.

Access to the staging area site will utilize the planned trail access to the main staging area and its extension southward (see Figure 5.6). MM-63S-2 is an abandoned exploratory well pad constructed in 1982 for the Oleum 3-4 Well drilled and abandoned by Kanaba Oil Company that year. At the time of its abandonment, the site was in private ownership and the associated oil and gas activities occurred prior to the creation and subsequent expansion of the Preserve. The well pad was developed and abandoned pursuant to the Florida State Oil and Gas Rules.

The staging area MM-62S-2 was not field-verified during the January 2014 site review; however, the vegetative composition of the area is likely similar to the nearby field staging area MM-63S (see Figure 5.11). Soil in the MM-63S-2 area consists of Ochopee Fine Sandy Marl—Shallow Phase (see Section 10.2.1.3.1).





**Figure 5.11 Staging Area MM-63S-2 – Existing Conditions**

*MM-70N*

The MM-70N site is located 723± feet north of the I-75 ROW and is immediately north of the I-75 recreational parking area. This staging area site was also selected for its close proximity to other existing impacts including I-75 and the recreational parking area. This site, which is approximately 7.9 miles west-northwest of the main staging area MM-63S, will service the mid to western portions of the NG3-D survey area on the north side of I-75.

Access to the 0.73± acre staging area site will not be directly off of I-75 but rather off of the service road associated with the recreational parking facility. Under an arrangement pursuant to Collier-FDOT Agreement (see Exhibit 6) access is expected to be a FDOT-constructed connecting pathway from the paved parking area through a fence cut approximately 75 feet west of the existing visitor entry point. From there, a pathway will be provided to the ROW fence where a second locked gate will be installed providing entry into the Preserve and to the open area staging site.

The existing conditions of the MM-70N field staging area are shown in Figure 5.12. MM-70N is mostly located in a wetland community type. Canopy cover includes widely scattered cypress. Sub-canopy cover includes clustered cypress, wax-myrtle, and corkwood. The ground cover includes panic grass, beaksedge, rush, lovevine, Asiatic pennywort, bushy bluestem, and sawgrass.

Soil in the MM-70N area consists of Ochopee Fine Sandy Marl—Shallow Phase, Tucker Marl, and Broward Ochopee Complex (see Section 10.2.1.3.1).





Middle of recreational parking area looking east at entrance and service road



Area between parking area and fence; the new access point would be in this general area



Off pavement looking northeast at visitor fence entrance



Proposed staging area



Facing west between pavement and visitor's entrance; proposed access point from pavement to staging areas located approximately at the near palmetto tree on left

**Figure 5.12      Staging Area MM-70N – Existing Conditions**



### MM-70S

The MM-70S staging area site lays 600± feet south of an I-75 recreational parking area. The staging area site was selected for its proximity to I-75 and its utilization of existing service road/parking area infrastructure. MM-70S is located approximately 7.5 miles west of the main MM-63S staging area and is expected to support operations in the western to central portions of the NG3-D survey area south of I-75.

Access to the 1.7± acre staging area site will utilize an existing recreational parking area and trail with locked gate that directly connects to an open area FDOT has just replaced the old access path (shown on Figure 5.13, top left photograph) with a newly constructed access path (not shown) that improves the safety of other users entering the Preserve through the existing locked gate to an existing limestone road. This road will connect to the open area staging site.

Figure 5.13 displays existing conditions at MM-70S. The MM-70S staging area is located in a wetland community type. Canopy coverage is mostly open and includes widely scattered cypress. The sub-canopy is also largely open and includes cypress, wax myrtle, and corkwood. The ground cover is composed of panic grass, beaksedge, rush, lovevine, Asiatic pennywort, bushy bluestem, and sawgrass.

Soil in the MM-70S area consists of Ochopee Fine Sandy Marl—Shallow Phase (see Section 10.2.1.3.1).

## **5.1.2 Staging Area Layout and Improvements (Work Segment 4)**

### MM-63S

The main field staging area, MM-63S will occupy 3.57± acres (640 x 250 feet) and provide enough space to accommodate the coordination and management of the field operations including access, fuel storage and refueling, recording crew trailers, recorder truck, geomerger trailer and journey management, helicopter operations and security, and coordination/management of transportation and NG3-D field operations. The remaining four satellite staging areas will be temporarily utilized primarily for supporting survey, geophone layout and acquisition operations during a portion of the 18-week operation. The MM-63S staging area will be designed to accommodate the general types of equipment and facilities (or their functional equivalents) listed below.

- One helicopter landing zone with additional bermed fuel spill containment system for equipment management and helicopter fueling operations;
- One (1) helicopter coordinator Kodiak trailer and heavy pickup truck;
- One (1) helicopter company storage/work trailer and light pickup truck;





East view of recreational acceleration service road merge with I-75; existing access is the dirt road on right side of wood fence



Proposed staging area



Existing ROW fence gate south of parking area; access via the dirt road shown on top photo



Access road (looking north) to the proposed staging area



Existing access road to gate; looking north towards I-75 (staging area to the right)



Proposed staging area looking east

**Figure 5.13      Staging Area MM-70S – Existing Conditions**



- Two (2) truck-mounted, 2,000-gallon fuel tanks with containment systems – diesel and Jet A or equivalent;
- Up to 10,000 gallon fuel tank for diesel storage – bermed and stationary;
- One (1) ~400-gallon truck-mounted diesel tank with bed liner containment system (mobile to refuel vibrators) for in-the-field refueling;
- One (1) ~500 gallon truck-mounted diesel fuel tank with bed liner containment system, a 4x4 ARDCO buggy with flotation tires for in-the-field, off-road refueling of vibroseis buggies;
- One (1) FDOT certified (annually) trailer with two ~300 gallon fuel tanks (~600 gallons total) equipped with a secondary containment system will be used for helicopter Jet A fuel storage;
- Two (2) 8 x 30 foot steel storage containers or equivalent;
- One (1) 10 x 30 foot work trailer – office or equivalent;
- Two (2) diesel generators or equivalent (50 and 20kw);
- One (1) 60-foot radio tower or equivalent;
- Recording truck with generator;
- Six (6) semi-trailers from equipment mobilization and storage;
- Battery charging trailer for GSR recording system with generators;
- Up to 12 utility vehicles (UTVs) for field work;
- Up to 8 pickup trucks; and
- Parking area for vehicles.

Temporary staging area improvements are expected to be essentially limited to FDOT's construction of ingress/egress facilities at MM-70N (limestone access road, fence cuts and gate installations) on FDOT property. The Applicant anticipates utilizing roads and trails in their existing condition. Should improvements be needed for either access or at the staging areas, the Applicant may utilize a composite mat system similar to that shown in Exhibit 9.

#### Other Staging Area

The four other staging areas will be utilized to a lesser degree for surveying and geophone deployment activities and support of acquisition operations. Figure 5.14 shows an example of a typical staging area and equipment.





**Figure 5.14 Typical Staging Area Equipment**

### **5.1.3 Fuel Storage and Refueling Operations (Work Segment 4)**

Two fuel storage operations and four types of refueling activities will occur within the NG3-D seismic survey area. At the main staging area, the largest non-mobile fuel storage equipment will be an up to 10,000 gallon stationary, bermed-diesel fuel tank stand. Mobile self-contained equipment will be used for fuel storage and vibrator refueling activities at each field staging area and/or in the field. Two (2) 2,000-gallon fuel tanks (aviation fuel/diesel) or their equivalent will be mounted on a tractor-trailer with an onboard spill containment system and fuel supply hose reel (Figure 5.15). One fuel trailer will be located at MM-63S and will service other staging areas as needed. One 400± gallon truck-mounted diesel tank with bed liner containment system supplemented with a flotation tire-equipped 4x4 ARDCO buggy with mounted a ~500 gallon diesel fuel tank to refuel vibrators in the field. A FDOT certified (annually) trailer equipped with two ~300 gallon fuel tanks (~600 gallons total) equipped with a secondary containment system similar to that shown in Figures 5.15 and 5.16, will be used for Jet A helicopter fuel storage and refueling.

Fuel spill containment systems will be utilized for fuel storage (fixed and mobile), refueling and parking. Fuel tank stands (typically located at a staging site) come equipped with metal containment and reside on secondary tarps which extend out past the tank stands so that vehicles can drive up on the tarp to fuel. A high-density vinyl containment mat with collapsible 12 inch high bermed sides will be used under the 2,000-gallon mobile storage trucks while parked at staging areas (Figure 5.15). For a more detailed discussion of spill refueling and containment together with photographs of containment systems, see Section 6.4.3.



Operations are planned for the dry season; however, if necessary, contact storm water will be removed from the ground protection systems and disposed of pursuant to BCNP MMP geophysical Stipulations #3 and #30 (Exhibit 5).



**Figure 5.15 Fuel Truck Trailer with Bermed Spill Containment System (Side Panels Collapsed)**

#### **5.1.3.1 Helicopter Refueling**

Helicopters will refuel once every 90± minutes of flight operations. This equates to an overall average of three to four re-fuels per day during geophone layout and retrieval acquisition operations (13± weeks). Refueling operations will be conducted at the field staging areas utilizing a FDOT certified (annually) trailer with two ~300 gallon fuel tanks (~600 gallons total) and a bermed fuel spill containment system under the fuel truck (see Figure 5.16 below for typical).



**Figure 5.16 Typical Helicopter Refueling Area**



### **5.1.3.2 Field Refueling**

It is anticipated that each 4x4 UTV will be refueled 1± time per day both at staging areas and in the field utilizing 5-gallon Occupational Safety and Health Administration (OSHA)/National Fire Protection Association (NFPA) approved steel fuel containers (Type II Safety Cans). Vibrators will be refueled daily by a 400± gallon truck-mounted diesel tank with bed liner containment system and/or a flotation tire-equipped 4x4 ARDCO buggy with a ~500 gallon diesel fuel tank. Field refueling operations will be conducted over a ground liner. See Section 6.4.3 for additional spill protection plans and photographs.

### **5.1.3.3 Other Vehicles**

When possible, UTVs and other non-field vehicles (trucks, crew vans, etc.) will be refueled as necessary at the field staging areas on the liner ground protection system described earlier. See Section 6.4.3 for additional spill protection plans and photographs.

Fuel storage and field refueling operations will be conducted in compliance with BCNP MMP geophysical Stipulations #1, #28, and #30 (see Exhibit 5). Ground tarps or liner ground protection and bermed fuel spill containment systems described above will be used to prevent soils contamination. In addition, absorption pads, shovels and approved fire safety equipment will be available on field vehicles and equipment and at field staging area fueling locations.

## **5.1.4 Equipment and Mobilization Operations (Work Segment 4)**

### **5.1.4.1 Crew Mobilization**

When in use, field staging areas will serve as terminals for daily mobilization and de-mobilization of field crews according to the daily location of field operations. Crew transportation vehicles will leave off-site crew housing facilities after daily safety and operational briefing meetings in time to arrive at the field staging areas prior to apparent sunrise. Crews will depart their respective staging areas approximately one-half hour after apparent sunrise by helicopter, UTVs, other vehicles or on foot depending on daily starting locations. Daily crew de-mobilization will conclude at the field staging areas approximately one-half hour before apparent sunset.

Field operations are scheduled for the dry season (December through May) so daily mobilization/de-mobilization operations will begin slightly later and end slightly earlier through the shortest day of the year (December 21/22). This trend will reverse itself with allowances for Daylight Savings Time. This arrangement will allow the Operator to take full advantage of available “dry season” daylight as well as accommodate helicopter flight safety guidelines and personnel-related emergencies should they occur.



#### **5.1.4.2 Survey and Layout Equipment**

The quality of acquired 3-D seismic data depends upon the accuracy of source and receiver point layout operations. NG3-D seismic survey area vegetative cover and compliance with BCNP MMP geophysical Stipulations #13, #16, and #20 (see Exhibit 5) will require use of the latest surveying technologies to achieve the required accuracy. It is the Operator's intent as much as possible to layout geophone receivers and acquire seismic data without traditional staking. However, there may be the limited need to employ some elements of traditional field marking in certain vegetative settings such as heavy canopy or to identify/confirm the routing of foot crews or vibroseis equipment in order to avoid field hazards or impacting important resources. Survey-quality GPS will be used in open areas where satellite signals are readily accessible. In those areas where satellite signals are not accessible, alternative technologies including Real Time Kinematic (RTK) correction will be substituted. Each of these have been used successfully along the U.S. Gulf Coast in topographical and vegetative cover conditions similar to those in the NG3-D survey areas.

The following are examples of equipment commonly used in 3-D source and receiver point survey and layout operations. Actual configurations and numbers of surveying equipment utilized may change depending upon conditions prevalent during field operations:

- Standard GPS: Trimble 4000, RTK enabled GPS with "GPSeismic" management software or functional equivalent;
- Under vegetative cover: Leica GPS1200, RTK enabled GPS with GPSeismic management software or functional equivalent;
- Inertial: Applanix POS LS VI navigation software or functional equivalent;
- Inertial: Trimble 5700 RTK enabled GPS with GPSeismic management software or functional equivalent; and
- Tiger Nav System (in Vibroseis Buggies) to locate source points in the field.

#### **5.1.4.3 Survey Crew and Support Equipment Mobilization**

Up to five survey crews (see Table 4.1) will be deployed to accomplish survey and layout operations. Pick-up trucks (with a minimum ground clearance of eight inches) or UTVs (with a ground clearance between six and ten inches) will be used along existing roads and trails to the extent feasible for daily crew mobilization/de-mobilization operations. Field survey and layout operations will be conducted predominately on foot and/or UTVs. Up to six USDO/NPS-approved UTVs and/or 4x4 "mule" type land vehicles will be available at the field staging areas and may be used in the event of field support or health/safety emergencies (see Figure 5.17).





**Figure 5.17 4x4 Utility Transport Vehicles (UTVs)**

### **5.1.5 Data Acquisition (Recording) Equipment (Work Segment 4)**

Data acquisition equipment and personnel (see Table 4.1) will be mobilized to the main field staging area, MM-63S, from outside the NG3-D survey area by semi-tractor trailers or lightered in using smaller trucks. At the field staging areas the acquisition equipment will be unloaded, organized, inspected, tested and bundled into orange equipment bags and positioned for field mobilization by “bag-runner” equipped helicopter and land vehicles, to the extent practicable. Each equipment bag will hold equipment – geophones, field recording/telemetry and battery – sufficient to establish ten receiver points. Upon delivery to drop zones, layout crews will unload the equipment bags and proceed with layout operations. Layout operations will be conducted on foot and UTV, if necessary. Empty equipment bags will remain in the field pending their retrieval as described below.

At the conclusion of operations in each acquisition swath or patch, recording equipment will be re-packed in equipment bags and returned to the field staging area for inspection, repair and re-loading while reserve recording equipment is mobilized to the next acquisition swath. This mobilization, de-mobilization, inspection, and re-mobilization sequence will continue until acquisition operations are complete. Recording equipment will then be returned to the field main staging areas for processing and transport out of the NG3-D seismic survey area.



Occasional equipment failures are expected and will be addressed in the field by technicians as they occur. Field data acquisition equipment is expected to consist of the following or its functional equivalent (see Exhibit 10 for recording equipment):

- Up to 15,000 strings of SM-24 10 Hz analog geophones - 3 geophones per string (Figure 5.18);
- Up to 15,000 channels of Oyo GSR single-Channel with batteries, 24-bit, Water Proof Remote Seismic Recorder Units - 1 unit for every station (Figure 5.18);
- One (1) Oyo Geomerge, imaging computer system;
- One (1) Oyo GSR recording control truck with extendable antenna;
- Two (2) vehicles: vibrator mechanic and general maintenance; and
- Seven (7) Vibroseis buggy mounted units operating in two sets of 3 with one spare.



**Figure 5.18 Oyo GSR, Battery & Geophone String**

#### **5.1.5.1 Acquisition Support Equipment**

Field data acquisition support equipment will include up to ten 4x4 UTVs available at field staging areas for field support, line viewing trouble shooting and personnel health/safety emergencies should they occur. A typical staging area with equipment is shown in Figure 5.19. Non-field data acquisition support equipment and facilities will be stationed on MM-63S and, at a minimum, will include the following (actual dimensions and numbers may vary slightly):

- One (1) 8 x 35 foot office/staging trailer;
- One (1) 8 x 10 foot data recording control truck (“Dog House”) plus generator;
- One (1) 60-foot high radio-telemetry antenna;
- One (1) 8 x 25 foot Journey management trailer plus generator;





**Figure 5.19 Typical Staging Area with Data Acquisition Support Equipment**

- One (1) 8 x 30 foot Geomerger trailer plus generator;
- One (1) 8 x 30 foot Battery charging trailer plus generator;
- Up to 10 UTVs;
- One (1) 8 x 25 foot Helicopter support and tracking trailer plus generator; and
- Five (5) 8' x 40 foot equipment semi-trailers.

#### **5.1.6. Other Field Staging Area Operations (Work Segment 4)**

##### **5.1.6.1 Potable Water Supply**

Bottled water will be delivered to field staging areas on daily crew transport vehicles and supplied to field crews as needed. This will address the potable water requirements of field operations. Clean-up of bottles and other materials will occur daily.

##### **5.1.6.2 Wastewater**

Except for minimal work and comfort facilities necessary to accommodate on-duty supervisory personnel, no residential use of field staging areas will occur during field operations. Field personnel will be housed outside the Preserve and transported in and out daily. Work trailers will not be equipped with restroom facilities but will utilize portable toilets on-site. Portable toilets will be pumped as necessary by a licensed waste hauler. A copy of an executed wastewater



removal contract or arrangement will be provided to Preserve staff prior to the start of field operations. No food preparation facilities will be available. Portable toilets will be provided at other staging areas proximate to I-75 should activity levels dictate such need.

#### **5.1.6.3 Solid Waste**

The Applicant intends to remove trash from the work areas daily. Since a nearly stakeless survey and layout operation is intended, it is expected that trash removal needs will be reduced. Trash removal will be effected by crews departing the survey area each night. If needed, the Operator will provide covered, steel waste containers (two to five cubic yard dumpsters) at the main MM-63S field staging area to accommodate the solid waste generated by daily field operations. Waste containers will be locked at night and emptied as necessary by a licensed waste hauler. A copy of an executed waste removal contract or arrangement will be provided to Preserve staff prior to the start of field operations. Additional containers will be positioned at other staging areas proximate to I-75 should activity levels dictate such need.

#### **5.1.6.4 Area and Crew Security**

NG3-D survey area access from I-75 is restricted by a 12-foot chain link fence on either side of the FDOT ROW. During the field operations period, access will be controlled by locked gates in the FDOT ROW fences. Staging areas gates will be locked and opened on an as-needed basis by approved personnel. No non-program visitors will be allowed to enter the Preserve through the MM-63S or MM-63N equipment gate facilities. Instead they will be directed to use the existing Florida Trail personnel gates. Both equipment gates will be locked at night.

Pedestrian visitors will be able to access the Florida Trail facilities through personnel gates after being advised of field operations in the vicinity. Non-seismic ORVs and other off-trail activities will not be allowed entry through equipment gates during the field operations.

Notifications satisfactory to the USDOJ-NPS will be posted online and at the Oasis Ranger Station, Ochopee Headquarter, the MM-63 Rest Area, Florida Trail personnel gates, and all other NG3-D staging area gates prior to and throughout the period of field operations.

No firearms, hunting, fishing, pets or open fires will be allowed by crew members during field operations. No smoking will be permitted in the field. Smoking in the staging area will be permitted in designated areas only.

#### **5.1.6.5 Communications**



Portable communication towers will be installed at the main MM-63S field staging area and other staging areas, if needed, for field radio communications by the Operator and subcontractors.

## **5.1.7 Methods of Transportation (Work Segment 4)**

### **5.1.7.1 Truck Transport**

Materials, equipment and supplies will be transported to field staging areas by trucks and semi-tractor trailers to the greatest extent feasible. Other forms of transportation will be employed from the equipment inventory should operating conditions dictate.

### **5.1.7.2 Helicopter Transport**

The field helicopter will operate from MM-63S and other field staging areas according to the work sequence determined by the Project Manager. The field helicopter will be equipped with slings, long lines and quick disconnect systems to move and deploy equipment and supplies (see Figure 5.20). Refueling operations will be conducted primarily at MM-63S and to a lesser extent at MM-63N staging areas as described above. Landing zones and delivery locations will be selected and USDOI-NPS certified in compliance with BCNP MMP geophysical Stipulation #15 (see Exhibit 5).



**Figure 5.20 Helicopter with Long-Line Sling**

### **5.1.7.3 Field Personnel**

Field personnel will be transported to the field staging areas in crew vans, vehicles or buses and then mobilized to the field using UTVs, crew-cab pick-up trucks along existing roads, or on foot. Field operations will be conducted



primarily on foot with UTVs utilized, to the extent feasible, for line viewing and trouble shooting.

## **5.2 Helicopter Operations (Work Segment 4)**

### **5.2.1 Overview**

The field helicopter will be licensed, rated and equipped for sling transport operations. Overnight helicopter storage, maintenance and initial daily fueling operations will be undertaken outside the Preserve, unless overnighting at MM-63S main staging area would substantially improve overall operational efficiency (and then only with the approval of the Superintendent). Field refueling operations will be conducted at the field staging areas described earlier.

Flight, ground support and rigging crews are trained and experienced in helicopter field operations supporting geophysical seismic operations. The helicopter contractor will also provide documentation of current FAA flight operations, airworthiness inspection reports and hazard and liability insurance pursuant to Federal and State regulatory requirements.

Field support helicopter and ground support personnel/equipment include the following or their functional equivalents:

- One (1) Eurocopter 350 B3, Lama or equivalent (one pilot/load rating: varies);
- One (1) helicopter Coordinator with Kodiak trailer;
- One (1) helicopter operations advisor and helicopter company work/storage trailer;
- Support vehicles for both trailers; and
- Fire suppression equipment including Bambi water bucket.

The field helicopter will be equipped with GPS navigation systems, long line quick connect/disconnect bag-runner type equipment deployment systems (see Figures 5.21a-d) and accompanied by one helicopter coordinator to facilitate field trips and a mechanic/ground support crewmember/advisor with a one-ton support vehicle.

Initial daily helicopter operations will originate off-site unless re-positioned to the MM-63S staging area as discussed in the earlier paragraph. Subsequent daily operations will be intermittent and conducted from the MM-63S and other field staging areas, as required. The Project Manager will be responsible for the pace and efficiency of helicopter operations.





**Figure 5.21a Helicopter Deploying Long-Line Receiver Bag Load**



**Figure 5.21b Receiver Bag Runner System**



**Figure 5.21c Receiver Bag Runner System (Continued)**





**Figure 5.21d Receiver Bag Runner System (Continued)**



Field staging areas will translate to minimal helicopter flight requirements and transit times which will translate in turn to the lowest overall level of helicopter flight operation impacts for the survey as a whole, without compromising the speed, efficiency and environmental benefits attributable to their use. Field staging area refueling operations will eliminate unnecessarily lengthy out-of-program area flights that would otherwise be required for the sole purpose of refueling.

Helicopter flight operations will be conducted in full compliance with applicable FAA regulations and coordinated with the BCNP Chief Pilot in Ochopee and the FWCC and USFWS flight operations.

### **5.2.2 Helicopter Support of Data Acquisition Operations**

At the conclusion of crew mobilization, bag-runner equipped helicopters will begin daily deployment and re-deployment of data acquisition equipment: geophones, recording/telemetry units, batteries, cabling, expendable supplies, etc. (see Figure 5.21a-d).

## **5.3 Management of Transportation and Field Operations (Work Segment 4)**

In order to begin staging area/access development and mobilization operations, the Operator's survey manager will arrive with the survey and layout crews 5± weeks prior to the start of acquisition (recording) operations (see Table 4.1). The Survey and Party Manager will be responsible for conducting the following activities throughout field operations:

- Based upon field scouting and survey crew reports, determine a starting point for survey and recording operations, commensurate with the Operator's "one-pass" field operations planning concept;
- Prepare field site assessments identifying archaeologically or environmentally sensitive areas, "no permit" areas and potential field hazards not identified in the planning and design process;
- Re-confirm planned source and receiver points and, where applicable, adjust those locations, in consultation with USDOI-NPS representatives, according to the results of the field assessments;
- Address source and receiver point access issues, in consultation with USDOI-NPS representatives; and
- Conduct daily field scouting and groundtruthing operations to identify potential hazards; "no permit" areas, and potential environmental/archaeological concerns; and monitor listed species issues, field conditions, other user activities and ongoing USDOI-NPS field activities (e.g., prescribed burns, exotics removal, trails construction, species monitoring, etc.).

The Survey and Party Managers will:

- Develop, distribute and maintain current field maps which accurately reflect the results of daily field scouting operations and seismic acquisition progress;



- Conduct morning safety meetings to outline daily operations and apprise field crews of the results of daily field scouting and groundtruthing operations;
- Manage field access issues on a day-to-day basis; and,
- Interface with USDOI-NPS and any State representatives, if on site, to address day-to-day operational issues.

## **5.4 Source and Receiver Point Layout Operations (Work Segment 5)**

### **5.4.1 Field Surveying**

Up to five survey crews will be deployed in the NG3-D survey area concurrent with the arrival of the Survey Manager to begin layout operations. Each survey crew will consist of party members outlined in Table 4.1 (actual crew composition and count may vary slightly).

Field survey operations will be conducted on foot and/or by UTVs. Each survey crew will be equipped with backpack mounted GPS receivers with RTK correction capability. Two of the crews will also have Inertial Navigation System (INS) capability. Located hazards, trails, ingress/egress, receiver/source points will then be recorded on a digital map in GIS format using hand-held field computers that display planned and actual location information. Applicable field access, condition and safety findings will be forwarded to the Survey Manager for use in safety meetings.

As an alternative to surveying the Vibrator source points, crews may also use “Tiger Nav,” a real time RTK GPS, that is located inside the cab of the vibrator buggy with pre-positioned vibrator points by which the vibrator operator can navigate.

### **5.4.2 Source/Receiver Point Reconditioning**

Some point locations may be lost due to animal damage, storms, or vandalism. Reconditioning of receiver point locations throughout data acquisition operations will occur as needed.

### **5.4.3 Vegetation Trimming and Brush Cutting**

Vegetation trimming and/or brush cutting activities may occur, if needed, to provide safe passage through certain areas. Trimming of native vegetation will be minimized; consistent with BCNP MMP geophysical Stipulation #16 (see Exhibit 5). Trimming and brush cutting is subject to prior approval of USDOI-NPS representatives.

Should vegetation trimming and/or brush trimming be necessary, branches and small trees will be trimmed with hand tools, but cutting of vegetation will be avoided if possible below the height or beyond the width of 36 inches with the exception of exotic vegetation, which may be cut below 36 inches. Brush cutting will primarily impact vegetation along the edges of existing open areas where slightly more clearance is needed. Hand tools used for trimming and brush cutting will include sling blades and



machetes. Blades will have rounded tips; cutting edges will be sharpened or honed daily, as needed. Cuttings will be left on either side of the passage way.

Vegetation trimming and brush cutting will be consistent to the extent possible with BCNP GMP/EIS/MMP geophysical Stipulation #17 wherein cut vegetation must be capable of returning to its natural condition after operations. The term “return to natural conditions” indicates that trimmed vegetation will not be altered in such a way as to prevent its natural regrowth. Typically this would mean that no significant damage to the root structure or individual plant will be incurred to such a degree that the plant would not survive (i.e., brush uprooted or cut, preventing the survival and regrowth of the plant).

Extensive tree (i.e., a woody plant with a four inch diameter at breast height) removal is not proposed to occur as part of the seismic survey operations. To the extent that trees may need to be removed, the Applicant will only do so in coordination with the USDO-I-NPS. Areas with dense standing trees will generally be avoided.

## **5.5 Vibroseis (Work Segment 6)**

### **5.5.1 Background**

Seismic surveying depends on the creation and propagation of an acoustic signal below the surface to “bounce” off of different layers and densities of sub-surface lithology and return to the surface to be detected by very sensitive geophones. Signal generation in onshore seismic operations is typically produced either by detonation of a dynamite charge(s) set below the surface or the use of thumpers or Vibrators employed on the surface. 3-D seismic surveying employs the use of multiple, parallel strings of active geophones to record returning seismic signal reflections. Through high capacity computing, today’s state-of-the-art seismic surveying is translated into a picture of high definition, 3-D subsurface cube. With this picture geo-scientists look for structural traps or geological stratigraphy capable of accumulating reservoirs of oil and gas.

The Applicant has elected to employ the use of vibrator (Vibroseis) buggies to generate and transmit acoustic signals. This technology will minimize impacts potentially associated with the generation of the geophysical signal. Dawson Geophysical, Inc. (Midland, Texas) has been contracted to conduct the field operation. Dawson has over 60 years of geophysical experience operating in a variety of North American onshore environments including a number of U.S. Federal and State sensitive lands.

### **5.5.2 Equipment**

The Operator intends to employ Articulating AHV-VI Vibroseis Buggies to generate acoustic signals (see Figure 5.22). The Vibroseis Buggies have high capability to perform tight-radius turns to move the equipment between canopy and sub-canopy vegetation.





**Figure 5.22 Vibroseis Buggy**



These buggies are diesel-powered with a small pad located below and in the center of the machine that lowers and propagates sound waves into the ground. Inside the cab is sophisticated electronics to generate precise sound wave frequencies and to conduct precision navigation and mapping for moving safely through a survey (see Exhibit 7). Vibroseis buggies have a ground clearance of 18 inches.

Balloon (floatation) tires (see Figure 5.22) will be used on the Vibroseis Buggies. These wide, smooth treaded tires are designed to spread the weight of the buggy over a wider “footprint” reducing ground loading to a low 26 psi – 11 psi less than the equivalent of a pickup truck. This displacement of weight allows the Vibroseis Buggy to move through sensitive areas in a survey with minimum impact or footprint. The baseplate when engaged for vibrating is expected to exert a maximum ground pressure loading of no more than 15 psi, but could be less depending on sweep testing that will be conducted when the vibroseis buggies first arrive. BOCI believes that with its emphasis of operating in the dry season, avoiding standing water or saturated soil areas, and employing a “one pass” approach at source points, soil rutting can be kept to a minimum. In the unlikely event that shallow or minor rutting occurs, restoration operations will occur concurrently with survey activities as outlined in Section 5.7 of the POP. Figure 5.23 illustrates vibroseis operations in a field setting. Each Vibroseis buggy will be equipped with front-mounted winches. Since buggies will be operating in two groups of three vehicles, if a buggy becomes stuck, one or more buggies of the group will utilize the front-mounted winches to pull the stuck buggy free.



**Figure 5.23      Vibroseis Group in Field Operations**

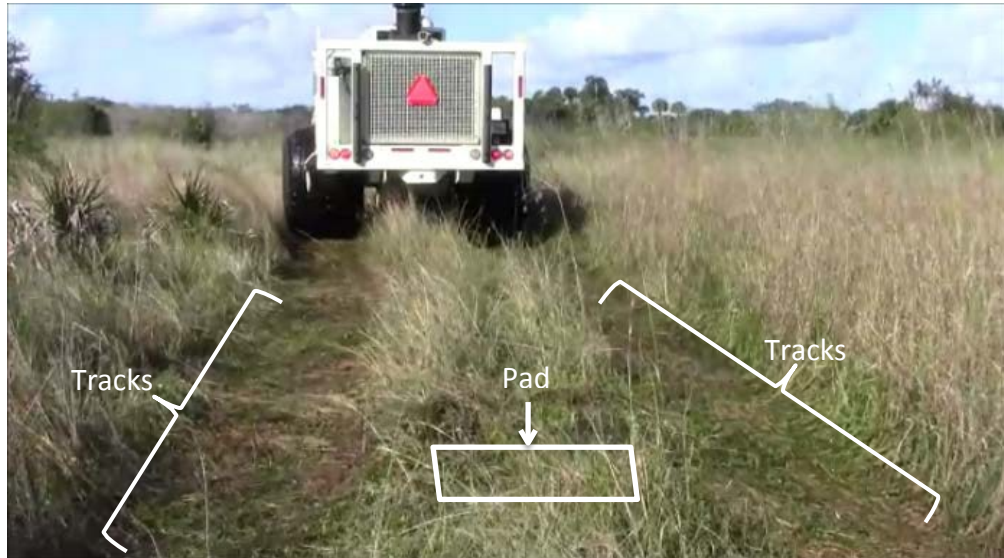


On December 6, 2013, the Applicant evaluated the use and potential impacts of a Vibroseis Buggy on private lands located approximately 7 miles north of the NG3-D survey area; then conducted a follow up inspection on June 6, 2014 to qualitatively document the conditions of the Vibroseis Buggy testing areas six months after the testing occurred. Specific details on the initial field test and follow-up site review is provided in Exhibit 8.

In summary, visible surface impacts to vegetation and soils were minimal in the wetland test area. The oversized “balloon” tires spread the weight of the equipment over the tire footprint which reduced the pressure on vegetation and soils beneath them. The oversized tires did push over/matt down vegetation as they passed; however, the root systems were left in place and were not dislodged from the ground (see Figure 5.24a). Soil rutting and compaction did not occur along the tire track areas (see Figure 5.24a). In addition, the pad impression areas displayed similar characteristics (see Figure 5.24a). The visible impacts on ground vegetation from the Vibroseis Buggy were very similar to the impacts shown on page 54 of the USDOI-NPS 2006 Operator’s Handbook for Non-Federal Oil and Gas Development in Units of the National Park System which states that vehicles with large tires that distribute the vehicle’s weight may be appropriate for transporting personnel and equipment along survey lines since although the exposed blades of grass are initially damaged by a vehicle with large tires, the root systems and soil structures are not disturbed (see Figure 5.24b).

The follow up site review was conducted within the Vibroseis Buggy field test area on June 6, 2014 to qualitatively document the conditions of the Vibroseis Buggy testing areas six months after the testing occurred. The follow up site review documented that the wetland test area had almost completely recovered with only six months of re-growth (see Figure 5.24c). This is also very similar to another photo shown on page 54 of the USDOI-NPS 2006 Operator’s Handbook for Non-Federal Oil and Gas Development in Units of the National Park System which states that soon after the survey was complete, the grass was growing again without the need for the company to perform any type of active reclamation (see Figure 5.24d).



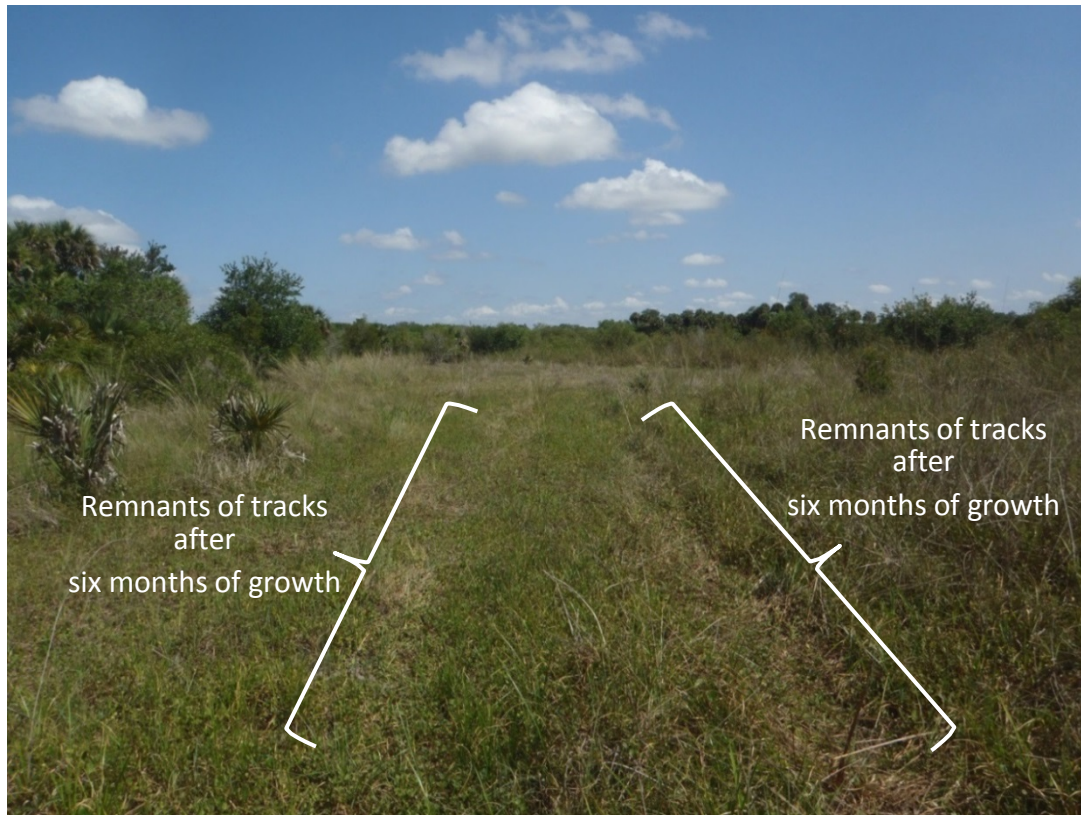


**Figure 5.24a Low Impact from Vibroseis Buggy During Initial Field Test in Wetland**



**Figure 5.24b Low Impact from Large Terra-Tires Shown in USDOI-NPS 2006 Operator's Handbook**





**Figure 5.24c    Remnants of Tire Tracks from Vibroseis Buggy Field Test in Wetland After Six Months of Growth**



**Figure 5.24d    Recovered Area from USDOl-NPS 2006 Operator's Handbook**



### **5.5.3 Advantages**

The major environmental advantages in using Vibroseis technology are:

- Reduced ground disturbance of seismic signal generation compared to buried explosive detonations.
- Non-explosive seismic signal source technology eliminates the need for drilling and the setting and detonation of explosive charges to create a seismic signal.
- The low ground tire pressure distributes the weight of the vehicle to avoid soil rutting and/or compaction.
- Low impact balloon/flotation tires allow vegetation to simply fold over and avoid/minimize potential root disturbance.
- The equipment is highly maneuverable and capable of moving between trees and shrubs without breaking or damaging them.
- Vibroseis technology allows for easy cleanup by requiring fewer survey stakes for navigation.

## **5.6 Data Acquisition Operations (Work Segment 7)**

Data acquisition operations will begin with the arrival of the Recording Manager, data acquisition crews (see Table 4.1), and recording equipment when surveying has a sufficient lead. This is anticipated to occur in week five of field operations. Recording operations will be undertaken in the same general sequence as surveying placement operations (generally from west to east). Recording swaths or patches will consist of at least 50 live geophone recording lines – at least 25 live lines on either side of each recorded vibrator source point – extending the entire length of the north-south axis of the NG3-D seismic survey area.

During the initial layout of receiver stations, source testing will be performed along a receiver line. This will entail one set of vibrators sourcing along a receiver line at an initial set up interval of 165 feet for approximately four miles but this design will be substantially modified as discussed on Section 5.10. The objective will be to determine the optimal “sweep” or vibrating period and frequency mix to be employed in the survey. After the test sourcing is completed, those receiver stations along the four-mile length will be picked up and replacement GSR receivers will be redeployed. The location of the receiver line chosen for the test will be situated to result in the least impact and be most accessible.

### **5.6.1 Crew Composition**

Crew members are cross-trained and each member participates in field operations according to his/her “training passport” credentials. Crew member task assignments are made by crew leaders as needed. Bearing in mind that the different crew types listed



below will often be composed of the same individuals, crew composition will consist of the following components detailed in Table 4.1 (actual crew composition and counts may vary slightly):

### 5.6.2 Recording Equipment Deployment

Recording equipment will be deployed primarily by helicopter. Some deployment along existing access roads/trails, if feasible, may be undertaken by pick-up truck as part of daily crew mobilization and support activities. Data recording operations will be undertaken in the following sequence:

- #1 - *Mobilize recording equipment:* Equipment mobilized to the survey area will include geophones, cables, recording/telemetry boxes, batteries, equipment bags, recording trailer or “doghouse” and equipment repair trailers (Figure 5.25);



**Figure 5.25 Typical Truck and Setup**

- #2 - *Assemble at staging area:* Equipment will be delivered initially to the field staging areas where crew members will organize, test and load it into quick disconnect equipment bags;
- #3 - *Field deployment:* A helicopter (or pick-up truck) will transport the equipment bags to designated drop zones along receiver lines in each recording swath where layout crews will deploy the geophones, cables, recording/telemetry boxes and recondition as needed (Figure 5.26); and





**Figure 5.26 UTV Operator with Line Viewing Device**

#4 - *Field re-deployment:* As “recording” operations (see 5.6.3 below) in each recording swath are completed, equipment will be packed in equipment bags and returned to the field staging areas by helicopter (or pick-up truck) for inspection, repair and re-packing and then re-positioned for alternate re-deployment. Standing reserve equipment bags will be deployed to the next recording swath by return trip and then the next sling load of equipment bags retrieved and returned to the field staging areas. This process of equipment pick-up and re-deployment will be repeated until all used equipment is retrieved and reserve equipment deployed to the next swath.

### **5.6.3 Vibrator Operations**

Vibrator operations generate the acoustic energy signals that reflect off target geologic features and provide seismic data (after geophone recording and data processing). Vibrators will operate in two sets of three buggies. While one set is moving to the next Vibrator source point the other set will be shaking its source point. Periodically, vibrators will need to use receiver lines to move to the next set of source lines if an adjacent trail is not available. For any vibrator source point, there will be 25 live recording (geophone) lines on either side of the vibrator source. The active receiver lines being recorded receive the reflected acoustic signals through geophones and transmit those signals to the geophones/GSR boxes in the active patch which simultaneously store each signal. The “doghouse” (located at the field staging area or other approved location) controls the timing and vibrator sync during recording operations. Once the GSR boxes are picked up from the back spread and flown into the staging area, the data in the GSR boxes will be downloaded, geomerged and sent out of the field for processing, analysis and 3-D modeling.



#### **5.6.4 Troubleshooting**

Line viewers/trouble shooters will drive on UTVs or walk along the receiver lines viewing each station (Figure 5.26). If the line viewer detects a bad GSR station, they will repair the station as needed. Typical repair issues include inoperative field recording boxes, low battery or disconnected geophones. The repairs usually require changing out defective equipment and returning it to the field staging areas for repair.

#### **5.6.5 Data Retrieval**

The field recording boxes have data storage media units that are downloaded upon pickup (Figure 5.27) and rotated to the field staging areas as described earlier. Data is stored in the Geomerge trailer as backup and later processed for quality assurance purposes.



**Figure 5.27     Deployment/Pickup of Receiver Telemetry Box in the Field**

### **5.7     Field Clean-Up and Restoration Procedures (Work Segment 8)**

Clean-up and restoration operations will be conducted concurrently with field operations and documented and approved by USDOI-NPS and FDEP representatives (cleanup only - see Section 5.9). Although the survey is expected not to result in any lasting impacts, there may be instances where minor, unavoidable soil or damage may occur. In those instances, field representatives will document the damage, and send clean-up and restoration personnel to the location to repair the damage by shoveling, raking and



leveling, as needed. The Project Manager will maintain a liaison with USDOJ-NPS and FDEP representatives, if on site (see Section 5.9), to ensure that work is completed to their satisfaction. As the acquisition proceeds, any flagging, pin flags, bamboo lath and any other trash used in the operation will be removed from the survey area by equipment pick up crews. Trash will be bagged and removed daily.

## **5.8 USDOJ-NPS Inspection and Oversight (Work Segment 9)**

Pursuant to BCNP MMP geophysical Stipulation #12 (see Exhibit 5) BCNP-NPS staff and USDOJ-NPS representatives will be present in the NG3-D seismic survey area throughout field operations. The Project Manager or his designee will act as liaison and coordinate inspection logistics as needed. Representatives will be provided radio and/or cellular telephone communications for use in the field. Representative personnel will be given safety and orientation training in the same manner as all other field personnel.

## **5.9 State Inspection (Work Segment 9)**

Because BOCI is utilizing surface vibration to generate seismic signals, no FDEP field representatives are required to monitor non-explosive permitted activities. However, a state inspector may periodically visit the proposed operations for the following purpose:

“...to verify that the permittee has removed from the site all equipment, trash, debris, and materials resulting from the permitted activity.” [62C-26.007(6)(a)(1), Florida Administrative Code (FAC)]

## **5.10 Actions Taken to Control, Minimize or Prevent Damage**

This section provides detailed descriptions “of all actions to control, minimize, or prevent damage to the recreational, biological, scientific, cultural, and scenic resources” of the BCNP. It also addresses actions to be taken to comply with the regulatory standards and/or operational stipulations embodied in the 36 CFR 9B regulations and BCNP MMP as well as other state and federal permit requirements.

### **5.10.1 Planning and Design**

Effective environmental and resource values protection begins with proper planning. In the case of the NG3-D survey, it began with the incorporation of a wide range of advanced geophysical seismic technologies in a survey design and field operations plan fully consistent with the 36 CFR 9B regulations, the BCNP MMP geophysical stipulations and the impact mitigation and environmental protection suggestions and guidelines provided in the 2006 USDOJ-NPS Operator’s Handbook. The result is a survey that will effectively evaluate the target geologic formation while generating *de minimis* surface impacts.



### 5.10.2 Design Overview and Impact Reduction Strategies (Modification Protocols)

The revised 3-D geophysical seismic survey's initial design encompasses approximately 110 square miles of surface land and is comprised of 64 source lines and 168 receiver lines oriented generally at right angles to each other in an industry standard, unmodified "orthogonal" pattern (see Figure 5.28 for an excerpted example). This is the initial design of hypothetical lines on a map; they do not result in newly proposed linear features on the ground surface. The 64 source lines are 1,155 feet apart, oriented east to west and designed to accommodate approximately 32,657 source points spaced at 82.5-foot intervals. The 168 receiver lines are 495 feet apart, oriented north to south and designed to accommodate approximately 37,465 receiver points spaced at 165-foot intervals. Each receiver point consists of three geophones placed inline.

The initial design was then modified based on aerial imagery and documented wildlife/cultural resources to minimize or avoid impacts to sensitive areas. Specifically, where the initial seismic survey design intersected with important resource areas, the Modification Protocols first looked to move source points to existing or previous disturbances (roads and trails) followed by selection of source points at non-road/trail locations offering the opportunity for the least surface impacts. Receiver lines were also modified to incur the least impacts feasible to important resource areas while maintaining as much of a straight line configuration as possible. While the design has inherent source and receiver point location flexibility, modifications are governed by the need to satisfy a minimum design "fold" standard (i.e., a sufficient volume of vibration responses received) in order to achieve a satisfactory survey quality. An example of the Applicant implementing its Modification Protocols for source and receiver points is shown in Figure 5.29. In this example, the "orthogonal" design of Figure 5.28 was modified to accomplish impact minimization required by applicable regulatory requirements, guidelines and BCNP MMP geophysical stipulations. The modified line locations for the entire NG3-D seismic survey area are shown on Maps 2A – 2E. These modified lines will be further moved during field operations to incorporate real-time data to further avoid/minimize potential natural resource impacts.

In summary, the Applicant has minimized and intends to further minimize impacts on the Preserve resources by utilizing the following strategies:

- Employing vibroseis methodology that avoids the drilling, placement, detonation and clean-up of explosive charges to create seismic signals and results in an overall shorter period of time in the field;
- Utilizing vibroseis buggies with balloon (flotation) tires to reduce ground pressures;
- Employing Modification Protocols to modify elements of the initial 3-D seismic survey design, such as:
  - The use of existing or previous disturbances (roads, trails, abandoned well pads sites, etc.) to reduce impacts;
  - The repositioning of vibration source points to such disturbances to reduce surface impacts where needed; and



- The repositioning of receivers in certain situations to reduce surface impacts.
- Avoiding, to the extent feasible, environmentally sensitive IRAs;
- Avoiding known archaeological/cultural sites (not shown in the example);
- Locating/avoiding/buffering known listed wildlife habitat areas (not shown);
- Anticipating vegetative trimming, to the extent feasible, with species identification/utilizing exotics brush cutting locations;
- Avoiding non-consenting mineral-owner property (not shown);
- Avoiding non-consenting surface-owner property (not shown); and,
- Locating and avoiding existing or abandoned oil and gas facilities (not shown).
- Groundtruthing field operations to incorporate real-time data to further avoid/minimize potential natural resource impacts.
- Employing the “one-pass” routing technique for vibroseis equipment as much as possible;
- Offsetting pathways and routing of equipment as much as possible to achieve a “one-pass” outcome where receiver and vibration source points are to be revisited more than once because of necessary overlapping of Phase survey edges;
- Drastically reducing the use of stakes and other forms of field markers during operations; and
- Employing helicopter operations to assist the on-foot layout and pick-up of geophone receivers.





# Nobles Grade 3D No Source or Receiver Moves Location #1

Receivers – Blue  
Source – Red  
Receiver Line Interval: 495'  
Receiver Group Interval: 165'  
Source Line Interval: 1155'  
Source Group Interval: 82.5'



Figure 5.28 Unmodified Standard “Brick-Grid”



# Nobles Grade 3D Theoretical Source and Receiver Moves Location #1

Receivers – Blue  
Source – Red  
Receiver Line Interval: 495'  
Receiver Group Interval: 165'  
Source Line Interval: 1155'  
Source Group Interval: 82.5'

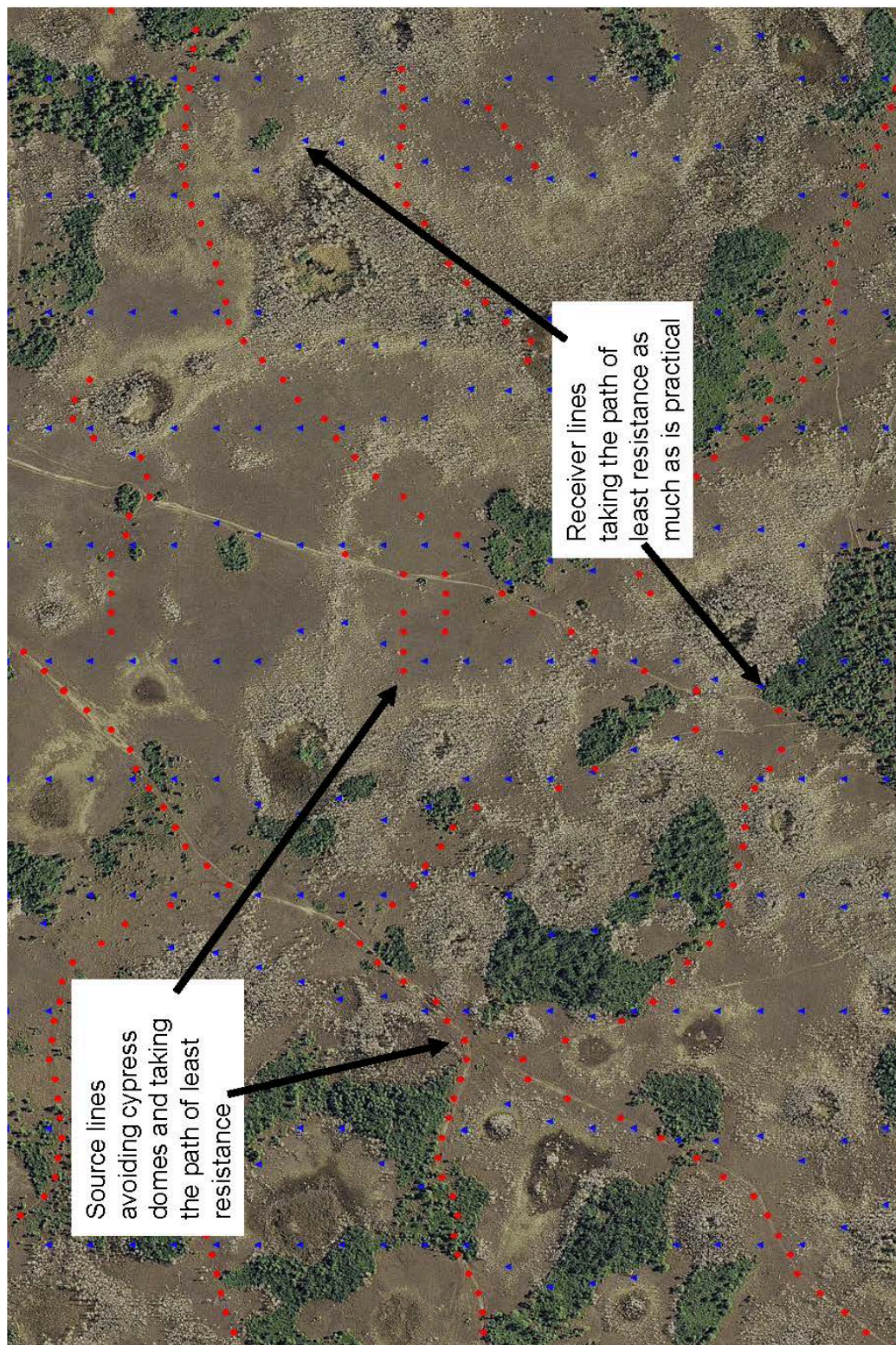


Figure 5.29 Modified Standard “Brick-Grid”



### **5.10.3 Survey and Plan Development Organization**

Dawson Geophysical, Inc., together with the Applicant's in-house geophysicist, has designed an initial 3-D seismic survey to evaluate Sunniland Trend and deeper geological prospects. Dawson is a leader in active field crews in North America with operations in nearly every major basin. The company has a strong history of designing, permitting, and conducting vibroseis operations – many of which have been conducted on Federal lands (Bureau of Land Management).

### **5.10.4 Prospect Data Considerations and Modeling**

This POP reflects the Applicant's strong interest in promising oil and natural gas prospects developed from evaluation and analysis of existing 2-D geophysical seismic data and exploratory drilling data in the Sunniland Oil Trend of Southwest Florida (Figure 1.4). The following evaluations and databases underpin the selection of the NG3-D exploration area and its exploratory 3-D seismic survey design:

- The Applicant's evaluation and analysis of Humble Oil and Refining Company's (Exxon) 2-D geophysical seismic data (1966-1967 and 1973-1976);
- The Applicant's evaluation and analysis of Shell Western E&P's 2-D geophysical seismic data (1973-1989);
- South Florida production and geologic data;
- South Florida drilled well data (1943 - 2000); and
- The Applicant's proprietary modeling of geological structures and reservoir potential.

### **5.10.5 NG3-D Seismic Survey Design**

The Applicant's seismic contractor, Dawson Geophysical, also serves as survey design and field operations advisors to the development of the Applicant's plan. Dawson's primary function was the 3-D seismic survey design and planning of field operations with technical methods capable of addressing the unique environmental conditions and special operating requirements inherent in and around the proposed seismic survey area. The modified survey design for the revised NG3-D survey area is depicted on Map 2A – 2E. This design reflects the implementation of the Modification Protocols discussed in 5.10.2. However, no plan is final until field operational realities are taken into account. This modified 3-D design plan is anticipated to have an adequate amount of flexibility built into it to accommodate minor field modifications for unanticipated sensitive environmental or cultural discoveries arising from daily surveying and scouting operations undertaken subsequent to plan approval.

### **5.10.6 Modification Protocols - GIS Data Layers, Analyses and Mapping**

The Applicant's seismic contractor has procured, developed, assembled, analyzed, and incorporated into individual GIS data layers the most recent high resolution (one foot resolution), color digital aerial imagery available to enable accurate source and receiver point modification. This comprehensive database provides the plan design team with an



up-close aerial view of the NG3-D survey area where surface conditions of survey occupancy points can be anticipated. This, in turn, is expected to contribute substantially to a dynamic survey and operational design that minimizes or eliminates environmental and cultural resource impacts, respects property rights and meets the Applicant's subsurface data acquisition and evaluation goals in an efficient and timely manner. GIS database analyses, digital imagery analysis and mapping operations are being utilized in the plan's modification process for many purposes that include the following:

- Roads, trails and existing disturbance identification and mapping;
- Relocation of seismic energy source points to roads, trails and other previously disturbed areas;
- Routine field access planning;
- Special access planning for off-trails source points;
- Geophone relocation, as needed;
- Avoidance of environmentally and culturally sensitive areas;
- Avoidance of listed species locations and accommodation of wildlife concerns;
- Surface/subsurface property ownership identification and non-consent avoidance;
- Identification of vegetative cover types;
- Vegetative trimming/brush cutting considerations, estimates and minimization;
- Identification of current and abandoned oil and gas operations and impacts;
- Plan map development and illustration;
- Helicopter flight path planning;
- Intermediate survey design requirements; and
- Area of Influence (AOI) estimates.

#### **5.10.7 Modification Protocols - Special Analytical and Design Considerations**

Implementation of the Applicants' Modification Protocols is expected to minimize or eliminate potential impacts to the Preserve's environmental and cultural resources. One of the most important elements of the Modification Protocols is the extensive utilization of existing and previous surface disturbances (trails) for source point relocation. The Applicant has accomplished important design modifications with a high degree of confidence through an innovative combination of GIS and digital imagery utilizing the following software-based analytical technologies, interpretative techniques and steps:

- Using ArcGIS/ArcMap software, the unmodified, standard 3-D seismic "brick-grid" was digitally overlain on the most recent high-resolution (one foot), color digital aerial imagery available;
- "Plainly visible" roads, trails and disturbances proximal to each source point were identified as to USDOJ-NPS use designation and "digitally over flown" in model space to confirm identification;
- Source points were then be re-located to the existing disturbances (pursuant to certain design constraints) and away from IRAs and environmentally/culturally sensitive areas. Detailed location notes assigned and a color code digitally assigned to reflect the confidence level of the relocation; and



- Receiver lines were also evaluated to determine vegetation types and moved to avoid dense vegetation, standing water areas, and documented occurrences of protected wildlife species.

This process was repeated for in the entire NG3-D survey area as shown on Map 2A – 2E. This modified survey design will be subject to further groundtruthing and field modifications in consultation with USDOJ-NPS representatives pursuant to the results of daily surveying and scouting operations.

#### **5.10.8 Field Implementation of Planning Objectives**

Using the fully modified survey design described above as a foundation, the Applicant's seismic survey plan consultant will finalize a plan of field operations. According to this plan, the Survey Manager will have the ability to identify and fine-tune any field access and source and receiver point location concerns that could not be identified during the planning and design phase of the survey. Final field modifications, access and location changes will be subject to approval by USDOJ-NPS representatives.

Specifically, a survey scout, ecologist, and archaeologist will work immediately ahead of each group of Vibroseis buggies to obtain real-time data for the undocumented hazards, sensitive areas, listed species occurrences, cultural resources, etc. The survey scout, ecologist, and archaeologist will survey along each of the source lines, as well as in areas where the source lines are proposed to be re-routed, prior to the Vibroseis buggies moving in. This in-the-field survey feature and the Vibroseis technology allow for the vibration source paths to be re-routed to avoid potential impacts to the types of areas discussed above.

Additional aerial scouting will be conducted by an ecologist to identify potential species habitat that could be affected by receiver line placement (i.e., RCW habitat, wading bird rookeries, etc.). Additional groundtruthing will be conducted by the ecologist (if needed) in conjunction with the USDOJ-NPS and/or the USFWS to avoid protected species locations along the receiver lines, if identified. Flexibility has been built into the operations plan to accommodate unanticipated encounters.

#### **5.10.9 Project Planning and Analysis**

The Applicant has conducted and will continue to conduct meetings with Federal, State, and regional agencies regarding the project. An analysis was also conducted of past 3-D plans of operation applications. Each set of activities has been evaluated to identify key issues, concerns, and expectations applicable to the NG3-D exploration project in the Preserve.

##### **5.10.9.1 Project Planning Meetings**

The Applicant has conducted and will continue to conduct meetings with the USDOJ-NPS, FDEP-OGS, FDEP-ERP, FDOT, FWCC, and USFWS; and has



been pursuing input through the USDO-I-NPS from the resource management staff of the Seminole and Miccosukee Tribes. Other agency and non-governmental organization representatives may be contacted, if needed. The dates of these coordination meetings are included in Exhibit 11. The information gathered from these meetings have been incorporated to develop many of the technologically feasible alternative field operations techniques and methods least damaging to the environmental and natural resource values of the Preserve.

#### **5.10.9.2 Review of Applicable MMP Stipulations**

The MMP stipulations for geophysical operations in the BCNP set out 38 operating requirements to be followed by the Applicant's planning work in the unit. The Applicant reviewed these stipulations in the planning phase of this project and incorporated conformance with applicable stipulations into plans and procedures for field operations. A review of the 38 MMP stipulations for geophysical operations and summary of actions to be taken by the Applicant to comply are provided as Exhibit 5.

#### **5.10.9.3 USDO-I-NPS Required Operating Stipulations**

For proposed geophysical operations, Table 3.2 of the 2006 USDO-I-NPS Operator's Handbook presents 20 geophysical exploration required operating stipulations directly reflecting operating requirements set forth in the 36 CFR 9B regulations and a variety of USDO-I-NPS Executive Orders (EOs), directives and procedural manuals as well as the Endangered Species Act (ESA). This POP was developed in conformance with each stipulation according to its respective applicability to anticipated NG3-D survey conditions. Each required operating stipulation is presented in Exhibit 12 with a brief description of actions taken by the Applicant to comply.

It should be noted, that among the various EOs that apply to the proposed geophysical operations, EO 11990 provides that "each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use" (42 Federal Register 26961 (May 24, 1977)). According to Director's Order 77-1 (Wetland Protection), the purpose of EO 11990 was to avoid "impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative" (USDO-I-NPS, Procedural Manual #77-1: Wetland Protection 1 (January 2012)).

The proposed POP does not trigger the EOs requirement for a Wetland Statement of Findings (WSOF). The EO applies to "new construction located in wetlands," not all activities which occur in wetlands. The POP proposes no new construction



in wetlands: field operations require no construction or filling of wetlands, and equipment will be staged on existing open areas near I-75. The purpose of the EO is to avoid “destruction or modification of wetlands,” and the POP was designed so that there would be no destruction or modification of wetlands. The EO also applies only to federal agencies “undertaking or providing assistance” to that new construction. Here, the POP will be undertaken by a private applicant (BOCI), rather than the USDOJ-NPS. The USDOJ-NPS also will be providing no financial assistance to BOCI. The oil and gas rights under the Preserve are privately owned, and the USDOJ-NPS review of the POP is not a leasing process. The POP also involves activities which are procedurally exempt pursuant to USDOJ-NPS Procedural Manual #77-1, including “use ... of unimproved backcountry stream crossings,” and “installation of scientific measuring devices.” For these reasons, EO 11990 is inapplicable and no WSOF is required for the Project.

Even if the EO applied to the POP, the POP would meet the criteria in the EO. EO 11990 calls for avoiding new construction unless “there is no practicable alternative to such construction,” and the “proposed action includes all practicable measures to minimize harm to wetlands.” The POP was designed specifically avoid new construction in wetlands in the BCNP: there is no filling or construction of anything in Preserve, which distinguishes this POP from previous POPs in the BCNP which involved some filling of wetlands. The POP also proposes to use vibroseis equipment, which avoids the need to excavate holes for use with underground explosive charges, and incorporates within the plan a series of environmentally-protective stipulations developed by the USDOJ-NPS in the GMP. BOCI cannot avoid using its equipment in wetlands located in BCNP, because those wetlands are located directly above the private oil and gas interests which BOCI has a right to explore. However, BOCI has structured its POP to avoid any new construction or destruction or modification of those wetlands, and to minimize wetland impacts, thereby meeting the intent of the EO.

The POP and associated Environmental Assessment (EA) also meet the content requirements of USDOJ-NPS Procedural Manual #77-1. Specifically, between the POP and the EA the following information has been provided: 1) a map showing the location of the proposed activities in relation to various wetland cover types; 2) a detailed descriptions of those wetland types; 3) a full disclosure of likely impacts of the proposed activities on those wetland types; 4) a description of alternatives to the POP; 5) an explanation of how none of the alternatives have fewer impacts to wetlands than the proposed action has fewer impacts; and 6) and a description of how the proposed action was designed to minimize wetland impacts. Since there will be no destruction of wetlands, there is no need to identify compensation for lost wetlands.



#### **5.10.9.4 USDOl-NPS Recommended Mitigation Measures**

The mitigation measures shown in Table 3.3 of the 2006 USDOl-NPS Operator's Handbook are recommended by USDOl-NPS to ensure compliance with 36 CFR Subpart 9B regulations, plan approval standard, requiring the use of "...technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety" (36 CFR § 9.37(a)(1)).

Many of the mitigation measures are derived from environmental guidelines and publications developed by the oil and gas industry and environmental professionals but may not address every potential environmental concern encountered during field operations. Table 3.3 is intended to be a project planning tool. An applicant can look through the table to see which mitigation measures may apply and select the most appropriate mitigation measure to meet the USDOl-NPS' least damaging approval standard (USDOl-NPS 2006 Operators Handbook). For details relative to selection of recommended mitigation measures and the Applicant's actions taken to conform, refer to Exhibit 12.

#### **5.10.9.5 FDEP Geophysical Permit Conditions and Requirements**

The geophysical permitting program is administered by the FDEP-OGS, an operational sub-unit of the FDEP Bureau of Mines and Minerals Regulation. MMP oil and gas operational stipulations reflect many of the regulatory provisions of the Florida Oil and Gas Rules. The specific rules governing geophysical seismic operations are found in Chapter 62C-26.007 FAC. Permit criteria applicable to NG3-D field operations are:

- Requirements to avoid sensitive areas;
- Minimization of soil and vegetation impacts; and
- Provisions for active clean-up and restoration of project area.

The FDEP-OGS is the lead permitting agency for Florida geophysical seismic permit applications and coordinates with FDEP-ERP, the state Wetlands permitting agency. Actions taken by the Applicant to comply with applicable environmental protection provisions discussed in Subsections 5.10.9.2-4 above will satisfy the Florida Oil and Gas Rules referenced above.

#### **5.10.9.6 FDEP ERP - Wetlands Resource Permitting**

The Applicant has reviewed the permitting requirements for geophysical seismic operations. The NG3-D plan is designed and expected to eliminate or minimize potential survey related impacts to *de minimis* levels. Concerted planning and design efforts are being made to maximize the use of existing roads, trails and other previously disturbed areas as well as helicopter field support and vibrators so as to minimize potential impacts to BCNP environmental and natural



resources. For these reasons, the Applicant believes that the potential impacts resulting from field operations fall below required permitting thresholds and should be considered *de minimis*. The applicable interagency agreements relative to *de minimis* activities for geophysical seismic permitting by FDEP are included in Exhibit 13.

#### **5.10.10 Technological Innovations and Resource Protection Benefits**

The NG3-D seismic survey includes a variety of technological and impact mitigation innovations that have evolved since the 1992 implementation of the BCNP GMP/EIS and BCNP MMP. Over the past 20 years, 3-D seismic surveys have become the industry's "gold standard" of seismic evaluations. Within the 3-D realm, resolution techniques have improved to the point that such surveys are used to differentiate and evaluate more subtle geological stratigraphy as well as reservoir fluid types and movement. The Applicant's goal in the NG3-D Seismic Survey is to explore the Sunniland Trend with the same high quality 3-D exploration techniques that are routinely employed elsewhere in the U.S. energy industry and do so in a way that produces as little impact as is feasible. Many of the following technological and impact mitigation innovations serve to produce a more robust seismic picture of the targeted subsurface geology and expedite field operations while simultaneously minimizing, or in some cases eliminating altogether potential environmental and resource values impacts traditionally associated with geophysical seismic surveys.

GPS and GIS technologies, high resolution imagery, and mapping techniques were used extensively in the design phase and will continue to be used throughout the surveying, scouting and daily operational planning of all field operations. Refer to Map 1, a GIS composite of the USGS 7.5 topographic map and to Map 2 depicting the operational details of the modified NG3-D survey design. Additional modifications will be made during the real-time scouting conducted immediately in front of the survey to further avoid potential impacts. As a result, the potential impacts attributable to the operations described in this plan after modification are expected to be *de minimis*.

**Innovation:** Deployment of buggy-mounted vibroseis vehicles that generates a localized, low to high frequency "thumping" or "vibrating" of the ground over a short 12 to 24-second period to produce a seismic signal (see Section 5.6). This equipment is highly maneuverable and utilizes low impact "balloon" or "flotation" tires that are designed to reduce ground tire pressure to 26 psi.

**Corresponding resource protection benefit:** This non-explosive seismic signal source technology eliminates the need for drilling, placement and detonation of explosive charges to create a seismic signal. The vibration and sound generated by the vibroseis equipment is not as apparent and loud as explosive charges, can only be heard within 600 feet (two football field lengths) of the equipment, and occurs only for less than half of one minute. The low impact tires allow vegetation to fold over and minimize root disturbance.

**Innovation:** Use of up-to-date, geo-referenced, high resolution, ortho-rectified digital imagery as the foundation of survey planning operations.



**Corresponding resource protection benefit:** A highly detailed, accurate and reliable 3-D seismic survey design and operational plan (incorporating source point location modifications) accomplished with a significant reduction in planning-related field work.

**Innovation:** Impact minimization strategies that incorporate 3-D seismic survey Modification Protocols emphasizing to the extent feasible the use of previously disturbed areas for all aspects of survey field operations.

**Corresponding resource protection benefit:** Minimization of new impacts to soils, hydrology, vegetative cover and wildlife species by utilizing existing and former roads, trails, well pads and open areas.

**Innovation:** Intensive serial computer seismic fold simulations to assess seismic data quality at multiple stratigraphic levels during the survey design process.

**Corresponding resource protection benefit:** Allows for application of Modification Protocols to the initial survey layout design in order to maximize the use of previously disturbed surface areas and minimize surface impacts while preserving enough survey design flexibility to accommodate unanticipated resources or access issues that may arise during field operations.

**Innovation:** Utilization of digital GPS satellite maps, existing roads and trails, and existing and previously disturbed areas for survey layout operations and high order ground survey control; where vegetative cover precludes satellite acquisition, non-satellite and kinematic survey control systems will be used (with limited flagging) to provide rapid and highly accurate layout surveys.

**Corresponding resource protection benefit:** Minimizes/avoids placement of source point locations in important resource areas; reduces vegetative trimming and brush cutting for source point and geophone receiver repositioning; expedites field survey operations; and minimizes potential impacts traditionally associated with human presence.

**Innovation:** Comprehensive in-the-field access scouting of GIS-based source/receiver location coordinated with USDOI-NPS on-scene representatives.

**Corresponding resource protection benefit:** Minimizes access impacts associated with vibrator source point placement and data acquisition operations and minimizes vegetation damage and surface impacts.

**Innovation:** Stakeless or minimal staking techniques (where canopy interference is encountered).

**Corresponding resource protection benefit:** Enhances wildlife safety, reduces potential for vandalism, facilitates concurrent clean-up operations and helps minimize reclamation requirements.

**Innovation:** A “one pass” design objective underlying source point locations and data acquisition planning operations.

**Corresponding resource protection benefit:** Minimizes vibrator buggy impacts by reducing the number of times they pass through a given area.



**Innovation:** Utilization of GPS field asset tagging technology for real-time monitoring of field equipment movement and helicopter support operations.

**Corresponding resource protection benefit:** Contributes significantly to minimization of flight times and in-field staging area requirements.

**Innovation:** Acquisition of long shelf life, high quality 3-D geophysical seismic data covering a large area that will be useful for many years and adaptable to anticipated data processing improvements.

**Corresponding resource protection benefit:** Potentially reduces the need for future geophysical surveys in the survey area until the next substantial leap in technology.

**Innovation:** Clean-up and restoration operations conducted concurrently with each segment of survey operations.

**Corresponding resource protection benefit:** Provides for the immediate identification of and response to impact to Preserve lands and resource values that may result from field operations. This will ensure not only comprehensive clean-up and restoration but also minimization of the temporal extent of exposed soils and hydrologic impacts.

**Innovation:** Application of a variety of Preserve-specific “Best Management Practices” based on the BCNP MMP, 2006 USDO-I-NPS Operators Handbook and Industry Environmental and Land Safety Manuals.

**Corresponding resource protection benefit:** Minimizes potential impacts to Preserve environmental and resource values identified in the 36 CFR 9B regulations, BCNP MMP, and 2006 USDO-I-NPS Operators Handbook.

#### **5.10.10.1 Florida Panther Avoidance**

The Applicant recognizes that Florida Panther avoidance is important. Known panther habitat data has been provided to the Applicant and is included in the Modification Protocols discussed above. The Applicant has and will continue to conduct planning meetings with State and Federal Florida Panther management and research agencies to discuss ongoing panther research and issues. A detailed discussion of panther issues, concerns and avoidance strategies is provided in Section 10.0: Background Environmental Information. The Applicant will coordinate field operations with continuing panther tracking efforts to avoid denning activities, where necessary. Computer simulations are expected to indicate that sufficient design flexibility is available to accommodate buffer zones around stationary panther activities (e.g. denning), if needed.

#### **5.10.10.2 RCW Avoidance**

Another important local biological resource is the RCW. Initial research of known colonies suggests minimal conflict in the survey area. The Applicant has incorporated this issue early in the plan development process and will continue to conduct planning meetings with State and Federal RCW management and research agencies. A detailed discussion of RCW issues, concerns and avoidance



strategies is provided in Section 10.0: Background Environmental Information. The Applicant will coordinate field operations with on-going RCW researchers to avoid contact where necessary. Buffer zones will be designed around documented RCW colonies, if applicable. Computer simulations are expected to indicate that sufficient program design flexibility is available to provide additional buffer zones should it become necessary based on on-going RCW research.

#### **5.10.10.3 Wading Bird Rookery Avoidance**

Another important local biological resource are wading bird rookeries. Initial research shows some historic wading bird rookeries in the survey area. The Applicant has incorporated this issue early in the plan development process and will continue to conduct meetings with State and Federal wading bird management and research agencies. A detailed discussion of wading bird issues, concerns and avoidance strategies is provided in Section 10.0: Background Environmental Information. The Applicant will coordinate field operations with on-going wading bird location efforts to avoid contact, where necessary. Buffer zones will be designed for active wading bird colonies. Computer simulations are expected to indicate that sufficient design flexibility is available to provide additional buffer zones should it become necessary based on on-going wading bird research.

#### **5.10.10.4 Archaeological, Historical, Cultural Site Avoidance**

As required by BCNP GMP/EIS/MMP geophysical operation stipulation, and in recognition of the inherently sensitive nature of archaeological, historical and cultural resources, the Applicant has retained the services of professional archaeologists to conduct extensive research, prepare a Site Avoidance Model for the NG3-D seismic survey, develop avoidance protocols, accompany the seismic survey crews to implement the Model, and conduct other field investigations as may be required by the USDOJ-NPS SEAC, the lead federal agency, subsequent to coordination and the concurrence of the STOF and the MTOI. As required by the Tribes, and in compliance with USDOJ-NPS and Florida regulations, the locations of known or previously undocumented sites will be kept confidential.

### **5.10.11 Crew Orientation and Education**

The MMP sets out a number of stipulations designed to specifically protect the Preserve's resources when conducting oil and gas activities. Table 3.3 of the *2006 USDOJ-NPS Operator's Handbook for Non-Federal Oil and Gas Development* recommends mitigation measures for geophysical operations. Exhibits 5 and 12 provide the Applicant's response to those stipulations and recommendations. As stated in Exhibit 12, the Applicant anticipates holding a series of meetings between the seismic contractor's field personnel and USDOJ-NPS staff, law enforcement, safety officials, emergency responders, etc. These meetings will serve to educate regulators and public, health and safety officials, as well as



geophysical crews about the special challenges and environmental protection objectives of conducting the operations described in this POP within the Preserve.

#### **5.10.11.1 Pre-Operation Meetings**

Conducting geophysical operations within the Preserve presents special challenges ranging from accessing the Preserve off of the limited-access I-75, to conducting operations in a unique environmental setting. In order to comply with the BCNP's MMP geophysical operating stipulations of both protecting the resources of the Preserve and conducting a safe survey, the Applicant proposes to conduct various pre-operation meetings between seismic field crews and USDOI-NPS/State resource experts for the purpose of familiarizing all parties with geophysical operations and the important resources of the Preserve. More than one meeting may have to be held as various members geophysical crews arrive in South Florida for the first time. These meetings will also include discussions with various State, Federal and local public official responsible for traffic control, fire, security and other forms of emergency responses.

#### **5.10.11.2 Crew Education**

Educational training will be provided to survey crews to help them identify and avoid wildlife and environmentally sensitive areas (to the extent feasible), as well as to identify and avoid cultural/archaeological areas. Crew education will serve to instruct team members to not collect vegetation, wildlife, artifacts, etc., as well as inform the crew of wildlife protection measures and safety hazards. These trainings will result in increased protection and awareness of sensitive resources within the Preserve.

Environmental preparations will include trainings on both listed and non-listed species that may be encountered in the field during seismic surveying operations. These trainings will include the identification of animal sign and habitat, including potentially active cavities, nests, colonies/roosting areas, burrows, and denning sites. Species identification training will also be provided. Crews will be trained to operate vehicles and equipment slowly and attentively to reduce potential impacts to wildlife species. Workers will be fully aware that wildlife species are not to be harmed or collected.

Per communications with the FWCC in comment letters dated February 20, 2014 and May 16, 2014, the agency does not believe that the seismic survey will impact Florida panther habitat. However, prior to the commencement of activities, the FWCC Florida Panther Team will provide information and training for field crews about the possibility of encountering a panther and/or panther denning activity while crews are deploying seismic equipment and how to handle such an encounter. The FWCC will alert the survey crews of potential denning areas by radio collared female panthers and the FWCC will coordinate with the seismic crews regarding flight operations over the same



airspace that is used to track panthers. In addition, educational materials describing the Florida panther, regulations related to its protection, and USDOJ-NPS and USFWS direction relative to panther observation protocols will be distributed to field crews prior to the start of the survey operations.

Additionally, per FWCC recommendations, crews will be informed that access points from the I-75 corridor must be kept secure to prevent unauthorized entry and to prevent wildlife from breaching the I-75 wildlife fencing. Crew members will also be educated about the secure storage and removal of food and food waste to prevent attracting wildlife such as the Florida black bear. In addition, crew education will include equipment/vehicle inspection and cleaning/decontamination procedures to minimize the risk of spreading invasive plants into sensitive and/or remote areas.

Survey crew members will be informed regarding potential field hazards that they may encounter including biting insects, alligators, venomous and non-venomous snakes, exotic species such as pythons, etc. The USDOJ-NPS will also brief workers prior to commencement of operations regarding these potential field hazards and reporting protocols. USDOJ-NPS staff will provide other information/instruction for issues they find appropriate.

Pursuant to BCNP MMP geophysical Stipulation #12, Preserve staff and USDOJ-NPS representatives will be involved throughout field operations. These representatives will be given safety and orientation training in the same manner as other field personnel.

#### **5.10.11.3 Operational Meetings**

In order to achieve the maximum avoidance and mitigation of operational effects, the Applicant anticipates during the 18-week survey period that daily, in the field meetings will occur between USDOJ-NPS, State (if on site; see Section 5.11) representatives and seismic contractor superintendent(s) and crew leaders. In these meetings, it is anticipated that coordination and discussions of survey progress and mitigation of field issues will occur together with planning and discussion of subsequent days' operations.

### **5.11 Area Safety and Security**

This section provides descriptions “of security measures that will be used to ensure public health and safety.”

Staging Area Operations:

- Field staging areas to utilize existing recreational parking infrastructure as an exit from I-75 and ingress to and egress from the Preserve;
- Field staging areas on either side of I-75 to facilitate field operations to have limited and locked I-75 ingress/egress; and



- Helicopter operations to comply with FAA regulations and safety guidelines prohibiting helicopters carrying long-line loads from flying over I-75, field personnel and known populated areas.

#### Helicopter Refueling:

- Refueling operations to be conducted at the field staging areas on ground liner protection and fuel trucks with or over fuel spill containment or protection systems.

#### Field Refueling:

- Occupational Safety and Health Administration/National Fire Protection Association approved steel fuel containers to be (Type II Safety Cans) transported to the field;
- Field refueling operations will be conducted over a ground liner carried on each piece of field equipment; and
- Fuel tanks will remain locked unless in use.

#### Wastewater:

- Personnel to be housed outside of the Preserve;
- Portable toilets to be provided at main staging areas (and other sites proximate to I-75 on as needed basis). No trailer restroom facilities; portable toilets to be emptied as needed by certified service company; and
- No food preparation facilities.

#### Solid Waste:

- Trash to be collected and removed daily; should there be a need for additional trash capacity, covered, secured steel waste containers sufficient to accommodate field generated solid waste will be contracted for main staging area; and
- If used, container to be emptied as needed by licensed waste hauler.

#### NG3-D Seismic Survey and Crew Security:

- Access to be restricted and controlled by locked gates;
- Access staging area gates will be will be locked at night;
- Night security will be provided at the main staging area, MM-63S;
- Non-program visitors will enter the Preserve through personnel gates at the MM-63N Florida Trail access and east of MM-63S staging area;
- Pedestrian visitors to be able to access the Nobles Grade trail facilities from I-75 during daylight hours only – after being documented and advised of field operations in the vicinity;
- Non-operational ORVs and other un-authorized off-trail activities to not be allowed through gates during field operations;



- Notifications to be posted online and at the Oasis Ranger Station, Ochopee Headquarters, the MM63 Rest Area, Florida Trail, and access gates prior to and throughout the period of field operations;
- No fire-arms, hunting, fishing, pets or open fires to be allowed by crew members during field operations; and
- No smoking to be permitted in the field. Smoking in the staging area to be permitted in designated areas only.

#### Communication:

- Crews to have individual communication systems; and
- Operator to provide field radio communication with field personnel with daily status checks.

### 5.12 Compliance with Ten Percent Area of Influence Stipulation

**Ten Percent Area of Influence Stipulation:** According to the 1992 BCNP GMP/EIS/MMP prepared for the original BCNP, at any one time only ten percent or less of the original BCNP can be subject to the influences of oil and gas exploration and development activities.

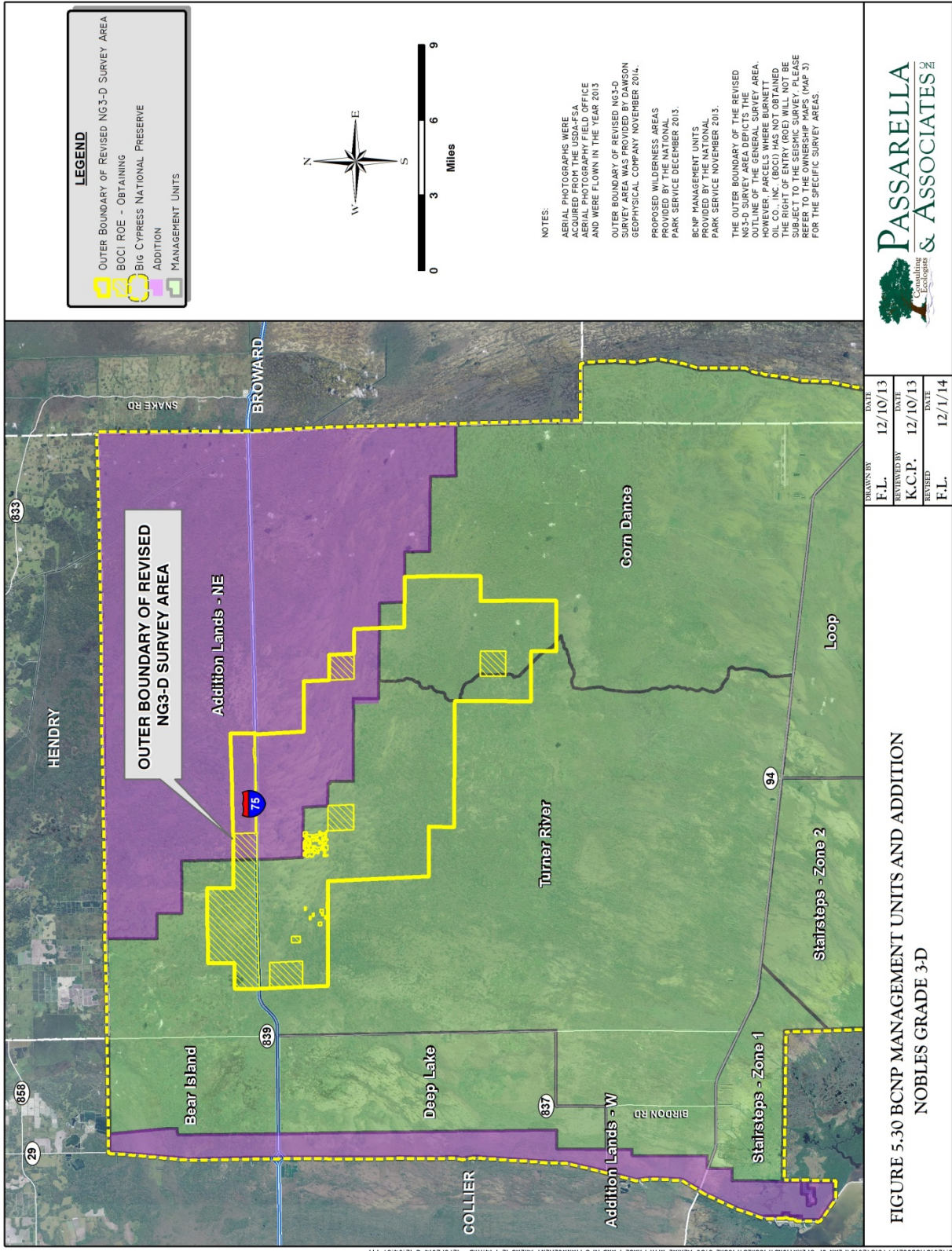
**Compliance:** Pursuant to BCNP GMP/EIS, Appendix B, the Applicant estimates in Exhibit 14 to this POP that the “influence” of oil and gas exploration and development activities including those influences directly attributable to NG3-D program field operations is not expected to exceed 10 percent of the BCNP at any time when combined with the AOI of existing oil and gas activities. It is estimated the AOI of a typical NG3-D Seismic Survey (based on activities described in Table 4.1) will not exceed 2.7 percent of the original BCNP while the survey is being conducted. If combined with the estimated existing oil and gas activity level of 2.7 percent, the total BCNP AOI level is not expected to exceed 5.4 percent – well under the 10 percent limit. When combined with the additional acreage of the Addition area and its estimated existing oil and gas activity AOI, the peak AOI is estimated not to exceed 5.1 percent. The AOI for the survey will return to zero after the survey and following the completion of any necessary reclamation work.

### 5.13 Compliance with Bear Island Stipulation

**Bear Island Stipulation:** According to the 1992 BCNP-GMPs MMP, future oil and gas operations in the Bear Island unit would be permitted only if the direct impacts of such operations do “...not exceed the acreage of unreclaimed access roads, pads and pipelines in the unit as of May 1, 1991.” The Applicant proposes to conduct a small portion of the revised NG3-D seismic survey in the Bear Island Unit of the BCNP (see Figure 5.30) and estimates that the effects of geophysical operations will be *de minimis*, not produce or result in any lasting increase in direct impacts and, therefore, be in compliance with the stipulation.

It is the Applicant’s understanding that over the past 20-plus years a significant portion (approximately 50 percent) of the Bear Island oil field infrastructure (direct impacts) has been reclaimed, thus providing the possibility of allowing a like amount of new direct impacts to







occur should they be permitted. In the case of the scaled-back NG3-D survey area, no lasting direct impacts are expected.

#### **5.14 IRA Protection Stipulation**

**IRA Protection Stipulation:** According to the MMP prepared as part of the GMP for the original BCNP, important resource areas include vegetation and landform resources such as cypress strands/mixed-hardwood swamps/sloughs and cypress domes, marshes, hardwood hammocks, old-growth pinelands, and mangrove forests; wildlife resources such as RCW colonies, Cape Sable seaside sparrow habitat, active bald eagle nesting sites, and known Florida panther areas; and cultural resources such as archaeological sites and Miccosukee Indian cultural sites. No surface occupancy for the placement of access roads, pads, or pipelines may be permitted in or on any vegetation community or cultural site identified as an IRAs. The use of motorized vehicles for the conduct of geophysical exploration may not be permitted in or on any cultural site or vegetation community identified as an important resource area, except old-growth pinelands as specified under geophysical operation Stipulation #14. Important wildlife resources will be avoided in accordance with applicable operational stipulations. This stipulation will not apply to casual or other uses that would not significantly disturb surface resources, such as geophysical surveys conducted by foot or non-motorized methods.

**Compliance:** The Applicant is aware of the wide range of IRAs and cultural resource values present in the NG3-D survey area. They represent the focus of the Applicant's planning and design operations (including the application of Modification Protocols discussed in Section 5.10.2) and will continue to be the subject of ongoing identification and monitoring activities throughout field operations. Much of this stipulation is directed toward activities associated with the drilling of wells, which are not part of this POP. The entire plan, and Section 10.0 in particular, contains comprehensive discussions of actions taken to comply with the provisions of this stipulation.

#### **5.15 Statement of Compliance with Operating Standards of 36 CFR §9.41-9.46**

The Applicant fully understands the requirements and operating standards of 36 CFR §9.41-9.46 and intends to comply. In the event that field conditions dictate modifications of the proposed activities presented in this plan, the request for a variance or modification will be made to the Superintendent with supporting information.



## **6.0 SPILL CONTROL PLAN & EMERGENCY PREPAREDNESS PLAN**

### **6.1 Purpose**

Pursuant to the 2006 USDO-I-NPS Operator's Handbook:

*The NPS has combined informational requirements and operating standards from the 9B regulations to develop the format for a Spill Control and Emergency Preparedness Plan. This plan covers the substances or site conditions that pose risks to human health and safety and the environment. It also describes the actions the operator would take to minimize these risks in the event of a spill or natural disaster (e.g., flood, fire, hurricane, or tornado). See Chapter 11 – Spill Control and Emergency Preparedness Plan in the Operator's Handbook for the organization and content of a Spill Control and Emergency Preparedness Plan.*

### **6.2 Identification of Potentially Contaminating Substances**

This plan addresses vibration seismic surveying only. The use of vibroseis technology eliminates the drilling of seismic charge holes for placement of small explosive charges. No drilling fluids will be used and no drill cuttings will be generated.

Six potentially contaminating substances used in field operations have been identified as follows:

1. Aviation Fuel - Jet A:
  - Hazardous content: refined hydrocarbons – jet fuel
  - Hazardous effect: fire hazard, irritant, toxic
  - Use: fuel – helicopter operations
  - Material Safety Data Sheet (MSDS) attached: no
2. Diesel Fuel:
  - Hazardous content: refined hydrocarbons – diesel
  - Hazardous effect: fire hazard, irritant, toxic
  - Use: fuel – electrical generators on field staging areas, vehicles and vibrators
  - MSDS attached: no
3. Gasoline:
  - Hazardous content: refined hydrocarbons – regular unleaded gasoline
  - Hazardous effect: fire hazard, irritant, toxic
  - Use: fuel – miscellaneous field equipment/miscellaneous staging area equipment/4x4 UTVs
  - MSDS attached: no
4. Hydraulic fluid used to operate and generate the vibration and movement of the Vibrators:
  - Hydraulic fluid



- Hazardous effect: irritant, toxic
  - MSDS attached: no
5. Radiator/engine coolant used to operate Vibrators, vehicles and generator engines:
    - Ethylene Glycol
    - Hazardous effect: irritant, toxic
    - MSDS attached: no
  6. Engine oil used to operate Vibrators, vehicles and generator engines
    - Engine oil
    - Hazardous effect: irritant, toxic
    - MSDS attached: no

### **6.3 Abnormal Pressures, Temperatures and Other Hazardous Conditions**

Abnormal pressures and temperatures are not normally associated with geophysical seismic operations and are not anticipated for the proposed seismic survey. No potential structural hazards are known in the NG3-D survey area at the time of plan submittal. The only known potential structural hazard in the general area is the long abandoned Sunniland Pipeline once used to transport crude oil from the Bear Island area to a storage facility in Ft. Lauderdale. The pipeline was abandoned in 1995 pursuant to applicable provisions of the Florida Oil and Gas rules and lies well north of the scaled-back NG3-D survey area.

Other known hazards in the vicinity of the NG3-D seismic survey lie within the I-75 ROW and consist of:

- I-75 itself;
- Facilities associated with the MM-63 rest area and its water/sewage treatment facilities;
- A commercial telecommunications tower;
- Electrical power facilities adjacent to and along and within the north side of the I-75 ROW; and
- Private land owners' structures and airstrips.

Identification of hazards during seismic field operations is the responsibility of the Survey Crew and Crew Manager who will conduct pre-operational and daily meetings and give instruction for groundtruthing operations to identify potential hazards including:

- IRAs and threatened species/habitat of the Preserve;
- Difficult ground conditions, water hazards and vegetation covered holes and pits;
- Specific areas to be avoided for environmental or archaeological sensitivity;
- Fences, gates, buildings;
- Animals and/or hunters, hikers;
- Hunting camps;
- I-75 fence issues; and
- Areas of no occupancy – no private ownership permission



## **6.4 Measures Taken to Minimize Health, Safety and Environmental Risks**

### **6.4.1 Environmental and Safety Planning and Monitoring**

In addition to identification of field hazards, the Survey Crew and Crew Manager are responsible for a number of other safety planning and monitoring activities. Chief among these will be to conduct daily field scouting and groundtruthing operations ahead of field crews to identify potential hazards, field conditions, other user activities and ongoing USDOJ-NPS management operations including prescribed burns, exotics removal, trail construction, species monitoring, etc. The following types of environmental and safety planning concerns will be identified and monitored:

- Based upon field scouting and survey crew reports, determine a starting point and ending point for field operations, commensurate with the Operator's "one-pass" field operations planning concept;
- Prepare field site assessments identifying archaeologically or environmentally sensitive areas (described in more detail in Section 10), "no permit" areas and potential field hazards not identified in the planning and design process;
- Re-confirm planned source and receiver points and, where applicable, adjust those locations, in consultation with USDOJ-NPS representatives, according to the results of the field site assessments;
- Address source and receiver point access issues, in consultation with USDOJ-NPS representatives;
- Develop, distribute and maintain current field maps which accurately reflect the results of daily scouting operations;
- Conduct morning safety meetings to outline daily operations and apprise field crews of the results of field scouting and groundtruthing operations;
- Manage field access issues on a day-to-day basis; and,
- Interface with USDOJ-NPS representatives to address day-to-day operational issues.

Morning safety meetings will be conducted to outline anticipated daily operations and apprise field crews of the results of daily field scouting, groundtruthing operations and potential safety concerns.

### **6.4.2 Staging Areas: Site Protection and Spill Prevention/Countermeasures**

Refer to Sections 5.1.1 and 5.1.2 for a comprehensive discussion of field staging area design, construction and operational considerations and practices. The MM-63S main staging area will have both fixed and mobile fuel storage. To enhance site protection and



spill prevention, fuel tanks, unless in use, will be locked and BOCI will provide night security at the MM-63S main staging area. The largest non-mobile fuel storage equipment will be an up to 10,000 gallon bermed-diesel fuel tank stand (Figure 6.1). The largest mobile storage will be a truck-mounted 2,000 gallon fuel tanker (Figures 6.2 and 6.3). BOCI's spill plan is designed to incorporate the following environmental site protection and spill prevention and countermeasure features and practices:

- Up to 10,000 gallon fuel tank for diesel storage – bermed
- Temporary fuel spill containment systems under fuel storage, fueling and fuel trailer and diesel generator parking areas provide positive protection against soil and vegetative ground cover contamination;
- Two (2) truck-mounted, 2,000-gallon fuel tanks with containment systems – diesel and Jet A;
- One (1) ~400-gallon truck-mounted diesel tank with bed liner containment system; and
- One (1) Flotation tire-equipped 4x4 ARDCO buggy with a ~500 gallon diesel fuel tank and bed liner containment system.



**Figure 6.1 Tank Stand Fuel Storage with Refueling Tarp**



**Figure 6.2 Fuel Truck on Bermed Containment System (Side Panels Collapsed)**





**Figure 6.3 Fuel Truck on Bermed Containment System (Side Panels Collapsed) (Continued)**

### **6.4.3 Fuel Storage and Refueling Operations**

Two fuel storage operations and four types of refueling activities will occur within the NG3-D survey area. A non-mobile storage/refueling tank stand will be located at the main staging site, while two mobile, 2,000 gallon trucks will be used for fuel storage and refueling activities at the in-field areas near or at staging areas. The fuel trailer will be located initially at MM-63S and shuttle between MM-63S and MM-63N as needed. Trailer parking facilities on MM-63N will conform to the same specifications as MM-63S.

The fixed fuel tank stand employs metal containment around the fuel tank as shown in Figure 6.1. The tank sits on a secondary tarp that extends beyond the tank stand. Vehicles can be driven onto the tarp for refueling. For spill protection and containment of the two 2,000 gallon mobile storage/refueling trucks, a drive-through, high-density vinyl mat with side berms is used (Figures 5.15, 6.2, and 6.3). This containment system is of one-piece construction made of 30 mil XR-5 material (flat portion). The side-berm float system (yellow strip) is made of HR-2545 Polyurethane Foam. The truck sits on the containment system at all times. If fluid were to spill onto the containment mat, the yellow float sides and end panel would rise up and effect containment. The berm is designed to hold 1.5 times the capacity of the truck that sits on it.

As mentioned in Section 6.4.2 above, to enhance site protection and spill prevention, fuel tanks, unless in use, will be locked and BOCI will provide night security at the MM-63S main staging area.

The three other forms of refueling are discussed below in the Sections 6.4.4-6.



#### 6.4.4 Helicopter Refueling

As discussed in Section 5.1.3.1, each helicopter will refuel once every 90± minutes of field flight operations. Figure 5.16 depicts a typical helicopter refueling area. Refueling will be accomplished utilizing a FDOT certified (annually) trailer equipped with two ~300 gallon fuel tanks (~600 gallons total) containing Jet A helicopter fuel. Spill protection and containment will be provided beneath the fuel truck and a high-density vinyl tarp will be placed beneath the helicopter refueling point.

#### 6.4.5 Field Refueling

Vibroseis buggies will be refueled in the field via either a ~400 gallon truck truck-mounted diesel tank or a flotation tire-equipped 4x4 ARDCO buggy equipped with a ~500 gallon diesel fuel tank. As shown in Figures 6.4 and 6.5, field refueling operations will be conducted over a High Density Polyethylene (HDPE) ground tarp carried on each refueling vehicle. Each vibroseis buggy will carry absorption pads, shovels and approved fire safety equipment.



**Figure 6.4 Field Refueling of Vibroseis Buggy (Over Tarp)**





**Figure 6.5 Field Refueling of Vibroseis Buggy (Over Tarp)  
(Continued)**

#### **6.4.6 Other Vehicles**

As shown in Figures 6.6 and 6.7, UTVs and non-field vehicles (trucks, crew vans, UTVs, etc.) will be refueled as necessary at the in-field staging areas over HDPE lined refueling areas or at the main staging area, MM-63S, as much as possible.



**Figure 6.6 UTV Refueling (Over Tarp)**





**Figure 6.7 UTV Refueling (Over Tarp) (Continued)**

Fuel storage and field refueling operations will be consistent with BCNP MMP geophysical Stipulations #3, #6, and #28. In all cases impervious ground tarps will be used to prevent accidentally spilled fuel from contaminating the lime rock pad or soil. In addition, absorption pads and shovels will be available.

#### **6.4.7 Health and Safety Concerns and Countermeasures**

##### **Procedures**

Job-specific procedures are designed under the direction of each Section Head, assisted by the Health, Safety, Security, Environment (HSSE) Advisor.

Activities in the field and the supply chain are subject to Job Safety Analysis (JSA). This process identifies the hazards associated with each activity, and applies the necessary control measures to ensure that each task is conducted safely. As well as routine and operational tasks, the process is applied to equipment maintenance and failure modes.

JSAs and procedures are documented and distributed to applicable supervisors. The HSSE Advisor holds a copy of the HSSE-MS, HSSE-MP and JSA-Procedures Manual, covering all JSAs and procedures for the crew.



### Implementation and Monitoring

Operations are conducted according to this HSSE Plan and the working procedures. Senior managers responsible for risk control measures are designated in this plan. Implementation of the Plan and procedures is based on the key activities listed in Table 6.1.

**Table 6.1 Implementation and Monitoring Plan**

Activity	Attendance	Time
Daily Safety Meetings	All personnel	Daily
Daily Tailgate Meetings & JSA	All personnel, in work groups	Daily
Crew HSSE Committee Meeting	HSSE, one person per section	Monthly
Audits	HSSE Advisor and Senior Staff	Random

HSSE performance is monitored by the HSSE Advisor. He receives hazard and incident reports from the crew and compiles a Weekly HSSE Report that includes statistical information on proactive and reactive HSSE indicators. He also maintains an Action Point List that lists all outstanding hazards requiring remedial action.

### Communications and Emergency Response

Normal operational communications are conducted on a VHF radio net with mobile and hand-held stations being issued to field and support personnel.

Sufficient VHF radios, cell phones, computers and journey management shall be supplied for an efficient operation.

### Journey Management

Vibroseis workers will report in each hour so their movements within the survey area can be tracked. It is the responsibility of the Journey Management Leader to adhere to the Journey Management Plan and see that it is carried out.

#### General driving requirements:

- Posted speed limits will be followed.
- No cell phone or text messaging use while driving.
- Headlights will be turned on at all times.
- Drivers and passengers will wear seatbelts while vehicle is in motion.

#### Travelling to and from the field:

- Drivers will report in each morning at the daily safety meeting.
- Drivers will sign-in and track their mileage.



- Vehicles will convoy to and from the field along a predetermined route as much as practical.
- No one will be allowed to leave the field without first checking in with the Journey Management Leader.

While in the field:

- The Journey Management Leader will be responsible for keeping a spreadsheet designed to track employee's movement in the field.
- Each crew (surveyors, trouble-shooters, vibrator operators, layout crew, pickup crew, etc.) will report in every hour with the Journey Management Leader with their location and time.
- At the end of each day, it will be the responsibility of the Journey Management Leader to ensure that field staff is accounted for prior to leaving the field.

## **6.5 Contingency Actions**

### **6.5.1 Field Staging Areas – Fuel Leaks/Spills**

The largest concentrations of fuel in or near staging areas as detailed in Section 5.1.2 will be as follows:

- One (1) 10,000 gallon diesel stationary main storage tank located at MM-63S;
- Two (2) truck trailer-mounted 2,000 gallon fuel tanks (for diesel and Jet A) equipped with bed liner containment systems (used to shuttle fuel between staging areas);
- One (1) truck with a ~400 gallon diesel fuel tank equipped with bed liner containment system for staging area use and high density protective liner (for field refueling of vibroseis buggies);
- One (1) 4x4 flotation tire-equipped ARDCO buggy equipped with ~500 gallon diesel fuel tank and containment systems (for off-road refueling of vibroseis buggies); and
- One (1) FDOT certified (annually) trailer with two ~300 gallon Jet A fuel tanks (~600 gallons total) equipped with a secondary bed containment system (used for helicopter refueling).

In the event of a spill or leak from the truck-mounted tanks:

- The bed liner containment systems on each of the refueling vehicles are of the type described in Section 5.1.3 and will contain a spill or leak kit;
- A leaking tank will be immediately taken out of service, isolated and observed for containment system leaks;



- Class B fire extinguishing equipment and absorbent pads and clean-up hand tools will be moved into position near the vehicles for use if necessary;
- A vacuum truck will be called to the scene to drain the tank and containment system and the fuel will be removed from the staging to an appropriate recycling or disposal facility;
- Absorbent pads will be applied to the inside of the containment system to prevent leakage of any remnant fuel and the vehicle will be removed until final disposition can be determined;
- Fuel inadvertently dripped or spilled onto the lined fuel storage and transfer areas will be collected by absorbent pad and rakes and shovels, as appropriate, bagged and removed to a licensed disposal facility pursuant to compliance with BCNP GMP/EIS/MMP geophysical Stipulations #1, #3, #6, and #30;
- The USDO-I-NPS representative will be notified at the earliest opportunity following discovery of a potential leak or spill that does not conflict with containment and clean-up operations; and
- Clean-up operations will be conducted and completed to the satisfaction of the Superintendent.

### **6.5.2 Field Locations – Fuel Leaks/Spills**

The largest concentrations of fuel available in the field will be:

- One (1) Vibrator refueling vehicle, a truck mounted with a ~400 gallon diesel tank equipped with a bed liner containment;
- One (1) 4x4 flotation tire-equipped ARDCO buggy with a ~400 gallon diesel tank and similar containment system; and
- Possibly 5 gallon approved containers for refueling 4x4 UTVs if in-field staging areas are inaccessible.

Field fueling operations will be conducted over portable liners carried on the refueling vehicle. Each vibroseis buggy is equipped with fuel spill absorbent pads and fire equipment.

In the event of a fuel spill or leak during field refueling operations:

- The liner will be cleaned using absorbent pads available on each refueling vehicle;
- Vegetation contaminated by fuel remnants dripping off the liner will be cleaned or removed by absorbent pad and rakes and shovels, as appropriate, bagged and



removed to a licensed disposal facility pursuant to compliance with BCNP GMP/EIS/MMP geophysical Stipulations #1, #3, #6, and #30;

- The USDO-I-NPS representative will be notified at the earliest opportunity following discovery of a potential leak or spill that does not conflict with clean-up operations;
- Clean-up operations will be conducted and completed to the satisfaction of the Superintendent; and
- Vibrator hydraulic leaks will be removed by absorbent pad and rakes and shovels, as appropriate, bagged and removed to a licensed disposal facility pursuant to compliance with BCNP GMP/EIS/MMP geophysical Stipulations #1, #3, #6 and #30.

### **6.5.3 Fire**

#### *Fire Prevention*

Dawson Geophysical trains their employees in the use of fire extinguishers, as well as other fire prevention. Survey vehicles, UTVs and vibrators are equipped with suitable fire extinguishers. Some vehicles may have additional equipment such as shovels and fire flaps. Smoking by employees is only allowed in vehicles and approved designated smoking areas. Vehicles should not be parked in tall grass or brush while idling. UTVs and vibrators are equipped with spark arrestors. A project contingency plan is utilized and placed in every vehicle and vibrator. Instructions on what to do in the event of a fire along with emergency phone numbers are included in this plan.

#### *Fire Response*

In the event of a fire in the survey area, crew members will attempt to contain the fire whether caused by Dawson or not. The recording truck will be called and notified of the fire. The emergency response plan for a fire will be enacted. The recording truck will call the Big Cypress Fire Management immediately and advise the location of the fire. Those closest to the area will be advised to assist with firefighting efforts until professional help arrives. Once professional help arrives, crew members will leave the area and allow firefighters to continue with the effort or if asked for assistance, act on their instruction. A helicopter for the movement of equipment is utilized for the field operations. This helicopter is equipped with a bambi bucket and can assist with firefighting efforts if a water source is available and approved.

Those crew members not associated with firefighting efforts will be placed on stand by and await further instructions. If the fire does not threaten the safety of the crew but does threaten equipment, crew members will be assigned to remove the equipment that can be retrieved safely without placing crew members in undue risk. If the fire threatens the safety of the crew, they will be advised to travel to muster zones to conduct a head count and exit the danger zone. Journey management for the tracking of personnel movement within the survey area will be conducted throughout the day for work groups on the crew.



The Journey Management Leader will advise the recorder when the crew members are accounted for.

Staging areas will be strategically located along existing roads/trails for easy egress in the event of a fire. A bulk fuel storage tank, two 2,000 gallon diesel/jet fuel mobile storage trailers, two 400 gallon truck mounted fuel tanks used for refueling equipment in the field will be located at the main or satellite staging areas (adjacent to I-75) when not conducting refueling operations. Tanks mounted on vehicles will be removed from the field in the event of a fire.

#### **6.5.4 Other**

Dawson Geophysical will have emergency and contingencies plans and policies that will be available for inspection and discussion with on-site FDEP and USDO-I-NPS representatives and address the following:

- Wildfires/lightning events;
- Land transportation emergencies and catastrophic events – hazardous spills, vehicular accidents, weapons transport incidents, etc.;
- Aviation related incidents – commercial crashes, agency/field aircraft crashes and emergencies; and
- Homeland security/criminal actions – primary concerns include terrorist actions/threats, explosives theft/vandalism, infectious disease contacts/outbreaks.



## **7.0 RECLAMATION PLAN**

### **7.1 Purpose**

Pursuant to the 2006 USDOJ-NPS Operator's Handbook:

*The reclamation plan will describe the actions needed to meet the general regulatory reclamation standards<sup>1</sup> as well as site-specific reclamation goals. It will be based on the disturbance anticipated from the proposed operations ... and reclamation expectations of the NPS ...*

### **7.2 Overview**

Consistent with 36 CFR § 9.39, BCNP MMP geophysical operational stipulations 39 through 45 (see Exhibit 5) and the suggestions and guidelines provided in the 2006 USDOJ-NPS Operator's Handbook, the Operator will take steps to reclaim the natural conditions and processes existing prior to the start of field operations or to such other conditions agreed to by the Operator and the Regional Director and Superintendent in an approved POP. In the event that field operations result in damage to Preserve lands or resources adjacent to the survey area, those lands or resources will also be reclaimed as described below.

Clean-up and restoration crews will be available and working concurrently with field operations. Post-operational restoration activities and any necessary monitoring requirements will be addressed by the Operator and State and Federal agencies within 30 days of the completion of field operations. Performance bonds will remain in place until such restoration efforts, if needed, meet required standards.

### **7.3 Reclamation Goals**

Reclamation operations will be conducted concurrently with field operations and completed at the conclusion of each task pursuant to documentation and approval by USDOJ-NPS representatives. USDOJ-NPS bond requirements will be augmented by similar bond requirements for state geophysical seismic permits.

#### **7.3.1 Site-Specific Goals, Procedures and Time Frames**

The following reclamation activities will be conducted as needed consistent with 36 CFR §9.39, BCNP MMP geophysical operational stipulations #36 through #45 (see Exhibit 5) and the 2006 USDOJ-NPS Operator's Handbook reclamation suggestions and guidelines.

- Field operations will be conducted during the "dry season" (December – May) consistent with BCNP MMP geophysical operational stipulation #8 (see Exhibit 5) and 2006 USDOJ-NPS Operator's Handbook seasonal plant dormancy mitigation recommendations;

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<sup>1</sup>See § 9.39, 36 CFR 9B regs, Reclamation Requirements.



- Low shrubs and herbaceous vegetation and topsoil, rootstock and plants will be left in place along source lines, receiver lines and access routes to facilitate natural re-vegetation;
- Consultation with USDOI-NPS will occur to determine access to off-trail source points in environmentally sensitive areas and appropriate reclamation actions;
- Vibroseis buggies with balloon tires will be used to spread vehicle surface weight and protect against vegetation mat disruption;
- Trash bags and receptacles will be provided to field crews for use during daily field operations. Trash and debris including plastic flagging, stakes, and other temporary markers put in place by the Operator, will be collected and removed from the field daily and as the seismic survey progresses;
- Marred or wounded standing trees are to be treated with a commercially available, non-toxic pruning paint or wound coating;
- Ruts, depressions, and vehicle tracks (i.e., potential depressions in the soil left by a vehicle that contains uprooted vegetation, soil displacement, and/or soil compaction which is visibly identifiable) resulting from field operations will be restored to original contour conditions concurrent with daily operations using shovels and rakes, to prevent the creation of trails. This does not include potential damage to habitat like the “lay-over” of vegetation expected to occur as a result of vehicle traffic in an off-road situation;
- Field clean-up will begin immediately upon completion of each task and final clearance will be documented by and coordinated with USDOI-NPS and FDEP representatives to the satisfaction of the Superintendent; and
- Removal and reclamation of field staging areas with associated access improvements will be completed to the satisfaction of the Superintendent, upon confirmation that no further use of staging area facilities is required by the Operator and not desired by USDOI-NPS or other Federal or State management or regulatory agencies. Final field reclamation and clean-up will be conducted concurrently with field operations and completed within 30 days following the last vibrator source point except in inclement weather conditions. Preserve headquarters will be contacted upon completion of reclamation work by telephoning (941) 695-2000 during normal business hours.

#### **7.4 Reclamation Cost Estimate and Bond Requirements**

NG3-D field operations are expected to result in *de minimis* overall environmental impacts. Temporary surface impacts are expected to be minimal and no permanent surface impacts are expected to occur. Anticipated reclamation costs are part of a sub-contracting package that cannot be finalized prior to plan approval.



Reclamation activities are expected to consist primarily of hand shoveling and raking. Predictions of reclamation costs are difficult to make at this point in time, because they will occur on an as needed basis as the activity progresses. For these reasons, estimates of a more detailed reclamation plan and an accurate reclamation cost estimate are not feasible at this time.

Although the provisions of 36 CFR § 9.48(d) require an Operator to post a bond against the liability imposed by 36 CFR 9.51(a) in the amount of \$25,000.00 (geophysical operations using more than one field party), BOCI will post a \$200,000.00 bond equal to the maximum liability amount required until a more accurate reclamation cost estimate can be made. This bond amount is separate and in addition to the bond requirements of other state, federal and local agencies such as the FDEP's \$100,000.00 geophysical performance bond.

The Operator is aware that the USDOJ-NPS bond amount is not necessarily the limit of liability for damage to Preserve resources. Under the 36 CFR Subpart 9B regulations the Operator is responsible for damages to park resources resulting from the Operator's failure to comply with the approved POP. Depending upon the type of substance, damage and/or incident, the Operator may also be held liable under other statutes that might be deemed applicable including the Park System Resource Protection Act, 16 (U.S.C. § 19jj), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Oil Pollution Act (OPA).



## 8.0 AFFIDAVITS AND STATEMENTS

Pursuant to the 2006 USDO-I-NPS Operator's Handbook the operator should:

*Include an "Affidavit of Compliance" signed by an official that is authorized to legally bind the company as required by regulations at 36 CFR § 9.36(a)(15) [Compliance with applicable federal, state and local laws]. The affidavit should state that the proposed operations are in compliance with all applicable federal, state and local laws and regulations.*

The 36 CFR Subpart 9B regulations require three additional affidavits/statements affirming or clarifying certain regulatory requirements found at 36 CFR §9.41(g), 36 CFR §9.37(f), and 36 CFR §9.36(a)(2). By topic, these regulatory references address compliance with applicable Federal, State and local laws and regulations, Operator accountability for contractors and subcontractors, and BCNP Superintendent or designee site access and oil and gas minerals ownership, respectively.

In affidavit and letter forms, these requirements are met by the following:

1. Affidavit of Compliance;
2. Affidavit of Operator Accountability; and
3. Affidavit of Preserve Superintendent Site Access.



**TO THE UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE**

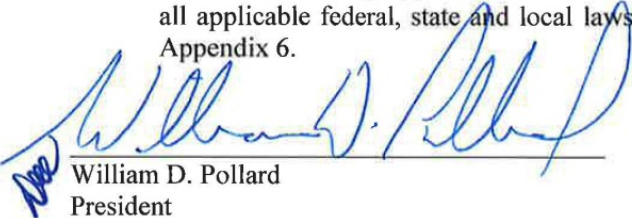
**RE: AFFIDAVIT CONCERNING COMPLIANCE WITH APPLICABLE FEDERAL, STATE  
AND LOCAL LAWS AND REGULATIONS**

**AFFIDAVIT OF COMPLIANCE**

STATE OF FLORIDA  
COUNTY OF COLLIER

BEFORE ME, the undersigned authority, personally appeared William D. Pollard,  
Who having by me first duly sworn, deposes and says:

1. That he is the President of Burnett Oil Co., Inc., a Texas corporation, as Managing Partner of Burnett Oil Company, a General Partnership on behalf of said corporation, duly organized and existing under the laws of the State of Texas and that he is authorized to act on the company's behalf.
2. That, pursuant to 36 CFR 9.36(a)(15), the Plan of Operations contained in this document regarding management units of the Big Cypress National Preserve is in compliance with all applicable federal, state and local laws and regulations.
3. That, pursuant to Appendix 6 B.1(e)(12) of the *Agreement Among the United States of America, Collier Enterprises, Collier Development Corporation, and Barron Collier Company* the portion of the Plan of Operations addressing 3-D geophysical seismic activities in the Big Cypress National Preserve and Addition Areas is in compliance with all applicable federal, state and local laws and regulations as well as the stipulations of Appendix 6.

  
William D. Pollard  
President

**Acknowledgement**

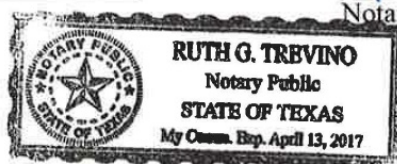
STATE OF TEXAS       §  
                                     §  
COUNTY OF TARRANT §

This instrument was acknowledged before me on the 10<sup>th</sup> day of ~~November~~ <sup>January 2014</sup>, by William D. Pollard, as President of Burnett Oil Co., Inc., a Texas corporation, as Managing General Partner of Burnett Oil Company, a General Partnership on behalf of said partnership.

My Commission Expires:

04-13-2017

  
Notary Public, State of Texas





**TO THE UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE**

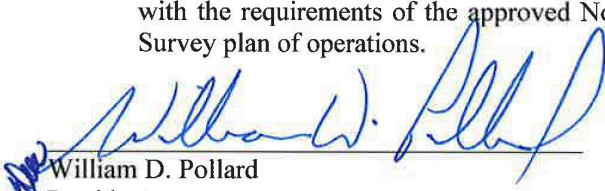
**RE: AFFIDAVIT CONCERNING THE OPERATOR'S ACCOUNTABILITY FOR  
CONTRACTORS AND SUBCONTRACTORS**

**AFFIDAVIT OF OPERATOR ACCOUNTABILITY**

STATE OF FLORIDA  
COUNTY OF COLLIER

BEFORE ME, the undersigned authority, personally appeared William D. Pollard,  
Who having by me first duly sworn deposes and says:

1. That he is the President of Burnett Oil Co., Inc., a Texas corporation, as Managing Partner of Burnett Oil Company, a General Partnership on behalf of said corporation, duly organized and existing under the laws of the State of Texas and that he is authorized to act on the company's behalf.
2. That, Burnett Oil Co., Inc., is the designated Operator for the Nobles Grade 3-D Phase I Geophysical Seismic Survey and is responsible for the planned 3-D geophysical seismic operations described in the Plan of Operations contained in this document.
3. That, pursuant to 36 CFR 9.41(g) and in clarification thereof, Burnett Oil Co., Inc., as designated Operator, is fully accountable for all contractor and subcontractor compliance with the requirements of the approved Nobles Grade 3-D Phase I Geophysical Seismic Survey plan of operations.

  
William D. Pollard  
President

**Acknowledgement**

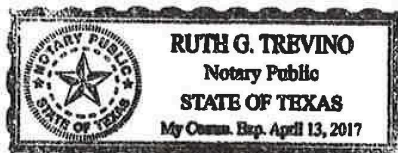
STATE OF TEXAS           §  
   §  
COUNTY OF TARRANT §

This instrument was acknowledged before me on the 10<sup>th</sup> day of ~~November~~ <sup>January 2014</sup>, by William D. Pollard, as President of Burnett Oil Co., Inc., a Texas corporation, as Managing General Partner of Burnett Oil Company, a General Partnership on behalf of said partnership.

My Commission Expires:

04-13-2017

  
Notary Public, State of Texas





TO THE UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE

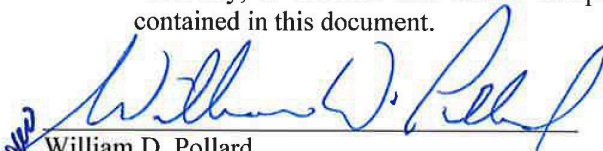
RE: AFFIDAVIT CONCERNING REASONABLE SITE ACCESS FOR THE BCNP  
SUPERINTENDENT OR DESIGNEE

AFFIDAVIT OF BCNP SUPERINTENDENT SITE ACCESS

STATE OF FLORIDA  
COUNTY OF COLLIER

BEFORE ME, the undersigned authority, personally appeared William D. Pollard,  
Who having by me first duly sworn deposes and says:

1. That he is the President of Burnett Oil Co., Inc., a Texas corporation, as Managing Partner of Burnett Oil Company, a General Partnership on behalf of said corporation, duly organized and existing under the laws of the State of Texas and that he is authorized to act on the company's behalf.
2. That, Burnett Oil Co., Inc. is the designated Operator and represents the primary oil and gas minerals owner for the Nobles Grade 3-D Phase I Geophysical Seismic Survey described in the Plan of Operations contained in this document.
3. That, pursuant to 36 CFR §9.37(f) and in compliance with the requirements thereof, the BCNP Superintendent, or his/her designee, shall have reasonable access to the site, as necessary, to monitor and ensure compliance with the approved plan of operations contained in this document.

  
William D. Pollard  
President

Acknowledgement

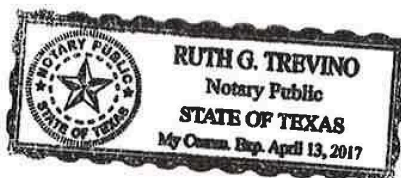
STATE OF TEXAS           §  
                                     §  
COUNTY OF TARRANT §

This instrument was acknowledged before me on the 10<sup>th</sup> day of ~~November~~ <sup>January, 2014</sup>, by William D. Pollard, as President of Burnett Oil Co., Inc., a Texas corporation, as Managing General Partner of Burnett Oil Company, a General Partnership on behalf of said partnership.

My Commission Expires:

04-13-2017

  
Notary Public, State of Texas





## **9.0 OTHER APPLICABLE PERMITS**

Pursuant to the 2006 USDO-I-NPS Operator's Handbook:

*At the superintendent's request, operators will need to provide the NPS with a copy of all applicable federal, state, and local permits. If the permits are still pending, Operators may submit a copy of the application for such permits.*

### **9.1 Overview**

USDO-I-NPS is the primary or "lead" regulatory agency governing NG3-D field operations. Approval of this plan is the first step in the lengthy and complex regulatory approval process associated with this geophysical seismic survey. This plan constitutes key elements of other applicable State and local permits. Copies of all complete permit applications will be provided pursuant to USDO-I-NPS request. USDO-I-NPS, like other State and Federal agencies, will also have an opportunity to comment on other permit applications as part of the normal public review and commenting process.

The Operator is aware that the NG3-D seismic survey field operations cannot begin until the necessary regulatory approvals have been obtained. The Operator expects that the USDO-I-NPS NG3-D seismic survey plan approval will not be delayed pending receipt of other permit applications.

Other applicable permit approvals are summarized below.

### **9.2 FDEP Oil and Gas Section (FDEP-OGS)**

The FDEP-OGS administers and regulates oil and gas operations in Florida. Most geophysical seismic permit applications are processed under the *de minimis* exemption described in Exhibit 13. If geophysical seismic operations qualify for a *de minimis* exemption FDEP-OGS acts as the sole permitting agency for that application. An approved Florida geophysical seismic permit represents Florida's concurrence that the proposed activity is consistent with Florida's federally approved Coastal Zone Management Program as required by Section 307 of the Coastal Management Act (Section 380.23(1), F.S.). Florida's oil and gas rules are codified as Chapters 62C-25 through 30, FAC. The NG3-D seismic survey project is currently being reviewed by the FDEP-OGS under Application No. G169-14.

### **9.3 FDEP – Environmental Resource Permit (ERP) - Wetlands**

Oil and gas permit applications in wetland areas are administered by the FDEP as part of its ERP-Wetlands permitting program. An ERP-Wetlands permit governs wetland resources, dredge and fill, and storm water management activities. The issuance of the FDEP-ERP also constitutes Florida's concurrence that the proposed activity is consistent with Florida's federally approved Coastal Zone Management Program as required by Section 307 of the Coastal Management Act. (Section 380.23(1), F.S.). The NG3-D seismic survey project is currently being reviewed by the FDEP-ERP-Wetlands permitting program under Application No. 11-0323836-0011.



#### **9.4 U.S. Army Corps of Engineers (USACOE) Clean Water Act Section 404 Permit**

A USACOE Clean Water Act Section 404 Permit is typically required if dredge or fill activities are proposed within USACOE jurisdictional wetlands or waters. A pre-application meeting was held with the head of the USACOE Fort Myers regulatory office (Mr. Tunis McElwain) on January 30, 2014 to discuss the NG3-D seismic survey project. Mr. Tunis McElwain of the USACOE followed up with an e-mail to Passarella & Associates, Inc. on January 30, 2014 verifying that the NG3-D seismic survey will not require a permit from the USACOE due to the lack of wetland impacts associated with the project (Exhibit 15).

#### **9.5 State Lands Permit**

Approximately 25 percent of the NG3-D seismic survey is located in the BCNP-A area. A minor portion of the purchased surface lands overlying private mineral interests and a more substantial amount of surface and mineral interest (fee) ownership to be explored by the Applicant utilizing geophysical techniques described in this plan is owned by the Board of Trustees of the Internal Improvement Trust Fund (and will continue to be so until transferred to the USDO). As such, applications for Use Agreements to occupy or travel over State-owned surface lands and explore state-owned mineral interests, are being made to the Trustees through the Bureau of State Lands Management.

#### **9.6 Collier County Site Development Plan (SDP)**

The Collier County Land Development Regulations may require approval of a SDP/Site Improvement Plan (SIP) prior to commencement of field operations. For geophysical seismic operations, the Collier County SDP/SIP is best characterized as a general permit governing all surface improvement and/or construction activities associated with NG3-D seismic survey operations. The review is directed primarily at in-field staging area facilities, activities and construction techniques and addresses issues (where applicable) such as zoning compliance, permitted uses, engineering/design, construction, fire safety, temporary work trailer location, trailer tie-downs, trailer hand rails, waste management, food preparation/temporary occupancy, over-the-berm utility connections, parking, facilities layout, traffic flow, etc. Collier County's SDP/SIP is approved administratively within the Development Services Administration.



## 10.0 BACKGROUND ENVIRONMENTAL INFORMATION

### 10.1 Overview

The Applicant proposes to conduct a 3-D geophysical seismic survey that will temporarily traverse through an area of approximately 110 square miles (70,454± acres) (Figure 1.2). The scaled-back survey area in the revised POP corresponds to the area originally identified as Phase I of the originally proposed surveys. The revised survey area represents approximately a 75 percent reduction in the proposed survey area from the original POP. Approval of future phases (i.e., Phases II, III, and IV) (see Figure 1.1) will be requested under a separate POP for each subsequent Phase. This will allow the USDO-I-NPS to focus strictly on the much smaller area contained in the revised POP which will eliminate some of the uncertainty of authorizing the proposed seismic survey to occur over the entire originally-proposed Program Area. Future phases will reflect the avoidance and mitigation experiences of the previous Phase(s), likely producing improvements in best practices for future phases.

The NG3-D seismic survey includes a variety of environmentally sensitive technological innovations that have evolved since the 1992 implementation of the BCNP GMP/EIS and BCNP MMP which were drafted at a time when the seismic industry was transitioning from 2-D to 3-D seismic technology. Many of the technological innovations serve to produce a more robust seismic picture of the targeted subsurface geology and expedite field operations while simultaneously minimizing, or in some cases eliminating altogether, potential environmental and resource value impacts traditionally associated with geophysical seismic surveys as a result of extensive planning – from pre-operational field planning through post-operational clean-up and demobilization operations. From an operational standpoint the minor potential impacts attributable to the operations described in this plan are expected to be *de minimis* as a result of these innovations and corresponding resource protection benefits. See Section 1.4 for a full description of these technological innovations and corresponding benefits. The seismic survey will generally employ a “one pass” design for source point locations and data acquisition operations. The seismic survey operations will be conducted during the dry season (December through the end of May).

The initial NG3-D seismic survey design consists of 64± source lines and 168± receiver lines oriented generally at right angles to each other in a modified industry standard “orthogonal” pattern. The 64± source lines are 1,155 feet apart, oriented east to west with source point station spacing of 82.5-foot intervals. Source points involve the use of buggy mounted vibroseis vehicles that employ a localized “thumping” or “vibrating” of the ground over a short 12 to 24-second period to produce a seismic. This equipment utilizes low impact “balloon” or “flotation” tires, is highly maneuverable, and designed to reduce ground tire pressure to 26 psi (approximately 11 psi less than a pickup truck). The 168± receiver lines are 495 feet apart, oriented north to south with receiver point spacing of 165 feet. Each receiver point consists of three geophones, a recording box and battery.

The initial design was then modified based on aerial imagery and documented wildlife/cultural resources to minimize or avoid impacts to these sensitive areas. Specifically, where the initial seismic survey design intersected with important resource areas, the Modification Protocols first



looked to move source points to existing and previous disturbances (roads and trails) followed by selection of source points at non-road/trail locations that offer the opportunity for the least surface impacts. Receiver lines were also modified to incur the least impacts feasible to important resource areas while maintaining as much of a straight line configuration as possible. These modified lines will be further revised as needed during field operations to incorporate real-time data and avoid/minimize potential natural resource impacts.

Because of the size and extent of the NG3-D seismic survey area, five staging areas will be required to efficiently support seismic field operations. See Figure 5.1 in Section 5.0. The majority of the field operations (i.e., equipment storage, fueling, etc.) will be conducted from the main staging area, MM-63S. In addition to the main MM-63S staging area, four satellite staging areas will also be utilized mostly for helicopter uses. As part of the Operator's surface impact minimization strategy, abandoned former well pad sites and access roads and open areas near I-75 recreational parking areas will be utilized to the extent feasible for staging purposes. The staging sites were selected to maximize utilization of disturbed or open areas with access from existing rest and recreational parking area service roads.

The Applicant plans to avoid the discharge of dredged or fill material into wetlands as part of the NG3-D seismic survey. The current plan would avoid filling wetlands in or near the staging areas, and avoid any type of new construction in the Preserve by using existing roads, former well pad sites and open areas. If the use of fill is needed, then the Applicant will obtain the necessary approvals from the relevant agencies prior to discharge.

The following section of this POP documents the natural and cultural resources within the Preserve and assesses the potential impacts that may result from the proposed seismic survey operations on these natural and cultural resources, as well as park visitor use areas. The natural resources assessed in this section include the geology, hydrogeology, hydrology, vegetation communities, wetlands, soils, wildlife, cultural resources, air quality, noise considerations, and visitor use/visual quality associated with the NG3-D seismic survey in the Preserve. The potential impacts that were considered include anticipated direct, indirect and cumulative effects that may result from implementation of the survey operations. The Applicant has submitted an EA of this POP for USDOJ-NPS review, which further addresses the reasonably foreseeable potential impacts of the proposed action.

Information regarding existing natural and cultural resources for this section was obtained from available USDOJ-NPS data for the Preserve and other available data sources and reports that covered NG3-D seismic survey area. These sources included, but are not limited to, the GMP/EISs that were prepared by the USDOJ-NPS in 1992 and 2010 for the BCNP and BCNP-A, respectively; the 2000 *Preserve Final Recreational Off-Road Vehicle Management Plan and Supplemental Environmental Impact Statement (2000a)*; and GIS data provided by USDOJ-NPS staff.

The GIS data included 1) USDOJ-NPS vegetation land cover; 2) 1954 Collier County soils data; 3) designated primary and secondary trails; 4) University of Georgia trail study lines and polygons; 5) tribal ceremonial sites; 6) documented archaeological sites; 7) RCW locations; 8) bald eagle nest locations; and 9) BCNP and BCNP-A boundaries and management units. In



addition, the *Nobles Grade 3-D Geophysical Survey Plan of Operations for the Big Cypress National Preserve and Addition Areas* submitted to the USDO-I-NPS in June 2006 by CRC was utilized as a data source for information related to geology, hydrogeology, hydrology, cultural resources, air quality, and noise. An aerial with the 2006 POP boundary overlaid on the proposed NG3-D survey area is provided as Figure 10.1.

## **10.2 Geology, Hydrogeology and Hydrology**

### **10.2.1 Surface and Subsurface Geology**

This section describes the surface lithologic and hydrogeologic conditions that are expected to influence seismic data acquisition. The deeper subsurface conditions are described to provide additional rationale for 3-D exploration. This geologic section was prepared for the *Nobles Grade 3-D Geophysical Survey Plan of Operations for the Big Cypress National Preserve and Addition Areas* submitted to the USDO-I-NPS in June 2006 by CRC. Pursuant to Chapter 492, Florida Statutes (professional geology), the required seal and signature page were previously provided under the 2006 POP.

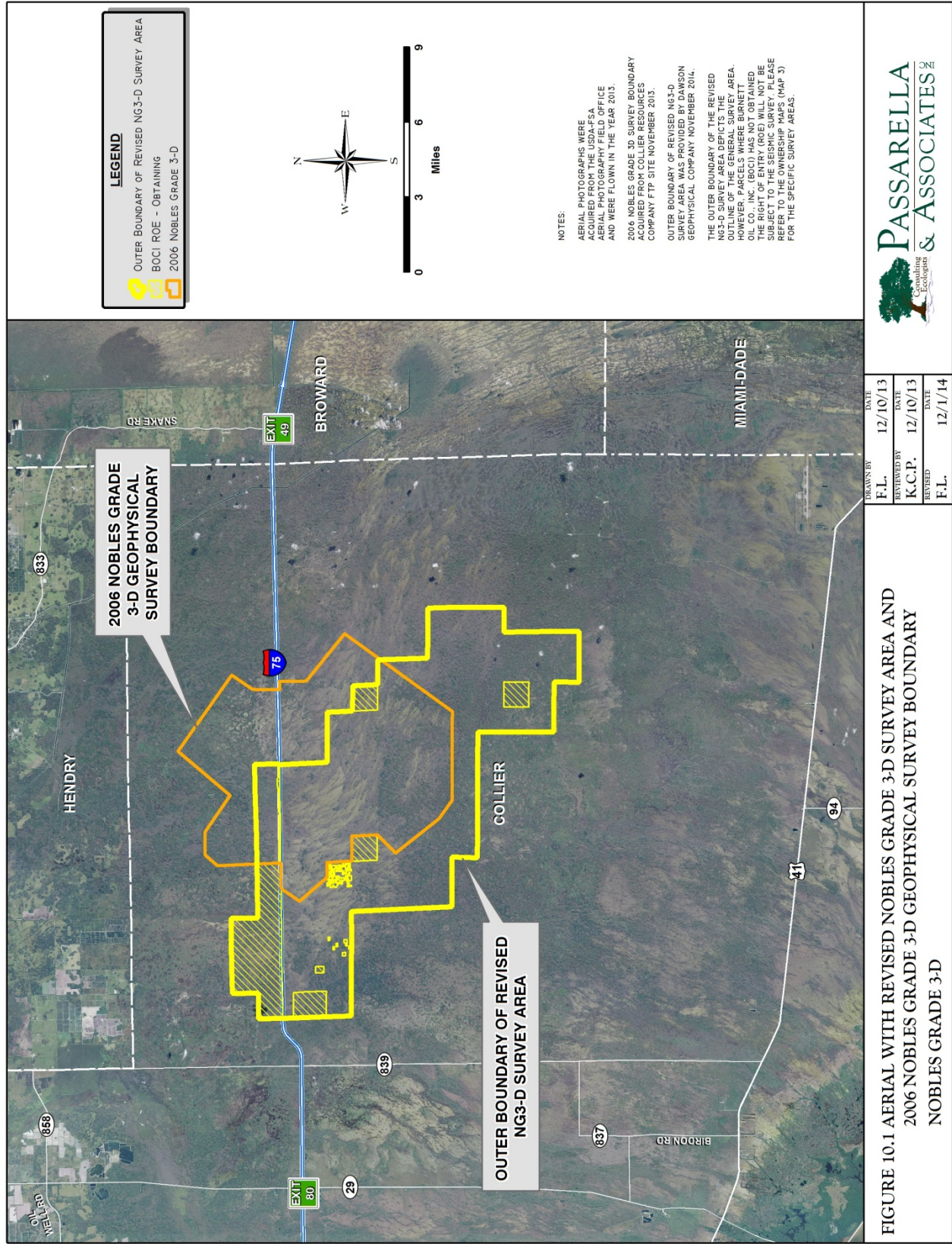
#### **10.2.1.1 Surface Formations and Thickness**

The geologic conditions at and near the surface in the survey area consist of a thin, semi-continuous, three to five foot thick limestone cap rock of cemented shell and siliciclastic materials. The cap rock is often described and mapped as a discrete limestone unit but most recently it has been described as a duracrust formed by high evaporation and mineralization. Whatever its origin, the cap rock has proven difficult to breach in past geophysical source placement operations.

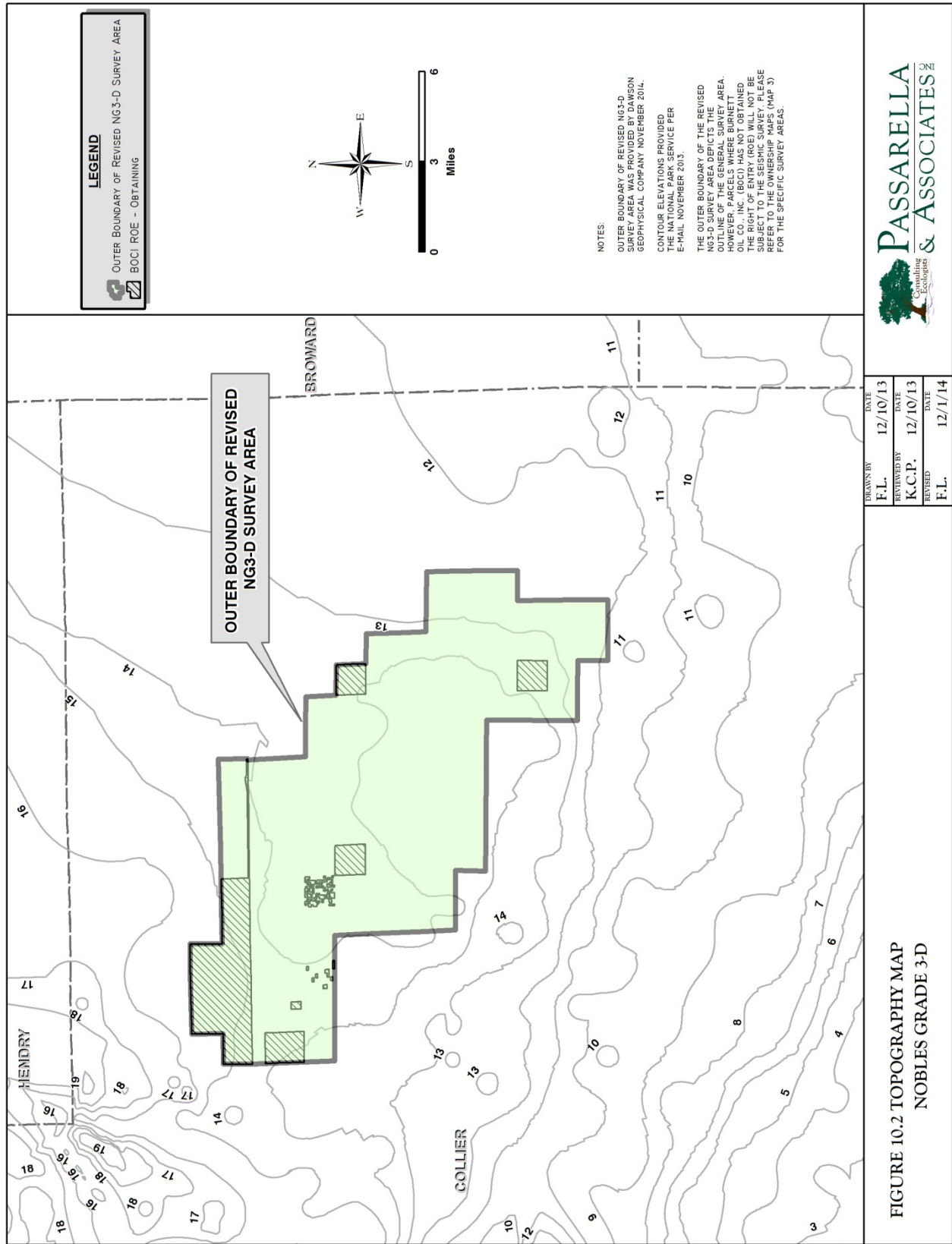
The NG3-D survey area is relatively flat with elevations ranging from approximately 10 to 13 feet south of I-75 to elevations of mostly 13 to 16 feet (NGVD) north of I-75, with higher isolated islands in the northwest portion of the survey area (Figure 10.2). The terrain is dotted with cypress domes formed around water filled depressions where the cap rock is absent. The water depth is often 5 to 8 feet in these depressions. Where present, the duracrust has formed over a sequence of Pleistocene and Pliocene-Pleistocene siliciclastic and poor to moderately indurated carbonate sediments that are up to 500 feet thick.

A review of shallow drilling information from the area has documented that this section of sediments is an alternating sequence of saturated shelly sand, shell beds and shelly limestone. The entire 500 foot thick sequence examined in boring logs is unconsolidated or at best moderately indurated. Below depths of 500 feet, the sedimentary unit is comprised of moderate to well indurated Miocene limestone of the Hawthorne Group. The shallow stratigraphic section is presented in Figure 10.3.

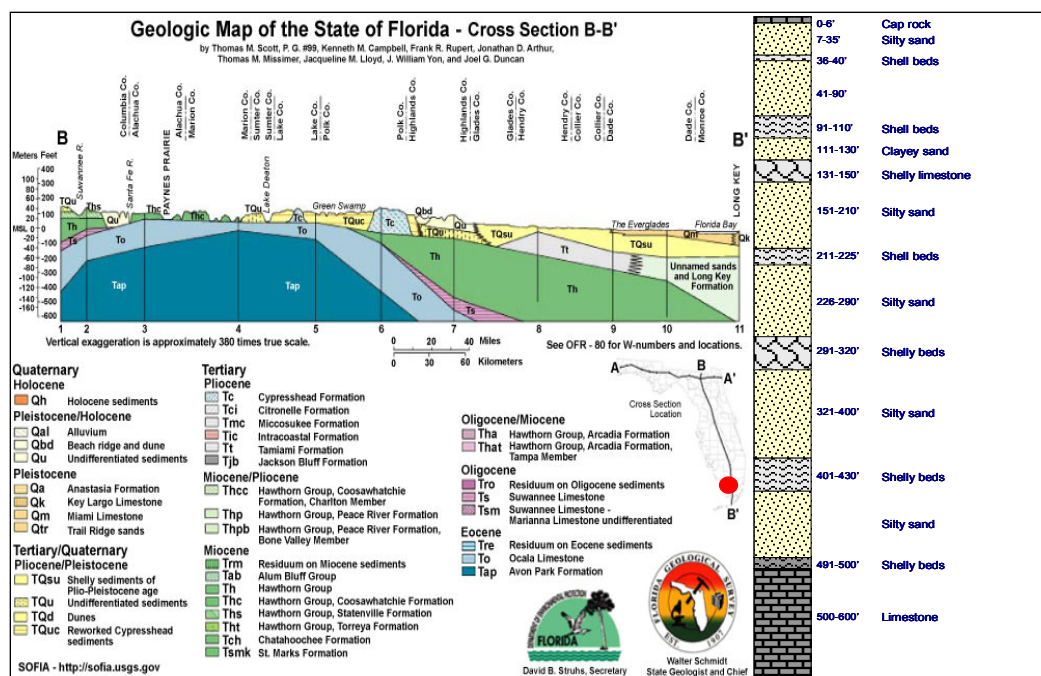












**Figure 10.3 Shallow Stratigraphy Exhibit**

### 10.2.1.2 Subsurface Geology

The NG3-D survey area is located in the South Florida Geologic Basin which is a carbonate rich sequence of beds more than 20,000 feet in thickness. The oil potential of the basin and survey area is discussed in Section 1.1 of this POP. The sediments of the basin are predominantly limestones and dolostones with anhydrites and minor siliciclastic sequences. The shape of the basin is a result of continental crustal movement and transcurrent faulting that has occurred since Jurassic time and the opening of the proto-Atlantic Ocean. An outline of the basin is shown as Figure 1.3.

### 10.2.1.3 Soil Types and Engineering Properties

The most recent soil surveys produced by the National Resources Conservation Service (NRCS), formerly the Soil Conservation Service, were originally issued in 1998 then updated in 2005. However, this mapping does not delineate most of the soil types east of SR 29 where the NG3-D survey area is located. As such, soils mapping from historic studies completed by the U.S. Department of Agriculture (USDA) in 1942 (and subsequently published in 1954) was used for this report. The 1954 soils information represents the best available data and has been provided in Map 5.

The engineering properties of these soils have not been evaluated. A cap rock with unconsolidated siliciclastic materials below generally underlies the survey area. The cap rock generally provides a good base for roads and will support



vehicles. Where the cap rock is absent, however, the soft, siliciclastic material does not support equipment without floatation tires or tracks.

The soils are generally poorly developed and can be characterized as follows:

*Cap rock* is found at or near the surface in many locations. This duracrust unit often has a thin, calcium rich marl or quartz sand over it. Cypress sloughs and strands have cap rock at or near the surface.

*Marl soil*, usually less than a foot thick, is found over much of the areas covered by dwarf cypress. The marl soil has a high pH and is a poor substrate for most vegetation. Marl soils have developed on lower elevations and support small cypress in sloughs and strands.

*Organic (or peat) soil* is found in wet, cypress dome areas where the cap rock is absent and decaying vegetation has accumulated in depressions. These areas have a very low pH and support cypress and submergent and emergent wetlands vegetation.

*Sandy soils* are thin quartz sands and found generally over higher elevations. These soils are dominated by pines and hardwoods.

#### 10.2.1.3.1 Soil Descriptions

According to the Soil Conservation Service March 1954 Soil Survey of Collier County (U.S. Department of Agriculture 1954), 13 soil types occur within the revised NG3-D survey area (Map 5). Table 10-1 lists the soil types and the associated soil descriptions follow.

**Table 10.1 Soils within the Revised NG3-D Survey Area**

Soil Types
Broward Fine Sand – Heavy Substratum Phase
Broward Fine Sand – Shallow Phase
Broward Ochopee Complex
Charlotte Fine Sand
Copeland Fine Sand – Low Phase
Copeland Fine Sand – Shallow Phase
Cypress Swamp
Felda Fine Sand
Freshwater Marsh
Ochopee Fine Sandy Marl – Shallow Phase
Ochopee Marl – Shallow Phase
Rockland
Tucker Marl



Broward Fine Sand, Heavy Substratum Phase

This phase occurs west and east of Sunniland. It differs from Broward fine sand chiefly in having a 2 to 6 inch layer of mottled yellowish-brown and light-gray fine sandy clay loam overlying the limestone. The limestone occurs at depths of 12 to 24 inches.

The natural vegetation is similar to that found on Broward fine sand, except that some areas are without slash pines (*Pinus elliottii*).

Broward Fine Sand, Shallow Phase

This phase, well distributed throughout the Big Cypress region, differs from Broward fine sand chiefly in having the underlying limestone at depths of 6 to 18 inches instead of 18 to 36 inches. In places a 1 or 2 inch layer of mottled yellowish-brown and gray fine sandy clay loam overlies the limestone. These areas are slightly lower than other parts of the phase.

Broward-Ochopee Complex

This complex consists of areas of Broward and Ochopee soils so intricately associated they cannot be separated on a map of the scale used. Islands of Broward soil separated by runways of Ochopee soils make up the complex.

The Broward areas consist mainly of the shallow phase of Broward fine sand; the Ochopee areas, mainly of the shallow phase of Ochopee fine sandy marl. A few areas of Ochopee marl, shallow phase, are included. Commonly limestone is at depths of 3 to 12 inches, but in places limestone rocks are exposed around the islands of Broward soils.

The Broward areas are covered by slash pine, cabbage palm, saw palmetto, other shrubs, and grasses. The Ochopee areas have a short-grass cover. Some of the Broward soils, however, have no pine trees, and some of the Ochopee areas support growths of small cypress.

Charlotte Fine Sand

This soil occupies level, nearly level, or slightly depressed areas in the Big Cypress region. It has a bright-yellow or yellowish-brown subsoil and it developed from moderately thick beds (40 to 60 inches deep) of fine sand over limestone or marl.

This Charlotte soil is associated with the Pompano and Arzell soils but differs from them mainly in that it has a layer of brownish or yellowish-brown fine sand below 10 to 15 inches and is slightly more alkaline.

The natural vegetation consists principally of second-growth slash pine, cabbage palm, a few saw palmetto, poverty oatgrass (*Danthonia spicata*), broomsedge (*Andropogon* sp.), wiregrass, switchgrass (*Panicum*



*virgatum*), carpetgrass (*Axonopus* sp.), maidencane (*Panicum hemitomon*), rushes (*Rhynchospora* sp.), sedges, pickerelweed (*Pontederia cordata*), arrowhead (*Sagittaria latifolia*), and a few dwarf cypress trees.

In most places the surface soil is covered by a very thin layer of organic scum deposited by surface waters. The surface layer ranges from grayish brown to gray or light gray and is 2 to 10 inches thick.

The lighter colored areas of Charlotte soil usually occur near areas of Arzell soil. In these positions the second layer is light gray or white to depths of 10 to 20 inches, where the brownish-yellow or yellowish-brown layer begins. This yellowish layer varies from 10 to 40 inches in thickness. In places it lies directly on the limestone and marl and the light-gray or white layer is missing. Small iron concretions are found immediately above the limestone in some areas, and the surface soil may contain small amounts of marl mixed with the fine sands.

#### *Copeland Fine Sand, Low Phase*

This soil is associated chiefly with the other Copeland soils and Cypress swamp but differs from Copeland fine sand in position. It is low and covered with water many months of the year and has only a very thin layer of fine sandy clay loam over the limestone, and in some places none at all. Internal drainage is rapid when the soil is freed of the high water table.

All of this land is covered with cabbage palm, saw palm, vines, ferns, and a few slash pine and cypress trees.

#### *Copeland Fine Sand, Shallow Phase*

This phase differs from Copeland fine sand mainly in having a shallow sandy layer over the limestone rocks and in occupying lower positions.

Internal drainage is rapid when the high water table is lowered. The normal range in depth to limestone is 3 to 12 inches, but in places limestone rocks are at the surface. The black or very dark-gray fine sand rests almost directly on the limestone; only a trace of fine sandy clay loam separates it from the limestone.

Because of its position—on lands within or adjacent to sloughs, marshes, and cypress strands—this phase has a dense growth of many subtropical plants mixed with cabbage palms, oaks, maples, and a few pine trees. Practically all of this soil still supports native vegetation.

#### *Cypress Swamp*

This land type consists of low-lying forested areas covered with water the greater part of the year. It occurs mainly as cypress strands and mixed swamps that serve as natural drainageways for the Big Cypress region in



the interior of the county. The soils in these areas vary within short distances in color, texture, composition, and thickness of the various layers. In some places the topmost 2- or 3-inch layer is black or dark-gray mucky fine sand or peaty muck, and in others it is brown peat. The subsoil, or lower layer, is usually gray or light-gray fine sand. Intermingling of soils, dense undergrowth in many areas, and wetness make separation into soil types and phases impractical, though some of the soils are known to be Pompano fine sand, Arzell fine sand, and Copeland fine sand. Also there are areas classified as peaty mucks or as peat.

Relatively large areas are made up of cypress strands and mixed swamps. The cypress strands support mainly medium to large bald and pond cypress (*Taxodium ascendens*) trees and an undergrowth of buttonbush (*Cephalanthus occidentalis*), some marsh rushes, grasses, ferns, and vines.

All of Cypress swamp lies at a very low elevation or in sloughlike depressions and may be covered by several feet of water part of the year. The water levels tend to vary widely from season to season and from year to year. Sometimes the surface is dry.

#### Felda Fine Sand

This level or nearly level soil occurs on the short-grass prairies adjacent to the Sunniland soil. The soil developed from thin beds of fine sand over clayey materials that contain limestone or moderately hard marl. The soil is poorly drained; it has no appreciable runoff and a high water table. During rainy seasons water drains from the higher soils and stands for many days on these depressional prairies.

This soil is associated with the Pompano Charlotte, and Arzell soils but differs from them in having a thin (18- to 36-inch) sandy layer over clayey sediments and limestone. It is more poorly drained and is grayer in the deeper layers than the Sunniland soil.

The native vegetation consists chiefly of switchgrass, carpetgrass, three-awn grass (*Aristida* sp.), and poverty oatgrass, broomsedge, maidencane, rushes, sedges, pickerelweed, and arrowhead.

This soil varies considerably, particularly in the colors of the sandy layers overlying the clayey materials. In some places these layers have almost the gray and light gray or white colors characteristic of the Arzell soil, but in other places the sandy layers are yellowish-brown to pale yellow, as in the Charlotte soil. Where the sandy layers resemble those of the Charlotte soil, the clayey materials are predominantly brownish yellow mottled with light gray and white.



### Fresh Water Marsh

This land type consists of shallow ponds and marshes covered with a few inches to 3 feet or more of water the greater part of the year. The soils in the marshes and smaller ponded areas vary a great deal within short distances and therefore are not separated into types and phases.

Most of the soils within the wettest section have 3 to 13 inches of partly decayed vegetative matter mixed with fine sands. The surface layer is underlain by gray fine sands, which grade into light-gray to white fine sands at depths of 15 to 30 inches. Calcareous clayey material, marl, or limestone rock occurs at depths of 36 to 48 inches.

In the southern part of Okaloacoochee Slough, the brown fibrous peat is about 6 inches thick and overlies very dark-gray fine sands that contain much organic matter. At a depth of 36 to 42 inches occur calcareous clayey materials, marl, or limestone.

This marsh usually supports a thick growth of water lily (*Nymphaea* sp.), pickerelweed, arrowhead, bonnets (*Chaptalia* sp.), bladderwort (*Utricularia* sp.), maidencane, wax myrtle, sedges, sawgrass, and cattails (*Typha* sp.). A few marsh areas are near brackish water and adjacent to tidal marshes; they support cattails, grasses, and sedges. The soils in this area vary from dark-gray mucky fine sands to grayish-brown fine sand overlying light-gray fine sand. They are usually alkaline.

### Ochopee Fine Sandy Marl, Shallow Phase

Most of this phase is associated with other Ochopee soils and with Tucker marl. It differs from Ochopee fine sandy marl chiefly in having limestone at shallower depths, or 6 to 12 inches below the surface instead of 12 to 36 inches. It is very poorly drained and has fewer narrow natural drainageways than the Ochopee fine sandy marl.

The surface layer, 3 to 4 inches thick, is dark grayish-brown or dark-gray fine sandy marl of loamy fine sand texture. This layer is underlain by grayish-brown marly fine sand that has a few light-gray and light yellowish-brown mottles. The depth to the limestone varies within short distances, primarily because of solution holes in the limestone formation. In places limestone rocks appear at the surface. Included with this soil are very small areas of Broward and Keri soils or Rockland, which occur as islands covered with cabbage palms.

The greater part of this soil has a cover of short grasses. Some areas, however, support stunted cypress, slash pine, and other trees.



#### Ochopee Marl, Shallow Phase

Extensive areas of this phase occur east and northeast of Deep Lake. The underlying limestone is at depths of 3 to 12 inches, as compared to 12 to 36 inches in Ochopee marl. In most other respects, the two soils are similar.

The surface layer, 3 to 8 inches thick, is a dark grayish-brown or dark-gray marl of fine sandy loam texture. Below this occurs grayish-brown or light-gray fine sandy marl of loamy fine sand or fine sand texture. In many places this fine sand layer is very thin or entirely absent and the marl surface layer lies directly on limestone. In a few instances a very thin layer of fine sandy clay loam overlies the limestone.

This soil is associated with other Ochopee soils and the Tucker and Broward soils. Where this phase is near Tucker marl, its surface layer varies within short distances from a fine sandy loam to a clay loam, and in some lower positions consists of a mixture of mucky materials and marl.

#### Rockland

This land type constitutes nearly level areas that contain small depressions. It occurs as islands within the Big Cypress region, where it is associated with the Broward, Ochopee, Tucker, Charlotte, Pompano, Keri, and Copeland soils. It is commonly referred to as pine rockland.

At the surface, outcrops of Tamiami limestone predominate but there is soil material between the outcrops similar to that described for the shallow phase of either Broward fine sand or Ochopee fine sandy marl. The soil material in the solution holes ranges from a few inches to several feet in thickness. It is somewhat poorly drained. Some of the surface water drains into the numerous sandy areas between the rocks and thence into underground channels.

The vegetative cover consists primarily of second-growth slash pine, cabbage palm, saw palmetto, running oak (*Quercus pumila*), wiregrass, and other grasses, and shrubs, but some of the areas support cypress trees, or grasses and a few trees, or grasses only.

#### Tucker Marl

This soil occupies level or nearly level marl prairies, 6 to 15 feet above sea level. It is associated with the Ochopee, Broward, Matmon, Sunniland, Charlotte, Pompano, and Felda soils. It differs from the Ochopee soils chiefly in its lower content of sand and higher content of clay. It has developed from recent deposits of finely divided calcareous sediments or marl mixed with appreciable quantities of fine sand and clay. The marl lies directly on moderately hard limestone at depths ranging from 4 to 24



inches. Natural drainage is very poor, and water covers the soil several months each year.

The native vegetation consists of sawgrass, switchgrass, poverty oatgrass, and carpetgrass, broomsedge, maidencane, arrowhead, rushes, and sedges.

This soil is strongly alkaline and its layers are of variable thickness. The surface layer is 3 to 8 inches thick; the second layer, 6 to 18 inches. The average depth to limestone is 14 inches, but the range is from 4 to 24 inches. In a few instances no rock is reached within a depth of 42 inches. Sometimes a thin layer of gritty materials – a mixture of sands, small limestone fragments, and marl – overlies the limestone. In small areas the surface texture approaches a fine sandy loam, but usually it is clay loam or silty clay loam. In other places the surface layer may be slightly mucky.

Included with this soil are several cabbage palm and saw palmetto islands where the areas are known to be rockland or soils of the Broward or Matmon series. In a few instances the limestone is more shallow adjacent to these islands and outcrops. Small limestone outcrops are scattered within areas of this soil.

#### **10.2.1.4 Paleontological Resources**

There are no known or anticipated paleontological resources in the NG3-D survey area as documented by the FGS (Letter of February 2, 2006, Exhibit 16).

### **10.2.2 Hydrology and Water Quality**

The hydrology and water quality of the NG3-D survey area are discussed in the following sections.

#### **10.2.2.1 Surface Water and Water Quality**

The land surfaces are flat and slopes to the south and southeast from elevations of approximately 15 to 10 feet over a distance of ten miles across (Figure 10.2). Surface water is generally present in lower elevations during the late summer and fall periods during the wet season. Through the winter and spring months water levels recede to cypress dome areas and soils become firm. Operations are scheduled during the dry period of the year (December – May) to minimize soil impacts and maximize access to surface areas. The applicant will coordinate all field operations with USDOI-NPS managers to avoid working in standing water to the extent practicable.

The seasonal high water typically occurs in late summer. The period from December through May is considered the dry season. In general, the water table across the site is at the surface during the wet season and within a few feet of the



ground surface during the dry season. During the dry season, there is typically standing water only in the deepest portions of the wetlands.

Within the NG3-D survey area, surface water generally moves south and southeast, through the shallow sloughs, as sheet flow controlled by the surface topography (Figure 10.2) and channel flow through man-made ditches and channels associated with I-75 drainage structures and pre-1996 agricultural practices on the BCNP-A. The sheet flow rates are highest during high water periods, and decrease as the wet season ends. The area is inundated during the wet season by water ranging from a few inches to several feet in depth (Klein *et al.* 1970). The velocity of sheet flow was calculated in the range of 800-1,500 feet per day with the highest velocities occurring during extreme high water conditions (Leach *et al.* 1972).

Surface water is ponded year round in the central depressions of cypress dome areas in all but drought years. The SFWMD maintains gauging stations at several locations in the area. In particular, the gauging stations at Mullet Slough in Section 30, Township 50 South and Range 33 East and Kissimmee Billy Strand in Section 25, Township 49 South, and Range 32 East are used by the SFWMD and the USDOI-NPS for water and land management purposes.

As stated in the 1992 GMP for the original Preserve and the 2010 GMP for the Addition, the water in Big Cypress is relatively unpolluted. Concentrations of nitrogen, phosphorus, total organic carbon, and persistent pesticides, which often serve as indicators of pollution, are generally similar to concentrations in nearby, relatively uninhabited areas, and concentrations are considerably less than those of nearby urbanized areas. Water quality changes occur seasonally and diurnally in Big Cypress and are related to the natural hydrologic and biologic regimes. The seasonal recession of water levels triggers physical, chemical, and biological changes in water quality. During low water, diurnal fluctuations in dissolved oxygen are greatest as a result of the high concentration of organisms in the remaining water. During the day plants produce excess oxygen by photosynthesis. At night dissolved oxygen decreases as photosynthesis ceases and respiration demands are met.

Published information on water quality conditions in the Preserve has been reviewed. The USGS has gathered, edited, and interpreted water-quality data from a range of sources for the Preserve. Water quality data from selected sampling stations in the Preserve is discussed in detail by the USGS at their South Florida Information Access site ([sofia.usgs.gov](http://sofia.usgs.gov)). Relevant sections from this site regarding water quality issues were previously presented to the USDOI-NPS in the *Nobles Grade 3-D Geophysical Survey Plan of Operations for the Big Cypress National Preserve and Addition Areas* submitted to the USDOI-NPS in June 2006 by CRC; specifically, in the USGS Water Quality Information report.



#### 10.2.2.2 Depth to Groundwater and Groundwater Quality

Groundwater is at or near the surface throughout the NG3-D survey area during the majority of the year. The groundwater resources of the area were examined most recently in the late 1990s by the USGS and reported by Reese and Cunningham in USGS Water-Resources Investigations Report 99-4213 (2000). The depth to groundwater from seven observation wells in or near the survey area as described by the USGS confirms the water table to be at or near the surface (Figure 10.4). The Reese and Cunningham report provides the most recent and definitive work on the near surface aquifer conditions in this area. Other relevant studies have been conducted by Klein and Hull (1978).

The Gray Limestone Aquifer is a marginally potable generally low-permeability aquifer unit that occurs throughout Collier, Hendry, Broward, and Miami-Dade Counties that exhibits varying hydrogeologic conditions throughout its area of occurrence.<sup>2</sup> As depicted in Figure 10.5, an east to west cross-section along Alligator Alley, the Gray Limestone Aquifer is mapped beneath a shallow, unconfined water table aquifer and confining and semi-confining units in the Pinecrest Sand unit in the survey area.

The top of the Gray Limestone Aquifer in the NG3-D survey area has been mapped by Reese and Cunningham to be at depths of 60 to 70 feet below land surface. The aquifer unit is 40 to 70 feet thick, occurring in thin and generally soft, unconsolidated limestone, shell beds, and quartz sand units generally recognized as part of the Tamiami Formation. The Pinecrest Sand unit contains a low permeability water table aquifer and very low permeability confining beds directly above the Gray Limestone Aquifer. The water quality in the Gray Limestone Aquifer is marginal for potable supplies with chloride levels above 150 mg/l.<sup>3</sup> The relationship of upper confining units to the aquifer is shown in Figure 10.6.

These low permeability materials of the water table aquifer and the upper confining unit that begin below the cap rock generally protects the Gray Limestone Aquifer from surface infiltration. Sheet flow across the surface has been termed “rejected recharge” by Klein and others in 1970 and, along with evapotranspiration, are the only processes that remove surface water.

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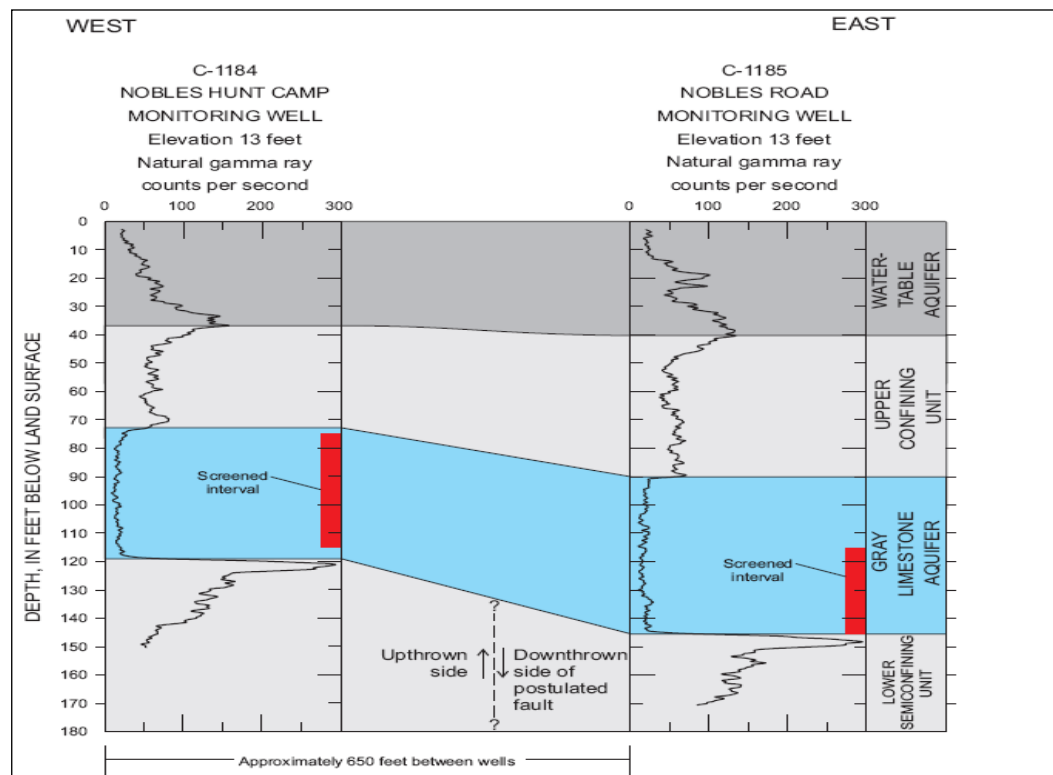
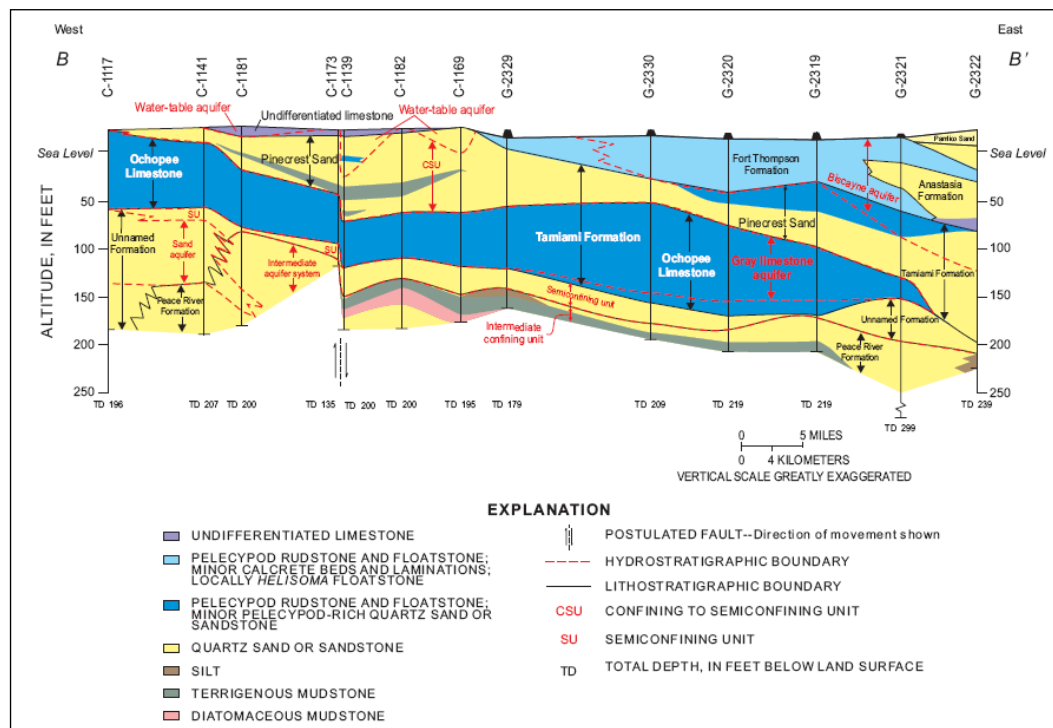
<sup>2</sup>The areal extent of the Gray Limestone Aquifer was expanded by the Reese and Cunningham work from studies reported in U.S. Geological Survey Water-Resources Investigations Report 87-4034 describing the surficial aquifer system in Broward County.

<sup>3</sup>Ibid.











### 10.2.2.3 Proximity to Floodplains (Base, 100 year, 500 year)

The occurrence of water standing on the land during the wet season in the NG3-D survey area is a function of the normal hydroperiod for the area. Thus, this area is not a “floodplain” in the classic sense, as that term usually connotes lowlands adjacent to a water body that is subject to flooding by the overflow of water from the adjacent water body during a flood event. This does not occur in the survey area. However, because of the proximity of groundwater to the surface and the extended periods of the year where surface water inundates the land, the entire area is considered a wetland and subject to applicable regulations.

## 10.3 Vegetation and Wildlife

In general, the Preserve is topographically flat and dominated by shallow water table conditions and shallow surface water moving generally south and southeast to the Ten Thousand Islands. The vegetation covering the area is predominantly of wetland types that are growing in poorly drained soils dominated by dense cap rock, extreme soil pH regimes and water table levels at or within a foot of the surface during most of the year.

As detailed in the GMP/EIS’s for BCNP and BCNP-A, the preserve is dominated by bald cypress (*Taxodium distichum*) and pond cypress. Cypress are deciduous trees that grow to 130 feet tall and reach diameters of 7 to 10 feet. Most of the larger cypress trees were removed by logging decades before the Preserve was established, and only a few large trees remain. Cypress trees are highly resistant to fire and thrive in saturated soils.

Temperate species are abundant within the Preserve. Pinelands, cypress domes and strands, prairies, and marshes are the most prevalent vegetation types and are dominated by temperate species. Tropical species primarily occur within hardwood hammocks, and are also found in pinelands, mixed-hardwood swamps, and cypress strands. Endemic plants, native only to areas within the Preserve, comprise ten percent of the vegetation within Big Cypress (Long 1974, USDOJ-NPS 1992, USDOJ-NPS 2010).

### 10.3.1 Vegetative Cover Types

A map depicting the USDOJ-NPS designations of the various land covers within the NG3-D survey area is provided as Map 4. This information was obtained from the USDOJ-NPS in November 2013. Table 10.2 lists the USDOJ-NPS land cover types and cover type acreages found within the survey area.

**Table 10.2 USDOJ-NPS Land Cover Types and Acres within the Revised NG3-D Survey Area**

USDOJ-NPS Land Cover Category	Revised NG3-D Survey Area Acreage
Cypress Forest	32,211
Disturbed	379



**Table 10.2 (Continued)**

<b>USDOI-NPS Land Cover Category</b>	<b>Revised NG3-D Survey Area Acreage</b>
Hydric Hammock	82
Hydric Pine Flatwoods	2,936
Marsh	688
Mesic Hammock	2,889
Mesic Pine Flatwoods	8,415
Scrub Cypress	18,855
Swamp Forest	486
Water	124
Wet Prairie	3,389
<b>Total</b>	<b>70,454</b>

Associated vegetation community descriptions were also provided by the USDOI-NPS and are listed along with the corresponding land cover category in Table 10.3.

**Table 10.3 USDOI-NPS Land Cover Types and Associated Vegetation Communities within the Revised NG3-D Survey Area**

<b>USDOI-NPS Land Cover Category</b>	<b>Vegetation Communities</b>
Cypress Forest	Cypress Domes/Heads; Cypress Strands; and Cypress-Mixed Hardwoods
Scrub Cypress	Cypress Savanna; and Dwarf Cypress
Disturbed	Major Canals (>30m Wide); Major Roads (>30m Wide);
Hydric Hammock	Bayhead; and Paurotis Palm
Hydric Pine Flatwoods	Cypress-Pines; Pine Savanna; and Slash Pine with Cypress
Marsh	Cattail Marsh; Non-Graminoid; Emergent Marsh; Tall Sawgrass; Pop Ash; and Willow
Mesic Hammock	Cabbage Palm; Hardwood Scrub; Oak Sabal Forest; Palm Savanna; Saw Palmetto Scrub; and Subtropical Hardwood Forest



**Table 10.3 (Continued)**

<b>USDOI-NPS Land Cover Category</b>	<b>Vegetation Communities</b>
Mesic Pine Flatwoods	Slash Pine; Mixed with Palms; and Slash Pine with Hardwoods
Swamp Forest	Mixed Hardwood Swamp Forest; Mixed Hardwood Cypress and Pine; and
Water	Water
Wet Prairie	Graminoid Prairie; Mixed Graminoids; Sawgrass; Shrublands; and Spikerush

The NG3-D survey area north of I-75 is characterized by extensive mesic pine flatwoods and cypress forests. Marshes and wet prairies are widely interspersed north of I-75. South of I-75, extensive scrub cypress areas are intermixed with cypress forests, mesic pine flatwoods, and wet prairies. Mesic and hydric hardwood hammocks are dispersed throughout both north and south of I-75.

A description of each vegetation community adapted from the 1992 and 2010 GMP/EIS documents is included below.

#### Cypress Forest

Cypress domes occur throughout the Preserve, particularly in the central and eastern portions. They are characterized by a monospecific overstory of cypress, which grow tallest in the center of a limestone depression and taper off toward the fringes, forming a domelike feature. This depression in the bedrock fills with organic soils and eventually peat forms due to constant saturation and slow decomposition. The largest and fastest growing cypress trees are found in these wetter, deeper peat deposits. Trees toward the dome edge are thought to be smaller because of more marginal soils, lower water levels, and more frequent susceptibility to fires (Duever *et al.* 1986a). Flooding is essential for maintaining cypress domes, and a 290-day hydroperiod is average for domes; average maximum water levels reach about two feet (Duever *et al.* 1986b). Periodic fires play an important role because they limit hardwood invasion, remove peat (which helps maintain the site's hydroperiod), and generally leave the cypress unharmed. Ponds often form in the center of cypress domes and are important habitat for alligators and aquatic wildlife. These ponds are likely the result of deep-burning peat fires that occurred during extreme droughts or the dissolution of limestone by acids in plant litter accumulations (Loveless 1959).

Cypress strands are found throughout the Preserve in deep mineral soil depressions, but they are distinct from cypress domes because they form along major drainages and generally retain a north-south orientation. Dominant vegetation features, when present,



are very large cypress trees, a few over 100 feet tall and 6 feet in diameter. Understory vegetation is diverse, unlike cypress domes, and includes shade-tolerant hardwoods, ferns, and epiphytes. Cypress strands within the Preserve have been logged, and many sites are now more characteristic of the mixed-hardwood swamps described in the following section. Cypress strands are also associated with relatively deep water, with a hydroperiod that extends over 240 days. Even though cypress strands rarely burn, evidence indicates that they may benefit from infrequent fires because cypresses are highly fire-resistant and competing hardwoods are not.

#### Scrub Cypress

Cypress prairies are characterized by an open forest of small cypress trees and scattered, sparse growths of grasses, sedges, and forbs. They occur on a thin layer of marl soil or sand overlying limestone. During the wet season, prairies are flooded to a depth of about eight inches, with inundation lasting 120 days. Fuel buildup is slow on these sites, and fires occur only once every decade or two (Wade and Hoffstetter 1980).

#### Disturbed

Areas affected by man's activities occur throughout the Preserve. Historical activities conducted without current environmental protections, such as logging, canal and road construction, farming and grazing, oil extraction, ORV use, and facility construction, have caused many changes in vegetation communities. The encroachment of exotic species, increased fire frequency, and loss of natural vegetation are the primary repercussions of these activities.

Thousands of non-native plant species have been introduced to Florida for ornamental plantings, agriculture, and other human uses. Because of the relative youth of the South Florida landmass and the semitropical climate, it is theorized that the region is particularly susceptible to invasion by exotic plant species (Duever *et al.* 1986b). Some 297 exotic plants are known to have been naturalized in South Florida (Duever *et al.* 1986b). Many of these are reported from Preserve, but most are restricted to early successional stages on disturbed sites, and only a few pose a long-term threat to native communities. Of these, five species melaleuca (*Melaleuca quinquenervia*), Brazilian pepper, Australian pine (*Casurina* spp.), water hyacinth (*Eichhornia crassipes*), and hydrilla (*Hydrilla verticillata*) are fairly widespread in the Preserve.

#### Mesic and Hydric Hammock

Hardwood hammocks are dense and diverse forests of hardwood trees and shrubs, ferns, and epiphytes that grow on land slightly higher than that of surrounding marshes and prairies. Hammocks are scattered throughout the Preserve, and because of their raised position, they often appear as islands of trees. Dominant overstory species are usually oak (laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), and live oak (*Q. virginiana*)) or tamarind (*Lysiloma bahamensis*). Oak is more prevalent in the northern portion of the BCNP than the frost-susceptible tamarind. Elevated bedrock overlain by sandy peat soils comprises the foundation of the hammocks. These soils remain moist because of the shady microclimate, but they are inundated only during extreme high-water periods. Because soils remain moist most of the year, hardwood hammocks rarely burn, but they



are susceptible to fire during extended droughts. Following a fire, the species composition of recolonized hammocks often changes significantly (Duever *et al.* 1986b).

### Marsh

Marshes in the Preserve can be divided into freshwater and salt marshes;<sup>4</sup> freshwater marshes are more prevalent in the Preserve. Both are dominated by emergent broad-leaved sedges and grasses and are inundated approximately 150 to 250 days per year. Species composition of freshwater marshes varies considerably, but typically includes pickerelweed, arrowhead, maidencane, and sawgrass. Freshwater marshes are generally located at elevations between cypress strands and pinelands, primarily on the slopes of the undulating bedrock surface that underlies most of the Preserve. Soils tend to be shallow and organic in origin, with bedrock exposed in patches as a result of past fires. A well-developed algal mat known as periphyton often covers the soil surface, forming marl soils high in calcium carbonate and constituting an important food chain element for many insects and fish (Gleason 1974). Maximum wet season water levels are about eight inches for these marshes. Dry surface soils are exposed during much of the dry season, resulting in frequent patchy fires, which prohibit pines and cypress from invading the quickly recovering marshes.

### Mesic and Hydric Pine Flatwoods

Pinelands occur extensively within the BCNP, primarily throughout the northeastern portions. South Florida slash pine (*Pinus elliotii* var. *densa*) is the major overstory species, with a dense understory of cabbage palm and saw palmetto on higher, drier sites and grasses on lower, wetter locations. Pinelands occupy a variety of sites; in some areas they exist on seldom inundated sandy sites; in others they occur along pond margins, topographic depressions, and rocky areas. Generally, maximum water levels reach just to the soil surface (Klein *et al.* 1970). Pine needles, grasses, and other combustible materials accumulate relatively quickly in pinelands, and pinelands burn at frequent intervals. If fires are suppressed, pinelands eventually succeed to hardwood-dominated stands.

An estimated 23,500 acres of pinelands in the BCNP have never been cut. These old-growth pinelands are collectively one of the largest examples of this type in South Florida. Grazing, logging, and drainage activities have affected pinelands considerably. Prescribed fires every one to three years to improve cattle range can prevent the establishment of pine seedlings. This perpetuates the formation of palmetto prairies instead of pinelands, especially where timber harvesting has occurred. Manipulating water levels by draining lowlands can result in pine stands becoming established in areas previously occupied by cypress or other wetland vegetation. Draining drier areas may result in conditions too dry for pine establishment, and these areas also become dominated by saw palmetto. Such changes are evident in the western portion of the Preserve, which is drained by the Turner River canal.

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<sup>4</sup>Salt marshes do not occur within the program area boundary.



### Swamp Forest

The logging of overstory bald cypresses in some strands has resulted in domination by former sub-canopy hardwood species, such as maple (*Acer rubrum*) and pop ash (*Fraxinus caroliniana*). Bald cypresses are often present, but they are no longer the dominant overstory trees. If the area remains relatively undisturbed, cypresses often return in impressive numbers. Understory species include ferns, epiphytes, aquatic species, and saplings of overstory vegetation. Older successional stages are dense and quite complex in terms of structure and species. Knolls within this vegetation type comprise a principal habitat for the rare royal palm (*Roystonea elata*), and older forests serve as homes for a large number of birds, mammals, reptiles, and amphibians (Wade and Hoffstetter 1980). Mixed-hardwood swamps occupy peats, sands, and rock and have a 270-day or longer hydroperiod.

### Water

The open water areas within the NG3-D survey area consist mainly of ponds, ditches and canals.

### Wet Prairie

Prairies are treeless areas dominated by grasses and grasslike plants. Wet and dry prairies have been differentiated (Duever *et al.* 1986a). Wet prairies are characterized by muhly grass (*Muhlenbergia capillaris*), love grass (*Eragrostis* spp.), and sand cordgrass (*Spartina bakerii*). In the southeastern portion of the BCNP, sawgrass and spikerush are the dominant wet prairie species. Dry prairies are characterized by broomsedges, white top sedge (*Dichromea* spp.), cordgrass, and saw palmetto. Wet prairies and marshes generally occupy the slopes of an undulating bedrock surface, with wet prairies being in higher areas than marshes. Wet prairies tend to have sandier soils than marshes, but they also occupy thin layers of marl soil over bedrock. Dry prairies occur at higher elevations on bedrock and have relatively little soil. Wet prairie types have hydroperiods of 70 days and are inundated to a maximum depth of eight inches during the wet season; dry prairies have hydroperiods of 50 days and are inundated to a maximum of two inches. Like marshes, prairies will burn during periods of drought and when sufficient fuel is present. Fire maintains prairies by eliminating invading trees and shrubs.

### Wetlands

Based upon the USDOI-NPS land cover categories outlined above, the majority of the revised NG3-D survey area, greater than 58,647± acres or 83 percent is comprised of wetland habitats (Table 10.4). These wetland habitats are spread throughout the survey area, both north and south of I-75.

**Table 10.4 USDOI-NPS Land Cover Type Wetlands and Acres within the Revised NG3-D Survey Area**

USDOI-NPS Land Cover Category	Revised NG3-D Survey Area Acreage
Cypress Forest	32,211
Hydric Hammock	82



**Table 10.4 (Continued)**

<b>USDOI-NPS Land Cover Category</b>	<b>Revised NG3-D Survey Area Acreage</b>
Hydric Pine Flatwoods	2,936
Marsh	688
Scrub Cypress	18,855
Swamp Forest	486
Wet Prairie	3,389
<b>Total</b>	<b>58,647</b>

### **10.3.2 Wildlife Species**

#### **Federally Listed Species**

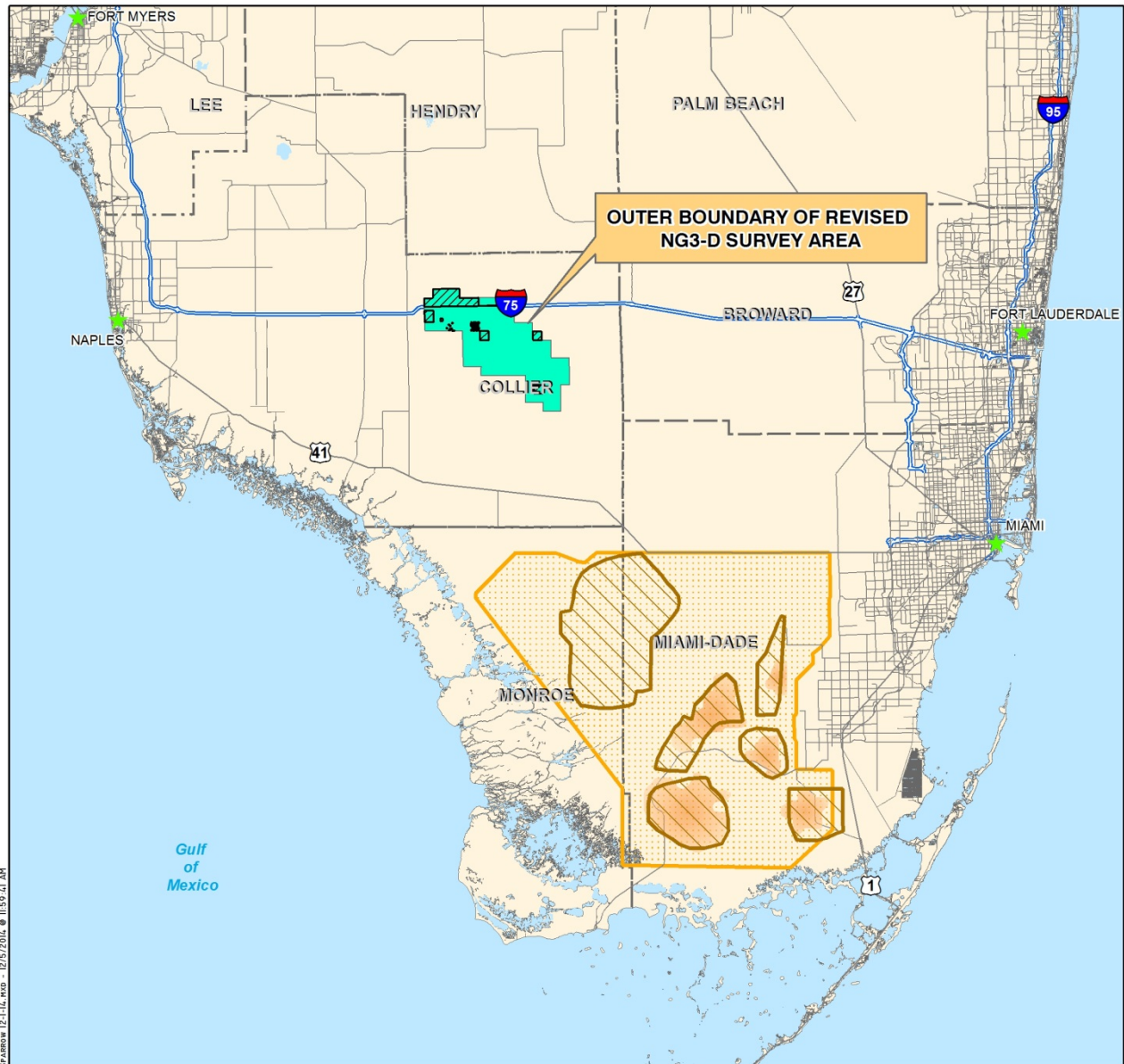
According to the FWCC, USFWS, and USDOI-NPS databases for documented occurrences of listed wildlife species, three Federally-listed species including the wood stork (*Mycteria americana*), Everglade snail kite (*Rostrhamus sociabilis*), and Florida panther occur within the NG3-D survey area (Map 6). The MMP for the Preserve designates one of these species, the known Florida panther areas, as an IRA.

The Cape Sable seaside sparrow habitat, active bald eagle nesting sites, and RCWs are also identified as IRAs but have not been documented within the NG3-D seismic survey area. Although no documented RCWs are located within the revised NG3-D survey area, they are in close proximity and could occur.

The Cape Sable seaside sparrow is a Federally-endangered species and its preferred nesting habitat includes short-hydroperiod prairie communities in the southern peninsula of Florida that contains moderately dense, clumped grasses, with open space permitting ground movements by the sparrows. The NG3-D survey area lies outside of the limits of the Cape Sable seaside sparrow USFWS consultation area and critical habitat zones/population areas (Figure 10.7) which are located predominantly in Everglades National Park and in the southern most portion of the Preserve. No Cape Sable seaside sparrows have been documented within the survey area. Cape Sable seaside sparrows have been documented within the far southern portion of the Preserve but the majority of the sparrow population exists within Everglades National Park. As such, the Cape Sable seaside sparrow has been dismissed from further analysis since the survey area does not appear to contain the very specific habitat requirements of the species, which is evidenced by the restricted distribution of the species.

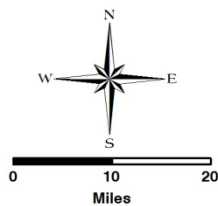
The bald eagle is not a State or Federally-listed species; however, it is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. No





**LEGEND**

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- BOCI ROE - OBTAINING
- CITIES
- CAPE SABLE SEASIDE SPARROW CONSULTATION AREA
- CAPE SABLE SEASIDE SPARROW POPULATION AREAS
- CAPE SABLE SEASIDE SPARROW CRITICAL HABITAT



NOTES:

COUNTY INFORMATION AND ROADWAY NETWORKS WERE ACQUIRED FROM THE FLORIDA GEOGRAPHIC DATA LIBRARY WEBSITE.

CAPE SABLE SEASIDE SPARROW CONSULTATION AND POPULATION AREAS WERE ACQUIRED FROM THE USFWS JUNE 2014.

CAPE SABLE SEASIDE SPARROW CRITICAL HABITAT WAS ACQUIRED FROM THE USFWS JUNE 2014.

THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

**FIGURE 10.7 CAPE SABLE SEASIDE SPARROW CONSULTATION AREA WITH CRITICAL HABITAT AND POPULATION AREAS NOBLES GRADE 3-D**

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REVIEWED BY	DATE
A.D.	12/10/13
REVISED	DATE
F.L.	12/1/14



J:\2013\USec2197\GIS\2013\Plan of Operations\Figures\Figure 10.7 Cape Sable Sea Side Sparrow 12-1-14.mxd - 12/15/2014 @ 11:59:41 AM



bald eagle nests have been identified within the revised NG3-D survey area; however, undocumented bald eagle nests could potentially occur.

According to the 1992 GMP/EIS for the Original Preserve, the 2010 GMP/EIS for the Addition, and the range and habitat descriptions provided in *Rare and Endangered Biota of Florida* series (Humphrey 1992, Gilbert 1992, Moler 1992, Deyrup and Franz 1994, Rodgers *et al.* 1996) an additional five Federally-listed wildlife species could potentially occur within the NG3-D survey area. Table 10.5 summarizes the Federally-listed wildlife species that have been documented, or could potentially occur, within the seismic survey area. Descriptions of each of these Federally-listed species can be found below.

**Table 10.5 Federally Listed Wildlife Species with Potential to Occur within the Revised NG3-D Survey Area**

Common Name	Scientific Name	Designated Status
		Federal (USFWS)
Reptiles		
American alligator	<i>Alligator mississippiensis</i>	T (S/A)
Eastern indigo snake	<i>Drymarchon corais couperi</i>	T
Gopher tortoise	<i>Gopherus polyphemus</i>	C
Birds		
Audubon’s crested caracara	<i>Polyborus plancus audubonii</i>	T
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E
Red-cockaded woodpecker	<i>Picoides borealis</i>	E
Wood stork	<i>Mycteria Americana</i>	E
Mammals		
Florida bonneted bat	<i>Eumops floridanus</i>	E
Florida panther	<i>Puma concolor coryi</i>	E

USFWS – U.S. Fish and Wildlife Service

C – Candidate

E – Endangered

T – Threatened

T(S/A) – Threatened Due to Similarity of Appearance

*American Alligator (Alligator mississippiensis)*

The American alligator is Federally-listed as threatened due to similarity of appearance to the endangered American crocodile (*Crocodylus acutus*) by the USFWS. Critical habitat for the American alligator has not been designated by the USFWS.

The American alligator can be found throughout the Southeastern United States from coastal North Carolina south to Southern Florida and the Florida Keys, and westward through the deep-south into central Texas and north into Arkansas (USFWS 2008a). Within Florida, the American alligator is found in all counties, and the Florida ecosystem provides abundant freshwater habitat, allowing for easy and numerous hunting and



distribution opportunities (USDOI-NPS, The American Alligator, <http://home.nps.gov/bicy/naturescience/loader.cfm?csModule=security/getfile&pageID=428352>).

The American alligator is predominantly found in wetland and open water habitats including rivers, streams, lakes and ponds, marshes, swamps, reservoirs, and ditches (University of Georgia, Savannah River Ecology Laboratory, American Alligator (*Alligator mississippiensis*), <http://srelherp.uga.edu/alligators/allmis.htm>). While primarily a freshwater species, alligators will also venture into brackish or salt water habitats. The American alligator is an opportunistic feeder and will prey upon numerous species. However, due to their preferred habitat, juvenile alligators will feed primarily upon insects, small amphibians, small fish, and other available invertebrates. Adult alligators will primarily consume fish, snakes, turtles, small mammals, and bird species available within their wetland open water habitats (FWCC, Alligator Facts, <http://myfwc.com/wildlifehabitats/managed/alligator/facts/>).

The Preserve, encompassing the survey area, is home to numerous American alligators, which are most commonly observed during the winter dry season when water levels are low and concentrate water-dependent species including the alligator (USDOI-NPS, Big Cypress Reptiles, [http://www.nps.gov/bicy/naturescience/upload/Reptile-Checklist\\_FINAL\\_Lores.pdf](http://www.nps.gov/bicy/naturescience/upload/Reptile-Checklist_FINAL_Lores.pdf)). The American alligator is one of the most noticeable large animals within the Preserve.

The Program Area includes eight habitats that may be utilized by the American alligator. These habitats include Cypress Forest, Scrub Cypress, Hydric Hammock, Hydric Pine Flatwoods, Marsh, Swamp Forest, Water, and Wet Prairies and total approximately 58,647 acres. The presence of the American alligator within the NG3-D survey area is anticipated.

#### *Eastern Indigo Snake (Drymarchon corais couperi)*

The Eastern indigo snake is listed as Threatened by the USFWS. Critical habitat for the Eastern indigo snake has not been designated.

The Eastern indigo snake was first listed as a Federally-threatened species under the ESA in 1978. The listing was prompted by the snake's significant population decline, which was caused by over-collecting for the domestic and international pet trade, as well as mortalities resulting from rattlesnake collectors gassing gopher tortoise (*Gopherus polyphemus*) burrows. With enforcement of the ESA as well as the Lacey Act, exploitation for the pet trade has declined but still remains a concern (Moler 1992). Although the gassing of tortoise burrows is still a threat to the Eastern indigo snake, it is not the most serious. Instead, the displacement and fragmentation of habitat from urban development have become the biggest threats to the snake since the listing. No critical habitat areas have been designated for the snake to date. The Eastern indigo snake is a long, black, nonvenomous snake found in Florida and Georgia. With a length of up to 104 inches, it is considered one of the longest snakes in the United States (Ashton and



Ashton 1981). The Eastern indigo has large and smooth scales with a uniform shiny black coloration, except for red or cream tints on the throat, chin, or cheeks.

The Eastern indigo snake is an active terrestrial predator that will eat any vertebrate small enough to be overpowered. Layne and Steiner (1996) documented several instances of indigos flushing prey from cover and then chasing it. An adult Eastern indigo snake's diet may include frogs, toads, snakes (venomous as well as nonvenomous), lizards, turtles, turtle eggs, fish, juvenile gopher tortoises, small alligators, birds, and small mammals (Keegan 1944, Babis 1949, Kochman 1978, Steiner *et al.* 1983). Juvenile Eastern indigo snakes eat mostly invertebrates (Layne and Steiner 1996).

Historically, the Eastern indigo snake was found throughout Florida and in the coastal plain of Georgia, Alabama, and Mississippi (Haltom 1931, Carr 1940, Cook 1954, Diemer and Speake 1983, Moler 1985).

Currently, the Eastern indigo is primarily found in sandhill habitat in northern Florida and southern Georgia. However, the snake is also widely distributed throughout central and South Florida. Its habitats include pine flatwoods; scrubby flatwoods; high pine; dry prairie; tropical hardwood hammocks; edges of freshwater marshes, agricultural fields, and coastal dunes; and even human-altered habitats. They are especially common in the hydric hammocks throughout this region (Moler 1985). In extreme South Florida, these snakes are typically found in pine flatwoods, pine rocklands, tropical hardwood hammocks, and mangrove forests (Kuntz 1977). In portions of South Florida, Eastern indigos may also occupy agricultural sites and areas along canals and other artificial waterways.

Wherever the Eastern indigo snake occurs in xeric habitats, it is closely associated with the gopher tortoise, the burrows of which provide shelter from winter cold (Bogert and Cowles 1947; Speake *et al.* 1978; Layne and Steiner 1996). Other underground refuges used by this species include burrows of armadillos, cotton rats (*Sigmodon hispidus*), and land crabs (*Cardisoma* sp.); burrows of unknown origin; natural ground holes; hollows at the base of trees or shrubs; ground litter; trash piles; and in the crevices of rock-lined ditch walls (Layne and Steiner 1996, Hyslop 2007).

Documented occurrence data for the Eastern indigo snake in the NG3-D survey area is not available. However, the Preserve (which encompasses the survey area) is located within its distribution range. The Eastern indigo snake has been observed in the Addition lands (USFWS 2010). While the survey area is dominated by wetland systems, it does contain suitable habitat types for the Eastern indigo snake including Mesic Hammock and Mesic Pine Flatwoods. The presence of the Eastern indigo snake within the NG3-D survey area is anticipated.

### Gopher Tortoise

The gopher tortoise is listed as a Candidate for Federal Listing. Critical habitat for the gopher tortoise has not been designated by the USFWS.



The gopher tortoise occurs in the Southeastern Coastal Plain of the United States from Eastern Louisiana to Southeastern South Carolina and throughout Florida (Auffenberg and Franz 1982). In Florida, gopher tortoises occur in portions of all 67 counties (Cox *et al.* 1987).

Three environmental conditions are especially important for gopher tortoises: well-drained, sandy soil in which to burrow; adequate low-growing herbaceous ground cover for food; and relatively open sunlit areas for nesting. The gopher tortoise is primarily associated with longleaf pine-scrub oak woodlands (sandhills), but it is also found in sand pine scrub, coastal strands, live oak hammocks, dry prairies, pine flatwoods, and mixed hardwood-pine communities. Disturbed habitats, such as roadsides, fencerows, clearings, and old fields often support relatively high tortoise densities (Auffenberg and Franz 1982, Cox *et al.* 1987).

Specific location data for gopher tortoise burrows or inhabited areas within the NG3-D seismic survey area are unavailable. Gopher tortoises typically inhabit a range of upland vegetative communities; however, they are not expected to be commonly encountered during the seismic survey, because operations primarily will occur in areas without necessary habitat conditions (i.e., well-drained, sandy soils).

#### Audubon's Crested Caracara

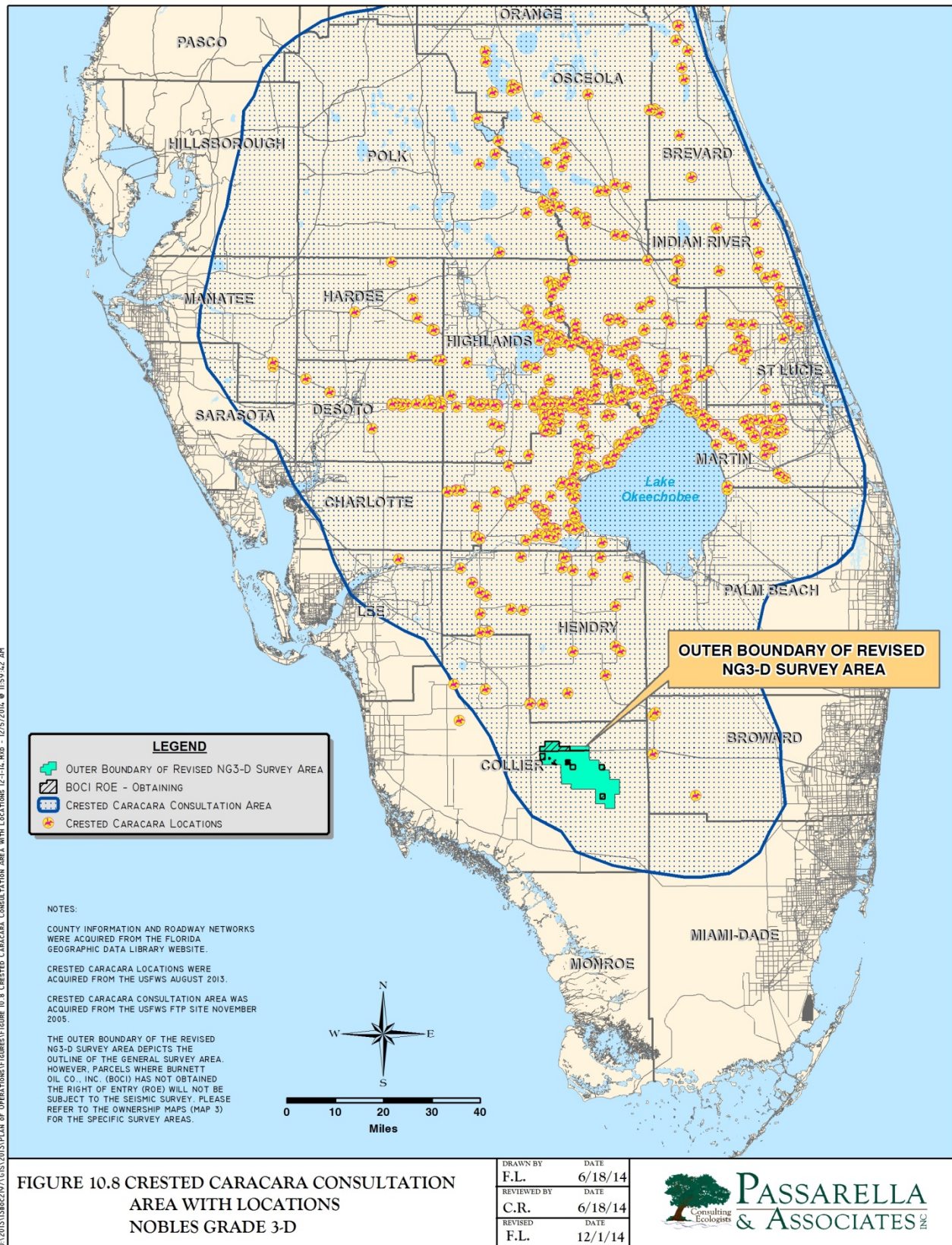
The Audubon's crested caracara is currently listed as threatened by the USFWS. Critical habitat for the Audubon's crested caracara has not been designated.

The Audubon's crested caracara occurs in the prairie area of the south-central region of Florida; South Texas; Southwestern Arizona; Northern Baja, California; and through Mexico and Central America to Panama. Populations are also found in Cuba and the Isle of Pines, and incidental in Jamaica. (USFWS, South Florida Multi-Species Recovery Plan - Species: Crested Caracara *Polyborus plancus audubonii*, [http://www.fws.gov/verobeach/MSR\\_PPDFs/AudubonsCrestedCaracara.pdf](http://www.fws.gov/verobeach/MSR_PPDFs/AudubonsCrestedCaracara.pdf)).

The Florida population commonly occurs in dry or wet prairie areas with scattered cabbage palms. It may also be found in lightly wooded areas. Scattered saw palmetto, scrub oaks (*Quercus geminata*, *Q. minima*, *Q. pumila*), and bald cypress may also be present. Widespread changes in land use may have forced a change in the type of habitat this subspecies will use. The caracara now uses improved or semi-improved pasture (Layne 1996).

The NG3-D survey area is located within the USFWS Consultation Area for the Audubon's crested caracara (Figure 10.8). There are no documented occurrences of the Audubon's crested caracara within the survey area (Figure 10.8 and Map 6). The closest documented Audubon's crested caracara occurrence is approximately eight miles north of the scaled-back NG3-D survey area. Audubon's crested caracaras in Florida primarily occur in dry or wet prairie areas with scattered cabbage palms or improved/semi-







improved pasture areas, while the majority of the survey area is dominated by forested habitats. Also, the NG3-D survey area is located in the far southern and western extreme of the Consultation Area. The Audubon's crested Caracara, therefore, has limited potential to occur within the NG3-D survey area. However, Audubon's crested caracara could occur in limited portions.

### Everglade Snail Kite

The Everglade snail kite was first listed as Federally-endangered under the Endangered Species Conservation Act (which preceded the ESA) in 1967 (32 CFR 4001). With a very low population at that time (only 10 snail kites were counted in Florida in 1965), the species was included in the first group of species to be listed under the act. Subsequent to the initial listing, critical habitat for the Everglade snail kite was designated by the USFWS in 1977 (42 CFR 40685) and augmented and corrected later that year (42 CFR 47840). The designated critical habitat areas for the kite are east and north of the Preserve (along the western perimeter of Lake Okeechobee and the SFWMD's Water Conservation Areas 1, 2A, 2B, and 3A). The NG3-D survey area lies outside of the limits of the Everglade snail kite's critical habitat (Figure 10.9).

In the South Florida Multi-Species Recovery Plan, the USFWS recommends a reconsideration of the critical habitat boundaries for the Everglade snail kite as a "species-level recovery action" and identifies the BCNP as a potential area of inclusion in the critical habitat area.

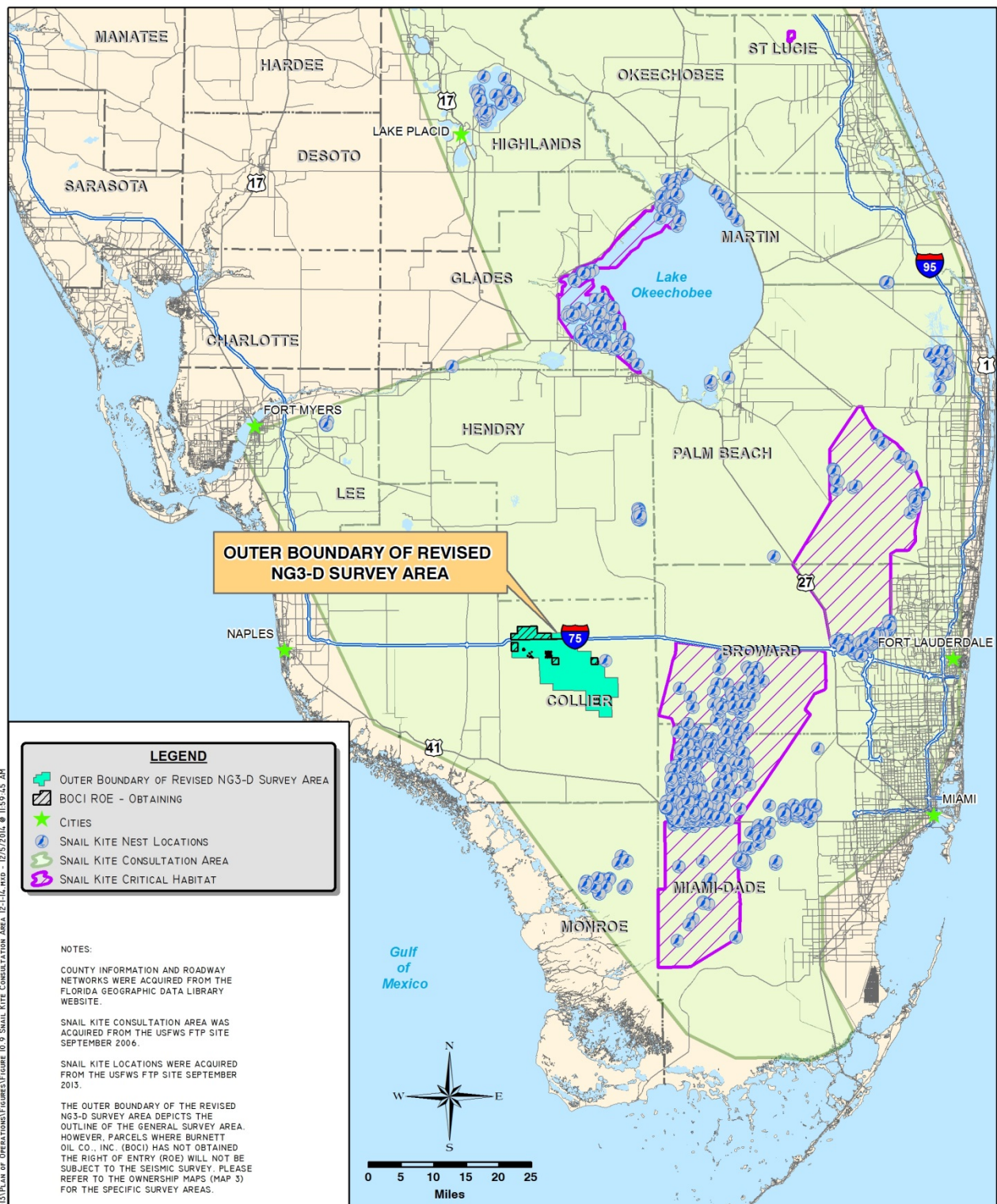
The Everglade snail kite (or snail kite) is medium in size, with a wingspan of 43 to 46 inches and a body length of 14 to 16 inches (Sykes *et al.* 1995). It is most easily distinguished from other raptors by its narrow, curved bill, which it uses to extract its primary prey, the apple snail. Also, the tail of both sexes is square-tipped with a white base. Adult snail kites have red eyes, while juveniles have brown eyes (Brown and Amadon 1978; Clark and Wheeler 1987).

The adult males are a uniform slate gray in color, whereas adult females are brown with cream-colored streaks from the face down to the breast. Immature snail kites tend to resemble adult females, with the facial/breast streaking being slightly more light brown than cream (Sykes *et al.* 1995).

The current range of the Everglade snail kite includes parts of South Florida, Cuba, and northwestern Honduras. Currently, the range and distribution of the Everglade snail kite in Florida is confined to areas with available habitat in the southern half of the state.

Although the snail kite is not a migratory bird species, it is known to be somewhat nomadic within its range in response to habitat changes (i.e., hydrologic changes, food availability, etc.).





J:\2013\USace2013\PLAN OF OPERATIONS\FIGURES\FIGURE 10.9 SNAIL KITE CONSULTATION AREA (2-14-14).mxd - 12/5/2014 @ 11:59:45 AM

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The habitat for the Everglade snail kite primarily consists of lowland freshwater marshes and the shallow littoral zones of lakes where an abundance of apple snails (*Pomacea paludosa*) can be found. The snail kite's diet predominantly consists of apple snails.

The NG3-D survey area is located outside of designated critical habitat, but within the USFWS Consultation Area for the Everglade snail kite (Figure 10.9). The closest documented Everglade snail kite nest is approximately one mile east of the survey area (Figure 10.9 and Map 6). Habitats within the survey area that may be utilized by the Everglade snail kite include Cypress Forest, Scrub Cypress, Hydric Hammock, Hydric Pine Flatwoods, Marsh, Swamp Forest, Water, and Wet Prairies. The Everglade snail kite could potentially occur within the NG3-D survey area.

#### Red-Cockaded Woodpecker

The RCW was listed as Federally-endangered under the ESA in 1970. Critical habitat for the RCW has not been designated by the USFWS. Lands in the Preserve (which encompasses the NG3-D survey area) contain suitable habitat for the RCW. The RCW is one of 22 species of woodpeckers native to North America. Adult RCWs are approximately 7 to 8 inches in length and have a wingspan that ranges between 1 to 1.2 feet. The RCW is easily distinguished by its large, conspicuous white cheek patches, black cap and neck, and black- and-white barred back and wings (Jackson 1994).

The RCWs historic range encompassed the southeastern U.S. from eastern Texas and Oklahoma to New Jersey, and the bird was characterized as abundant in 19th-century literature. Throughout the 20th century, however, the species distribution within its historic range has become fragmented, and its total population numbers have decreased drastically due to the destruction of its habitat. The woodpecker is still widely distributed in the southeastern United States, but the few remaining colonies (a particular group of woodpeckers that use a set of cavity trees) are confined to scattered refuges.

The population within the Preserve is the southernmost and perhaps the largest in South Florida (USDOI-NPS 1981). The RCW can only survive in mature pine stands, usually 60 years old or more, that are infected with red-heart disease, a fungus that weakens the interior "heartwood" of a pine. This allows the birds to excavate cavities for roosting and nesting. The RCW typically nests between April and August in tree cavities located 20 to 50 feet above the ground. In the Preserve, nesting is usually over by mid-June (Schulze 2007).

RCWs forage in a wide variety of pine species and especially favor areas that contain large trees, which have a large surface area and loose bark. They feed on adults, larvae, and eggs of arthropods, especially ants and termites that they find by flaking bark from the tree. In prime habitat the forage area for the RCW surrounds the colony and consists of pine forests. But within the Preserve, where pine forests are patchy, the forage area is large and includes prairies, swamps, and other vegetation communities. Recent studies show that forage areas in South Florida average more than 360 acres rather than 200 acres typical for most of the woodpeckers range (Nesbitt *et al.* 1983).



The RCW appears to be fairly tolerant of human activities as long as the colony is maintained. For instance, several active colonies in the Preserve are near ORV trails, active oil pads, and backcountry camps. There appears to be a limit, however, on the duration or types of activities that woodpeckers will tolerate; in other parts of the South, nesting failures have been attributed to noise from loud radio music and house construction, continuous chainsaw operation, and heavy interstate traffic (Jackson 1983).

The FWCC and USDOI-NPS monitor the RCW population in the Preserve. In 2011, there were 86 confirmed active clusters containing 84 potential breeding groups in the Preserve. The FWCC intensively monitors a portion of these clusters every year for reproductive success, cavity augmentations, translocation potential, and habitat recommendations. New clusters have been discovered in suitable pine habitat consistently since 2008.

The NG3-D survey area is partially located within the USFWS Consultation Area for the RCW (Figure 10.10). The closest documented RCW cluster is approximately 0.25 mile southwest of scaled-back NG3-D survey area (Figure 10.10 and Map 6). The FWCC and USDOI-NPS documented occurrences are primarily concentrated to the south and west of the NG3-D survey area. Habitats within the survey area that may be utilized by the RCW include Hydric Pine Flatwoods and Mesic Pine Flatwoods. Due to the close proximity, the RCW could potentially occur within the NG3-D survey area.

### Wood Stork

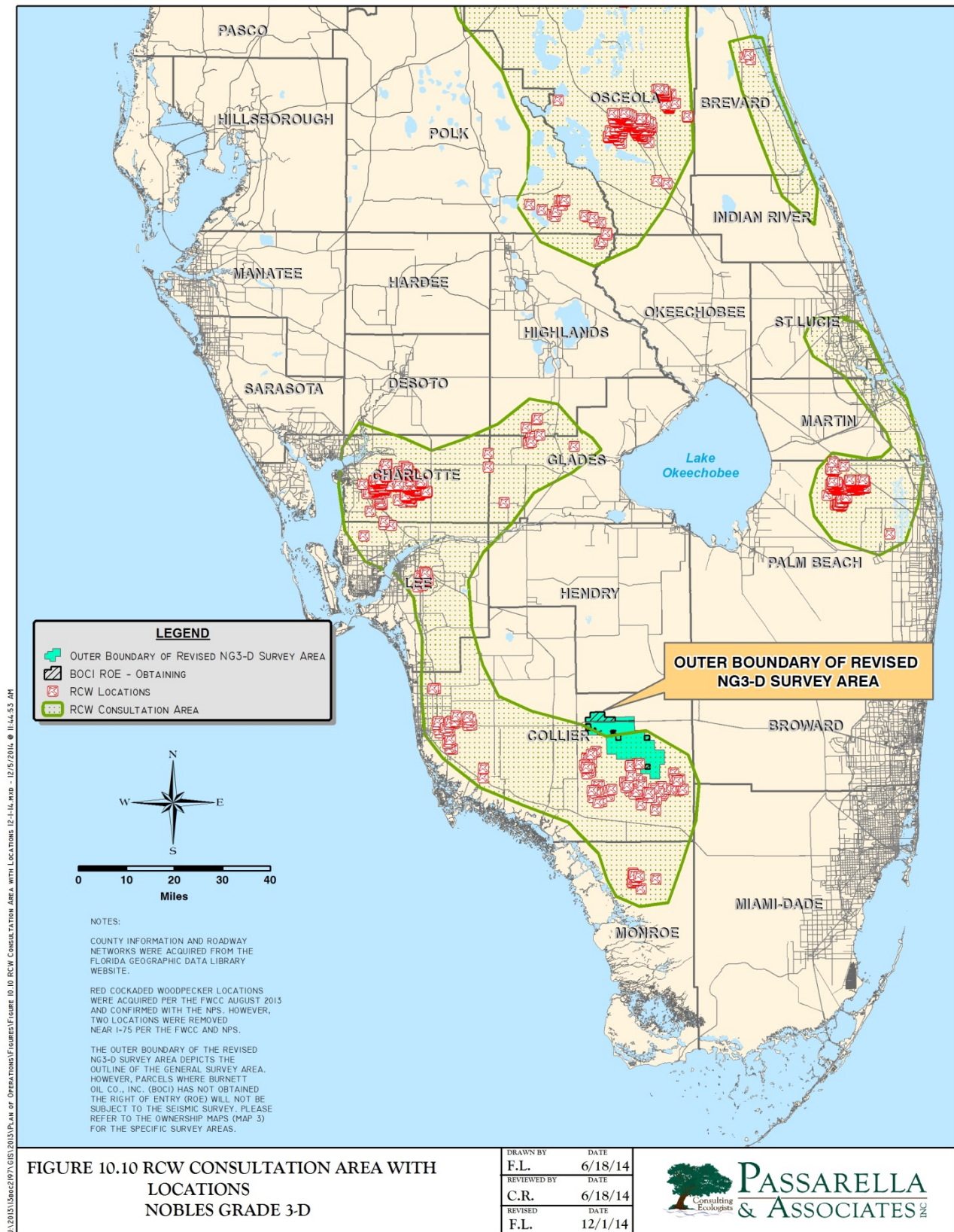
The wood stork was listed as Federally-endangered under the ESA in 1984. Critical habitat for the wood stork has not been designated by the USFWS.

The wood stork is a large, long-legged wading bird, with a body length (head to tail) of approximately 2.75 to 3.25 feet and a wingspan of 5 to 5.5 feet. Their plumage is white, except for iridescent black primary and secondary feathers and a short black tail. On adult wood storks, the rough scaly skin of the head and neck is unfeathered and blackish in color. Their legs are dark with dull pink toes. The bill color is blackish.

Wood storks are birds of fresh water and brackish wetlands, primarily nesting in cypress or mangrove swamps. In the United States, wood storks historically nested in all coastal states between Texas and South Carolina (Wayne 1910, Bent 1926, Howell 1932, Oberholser 1938, Dusi and Dusi 1968, Cone and Hall 1970, Oberholser and Kincaid 1974). Currently, wood storks breed in Florida, Georgia, and coastal South Carolina.

Wood storks usually construct their nests in medium to tall trees that are usually standing in water or in trees that are on dry land if the land is a small island surrounded by water. Their nests are large rigid structures usually found in the forks of large branches or limbs. Storks may add guano to the nest to stabilize the twigs (Rodgers *et al.* 1988). The nest may be constructed in branches that are only a yard above the water or in the tops of tall trees.







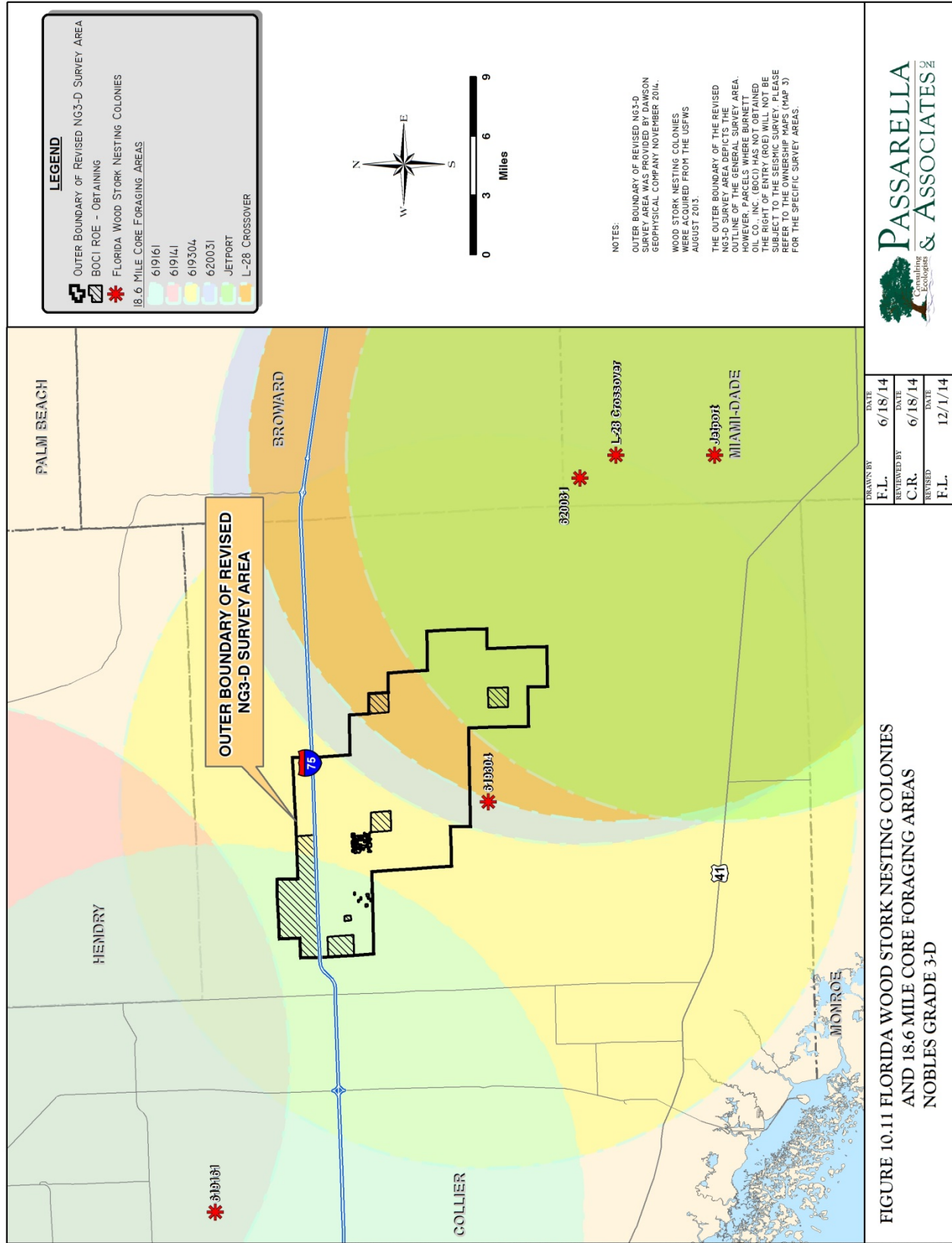
The nesting season of wood storks varies geographically, but in Florida egg-laying begins in October, and fledging of young birds occurs in February or March. The U.S. breeding population of the wood stork declined from an estimated 20,000 pairs in the 1930s to about 10,000 pairs by 1960. The decline was believed to be due primarily to the loss of suitable feeding habitat, especially in South Florida rookeries, where repeated nesting failures occurred despite protection of the rookeries. According to the South Florida Multi-Species Recovery Plan, under pre-drainage conditions wood storks formed colonies between November and January (December in most years regardless of annual rainfall and water level conditions). In response to deteriorating habitat conditions in South Florida, wood storks in the Everglades and Big Cypress basins had delayed the initiation of nesting to February or March in most years since the 1970s. This shift in timing was believed to be responsible for the increased frequency of nest failures and colony abandonment. However, according to the December 2013 South Florida Wading Bird Report (SFWMD 2013), the number of wood stork nests increased by 50 percent over the last 8-year average and 97 percent over the last 3-year average.

Wood storks feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools, primarily on fish between 7.75 and 9.75 inches in length. Particularly attractive feeding sites are depressions in marshes or swamps where fish become concentrated during periods of falling water levels. Feeding areas in South Florida have decreased by about 35 per cent since 1900 because of human alteration of wetlands. Additionally, levees, canals, and floodgates have greatly changed natural water regimes in South Florida.

The wood stork forages annually in the Preserve when water levels provide concentrations of fish. Documented nesting in the Preserve was rare until 1996 when 45 colonies were reported (Jansen and Brooks 1996). The previous two consecutive years of high water and subsequent buildup of the prey base apparently provided ideal conditions in which to raise young. Wood stork nests have been found only sporadically in the Preserve since 1996.

The USFWS's Draft Standard Local Operating Procedures for Endangered Species Wood Storks (2002) recognizes a 30-kilometer (18.6-mile) zone surrounding a colony boundary as a Core Foraging Area (CFA). According to USFWS data, the revised NG3-D survey area falls within the CFA of five historically recorded wood stork colonies (Figure 10.11). Colony No. 619161 is 13.55± miles west-northwest; Colony No. 620031 is 8.71± miles southeast; the L-28 Crossover colony is 10.33± miles southeast; the Jetport colony is 12.91± miles southeast; and Colony No. 619304 is 0.91± mile south. According to the Florida Atlas of Breeding Sites for Herons and their Allies (Runde *et al.* 1991) and the FWCC Waterbird Colony Locator (<http://atoll.floridamarine.org/waterBirds/>), only one of these colonies is an active wood stork colony (No. 619304) as of 1999. Additional wood stork information was provided by the USDO-I-NPS but did not include activity status. This information will be added to the POP, once available. Also per the USDO-I-NPS and USFWS request, the SFWMD was contacted on August 14, 2014 in an attempt to obtain the more recent GIS wading bird nesting data from the annual South Florida Wading Bird Reports. However, as of the date of this POP, no response from the







SFWMD has been received. This additional wading bird information will be included in the POP if it becomes available.

Habitats within the NG3-D survey area that may be utilized by the wood stork include Cypress Forest, Scrub Cypress, Hydric Hammock, Hydric Pine Flatwoods, Marsh, Swamp Forest, Water, and Wet Prairies. The presence of the wood stork is anticipated within the NG3-D survey area.

#### Florida Bonneted Bat (*Eumops floridanus*)

The Florida bonneted bat was listed as Federally-endangered on November 1, 2013. Critical habitat for the Florida bonneted bat has not been designated.

With an average wingspan of 490 to 530 millimeters (19.3 to 20.9 inches) and an average length of 130 to 165 millimeters (5.1 to 6.5 inches), the Florida bonneted bat is the largest species of bat found in Florida. They are members of the *Molossidae* family, commonly referred to as free-tailed bats. As the name suggests, Molossids, including Florida bonneted bats, have tails that extend well beyond their short tail membrane. Also similar to other free-tailed bats, the Florida bonneted bat has small eyes, large upper lips, and long, narrow wings. Their fur ranges from dark gray to brownish gray or cinnamon brown on its dorsal side, with lighter, grayish fur underneath. The Florida bonneted bat is characterized by its large size and its large, broad ears that slant forward over the eyes and join together along the midline of the head. Their big ears protrude over their head like a bonnet, giving them their name.

Florida bonneted bats have been found roosting in both urban and forested areas. They are known to roost in rock crevices, tree cavities, buildings and bat boxes. Foraging habitat includes areas over water such as ponds, wetlands, streams, canals, ditches, or over open ground such as forest edges, tree lines corridors, prairies, pastures, golf courses and croplands (Marks and Marks 2006).

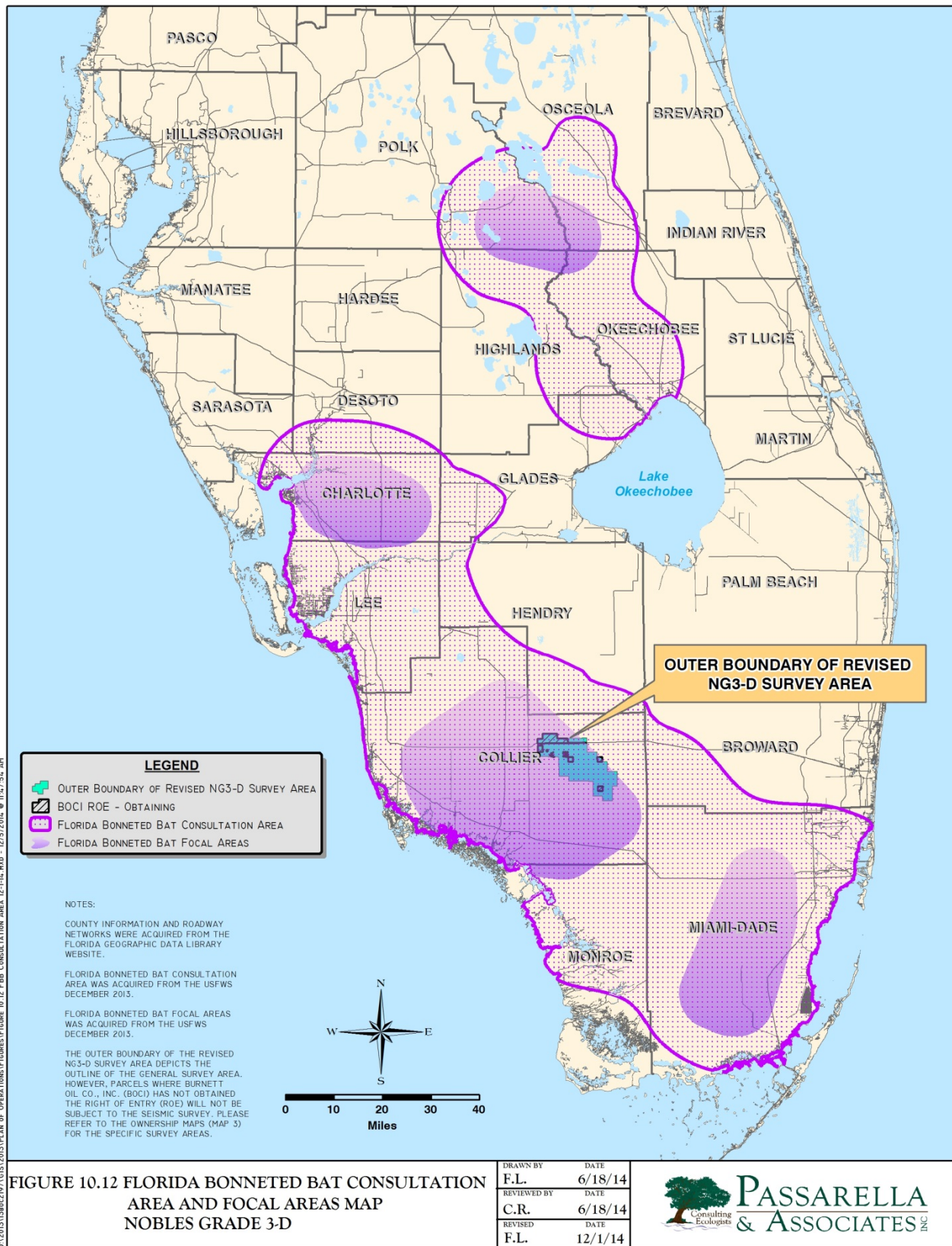
The current range of the Florida bonneted bat is known to include both the east and the west coasts of the southern portion of the Florida peninsula (excluding the Keys). Specimens have been discovered in very few areas, including the Miami area in 1936; Coral Gables, Coconut Grove, and Miami in the 1950s; Punta Gorda in 1979; Fakahatchee Strand in 2000; and North Fort Myers in 2003. In 2014, Florida bonneted bats were discovered at golf courses in the middle of urban Coral Gables. The NG3-D survey area is located within the USFWS Consultation Area, and partially within the USFWS Focal Area for the Florida bonneted bat (Figure 10.12). Due to the variable habitats utilized by this species, the presence of the Florida bonneted bat has the potential to occur within the NG3-D survey area.

#### Florida Panther

The Florida panther is listed as endangered by both the USFWS and the FWCC. Critical habitat for the Florida panther has not been designated.



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Panthers once lived throughout most of the southeastern U.S. Today, the only confirmed breeding population is located in South Florida. The current panther population is centered in/around the Preserve, including Everglades National Park, Fakahatchee Strand Preserve State Park, Florida Panther National Wildlife Refuge, and privately-owned lands north of the Preserve in Collier and Hendry counties.

Annual range-wide surveys of the Florida panther population in central and southern Florida began in 1981 (McBride *et al.* 2008). Approximately 20 to 30 Florida panthers remained in the early 1980s (McBride *et al.* 2008). Based on documented physical evidence, the population remained relatively stable at 20 to 30 panthers between 1985 and 1995 (McBride *et al.* 2012). In 1995, eight female Texas cougars were released into the Florida panther population, including four introduced into the Preserve, to offset the negative effects of inbreeding documented in panthers. The population began increasing after the genetic restoration efforts in 1995, reached a peak in 2007, and has remained relatively stable between 104 to 110 panthers from 2008 through 2011 (McBride *et al.* 2012).

Panthers are a landscape species that require large contiguous areas with adequate prey availability and reduced levels of human disturbance. Forest patches comprise an important component of panther habitat in South Florida (Kautz *et al.* 2006). Panthers select forested habitat types interspersed with other habitat types that are used in proportion to their availability (Land *et al.* 2008, Onorato *et al.* 2010). Panthers prefer to move through vegetated areas, and rarely move through open areas except at night.

Existing data on panther reproduction indicate that breeding may occur throughout the year, with a peak during winter and spring, a gestation period of around 90 to 95 days, litter sizes of one to four kittens, and a breeding cycle of two years for females successfully rearing young to dispersal, which typically occurs at 18 months (USFWS 2008b). Most panther births occur between March and July, and the den sites are used for two months after birth. Den sites are usually located in dense, understory vegetation, typically saw palmetto (Maehr 1990, Shindle *et al.* 2003).

The panther's preferred prey is white-tailed deer (*Odocoileus virginianus*) and feral hogs (*Sus scrofa*) (Maehr *et al.* 1990, Dalrymple and Bass 1996). Secondary prey includes raccoons (*Procyon lotor*), nine-banded armadillos (*Dasypus novemcinctus*), marsh rabbits (*Sylvilagus palustris*) (Maehr *et al.* 1990) and alligators (Dalrymple and Bass 1996).

Panthers are typically shy, secretive animals that normally avoid human interaction. A study was conducted between 1994 and 1998 by Janis and Clark (1999) to study the effects of hunting, and associated use of ORVs, on panthers. It centered on the panther population north of I- 75, including the Bear Island Unit in the original Preserve. This study focused on ORV trails used repeatedly by hunters who were seeking the same prey as panthers, primarily white-tailed deer and feral hogs. The USFWS's "Biological Opinion" for the 2000 *Final Recreational ORV Management Plan* states the following on page 562 of the plan (USDOI-NPS 2000a):



*Janis and Clark (1999) surmise that the increase in the distance of panther locations from trails is “biologically minor” and probably related to prey behavior; i.e. white-tailed deer moving deeper into the forest to avoid ORV users. The decrease in panther use of the Bear Island Unit is balanced by an increase in use of private lands north of [Big Cypress National Preserve] as “refugia.” The authors assert that this pattern would be of serious concern if panther habitat on private lands were lost.*

Fletcher and McCarthy (2011) conducted an updated analysis to assess effects found in Janis and Clark (2002). Their analysis supported the findings of Fletcher and McCarthy (2011) regarding the effects of hunting, and associated use of ORVs, on panthers. Particularly, Fletcher and McCarthy (2011) found:

*Panther locations during the hunting season in Bear Island were, on average, only 180 meters farther from trails than before the hunting season. An increase of 180 meters probably has minor biological consequences. Furthermore, it is possible that the effect we observed was not a reaction by panthers to human activity, but a reaction of their prey.*

Fletcher and McCarthy (2011) also found that heightened ORV use has only weak effects on panther distribution, specifically an increase in use of forested wetlands, but that variation in standing ground water was more influential on panther distributions. The authors concluded:

*Nonetheless, these results suggest that panthers and hunter ORV use can co-occur at least at the hunter ORV levels observed, and that forested wetlands may be disproportionately used by panthers during times of high hunter ORV use.*

Several government agencies are involved in panther management and research in South Florida and the Preserve. Under the ESA, the USFWS has oversight responsibility to review the actions of other agencies in relation to Federally-protected species and to establish species recovery programs. The USDOJ-NPS has the primary responsibility for protecting the panther (as well as other listed species) on lands under its jurisdiction. USDOJ-NPS efforts have concentrated on the distribution of panthers on USDOJ-NPS lands in the Preserve south of I-75 and east of SR 29 and in Everglades National Park. The FWCC is responsible for panther research and management and has focused on panther home ranges and movement patterns, habitat selection and needs, food habits, demographic parameters, physical condition and health, and other life history and management questions. In addition, the FWCC has been involved in studies of the condition and health of deer in the Preserve as the panthers’ main prey. The USDOJ-NPS and the FWCC cooperate for overall wildlife management in the Preserve.

In 2008, the *Florida Panther Recovery Plan* was updated with a third revision and released by the USFWS (2008b). This 2008 plan includes the following recovery objectives:



- to maintain, restore, and expand the panther population and its habitat in South Florida and expand the breeding portion of the population in South Florida to areas north of the Caloosahatchee River;
- to identify, secure, maintain, and restore panther habitat in potential reintroduction areas within the historic range, and to establish viable populations of the panther outside south and south-central Florida; and
- to facilitate panther recovery through public awareness and education.

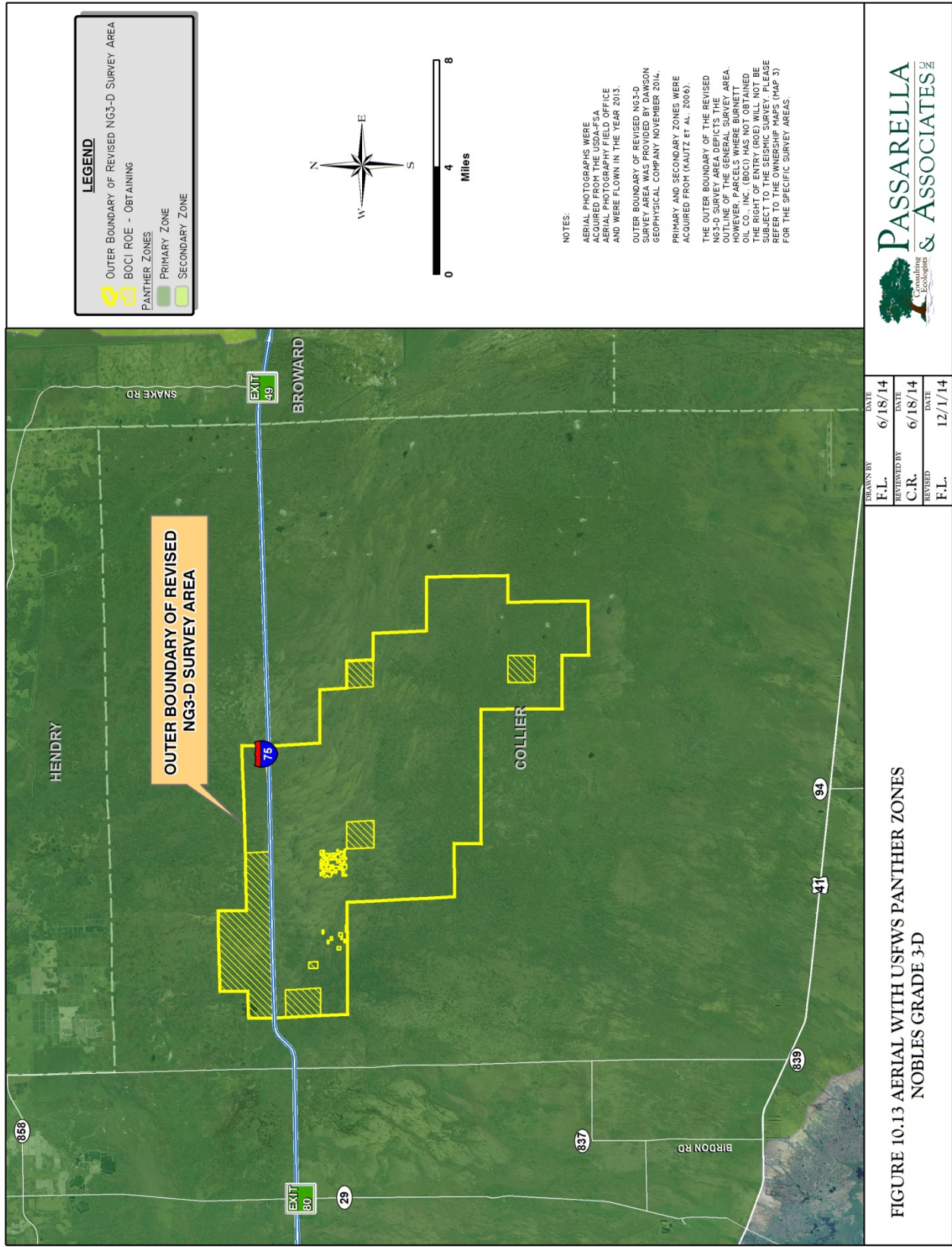
The USDO-I-NPS has an ongoing project monitoring the status of the panther population within the Preserve. The overall purpose is to provide information to management so that their decisions will support and enhance panther recovery, and to determine the panthers' behavioral and/or demographic responses to natural events, management actions, and human impacts in South Florida.

The scaled-back NG3-D survey area is located in the USFWS' Panther Focus Area, specifically the Primary Zone (Kautz *et al.* 2006) (Figure 10.13). A map depicting the locations of the available Florida panther telemetry within the NG3-D survey area is provided as Figure 10.14. A total of 2,104 telemetry locations have been recorded within the survey area boundary from August 1982 to June 3, 2013. These telemetry points are from a total of 73 Florida panthers (FP Nos. 7, 11, 12, 16, 17, 23, 26, 28, 29, 33, 36, 38, 40, 41, 42, 43, 44, 45, 48, 49, 50, 51, 54, 55, 56, 58, 59, 60, 62, 63, 64, 68, 69, 70, 71, 74, 76, 77, 79, 86, 87, 89, 90, 91, 93, 98, 100, 103, 108, 119, 127, 129, 133, 134, 138, 144, 147, 150, 153, 162, 164, 169, 171, 172, 175, 177, 184, 187, 190, 191, 192, 203, and 216) and 3 Texas cougars (TX Nos. 101, 102, and 107). Of the 73 Florida panthers, 8 individuals (FP Nos. 153, 162, 175, 177, 187, 191, 192, and 216) are still alive and have been confirmed using the revised NG3-D seismic survey area. Uncollared Florida panthers are also known to inhabit the Preserve, as evidenced by a female with two kittens that were treed but not collared in Raccoon Point in March of 1999 per the *Draft Environmental Assessment for Oil and Gas Plan of Operations Collier Resources Company Landing Strips in the Big Cypress National Preserve* (Big Cypress National Preserve Undated).

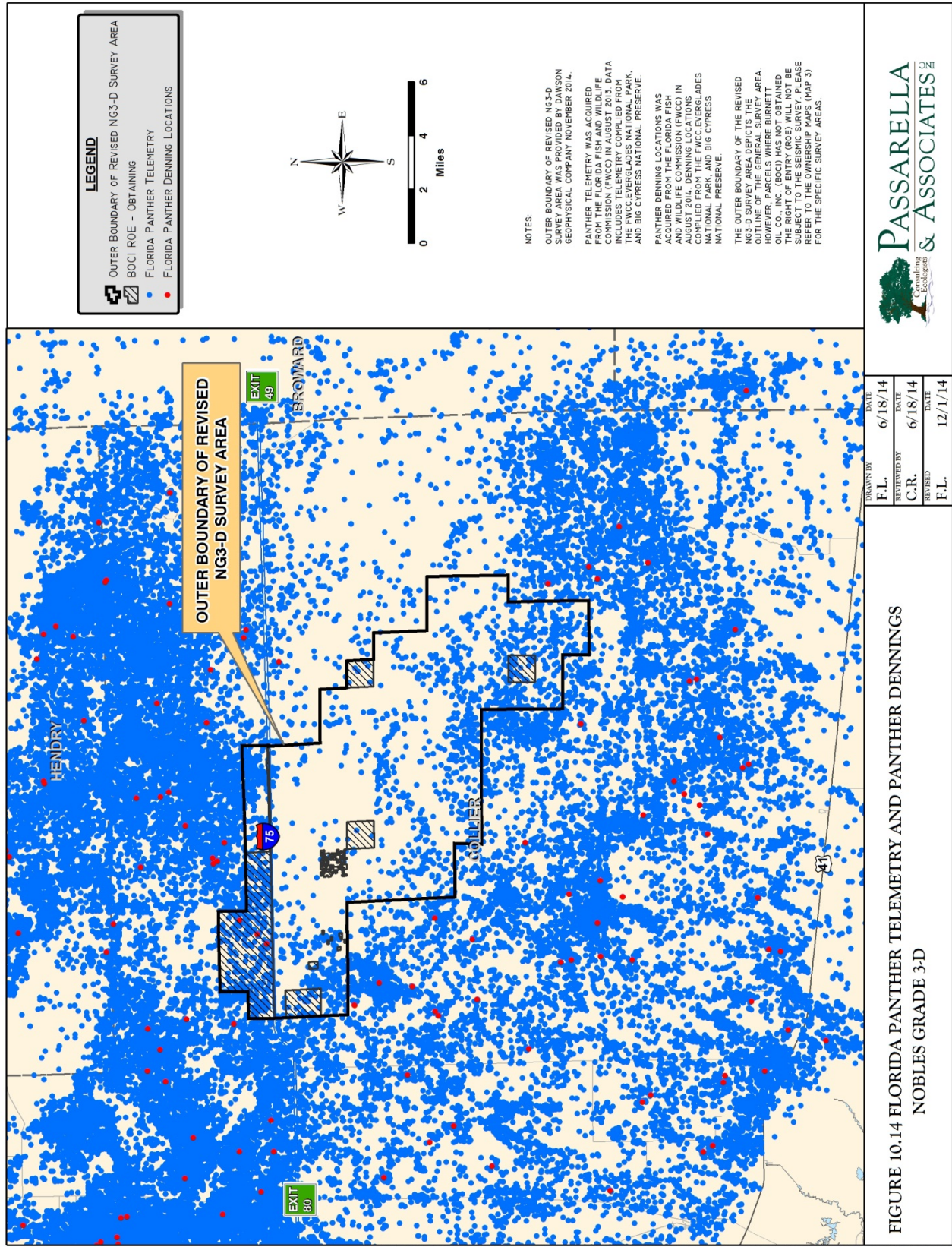
In addition to collared panther telemetry data, several Florida panther denning locations have also been confirmed within the revised NG3-D seismic survey area (Figure 10.13).

While Florida panther den sites are rarely utilized more than once, the historic denning activity may indicate the presence of habitat for future denning. The data for the documented den sites located within the NG3-D seismic survey area are summarized in Table 10.6 below.











**Table 10.6 Florida Panther Denning Activity Data within the Revised NG3-D Survey Area**

FP No.	Den Date	Location	UTM-E (Nad83)	UTM-N (Nad83)	Habitat	Minimum No. of Kittens at Den	Kittens Handled	Litter Status	Comments
175	August 2010	NBCNP Bear Island	480864	289457 2	Pine/ Palmetto	2	K310♀ K311♀	Failed	FP No. 175 copulated when this den was only 2.5 months old and she reddened on January 6, 2011
	January 2011	NBCNP Bear Island	481436	289514 3	Palmetto/ Pine Scrub	2	K319♂ K320♀		
	July 2012	NBCNP Bear Island	482283	289619 8	Hardwood Hammock	3	K373♀ K374♂ K375♂		

NBCNP – Big Cypress National Preserve North of I-75

♂ - Male

♀ - Female

### **State Listed Species**

State-listed wildlife species have also been identified, or have the potential to occur, within the revised NG3-D survey area. The 2000 *Preserve Final Recreational Off-Road Vehicle Management Plan and Supplemental Environmental Impact Statement* provides a detailed list of both State and Federally-listed species that can occur within the Preserve (USDOI-NPS 2000a). Of the species listed in that document, 12 State-listed or protected species (that have not been discussed thus far) have the potential to occur within the survey area. These species include the Everglades mink (*Mustela vison evergladensis*), Big Cypress fox squirrel (*Sciurus niger avicennia*), Florida black bear, Florida sandhill crane (*Grus canadensis pratensis*), limpkin (*Aramus guarauna*), little blue heron (*Egretta caerulea*), roseate spoonbill (*Ajaia ajaja*), reddish egret (*Egretta rufescens*), snowy egret (*Egretta thula*), tri-colored heron (*Egretta tricolor*), white ibis (*Eudocimus albus*), and Florida tree snail (*Liguus fasciatus*). Also, although not previously documented within the Preserve, or anticipated to occur within the revised NG3-D survey area, the Florida burrowing owl (*Athene cunicularia*) could potentially occur based on a review of FWCC literature.

The Florida black bear was removed from Florida's Endangered and Threatened Species List in 2012. However, Florida black bears remain protected by the FAC Bear Conservation Rule 68A-4.009. This species may require special management consideration for the proposed seismic survey.

Another ten State-listed species were identified in the 2000 ORV/MP/EIS report but these species occupy coastal habitat (outside of the NG3-D survey area) or are no longer listed species (USDOI-NPS 2000b). As such, these species were dismissed from further analysis. These include the common snook (*Centropomus undecimalis*), arctic peregrine falcon (*Falco peregrinus*), American oystercatcher (*Haematopus palliatus*), osprey



(*Pandion haliaetus*), brown pelican (*Pelecanus occidentalis*), black skimmer (*Rynchops niger*), least tern (*Sterna antillarum*), mountain lion (*Puma concolor*), West Indian manatee (*Trichechus manatus*), and white-crowned pigeon (*Columba leucocephala*). The Florida tree snail is also not discussed further since the main threat to the species is the loss of habitat (Emmel and Cotter 1995) and no permanent habitat loss is expected to occur.

Table 10.7 summarizes the State-listed wildlife species that have been documented or could potentially occur within the NG3-D survey area.

**Table 10.7 State Listed Wildlife Species with Potential to Occur within the Revised NG3-D Survey Area**

Common Name	Scientific Name	Designated Status
		State (FWCC)
Mammals		
Everglades mink	<i>Mustela vison evergladensis</i>	ST
Big Cypress fox squirrel	<i>Sciurus niger avicennia</i>	ST
Birds		
Limpkin	<i>Aramus guarauna</i>	SSC
Little blue heron	<i>Egretta caerulea</i>	SSC
Snowy egret	<i>Egretta thula</i>	SSC
Tri-colored heron	<i>Egretta tricolor</i>	SSC
White ibis	<i>Eudocimus albus</i>	SSC
Florida sandhill crane	<i>Grus Canadensis</i>	ST
Roseate spoonbill	<i>Platalea ajaja</i>	SSC
Mollusks		
Florida tree snail	<i>Liguus fasciatus</i>	SSC

FWCC – Florida Fish and Wildlife Conservation Commission

SSC – Species of Special Concern

ST – State Threatened

### **Game Species**

According to the 2010 GMP/EIS for the Addition, the Preserve contains 13 major game species. Of these, the white-tailed deer, feral hogs, and wild turkey (*Meleagris gallopavo*) require special management consideration because of their importance to recreational hunters and because of their importance as prey species for Florida panthers (Maehr *et al.* 1990, Dalrymple and Bass 1996). The current status of these three game species and their habitat is described below.

#### **White-Tailed Deer**

The white-tailed deer is the most important game species within the Preserve. In addition to being a popular large game animal, white-tailed deer are prey species for Florida panthers. In 1984, the FWCC began collecting data on the resident deer herd to estimate



the population size, health and condition. Since the data collection began, the deer population within many areas of the Preserve has increased.

### *Feral Hog*

European feral hogs are currently managed as a game animal by the FWCC and are second to white-tailed deer in importance as game animals. The current population of feral hogs in the Preserve has declined in recent years and is currently low. Reasons for low hog populations are not well understood, however it is suspected that increased hunting pressure by panthers may be a factor.

### *Wild Turkey*

Wild turkeys are also an important prey resource for the Florida panther and are one of the principal game animals for recreational hunters in the Preserve. Wild turkeys are common in the region. Turkey density tends to fluctuate from year to year due to environmental conditions (Powell 1965, Frye 1954). Mortality of turkey poults is high if heavy rains occur in April or May when young birds are susceptible to disease and drowning, but populations usually recover if conditions are favorable during the next breeding season (Powell 1965).

### *Exotic and Non-Native Wildlife*

According to the 1992 and 2010 GMP/EIS for BCNP and BCNP-A, at least 22 exotic species have been collected in the Preserve, 18 of which were known to be breeding populations.

### *Other Wildlife*

The Preserve is also home to a variety of other wildlife (i.e., fish, reptiles, birds, and mammals), which include some small game species. These species are discussed in the 1992 EIS for the original Preserve's GMP; the 2010 EIS for the Addition GMP; and the ongoing EA for the Hunt Management Plan. Due to the extreme differences in these species and their habitat use, they are not discussed in detail in this Chapter. However, potential impacts to other wildlife are discussed further in Section 10.5.1.5.3.

### **10.3.3 Listed Plants**

In the 1992 BCNP GMP/EIS, 12 plant species were identified as, "under review for Federal protection." None of these 12 species were subsequently listed as threatened or endangered by the USFWS. The 2010, BCNP-A GMP/EIS identified 2 species within the BCNP-A that were listed as "candidate" species for federal listing. Additionally 96 species were identified as threatened or endangered by the State of Florida and 3 more that are identified as commercially exploited. Table 10.8 combines the species lists from the 1992 and 2010 GMP/EIS and identifies the current protection level for each of the identified species within the Preserve.



**Table 10.8 State and Federally Listed Plant Species Documented within the Preserve**

Common Name	Scientific Name	Designated Status	
		USFWS	FDACS
Parotis palm, Everglades palm	<i>Acoelorrhaphe wrightii</i>		T
Golden leather fern	<i>Acrostichum aureum</i>		T
Brittle maidenhair	<i>Adiantum tenerum</i>		E
Sensitive joint-vetch, Meadow joint vetch	<i>Aeschynomene pratensis</i>		E
White colic root, Bracted colic root	<i>Aletris bracteata</i>		E
Pineland-allamanda, Pineland golden trumpet	<i>Angadenia berteroi</i>		T
Eared spleenwort	<i>Asplenium erosum</i>		E
Bird's nest fern, Wild birdnest fern	<i>Asplenium serratum</i>		E
Pinepink	<i>Bletia purpurea</i>		T
Spider orchid	<i>Brassia caudata</i>		E
Fakahatchee bluethread	<i>Burmannia flava</i>		E
Manyflowered grasspink	<i>Calopogon multiflorus</i>		E
Spicewood, Pale lidflower	<i>Calyptanthus pallens</i>		T
Leafless bentspur orchid	<i>Campylocentrum pachyrrhizum</i>		E
Narrow strap fern, Narrow-leaved strap fern	<i>Campyloneurum angustifolium</i>		E
Tailed strap fern	<i>Campyloneurum costatum</i>		E
Powdery strap airplant	<i>Catopsis berteroniana</i>		E
Florida strap airplant	<i>Catopsis floribunda</i>		E
Southern Florida sandmat	<i>Chamaesyce pergamena</i>		T
Porter's sandmat	<i>Chamaesyce porteriana</i>		E
Satinleaf	<i>Chrysophyllum oliviforme</i>		R
Coffee colubrine, Greenheart	<i>Colubrina arborescens</i>		E
Butterflybush, Curacao bush	<i>Cordia globosa</i>		E
Quailberry, Christmassberry	<i>Crossopetalum ilicifolium</i>		T
Pepperbush	<i>Croton humilis</i>		E
Florida tree fern, Red-hair comb fern	<i>Ctenitis sloanei</i>		E



**Table 10.8 (Continued)**

Common Name	Scientific Name	Designated Status	
		USFWS	FDACS
Blodgett's swallowwort	<i>Cynanchum blodgettii</i>		T
Cowhorn orchid, Cigar orchid	<i>Cyrtopodium punctatum</i>		E
Florida prairieclover	<i>Dalea carthagenensis</i> var. <i>floridana</i>	C	E
Ghost orchid, Palmplolly	<i>Dendrophylax lindenii</i>		E
Caribbean crabgrass	<i>Digitaria filiformis</i> var. <i>dolichophylla</i>		T
Florida pineland crabgrass	<i>Digitaria pauciflora</i>	C	E
Guiana-plum	<i>Drypetes lateriflora</i>		T
Clamshell orchid, Cockleshell orchid	<i>Encyclia cochleata</i>		E
Florida butterfly orchid	<i>Encyclia tampensis</i>		CE
Dingy flowered star orchid	<i>Epidendrum anceps</i>		
Acuna's start orchid	<i>Epidendrum blancheanum</i>		E
Umbrella star orchid	<i>Epidendrum floridense</i>		E
Night blooming epidendrum, Night scented orchid	<i>Epidendrum nocturnum</i>		E
Stiff flower star orchid	<i>Epidendrum rigidum</i>		E
Sanibel Island love grass	<i>Eragrostis tracyi</i>		E
Beach verbena, Coastal mock vervain	<i>Glandularia maritime</i>		E
Wild cotton, Upland cotton	<i>Gossypium hirsutum</i>		E
West Indian tufted airplant	<i>Guzmania monostachia</i>		E
Snowy orchid	<i>Habennaria nivea</i>		E
Needleroot airplant orchid	<i>Harrisella porrecta</i>		T
Poeppig's rosemallow	<i>Hibiscus poeppigii</i>		T
Hanging club-moss	<i>Huperzia dichotoma</i>		E
Delicate violet orchid	<i>Ionopsis utricularioides</i>		E
Rockland morningglory	<i>Ipomoea tenuissima</i>		E
Pineland clustervine	<i>Jacquemontia curtisii</i>		T
Skyblue clustervine	<i>Jacquemontia pentanthos</i>		E
West coast lantana, Sanibel shrubverbena	<i>Lantana depressa</i> var. <i>sanibelensis</i>		E
Catesby's lily, Pine lily	<i>Lilium catesbaei</i>		T
Small's flax	<i>Linum carteri</i> var. <i>smallii</i>		E
Pantropical widelip orchid	<i>Liparis nervosa</i>		E
Nodding club moss	<i>Lycopodiella cernua</i>		CE
Hidden orchid	<i>Maxillaria crassifolia</i>		E
Pineland blackanthers	<i>Melanthera parvifolia</i>		T



**Table 10.8 (Continued)**

Common Name	Scientific Name	Designated Status	
		USFWS	FDACS
Climbing vine fern	<i>Microgramma heterophylla</i>		E
Twinberry, Simpson's stopper	<i>Myrcianthes fragrans</i>		T
Giant sword fern	<i>Nephrolepis biserrata</i>		T
Wild basil, Wild sweet basil	<i>Ocimum campechianum</i>		E
Florida dancinglady orchid	<i>Oncidium ensatum</i>		E
Hard fern	<i>Ophioglossum palmatum</i>		E
Erect picklypear	<i>Opuntia stricta</i>		T
Royal fern	<i>Osmunda regalis</i> var. <i>spectabilis</i>		CE
Pineland passionflower	<i>Passiflora pallens</i>		E
Comb polypody	<i>Pecluma ptilodon</i> var. <i>caespitosa</i>		E
Cypress peperomia	<i>Peperomia glabella</i>		E
Florida perperomia, Baby rubberplant	<i>Peperomia obtusifolia</i>		E
Yerba linda	<i>Peperomia rotundifolia</i>		E
Southern fogfruit	<i>Phyla stoechadifolia</i>		E
Greater yellowspike orchid	<i>Polystachya concreta</i>		E
Bahama ladder brake	<i>Pteris bahamensis</i>		T
Swartz's snoutbean	<i>Rhynchosia swartzii</i>		E
Royal palm, Florida royal palm	<i>Roystonea regia</i>		E
Leafless beaked lady's tresses	<i>Sacoila lanceolata</i>		T
Ray fern	<i>Schizaea pennula</i>		E
Florida keys nutrush	<i>Scleria lithosperma</i>		E
Everglades bully	<i>Sideroxylon rekubaty</i> subsp. <i>Austrofloridense</i>		E
Mullein nightshade	<i>Solanum verbascifolium</i>		T
Everglades Keys false buttonweed	<i>Spermacoce terminalis</i>		T
Texas ladiestresses	<i>Spiranthes brevilabris</i>		E
Lacelip lady's tresses	<i>Spiranthes laciniata</i>		T
Southern lady's tresses	<i>Spiranthes longilabris</i>		E
West Indian mahogany	<i>Swietenia mahagoni</i>		T
Broad halbard fern	<i>Tectaria heracleifolia</i>		T
Curtiss' hoarypea	<i>Tephrosia angustissima</i> var. <i>curtissii</i>		E
Lattice-vein fern	<i>Thelypteris reticulata</i>		E



**Table 10.8 (Continued)**

Common Name	Scientific Name	Designated Status	
		USFWS	FDACS
Reflexed wild pine, Northern needleleaf	<i>Tillandsia balbisiana</i>		T
Stiff leaved wild pine, Cardinal airplant	<i>Tillandsia fasciculata</i> var. <i>densispica</i>		E
Banded wild pine, twisted airplant	<i>Tillandsia flexuosa</i>		T
Hoary wild pine, Fuzzywuzzy airplant	<i>Tillandsia pruinosa</i>		E
Giant wild pine, Giant airplant	<i>Tillandsia utriculata</i>		E
Soft leaved wild pine, Leatherleaf airplant	<i>Tillandsia variabilis</i>		T
Chiggery grapes	<i>Tournefortia hirsutissima</i>		E
Entire winged bristle fern	<i>Trichomanes holopterum</i>		E
Hoopvine	<i>Trichostigma octandrum</i>		E
Florida gamagrass	<i>Tripsacum floridanum</i>		T
Leafy vanilla	<i>Vanilla phaeantha</i>		E
Rain lily, Redmargin zephyrlily	<i>Zephyranthes simpsonii</i>		T

FDACS – Florida Department of Agriculture and Consumer Services

USFWS – U.S. Fish and Wildlife Service

C – Candidate

E – Endangered

T – Threatened

Section 581.185(12) Florida Statutes, states that “the Regulated Plant Index is to be used solely to restrict unlawful harvesting of native flora without the authorization of the landowner. The Regulated Plant Index is not to be used to regulate construction or other land alteration activities on any property.”

Two species, Florida prairie clover (*Dalea carthagenensis* var. *floridana*) and Florida pineland crabgrass (*Digitaria pauciflora*), are identified as USFWS “candidate” species, per Federal Register No. 77 volume 225, dated November 21, 2012. Species descriptions for these candidate species are included below.

#### Florida Prairie-Clover

Florida prairie-clover is listed as a candidate for Federal listing by the USFWS. No critical habitat has been designated for the Florida prairie-clover.

Florida prairie-clover is restricted to South and Southwest Florida with small, scattered populations found within Collier, Miami-Dade, and Monroe counties (50 CFR Part 17,



USDOI 2012a). A total of nine occurrences are documented for Florida prairie-clover, with seven of those populations located on conservation lands.

Florida prairie-clover is found in pine rocklands, edges of rockland hammocks, coastal uplands, and marl prairie. Fire is probably an important component to the livelihood of this plant, and it probably does not tolerate shade well arising from hardwood species in the absence of a fire regime (USFWS, U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form *Dalea carthagenensis floridana*, [http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q3HL\\_P01.pdf](http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q3HL_P01.pdf)). Florida prairie-clover occurs in association with South Florida slash pine, live oak, gumbo limbo (*Bursera simaruba*), poisonwood (*Metopium toxiferum*), willow bustic (*Sideroxylon celastrinum*), white stopper (*Eugenia axillaris*), bluestem grasses (*Schizachyrium* spp.), and paspalum grasses (*Paspalum* spp.).

The 2010 GMP/EIS identified Florida prairie-clover within the Addition lands, and the USFWS noted the presence of Florida prairie-clover within the Preserve lands in the Federal Register in November 2013 (50 CFR Part 17, USDOI 2013). Although this species has been documented in the immediate area, it is unknown if this species occurs in the scaled-back NG3-D survey area. USDOI-NPS habitats that may potentially contain this species may include Hydric Pine Flatwoods, Mesic Hammock, Mesic Pine Flatwoods, and Wet Prairie, totaling 17,629± acres. Therefore, the presence of Florida prairie-clover may be anticipated within the revised NG3-D survey area; however, the known location within the Addition is likely the only occurrence in the region due to the rarity of this species.

#### Florida Pineland Crabgrass

Florida pineland crabgrass is listed as a candidate for Federal listing by the USFWS. No critical habitat has been designated for the Florida pineland crabgrass.

Florida pineland crabgrass was historically found in central and southern Miami-Dade County in Florida, along the Miami Rock Ridge and south to Long Pine Key (USFWS, U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form *Digitaria pauciflora*, [http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q1VG\\_P01.pdf](http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q1VG_P01.pdf)). Currently the known range is entirely within Long Pine Key of Everglades National Park and at the Preserve.

Florida pineland crabgrass most commonly occurs along the ecotone between pine rockland and marl prairie, with some overlap into the two ecosystems. These habitats occasionally flood during the wet season, especially within the marl prairie habitat. These preferred habitats indicate that this species is associated with low elevation pinelands and pineland/marl prairie ecotones that flood each summer during the wet season. Periodic fires appear to be extremely important to Florida pineland crabgrass for both the removal of overstory hardwoods and the removal of accumulated litter. Dominant vegetation types associated with this species included gulf muhly grass and little bluestems (grasses); sawgrass and rushes (sedges); saw palmetto and cabbage palm



(palms); and coco plum (*Chrysobalanus icaco*), buttonwood (*Conocarpus erectus*), and white indigoberry (mixed shrubs), and has been found to be most abundant with grasses and sedges. Its microhabitat was classified as being on mixed marl and rock soils, in the ecotone, most likely associated with grasses and in regions with solution holes (USFWS, U.S. Fish and Wildlife Service Species Assessment and Listing Priority Assignment Form *Digitaria pauciflora*, [http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q1VG\\_P01.pdf](http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q1VG_P01.pdf)).

The 2010 GMP/EIS identified Florida pineland crabgrass within the Addition lands, and the USFWS noted the presence of Florida pineland crabgrass within the Preserve lands in the Federal Register in November 2013 (50 CFR Part 17, USDOJ 2013). Although this species has been documented in the immediate area, it is unknown if this species occurs in the revised NG3-D survey area. USDOJ-NPS habitats that potentially contain this species may include Hydric Pine Flatwoods, Mesic Hammock, Mesic Pine Flatwoods, and Wet Prairie, totaling 17,629± acres. Therefore, the presence of Florida pineland crabgrass may be anticipated in the NG3-D survey area.

#### **10.3.4 Nonnative/Invasive Plant Species**

The Florida Exotic Pest Plant Council (FLEPPC) keeps an updated list of Category I and Category II nonnative plants in Florida, which represents about eleven percent of the more than 1,400 nonnative plant species that have been introduced into Florida and subsequently established outside of cultivation (FLEPPC 2011). Category I nonnative plants are those invasive nonnatives that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives (FLEPPC 2011). Category II nonnative plants are those invasive nonnatives that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species; these species may become ranked Category I if ecological damage is demonstrated (FLEPPC 2011). Many of these plants are reported in the Preserve, and therefore potentially within the scaled-back NG3-D survey area, but most are restricted to early successional stages on disturbed sites, and only a few pose a long-term threat to native communities. Of these, five species – melaleuca, Brazilian pepper, water-hyacinth, hydrilla, and small-leaf climbing fern (*Lygodium microphyllum*) – are fairly common in the Preserve. Melaleuca and Brazilian pepper are capable of invading native plant communities, and control efforts have been concentrated on these species. Australian-pine was identified as a nonnative invasive species of concern; however, in the last two decades it has been eradicated. All known Australian-pine plants have been eliminated from the Preserve, except for those on private property. Water-lettuce (*Pistia stratiotes*) and common air-potato (*Dioscorea bulbifera*) are also known to be present.

It is anticipated that the non-native/invasive plant species documented within the Preserve can also be found within the revised NG3-D survey area. However, a nonnative plant control program is carried out by USDOJ-NPS contractors and maintenance and resource management staff. Specifically, USDOJ-NPS management activities within the Preserve lands (including the survey area) include exotic vegetation eradication activities through prescribed fire regimes, as well as targeted exotic vegetation removal through the



use of mechanized equipment (i.e., conventional trucks and mechanized vegetation clearing equipment such as GyroTracs, chain saws, and tractors).

Also, USDO-I-NPS staff are active participants in the FLEPPC, an interagency task force organized to share technical information on the control of nonnatives, monitor the distribution of nonnatives in South Florida, and collaborate on comprehensive control strategies.

Nonnatives are typically spread by natural events (such as hurricanes) and animals (such as raccoons and birds). However, there are indications that ORVs have resulted in the spread of some nonnative and invasive plants, most commonly Brazilian pepper, melaleuca, and small-leaf climbing fern.

### Melaleuca

This species, a native of Australia and New Guinea, was introduced to Florida around 1910 for landscaping. Perhaps the first introduction of melaleuca in the Preserve was at Monroe Station around 1940. Since it grows in pure stands at the expense of native vegetation and can occupy large areas, melaleuca is considered to be a major threat to the ecological integrity of the Preserve.

Melaleuca has successfully invaded much of South Florida because of its outstanding ability to propagate. A mature tree may contain tens of thousands of small woody seed capsules along its branches, and each capsule contains about 250 seeds. The capsules remain closed as long as they receive moisture from the tree's vascular system. However, if the vascular system fails due to damage by fire, frost, cutting, herbicidal injury, or simply old age, the capsules will slowly dry out, open, and release hundreds of thousands of seeds. The seeds fall within a short distance of the parent tree and germinate best on open, moist soils. Germination is limited on very dry or very wet soils and under dense canopy cover. As a result, melaleuca does well in prairies and open, moist pinelands, but is slower to invade wetter communities such as cypress domes and strands.

Melaleuca is controlled through two primary methods: (1) hand pulling – manually pulling the plants when they are small enough, and (2) stump cutting/girdling – brushing or spraying herbicide on freshly cut stump surfaces. Both techniques are labor-intensive, and trained personnel are required to handle the herbicides. Once mature, seed-bearing trees have been killed, prescribed fire or cutting may be used to control seedlings and sprouts.

The entire Preserve has been inspected for the presence of melaleuca plants. Today, melaleuca is considered to be under control within the Preserve.

### Brazilian Pepper

A native of South America, Brazilian pepper was first introduced to South Florida around 1900. It is now widespread, primarily on disturbed, well-drained sites.



Brazilian pepper reproduces by seed. Seeds are produced in bright red berries that are ingested by birds and other wildlife and then spread to other areas. Ingestion appears to improve seed germination potential.

Like melaleuca, Brazilian pepper occurs in dense, pure stands. However, unlike melaleuca, dense Brazilian pepper stands are almost always confined to areas with substrate disturbance (roadsides, canal banks, abandoned homesites, or camps – typically areas in which fill has been placed to create dry land). As some upland areas mature toward hardwood hammock vegetation, Brazilian-pepper will decline in importance.

However, in most upland areas the natural fire cycle is likely to maintain Brazilian pepper as a component of the understory indefinitely. Fire and hydrological cycles seem to prevent Brazilian pepper from invading undisturbed prairies, marshes, and other more moist types of environments.

Brazilian pepper occurs in mesic communities nearly throughout the Preserve (including the revised NG3-D survey area). The overall goal is to stop the spread of Brazilian pepper in the entire Preserve (USDOI-NPS 2006b).

#### *Water-Hyacinth and Hydrilla*

Water- hyacinth and hydrilla have invaded the Preserve's canal systems and excavated ponds, where they often form dense mats. Neither species can invade seasonally dry wetlands nor do both species appear to be restricted to permanent water in canals and ponds.

#### *Small-Leaf Climbing Fern*

Small-leaf climbing fern is rapidly becoming a significant problem species throughout southern Florida due to its invasive nature. It apparently originated in the Palm Beach County area on the east coast of the state and has been spreading rapidly westward and southward. The first recorded treatment of small-leaf climbing fern in the Preserve occurred in 1998.

Since then this nonnative invasive species has been found in nearly 100 sites in the Preserve, with the greatest concentration in the northeast. Most of these infestations are small (<0.5 acre), although some larger patches have been found. It is unknown if small-leaf climbing fern is currently located within the scaled-back NG3-D survey area. To date all known infestations of this species have been treated. However, further establishment of this fern in the Preserve is anticipated, and detailed reconnaissance to locate infestations will occur annually. The overall goal is to prevent incipient infestations of small-leaf climbing fern from becoming major eradication problems.

Another similar nonnative invasive climbing fern, Japanese climbing fern (*Lygodium japonicum*), is causing similar problems with native communities. Although Japanese climbing fern has been recorded in the Preserve, it is not common.



## 10.4 Cultural Resources

According to the USDO-I-NPS SEAC and the Florida Master Site File (FMSF) databases, there are more than 400 recorded cultural resources recorded within the Preserve, including prehistoric and historic archaeological sites and historic resources in the Preserve. Currently there is no available database for IRAs in the NG3-D survey area or the Preserve. It is anticipated that a similar number of unrecorded sites are within the Preserve, many located with the NG3-D survey area. To identify and avoid recorded sites and potential sites, the *Nobles Grade 3-D Geophysical Survey Plan of Operations for the Big Cypress National Preserve and Addition Areas*, submitted to the USDO-I-NPS in June 2006 by CRC, included a report of the cultural, historical and archaeological resources in and near the original 2006 Program Area (approximately 40 percent of the revised NG3-D survey area). In 2014, BOCI retained the services of a cultural resource management firm to build on the 2006 information, conduct additional research, and prepare a Site Avoidance Model. These efforts utilized state and federal cultural resources inventories, archaeological, ethnographic, and historical literature, as well as the most recent USDO-I-NPS archaeological survey reports housed at the SEAC. Research focused on historic aerials and land use patterns, 19<sup>th</sup> century federal surveyor's plats and field notes, current vegetation, hydrology, and soil maps of the BCNP. Recorded and anticipated type sites include prehistoric habitation areas, burial areas, special use camps, as well as 19<sup>th</sup> century military camps, fortifications, trails, and historic Seminole or Miccosukee camps, as well as 20<sup>th</sup> century hunting and lumber camps. The 2006 plan was submitted to the USDO-I-NPS under separate cover, as well as the 2014 research and resulting Site Avoidance Model. Implementation details are in Section 10.8.

## 10.5 Description of Impacts

Although similar to the types of impacts arising from ongoing Preserve management operations and recreational uses, some temporary impacts to the natural resources of the Preserve may occur as result of survey operations detailed in this POP. This section identifies and describes the nature and anticipated extent of potential NG3-D survey area generated temporary impacts. Section 5.0 of this plan details actions planned by the Applicant to eliminate or minimize potential program-generated impacts by complying fully with the BCNP GMP/EIS/MMP geophysical stipulations and other impact mitigation measures developed by USDO-I-NPS.

Potential environmental impacts will be substantially reduced by the daily scouting that will occur immediately in front of the survey in direct coordination with the USDO-I-NPS and subsequent route adjustments to avoid sensitive resources. An ecologist, along with the Survey Crew and Crew Manager Chiefs, will scout a given area daily prior to the seismic survey taking place. The ecologist will be from a private entity that will be professionally trained with local experience with the flora and fauna of the Preserve. Separate ecologists will be present with each survey crew. Additional aerial scouting will be conducted by an ecologist to identify potential species habitat that could be affected by the receiver line placement (i.e., RCW habitat, wading bird rookeries, etc.). Additional groundtruthing will be conducted by the ecologist (if needed) in conjunction with the USDO-I-NPS and/or the USFWS to avoid protected species location along the receiver lines, if identified. Flexibility has been built into the operations plan to accommodate unanticipated encounters.



## 10.5.1 Potential Natural Resources Impacts

### 10.5.1.1 ORV Background

Extensive studies have been conducted, and numerous documents have been prepared, that address ORV use in Preserve. Specifically, two studies, titled *Off-Road Vehicles and Their Impacts in the Big Cypress National Preserve* (Duever *et al.* 1981) and *Long Term Recovery of Experimental Off-Road Vehicle Impacts and Abandoned Old Trails in the Big Cypress National Preserve* (Duever *et al.* 1986c), evaluated ORV impacts and recovery time within the Preserve. Also, the *GMP/EIS* for the original Preserve (USDOI-NPS 1992) and the *GMP/Wilderness Study/Off-Road Vehicle Management Plan/EIS* for the Addition (USDOI-NPS 2010) both discuss and consider ORV use in the Preserve, while the *Final Recreational Off-Road Vehicle Management Plan and Supplemental Environmental Impact Statement* (USDOI-NPS 2000a) evaluates the effects of ORV use on a variety of environmental factors, and provides overall guidance for ORV management in the original BCNP.

The 1981 Duever study evaluated experimental impacts produced by commonly used types of ORVs in six major habitat types regularly used by ORVs in the Preserve; and assessed one annual cycle of recovery in the treatment areas. Each ORV was required to make three levels of impact in each treatment area along three separate lanes. The impacts were conducted in the fall when water levels were similar to wet season conditions. The lowest level of impact was a single pass of an ORV over a designated test plot/lane. Continuous driving back and forth was then done in another lane until a “heavy impact” was achieved. A “heavy impact” was defined as severe or total destruction of vegetation and severe soil disturbance. The third series of passes produced a “medium impact” which involved severe impacts to the vegetation but no significant impacts to the soil. Impacts to soil and vegetation were monitored the following year in late winter (before the growing season began) and again in early fall (shortly after the growing season ended).

Duever *et al.* 1981 found that among the types of soil impacts, soil compressibility was least affected and soil compaction did not occur. Rutting was the most severe soil impact. However, deep rut depths tended to decrease rapidly following the tests and were generally quite shallow, if detectable, one year later. The height of ridges (displaced soil) along the test lanes were minor initially and generally undetectable one year after the treatments. Soils recovered more quickly than vegetation. Vegetation impacts varied significantly but were least in the single pass areas. The degree of habitats sensitivity was closely related to each habitat’s hydrologic characteristics, where the most easily impacted sites were the wettest. Not only were the wettest habitats most sensitive, but within each habitat type those sites with water above or near the ground surface at the time when treatments occurred were also more sensitive to ORV disturbance than were sites with lower water levels. It should be noted that impacts from the various



categories were much less in the single pass areas, even from the heaviest of the ORVs, and the majority of these single pass areas had recovered following the first growing season.

The 1986 Duever study (1986c) served as a follow-up to the original Duever *et al.* 1981 study to evaluate the long term recovery of the impacted areas. This study was conducted seven years after the experimental lanes had been created. The results of the follow-up study showed that virtually all of the one pass, and most of the medium impact lanes had completely disappeared. However, the “heavy impact” lanes (resulting from the severe disturbance of soil) had not statistically recovered for many parameters.

As stated above, the 1992 *GMP/EIS* for the BCNP (USDOI-NPS 1992) and the 2010 *GMP/Wilderness Study/Off-Road Vehicle Management Plan/EIS* for the Addition (USDOI-NPS 2010) both discuss and consider ORV use in the BCNP. However, the *Final Recreational Off-Road Vehicle Management Plan and Supplemental Environmental Impact Statement* (USDOI-NPS 2000a) considered, in detail, the potential impacts from ORV use on preserve resources and values, including, but not limited to: water resources, soils, vegetation, wildlife, cultural resources, and visitor experience; and also provides overall guidance for ORV management in the original BCNP. It should be noted that these documents were written in the context of recreational ORV use in the BCNP, while the ORV use during the seismic survey will be remarkably different. In addition, numerous survey procedures, protection, and reclamation measures will be required as part of the NG3-D seismic survey.

The use of ORVs associated with the seismic survey is anticipated to result in significantly less impacts than ongoing recreational ORV use within the BCNP, mainly due to the “one pass” design and operation during the dry season when no standing water is present. Surveying activities will not commence until dry season conditions are present. In the event that isolated areas with standing water are encountered, the survey equipment would avoid these areas. The survey would also cease when site conditions become wet enough that the survey cannot be conducted due to the presence of standing water. In the event that survey activities are not complete by the end of the dry season, they will not continue into the wet season and will be ceased pursuant to coordination with USDOI-NPS and FDEP inspectors. The characterization of the anticipated *de minimis* impact from vibroseis vehicles is heavily dependent on their use during dry conditions.

Vibrators will operate in two sets of three buggies. The buggies in each group will be lined up in a row. The two groups (or lines) of buggies will be separate but in relative proximity to each other. While one set of three buggies is moving to the next vibration source point, the other set of three buggies will be shaking its source point. Each group of buggies will have a scout UTV working with an ecologist and archaeologist (in a second UTV) – traveling in tandem across vibration source point lines with the least environmental impacts. The “one pass”



survey design means that the equipment groups will only traverse a given area once and that area will not be driven upon again in the majority of cases. However, certain crossings may be used more than once if it would result in less environmental impacts to avoid a sensitive area.

The “one pass” design eliminates the progressive widening of trails which generally occurs as a result of overuse and rutting from multiple passes. Duever concluded in his original 1981 and in his follow up 1986 study, that single passes of ORVs (in most cases) did not result in long-term adverse impacts to vegetation or soils and that that virtually all of the one pass lanes had restored in one year and completely disappeared after seven years of recovery. Recreational ORV use is typically comparable to “heavy impact” category described in Duever *et al.* 1981 which results from repeated use of the same trail.

Duever summarized in his 1986 study that vegetation which is impacted by a passing vehicle is frequently not killed, and will resprout and continue to grow. Dead vegetation loses its ability to bind the soil, resulting in rutting on a trail over time; therefore, one pass over a short period of time may never create a rut. In addition, Duever concluded in his original 1981 study that water levels were the single most important environmental factor influencing severity of ORV impacts; and that when water is above ground or near the soil surface at the time ORV impacts occur, the degree of impact and time required for recovery are greatly increased. As such, it is important to note that the original 1981 Duever study was conducted during the wet season, when environmental conditions were at their most sensitive, and that the single passes of ORVs (in most cases) still did not result in significant damage to vegetation or soils. Seismic survey vehicles will not operate in standing water, which will significantly decrease the likelihood of soil and plant disruption. In addition, if the vehicle tires begin to break the soil surface, the operator will retreat and move around the soft soils, where possible.

#### **10.5.1.2 Potential Surface and Subsurface Geologic Impacts**

Potential temporary impacts to soil in some locations could occur through soil rutting and soil compaction. Potential impacts to habitat depend upon the degree of a given habitat’s sensitivity. Habitat sensitivity is closely related to the habitat’s hydrologic characteristics, where the most easily impacted sites are the wettest (Duever *et al.* 1981). Seismic survey activities in wetlands would be expected to produce greater impacts than those to upland areas.

Because the controlling factor in the capacity to severely disrupt soils is often the moisture content of the soil (2000 BCNP ORV Management Plan), operations will be conducted during the dry period of the year (December – May) to reduce or eliminate potential impacts to soils. Marl and peat soils (a product of extended inundation) were shown to be less sensitive to disturbance during dry periods (Duever *et al.* 1981). BOCI will coordinate all field operations with USDOI-NPS managers to avoid working in standing water to the extent practicable.



The extent to which vehicular operations affect soils within the Preserve varies based on soil depth, soil composition, plant cover, and frequency of use (2000 BCNP ORV Management Plan). The 2006 USDOI-NPS operators manual specifically recommends the use of vehicles with “low ground pressure” to reduce potential impacts. The Preserve’s ORV GMP/EIS (USDOI-NPS 2000b) states that using wider, high-flotation tires and reducing vehicle weight may help reduce soil displacement, rut depths, and root damage. As such, the balloon (floatation) tires used on the Vibroseis buggies to reduce or eliminate potential impacts to soils will also help protect against surface impacts. The wide, smooth treaded balloon tires will spread the weight of the buggy over a wider “footprint.” This displacement of weight will allow the Vibroseis buggy to move through sensitive areas in a survey with minimum impact or footprint. The Duever *et al.* report found that soils recovered more quickly than vegetation and soil compaction did not occur as a result of the ORV impact areas studied (1981).

The bulk of the other field operations (surveying, laying out and picking up geophone receivers and recording equipment) will be accomplished, in large part, by crews working and traveling on foot and by helicopter. A field helicopter equipped with slings, long lines, and a quick disconnect system to move and deploy geophone and recording equipment and supplies will also be used. This will reduce time and equipment on the ground, which will in-turn, decrease potential impacts as less equipment and personnel will be traversing the ground.

In the unexpected event that field operations along the source or receiver lines result in damage to Preserve lands, the impacts will be remediated immediately by members of the survey crew. These areas will be reclaimed by restoring ruts, depressions, and vehicle tracks resulting from field operations to original contour conditions concurrent with daily operations using shovels and rakes. Field clean-up will begin immediately upon completion of each task and final clearance will be documented by and coordinated with USDOI-NPS representatives. As a result of these efforts, the need for follow up reclamation measures is not anticipated. However, consistent with 36 CFR § 9.39, Preserve MMP geophysical operational stipulations 39 through 45, and the suggestions and guidelines provided in the 2006 USDOI-NPS Operator’s Handbook, the Operator will take steps to reclaim the natural conditions and processes existing prior to the start of field operations or to such other conditions agreed to by the Operator and the Regional Director and Superintendent, if needed.

Since the near surface geologic materials in the NG3-D survey area consist largely of unconsolidated and saturated sands and clays, the inherent unconsolidated nature and elasticity of the near surface and subsurface geologic strata is expected to provide for non-fracturing outcomes by source point vibrations. Because of the subsurface characteristics described above and source point spacing (no closer than 82.5 feet) short, high-frequency vibration by vibroseis equipment is not expected to disrupt or fracture rock materials or alter



groundwater conditions beneath the surface. No drilling or dynamite will be used for the seismic survey.

Temporary staging areas will be utilized to minimize the amount of disturbance by reducing the amount of equipment and personnel traversing the NG3-D seismic survey area. The main staging area (63-S) will be utilized mostly for vehicle parking, equipment storage, crew mobilization. The four other staging areas will be utilized to a lesser degree for surveying and geophone deployment activities and support of acquisition operations. The staging areas were selected to minimize potential impacts, and generally be located on existing abandoned oil well pads, other easily accessible open areas adjacent to I-75, or previously disturbed areas. No discharge of dredged or fill material into wetlands is proposed. Removal and reclamation of field staging areas with associated access improvements will be completed to the satisfaction of the USDOI-NPS Superintendent and the FDEP upon confirmation that no further use of the staging area facilities will be required.

#### **10.5.1.3 Potential Hydrologic Impacts**

Temporary impacts to water quality and hydrology could potentially result from equipment and crew movement. Surface water quality could be degraded from suspending sediment/soil into surface waters in the immediate locations traversed by vehicles if vehicle movement and heavy foot traffic occurred in pools of puddles of standing water. Although unlikely, this turbidity could potentially lead to reduced light penetration and the mobilization of nutrients into the water column—both of which could result in dissolved oxygen depletion. Dissolved oxygen depletion could stress both plants and animals in these shallow water areas directly traversed by vehicles. Also, potential impacts to water quality as a result of the proposed survey could occur through fuel spills and/or minor leaking of fluids from the geophysical vehicles. All of these potential impacts are addressed by the plan design and/or mitigation measures.

However, many of the potential impacts to surface and groundwater quality will be minimized by conducting the 3-D seismic operations in conditions where standing water is absent and soils are at their driest (Davis *et al.* 2010). Consistent with the Preserve GMP/EIS/MMP geophysical Stipulation #7, the proposed seismic survey will be scheduled during the dry period of the year (December – May) so significant impacts to water quality, hydrology, and near surface, subsurface geologic resources are not anticipated. BOCI will coordinate all field operations with USDOI-NPS managers to avoid working in standing water to the extent practicable.

As stated in the MMP prepared as part of the management plan for the original Preserve, properly conducted geophysical operations should not adversely affect hydrology in the Preserve. The irregular ground surface of the Preserve is not susceptible to channelizing as wetlands are predominantly bounded at both ends



by uplands (Davis *et al.* 2010). Although some drainage could take place anywhere a trail leads into a slough or strand, it is unlikely that even a trail with shallow ruts (which are highly unlikely) will have significant drainage impacts (Davis *et al.* 2010). Survey activities will avoid hydrological impacts by re-routing seismic survey activities around soft soils and standing water areas, thereby reducing the risk for rutting, and subsequently channelization. No hydrologic modifications are proposed as part of the seismic survey and no interruption to surface water flows are anticipated.

Vibroiseis Buggies will be equipped with wide, smooth treaded balloon tires designed to spread the weight of the buggy over a wider “footprint” to reduce or eliminate potential temporary impacts to soils which will also minimize potential rutting which will in turn minimize impacts to water quality and hydrology. Vibroiseis source lines will be located on existing roads, trails and disturbances, where feasible. The use of Vibroiseis buggies and the use of existing disturbances will minimize potential temporary channeling of surface flow or erosion/sedimentation.

A field helicopter equipped with slings, long lines, and a quick disconnect system to move and deploy geophone and recording equipment and supplies will also be used. This will reduce time and equipment on the ground, which will in-turn, decrease potential impacts to water quality and hydrology as less equipment and personnel will be traversing the ground. No drilling or dynamite will be used for the seismic survey, so potential turbidity from drilling shotholes and sealing off the wellbore from possible cross-contamination of aquifers will not occur. Direct impacts to aquifers or groundwater from the seismic survey are not anticipated.

Potential contaminants associated with the seismic survey will be very limited and localized to small areas due to the application of the MMP’s resource protective stipulations on the proposed operations. Although fuel spills are unlikely, fuel spill containment systems will be available for refueling, parking and fuel tank/trailer storage to reduce potential impacts associated with accidental fuel spills to water quality. Clean up and restoration activities will be conducted in compliance with applicable MMP operation stipulations, resulting in short-term/temporary impacts, in the unlikely event that a spill occurs. As a result of actions taken by the Applicant to reduce or eliminate potential program-generated impacts, hydrologic impacts arising from NG3-D survey operations are anticipated to be minor and temporary.

#### **10.5.1.4 Potential Vegetation Impacts**

Temporary vegetative impacts could result primarily from the movement of Vibroiseis buggies along source lines and the use of the proposed staging areas for equipment storage and daily mobilization. Potential temporary disturbances to individual pieces of vegetation could occur through the matting down of plants, scraping of trees, exposure of plant roots; bending or breaking of vegetation,



and/or brush cutting and vegetation trimming. Details of the proposed brush cutting and vegetation trimming can be found in Section 5.4.3 of the POP. However, exotic vegetation may be cut outside of these stipulations. Consistent with BCNP GMP/EIS/MMP geophysical Stipulation #17, cut vegetation must be capable of returning to its natural condition after operations. A definition of what “return to natural conditions” means for this operation can also be found in Section 5.4.3 of the POP. There is some potential that the spread of nonnative invasive plant species could also occur through the operation of vehicles. Each of these potential impacts, while minor in scale, is addressed by mitigation measures.

Survey activities will not commence until dry season conditions are present. In the event that isolated areas with standing water are encountered, the survey equipment would generally avoid these areas. The survey would also cease when site conditions become wet enough that the survey cannot be conducted due to the presence of standing water. In the event that survey activities are not complete by the end of the dry season, survey activities will not continue into the wet season and will be ceased pursuant to coordination with USDOI-NPS and FDEP inspectors. The characterization of the anticipated *de minimis* impact from vibroseis vehicles is heavily dependent on their use during dry conditions.

The “one pass” design of survey operations will minimize or eliminate impacts to vegetation. The “one pass” survey design means that the equipment will only traverse a given area once and that area will not be driven upon again in the majority of cases. However, certain crossings may be used more than once if it would result in less environmental impacts to use the same crossing to avoid a sensitive area. As discussed in the ORVs background section of this Chapter, *Off-Road Vehicles and Their Impacts in the Big Cypress National Preserve* (Duever *et al.* 1981) indicated that single passes of ORVs in most cases did no significant damage to vegetation and that the majority of these single pass areas recovered following the first growing season in nearly all of the parameters evaluated. The *Long Term Recovery of Experimental Off-Road Vehicle Impacts and Abandoned Old Trails in the Big Cypress National Preserve* (Duever *et al.* 1986c) study states that vegetation which is impacted by a passing vehicle is frequently not killed, and will re-sprout and continue to grow (Davis *et al.* 2010). “One pass” operations will further reduce the potential for impacts by utilizing flotation tire-equipped Vibroseis Buggies which reduce pressure on the ground.

During the modification phase of planning, receiver and source line segments were relocated away from sensitive vegetation cover areas such as cypress domes, hardwood hammocks and dense cypress forests to the extent feasible. In consultation with USDOI-NPS representatives, receiver line segments and vibration source points may also be modified during field operations to further minimize impacts should unforeseen environmental or cultural sensitivity concerns arise from daily field scouting and groundtruthing operations.



To the extent feasible, many of the vibration source points and receiver lines will utilize existing trails, roads, and other previously disturbed surface areas to minimize vegetative impacts. The utilization of existing trails will include trails in various stages of recovery. Studies within the BCNP have shown that single ORV passes in most cases did not result in significant damage to vegetation or soils and that virtually all of the one pass impact lanes had recovered after one growing season (Duever 1981, Duever *et al.* 1986c). The recovery of trails in the Preserve is not anticipated to be adversely impacted by seismic surveying operations. Trails are projected to recovery quickly from any minimal and temporary impacts which may occur as a result of their use.

Most of the receiver lines will briefly occupy prairies, savannas, and other open areas and will require little, if any, vegetation trimming. In such areas, anticipated vegetative impacts are expected to be limited to minimal data acquisition crew foot traffic. Where geophone receiver lines pass through heavy ground cover, it may be necessary to side-trim some vegetation. In all cases, vegetation trimming will be done in consultation with USDOI-NPS representatives and accomplished consistent with BCNP GMP/EIS/MMP geophysical Stipulation #16.

In accordance with the Preserve's MMP, impacts to vegetation will be further minimized by avoiding vulnerable areas. The wide range of IRAs present in the NG3-D seismic survey area will represent the focus of the planning efforts and design operations which will continue to be the subject of ongoing identification and monitoring activities throughout field operations. No surface occupancy for the placement of access roads or staging areas will occur in or on any vegetation community identified as an IRAs. The use of motorized vehicles for the conduct of geophysical exploration will not occur in or on these IRAs, except old-growth pinelands as specified under the MMP's geophysical operation stipulation 14. However, much of this stipulation is directed toward activities associated with the drilling of wells, which will not occur during the seismic survey.

The survey areas will be scouted by an ecologist, working concurrently with the survey operations. The ecologist will coordinate with the access management, surveying crews, and agency personnel to identify IRAs, protected plant species, and other environmentally sensitive areas to determine routing alternatives immediately in front of the survey. An ecologist will be present with each survey crew. Vibroseis technology and the survey design features increase the flexibility to avoid IRAs, protected plant species, and environmentally sensitive areas. Receiver points will be relocated and vibration source paths re-routed in the field to avoid impacts to these areas. As such, habitat loss, habitat fragmentation, or destruction of protected plant species is not anticipated.

BOCI anticipates that the Vibroseis buggies will only be present for a matter of minutes in each vibroseis location at any given time. In addition, it is expected that the Vibroseis buggies will only be present within 2½ square miles of the



NG3-D survey area per day. The buggies will avoid trees by using routes that are already devoid of large trees, as well as by use of the buggies articulation feature which will allow the equipment to travel around obstacles. Minimal vegetation cutting will be required for survey operations and no root damage or cutting of large trees is expected to occur.

Trash bags and receptacles will be provided to field crews for use during daily field operations. Trash and debris including minimal plastic flagging, stakes, and other temporary markers will be collected and removed from the field daily. The majority of the survey will be “flagless” and navigated by GPS systems. This will reduce potential adverse impacts to vegetation.

The bulk of the other field operations (surveying, laying out and picking up geophone receivers and recording equipment) will be accomplished, in large part, by crews working and traveling on foot and by helicopter. A field helicopter equipped with slings, long lines, and quick disconnect systems to move and deploy equipment and supplies will be used to reduce time and equipment on the ground. Specifically, local delivery points proximal to the receiver lines will be used so helicopters can deliver equipment bags by the quick disconnect “bag runner” system using the DynaNav GPS positioning system.

In the unexpected event that field operations along the source or receiver lines result in damage to Preserve lands or resources within or adjacent to the NG3-D survey area, the impacts will be remediated immediately by members of the survey crew. These areas will be reclaimed by treating marred or wounded standing trees. Field clean-up will begin immediately upon completion of each task and final clearance will be documented by and coordinated with USDOI-NPS inspectors. As a result of these efforts, the need for follow up reclamation measures is not anticipated. However, consistent with 36 CFR § 9.39, Preserve MMP geophysical operational stipulations 39 through 45, and the suggestions and guidelines provided in the 2006 USDOI-NPS Operator’s Handbook, the Operator will take steps to reclaim the natural conditions and processes existing prior to the start of field operations or to such other conditions agreed to by the Operator and the Regional Director and Superintendent, if needed.

Temporary staging areas will be utilized to minimize the amount of disturbance by reducing the amount of equipment and personnel traversing the survey area. The staging areas will be utilized mostly for vehicle parking, equipment storage, crew mobilization, helicopter operations, and satellite uses (i.e., geophone pick-up and drop off via helicopter). The staging areas will be selected to minimize potential impacts, and generally be located on existing abandoned oil well pads, other easily accessible open areas adjacent to I-75, or previously disturbed areas. No discharge of dredged or fill material into wetlands is proposed. Removal and reclamation of field staging areas with associated access improvements will be completed to the satisfaction of the USDOI-NPS Superintendent and the FDEP



upon confirmation that no further use of any staging area facilities will be required.

A similar restoration protocol was followed with regard to the 1999 3-D seismic survey at Raccoon Point. Reclamation activities of the Raccoon Point 3-D Seismic Survey included the restoration of ruts and vehicle tracks resulting from seismic operations to original contour conditions. Restoration and monitoring of nine locations showed vegetation restoration “success” after three years. “Success” in areas deemed to be disturbed by seismic survey activities was defined as when “the achievement of recruited percent coverage meets or exceed 80 percent of the undisturbed adjacent percent coverage” (WilsonMiller, Inc. 2000).

The minimal effect of seismic operations on vegetation is demonstrated by the history of seismic surveys in the Preserve. As stated in Section 1.1.1, since the 1960s seismic surveys of various types have been conducted in most areas of the Preserve. Although the 1992 GMP for the original Preserve states that many of the seismic lines from 1970 – 1977 were still visible on 1984 high altitude infrared aerial photographs, the GMP acknowledged that it was because these areas had been reused as ORV trails. The vast majority of the historic seismic lines that were not disturbed by repeated ORV uses (not associated to the seismic surveys) returned to their natural conditions and no permanent or long term impacts occurred.

Survey equipment and vehicles will be cleaned prior to initially entering the Preserve to reduce or avoid the spread of non-native plant species. Also, the majority of the equipment used for survey activities (i.e., Vibroseis Buggies and utility transport vehicles) will remain within the NG3-D survey area for the duration of the survey activities which will reduce the likelihood of bringing in non-native seeds. Existing USDOI-NPS management activities will assist with the ongoing exotic vegetation eradication in the Preserve and the NG3-D survey area. Reclamation of surface disturbances will be conducted concurrently with field operations and will address soils impacts (rutting, scarring, etc.) which may facilitate exotics infestation.

#### ***10.5.1.4.1 Listed Flora***

State listed plants species are known to occur within the Preserve and have the potential to occur within the NG3-D survey area. State listing imposes no regulatory provisions beyond prohibitions on collection. No federally listed plant species were identified within the Preserve but two plants species which have the potential to occur in the NG3-D survey area are classified as “candidate” species by the USFWS.

As previously stated, caution will be utilized as survey activities occur to avoid the destruction of any identified protected plant specimens. In the event that protected plant species are observed prior to or during survey operations,



observation reporting protocols will be initiated with the appropriate agencies so that sufficient setbacks and survey design modifications can be implemented pursuant to the advice and direction of agency personnel. As previously stated, in regards to the State-listed plant species, it should be noted that Section 581.185(12) Florida Statutes, states that the Regulated Plant Index is to be used solely to restrict unlawful harvesting of native flora without the authorization of the landowner. The Regulated Plant Index is not to be used to regulate construction or other land alteration activities on any property. No harvesting or collection of the protected plant species will occur.

### **10.5.1.5 Potential Wildlife Impacts**

#### ***10.5.1.5.1 Overview - Preserve Ambient Impacts***

The fish and wildlife populations in the Preserve are routinely exposed to a broad array of naturally occurring and human associated impacts. Naturally occurring impacts can include events such as thunder, lightning, fire, hurricanes, storms, droughts, floods, and diseases. Since pre-historic times, human associated impacts have included long-term human presence and subsistence hunting, fishing and trapping. Human associated impacts are associated with the planned and purposeful use of the area for activities including: agriculture, sport hunting, fishing, research, hiking, camping, ORVs, cultural uses, wildlife management operations, prescribed burning, exotic vegetation removal, law enforcement, agency, military and commercial aviation operations, highway traffic, recreational access, and oil and gas exploration and production operations. Although the NG3-D seismic survey will be conducted in remote areas (some of which are not accessible to the general public), and may result in more intense activities for a short period of time, the on-going natural and human generated impacts currently occurring in the Preserve can be related to the potential impacts that may result from the NG3-D seismic survey.

Human associated impacts were ongoing for many decades before the Preserve was established. Furthermore, it was this variety of long-term human presence and activities that gave rise to the establishment of the Preserve as a “preserve” rather than a “park.” Prior to its incorporation into the BCNP in 1988, the BCNP-A had been the subject of over 40 years of active (and Congressionally recognized) oil and gas operations. Until the expansion, the BCNP-A was also used for agricultural and cattle production as well as hunting and other recreational uses. Modern human occupation of the area has been continuous since the early 1900s. While some of these traditional and congressionally recognized “uses,” including oil and gas exploration, are reflected as permitted activities in the Preserve, the implementation of these activities today are significantly restricted and heavily regulated.

Current recreational uses allow for the potential for human interaction with area wildlife. Hunting regulations allow up to 800 hunters 152 days per year for sport



hunting in the BCNP. Fishing and frogging are permitted year-round in the BCNP as are recreational activities such as hiking and camping. Up to 2,000 ORVs are allowed in the BCNP 305 days per year and are subject to additional regulations regarding equipment approvals, dispersed use and existing trails restrictions.

Most recreational activities are also permitted in the BCNP-A. Since the 1988 congressional authorization of the BCNP-A and its ultimate acquisition in 1996, a variety of management, monitoring and research operations have been ongoing by USDOI-NPS and other state and federal agencies. As noted, prior to the congressional authorization in 1988, activities including agricultural activities, hunting, recreation, and oil and gas exploration were conducted within the BCNP-A.

The following discussion provides a comparison of the effects of ambient stimuli to the anticipated effect of potential program-generated stimuli on wildlife within the Preserve.

#### ***10.5.1.5.2 Ambient and Program Generated Wildlife Impacts and Stimuli***

Ongoing activities within the Preserve, including but not limited to, resource and species management, recreation, cultural uses, and transportation and aviation operations certainly affect wildlife behavioral stimuli and responses in portions of the Preserve.

Potential NG3-D seismic survey generated wildlife impacts and stimuli are subsumed by the surrounding ambient, non-survey related stimuli in some areas. However, the seismic survey will be conducted in other more remote areas (some of which are not accessible to the general public) and may result in more intense activities for a short period of time. As such, modification protocols will be used to minimize or eliminate survey generated impacts for the brief duration that the survey is present. Program generated effects on area wildlife should be minimal and temporary. Also, no long term adverse wildlife impacts are anticipated to result from survey operations.

The following tables (Table 10.9) provide a detailed review of natural and human impacts within the Preserve and their associated stimuli, as well as the proposed NG3-D survey area generated impacts and their potential associated stimuli, which demonstrates the consistency between ongoing and proposed activities in certain areas.



**Table 10.9 Impacts with Associated Stimuli Summary**

Natural and Human Impacts within the Preserve and their Associated Stimuli	Potential NG3-D Seismic Survey Generated Impacts and their Potential Associated Stimuli
<b><i>Thunder/Lightning/Hurricanes and Storm Events.</i></b> Loud noises and vibrations of variable frequency and duration/ashes of bright light/rain/noises associated with wind and vegetative disturbance	<b><i>Staging Area Layout and Improvement Activities.</i></b> Intermittent automobile, semi-tractor trailer and equipment movement and noise of variable frequencies and duration during daylight hours for 18± weeks/human intermittent presence and movement/minimal temporary vegetative impacts (predominantly occurring at the MM-63 S staging area; daily staging area operations undertaken within existing umbrella of I-75 ambient impacts and stimuli)
<b><i>Fire/Prescribed Burning Operations.</i></b> Noise from fire, equipment, radio communications, associated aviation operations, etc./smoke/human presence, noise and movement/significant temporary vegetative impacts	<b><i>Staging Area Operations.</i></b> Intermittent daily helicopter flight operations/equipment and vehicle presence, noise and movement/field supply storage and loading activities/sustained human presence, noise and movement/vehicle traffic during daylight hours/electronic communications noise/minimal temporary vegetative impacts (daily staging area operations undertaken within existing umbrella of I-75 ambient impacts and stimuli noted above)
<b><i>Recreational and Subsistence Hunting, Fishing and Frogging Activities.</i></b> Sustained human presence, noise and movement (up to 800 hunters for 152 days per year for sport hunting in the Preserve, fishing and frogging are permitted year-round)/active quarry pursuit/noise associated with weapons discharges/ORV equipment and movement/minimal temporary vegetative impacts	<b><i>Access Management Operations.</i></b> Transient human presence, noise and movement through NG3-D seismic survey/electronic communications noise/minimal temporary vegetative impacts
<b><i>Recreational Hiking and Camping Activities.</i></b> Sustained human presence, noise and movement/sustained noise, smoke, and odor associated with camp fires and other camping activities/minimal temporary vegetative impacts	<b><i>Crew and Equipment Mobilization Operations.</i></b> Transient human presence, noise and movement through NG3-D seismic survey/ equipment presence, noise and movement through the program area/minimal temporary vegetative impacts
<b><i>Federal and State Agency Wildlife Research and Management Activities.</i></b> Sustained, routine human presence, noise and movement/species pursuit/fixed-wing and helicopter aviation operations/direct species interaction – collaring, tagging, trapping, anesthesia, etc./sustained noise – equipment, radios, etc./minimal temporary vegetative impacts	<b><i>Program Surveying Operations.</i></b> Transient human presence, noise and on-foot movement through NG3-D seismic survey/limited equipment presence/ electronic communications noise/minimal temporary vegetative impacts
<b><i>Recreational ORV Activities.</i></b> Sustained human presence, noise and movement/ORV equipment noise and movement (up to 2,000 ORVs are allowed in the Preserve 305 days per year)/ significant long-term soils and vegetative impacts	<b><i>Source Point and Receiver Point Layout Operations.</i></b> Intermittent daylight helicopter flight operations/helicopter field landing operations (staging areas)/transient human presence, noise and on-foot movement through NG3-D seismic survey/ limited equipment presence/minimal temporary vegetative impacts
<b><i>Exotic Vegetation Control Removal Operations.</i></b> Sustained human presence, noise and movement/sustained heavy equipment noise/herbicide use and application equipment noise/significant long-term vegetative impacts	<b><i>Reconditioning Activities.</i></b> Transient human presence, noise and ORV/on-foot movement through NG3-D seismic survey/electronic communications noise/minimal temporary vegetative impacts
<b><i>Law Enforcement Activities.</i></b> Sustained human presence, noise and movement/ORV/helicopter /noise and movement/ flashing light (I-75 and other state roads)/minimal temporary vegetative impacts	



**Table 10.9 (Continued)**

<b>Natural and Human Impacts within the Preserve and their Associated Stimuli (Continued)</b>	<b>Potential NG3-D Seismic Survey Generated Impacts and their Potential Associated Stimuli (Continued)</b>
<b><i>Cultural Uses (by Seminole and Miccosukee Tribes).</i></b> Human presence, noise and movement/ORV noise, presence, and movement/minimal temporary vegetative impacts	<b><i>Data Acquisition Operations (Coincidental Vibroseis Source Generation and Recording Operations).</i></b>
<b><i>Crude Oil and Natural Gas Exploration and Production Operations.</i></b> Human presence, noise and movement (brief for exploration operations/sustained (but localized) for production operations)/equipment presence, noise and movement/vehicle movement along all-weather roads/temporary, production-related construction activities (not applicable to the NG3-D survey)/minimal long-term vegetative impacts – well drilling and production (not applicable to the NG3-D survey)/minimal temporary vegetative impacts – non-well drilling exploration	Source Point Generation (12 to 24 second vibration): Equipment presence, noise, short period of nearly imperceptible ground vibration, and movement through NG3-D seismic survey/human presence, noise and movement/minimal temporary vegetative impacts (all limited to approximately a 2 to 2½ square mile area per day) Recording: Minimal and transient human presence, noise and movement through NG3-D seismic survey after receiver layout deployed/electronic communications noise/minimal temporary vegetative impacts
<b><i>Florida Department of Transportation (FDOT) I-75.</i></b> High level of sustained automobile and semi-tractor trailer movement and noise of variable frequencies and constant duration up to one mile from roadway/extensive human presence, noise and movement at rest areas (MM-63 in this case) of relatively constant duration – acceleration/deceleration lanes, parking, waste treatment facilities, outdoor picnic areas, north and south Preserve recreational access facilities/air quality/interstate highway law enforcement activities/temporary disturbances associated with traffic accidents/aviation operations/intermittent roadway construction and maintenance activities/significant long-term vegetative impacts	<b><i>Receiver Equipment Pick Up and Demobilization.</i></b> Transient human presence, noise and on-foot movement through NG3-D seismic survey/intermittent helicopter flight and equipment air lifting operations/minimal temporary vegetative impacts
	<b><i>Field Clean-Up and Restoration Activities.</i></b> Transient human presence, noise and on-foot movement through NG3-D seismic survey/electronic communications noise/ intermittent helicopter flight and debris pick up operations/minimal temporary vegetative impacts
	<b><i>Agency Inspection and Oversight Activities.</i></b> Transient human presence, noise and movement through NG3-D seismic survey/electronic communications noise/minimal temporary vegetative impacts

#### **10.5.1.5.3 General Discussion of Potential Wildlife Impacts**

The BCNP GMP/EIS focuses its assessment of wildlife impacts (other than imperiled species) on white-tailed deer and feral hog populations due to their importance as forage for the Florida panther and quarry for Preserve sport-hunters. The BCNP GMP/EIS concludes that habitat quality is probably the most important factor affecting the density of deer and hogs in the Preserve. It also noted that hunting could impact deer and hog populations. However, the GMP noted that deer and hog populations were generally highest in areas where hunting activity was highest and suggested that white-tailed deer adjusted quickly to the



presence of human activity (USDOI-NPS 1992). However, numerous other types of wildlife (including listed species) are present throughout the Preserve.

Alarm, flight and predator avoidance behavior has been extensively studied and described for numerous wildlife species (LaGory 1987, Hilton *et al.* 1999, Griffin 2004, Lind and Creswell 2005, Lingle *et al.* 2005, Lingle 2001, Dixon 1998, Williams and Austin 1988, Bailey 1967, Marchinton and Hirth 1984). Avoidance is a behavior animals have developed to avoid danger, including human and non-human predators. It is considered a critical survival tool. “Costs” considered to accrue to a specific animal when exercising avoidance behavior include energy expenditures beyond base metabolic rates associated with actually moving out of the way, temporary disruption of daily activities, and the potential for exposure to predators or other unanticipated hazards while on the move.

A wide variety of wildlife is abundant around those areas of the Preserve where constant and intense human use takes place (i.e., designated ORV trails, heavily hunted areas, hiking trails, I-75, etc.). Therefore, it can be assumed that wildlife within the more remote areas of the Preserve will exhibit similar responses when the seismic survey is conducted. Specifically, since the survey will be temporary in nature, will only occupy small portions of the Preserve at a given time, will employ a one-pass design for the most part, long-term alterations to wildlife species behavior are not anticipated in response to the seismic operations.

Simple avoidance is the anticipated wildlife response during the 18 week period of operations. Wildlife will not avoid the entire revised NG3-D seismic survey area, but only the specific portion of the area which is being surveyed at any given time. Consistent with BCNP GMP/EIS/MMP geophysical Stipulations #11 and #18 and in support of USDOI-NPS manual guidelines regarding the environmental benefits of their use, one helicopter will be utilized intermittently to support field operations as described in Section 5.0. In addition to regulatory compliance, the proposed helicopter usage brings the additional benefits of speed, efficiency and an overall shortening of the survey period and is a large contribution to the Applicant’s efforts to minimize or eliminate surface impacts, particularly in undisturbed, sensitive areas.

In terms of potential wildlife response behavior attributable to helicopter operations, it is expected to be no different than that resulting from other ongoing helicopter and fixed-wing aviation operations in and around the NG3-D survey area, except that it will be somewhat more intense for the short period of time (seconds) required to drop off or pickup an equipment bag by long line (without landing). The anticipated wildlife behavioral response to the noise stimulus is avoidance. Scientific literature on the subject of wildlife responses to noise is at best inconclusive for the range of species anticipated in the Preserve. Radle (undated) conducted a review of existing literature related to the effects of noise on wildlife. Radle’s review included discussion of findings from research that specifically examined impacts of helicopter and fixed wing aircraft on wildlife



behavior and welfare. Radle cites articles that depicted impacts of helicopter operations on wildlife, specifically citing a study which notes some unique capabilities of helicopters to disturb some species of wildlife (Calef *et al.* 1976). She concludes that various studies document diverse effects, and that these diverse effects make it difficult to reach definitive conclusions regarding the effect of noise on wildlife as a whole.

BOCI proposes to use the Eurocopter AS 350 B3 or equivalent to assist in geophone receiver and recording equipment deployment and pickup. The helicopter will utilize an industry standard “bag runner” delivery system tethered from a long line cable arrangement. Operations will involve hovering over staging area for bag pick-ups or drop-offs followed with relatively short, low level flights to deployment and/or pick up points. According to a Dawson helicopter subcontractor, measured noise levels for such operations can be expected to range between 87.3 A-weighted decibels [dB(A)] to 91.3 dB(A) for flyover and approach, respectively. Takeoffs can be expected to be around 89.7 dB(A). In another measurement recorded by Dawson Geophysical Company, helicopter noise levels at landing zones while conducting bag runner operations averaged 75.2 dB(A) with 45-second noise peaks at 105 dB(A) while the helicopter was directly overhead hooking or un-hooking bags.

In summary, while helicopter noise might disturb some species of wildlife through temporary avoidance behavior, the environmental and operational benefits of helicopter use discussed above more than offset this wildlife avoidance behavior that may result from their use when operated in compliance with applicable USDOI-NPS regulations, stipulations and recommendations. The direct impact to wildlife in and around the NG3-D survey area resulting from helicopter operations is anticipated to be minimal and temporary, and limited to temporary avoidance behavior.

At a given source generation point (which were initially spaced only 82.5’ apart from each other), noise from a Vibroseis Buggy is expected to be of short duration, eight to ten minutes, (as it approaches and departs a point). Directional noise levels recorded in a non-Preserve setting ranged between 75 dB(A) and 84 dB(A) 50 feet from a single operating Vibroseis buggy with the vibrating plate engaged. Noise levels at 200 feet from the buggy attenuated to between 69 dB(A) and 80 dB(A). Dawson measured (in a non-Preserve setting) an overall increase of 9 percent in noise level for a three buggy group. Noise from Vibroseis Buggy operations should not be audible beyond 600 feet from the buggy when it is in operation. By way of comparison, the sound of a large barking dog at 50 feet is approximately 72dB (A); the sound of surf (moderate seas) at 10 feet is 78 dB (A); the sound of a lawn mower at 5 feet is approximately 86 dB (A); and the sound of a pistol shot at 250 feet is approximately 106 dB (A). In other words, the sound from the Vibroseis Buggies will be less than sounds already generated by hunters in the survey area. The Vibroseis Buggy noise sources are expected to be primarily the engine exhaust and, to a lesser extent, the vibrator pad. The overall



noise profile is expected to be similar or less to that of the Gyro-trac exotic vegetation removal equipment and fire control equipment being used by the USDOI-NPS in the BCNP-A.<sup>5</sup> The impact to wildlife in and around the NG3-D survey area resulting from the operation of a Vibroseis Buggy is anticipated to be minimal, temporary and limited to temporary avoidance behavior.

The ground vibration levels from source generation operations measured as “peak particle velocity” are expected to be well within accepted operational guidelines for nearby structures<sup>6</sup> at the source and attenuate rapidly (a baseline reference only – no structures are anticipated). The Applicant anticipates impact to wildlife in and around the NG3-D survey area resulting from vibroseis operations to be minimal and temporary without significant adverse wildlife effects.

Data acquisition recording operations will coincide with vibroseis operations (acoustic signal generation). The nature of the data acquisition operations concentrates on vibrating source points between predetermined recording lines at a coverage rate of 2 to 2½ square miles per day within the 110± square mile NG3-D survey area. Following a day of vibrating and recording, seismic acquisition operations move to other areas and the noise and vibration conditions return to ambient levels.

In summary, anticipated wildlife impacts resulting from survey operations is expected to be that of avoidance behavior. White-tailed deer reportedly avoid ORVs during heavy use periods, but return to the trails used by ORVs less than 24 hours after traffic had ceased (Marchinton and Hirth 1984). Deer and other wildlife in the NG3-D survey area are expected to exhibit the same behavior in response to Vibroseis equipment. Wildlife are also expected to exhibit avoidance behavior in the presence of survey work crews in the same way they respond to other human presences such as hunters, hikers, agency management and research personnel. Although there is not significant human presence in much of the NG3-D seismic survey area, it can be assumed that wildlife within the more remote areas of the Preserve will exhibit similar responses to the occupied areas when the seismic survey is conducted since a wide variety of wildlife is still abundant around those areas of the Preserve where constant and intense human use takes place (i.e., designated ORV trails, heavily hunted areas, hiking trails, I-75, etc.).

#### ***10.5.1.5.4 Listed Fauna***

Tables 10.5 and 10.7 identify Federal and State listed animal species which have been documented or are reasonably expected to occur within the scaled-back NG3-D survey area. The following is a discussion of the potential impacts to listed species that may result from survey operations as well as protection

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<sup>5</sup>The USDOI-NPS uses a Gyro-Trac GT13 with a four cylinder turbo diesel and horizontal cutterhead. <http://www.gyrotrac.net/>

<sup>6</sup>U.S. Bureau of Mines ground vibration guidelines for explosives use.



measures and Modification Protocols which will be instituted to minimize or eliminate potential impacts to these species.

Potential impacts associated with the survey, and associated mitigation/ protection measures for many wildlife species, are the same or very similar in some cases. As such, the following wildlife groupings were used to discuss the potential impacts and address the protection measures for the wildlife species outlined in Section 10.2.3.

- RCWs;
- Bald Eagles;
- Wading Birds;
- Other Protected Birds;
- Florida Panthers;
- Other Protected Mammals;
- Protected Reptiles;

#### Red-Cockaded Woodpecker

The closest documented RCW cluster is approximately 0.25 mile southwest of the scaled-back NG3-D survey area. The FWCC and USDOJ-NPS documented occurrences are primarily concentrated to the south and west of the NG3-D survey area.

Field operations could potentially have an effect on RCW nesting and reproduction. The USFWS has identified the RCW typical nesting season to be April 15 through June 15 which coincides with the proposed seismic survey timeframe (December – May). The survey will occur during the time when RCWs typically court, lay and incubate their eggs, and raise their nestlings. However, it is estimated that approximately 25 percent of active clusters in the Preserve may consist of male-only groups which will not have breeding activities taking place (Davis *et al.* 2010). As such, potential impacts to these clusters will be much less.

The USDOJ-NPS and FWCC conduct extensive, ongoing research on RCW populations within the Preserve. The specific locations of documented RCW clusters, and cavity trees, will be shared with BOCI so that these areas could be avoided and appropriate setbacks could be maintained. The *USFWS Recovery Plan for the Red-cockaded Woodpecker (Picoides borealis) Second Revision* (USFWS 2003) recommends the establishment of a buffer zone of continuous forest 61 meters (200 feet) in width, generally established around the minimum convex polygon containing a group's active and inactive cavity trees. As such, a buffer of 61 meters (200 feet) in width will be maintained between RCW clusters and any foot or ORV traffic. Special precautions will be taken around RCW clusters during the peak feeding activity periods of early morning (6a.m. to 9a.m.)



and late afternoon (4p.m. to sunset). Where practicable, activity near RCW clusters will be avoided entirely during those time windows.

In order to further reduce potential RCW disturbances, a 61 meter (200 foot) buffer will be established vertically and applied to helicopter activity above active cavities. RCWs usually do not fly above canopy level, thus the potential for a helicopter collision with a bird will be negligible (Davis *et al.* 2010).

Potential RCW habitat areas will be scouted by an ecologist prior to the commencement of surveying activities. Flexibility will be built into the operations plan so that previously undocumented areas containing RCW clusters can be avoided and that the 61 meter (200 foot) buffers will be maintained. Survey crews will be trained to identify RCWs, as well as to identify active and in-active RCW cavity trees. No identified RCW cavity trees will be cut, destroyed, or damaged as a result of seismic surveying activities.

It should be noted that the 2000 USDOI-NPS ORV Management Plan/EIS states that there has been no documentation of the loss of trees used by RCWs due to compaction or injury along recreational ORV trails; and that the abandonment of clusters due to disturbance by recreational ORVs also has not been observed.

### Bald Eagle

Although no bald eagle nests are documented within the reduced NG3-D survey area, they could potentially occur. As such, field operations could potentially have an impact on bald eagle nesting and reproduction. The USFWS identifies the primary bald eagle nesting season to be October 1 through May 15 which coincides with the proposed seismic survey timeframe (December – May). The survey will occur during the time when most bald eagles will be incubating their eggs and brooding their eaglets.

Potential bald eagle nesting areas will be scouted by an ecologist prior to the commencement of surveying activities. Flexibility has been built into the operations plan so that previously undocumented bald eagle nests can be avoided, and the appropriate buffers can be established. The buffer zones will adhere to the USFWS and FWCC recommended 660-foot buffer protection zone. No foot or ORV traffic will be allowed in these areas. Survey crews will also be trained to identify bald eagles, as well as bald eagle nests. No bald eagle nest trees will be cut, destroyed, or damaged as a result of seismic surveying activities.

### Wading Birds

The wading birds evaluated under this category include the wood stork, little blue heron, snowy egret, roseate spoonbill, reddish egret, tri-colored heron, and white ibis. They are grouped together for purpose of this analysis and discussion.



Potential impacts to foraging flocks of wading birds, and/or to their nesting colonies, could potentially occur as a result of survey operations. Specifically, foraging flocks of wading birds could be flushed from their feeding sites, which, in the worst case, could reduce their energy intake and ultimately lower fitness of nestlings or adults. Potential impacts on nesting colonies could also potentially occur, resulting in reduced nest attendance, and in the worst case, nest abandonment.

Wood storks forage annually in the Preserve when lowering water levels provide concentrations of fish (2000 USDOI-NPS ORV Management Plan). Other wading birds are known to forage throughout the reduced NG3-D survey area because ample forage opportunities exist. If seismic survey activities cause wading birds to flush during foraging, they will likely move a short distance and resume feeding but then return to their original foraging location after the disturbance passes (Davis *et al.* 2010). Since the proposed action will be transitory and utilize a “one pass” design, significant impacts to foraging wading birds are not expected because birds foraging at a given location will experience a disturbance only once at that location. Further, survey activities will avoid passing through open water areas and will be slow-moving and gradual to minimize potential disturbance. Studies have shown that humans that slowly approached roosting waterbirds flushed fewer birds than did humans moving rapidly (Knight and Cole 1995).

The USDOI-NPS Operators Handbook (2006a) calls for geophysical exploration to be conducted during a time that result in the minimum impact to listed species, which will be the wet season for the wood stork and wading birds. However, this season conflicts with the time of lowest impacts for most other components of the ecosystem (Davis *et al.* 2010). In keeping with the proposed protection measures for vegetation, soils, and water quality, the survey will reduce impacts to foraging habitats and foraging flocks birds by avoiding surface water areas.

Wood storks and other wading birds have historically nested in the NG3-D survey area. However, the probability of wood storks currently nesting in the survey area is low (Davis *et al.* 2010). In South Florida, wood stork colonies typically form during the period of January to March (Ogden 1990) which coincides with the seismic survey timeframe (December – May). The period of greatest sensitivity to disturbance occurs during nest building and incubation (Knight and Cole 1995). Therefore, recommended wood stork buffers will be applied to all groups of nesting wading birds since these species often nest together.

The USFWS *Habitat Management Guidelines for the Wood Stork* (1990) states that unauthorized human entry closer than 300 feet of nesting wood stork colonies will likely be detrimental to the colony. Davis *et al.* recommended a similar minimum 328 foot (100 meter) buffer from active colonies (2010). As a precautionary measure, a buffer of 328 feet (100 meters) in width will be



maintained between active wading bird colonies and any foot or ORV traffic associated with the survey.

In order to further reduce potential disturbances to active wading bird colonies, a 152 meter (500 foot) buffer will be established for helicopter activity above active colonies as recommended by the USFWS *Habitat Management Guidelines for the Wood Stork* (1990). No repeated flights on the same path over active wading bird colonies will occur.

The USDO-I-NPS has collected data on nesting wading birds within the Preserve in the past. This information will be shared with BOCI so that documented colonies can be avoided and appropriate setbacks maintained. BOCI will also use historical data to determine areas where nesting wading birds will be more likely to occur. These potential nesting areas will be scouted by an ecologist prior to the commencement of surveying activities. Flexibility will be built into the operations plan so that previously undocumented colonies can also be avoided with appropriate buffers. Survey crews will be trained to identify the different wading birds, as well as to identify nesting areas. No wading bird nest trees will be cut, destroyed, or damaged as a result of the proposed seismic surveying activities.

#### Other Protected Birds

Other protected birds that are discussed under this category include the Audubon's crested caracara, Everglade snail kite, Florida burrowing owl, Florida Sandhill Crane, and limpkin which are grouped together for purpose of this analysis and discussion.

Field operations could potentially have an impact on the foraging and nesting of these other protected birds because the seismic survey timeframe (December – May) coincides with the nesting seasons of these species. However, due to the current range and known occurrences of the Audubon's crested caracara and the Florida burrowing owl, and habitat use of the Everglade snail kite, Florida Sandhill Crane, and limpkin, these species are not anticipated to be significantly affected by the proposed action.

No Audubon's crested caracaras have been documented within the scaled-back NG3-D survey area. In addition, the Preserve is located in the southernmost extent of the Audubon's crested caracara's Florida range. As such, the majority of the survey area is not expected to be utilized by the Audubon's crested caracara. However, no foot or ORV traffic will occur within the USFWS designated Primary Zone (i.e., radius of 300 meters (985 feet)) of an active Audubon's crested caracara nest, if observed.

To further reduce potential crested caracara disturbances, a 152 meter (500 foot) buffer will be established vertically and applied to helicopter activity above documented Audubon's crested caracara nest, if applicable.



The reduced NG3-D survey area is located outside of designated critical habitat, but within the USFWS Consultation Area for the Everglade snail kite. The closest documented Everglade snail kite nest is approximately one mile east of the NG3-D survey area. No foot, ORV, or helicopter traffic will occur within the USFWS designated No-Entry Buffer Zone (i.e., radius of 150 meters (500 feet)) or Limited Activity Buffer Zone (i.e., radius of 500 meters (1,640 feet)) of an active Everglade snail kite, if observed.

Although not previously documented within the Preserve, or anticipated to occur within the NG3-D survey area, the Florida burrowing owl could potentially occur based on a review of FWCC literature. Florida Sandhill Cranes and limpkins are known to occur throughout the Preserve. However, the general avoidance of standing water by survey activities will avoid or greatly minimize any potential disturbance to the foraging and nesting habitats of these species, as well as the Everglade snail kite.

Potential “protected bird” nesting/burrow areas will be scouted by an ecologist concurrent with the surveying activities. Flexibility has been built into the operations plan so that previously undocumented “protected bird” nests/borrows can be avoided, and the appropriate buffers can be established. In the event that “protected bird” nest/burrow sites are discovered prior to or during program operations, BOCI will initiate observation reporting protocols with USDO-I-NPS (and other agencies, when applicable). Appropriate setbacks and design modifications will be designated and implemented pursuant to the advice and direction of agency personnel.

Survey crews will be trained to identify the protected birds, as well as to identify nesting/burrow areas. No “protected bird” nesting trees or vegetation will be cut, destroyed, or damaged as a result of the seismic surveying activities. In addition, it is not likely that “protected bird” burrows will be destroyed or damaged as a result of the seismic surveying activities.

#### Florida Panther

Field operations could potentially have an effect on Florida panther behavior and denning. Panther mortality or injury will be highly unlikely to occur.

Florida panthers have been documented to occur throughout the Preserve. The primary anticipated behavioral response by Florida panthers in close proximity to survey operations is avoidance. The study *The Effects of Recreational Deer and Hog Hunting on the Behavior of Florida Panthers* (Janis and Clark 1999) indicates that panthers stayed further from recreational ORV trails during hunting season in the Bear Island portion of Preserve. The study states that panthers could have been modifying their activity to the reactions of their prey (i.e. white-tailed deer and wild hogs); however, it is likely that the panther’s movement away from trails is a direct response to human activity. Janis and Clark conclude that there



are only minor biological consequences to this response. Fletcher and McCarthy (2011) conducted an updated analysis that supported the earlier findings regarding the effects of hunting, and associated use of ORVs, on panthers. As documented by previous research, human activity and ORV use will not result in significant behavioral consequences to the Florida panther.

Panther denning activity is known to occur year round; however, 81 percent of denning activity occurs between March and July, with the most births occurring in July (USFWS 1999). Seismic survey activities are scheduled to occur from December through May which overlaps the earliest part of the Florida panther denning period. *Early Maternal Behavior in the Florida Panther* (Maehr *et al.* 1989) states that panther dens are generally surrounded by vegetation nearly impenetrable to investigators. *Day beds, natal dens, and activity of Florida panthers* (In Maehr *et al.* 1990b) found that day rest sites and natal dens of Florida panthers were dominated by saw palmetto at 66 percent of the dens studied, with upland vegetation used as cover 75 percent of the time. Since the proposed survey activities will not take place within impenetrable vegetation, Florida panther dens and day beds are not anticipated to be directly impacted. However, meetings will be held with USDOI-NPS and FWCC panther experts to determine potential denning areas within the vicinity of the scaled-back NG3-D survey area during the survey operations. BOCI or designated representatives will contact USDOI-NPS and FWCC biologists regarding the monitoring of radio-instrumented panthers in and around the NG3-D survey area. If monitoring suggests panthers are denning in the survey area, appropriate actions will be taken as recommended by USDOI-NPS and FWCC staff. In general, the den sites will be buffered by approximately 100-200 meters, as recommended by Darrell Land with the FWCC. However, each den will be evaluated on a case-by-case basis and buffers will be coordinated through the FWCC and USDOI-NPS.

It should be noted that female panthers have not been observed to abandon dens after visits by researchers (Davis *et al.* 2010,). As such, the transitory nature of the proposed survey should not affect the overall success of a panther den even if the survey came in close proximity. Also, panthers are less likely to be active during daylight hours so daytime operations will not disturb panthers at their most active time (night time). The FWCC stated in their February 20, 2014 letter regarding the seismic survey that FWCC staff does not believe that the survey work proposed will impact Florida panther habitat in any significant way.

Survey crews will be trained to identify Florida panthers. In addition, the FWCC panther team will lead a follow up training for survey crews to provide additional information on the panther, as well as training about the possibility of encountering a panther while crews are deploying seismic equipment and how to handle such an encounter.

Panther mortality/injury is not expected to occur in association with the survey since the survey equipment will move attentively, at relatively slow speeds, and



panthers will likely avoid the survey activities. In addition, access points to the NG3-D survey area will be kept secure to prevent panthers from breaching the I-75 wildlife fencing.

#### Other Protected Mammals

Other protected mammals that are discussed under this category include the Florida black bear, Everglades Mink, Big Cypress Fox Squirrel, and Florida Bonneted Bat which are grouped together for purpose of this analysis and discussion.

Field operations could potentially have an impact on these mammals' behavior. Mortality/injury is not expected to occur in association with the survey since the survey equipment will move attentively, at relatively slow speeds, and these mammals will likely avoid the survey activities.

While encounters of Florida black bears during survey activities are probable, the likelihood of exploratory activities permanently displacing a bear from its territory is low. Even at den sites, bears tolerate high levels of disturbance (Davis *et al.* 2010). Florida black bears are wide-ranging and can have large home ranges in which they shift activities to avoid humans (Davis *et al.* 2010). The main area of concern for Florida black bears is attraction. As such, trash/food from the survey operations will be securely stored and removed from the NG3-D survey area daily to prevent or minimize attraction.

Limited information is available about the Everglades mink and Florida Bonneted bat; however, due to their known nocturnal nature, day-time survey activities are not expected to significantly impact these species. As previously stated, areas with standing water will be avoided, thus reducing potential impacts to the Everglades mink. If Big Cypress Fox Squirrel nests or potential Florida bonneted bat cavities are identified, they will be avoided. No nest or cavity tree removal will occur as a result of survey activities.

The primary anticipated response by other protected mammals is avoidance. Other protected mammal mortality/injury is not expected to occur from the survey since the survey equipment will move attentively, at relatively slow speeds. In addition, access points to the NG3-D survey area will be kept secure to prevent wildlife from breaching the I-75 wildlife fencing.

Survey crews will be trained to identify the other protected mammals, as well as to identify potential nesting or denning areas. No other protected mammal denning trees will be cut, destroyed, or damaged as a result of the seismic surveying activities.



### Protected Reptiles

Protected reptiles that are discussed under this category include the American alligator, gopher tortoise, and Eastern indigo snake which are grouped together for purpose of this analysis and discussion.

Field operations could potentially have an impact on other protected reptile behavior and habitat. Although not anticipated, mortality/injury to protected reptiles could also occur.

During the dry season American alligators will likely be concentrated in isolated areas of water but may be encountered when they are traveling overland to seek permanent bodies of water (2000 USDOI-NPS ORV Management Plan). Though rare in the original Preserve, gopher tortoise burrows have been recorded in the Addition Lands. The gopher tortoise population within the revised NG3-D survey area is unknown but is expected to be minimal due to the lack of appropriate habitat. Limited information is available on the seasonal activity and movement of indigo snakes, and their current abundance in the Preserve and the NG3-D survey area is unknown. However, the *Status of the Eastern Indigo Snake in Southern Florida National Parks and Vicinity Report SFRC-83/01* (Steiner *et al.* 1983) suggests that Eastern indigo snakes are diurnal and have been observed more frequently in the dry season than the wet season. Generally, Eastern indigo snakes have a known association with gopher tortoise burrows and solution holes as refuges (Steiner *et al.* 1983). Therefore, Eastern indigo snake population numbers may be low in the scaled-back NG3-D survey area due to the expected lack of gopher tortoise burrows.

The primary anticipated response by protected reptiles is avoidance. While man-made noise and vibrations may temporarily adversely affect reptiles, noise exposure will be brief and temporary. As such, no significant impacts are expected to occur.

If a protected reptile is observed during the seismic survey, the survey will temporarily cease to allow sufficient time for the reptile to move away from the activity before resuming activities. Protected reptile mortality is not expected to occur associated with the survey since the survey equipment will move attentively, at relatively slow speeds.

Potential impacts to protected reptile habitat could also occur; but if so, it will be minimal. Survey crews will be trained to identify the protected reptiles, as well as to identify their potential burrows or nests. Due to the protection measures proposed, it is not likely that burrows or nests will be destroyed or damaged as a result of the seismic surveying activities. In addition, the survey crews will be provided additional training about the possibility of encountering protected reptiles while crews are deploying seismic equipment and how to handle such an



encounter. The crews will be specifically instructed to not come in contact with protected reptiles.

#### ***10.5.1.5.5 Game Species and Other Wildlife***

Although not anticipated, actions associated with the seismic survey could potentially have impacts on major game species and other wildlife in the NG3-D survey area. The following is a discussion of the potential impacts to game species and other wildlife that may result from survey operations as well as protection measures and Modification Protocols which will be instituted to minimize or eliminate potential impacts to these species.

##### *Game Species*

The major game species that are discussed under this category include the white-tailed deer, feral hog, and wild turkey which are grouped together for purpose of this analysis and discussion.

Field operations could potentially have an impact on major game species behavior. Since 1991, the deer population in Preserve has increased due to favorable environmental conditions, areas closures, and changes in hunting regulations (2000 USDOI-NPS ORV Management Plan). Additionally, the Deer Status Report for the BCNP-A as shown in Appendix F of the 2012 FWCC Second Revised Draft of the USDOI-NPS Hunting Management Plan/Environmental Assessment (2012b) states that deer harvest has had a slight upward trend since 1980. The historical average (1980 to 2011) is 202 deer harvested per year with a high of 346 harvested in 1998 and a low of 103 in 1980. Strict hunting management and quotas serve to allow the sustainable harvest of deer and other popular game species within the Preserve, as well as providing for conservation of the Florida panther. Overall, the Deer Status Report states that documented deer harvest in Preserve has been stable or slightly increasing over the past 30 years.

The BCNP GMP states feral hogs have been stocked in areas including the Preserve as late as 1975. However, pseudorabies-free castrated feral hogs were released near BCNP as recently as 1987 to perform a FWCC study for the Florida panther, as recorded in *Fates of Wild Hogs Released into Occupied Florida Panther Home Ranges*. *Fates of Wild Hogs Released into Occupied Florida Panther Home Ranges* indicates that panthers using the Fakahatchee Strand north of Alligator Alley, the Bear Island Unit of Preserve, and private ranches to the north, are in better condition than individuals south of Alligator Alley. The article postulates that panthers found north of Alligator Alley derive most of their diet from large prey such as wild hog and white tailed deer, while panthers south of the highway derive most of their intake from raccoon and nine-banded armadillos. The article additionally cites a decline in soil quality and hydrologic conditions as



a potential explanation for a lack of a resident hog population south of Alligator Alley.

Additionally, according to the FWCC, hogs prefer hard mast as their food source, and directly compete with many popular game animals including deer, turkeys, and squirrels. The impacts of this competition are uncertain, but it may be a limiting factor for populations of native species in some areas. In addition, hogs may consume the nests and young of reptiles (including turtles), ground-nesting birds and mammals (including deer fawns) per *Wild hogs in Florida: an overview* (FWCC 2012, [http://myfwc.com/media/2102702/6staffreport-wildhog\\_presentation.pdf](http://myfwc.com/media/2102702/6staffreport-wildhog_presentation.pdf)).

Turkey density tends to fluctuate from year to year due to environmental conditions (Powell 1965, Frye 1954). Per the BCNP Small Game and Wild Turkey Harvest and Pressure Summary 2011-12, which is found within Appendix G of the 2012 Second Revised Draft of the USDOI-NPS Hunting Management Plan/Environmental Assessment (2012*b*), the biological data for turkey adults in relation to juveniles remained fairly constant from 1985-86 to 2010-11. Total turkey harvest ranged from a high of 55 in 2008-09 to a low of 26 in 2010-11. The total turkey harvest for 2011 to 2012 was 36, which was slightly above average. FWCC and USDOI-NPS officials monitor hunter pressure and harvest data to insure optimal hunting conditions and overall wildlife health. No adverse impacts to turkey populations in Preserve are expected as a result of the proposed seismic survey.

Major game species have historically coexisted with similar human disturbance and hunting pressures in the Preserve so impacts are not anticipated to be significant. Given the extent to which major game species have been exposed to ongoing resource management, recreational uses and other activities occurring in the NG3-D survey area, these species are expected to exhibit the same avoidance behavior in response to survey operations as they normally do to other activities in the Preserve.

#### Other Wildlife

Many animals not listed as endangered or threatened, or classified as major game species, live in Preserve. Like the species noted above, other wildlife species will greatly vary in their responses to the proposed activity. However, the anticipated wildlife response to survey operations is expected to be that of avoidance behavior (in general); with the exception of mollusks or other invertebrates, where no significant impact to the populations will be expected to occur due to the avoidance of open water areas.

The proposed protection measures for the NG3-D seismic survey will significantly reduce potential impacts to other wildlife species in the Preserve. Because seismic survey activities will not occur in wet and submerged areas, fish



and other water-dwelling species will not be impacted. Highly mobile species such as other birds and mammals are anticipated to avoid the small area where seismic surveying activities will occur during a given day. Given that the nature of the NG3-D seismic survey generated stimuli is consistent with ambient stimuli and other conditions currently occurring in the Preserve, no adverse impacts to other wildlife are anticipated.

In addition, moving at slow-speeds with attentive drivers, educational trainings for survey crews, scouting ecologists and agency coordination will provide additional protections for other wildlife species. As previously stated, field personnel will avoid directly disturbing wildlife.

In summary, significant impacts to game species and other wildlife species utilizing the Preserve will not be expected as a result of survey operations since the proposed activities are similar to ongoing activities within the Preserve. Natural/human impacts currently ongoing in the Preserve, and potential NG3-D survey area generated impacts, are anticipated to generally result in avoidance wildlife behavior overall.

## **10.6 Air Quality**

Collier County is an air quality attainment area and not subject to restrictions for development activities under state air quality regulation programs. Ongoing air quality impacts associated with known air pollution sources in the vicinity of the revised NG3-D survey area (ambient air impacts) and anticipated program-generated air pollution impacts (the NG3-D seismic survey generated air impacts) has been evaluated. In summary, it is anticipated that NG3-D survey operations will contribute minor air emissions of short duration in the form of internal combustion engine exhaust that may amount to an additional 7 percent above ambient impact levels attributable to traffic volume on I-75. Ambient air impacts were estimated for interstate traffic volumes using published FDOT data sources. Anticipated NG3-D seismic survey generated air impacts were estimated by evaluating applicable survey equipment for fuel consumption over the 18 week period of field operations compared to the estimated fuel consumption of I-75 traffic passing through the survey area. Ambient and anticipated NG3-D seismic survey generated air impacts were compared and the findings are presented below.

### **10.6.1 Ambient Motor Vehicle Air Emissions**

Based on the *I-75 South Sketch Interstate Plan Mainline Vision Report* prepared by CDM Smith in December 2011 for the Florida Department of Transportation Systems Planning Office, in 2015 23,250 motor vehicles are expected to pass through the Preserve every 24 hours on the ten miles of I-75 running through the NG3-D survey area. Based on this projected traffic volume 15,525 gallons of gasoline and diesel fuel are expected to be consumed and emissions produced from ambient I-75 traffic conditions within the NG3-D survey area every 24 hours at the time the NG3-D seismic survey commences. This estimate is based on the following:



- 20,000 autos/day (estimated) using an average of 0.5 gallons of gasoline (at an average 20 mpg) for the 10.0 miles in the NG3-D survey area = 10,000 gallons; and
- 3,250 trucks/day (estimated) using an average of 1.7 gallons of diesel fuel (at an average 6 mpg) for the 10.0 miles in the NG3-D survey area = 5,525 gallons.

### **10.6.2 Other Ambient Air Emission Sources (Intermittent)**

Controlled burns are a resource management tool employed by USDOI-NPS to control vegetation and fuel loads in the Preserve. Controlled burns generate particulates (smoke) and a variety of combustion products – predominantly carbon monoxide. In addition to controlled burns, wildfires are sparked from various sources including lightning strikes, discarded smoking materials and unattended campfires. These sources contribute combustion products and particulates into the air on an intermittent basis.

### **10.6.3 Program Generated Combustion Emissions (Estimated)**

The NG3-D seismic survey is anticipated to generate a slight increase in air emissions in the survey area. Anticipated NG3-D seismic survey generated air impacts will include minor particulate emissions and products of combustion from the six Vibroseis Buggies, one helicopter, and the various support vehicles and equipment operating at the staging areas and, to some extent, in the survey area. BOCI anticipates that daily fuel consumption and corresponding emissions will range from a low of 162 gallons of gasoline and diesel during the initial few weeks increasing to a high of 1,047 gallons consumed each 24 hour period when all work segments of the survey are underway.

Fuel usage estimates for initial survey period (weeks 1-5) are based on the following:

- 2 diesel generator sets = 87 gallon;
- 50% of 15 road vehicle total = 75 gallons; and
- Total of 162 gallons burned per day (gasoline, diesel and Jet A) or 1.04% increase over ambient conditions.

Fuel usage estimates (weeks 6 – 18) are based on the following:

- 6 Vibroseis Buggy/turbo diesels (4 cyl.) @ 8 gph for 10 hours of operation per day = 480 gallons;
- 2 diesel generator sets (diesel):
  - 20KW @ 1.7 gph for 14 hours of operation per day = 24 gallons;
  - 56KW @ 4.5 gph for 14 hours of operation per day = 63 gallons;
- 15 road vehicles @ 2 gph for 6 hours of operation per day estimated consumption = 180 gallons;



- 1 helicopter averaging 6 hours operations per day (total time) @ 50 gph = ~300 gallons; and
- Total of 1,047 gallons burned per day (gasoline, diesel and Jet A) or 6.7% over ambient conditions.

In summary, because of temporary nature and qualitative similarities of the slight increase in potential NG3-D seismic survey generated air quality impacts to existing ambient air quality no additional wildlife or recreational user impacts or adverse effects are expected to result from survey operations. Wildlife and recreational use impacts in and near the NG3-D survey area resulting from air quality issues attributable to survey operations are anticipated to be *de minimis*.

## 10.7 Noise Considerations

In accordance with USDOJ-NPS *Management Policies* (2006b) and Director's Order 47: *Sound Preservation and Noise Management* (USDOJ-NPS 2000c), an important part of the USDOJ-NPS mission is preservation of natural soundscapes associated with USDOJ-NPS Units. The USDOJ-NPS defines a soundscape as (USDOJ-NPS 2000c):

*... the total ambient acoustic environment associated with a given environment (sonic environment) in an area such as a National Park. It is also refers to the total ambient sound level for the park. In a National Park setting, this soundscape is usually composed of both natural ambient sounds and a variety of human-made sounds.*

The USDOJ-NPS Natural Sounds Program differentiates between the use of *sound* and *noise*, since these definitions have been used inconsistently in the literature (USDOJ-NPS 2011b). Humans perceive *sound* as an auditory sensation created by pressure variations that move through a medium such as water or air and is measured in terms of amplitude and frequency (Harris 1998; Templeton and Sacre 1997). Although *noise* is sometimes incorrectly used as a synonym for sound, the USDOJ-NPS defines noise as “an unwanted or undesired sound, often unpleasant in quality, intensity or repetition” (USDOJ-NPS 2000c). Sounds found desirable during times of rest and relaxation are referred to as natural quiet, and include natural, outdoor ambient sounds, without the intrusion of human-caused sounds.

Sound levels are usually measured in A- weighted decibels [dB(A)], and a descriptor such as the energy equivalent noise level (Leq) is commonly used to account for fluctuations of sound over time. Generally, a 3 dB(A) increase in sound level is considered the minimum threshold at which most people can detect a change in the sound environment; an increase of 10 dB(A) is perceived as a doubling of the sound level.

Natural sounds throughout the Preserve – including flowing water, animals, and rustling leaves – are not considered noise. The enjoyment of natural sounds in the Preserve enhances the visitor's experience, and natural quiet can be essential in order for some individuals to achieve a feeling of peace and solitude. However, sound levels in the



Preserve can vary greatly, depending on the area and activities. Ambient sound levels in the Preserve generally range between 24 dB(A) and 40 dB(A), depending on the contribution of sound by insects (USDOI-NPS 2010). These levels increase to between 35 dB(A) to 78 dB(A) during the summer wet season (Law 1992). Since environmental conditions in the Addition are similar to those in the original Preserve, these noise levels are also representative of those that are expected in the Addition. Some of the sounds that can typically be heard in areas of the Preserve are listed in Table 10.10.

**Table 10.10 Typical Sounds in the Preserve**

<b>Sound</b>	<b>Approximate Level [dB(A)]</b>
Threshold of human hearing at 1 kHz	0
Leaves rustling	20
Whispering (1.5 meters/5 feet)	20
Crickets (5 meters/16 feet)	40
Distant bird calls	45
Rainfall	50
Normal conversation	60
Freeway traffic	70
Motorboats	85 – 115
Thunder	100 – 120
Gunfire	150 – 170

Sources: Center for Hearing and Communication 2011, USDOI-NPS 2011*b*

There are no absolute standards that define unacceptable levels, duration, or qualities of environmental noise (USDOI-NPS 2010). The U.S. Forest Service (1980) has established subjective audibility guidelines to assess noise impacts for various recreational opportunities. While these guidelines do not apply, they are included in Table 10.11 as an example, and they relate recreational opportunities to the corresponding acceptable level above ambient sound levels. The U.S. Department of Energy suggests that there is a “strong likelihood of individual complaints” when the intruding noise is greater than 10 dB above ambient sound levels. Complaints about noise require listeners to be within earshot, which means that the measure of noise impacts depends in part on human presence in a given area. In the vast backcountry of the Preserve, there usually are few if any persons present to hear noises.

**Table 10.11 Acceptable Levels above Ambient Sound Levels for Various Recreational Opportunities**

<b>Recreational Opportunity</b>	<b>Acceptable Level (dBA)</b>
Appropriate for primitive recreational area; intruding noise not detectable	0
Appropriate for trail camps; will not wake most sleepers; intruding noise normally not detectable	5



**Table 10.11 (Continued)**

<b>Recreational Opportunity</b>	<b>Acceptable Level (dBA)</b>
Appropriate for undeveloped roadside camps and those accessible by four-wheel drive and all-terrain vehicles	10
Appropriate for roadside camps accessible by highway vehicles	20
Appropriate for highly developed campgrounds in a quiet, suburban neighborhood	40

Source: U.S. Forest Service 1980

### Noise

Current noise sources in the Preserve include: human noise sources (e.g., USDOJ-NPS management activities, recreational activities), hunting-related firearm use, ORVs, existing oil and gas development noise, aircraft noise, and highway noise (USDOJ-NPS 2010). While some of these noise sources exist in locations throughout the Preserve, noise from hunting, ORVs, and oil and gas development is mainly confined to a few discrete locations in the original Preserve.

### Hunting Noise

Hunting activities in the original Preserve are long-established and include bow, muzzleloading, and modern gun seasons. Gun hunting is permitted only during limited times of the year (e.g., during October, November, and December). Sound levels for hunting activities will primarily be associated with the weapons used for hunting (e.g., rifles or shotguns) or ORVs used by hunters for access (see discussion below). The sound of an average rifle ranges from 155 dB(A) to 170 dB(A), depending on weapon type (Center for Hearing and Communication 2011). The sound of an average shotgun ranges from 150 dB(A) to 160 dB(A) (Center for Hearing and Communication 2011). Using a commonly accepted sound level drop-off rate of a 6 dB reduction in noise for every doubling of distance from the source, and not accounting for the effects of terrain, ground cover, and atmospheric conditions; firearm noise of this magnitude will be expected to be plainly evident at distances of more than 2 miles. Such noises associated with hunting in the Preserve will be expected to be sporadic and occur only during hunting seasons and hours.

### ORV Noise

Noise levels from ORVs have been measured to range between 78 dB(A) to 91 dB(A) at near distances depending on size, wheel/track configuration (but all powered by the same types of muffled automotive engine), and soil type to essentially ambient sound levels of 43 dB(A) to 60 dB(A) at 300 feet distance (Duever *et al.* 1981). Management of ORVs in the original Preserve is guided by the *Final Recreational Off-Road Vehicle Management*



*Plan Supplemental Environmental Impact Statement (USDOI-NPS 2000a).* Management of ORVs in the Addition is guided by the Addition GMP (USDOI-NPS 2010). The Addition GMP adopts the vehicle specifications of those established in the 2000 Final Recreational ORV Management Plan which includes the requirement that “all wheeled vehicles will be required to have a muffler in good working condition and in constant operation.”

#### *Oil and Gas Development Noise*

The Preserve soundscape can be affected by oil and gas exploration and development activities, including geophysical operations, drilling, production, abandonment, and reclamation. Most of these impacts are unrelated to the survey considered in this document, because only geophysical activities are proposed. In an oil field’s long life cycle, drilling activity is short-term and usually produces the highest level of noise compared to the much longer and quieter production period. According to the Addition GMP (USDOI-NPS 2010), noise levels associated with drilling operations can range from 93 dB(A) within 10 feet of a drill rig to ambient (40 dB(A)) at distances of 10,000 feet or greater from the rig, depending on the type of activity taking place. Measured 1990 production operation noise levels at Raccoon Point oil field ranged between 85 dB(A) near a generator to 70 dB(A) at the edge of the production pad (Law 1990).

Dawson Geophysical Company, BOCI’s proposed seismic contractor, expects short-term noise levels for the proposed Vibroseis geophysical seismic testing activities to emanate primarily from staging activities (generators and trucks), support equipment used to move crews and materials (trucks, field ATVs and a support helicopter) and Vibroseis buggies (2 groups of 3 buggies). Directional noise levels recorded in a non-Preserve setting ranged between 75 dB(A) and 84 dB(A) 50 feet from a single operating Vibroseis buggy with the vibrating plate engaged (similar to the seismic survey). Noise levels at 200 feet from the buggy attenuated to between 69 dB(A) and 80 dB(A). Dawson measured (in a non-Preserve setting) an overall increase of 9 percent in noise level for a three buggy group. The sound values measured in a non-Preserve setting are expected to be somewhat lower if employed in the Preserve with its extensive vegetation.

As a comparison, noise levels in CRC’s 3-D Nobles Grade 2006 POP utilizing buried dynamite charges were expected to be as high as 100 dB(A) to 110 dB(A) during the period when the sonic drive unit was engaged in shothole drilling operations. Noise from a June 2005 test detonation of a 2.25 lb. explosive charge buried at a depth of 35 feet was measured at 123 dB(A) and 97 dB(A) at 27 and 335 feet from the shothole, respectively.

#### *Aircraft Noise*

According to the Addition GMP (USDOI-NPS 2010), natural soundscapes throughout the Preserve are affected by aircraft noise from a variety of overflight sources. These include high-altitude, commercial jet traffic; military activity; general aviation; USDOI-NPS administrative operations, such as resource management, prescribed fire activities, emergency response, and facility maintenance; municipal and commercial air traffic from



surrounding counties; and the air flight training operating out of the Dade-Collier Training and Transition Airport known locally as the Jetport (USDOI-NPS 2010).

Helicopter use is of particular interest within the Preserve because this type of aircraft is often used to access the backcountry. The acoustical impact of a helicopter is a function of the size and the type of engine used, as well as the movement of the rotor blades through the atmosphere as they produce lift (USDOI-NPS 2010).

BOCI proposes to use the Eurocopter AS 350 B3 or equivalent to assist in geophone receiver and recording equipment deployment and pickup. The helicopter will utilize an industry standard “bag runner” delivery system tethered from a long line cable arrangement. Operations will involve hovering over staging area for bag pick-ups or drop-offs followed with relatively short, low level flights to deployment and/or pick up points. According to a Dawson helicopter subcontractor, measured noise levels for such operations can be expected to range between 87.3 dB(A) to 91.3 dB(A) for flyover and approach, respectively. Takeoffs can be expected to be around 89.7 dB(A). In another measurement recorded by Dawson Geophysical Company, helicopter noise levels at landing zones while conducting bag runner operations averaged 75.2 dB(A) with 45-second noise peaks at 105 dB(A) while the helicopter was directly overhead hooking or un-hooking bags.

### Highway Noise

According to the Addition GMP (USDOI-NPS 2010), I-75 creates a considerable impact on the natural soundscape in the northern portion of the Addition as a result of the nearly constant traffic. To a lesser degree, SR 29 and U.S. 41 also impact the natural soundscape within the Preserve. The level of highway traffic noise depends on (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of the traffic. Vehicle noise is a combination of the noises produced by the engine, the exhaust, and the tires. The loudness of traffic noise can also be increased by defective mufflers or other faulty equipment on vehicles. As a person moves away from a highway, traffic noise levels are reduced by distance, terrain, vegetation, and natural and man-made obstacles (Federal Highway Administration 1995). A 61-meter (about 200-foot) width of dense vegetation, for example, can reduce noise by 10 decibels, which reduces the loudness of traffic noise by half (Federal Highway Administration 1995).

#### **10.7.1 Ambient Motor Vehicle Noise – I-75**

Ambient noise in the vicinity of the Program Area, generated primarily from I-75 traffic has been studied extensively and is summarized as follows. Based upon local I-75 traffic volumes at interstate highway speeds, the Federal Highway Administration traffic noise prediction model indicates that automobiles, SUVs and trucks, will generate peak noise levels of 75-78 dB(A) at a distance of 50 feet from the roadway and will attenuate to 50-55 dB(A) at a distance of 1,000 feet from the roadway. To an observer at a distance of 1,000 feet, traffic noise will begin to blend with other natural background noise so that traffic will usually be audible only intermittently. At distances of several miles an



observer can hear, in still air, specific noise sources such as loud, poorly muffled truck exhaust. Within the BCNP and BCNP-A, dense vegetation between the observer and a source will cause higher frequency (shorter wavelengths) noise to attenuate more rapidly while low frequency noise (longer wavelengths) will be audible for greater distances.

### **10.7.2 Other Ambient Noise Sources**

Recreational ORVs used in support of BCNP hunting activities at speeds less than 15 mph generate noise levels in the range of 60-75 dB(A) and have been measured up to 78-91dB(A) in non-hunting recreation. The USDOJ-NPS exotic plant control operations utilize mechanized equipment to clear exotic plants and conduct fire prevention activities. These operations use several conventional trucks, mechanized vegetation clearing equipment such as GyroTracs, chain saws, and tractors that create ambient noise levels similar to those generated by survey equipment.

### **10.7.3 Anticipated Program Generated Noise**

NG3-D seismic survey generated noise will originate from the Vibroseis buggies and signal generation activities at each source point. The Vibroseis buggies will have two noise sources: 1) diesel exhaust noise; and 2) to a much lesser extent, vibrating pad noise. Additional noise from support helicopters will be generated as well.

Effects on visitor experience in relation to noise are anticipated to be minimal. Most visitors will not notice survey field operations and diminished soundscapes unless standing in or immediately adjacent to the daily 2½ square-mile operating area or having noticed helicopter operation at the staging areas adjacent to the Collier County rest and recreational areas along I-75. For those visitors electing to experience the backcountry in the immediate vicinity of survey activities, BOCI will work with USDOJ-NPS to provide informational materials at the limited entry points and online.

The Vibroseis buggies will operate in two groups of three buggies. Vibroseis buggies within each group will be in close proximity to each other and relatively close to the second group (in many instances separated by less than one quarter mile). The total area of noise impact associated with the Vibroseis buggies will be confined to an approximate area of 2½ square miles per day.

Generation of acoustic signals at source points will occur approximately every two minutes in the planned daily survey area over a 10 to 12 hour daytime period. Noise and effects of vibroseis signal generation at each source point will attenuate rapidly as the vibroseis group approaches and then moves away from any single vibration source point.

Peak helicopter usage will occur during data acquisition operations (receiver layout and Vibroseis operations). Helicopter operations will be conducted an average of three to six hours each day during the 18 weeks of survey operations.



The 2006 USDO-I-NPS Operator's Handbook suggests the use of helicopters as a strategy to preclude the need for new trails in sensitive and difficult to reclaim areas. BOCI's operational plans will include the use of a helicopter to assist field operations. However, noise from a support helicopter will be generated. Peak helicopter usage will occur during receiver deployment and recovery and vibroseis operations. As discussed in Section 10.7, expected sound levels during these operations will range between 75.2 dB(A) and 91.3 dB(A) with short-term peaks (45-seconds at 105 dB(A)) during receiver bag drop-offs and pickups. Helicopter operations will be conducted an average of three to six hours each day during the 18 weeks of program operations.

No ground disturbing activities, drilling, or dynamite will be used to conduct the seismic survey. Also, operations will occur during daylight hours; therefore, the noise from plan operations will occur only during daylight hours.

The types and levels of NG3-D seismic survey generated noise are anticipated to be similar to ambient noise impacts attributable to ongoing resource management, recreational uses, vehicle traffic (especially from I-75), and a variety of non-survey related flight operations. In addition, NG3-D seismic survey generated noise will be intermittent and limited to a small portion of the survey area (2½ square miles) on any given day. As such, the proposed seismic survey will not impose any long term effects on natural ambient soundscape.

## **10.8 Cultural Resources**

In recognition of the inherently sensitive nature of archaeological, historical and cultural resources in the Preserve, it is the Applicant's intent to identify and avoid recorded and potential archaeological and cultural sites. To this end, the *Nobles Grade 3-D Geophysical Survey Plan of Operations for the Big Cypress National Preserve and Additional Areas*, was submitted to the USDO-I-NPS in June 2006 by CRC, and included a report of the cultural, historical and archaeological resources in and near the original 2006 Program Area (40 percent of the revised NG3-D survey area). In 2014, BOCI retained the services of a cultural resource management firm, Archaeological Consultants, Inc. (ACI), to use the 2006 information, conduct additional research for the NG3-D seismic survey, prepare a Site Avoidance Model and develop protective protocols, and site/resource recognition training to avoid significant archaeological and cultural sites, and to oversee survey activities.

Based on the Avoidance Model and avoidance/site protective protocols being developed for the NG3-D seismic survey and the ARPA permit that must be approved by the USDO-I-NPS, the Applicant anticipates that potential impacts to significant resources, including IRAs (contingent upon data from federally recognized tribes, per the MMP) will be minimized or eliminated. Significant resources are defined as resources listed, determined eligible, or considered potentially eligible for listing in the National Register of Historic Places (NRHP as defined in the National Historic Preservation Act [16 USC 470]). These efforts are also in keeping with the BCNP MMP/EIS/MMP geophysical Stipulation #7 and all other applicable federal and state permitting requirements for field operations.



Based on the Avoidance Model, the requirements laid out in the ARPA permit, and the USDOl-NPS approved avoidance protocols, archaeologists will groundtruth the proposed source lines, staging areas and other locales within the NG3-D survey area to locate or assess the potential for undocumented and unanticipated cultural/archaeological resources prior to seismic survey. Reconnaissance survey and subsurface testing along the receiver lines is not required. However, previously recorded sites (if any) located along those lines should not be driven over. Site/resource recognition training will be provided for the seismic crews and other field personnel regarding the physical characteristics of archaeological sites prior to entering the NG3-D survey area. Field personnel will be instructed not to collect artifacts, but rather to report items to designated archaeologists for recording and avoidance as required by USDOl-NPS and the SHPO office. If unexpected resources are discovered during any phase of field work, an archaeologist will also assist/advise in rerouting/relocating lines, routes, and/or staging areas as necessary to avoid impacts to significant resources.

The Applicant does not anticipate discernible impacts on existing surface or subsurface conditions as a result of program operations if the Avoidance Model, avoidance protocols, and ARPA stipulations are followed. It is anticipated that the source lines, staging areas, access roads, etc. will be located so as to avoid all sites/resources and areas of high archaeological potential as defined by SEAC and the Avoidance Model. A 100 foot buffer will be included around all previously recorded resources to ensure no impact. Subsurface testing at 20 meter (66 foot) intervals will take place in all probability areas that cannot be avoided, as per the SEAC. Should resources be discovered during program field operations, site boundaries will be delimited to the extent that the resources will be avoided. The program archaeologist will record the resource, as required by the USDOl-NPS and the SHPO. Further, indirect impacts seem unlikely because of the implementation of the Avoidance Model, avoidance protocols, and an on-site professional archaeologist to handle unanticipated discoveries.

## 10.9 Visitor Use Areas and Visual Quality

### 10.9.1 Visitor Use Areas

#### Recreational Visitation Data

Table 10.12 shows the annual number of recreational visitors to the Preserve from 1989 to 2010. Approximately 400,000 to 500,000 recreational visitors were recorded annually at the Preserve between 2000 and 2004. In 2005, the Preserve changed its counting methods, adding visitor counts from the Oasis Visitor Center parking lot and vehicle counts from the east and west ends of the Loop Road. This change contributed to the higher visitation figures from 2005 to present (USDOl-NPS 2010).

**Table 10.12 Recreational Visits (1989-2010)**

Year	Recreational Visitors	Year	Recreational Visitors
1989	81,157	1992	212,682
1990	127,790	1993	234,830
1991	159,172	1994	294,307



**Table 10.12 (Continued)**

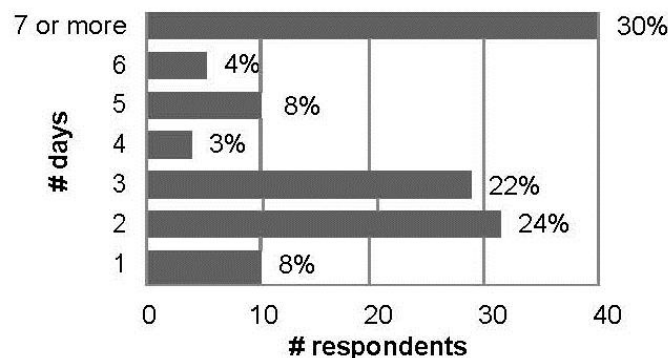
Year	Recreational Visitors	Year	Recreational Visitors
1995	365,463	2003	400,902
1996	424,920	2004	385,194
1997	462,553	2005	768,687*
1998	474,895	2006	825,857
1999	503,110	2007	822,864
2000	505,062	2008	813,790
2001	409,771	2009	812,207
2002	449,481	2010	665,523

Source: USDOJ-NPS 2011c

\*Change in counting method

### Length of Visit

The Visitor Services Project and Cooperative Park Studies Unit of the University of Idaho conducted a general visitor survey for Big Cypress National Preserve in the spring of 2007 (Papadogiannaki *et al.* 2007). As part of the 2007 study, visitors to the Preserve were asked the number of consecutive days spent visiting the Preserve. Figure 10.15 summarizes the results of those responses (Papadogiannaki *et al.* 2007).



Source: Papadogiannaki *et al.* 2007

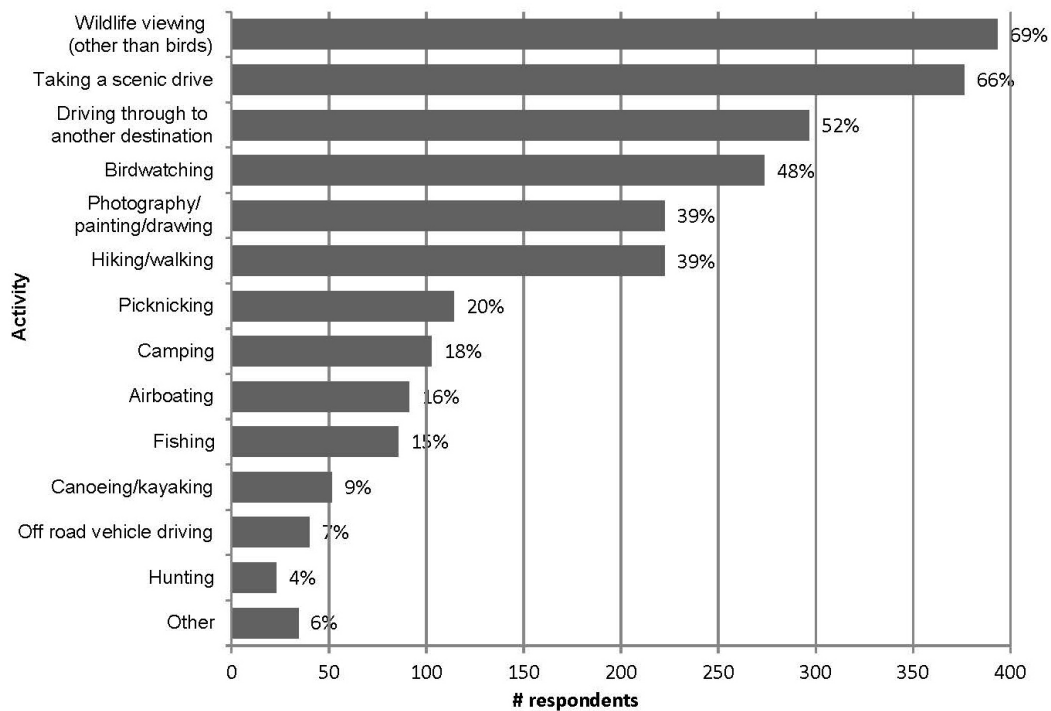
N = 131 visitor groups

**Figure 10.15 Number of Days Spent Visiting the Preserve**

### Visitor Activities

As part of the 2007 visitor study, one of the questions that visitors were asked was, “On this visit to the Big Cypress National Preserve, what activities did you and your group participate in?” Figure 10.16 summarizes the results of those responses.





Source: Papadogiannaki *et al.* 2007

N = 570 visitor groups

Note: Total percentages do not equal 100 because visitors could select more than one answer.

**Figure 10.16 Visitor Activities Participated In**

### Recreational Opportunities

According to the Addition GMP (USDOI-NPS 2010) the primary recreational activities within the Preserve include the following, with the areas in which the activities are currently permissible noted in parentheses:

- Front country driving, sightseeing, and visitor centers (original Preserve)
- Walking and hiking (original Preserve and the Addition)
- Bird-watching and wildlife viewing (original Preserve and the Addition)
- Paddling (original Preserve and the Addition)
- Motorboating (original Preserve and limited in the Addition)
- Camping (original Preserve and the Addition)
- Bicycling (original Preserve and limited in the Addition)
- Riding ORVs (original Preserve)
- Fishing and frogging (fishing permissible in original Preserve and the Addition; frogging permissible in the original Preserve)
- Hunting (original Preserve)
- Opportunities to experience peace and quiet in a natural environment (original Preserve and the Addition)

NG3-D seismic survey operations will be conducted in an area of the BCNP and BCNP-A which contain visitor use areas and I-75 vista observation opportunities. Preserve



visitor use features in or near the scaled-back NG3-D survey area are depicted in Figure 10.17

### **10.9.2 Visual Quality**

The Preserve has desirable visual qualities due to its on-site habitats. The Preserve lands are virtually flat throughout the NG3-D survey area, with areas of dense vegetation such as the cypress and hardwoods, as well as areas of sparse vegetation above the herbaceous stratum such as marsh lands and prairies. Per the 1992 GMP, the Sunniland Trend (which encompasses the NG3-D survey area), is the most probable productive oil and gas area within the Preserve lands, and includes a surface mosaic of old-growth pine, hardwood hammocks, marsh, and prairie. Due to the mixture of vegetation habitats, long-distance views are uncommon. Vast marsh and prairie habitats could potentially afford long-distance views up to two or three miles; however, these expanses are uncommon and most visual expanses are anticipated to be less than a mile.

### **10.9.3 Potential Impacts to Visitor Use and Perception and Visual Quality**

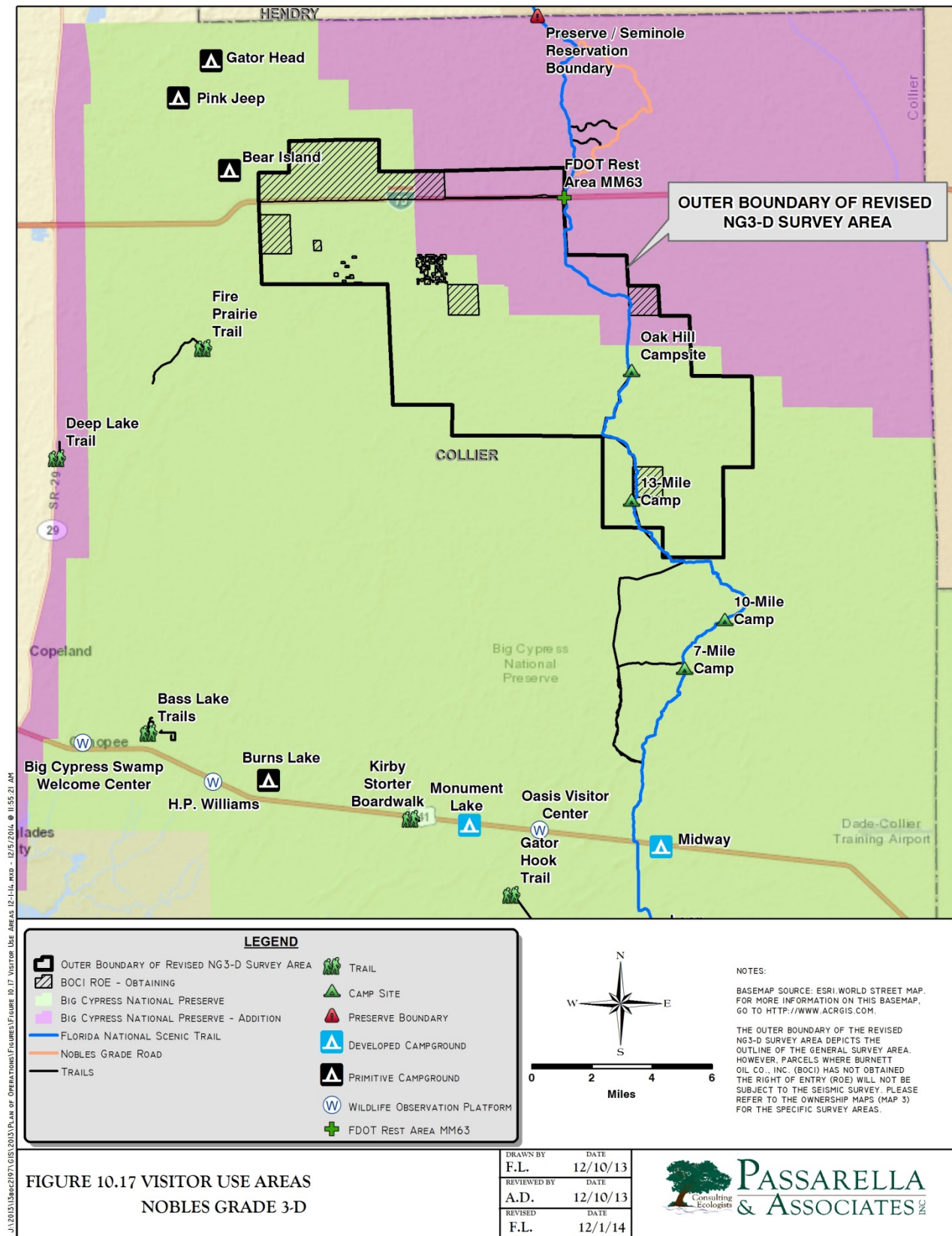
Impacts to visual quality and visitor use and perception are addressed in this section. Noise impacts, which may also have an effect on visitor experience, are discussed in the Section 10.7, “Noise Considerations.”

USDOI-NPS Management Policies (2006*b*) addresses “enjoyment of park resources and values by the people of the United States” as “part of the fundamental purpose of all parks.” The USDOI-NPS is committed to “providing appropriate, high- quality opportunities for visitors to enjoy the parks,” by maintaining “an atmosphere that is open, inviting, and accessible” (USDOI-NPS 2006*b*).

Potential temporary impacts to visual visitor experiences could result from the proposed action in limited areas through visibility of staging areas and operations to visitors, and through the disruption of vegetation and/or soils. In addition, the NG3-D survey area is bisected by the Florida National Scenic Trail and other trails so hikers’ trail experiences could be affected if they happen to be in the vicinity of survey activities when they are taking place. Also, the dry season field operations could also affect hunters and ORV users.

Because the Preserve lands are virtually flat throughout the NG3-D survey area, with areas of both dense vegetation and areas of sparse vegetation, survey activities could potentially be viewed by park visitors. However, due to the mosaic of dense and open habitats, vast expanses are uncommon and most visual expanses will be anticipated to be less than a mile. As stated in the MMP prepared as part of the management plan for the original Preserve, the dense vegetation in certain areas helps to hide much of oil and gas operations when viewed from the ground level. The survey’s proposed staging areas are not expected to be visible from I-75; however, the presence of vehicles and workers may be noticeable as they enter recreational parking areas, traverse locked fencing, and travel access pathways to staging areas off of I-75.







Some staging area access activities may be observed by MM-63 rest area visitors during the 18 week survey period as vehicles enter and leave the two staging areas from the I-75 MM-63 rest area ingress and egress ramps to MM-63N and MM-63S. These same activities may be observed to a much lesser extent at the MM-70N and MM-70S recreational parking areas where no rest facilities are available. Helicopter operations will occur in the vicinity of the field staging area between 0630 and 1730. Depending on the phase of survey operations, hunters and hikers may observe the Vibroseis Buggy and airborne helicopter operations in the field and possibly feel vibroseis acoustic signal generation when for the short period of time field operations are in close proximity to the rest areas.

The survey will utilize where practicable existing roads, trails, and other existing or previously disturbed areas but using these areas could temporarily disrupt recreational uses of roads and trails by hikers, ORV users, and hunters. Also, a visitor to the backcountry could encounter some operational elements in natural settings, and view minor and temporary disruption of surface vegetation and/or soils.

However, BOCI will work collaboratively with the USDOJ-NPS and other agencies to educate visitors of the seismic survey during operations to prevent, or limit, potential negative experiences caused by the survey operations. Nevertheless, almost all operations will occur away from Preserve visitors. With the exception of travelers along I-75, and occasional hikers, ORV users, and hunters along trails, no plan operations will occur near areas frequented by Preserve visitors.

NG3-D seismic survey activities will be conducted quickly using the vibroseis buggies and with minimal vegetation clearing and/or soil disruption. Therefore, potential adverse impacts to the visual quality and visitor use/perception of the Preserve lands will be minor and temporary (one day only, except at staging areas).

## **10.10 Additional Background Information on Environmental Effects**

Section 9.36(a)(16) of Title 36 CFR requires the Applicant to provide background information on the anticipated environmental effects of the POP. This information has been provided above. To further assist the USDOJ-NPS, the Applicant submitted a draft Environmental Assessment to USDOJ-NPS in June 2014 pursuant to NEPA under separate cover. The Applicant identified seventeen different categories in the EA which were considered and discussed.

## **10.11 Anticipated Indirect Impacts/Potential Future Exploration and Production Activities**

USDOJ-NPS regulations at 36 CFR § 9.36(a)(16) require a description of the anticipated direct and indirect effects of the operations on the BCNP's natural, cultural, social, and economic environment. Council on Environmental Quality regulations under NEPA define "direct effects" as those "caused by the action and occur at the same time and place" (40 CFR § 1508.8(a)). "Indirect effects" are defined as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR § 1508.8(b)).



Direct effects anticipated from the POP are discussed above. Due to the minor and temporary nature of the NG3-D survey operations, effects caused by the POP will occur at the same time and place as the operations. The Applicant does not expect there to be effects caused by the POP which occur later in time or farther removed in distance than the time and place of the actual operations.

Indirect effects of this POP do not include potential future drilling operations, because such operations would not be caused by approval of this POP. This POP does not address the drilling of exploratory or production wells in the Preserve. If the NG3-D seismic survey does not identify potentially producing underground oil and gas structures in the Preserve, then no further operations may be taken in the Preserve following this survey. On the other hand, if the survey indicates that there are potentially producing oil and gas structures in the Preserve, then a separate POP which addresses the drilling of wells and/or related operations and facilities will be submitted. The USDO-I-NPS therefore will have a further review of such operations before they occur. Approval of this POP would not constitute an approval of operations and facilities related to the drilling of wells.

Potential future POP's depends on the outcome of the NG3-D seismic survey. One of three outcomes is expected:

- Outcome #1: The subsurface data acquired from the 3-D geophysical seismic survey may indicate that one or more potentially producing Sunniland (or other) structures are present in the NG3-D survey area;
- Outcome #2: The subsurface data acquired from the 3-D geophysical seismic survey may indicate that none of the anticipated subsurface structures or only a portion of a structure is present in the NG3-D survey area; or
- Outcome #3: The subsurface data acquired from the 3-D geophysical seismic survey may indicate that a potentially producing structure is not present in any portion of the NG3-D survey area.

The realization of any one of these scenarios may compel the Applicant to:

- Contemplate the pursuit of additional 3-D geophysical seismic evaluation; or,
- Contemplate the pursuit of exploratory drilling operations to confirm productivity; or,
- Contemplate the pursuit of both additional seismic assessment and exploratory drilling operations; or,
- Contemplate re-evaluation of the exploration operation and pursue exploration operations elsewhere.



Predicting an outcome to the planned 3-D seismic survey and subsequent activity at this point in time is an exercise in probability analysis that is highly influenced by a range of assumptions. The ultimate outcome, of course, will not be known until the 3-D seismic data is acquired, further plans submitted and approved and a well(s) drilled. However, the use of 3-D technology has improved exploration and development success in the energy industry. Based on the strength of the data and information from older seismic and wells drilled in the area, the Applicant believes that there is a good probability that at least one or more oil and gas producing prospects will be identified. Should an exploration prospect be identified from 3-D seismic, the following exploration and development activities may occur subject to separate POP review and subsequent approval:

- Drilling of an exploratory well;
- Drilling of development wells;
- Installation of production and transportation facilities; and
- Commencement of production operations.

Approval of a separate POP will be required before these potential activities can be undertaken. The Applicant is aware that approval of this plan does not guarantee or imply approval of subsequent plans. However, the Applicant does expect approval of activities to occur if such activities fully comply with and conform to the operational conditions set forth in the Preserve regulatory documents referenced in this POP.

## **10.12 Anticipated Cumulative Effects**

### **10.12.1 Overview**

*Cumulative impact is 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 non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).*

Oil and gas exploration activities are not expected to represent or produce new adverse influences or phenomena in either the NG3-D survey area specifically, or the Preserve generally. As noted above, anticipated NG3-D seismic survey generated impacts and stimuli are similar to ambient or existing conditions in some cases, and activities will be temporary. Based on the temporary nature of the survey, the proposed activity is not expected to result in new natural, cultural, or socioeconomic impacts discernible from those which commonly occur today.

Prior to the establishment and subsequent expansion of the Preserve, the area had been the subject of nearly 40 years of active (and congressionally recognized) oil and gas operations. The Applicant does not view planned 3-D seismic activities as potential



sources of new environmental influences or adverse effects, as there is nothing about 3-D seismic activities that is different in kind from the activities that have taken place (and continue to take place) within the Preserve. The brief duration of NG3-D seismic survey generated impacts will be minimal and temporary. No cumulative impacts or adverse effects on Preserve resource are anticipated to arise from survey operations.

#### **10.12.2 Cumulative Impacts Discussion**

The Applicant believes that based upon the modifications protocols that will be implemented, aspects of the proposed survey operations can be accurately characterized as “minimal” and in many cases *de minimis* may be a more fitting description. From a temporal perspective, 18± weeks of dry season field operations is a very brief period for potential impacts to occur. Many of the sources of potential NG3-D seismic survey generated impacts and resource stimuli will only occur for a fraction of the overall field operations period. At a given field location during the 18 week survey period, the survey activity will be noticeable for a period effectively ranging from minutes to hours.

Planned field operations will result in some temporary incremental impacts of the same type as those presently occurring in portions of the Preserve but none are expected to result in cumulative adverse effect or response. For example, temporary impacts to wildlife is limited to temporary avoidance behavior of wildlife. However, there is no reason to expect that the additional disturbance to wildlife described in this POP over a short period of time will result in cumulative effects to wildlife. The same can be said for potential vegetation/habitat impacts. Temporary impacts due to vibroseis travel, vegetation trimming, etc., are expected to recover naturally (or with limited reclamation efforts) and return to their natural condition within one to two years.

The AOI concept implemented by USDOJ-NPS in the BCNP GMP/EIS/MMP is essentially a surrogate cumulative impacts analysis. In the AOI concept, the USDOJ-NPS attempted to quantify the incremental impacts or influences resulting from the stimuli associated with all past, present and possible future levels of oil and gas activities and establish a limit of such activities acceptable within the Preserve. The conclusion was that an AOI equal to 10 percent of the BCNP land area is the maximum acceptable level of oil and gas influences in the Preserve at any one time. As discussed in Section 5.12 and more in depth in Exhibit 14, total AOI for the Preserve, including the planned NG3-D seismic survey AOI is estimated to peak at 5.1 percent, well below the maximum USDOJ-NPS determined acceptable 10 percent level. This peak AOI is expected to reduce to 2.7 percent following the conclusion of the survey.

For these reasons, the Applicant does not expect any unacceptable cumulative impacts to result from planned survey operations.



## **11.0 RELATIONSHIP TO BCNP PLANNING DOCUMENTS**

### **11.1 Overview**

Field operations will temporarily incorporate 53,079± acres of surface lands in the pre-expansion BCNP (75 percent) and 17,375± acres in the BCNP-A (25 percent) management units of the Preserve. Approximately 2 to 2½ square miles (1,600± acres) per day will be affected by vibroseis operations. Some additional levels of human presence (deployment and retrieval of geophones and recorders equipment ahead and behind vibroseis operations) will also occur from the proposed operations in other areas within the NG3-D survey area. This POP was developed pursuant to the policies, regulations and guidelines incorporated in the 36 CFR Subpart 9B regulations, BCNP MMP, and 2006 USDO-I-NPS Operator's Handbook. Applicable preserve planning documents are identified below and their relationship to this plan described as follows.

### **11.2 36 CFR Subpart 9B Regulations**

The Collier family conveyed large portions of the surface lands comprising the pre-expansion BCNP and the BCNP-A area to USDO-I-NPS in 1974 and 1996, respectively. As authorized by the corresponding legislation establishing the BCNP (88 Stat. 1255) (Public Law 93-440) and further agreed to in the Addition Lands Agreement, the Colliers retained its ownership interest in and right to pursue exploration and development of these oil and gas mineral interests.

Applicable regulations governing these oil and gas activities are embodied in the 36 CFR Subpart 9B regulations and BCNP MMP. Further guidelines suggested by USDO-I-NPS were published subsequently in the 2006 USDO-I-NPS Operator's Handbook. The NG3-D plan was developed in conformance with applicable provisions of each of these.

### **11.3 BCNP MMP**

The BCNP MMP is a BCNP-specific application of 36 CFR Subpart 9B regulations. It contains the five general oil and gas stipulations and 45 geophysical operational stipulations referenced throughout this plan. Actions taken to comply with each MMP stipulation, the 36 CFR Subpart 9B operating standards and the 2006 USDO-I-NPS Operator's Handbook required operating stipulations are set forth in Section 5.

### **11.4 2006 USDO-I-NPS Operator's Handbook**

This document provides detailed plan development and operational recommendations and guidelines and has proven useful in amplifying and interpreting specific provisions of the 36 CFR Subpart 9B regulations and the BCNP MMP. As noted, a comprehensive review of actions taken to comply with the required geophysical operating stipulations and recommended mitigation measures is included in Section 5.



## **11.5 USDOl-NPS Addition Lands General Management Plan and Proposed Wilderness Designation**

The *October 2011 Record of Decision for the Big Cypress National Preserve – Addition Final General Management Plan/Wilderness Study/Off-Road Vehicle Management Plan/Environmental Impact Statement*, and its proposed designation of wilderness in the BCNP-A, does not affect oil and gas operations. In the October 2010 Final GMP for the BCNP-A, the USDOl-NPS considered four alternative management plans, three of which proposed the designation of wilderness and one of which did not. The Final GMP stated that “[n]othing in this general management plan would affect the existing legal rights of mineral owners or change the approved exploration plans and practices of operators” (USDOl-NPS 2010). This was confirmed by the GMP’s environmental analysis, which assumed no differences in oil and gas activities even within the proposed wilderness areas: “None of the actions included in the GMP would result in changes to oil and gas exploration or the extraction of new resources from the Addition” (USDOl-NPS 2010). The Record of Decision approving the Preferred Alternative in the Final GMP, issued February 2011, confirmed that “[n]othing in the selected action will affect the existing legal rights of mineral owners or change the approved plans or practices of operators” (USDOl-NPS 2011a). Since the proposed designation of wilderness expressly excluded any restrictions on or changes to oil and gas operations, the final approved GMP does not affect USDOl-NPS approvals for those operations. Wilderness areas in the BCNP are displayed on Figure 11.1.

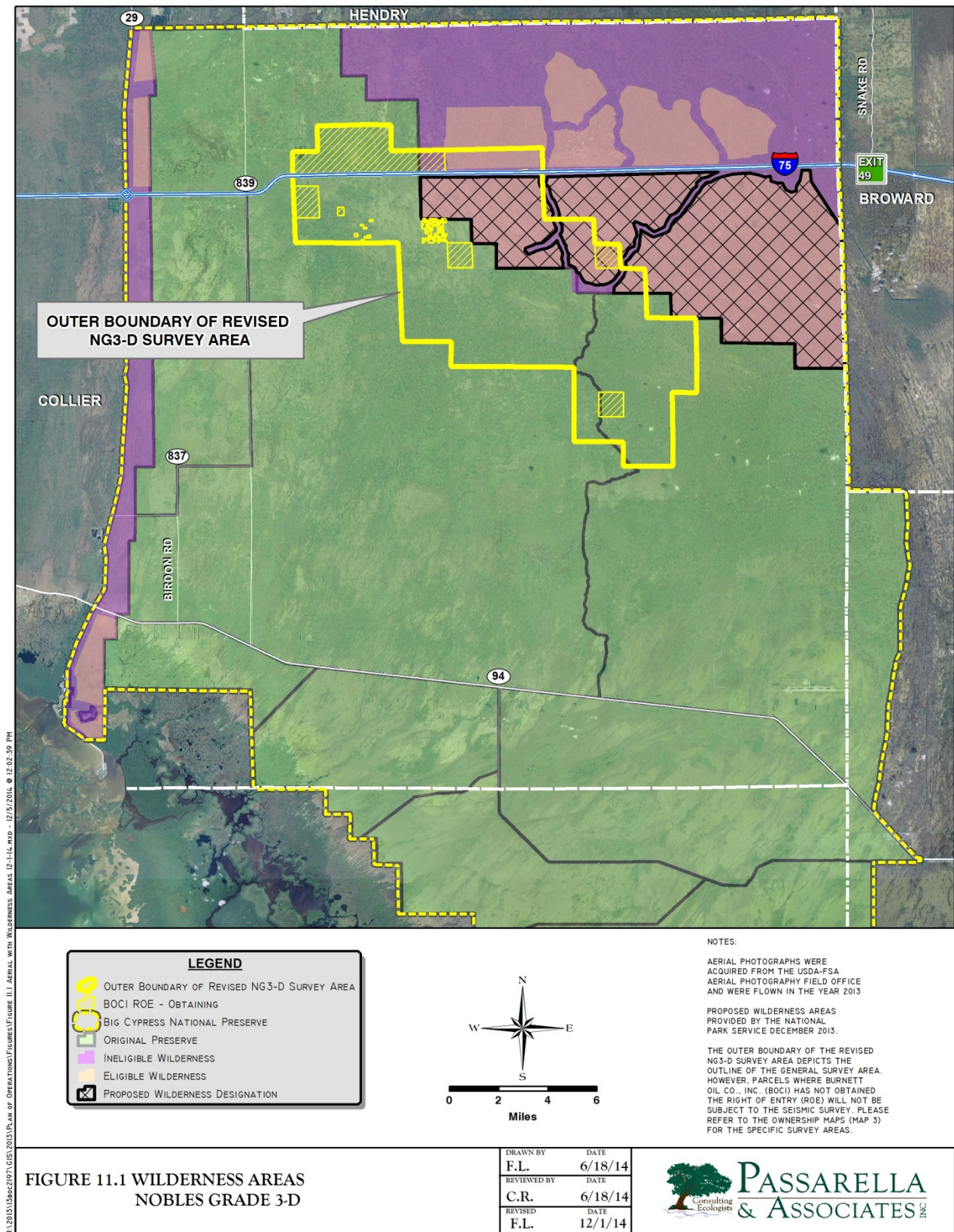
## **11.6 USDOl-NPS Directives, EOs and Procedural Manuals**

This POP proposes conducting the NG3-D Seismic Survey in the BCNP and BCNP-A areas. The activities proposed in this POP reflect activities planned to comport with the guidance and regulations provided in 36 CFR Subpart B, the 1922 BCNP-GMP and its MMP, and the 2006 USDOl-NPS Handbook for oil and gas operations conducted on private mineral interests beneath federally-owned surface lands. It is the Applicant’s understanding that the 1992 BCNP-GMP and its MMP comply with appropriate USDOl-NPS Directives, EOs and Procedural Manuals. With the information supplied within this POP including (i) an extensive analysis of the environmental setting, (ii) the Applicant’s plans to mitigate environmental effects of its proposed activity, and (iii) the submitted draft EA for USDOl-NPS review addressing the proposed activity, it is the Applicant’s position that the activities proposed in this POP are therefore also in compliance with such directives orders and manuals.

## **11.7 Wetland Statement of Findings**

EO 11990 provides that “each agency, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use” (42 Federal Register 26961 (May 24, 1977)). According to Director’s Order 77-1 (Wetland Protection), the purpose of EO 11990 was to avoid “impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support







of new construction in wetlands wherever there is a practicable alternative” (USDOI-NPS, Procedural Manual #77-1: Wetland Protection 1 (January 2012)).

The proposed POP will not trigger the EO or its requirement for a WSOF. The EO applies to “new construction located in wetlands,” not all activities which occur in wetlands. The POP proposes no new construction in wetlands: field operations require no construction or filling of wetlands, and equipment will be staged on existing open areas near I-75. The purpose of the EO is to avoid “destruction or modification of wetlands,” and the POP calls for no destruction or modification of wetlands. The EO also applies only to federal agencies “undertaking or providing assistance” to that new construction. Here, the POP will be undertaken by a private applicant (BOCI), rather than the USDOI-NPS. The USDOI-NPS also will be providing no financial assistance to BOCI. The oil and gas rights under the Preserve are privately owned, and the USDOI-NPS review of the POP is not a leasing process. The POP also involves activities which are procedurally exempt pursuant to USDOI-NPS Procedural Manual #77-1, including “use ... of unimproved backcountry stream crossings,” and “installation of scientific measuring devices.” For these reasons, EO 11990 is inapplicable and no WSOF is required for the Project.

Even if the EO applied to the POP, the POP would meet the criteria in the EO. EO 11990 calls for avoiding new construction unless “there is no practicable alternative to such construction,” and the “proposed action includes all practicable measures to minimize harm to wetlands.” The POP was designed specifically avoid new construction in wetlands in the BCNP: there is no filling or construction of anything in Preserve, which distinguishes this POP from previous POPs in the BCNP which involved some filling of wetlands. The POP also proposes to use vibroseis equipment, which avoids the need to excavate holes for use with underground explosive charges, and incorporates within the plan a series of environmentally-protective stipulations developed by the USDOI-NPS in the GMP. BOCI cannot avoid using its equipment in wetlands located in BCNP, because those wetlands are located directly above the private oil and gas interests which BOCI has a right to explore. However, BOCI has structured its POP to avoid any new construction or destruction or modification of those wetlands, and to minimize wetland impacts, thereby meeting the intent of the EO.

The POP and associated EA also meet the content requirements of USDOI-NPS Procedural Manual #77-1. Specifically, between the POP and the EA the following information has been provided: 1) a map showing the location of the proposed activities in relation to various wetland cover types; 2) a detailed descriptions of those wetland types; 3) a full disclosure of likely impacts of the proposed activities on those wetland types; 4) a description of alternatives to the POP; 5) an explanation of how none of the alternatives have fewer impacts to wetlands than the proposed action has fewer impacts; and 6) and a description of how the proposed action was designed to minimize wetland impacts. Since there will be no destruction of wetlands, there is no need to identify compensation for lost wetlands.



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[http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q1VG\\_P01.pdf](http://ecos.fws.gov/docs/candidate/assessments/2013/r4/Q1VG_P01.pdf). Accessed on January 16, 2014.
- U.S. Geological Survey. nd. South Florida Information Access (SOFIA)  
<http://sofia.usgs.gov/>

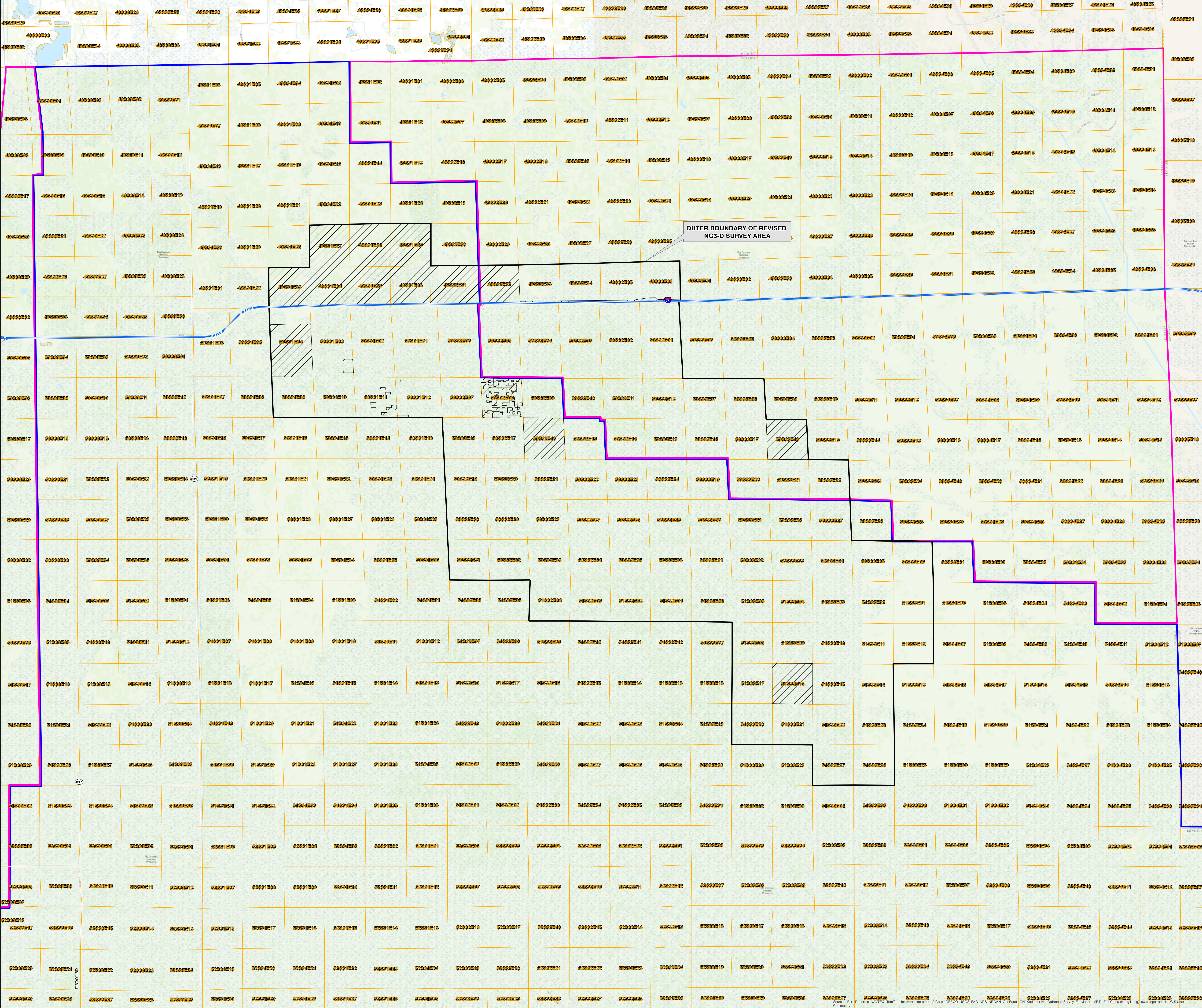


**MAP 1**

**COMPOSITE TOPOGRAPHIC MAP  
(USGS 7.5 MINUTE)**



J:\2015\13622197\GIS\2015\PLAN OF OPERATIONS\Figures\Map 1 Composite Topo Map 12-1-14.mxd - 12/1/2014 @ 9:58:02 AM



**LEGEND**

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- BOCI ROE - OBTAINING
- BIG CYPRESS NATIONAL PRESERVE
- BIG CYPRESS NATIONAL PRESERVE - ADDITION

N  
W E  
S

1 inch = 4,000 feet

NOTES

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

TOPOGRAPHIC QUADRANGLES WERE ACQUIRED FROM ESRI. COPYRIGHT © 2011 NATIONAL GEOGRAPHIC SOCIETY. 1-0809

THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

REVISIONS		DATE		DRAWN BY		DATE		13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069		 PASSARELLA & ASSOCIATES INC.		NOBLES GRADE 3-D  COMPOSITE TOPOGRAPHIC MAP (USGS 7.5 MINUTE)		DRAWING No.	
				F.L.		12/10/13								13BOC2197	
				DESIGNED BY		DATE								SHEET No.	
				REVIEWED BY		DATE								MAP 1	
				K.C.P.		12/10/13									



**MAP 2**

**AERIAL WITH MODIFIED SOURCE AND RECEIVED LINES  
(MAPS 2A-E)**





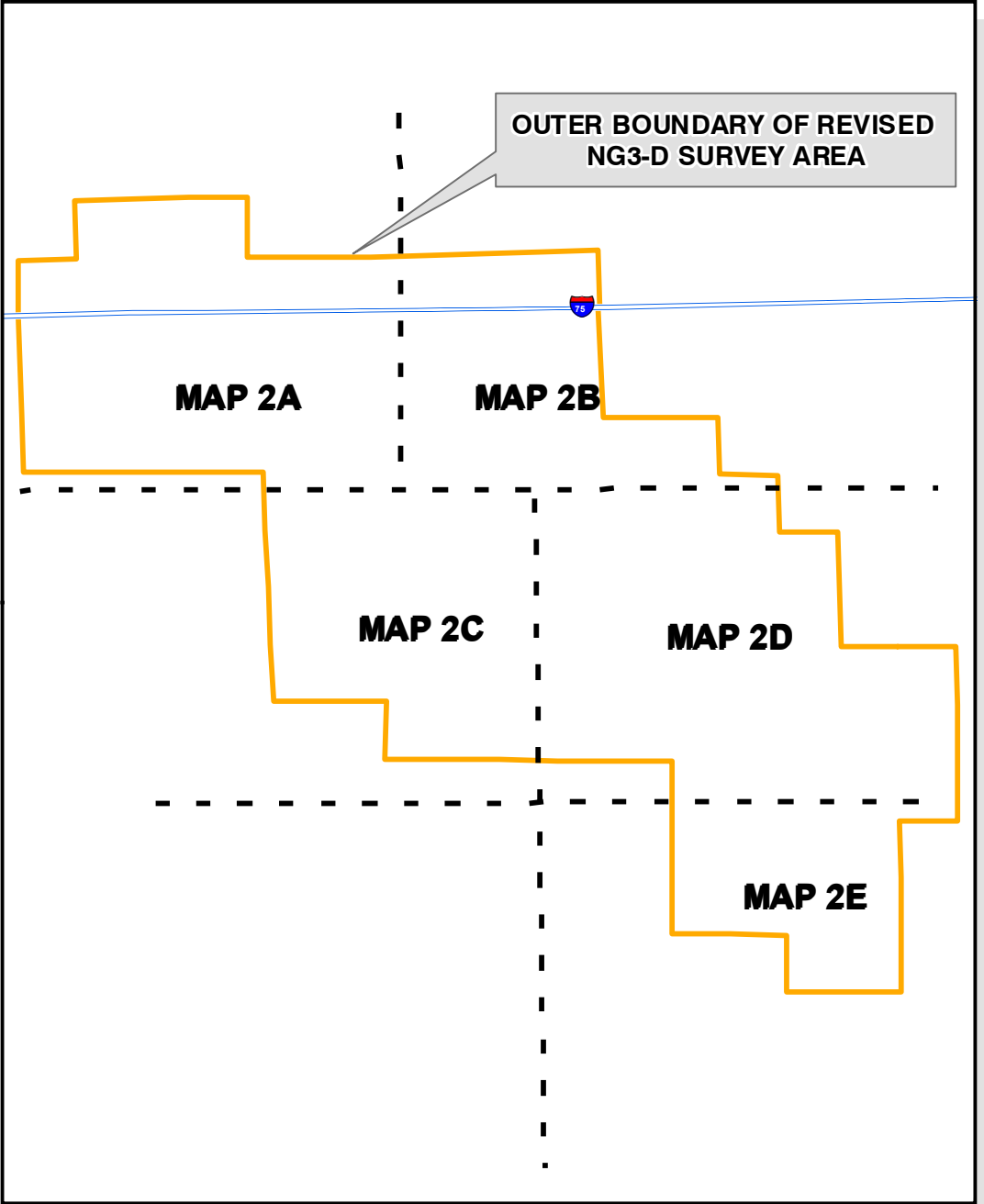
LEGEND

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

BOCI ROE - OBTAINING

RECEIVER POINTS

SOURCE POINTS



N

E

S

W

1 inch = 900 feet

NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

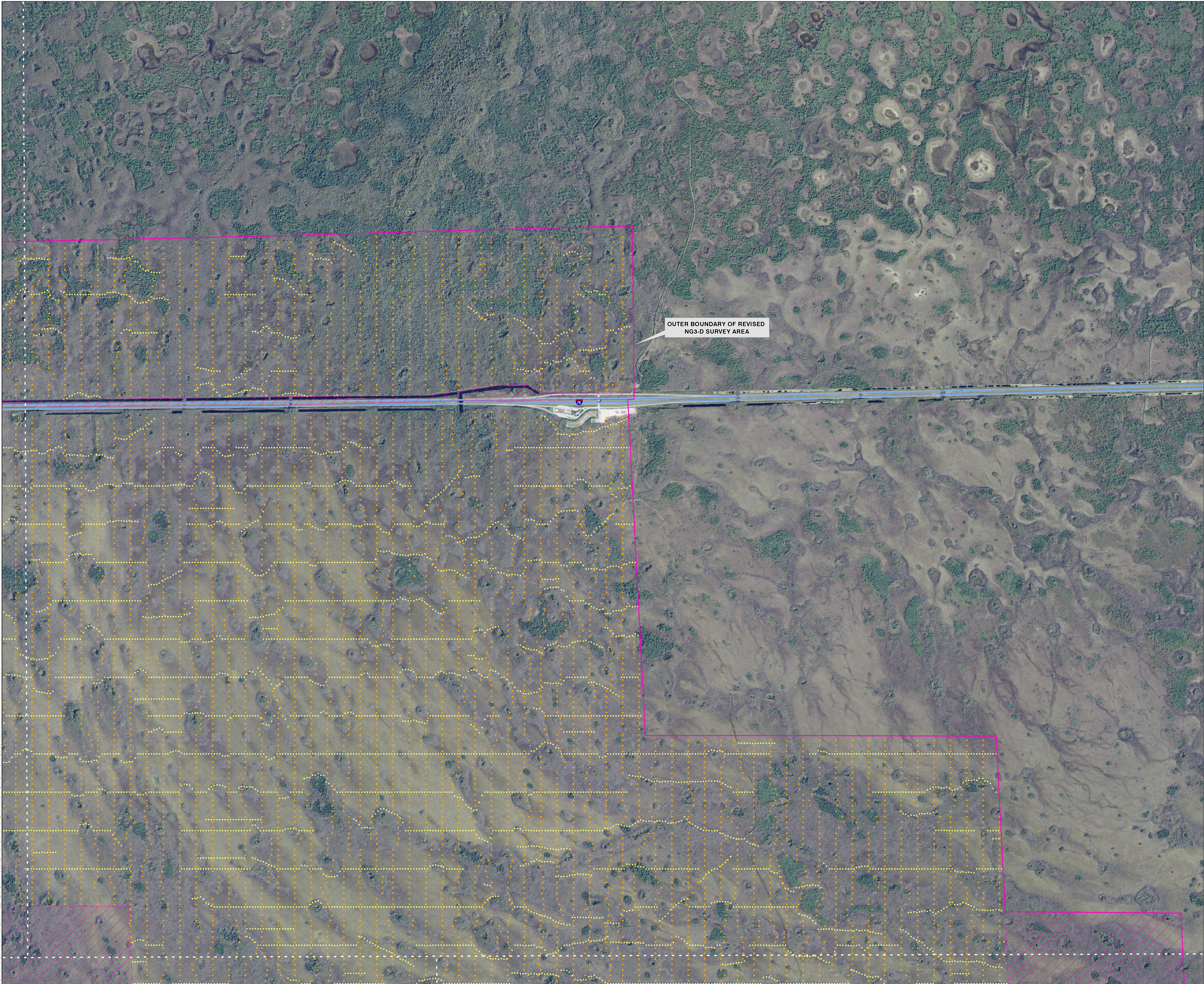
THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

REVISIONS		DATE	DRAWN BY	DATE	13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069	<div><div><div></div></div><div>Consulting Ecologists</div></div> <div>PASSARELLA &amp; ASSOCIATES INC</div>	NOBLES GRADE 3-D AERIAL WITH SOURCE AND RECEIVER POINTS		DRAWING No.
Revised Per New Source and Receiver Points		8/20/14	F.L.	12/10/13					13BOC2197
			DESIGNED BY K.C.P.	12/10/13					SHEET No.
			REVIEWED BY K.C.P.	12/10/13					MAP 2A

J:\2013\13620\2197\GIS\2013\PLAN OF OPERATIONS\FIGURES\MAP 2A AERIAL WITH SOURCE AND REC POINTS 12-10-14.mxd - 12/10/2014 @ 10:08:31 AM





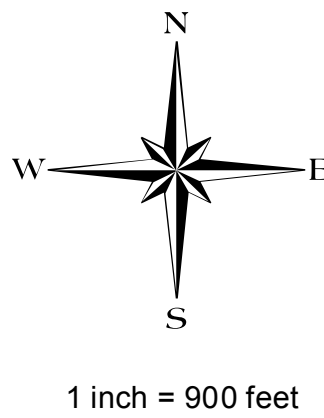
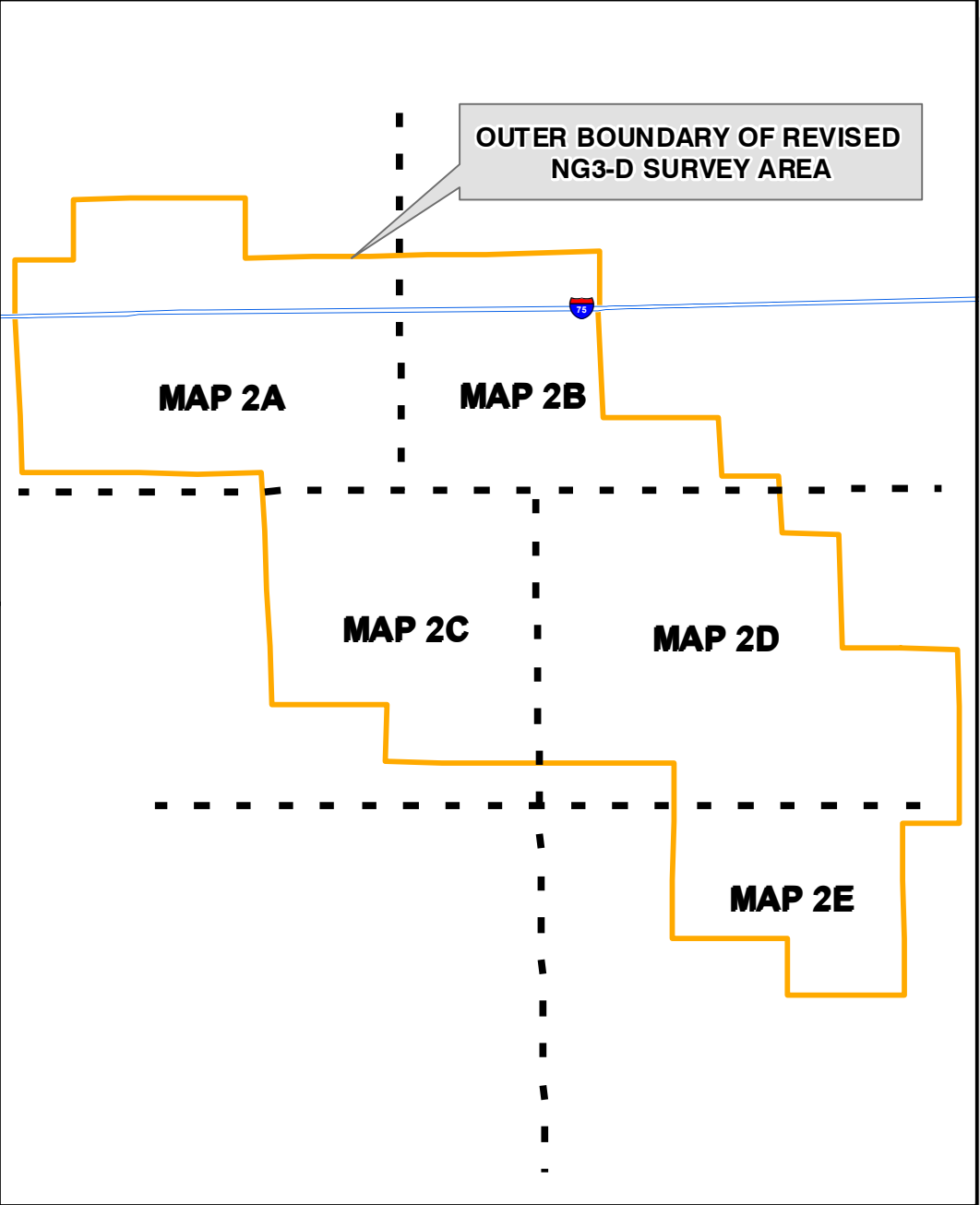
LEGEND

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

BOCI ROE - OBTAINING

RECEIVER POINTS

SOURCE POINTS



NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

REVISIONS		DATE	DRAWN BY	DATE	13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069	<div>PASSARELLA &amp; ASSOCIATES INC</div>	NOBLES GRADE 3-D  AERIAL WITH SOURCE AND RECEIVER POINTS	DRAWING No.
Revised Per New Source and Receiver Points		8/20/14	F.L.	12/10/13				13BOC2197
			DESIGNED BY K.C.P.	DATE 12/10/13				SHEET No.
			REVIEWED BY K.C.P.	DATE 12/10/13				MAP 2B

J:\2013\13620\2197\GIS\2013\PLAN OF OPERATIONS\FIGURES\Map 2B AERIAL WITH SOURCE AND REC POINTS 12-1-14.mxd - 12/1/2014 @ 10:26:56 AM





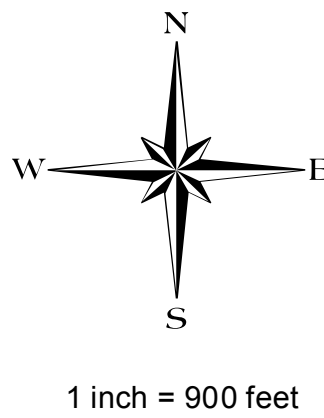
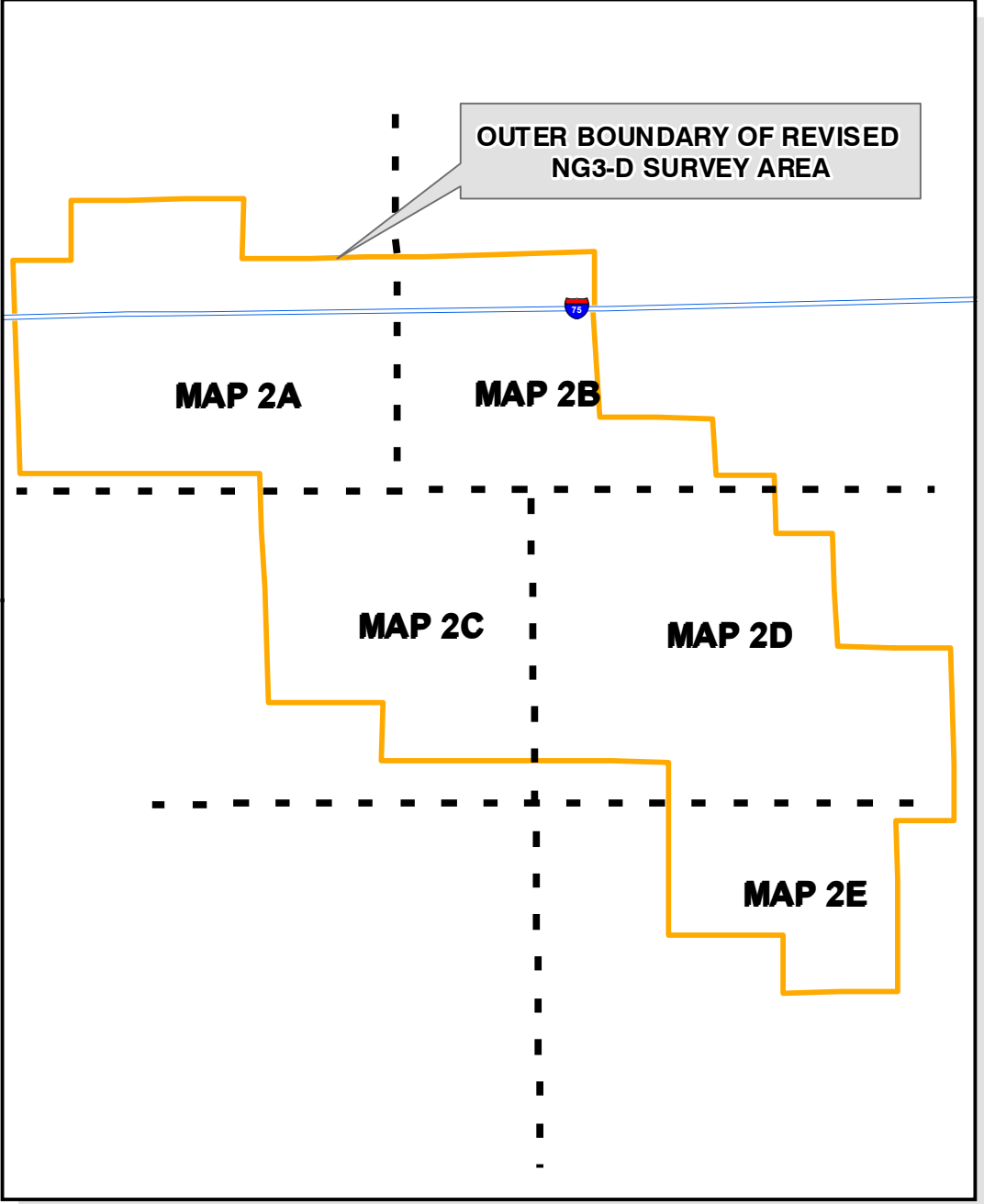
LEGEND

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

BOCI ROE - OBTAINING

RECEIVER POINTS

SOURCE POINTS



NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

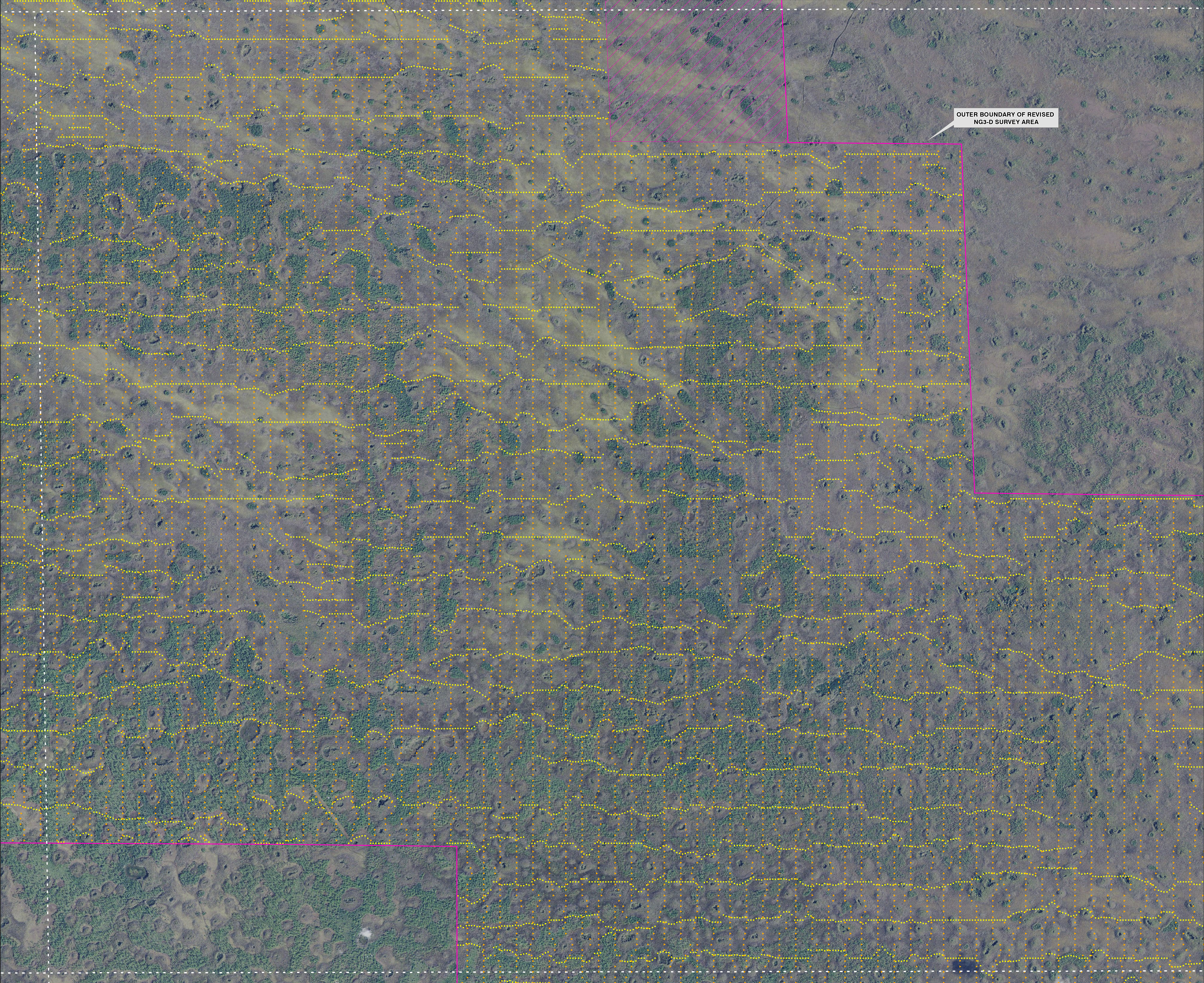
OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

REVISIONS		DATE	DRAWN BY	DATE	13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069	 <b>PASSARELLA &amp; ASSOCIATES</b> INC <small>Consulting Ecologists</small>	DRAWING No. 13BOC2197		
Revised Per New Source and Receiver Points		8/20/14	DESIGNED BY	DATE					
			K.C.P.	12/10/13					
			REVIEWED BY	DATE					
			K.C.P.	12/10/13	NOBLES GRADE 3-D		SHEET No.		
					AERIAL WITH SOURCE AND RECEIVER POINTS		MAP 2C		





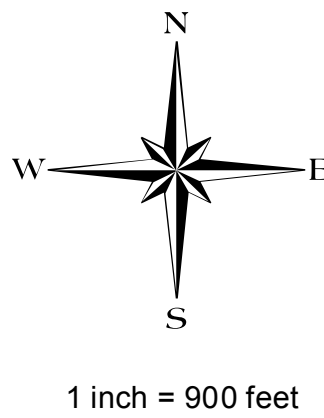
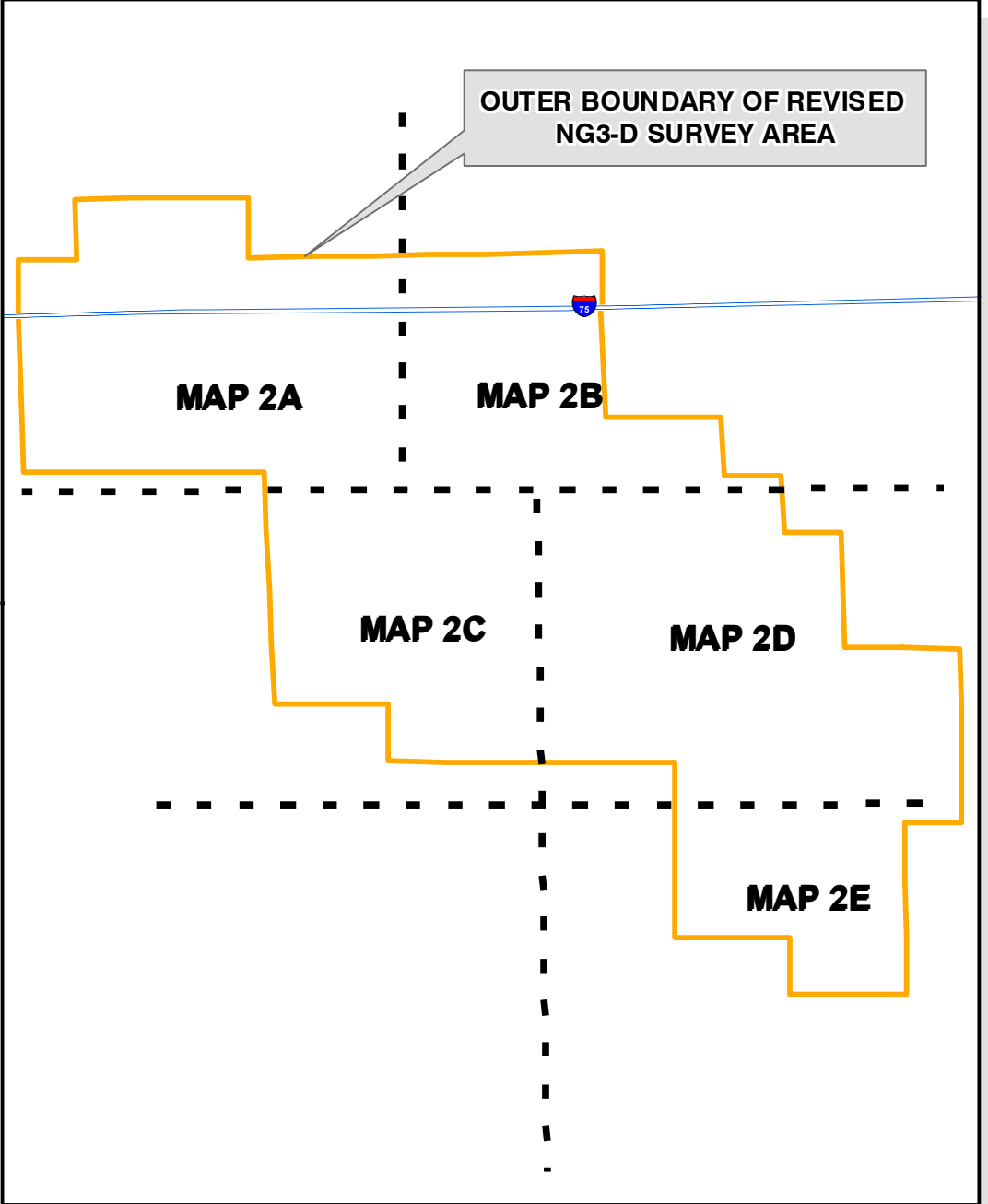
LEGEND

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

BOCI ROE - OBTAINING

RECEIVER POINTS

SOURCE POINTS



NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

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REVISIONS	DATE	DRAWN BY	DATE	13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069	 <b>PASSARELLA &amp; ASSOCIATES</b> INC	DRAWING No.	
Revised Per New Source and Receiver Points	8/20/14	F.L.	12/10/13			13BOC2197	
		DESIGNED BY	DATE			SHEET No.	
		K.C.P.	12/10/13			MAP 2D	
		REVIEWED BY	DATE				
		K.C.P.	12/10/13				

NOBLES GRADE 3-D
AERIAL WITH SOURCE AND RECEIVER POINTS





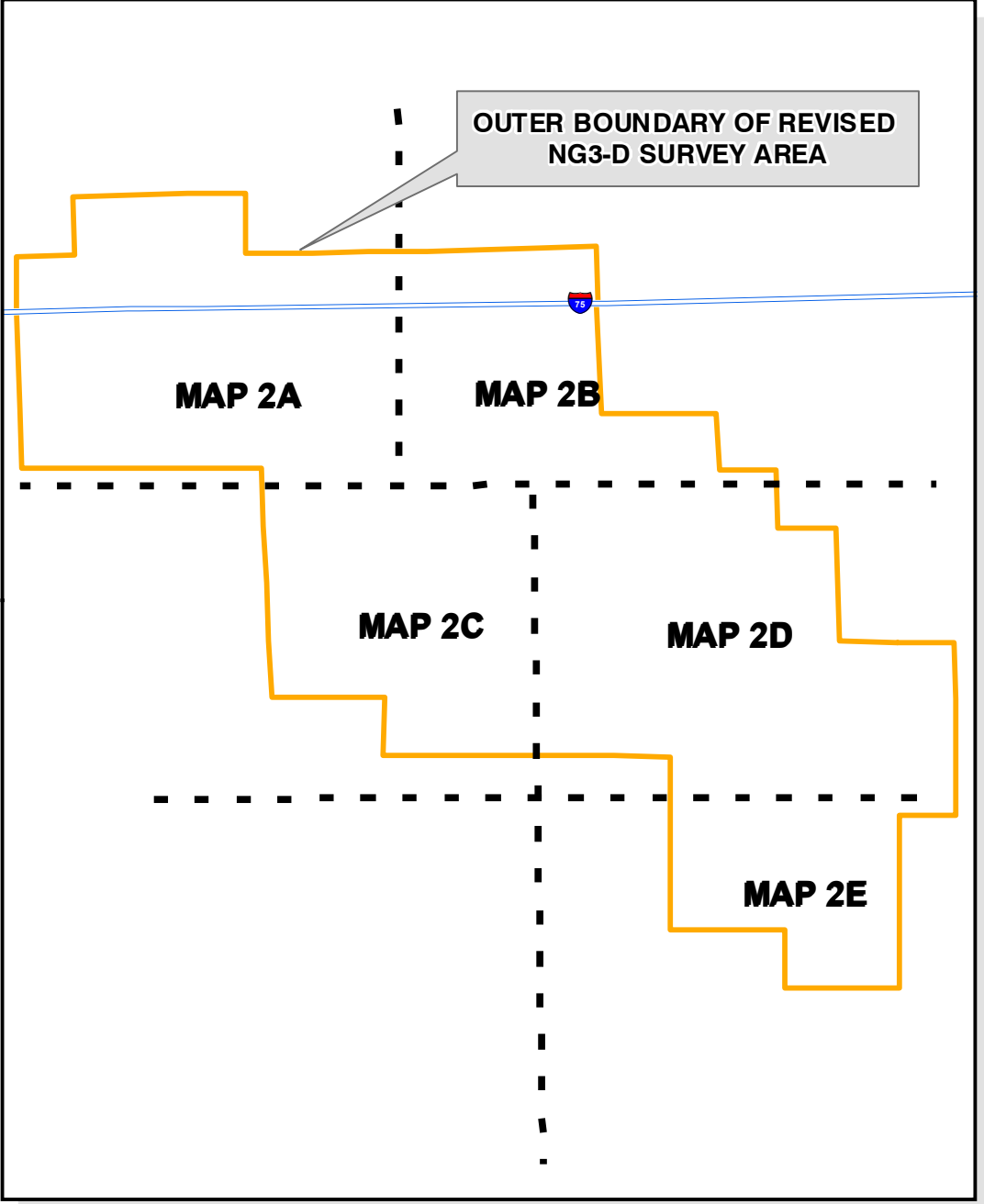
LEGEND

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

BOCI ROE - OBTAINING

RECEIVER POINTS

SOURCE POINTS



N

W

E

S

1 inch = 900 feet

NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

REVISIONS	DATE	DRAWN BY	DATE	13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069		NOBLES GRADE 3-D  AERIAL WITH SOURCE AND RECEIVER POINTS		DRAWING No.
Revised Per New Source and Receiver Points	8/20/14	F.L.	12/10/13					13BOC2197
		DESIGNED BY	DATE					SHEET No.
		K.C.P.	12/10/13					
			REVIEWED BY	DATE				
		K.C.P.	12/10/13					

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**MAP 3**

**SURFACE AND MINERAL OWNERSHIP  
(MAPS 3A & B)**

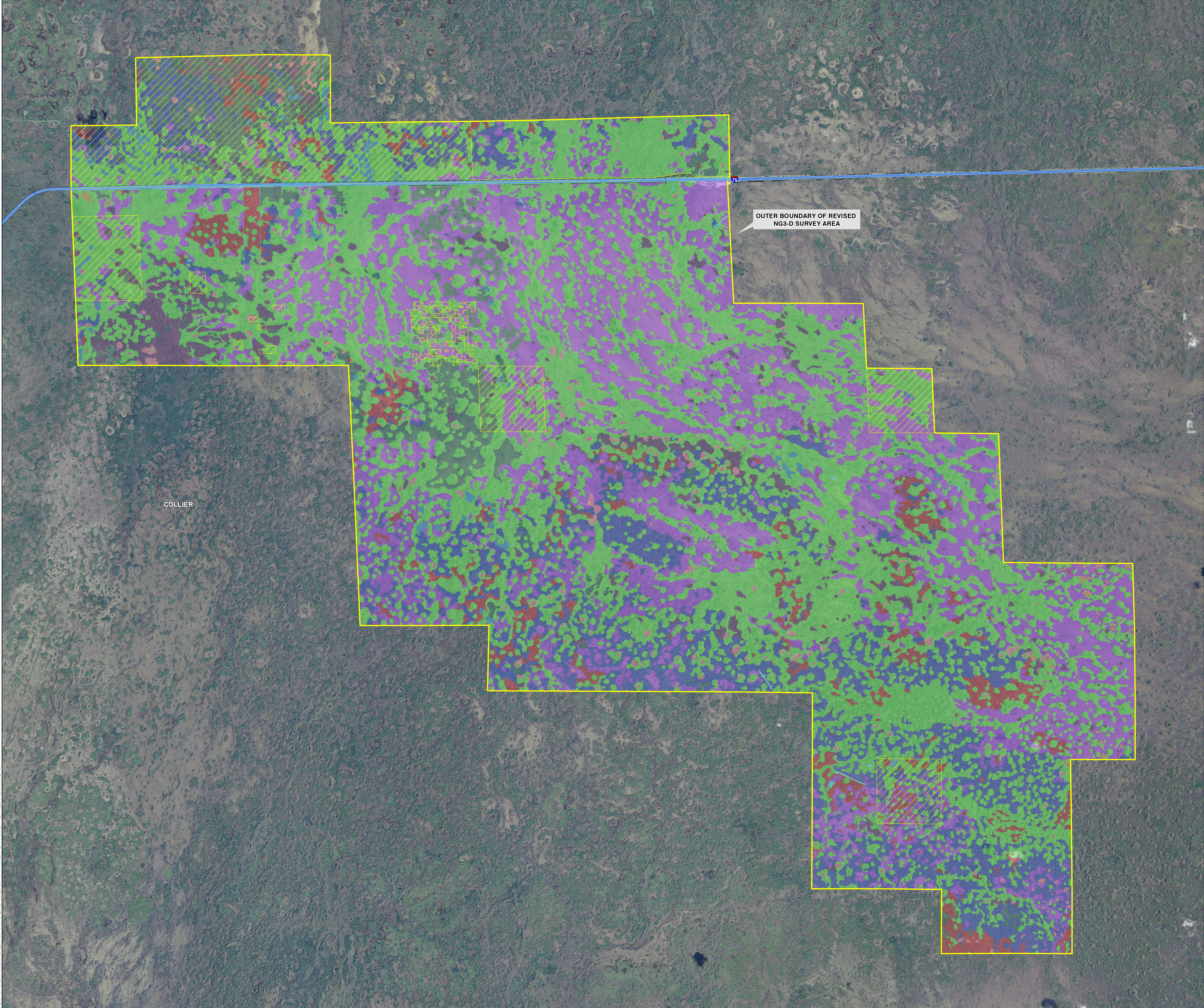
*Confidential Business Information / Trade Secrets / Exempt from Disclosure Under FOIA*



## **MAP 4**

### **USDOI-NPS LAND COVER DATA**





LEGEND

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

BOCI ROE - OBTAINING

CYPRESS FOREST

DISTURBED

HYDRIC HAMMOCK

HYDRIC PINE FLATWOOD

MARSH

MESIC HAMMOCK

MESIC PINE FLATWOODS

SCRUB CYPRESS

SWAMP FOREST

WATER

WET PRAIRIE

N

W

E

S

1 inch = 2,500 feet

VEGETATION DESCRIPTION	ACREAGE
Cypress Forest	32,211 Ac.±
Disturbed	379 Ac.±
Hydric Hammock	82 Ac.±
Hydric Pine Flatwood	2,936 Ac.±
Marsh	688 Ac.±
Mesic Hammock	2,889 Ac.±
Mesic Pine Flatwoods	8,415 Ac.±
Scrub Cypress	18,855 Ac.±
Swamp Forest	486 Ac.±
Water	124 Ac.±
Wet Prairie	3,389 Ac.±
<b>TOTAL</b>	<b>70,454 Ac.±</b>

NOTES

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

VEGETATION LAND COVER DATA PROVIDED BY THE NATIONAL PARK SERVICE NOVEMBER 2013.

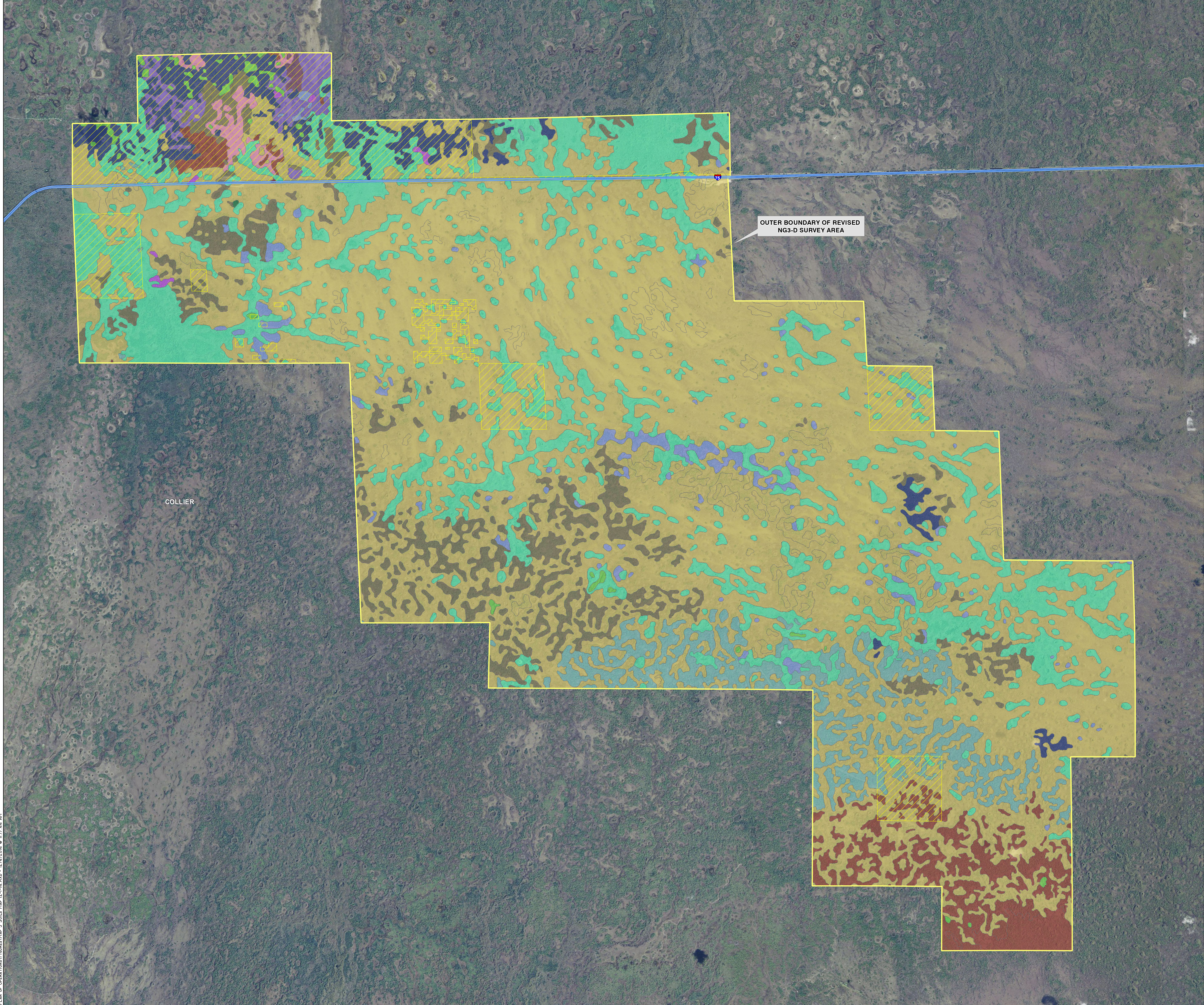
J:\2013\136622197\GIS\2013\PLAN OF OPERATIONS\FIGURES\MAP 4, NPS LAND COVER DATA - PHASE 1 12-1-14.mxd - 12/4/2014 @ 11:09:12 AM



**MAP 5**  
**SOILS MAP**



J:\2013\13662197\GIS\2013\PLAN OF OPERATIONS\FIGURES\MAP 5 SOILS MAP (2-1-14).MXD - 12/1/2014 @ 11:17:44 AM

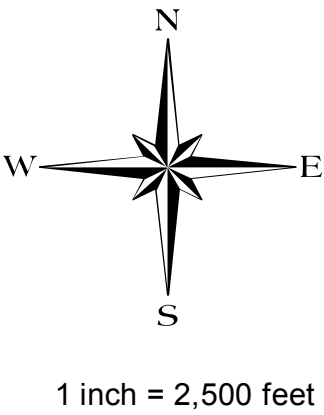


**LEGEND**

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA  
BOCI ROE - OBTAINING

**COLLIER SOILS**

- BROWARD OCHOPEE COMPLEX
- BROWARD FINE SAND - HEAVY SUBSTRATUM PHASE
- BROWARD FINE SAND - SHALLOW PHASE
- CHARLOTTE FINE SAND
- COPELAND FINE SAND - LOW PHASE
- COPELAND FINE SAND - SHALLOW PHASE
- CYPRESS SWAMP
- FELDA FINE SAND
- FRESH WATER MARSH
- OCHOPEE FINE SANDY MARL - SHALLOW PHASE
- OCHOPEE MARL - SHALLOW PHASE
- ROCKLAND
- TUCKER MARL



NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2015.

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

COLLIER SOILS MAPPING WAS ACQUIRED FROM THE U.S. GEOLOGICAL SURVEY WEBSITE NOVEMBER 2013 AND ISSUED BY THE SOIL CONSERVATION SERVICE IN MARCH 1954.

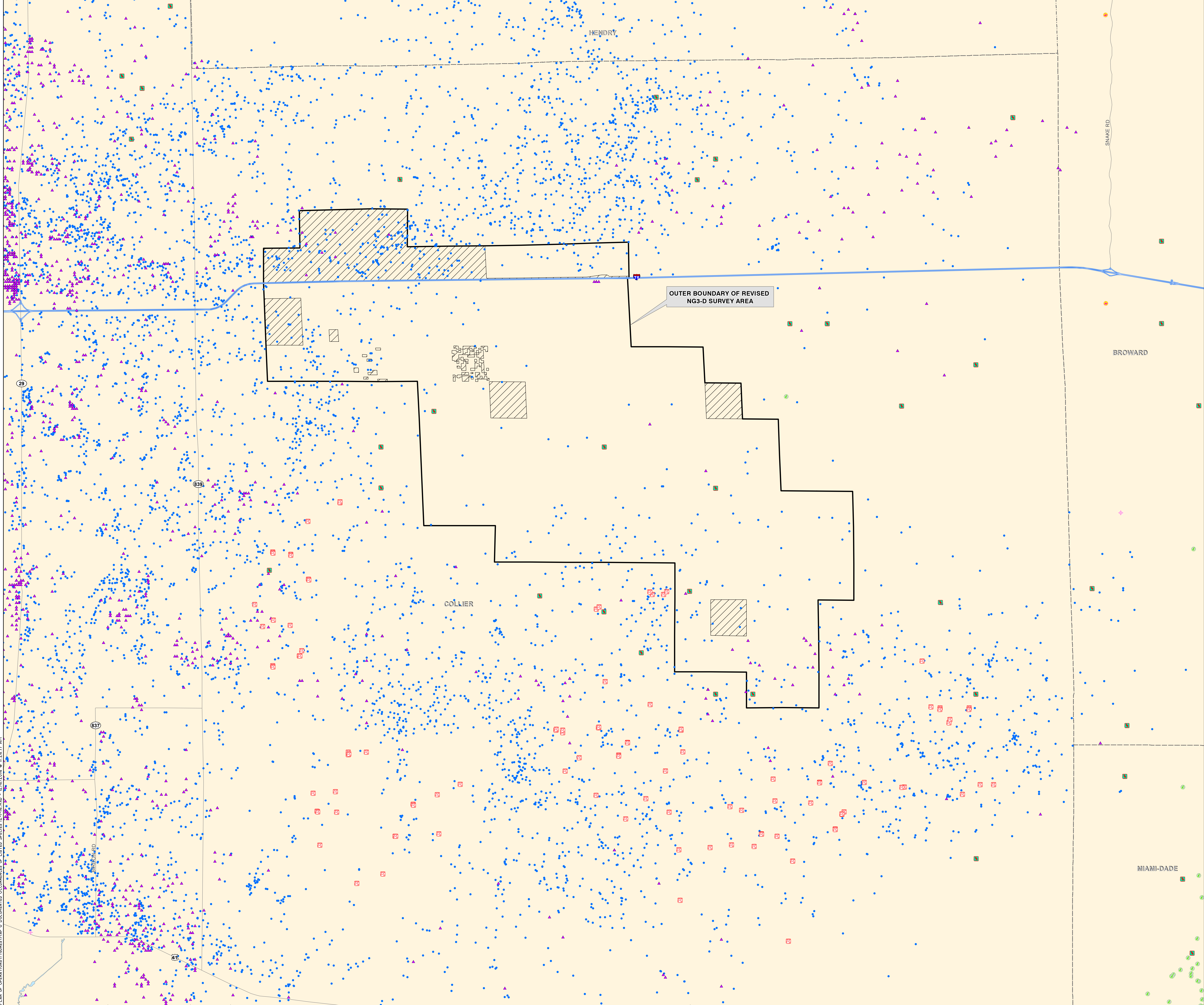
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		F.L.	12/10/13				13BOC2197
		DESIGNED BY	DATE				SHEET No.
		K.C.P.	12/10/13				MAP 5
		REVIEWED BY	DATE				
		K.C.P.	12/10/13				



**MAP 6**

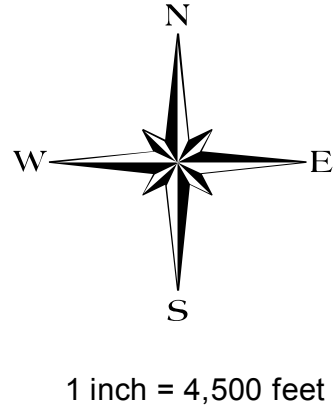
**DOCUMENTED OCCURENCES OF LISTED SPECIES**





**LEGEND**

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- BOCI ROE - OBTAINING
- FLORIDA PANTHER TELEMETRY
- BALD EAGLE NEST
- CRESTED CARACARA LOCATIONS
- SNAIL KITE NEST LOCATIONS
- RCW LOCATIONS
- WADING BIRD LOCATIONS
- BLACK BEAR LOCATIONS



NOTES:

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

BLACK BEAR LOCATIONS WERE ACQUIRED FROM THE FWCC AUGUST 2013 AND IS CURRENT TO 2007.

EAGLE NEST LOCATIONS WERE ACQUIRED FROM THE FWCC AUGUST 2013.

SNAIL KITE LOCATIONS WERE ACQUIRED FROM THE USFWS FTP SITE SEPTEMBER 2013.

RED COCKADED WOODPECKER LOCATIONS WERE ACQUIRED PER THE FWCC AUGUST 2013 AND CONFIRMED WITH THE NPS. HOWEVER, TWO LOCATIONS WERE REMOVED NEAR I-75 PER THE FWCC AND NPS.

WADING BIRD ROOKERIES WERE ACQUIRED FROM THE FWCC AND ARE CURRENT TO 1999.

PANTHER TELEMETRY WAS ACQUIRED FROM THE FLORIDA FISH AND WILDLIFE COMMISSION (FWCC) AUGUST 2013. DATA INCLUDES TELEMETRY COMPLIED FROM THE FWCC EVERGLADES NATIONAL PARK, AND BIG CYPRESS NATIONAL PRESERVE. TELEMETRY DATA SORTED FROM JUNE 2009 TO JUNE 2013.

THE OUTER BOUNDARY OF THE REVISED NG3-D SURVEY AREA DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCI) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY. PLEASE REFER TO THE OWNERSHIP MAPS (MAP 3) FOR THE SPECIFIC SURVEY AREAS.

J:\2013\13622197\GIS\2013\PLAN OF OPERATIONS\FIGURES\Map 6 DOCUMENTED OCCURRENCES OF LISTED SPECIES [2-1-14].mxd - 12/11/2014 @ 11:24:17 AM

REVISIONS		DATE	DRAWN BY	DATE	13620 Metropolis Avenue Suite 200 Fort Myers, Florida 33912 Phone (239) 274-0067 Fax (239) 274-0069		DRAWING No.				
			F.L.	12/10/13			13BOC2197				
			DESIGNED BY	DATE			SHEET No.				
			K.C.P.	12/10/13			MAP 6				
			REVIEWED BY	DATE	NOBLES GRADE 3-D DOCUMENTED OCCURRENCES OF LISTED SPECIES						
			K.C.P.	12/10/13							



**EXHIBIT 1**

**FLORIDA REGISTRATION TO DO BUSINESS  
(BURNETT OIL CO., INC. AND DAWSON GEOPHYSICAL COMPANY)**





FLORIDA DEPARTMENT OF STATE  
Division of Corporations

April 18, 2013

FLORIDA FILING & SEARCH SERVICES, INC

Qualification documents for BURNETT OIL CO., INC. were filed on April 17, 2013 and assigned document number F13000001668. Please refer to this number whenever corresponding with this office.

Your corporation is authorized to transact business in Florida as of the file date.

The certification you requested is enclosed.

To maintain "active" status with the Division of Corporations, an annual report must be filed yearly between January 1st and May 1st beginning in the year following the file date or effective date indicated above. If the annual report is not filed by May 1st, a \$400 late fee will be added.

A Federal Employer Identification Number (FEI/EIN) will be required when this report is filed. Contact the IRS at 1-800-829-4933 for an SS-4 form or go to [www.irs.gov](http://www.irs.gov).

Please notify this office if the corporate address changes.

Should you have any questions regarding this matter, please contact this office at (850) 245-6052.

Justin M Shivers  
Regulatory Specialist II  
New Filing Section  
Division of Corporations

Letter Number: 813A00009271

Account number: FCA000000015

Amount charged: 87.50



# State of Florida



Department of State

I certify from the records of this office that BURNETT OIL CO., INC., is a corporation organized under the laws of Texas, authorized to transact business in the State of Florida, qualified on April 17, 2013.

The document number of this corporation is F13000001668.

I further certify that said corporation has paid all fees due this office through December 31, 2013, and its status is active.

I further certify that said corporation has not filed a Certificate of Withdrawal.

Given under my hand and the  
Great Seal of the State of Florida  
at Tallahassee, the Capital, this the  
Eighteenth day of April, 2013



CR2EO22 (1-11)

*Ken Detzner*  
Ken Detzner  
Secretary of State



# State of Florida



Department of State

I certify the attached is a true and correct copy of the application by BURNETT OIL CO., INC., a Texas corporation, authorized to transact business within the State of Florida on April 17, 2013 as shown by the records of this office.

The document number of this corporation is F13000001668.

Given under my hand and the  
Great Seal of the State of Florida  
at Tallahassee, the Capital, this the  
Eighteenth day of April, 2013



CR2EO22 (1-11)

*Ken Detzner*  
Ken Detzner  
Secretary of State



APPLICATION BY FOREIGN CORPORATION FOR AUTHORIZATION TO TRANSACT  
BUSINESS IN FLORIDA

IN COMPLIANCE WITH SECTION 607.1503, FLORIDA STATUTES, THE FOLLOWING IS SUBMITTED TO  
REGISTER A FOREIGN CORPORATION TO TRANSACT BUSINESS IN THE STATE OF FLORIDA.

1. Burnett Oil Co., Inc.  
(Enter name of corporation; must include "INCORPORATED," "COMPANY," "CORPORATION,"  
"Inc.," "Co.," "Corp.," "Inc.," "Co.," or "Corp.")

(If name unavailable in Florida, enter alternate corporate name adopted for the purpose of transacting business in Florida)

2. Texas 3. \_\_\_\_\_  
(State or country under the law of which it is incorporated) (FEI number, if applicable)

4. March, 14, 1980 5. Perpetual  
(Date of incorporation) (Duration: Year corp. will cease to exist or "perpetual")

6. N/A  
(Date first transacted business in Florida, if prior to registration)  
(SEE SECTIONS 607.1501 & 607.1502, F.S., to determine penalty liability)

7. 801 Cherry Street - Unit 9, Fort Worth, TX 76102  
(Principal office address)

801 Cherry Street - Unit 9, Fort Worth, TX 76102  
(Current mailing address)

8. Oil & gas exploration and development and activities associated therewith.  
(Purpose(s) of corporation authorized in home state or country to be carried out in state of Florida)

9. Name and street address of Florida registered agent: (P.O. Box NOT acceptable)

Name: Capitol Corporate Services, Inc.

Office Address: 155 Office Plaza Dr Ste A

Tallahassee, Florida 32301  
(City) (Zip code)

10. Registered agent's acceptance:

*Having been named as registered agent and to accept service of process for the above stated corporation at the place designated in this application, I hereby accept the appointment as registered agent and agree to act in this capacity. I further agree to comply with the provisions of all statutes relative to the proper and complete performance of my duties, and I am familiar with and accept the obligations of my position as registered agent.*

Gayle Windle  
(Registered agent's signature)

Gayle Windle, Assistant Secretary on  
behalf of Capitol Corporate Services, Inc.

11. Attached is a certificate of existence duly authenticated, not more than 90 days prior to delivery of this application to the Department of State, by the Secretary of State or other official having custody of corporate records in the jurisdiction under the law of which it is incorporated.

TPG 0000003



12. Names and business addresses of officers and/or directors:

A. DIRECTORS

Chairman: Anne B. Windfohr

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

Vice Chairman: \_\_\_\_\_

Address: \_\_\_\_\_

Director: Julie Phillips

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

Director: John L. Marion

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

B. OFFICERS

President: William D. Pollard

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

Vice President: Windi Grimes

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

Secretary: Julie Phillips

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

Treasurer: Julie Phillips

Address: 801 Cherry Street - Unit 9, Fort Worth, TX 76102

NOTE: If necessary, you may attach an addendum to the application listing additional officers and/or directors.

13. [Signature]

Signature of Director or Officer

The officer or director signing this document (and who is listed in number 12 above) affirms that the facts stated herein are true and that he or she is aware that false information submitted in a document to the Department of State constitutes a third degree felony as provided for in s.817.155, F.S.

14. V. Neils Agather Ute CFO

(Typed or printed name and capacity of person signing application)

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12. ADDENDUM TO OFFICERS AND DIRECTORS

A. DIRECTORS

Executive Vice President: V. Neils Agather

Address: 801 Cherry Street, Unit 9, Fort Worth, TX 76102

Director: Anne B. Windfohr

Address: 801 Cherry Street, Unit 9, Fort Worth, TX 76102

B. OFFICERS

Chief Financial Officer: V. Neils Agather

Address: 801 Cherry Street, Unit 9, Fort Worth, TX 76102

43 APR 17 AM 8:10  
STATE  
PRIDA



Corporations Section  
P.O. Box 13697  
Austin, Texas 78711-3697



John Steen  
Secretary of State

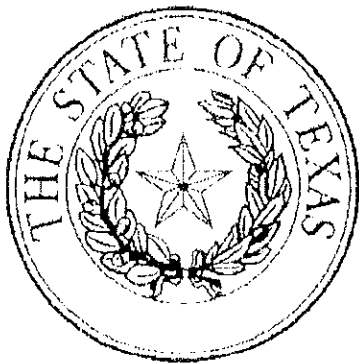
## Office of the Secretary of State

### Certificate of Fact

The undersigned, as Secretary of State of Texas, does hereby certify that the document, Articles of Incorporation for BURNETT OH CO., INC. (file number 51069600), a Domestic For-Profit Corporation, was filed in this office on March 14, 1980

It is further certified that the entity status in Texas is in existence.

In testimony whereof, I have hereunto signed my name officially and caused to be impressed hereon the Seal of State at my office in Austin, Texas on April 16, 2013.



A handwritten signature of John Steen in black ink.

John Steen  
Secretary of State

13 APR 17 PM 8:10  
OFFICE OF THE SECRETARY OF STATE  
AUSTIN, TEXAS









October 8, 2013

FLORIDA DEPARTMENT OF STATE  
Division of Corporations

DAWSON GEOPHYSICAL COMPANY  
508 WEST WALL ST, STE 800  
MIDLAND, TX 79701

Qualification documents for DAWSON GEOPHYSICAL COMPANY were filed on October 7, 2013 and assigned document number F13000004336. Please refer to this number whenever corresponding with this office.

Your corporation is now authorized to transact business in Florida.

This document was electronically received and filed under FAX audit number H13000222500.

To maintain "active" status with the Division of Corporations, an annual report must be filed yearly between January 1st and May 1st beginning in the year following the file date or effective date indicated above. If the annual report is not filed by May 1st, a \$400 late fee will be added.

A Federal Employer Identification Number (FEI/EIN) will be required when this report is filed. Contact the IRS at 1-800-829-4933 for an SS-4 form or go to [www.irs.gov](http://www.irs.gov). Please notify this office if the corporate address changes.

Should you have any questions regarding this matter, please contact this office at (850) 245-6052.

Valerie Herring  
Regulatory Specialist II  
New Filing Section  
Division of Corporations

Letter Number: 313A00023554



**APPLICATION BY FOREIGN CORPORATION FOR AUTHORIZATION TO TRANSACT  
BUSINESS IN FLORIDA**

*IN COMPLIANCE WITH SECTION 607.1503, FLORIDA STATUTES, THE FOLLOWING IS SUBMITTED TO  
REGISTER A FOREIGN CORPORATION TO TRANSACT BUSINESS IN THE STATE OF FLORIDA.*

**1. DAWSON GEOPHYSICAL COMPANY**

(Enter name of corporation; must include "INCORPORATED," "COMPANY," "CORPORATION,"  
"Inc.," "Co.," "Corp.," "Inc.," "Co.," or "Corp.")

(If name unavailable in Florida, enter alternate corporate name adopted for the purpose of transacting business in Florida)

**2. TEXAS**

(State or country under the law of which it is incorporated)

**3. 75-0970548**

(FEI number, if applicable)

**4. 11/4/1955**

(Date of incorporation)

**5. Perpetual**

(Duration: Year corp. will cease to exist or "perpetual")

**6.**

(Date first transacted business in Florida, if prior to registration)  
(SEE SECTIONS 607.1501 & 607.1502, F.S., to determine penalty liability)

**7. 508 WEST WALL ST, STE 800 MIDLAND TX 79701**

(Principal office address)

**508 WEST WALL ST, STE 800 MIDLAND TX 79701**

(Current mailing address)

**8. Seismic Data Acquisition Services**

(Purpose(s) of corporation authorized in home state or country to be carried out in state of Florida)

**9. Name and street address of Florida registered agent: (P.O. Box NOT acceptable)**

Name: **C T Corporation System**

Office Address: **1200 South Pine Island Road**

**Plantation**

(City)

**, Florida**

**33324**

(Zip code)

**10. Registered agent's acceptance:**

*Having been named as registered agent and to accept service of process for the above stated corporation at the place designated in this application, I hereby accept the appointment as registered agent and agree to act in this capacity. I further agree to comply with the provisions of all statutes relative to the proper and complete performance of my duties, and I am familiar with and accept the obligations of my position as registered agent.*

**C T Corporation System**

By: 

(Registered agent's signature)

**Michael E. Jones**  
Assistant Secretary

**11. Attached is a certificate of existence duly authenticated, not more than 90 days prior to delivery of this application to the Department of State, by the Secretary of State or other official having custody of corporate records in the jurisdiction under the law of which it is incorporated.**



12. Names and business addresses of officers and/or directors:

**A. DIRECTORS**

Chairman: STEPHEN JUMPER

Address: 508 WEST WALL, STE 800

MIDLAND TX 79701

Vice Chairman: \_\_\_\_\_

Address: \_\_\_\_\_

Director: JACK D LADD

Address: 508 WEST WALL, STE 800

MIDLAND TX 79701

Director: CRAIG W COOPER

Address: 508 WEST WALL, STE 800

MIDLAND TX 79701

**B. OFFICERS**

President: STEPHEN JUMPER

Address: 508 WEST WALL ST, STE 800

MIDLAND TX 79701

Vice President: C. RAY TOBIAS

Address: 508 WEST WALL ST, STE 800

MIDLAND TX 79701

Secretary: CHRISTINA W HAGAN

Address: 508 WEST WALL ST, STE 800 MIDLAND TX 79701

Treasurer: MELODY CROWL

Address: 508 WEST WALL ST, STE 800 MIDLAND TX 79701

NOTE: If necessary, you may attach an addendum to the application listing additional officers and/or directors.

13. \_\_\_\_\_

*Christina W Hagan* Exec VP/CFO  
Signature of Director or Officer

The officer or director signing this document (and who is listed in number 12 above) affirms that the facts stated herein are true and that he or she is aware that false information submitted in a document to the Department of State constitutes a third degree felony as provided for in s.817.155, F.S.

14. CHRISTINA W HAGAN (EXEC VP/CFO/SEC)

(Typed or printed name and capacity of person signing application)





## Office of the Secretary of State

### Certificate of Fact

The undersigned, as Secretary of State of Texas, does hereby certify that the document, Articles of Incorporation for DAWSON GEOPHYSICAL COMPANY (file number 12902300), a Domestic For-Profit Corporation, was filed in this office on November 04, 1955.

It is further certified that the entity status in Texas is in existence.

In testimony whereof, I have hereunto signed my name officially and caused to be impressed hereon the Seal of State at my office in Austin, Texas on October 07, 2013.



A handwritten signature in black ink, appearing to read "John Steen".

John Steen  
Secretary of State



## **EXHIBIT 2**

### **MEMORANDUM OF SEISMIC AND EXPLORATION AGREEMENT**

*Confidential Business Information / Trade Secrets / Exempt from Disclosure Under FOIA*



### **EXHIBIT 3**

## **REGULATION OF OIL & GAS ACTIVITIES**



## APPENDIX 6

### AGREEMENT GOVERNING THE EXERCISE OF RESERVED OIL AND GAS RIGHTS OF COLLIER ENTERPRISES AND BARRON COLLIER COMPANY

- A. INTRODUCTION
  - 1. Purpose
  - 2. Definitions
  - 3. Applicability
- B. OIL AND GAS EXPLORATION, DEVELOPMENT AND PRODUCTION
  - 1. Plan of Operations
  - 2. Review and Approval of a Plan of Operations
  - 3. Good Faith Negotiations
  - 4. Commencement of Operations
  - 5. Amendment of a Plan of Operations
  - 6. Administrative Suspension of a Plan of Operations
  - 7. Standards Governing the Conduct of Operations
  - 8. Access to the Area of Operations
- C. PERFORMANCE BOND
- D. DAMAGES AND PENALTIES
- E. TRANSFER OF INTERESTS
- F. PUBLIC INSPECTION OF DOCUMENTS
- G. WAIVER



A. INTRODUCTION

1. Purpose.

(a) Any operations in conjunction with the exploration for, development or production of the oil and gas interests owned or controlled by Collier Enterprises or Barron Collier Company (collectively referred to herein as "Collier") located beneath the surface of lands within the boundaries of the Big Cypress National Preserve Addition (which oil and gas interests are herein referred to as "Collier interests") shall be conducted in accordance with the procedures and standards of these stipulations, until such time as the Secretary may promulgate regulations governing such operations pursuant to the Big Cypress National Preserve Addition Act, Pub. L. 100-301, and such regulations are, by their terms, applicable to such operations, provided, that, operations in conjunction with the exploration for, development or production of oil and gas owned or controlled by Collier, which operations are subject, as of the date of execution of the Exchange Agreement, to the regulatory authority of the National Park Service with respect to the exercise of non-Federal oil and gas rights shall remain subject to such regulations as presently promulgated at 36 C.F.R. Part 9B or as subsequently amended from time to time.



(b) These stipulations are intended to ensure that operations in conjunction with the exploration for, development or production of Collier interests are conducted in a manner consistent with the purposes for which the unit was created, to prevent or minimize damage to the environment and other resources of the unit, and to ensure to the extent feasible that the unit is left unimpaired for the enjoyment of future generations.

(c) Except as provided in subparagraph (a) or the Big Cypress National Preserve Addition Act, these stipulations are binding upon the United States and upon Collier, its heirs, successors and assigns. Obligations of Collier to the United States pursuant to such stipulations shall be enforced by the United States in lieu of the exercise of authority to regulate the conduct of exploration for, development or production of Collier interests that might have otherwise been exercised by the National Park Service for the purposes described in paragraph (b) of this section A.1, and shall remain effective until such time as the Secretary may promulgate regulations as described in paragraph (a). The application of these stipulations to the conduct of operations is intended to accomplish such purposes, and further to provide for reasonable use and enjoyment of privately owned oil and gas interests to the same extent that such purposes may otherwise lawfully be accomplished without the taking of a compensable interest in



property under the Constitution of the United States through the exercise of regulatory authority by the National Park Service. Accordingly, a taking of Collier interests under these stipulations shall occur only upon the enforcement of any provision of these stipulations in a manner that would result in a limitation on the use of Collier interests greater than that which would lawfully be permitted if the United States were exercising regulatory authority as described in this paragraph, provided, however, that the United States may, as an alternative to invalidation of the application of such provision or provisions to a plan of operations, acquire the interests in lands reserved by Collier, if the Secretary, in his judgment, determines that such interests are subject to, or threatened with, uses which are, or would be detrimental to the purposes for which the unit was established, consistent with the requirements of section 1 of the Act of October 11, 1974, establishing the Big Cypress National Preserve, 16 U.S.C. § 698f.

2. Definitions.

The following definitions are applicable to these stipulations:

(a) "Approved Plan of Operations" means a plan of operations which has been reviewed and found to meet the requirements for approval of a plan of operations under section B.7 and other provisions of these stipulations.



(b) "Area of operations" means that area required for surface use for the conduct of operations under a plan of operations, including roads used to gain access to the areas of operations.

(c) "Big Cypress National Preserve Addition" or "Addition" means the surface of lands that comprise the Big Cypress National Preserve Addition as designated pursuant to the Act of October 11, 1974, 16 U.S.C. § 698f, et seq., as amended.

(d) "Collier interests" means the oil and gas owned or controlled by Collier located beneath the surface of lands within the boundaries of the Big Cypress National Preserve Addition.

(e) "Cultural resources" means any property, district, site, building or structure, included on or eligible for inclusion on the National Register of Historic Places or National Registry of Historic Landmarks or any object of scientific, archeological, cultural, historical or paleontological significance.

(f) "Department" means the Department of the Interior and any of its component agencies and offices.

(g) "Development and production" means any drilling of an oil or gas well to desired depth to develop or produce existing hydrocarbons. It includes testing, completion activities, production activities and facilities, and



development of related support, transport and processing facilities.

(h) "Exploration" or "exploration activities" means geological or geophysical exploration activities or both, exploratory drilling, and all related activities and logistics associated with either or both.

(i) "Exploratory drilling" means any drilling operation to test for the actual existence of oil and gas. It includes core drilling for subsurface geologic information, the drilling of any well to a depth sufficient to measure the geologic, geophysical and engineering parameters used for determining an area's oil and gas potential and the development of related support facilities, access roads and site preparation for drilling operations.

(j) "Gas" means any fluid, either combustible or noncombustible, which is produced in a natural state from the earth and which maintains a gaseous or rarefied state at normal temperature and atmospheric pressure conditions.

(k) "Geologic or geophysical exploration activities" means any surface exploration activity relating to the search for evidence of oil and gas that requires physical presence within the boundaries of a unit. It includes drilling operations necessary for placing explosive charges, seismic exploration, magnetic anomaly detection, or surface geologic sampling, and all related activities and logistics associated with either or both.



(l) "Harass" means to pursue, hunt, take, capture, molest, collect, harm, shoot or kill wildlife or attempt to engage in any of the preceding by either an intentional or negligent act or omission.

(m) "Hazardous or contaminating substances" means those substances, including, but not limited to salt water (formation waters) or any other injurious or toxic material, sediment mud with injurious toxic additives, chemical effluent, explosives or other toxic materials or substances produced or used in the conduct of operations, transportation, or on-site storage of oil and gas.

(n) "Important Resource Areas" means discrete areas of lands or waters where sensitive natural or cultural resources are known to exist. Examples of such areas include: Cypress stands, mixed hardwood swamps, sloughs, freshwater marshes, old growth pinelands, mangrove forests, hardwood hammocks, red-cockaded woodpecker colonies, Cape Sable sparrow habitat, Bald Eagle nesting sites, known Florida Panther areas, Miccosukee Indian cultural sites and archeological sites.

(o) "Natural resources" means atmospheric, hydrologic, geologic, paleontologic, floral or faunal components of the indigenous ecology.

(p) "Oil" means any viscous combustible liquid hydrocarbon or solid hydrocarbon substance easily liquifiable on warming which occurs naturally in the earth, including drip



gasoline or other natural condensates recovered from gas, without resort to manufacturing process.

(q) "Operations" means all function, work and activities within a unit in connection with exploration for, development and production of Collier interests, including: access; prospecting; exploration; surveying; preproduction development and production; gathering, on-site storage, transport or processing of petroleum products; surveillance, inspection, monitoring, or maintenance of equipment; reclamation of the surface disturbed by such activities; and all activities and uses reasonably incident thereto performed within the boundaries of a unit, including construction of roads, pipelines or other means of access or transportation.

(r) "Operator" means Collier, its heirs, successors and assigns, or a person, designated in writing by Collier, who conducts or submits a plan of operations for the purpose of conducting exploration, development or production with respect to Collier interests under these stipulations or, where the context requires, the operator identified in a specific plan of operations.

(s) "Person" means any individual, firm, partnership, corporation, association, organization or agency.

(t) "Plan of operations" means a description of procedures, equipment and timing for conducting operations with respect to Collier interests under these stipulations.



(u) "Reclamation" means the restoration or rehabilitation of an area of operations so as to return the area of operations to natural conditions existing prior to implementation of the plan of operations unless other conditions are mutually agreed upon by the Regional Director, Collier and the operator.

(v) "Regional director" means the director of that Region of the National Park Service or his or her respective designees responsible for overseeing the administration of the Big Cypress National Preserve Addition.

(w) "Unit" means interests in lands within the established boundaries of the Big Cypress National Preserve Addition.

(x) "Unit manager" means the National Park Service Superintendent responsible for the administration of the Big Cypress National Preserve Addition.

(y) "Unit resources" means cultural or natural resources within the unit.

(z) "Unit values" means the purposes for which the unit was established, including but not limited to preserving, conserving and protecting: recreation opportunities for visitor enjoyment of unit resources, endangered species, air and water quality, fish and wildlife and their habitat and water flow regimes.



(aa) "Waste" means all material for discard from exploration, development or production operations including, but not limited to, refuse, fuel drums, shot wire, survey stakes, and functional or nonfunctional equipment not being used, drilling fluids and cuttings, human waste, trash and garbage, pipes, casing, explosive boxes, and other synthetic or man-made structures and equipment.

(bb) "Wildlife" means fish or wildlife or both.

3. Applicability.

These stipulations shall apply to the conduct of operations by operators for the exploration for or development and production of Collier interests located beneath the surface of lands within the boundaries of the Addition pursuant to a plan of operations submitted on or after the date of ratification by the Congress of the United States of the Agreement among the United States, Collier Enterprises and the Barron Collier Company ("Agreement"), executed \_\_\_\_\_, 1988.

B. OIL AND GAS EXPLORATION, DEVELOPMENT AND PRODUCTION

1. Plan of Operations.

(a) No operations in connection with the exercise of Collier interests shall be conducted by an operator or other person on the surface of lands within the boundaries of the Addition except pursuant to a plan of operations which has been reviewed and approved by the Regional Director under the procedures set forth in this section B.



(b) The costs to an operator for gathering, analyzing, preparing, revising and submitting all required information as part of a plan of operations are to be borne by the operator.

(c) Prior to submission of a plan of operations, the operator and the unit manager shall hold a preliminary meeting to discuss the anticipated scope of the operations within the unit to be affected by the operations and the requirements for preparation of a plan of operations applicable to such operations. In addition, at such preliminary meeting the operator and the Regional Director may reach preliminary agreement to review the plan of operations on an expedited basis under paragraph (c) of section B.2.

(d) A plan of operations shall identify all operations that the operator intends to implement upon approval of a plan of operations and such plan of operations shall be deemed to cover all operations so identified. A plan of operations may cover operations within a single location or within multiple locations of surface facilities, pipelines and other support or logistic facilities. A plan of operations may cover either comprehensive or phased operations, provided, however, that each plan need only cover those phases or locations of operations known to or planned by the operator submitting such plan of operations. The operator may, for purposes of information, describe other future phases of



operations or other possible locations related to the operations covered by the plan of operations. However, implementation of one phase of operations or of operations at a single location covered by an approved plan of operations does not imply approval of a subsequently submitted plan of operations to cover any other phase of or location for operations which phase or location is not covered by an approved plan of operations. The plan of operations may be amended, revised or supplemented to include additional development wells, production and transportation facilities, subject to the requirements for amendment of a plan of operations under subsection 5 of this section B.

(e) The plan of operations shall include information sufficient for the Regional Director to evaluate the effect of the operations on unit resources and unit values and whether the plan of operations complies with the requirements of the Agreement and these stipulations, including the standards set forth in subsection 7 of this section B. The information shall include, as appropriate, the following:

(1) The names and legal addresses of the following persons: the operator, contractors, subcontractors and telephone numbers so that these persons may be reached in an emergency; and the names and legal addresses of owner(s) or lessee(s) other than the operator;



(2) A copy of the instrument by which the operator's right to conduct operations was granted;

(3) A map or maps showing:

(A) the location of a point of reference selected by the operator within the area of operations which shows, in relation to that point, existing and planned access routes or roads to be used to gain access to the area of operations, the boundaries of surface disturbances and location of survey lines;

(B) to the greatest extent feasible the precise location and dimension of planned drilling sites, wellsite layout and surface support facilities including, but not limited to, pipelines (including planned burial depths), electrical lines or power generation equipment, tank batteries and sanitary facilities; all abandoned, temporarily abandoned, disposal, water, production and drilling wells of public record within a two-mile radius of the area of operations; transportation facilities, such as staging areas of loading docks; the lease boundaries; natural features, including strands, freshwater marshes, sloughs, streams, lakes, ponds, vegetation and topographic relief; and, the boundaries of planned surface disturbance, including any spoils or topsoil salvage piles;



(4) An estimated time schedule for operations covered by the plan of operations, the anticipated dates for commencement and completion of such operations and an estimated time schedule for related possible future phases of the operations, to the extent that the schedule for such related future phases of the operations may reasonably be anticipated;

(5) A description of the potential hazards to the environment, such as high pressure blowouts or hydrogen sulfide gas or oil spills, hydrogen sulfide gas or oil concentrations under high pressure;

(6) Geologic information, including planned drilling depths, the estimated tops of geologic markers, estimated depths at which brines of formation water, oil, gas or other minerals bearing formations are expected to be encountered, and the known nature and extent of the known deposit or reservoir to be produced;

(7) A description of planned methods of disposal of wastes and hazardous or contaminating substances and actions to be taken to use, store, control, and clean up these substances, and contingency plans for control and clean up of hazardous or contaminating substances in case of accidental spills or fires;

(8) A description of planned operations including estimates of: the numbers of individuals in crews, the number of crews, and the duration of crew presence to



conduct operations; the method of conducting operations and the equipment involved; modes of transportation and number of vehicles to be used in the operation; the operator's minimum specifications for pressure control equipment, testing procedures and frequency, and pressure rating for the equipment to be used; the type, characteristics and quantities of the circulating medium; testing, coring and logging programs to be used; casing program; setting depths of casing strings; descriptions of anticipated composition of produced oil, water, or gas and a description of the additives to be used in production; and, descriptions of transportation methods including pipelines, trucking and support supply/disposal plans;

(9) A reclamation plan, which shall include a description of the steps to be taken to achieve reclamation of the area of operations, a time schedule for such steps to the extent that such schedule may reasonably be anticipated, and identification and analysis of the effect of implementation of the reclamation plan on unit resources and unit values;

(10) A description of the unit resources and values in existence at the time of submission of the plan of operations within and directly adjacent to the area of operations, and the anticipated effects of the planned operations on such unit resources and values;



(11) A description of planned steps to be taken to avoid, minimize or mitigate adverse effects on unit resources and values including a discussion of cumulative effects of planned operations if the plan of operations covers multiple operations or locations, and a description of planned procedures for monitoring compliance with the environmental protection requirements of these stipulations and other law and regulation, as applicable;

(12) An affidavit stating that the planned operations will be in compliance with these stipulations and other applicable law and regulation or, as appropriate, evidence to that effect;

(13) A statement of the basis for the operator's belief that the planned operations are consistent with the requirements of these stipulations, including the standards set forth in the subsection 7 of this section B, and the information requirements set forth in this subsection 1; and

(14) Any additional information that the operator and the Regional Director or unit manager agree should be submitted or that the operator believes will be useful to the Regional Director in reviewing the plan of operations.

(f) In addition to meeting the information requirements set forth in paragraph (e) of this section B.1, the plan of operations must consider and discuss the unit's Statement for Management and other planning documents as



furnished by the Superintendent, and activities to control, minimize or prevent damage to the recreational, biological, physical, scientific, cultural, and scenic resources of the unit, and any reclamation procedures suggested by the Superintendent.

(g) If the operator is seeking expedited review of a plan of operations pursuant to paragraph (c) of section B.2, the cover letter or top of the plan submitted must be clearly marked "Request for Expedited Review."

2. Review and Approval of a Plan of Operations.

Review of and final action with respect to a plan of operations submitted pursuant to subsection 1 of this section B shall occur pursuant to the following requirements and procedures:

(a) The Regional Director shall review and take final action with respect to a plan of operations within ninety (90) calendar days of the date such plan of operations is received by the Regional Director unless:

(1) the Regional Director, within 30 days from the date such plan of operations is received by the Regional Director,

(A) provides notice to the operator in writing that such plan of operations is inadequate to satisfy the information requirements of section B.1; and



(B) identifies the information reasonably necessary to satisfy such requirements, in which event review and final action with respect to such plan of operations shall occur pursuant to the procedures set forth in paragraph (b) of this subsection;

(2) the Regional Director and the operator agree in writing that such review and final action shall occur within a longer period for the purpose of entering into good faith negotiations with respect to a plan of operations under subsection 3;

(3) the Regional Director determines, and so notifies the operator, that additional time is necessary to permit the Regional Director, in reviewing the plan of operations, to comply with other applicable law, Executive Orders or regulations, in which event review and final action with respect to such plan of operations shall occur within such longer time only as is reasonably necessary for the Regional Director to comply with such laws, orders or regulations; or

(4) the Regional Director agrees to the request of an operator for expedited review of such plan according to the procedures set forth in paragraph (c) of this subsection 2.

(b) If the Regional Director provides notice to the operator under paragraph (a)(1), the operator shall supply any reasonably necessary additional information and shall advise the Regional Director that the operator believes that the plan



of operations contains all reasonably necessary information and is therefore complete, whereupon the Regional Director may:

(1) within thirty (30) days of receipt of such notice from the operator to the Regional Director determine that the application does not contain all reasonably necessary additional information and disapprove the plan of operations for failure to meet the standard for approval of a plan of operations specified in paragraph (a)(8) of subsection 7 of this section B; or

(2) review the application and take final action within sixty (60) days from the date that the applicant provides notification to the Regional Director that its application is complete, provided, however, that nothing herein shall preclude the Regional Director and the operator from entering into good faith negotiations under subsection 3 of this section B.

(c) Upon request of the operator, the Regional Director shall review and take final action with respect to a plan of operations on an expedited basis, unless the Regional Director notifies the operator, within ten (10) calendar days of the date of submission of such plan of operations that:

(1) the plan of operations, as submitted, does not meet the information requirements of section B.1;



(2) review cannot be completed and final action taken within thirty (30) days because the area of operations includes a surface area likely to be critical to the preservation of any threatened or endangered species or other sensitive unit resource;

(3) review of the plan of operations requires consultation with other agencies under procedures that cannot be completed within thirty (30) days; or

(4) the operations to be undertaken pursuant to such plan would result in significant surface disturbance the effects of which cannot be reviewed within thirty (30) days.

Such notice to the operator shall include a statement of the reasons why review cannot be completed on an expedited basis under this paragraph. For purposes of this paragraph, the following operations qualify for expedited review so long as the use of motorized vehicles in connection with such operations is limited to airboats, helicopters, ORV's qualifying for ORV permits and used on existing ORV trails, or other motorized vehicles using existing or designated roads:

(A) site inspection, or gathering of data on unit resources and values, in connection with the preparation of a plan of operations;

(B) surveying and/or marking (staking) of proposed routes for roads, pipelines, or geological/geophysical exploration;



(C) surface geologic studies, which means outcrop or surface sampling necessary to create maps of outcropping geology or to conduct geochemical analysis of outcrops;

(D) workover of an existing well;

(E) unforeseen repair or maintenance of structures or facilities covered by an existing plan of operations; or

(F) other activities that do not require the use of motorized vehicles other than airboats, helicopters, ORV's qualifying for ORV permits and used on existing ORV trails, or motorized vehicles using existing or designated roads.

The Regional Director shall, in good faith, provide expedited review of and final action on any plan of operations that meets the requirements of this paragraph. The operator shall, in good faith, seek expedited review only with respect to a plan of operations likely to meet the requirements of this paragraph.

(d) The review of the Regional Director under this subsection shall be for the purpose of determining whether the plan of operations meets the standards for review and approval of a plan of operations under subsection 7 of these stipulations. If a plan complies with such standards, such plan shall be approved.



(e) In taking final action with respect to a plan of operations under this section the Regional Director may:

- (1) approve a plan of operations;
- (2) disapprove a plan of operations upon a determination that the plan fails to comply with the standards of subsection 7; or

- (3) approve a plan of operations, subject to such terms and conditions as the Regional Director determines are reasonably necessary to ensure compliance with the standards of section 7.

Approval of a plan of operations shall constitute a permit authorizing the commencement of operations consistent with the provisions of such plan of operations and approval of a plan of operations subject to terms and conditions shall constitute a permit authorizing commencement of operations consistent with such plan of operations subject to such terms and conditions.

(f) If the Regional Director disapproves a plan of operations or fails to take final action in accordance with this subsection, Collier may initiate an action in a court of competent jurisdiction seeking authorization to implement such plan. Such plan may be implemented if Collier demonstrates that the plan complies with the requirements of these stipulations.



3. Good Faith Negotiations.

At any time prior to the date upon which the Regional Director is required to take final action with respect to a plan of operations under section B.2, the Regional Director may request the operator to enter into good faith negotiations for the purpose of developing modifications to the plan of operations as may be necessary to ensure that such plan meets the standards for approval of a plan of operations under section B.7. If the operator and the Regional Director enter into such good faith negotiations, the Regional Director shall take final action within a period mutually agreed upon by the operator and the Regional Director, provided, that if no such period is mutually agreed upon the Regional Director shall take final action as otherwise required under section B.2.

4. Commencement of Operations.

If the Regional Director approves a plan of operations or approves a plan subject to terms and conditions, operations pursuant to such plan may commence upon the receipt by the Regional Director of an acceptable performance bond or security deposit in accordance with section C of these stipulations, and an affidavit of Collier or the operator stating that Collier or the operator has obtained all necessary permits required under other applicable law and regulations, provided, that, if such plan is approved subject to terms and conditions, the operator must, prior to the commencement of



operations, also file with the Regional Director an affidavit stating its intent to comply with such additional terms and conditions.

5. Amendment of a Plan of Operations.

(a) A proposal to amend, whether by supplement or revision, an approved plan of operations may be made by Collier, the operator or the Regional Director to adjust the plan to new information or changed conditions, to correct oversights or to address conditions not previously contemplated by the parties as necessary to ensure compliance with the requirements of these stipulations or the economic and technological feasibility of the operations.

(b) A proposal to amend a plan of operations under paragraph (a) shall be made by notifying the appropriate party in writing of the proposed amendment and the justification therefor. The parties shall negotiate in good faith concerning any proposed amendment. Collier and the operator shall accept any proposed amendment that will not jeopardize the overall success of the plan of operations or unreasonably increase the cost of completing the plan and is otherwise consistent with requirements of the Agreement and these stipulations. The Regional Director shall accept any proposed amendment that complies with the requirements of the Agreement and these stipulations. No amendment to such a plan shall be implemented without the consent of the Regional Director.



(c) The operator may submit a proposal to amend, whether by supplement or revision, a previously filed plan of operations prior to final action by the Regional Director by notifying the Regional Director of the proposed amendment and the justification therefor. Such amendment shall be reviewed as if it were a newly proposed plan of operations submitted for review under subsection 2 of this section B, provided, however, that the Regional Director may waive such requirement if he determines that the proposal to amend such pending plan of operations can be reviewed and final action taken within the review period applicable to the pending plan of operations.

(d) In the event that the parties cannot agree, through good faith negotiations, to a proposed amendment under this subsection, such amendment may not be implemented in the absence of review and approval by the Regional Director under the procedures established in subsection 2 of this section B.

6. Administrative Suspension of a Plan of Operations.

Notwithstanding any other provision of these stipulations:

(a) if an operator violates its plan of operations, and if the violation does not pose an immediate threat either to human health and safety, or of a significant adverse effect on unit resources or unit values, the Regional Director may notify the operator in writing to correct the violation in the shortest practicable time, not to exceed thirty (30) days or



such other time period as may mutually be agreed upon. If the violation is not corrected within thirty (30) days or the agreed upon time period, whichever is longer, the Regional Director may suspend the activity until the violation is corrected, provided, that, upon a showing of good cause why the violation cannot reasonably be corrected within thirty (30) days or the agreed upon time period, the Regional Director may extend this period for an additional time not to exceed ninety (90) additional days.

(b) if an operator violates its plan of operations or if an unforeseen condition develops, and if the violation or condition poses an immediate threat either to human health and safety, or of a significant adverse effect on unit resources or unit values, the Regional Director may immediately suspend operations until such time as the violation or condition is corrected.

(c) if an unforeseen condition develops that does not pose an immediate threat either to human health and safety or of a significant adverse effect on unit resource or unit values, but which the Regional Director believes will pose such a threat at some future time, the Regional Director shall notify the operator in writing of such unforeseen condition and provide recommendations to the operator for avoiding such effect. The operator and the Regional Director shall immediately enter into good faith negotiations to agree upon a



means for correcting such condition. Nothing in this paragraph shall be construed to preclude the Regional Director from suspending operations under paragraph (b), in the event that such unforeseen condition poses an immediate threat either to human health and safety, or of a significant adverse effect on unit resources or unit values.

7. Standards Governing the Conduct of Operations.

(a) The Regional Director shall approve a plan of operations which meets the following requirements:

(1) Such operations shall be conducted only by persons with a legal right to conduct operations.

(2) Siting or the conduct of operations shall not be conducted in a manner that is likely to jeopardize the continued existence of any threatened or endangered species.

(3) Siting or the conduct of operations shall be contained within the area of operations so as to avoid damage to unit lands and resources adjacent to and not required for the development of the area of operations.

(4) Such operations shall use technologically feasible methods least damaging to unit resources and values within the area of operations, provided, that methods for conducting operations that are similar to oil and gas development practices used in similar habitats or ecosystems within the Big Cypress National Preserve at the time of submission of the plan of operations shall be deemed to be



technologically feasible methods least damaging to unit resources and values.

(5) Such operations shall be conducted in a manner that ensures the protection of public health and safety.

(6) Such operations may not use groundwater from a point of diversion that is within the boundaries of a unit, unless the operator shows that such use of the water is authorized under state law and that removal of the water will not significantly damage the unit resources and unit values.

(7) Reclamation plans must comply with the requirements of subparagraph (39) of paragraph (b) of this section B.7.

(8) The plan of operations shall satisfy all information requirements listed in section B.1.

(b) Compliance with the following operating standards and procedures is sufficient to comply with the general standards of paragraph (a):

(1) Operations must begin within eighteen (18) months of the date of the Regional Director's review of the applicable plan, unless the Regional Director agrees in writing to a longer period.

(2) The operator shall protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, removal or permanent damage from operations and shall be responsible for the reclamation or



restoration of any such listed items which are destroyed or damaged during the conduct of operations. Restoration or repair of damaged, removed or destroyed property must be accomplished within thirty (30) calendar days of the damage, destruction, or removal. Marred or wounded standing trees shall be treated with a commercially available, non-toxic pruning paint or wound coating. Reasonable compensation for marketable timber removed will be made to the United States within sixty (60) days of presentation of a bill by the Regional Director.

(3) The operator shall take all reasonable precautions to prevent accidents, fires, and damage to unit resources and values. Operators shall immediately notify the unit manager of any accidents involving personal injury or death, or of any fires or spills or any other accidents which damage unit resources. A written report shall follow initial notification of the unit manager within a mutually acceptable period of time.

(4) Surface operations shall at no time be conducted within 500 feet of:

(A) the high water banks of strands, freshwater marshes, sloughs, lakes, ponds or streams; or

(B) the high pool shoreline of natural or man-made impoundments. This requirement may be waived by the unit manager.



(5) No operations may occur within a one-half mile buffer zone of any Federally-owned or -controlled building, campground, interpretive or research site or other facility in which the National Park Service has invested public funds to further the purposes for which the unit was established and which is in existence at the time of the submission of the plan, unless (i) the Regional Director agrees that such operations would not significantly adversely affect such sites or facilities or visitor values or (ii) Collier or the operator can demonstrate that the United States has located interpretive or research sites and facilities so as to interfere unreasonably with operations in connection with Collier oil and gas rights.

(6) Whenever drilling operations are suspended, according to the provisions of section B.6 of these stipulations, for more than twenty-four (24) hours and less than thirty (30) calendar days, the wells shall be shut in by closing wellhead valves or blowout prevention equipment. When producing operations are suspended for thirty (30) calendar days or more, suitable plugs or other fittings acceptable to the unit manager shall be used to close the wells.

(7) The operator shall mark all operating derricks or wells in a conspicuous place with his name, the number and location of the well, and shall preserve the legibility of these markers.



(8) Fences shall be built around installations (wells, storage tanks, all high pressure facilities) to protect visitors and wildlife, unless otherwise authorized by the unit manager. Such fences shall have at least one gate of sufficient width to allow access by fire suppression equipment and shall be a design acceptable to the unit manager. Hazards within visitor use areas shall be clearly marked with warning signs acceptable to the unit manager.

(9) The operator shall prevent and remove accumulations of oil and other materials deemed to be fire hazards from the vicinity of well locations and tanks, and shall remove from the property or store in an orderly manner all scrap and other materials not in use.

(10) Any technical data which are submitted to the State, pursuant to State regulations, or to any agent of the United States shall be available to the unit manager upon request. The United States shall be bound by any requirements respecting confidentiality of such data applicable under state law and regulation.

(11) When drilling in any field where high pressures are likely to exist, the operator shall take all necessary precautions to keep the well under control at all times and shall install and maintain the proper high pressure fittings and equipment to assure proper well control. If a well becomes "wild", the operator shall take immediate steps to bring such wells under control.



(12) Oilfield brine, and all other waste and contaminating substance must be kept in the smallest practicable area, must be confined and rendered impermeable according to established industry standards and procedures so as to prevent escape as a result of percolation, rain, high water, or other causes. Such wastes must be stored and disposed of or removed from the unit as quickly as practicable in order to prevent pollution or permanent injury to the lands, waters, and resources of the unit. Disposal may be accomplished by pumping such waste or substance into a disposal well or through the annulus of the well with a closed transport and storage system.

(13) No fuel storage facilities shall be placed within wetland areas of the unit, and no vehicle refueling shall occur within such areas, unless such storage and refueling occur on the drilling pad within the area of operations.

(14) The operator must immediately notify the unit manager of any cultural resources that might be altered or destroyed by operations and shall leave such a discovery intact until permitted to proceed by the unit manager. The unit manager will evaluate the discovered resources and will notify the operator within ten (10) calendar days of action taken with respect to such discoveries. The responsibility for and cost of investigations and salvage of such cultural resources during



operations will be that of the operator, when such resources are discovered on Federally-owned or -controlled lands or waters.

(15) Hunting, fishing and trapping by the operator and its employees within a unit are prohibited during the conduct of such operations except in accordance with established rules and regulations of the unit. Work crews will be prohibited from carrying firearms in the unit while conducting operations. No dogs will be allowed at camps or any site within the area of operations.

(16) If natural surface drainage will be disrupted by surface disturbances, appropriate drainage structures shall be installed and maintained.

(17) Operators shall not alter the banks of streams, rivers or lakes during the conduct of operations.

(18) In the event that a plan of operations does not identify the precise location of planned wells within an area of operations, the Regional Director may, after site inspection and consultation with the operator, require the operator to move a well to a different location within the areas identified as potential well location sites in the plan of operations.

(19) Fill materials shall be composed of native limestone from existing quarries.



(20) Culverts shall be placed under access roads as needed to sustain flow in natural drainages and to accommodate sheet flow.

(21) A dike capable of containing at least 1.5 times the volume of crude stored on the site must be constructed around each well.

(22) Well casings protecting surface and groundwater supplies will be required for producing wells to be set consistent with the following:

(A) surface casing must be set to seal surface muds/formations (200-300 ft.);

(B) second string must be set at the top of the boulder zone (permeable unconsolidated zone);

(C) third string must be set out of the bottom of the boulder zone; and,

(D) fourth string must be set so as to reach the bottom of the well.

If a well is found to be a dry hole, the fourth string will not be necessary.

(23) Internal corrosion of well casings shall be controlled by continuous injection of chemicals and monitored by ultrasonic inspection, corrosion coupon surveys, and water sampling.



(24) Buried flow lines shall be protected against external corrosion by plastic coatings and cathodic protection devices, periodically dug up at selected points, and examined by x-rays or inspected annually.

(25) Pipelines shall cross over rather than under canals to avoid creating low spots in the flowlines which could trap water.

(26) Automatic well shutdown devices shall be required to shut off oil flows in response to pressure changes.

(27) Oil and gas wells shall have fail-safe, ball-type, remote control subsurface safety valves.

(28) Blowout preventer assemblies shall be designed to preclude "gushers" and leaks.

(29) Automatic shut-off valves shall be activated whenever a significant pressure drop is detected in a pipeline, which will come into action before 10 barrels of oil are lost.

(30) Oil spill cleanup equipment (pumps, skimmers, and absorbents) and emergency personnel shall be on-site and available for immediate mobilization.

(31) Provision shall be made for returning produced formation waters (brines) via reinjection wells or through the annulus of the well from which the water was taken. Under no conditions may salt water be released on the surface, and underground disposal of produced formation waters is



limited to zones of equal or lesser water quality than the produced waters. To assure that no salt water is released, monitoring wells shall be installed upstream and downstream from the drilling pad.

(32) Continuous gas monitoring devices shall be installed in all enclosed areas to decrease the likelihood of fire.

(33) Introduction of well products to surface resources during high water period shall be prevented.

(34) Operations shall provide for proper plugging and abandonment procedures for wells.

(35) All access roads, drill pads, and equipment shall be removed after completion of operations.

(36) No charge in excess of 100 pounds shall be detonated without the written approval of the Regional Director. All plastic flagging, stakes, other temporary markers put in place, wires, detonation caps, and other equipment shall be removed from the unit.

(37) Operations must be sited or scheduled to avoid:

(A) known archeological sites;

(B) periods of extreme or high fire

danger;



(C) known sites used by threatened or endangered species. The operator will contact the unit manager or the unit manager will contact the operator immediately if either party discovers new use sites of threatened or endangered species. Operations may be rescheduled or halted as a consequence of discovering new use sites of endangered species, by mutual agreement of the Regional Director and the operator or by the Regional Director in accordance with procedures under section B.6;

(D) areas within reasonable buffer zones to minimize disturbance to sensitive wildlife which buffer zones shall be established in consultation with the unit manager;

(E) season, periods, or times of critical wildlife use, by threatened or endangered species, such as nesting, breeding, and birthing; and

(F) generating loud noises (greater than 70 decibels) when proposed near areas of critical wildlife use, by threatened or endangered species. Operations may be halted or rescheduled during sensitive wildlife use seasons, periods, or times, by mutual agreement of the Regional Director and the operator, or by the Regional Director in accordance with procedures under section B.6.



(38) To the fullest extent possible, vegetative clearings for roads, pads and other above-ground structures will be located to avoid important resource areas.

(39) The operator shall be responsible for reclamation or rehabilitation of the area of operations to the natural conditions existing prior to the commencement of operations or to such other conditions agreed to by Collier, the operator and the unit manager. In the event that the conduct of operations also results in damage to unit lands or resources adjacent to the area of operations, such lands or resources must also be reclaimed or rehabilitated in a manner that meets the requirements of this subparagraph. Reclamation must be accomplished as contemporaneously as possible with the conduct of operations or as specified in a plan of operations. A reclamation plan will be implemented for areas of operations as soon as these areas are no longer needed for operations. In conducting reclamation activities, the operator shall:

(A) remove all above-ground structures, equipment, and roads used for operations, except that such structures, equipment or roads may remain where they are to be used for continuing operations;

(B) prevent subsidence;

(C) remove all waste resulting from operations;



(D) remove or neutralize all contaminating and hazardous substances;

(E) plug and cap all non-producing wells and fill all excavations;

(F) grade to reasonably conform to the pre-existing contours of the lands within the areas of operations, where such grading will not jeopardize reclamation. Ruts and vehicles tracks will be rolled or scraped to restore the ground surface to the contour of the surrounding areas. No fill materials will be brought into the area;

(G) replace the natural topsoil necessary for revegetation. All available topsoil will be saved and stockpiled for use in reclamation. The soil stockpile will be protected during operations from losses due to run-off or erosion;

(H) reestablish native vegetative communities. Vegetative clearings will have free form, irregular lines and feathered edges;

(I) restore original hydroperiod;

(J) provide for safe movement of native wildlife; and

(K) reclaim the area of operations to a condition which does not constitute a nuisance and will not adversely affect or damage unit purposes, resources,



visitor values, lands, waters, and unit management objectives.

(40) Failure to initiate or complete reclamation according to the standards of this section shall be grounds for forfeiture of all or so much of the bond or security deposit as the Regional Director determines is necessary to achieve successful reclamation in the area of operations.

(41) No access to site(s) outside of the unit for purposes unrelated to the conduct of operations within such unit under a plan of operations will be permitted across a unit unless such access is by foot, pack animal, or on an existing road designated by the unit manager or as otherwise agreed to by the operator and the unit manager. To the greatest extent possible, new gas and oil pipelines routes across Collier lands will be within existing pipeline corridors or parallel and adjacent to existing pipeline routes. To protect endangered species, the use of access roads shall be limited to use by personnel involved in the conduct of operations covered by a plan of operations or for monitoring compliance with the plan of operations. Facilities used for the transport of oil and gas shall not be used for the transport of oil and gas other than Collier interests in oil and gas, without the consent of the unit manager.



(42) A plan of operations shall indicate the types of commercial vehicles expected to use roads within a unit, administered by the unit agency, in connection with operations under such plan of operations. The operator shall take all steps reasonably necessary to ensure that no commercial vehicles other than those necessary for operations within the unit are admitted to the area of operations. Roads must be used in accordance with limitations, procedures, and requirements outlined in the plan of operations. Roads owned and administered by the United States shall be used in accordance with a posted reasonable fee schedule established by the Regional Director. An adjustment of the fees may be made at the discretion of the unit manager where a cooperative maintenance agreement is entered into with the operator.

(43) The following may be necessary in specific cases to protect important resource areas:

(A) Well spacing and directional drilling:  
Well sites will be located according to a 160-acre spacing pattern. Directional drilling techniques (which do not include slant drilling techniques) will be employed when multiple development wells are necessary to minimize the area of surface disturbance to the fullest extent practicable;



(B) Containerized mud systems: A closed or containerized mud system will be employed in lieu of using reserve pits to minimize surface disturbance and the risk of ground and surface water contamination;

(C) Use of existing facilities: Where possible, existing pads and access roads will be used for operations in lieu of creating new surface disturbances to develop oil and gas facilities;

(D) New access roads: All new oil and gas access roads should be located to avoid degradation of habitat used by threatened and endangered species; designed and constructed to minimize hydrologic impacts; restricted in use for the intended purpose; removed as soon as possible following its need for service, and maintained and reclaimed to discourage invasion of exotic plants;

(E) Access corridors and pipelines will be contiguous and designed so that collector lines would be located in sites used for access roads, storage tanks or tank batteries and will not be located in or through important resource areas, rookeries, alligator holes or research sites, provided, that the application of this provision shall not result in the denial of access. Access corridors will be maintained so as to avoid potential safety hazards resulting from impaired



visibility and potholes and maintained and reclaimed to avoid encroachment by exotic plant species;

(F) Operators will be responsible for controlling unauthorized use of any new access road for the life of the road's purpose; and,

(G) Pipelines will be used to transport produced oil or gas. Trucking may be used to transport oil only from points in close proximity to a major road or for the purpose of pre-production testing.

(c) Operators shall be fully accountable for compliance with requirements of the plan of operations and these stipulations by all agents, assignees, contractors, designees, employees, lessees, subcontractors, and representatives thereof.

(d) The conduct or activities of persons within the boundaries of the unit in connection with the conduct of operations shall be governed by these stipulations, provided, however, that activities unrelated to such conduct or activities of operations, including but not limited to camping, hunting and other recreational activities, shall be subject to such rules and requirements as may be established from time to time by the National Park Service governing such conduct or activities within such unit.



8. Access to the Area of Operations.

The Regional Director shall have such reasonable access to the area of operations as is necessary to properly monitor activities included in the plan of operations and to ensure compliance with the plan of operations.

C. PERFORMANCE BOND

1. Prior to commencement of operations, the operator shall file with the Regional Director a suitable performance bond or security deposit with satisfactory surety, payable to an acceptable contractor assigned to conduct reclamation according to the plan of operations. The bond shall be conditioned upon faithful compliance with all applicable laws, standards and procedures in these stipulations and the plan of operations. This performance bond is in addition to and not in lieu of any bond or security deposit required by any other regulatory authorities. When bonds are to serve as security, the operator must provide a power of attorney to the Secretary or his designee.

2. In lieu of a performance bond, an operator may deposit with the Regional Director or his designee, cash, negotiable bonds of the United States Government, or other form of security acceptable under state law or regulation applicable to the activities covered by the plan of operation. Any cash deposit will be invested and the interest thereon will accrue to the operator. The cash deposit or the market value of such



securities shall be at least equal to the required sum of the bond(s).

3. If a plan of operations is revised, the Regional Director shall adjust the amount of the bond or security deposit to conform to the revised plan of operations.

4. The bond or security deposit shall be established by the Regional Director in an amount:

(a) equal to an estimated cost of completion of reclamation requirements. This figure shall be based on values for reclamation according to the suitability and restoration potential of the lands proposed for operations. Areas with a high restoration potential and therefore suitable for siting of operations (i.e., prairie, inland marshes, sloughs, and ponds) will have a minimum bonding liability of \$50,000 per acre. Areas with a moderate restoration potential and therefore less suitable for siting of operations (i.e., pine forest or cypress forest) will have a minimum bonding liability of \$70,000 per acre. Areas with a low restoration potential should be avoided for the siting of operations (mixed swamp forest and hammock forest) but will have a minimum bonding liability of \$100,000 per acre disturbed; plus,

(b) that set by the unit manager consistent with the type of operations proposed in order to bond against:

- (1) liabilities imposed under Section D; and
- (2) costs of clean up; and



(3) costs of repair for damages resulting from oil spill, escape of gas, wastes, hazardous or contaminating substances, or fire caused by operations. The following schedule establishes maximum bonding liabilities for this subparagraph according to the operations proposed:

<u>Operation Proposed</u>	<u>Maximum Bonding Liability</u>
Geophysical Surveys	
a. more than one field party	\$25,000
b. one field party	\$ 5,000
Each Pad	\$50,000
Other Operation	\$50,000.

Notwithstanding any other provision of this section C, the total bonding liability per operator shall not exceed \$300,000 within a unit. No further bond requirements will be collected for additional activities conducted within that unit, and the operator may substitute a blanket bond of \$300,000 for all operations conducted within the unit.

(c) The operator's and his surety's responsibility and liability under the bond or security deposit shall continue until the unit manager determines that successful reclamation of the area of operations has occurred, provided, however, that such bond or surety shall be released on the sixtieth (60th) day following notification by the operator to the unit manager that reclamation has been successfully completed, unless the



unit manager determines that successful reclamation has not been completed and requires that some portion of the bond or surety reasonably reflective of the cost of reclamation yet to be completed shall not be released.

D. DAMAGES AND PENALTIES

1. The operator agrees that it will save and hold harmless the United States and its employees from any damages or claims for injury or death of persons and damage or loss of property by any person or persons arising out of any acts or omissions by the operator, its agents, employees or subcontractors done in the course of operations.

2. In addition to any remedy available under section B for violation of the stipulations or a plan of operations, the operator shall be held liable for damage to unit resources resulting from the conduct of operations or from failure to comply with the Agreement of these stipulations notwithstanding the level of bond that may be required under section C.

3. Conduct of operations in violation of a plan of operations or the terms of the Agreement or these stipulations shall be cause for forfeiture of all or part of the performance bond or security deposit commensurate with the level of damage and scope of violation, provided, however, that the amount of such performance bond or security deposit shall not be a limit on the operator's liability for damage to unit resources under this section D.



E. TRANSFER OF INTERESTS

(a) Any person who receives through purchase, gift, assignment or any other means of conveyance an interest in all or part of Collier interests must notify the unit manager within thirty (30) calendar days of the completion of transfer. This notification must include: a legal description of the property; the name and legal address of the person receiving the interest; a description of the interest so conveyed; and a copy of the instrument conveying the interest.

(b) A transferor of Collier interests shall remain liable under any bond or security deposit posted by the transferor under section C and such bond or security deposit shall not be released until:

(1) the reclamation requirements and standards of these stipulations have been satisfied; or

(2) the transferee has obtained and filed a suitable performance bond or security deposit with the Regional Director which complies with the requirements of section C.

F. PUBLIC INSPECTION OF DOCUMENTS

Any document or information provided to, or otherwise acquired by, the Regional Director with respect to operations or proposed operations may be made available for public inspection at the office of the unit manager during normal business hours; provided, however, that upon request of Collier or the operator any such document or information that contains



proprietary or confidential information may be withheld from public disclosure under the Freedom of Information Act and the rules and regulations thereunder or other Federal law unless Collier consents to such disclosure. To the fullest extent practicable, Collier or the operator shall identify any document it wishes to have withheld from public disclosure as proprietary and confidential at the time of submission to the Regional Director.

G. WAIVER

For good cause shown, the Regional Director in his discretion may waive in writing any provision of these stipulations which runs in favor of the United States. Any such waiver shall be limited to the express waiver provided therein and shall not be construed to provide a waiver of any provision of these stipulations not specifically set forth therein.



## **EXHIBIT 4**

### **2006 NATIONAL PARK SERVICE OPERATOR'S HANDBOOK – GEOPHYSICAL OPERATIONS**



**OPERATORS HANDBOOK  
FOR  
NONFEDERAL OIL AND GAS DEVELOPMENT  
IN UNITS OF THE  
NATIONAL PARK SYSTEM**

Prepared by the National Park Service  
Geologic Resources Division  
Lakewood, Colorado

October 2006







## INTRODUCTION

The National Park Service (NPS) has developed this handbook to help existing and prospective nonfederal oil and gas operators in units of the National Park System to:

- understand and follow the NPS regulations at 36 C.F.R. Part 9 Subpart B, and
- prepare a "plan of operations" or "§ 9.32(e) application" to conduct oil and gas operations.

Petroleum development in national parks most often occurs where entities other than the federal government own the rights to the oil and gas. Individuals, corporations, state or local governments, Indian tribes, or native corporations may own these "nonfederal" rights. In some cases, the holder of oil and gas rights on a tract of land in a park may own both the surface and mineral estate. However, most often when the park was established the United States acquired the surface estate and left the mineral estate in private or state ownership.

The NPS must recognize nonfederal mineral rights in park units. It must also fulfill Congress' mandate to leave park resources and values unimpaired for the enjoyment of future generations.<sup>1</sup> In rare instances where nonfederal oil and gas activities would prevent the NPS from meeting this mandate, the federal government will seek to acquire the mineral interest.

Congress granted the NPS authority to issue regulations as needed to protect National Park System lands and waters.<sup>2</sup> The NPS issued regulations for nonfederal oil and gas operations on December 8, 1978. The regulations commonly known as the "9B Regulations" are found at Title 36 of the Code of Federal Regulations, Part 9, Subpart B. Appendix A contains a copy of the 9B regulations.

## USE OF THIS HANDBOOK

Operators should first familiarize themselves with the NPS regulations by reading the overview in Chapter 1, the NPS oil and gas regulations in Appendix A, and the plan of operations permitting process in Chapter 2. Operators can then focus on the following chapter(s) pertaining to the particular types of activities that are planned:

- Ch. 3 - Geophysical Exploration Operations,
- Ch. 4 - Drilling and Production Operations,
- Ch. 5 - Directional Drilling Operations,
- Ch. 6 - Existing Oil and Gas Production Operations,
- Ch. 7 - Well Plugging and Surface Reclamation,
- Ch. 8 - Transpark Pipelines, and
- Ch. 9 - 9B Flowlines and Gathering Lines.

Chapters 10, 11, and 12 cover performance bonds, spill control and emergency preparedness plans, and operator liability.

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<sup>1</sup> The Organic Act [16 U.S.C. §§ 1 *et seq*] orders the NPS "...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...as will leave them unimpaired for the enjoyment of future generations." Thus, the NPS's greatest responsibility is to protect the natural, historical, and recreational qualities in each and every unit of the National Park System.

<sup>2</sup> AUTHORITY: Act of August 25, 1916, 39 Stat. 535 (16 U.S.C. § 1, *et seq.*); and the acts establishing the units of the National Park System, including but not limited to: Act of Sept. 28, 1962, 76 Stat. 650 (16 U.S.C. §§ 459d-459d-7); Act of Mar. 7, 1974, 88 Stat. 43 (16 U.S.C. § 460ee); Act of Oct. 11, 1974, 88 Stat. 1254 (16 U.S.C. §§ 698-698e); Act of Oct. 11, 1974, 88 Stat. 1258 (16 U.S.C. §§ 698f-698m-4); Act of Oct. 12, 1976, 90 Stat. 2329 (16 U.S.C. § 1274(15)); Act of Nov. 10, 1978, 92 Stat. 3534 (16 U.S.C. §§ 230-230i); Act of Nov. 10, 1978, 92 Stat. 3544 (16 U.S.C. §§ 460m-15-460m-30);. Act of Nov. 12, 1996, 110 Stat. 4202 (16 U.S.C. §§ 698u-698u-7).



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## ACRONYMS

**19jj** – Park System Resource Protection Act  
**9B, 9B Regulations** – Nonfederal Oil and Gas Rights Regulations (36 C.F.R. Part 9 Subpart B)  
**ACHP** – Advisory Council on Historic Preservation  
**ARPA** – Archeological Resources Protection Act  
**BA** – Biological Assessment  
**CAA** – Clean Air Act  
**CERCLA** – Comprehensive Environmental Response, Compensation, and Liability Act  
**CE** – categorical exclusion  
**C.F.R.** – Code of Federal Regulations  
**CLPR** – Current Legal and Policy Requirements  
**COE** – U.S. Army of Corps of Engineers  
**CWA** – Clean Water Act  
**CZMA** – Coastal Zone Management Act  
**DEIS** – draft environmental impact statement  
**DO-12** – NPS Director’s Order 12 and Handbook  
**DO-28** – NPS Director’s Order 28 – NPS Cultural Resources Management Guidelines  
**DO 77-1** – Director’s Order 77-1, Wetland Protection  
**DO 77-2** – Director’s Order 77-2, Floodplain Management  
**EA** – environmental assessment  
**EIS** – environmental impact statement  
**EO** – Executive Order  
**EPA** – Environmental Protection Agency  
**ESA** – Endangered Species Act  
**FIFRA** – Federal Insecticide, Fungicide, and Rodenticide Act  
**FIRM** – Flood Insurance Rate Maps  
**FLPMA** – Federal Land Policy and Management Act  
**FONSI** – Finding of No Significant Impact  
**FWS** – U.S. Fish and Wildlife Service  
**MBTA** – Migratory Bird Treaty Act  
**NAGPRA** – Native American Graves Protection and Repatriation Act  
**NEPA** – National Environmental Policy Act  
**NHPA** – National Historic Preservation Act  
**NMFS** – National Marine Fisheries Service  
**NOAA** – National Oceanic and Atmospheric Administration  
**NPS-77** – NPS Natural Resources Management Guidelines  
**OPA** – Oil Pollution Act  
**RCRA** – Resource Conservation and Recovery Act  
**ROD** – Record of Decision  
**SHPO** – State Historic Preservation Office  
**SOF** – Statement of Findings  
**SPCCP** – Spill Prevention Control and Countermeasure Plan  
**SUP** – Special Use Permit  
**T&E** – Threatened and Endangered Species  
**THPO** – Tribal Historic Preservation Office  
**U.S.C.** – U.S. Code  
**USDOC** – U.S. Department of Commerce  
**USGS** – U.S. Geological Survey  
**§** – section (this symbol is commonly used when citing laws and regulations)







## CHAPTER 1

# KEY PROVISIONS OF THE NATIONAL PARK SERVICE NONFEDERAL OIL & GAS RIGHTS REGULATIONS

## INTRODUCTION

The National Park Service promulgated oil and gas regulations at 36 C.F.R. Part 9, Subpart B (“9B regulations”) in December 1978. The 9B regulations govern oil and gas activities that are associated with the exploration and development of nonfederal oil and gas rights located within park boundaries where access is on, across, or through federally owned or controlled lands or waters.

The legal authority for the 9B regulations stems first from the *Property Clause* [art. IV, § 3 (2)] and the *Commerce Clause* [art. I, § 8 (3)] of the United States Constitution, and then from statutes enacted by Congress and signed into law by the President. With respect to statutes, Congress has given the NPS, through the Secretary of the Interior, power to regulate nonfederal oil and gas activities in parks via the general language contained in sections 1 and 3 of the NPS Organic Act, and specific provisions in individual park enabling statutes. Not all parks with nonfederal oil and gas development occurring within their boundaries have specific provisions within their enabling statutes that cover nonfederal oil and gas development. In such units the power of the NPS to regulate falls back to the Organic Act.

Nonfederal oil and gas rights consist of those held by individuals, companies, nonprofit organizations, state and local governments. Although these property rights fall under the protection of the 5th Amendment of the U.S. Constitution (“No person ... shall be deprived of ... property without due process of law; nor shall private property be taken for public use without just compensation.”), the NPS nonetheless has the authority to regulate these rights as stated above.

The 9B regulations are a park superintendent’s primary tool in protecting park resources from adverse impacts associated with the exercise of nonfederal oil and gas rights. To assess and manage these potential impacts, the 9B regulations require that an operator submit a plan of operations to the NPS describing all of the activities (from exploration to site reclamation) that an operator intends to undertake in order to develop their oil and gas interest. An operator must also submit a suitable performance bond. The NPS reviews the operator’s plan to make sure that the information is complete and, in turn, to ensure that park resources will be protected. Once the NPS has completed its review and environmental compliance responsibilities, it may approve the operator’s plan. The approved plan allows the operator to conduct operations in a unit of the National Park System.

If an operator intends to directionally drill a well from outside a unit of the National Park System to develop nonfederal oil and gas underneath the park, the operator must submit an application under 36 C.F.R. § 9.32(e) to the NPS to determine if the operator is eligible for an exemption from the plan of operations and performance bonding requirements. A description of this process and the information requirements for a § 9.32(e) application can be found in *Chapter 5 – Directionally Drilling a Well from Outside Park Boundaries to Inside a Park Unit*.



Below is a summary of key provisions of the 9B regulations. Appendix A includes a reprint of the 36 C.F.R. 9B regulations from the Code of Federal Regulations.

### **GOALS OF THE 9B REGULATIONS**

The 9B regulations ensure that oil and gas operators conduct their operations in ways that:

- are consistent with the purposes of the NPS unit,
- prevent or minimize damage to the environment and other resource values, and
- ensure, to the extent feasible, that all units of the National Park System are left unimpaired for the enjoyment of future generations.

It is important for operators to understand that Congress has mandated that the NPS protect park resources and values. Because oil and gas rights remain outstanding in some parks, the NPS must recognize those private property rights. However, the NPS must also fulfill its conservation mandate from Congress. The 9B regulations are reasonable time, place, and manner regulations that assist park managers in carrying out park mandates while allowing oil and gas operators to exercise their property rights.

### **RIGHT TO CONDUCT OIL AND GAS OPERATIONS IN NATIONAL PARK SYSTEM UNITS**

The right to conduct oil and gas operations in units of the National Park system is based on ownership rights and obtaining NPS authorization to conduct the operation (36 C.F.R. § 9.30(a)). The following persons may conduct operations in parks:

- the owners of the nonfederal oil and gas interest, whether or not they own the surface interest,
- persons or companies that lease the oil and gas interests (lessee) from the owners (lessor), and
- persons or companies under contract with (or with the expressed written consent from) the owners or lessees to perform work specific to oil and gas operations.

### **DEMONSTRATION OF OWNERSHIP RIGHTS**

To demonstrate ownership rights, operators must show the NPS that they hold either a “lease, deed, designation of operator, or assignment of rights...” (36 C.F.R. § 9.36(a)(2)). This is the most basic and important piece of information that an operator must provide to the NPS. Without a demonstration of ownership rights, the NPS owes no legal obligation to an operator to grant temporary approval, review a plan of operations, or evaluate a § 9.32(e) application.



## APPLICABILITY OF THE 36 C.F.R. 9B REGULATIONS

The applicability of the 9B regulations depends on access on federal lands (36 C.F.R. § 9.30(a)). If an operator uses "access on, across, or through lands or waters owned or controlled by the United States" to conduct operations, they must comply with the NPS 9B regulations.

The 9B regulations apply in any of the following situations:

- The oil and gas site in the park is on land owned by the United States.
- The oil and gas site in the park is on private land but the operator's access route is on, across, or through lands or waters owned or controlled by the United States.
- The operator accesses his/her oil and gas underlying the park from a surface location outside the park such that the wellbore crosses in to the park through lands or waters owned or controlled by the United States.

Under the 9B regulations:

Access means any and all ways of entering, going over, across, or underneath an area of land or water. It includes travel by vehicle, watercraft, fixed-wing aircraft, helicopter, off-road vehicle, mobile heavy equipment, snowmobile, pack animal, and by foot. It also includes travel of the drill bit.

Federally owned or controlled lands are all lands where the United States owns the surface estate which has been acquired through purchase, donation, public domain, or condemnation. It also includes lands that the United States holds any interest, such as a lease, easement, right-of-way, or cooperative agreement.

Federally owned or controlled waters include all surface waters within the boundaries of a National Park System unit. It does not matter what entity holds title to the submerged lands.

## PLAN OF OPERATIONS SCOPE

Operators have the flexibility to prepare a plan only for the activities they want immediate approval (36 C.F.R. § 9.30(c)). All future activities do not have to be included in a plan of operations. For example, an operator can choose to address only the activities of drilling a well and not include the production activities associated with the well. However, the operator must keep in mind that approval of a plan permits only those specific operations that are addressed in the plan.

The NPS has found that it sometimes makes sense to include the next phase of an oil and gas development project in a plan of operations. The most common example is a plan for drilling and then producing one or more wells. The advantage to this approach is that there would be no delays in beginning production operations if the well is successful in finding oil and gas. In many cases, operators have a fairly good idea of how many additional wells would be drilled and the necessary facilities that would be needed to produce the oil and gas to include that information in a single plan of operations. Also, when developing plans of operations for the production phase, operators should include future activities that are likely to be necessary. Common examples of actions that may not occur immediately, but are likely to be necessary in



the future include installation of compressors for gas wells, artificial lift, or well servicing/workovers.

In other instances, the operator may not have the available information to develop a proposal for the next phase of the operation. For example, including plans for drilling an exploration well with a 3D seismic proposal may not be appropriate. On the other hand, if a successful well were based on 3D seismic data, it would probably be prudent to develop a plan of operations that includes full field development.

### **RECLAMATION REQUIREMENTS**

All proposed plans of operations must adequately describe specific actions that will be taken to achieve compliance with the applicable reclamation requirements. The 9B regulations present two distinct sets of reclamation standards depending on ownership and control of the surface estate disturbed during the oil and gas operations. An operator must initiate reclamation as soon as operations cease, and no later than six months following completion of operations, unless the NPS authorizes a longer period of time. For more information on reclamation, see information for each type of oil and gas operation in *Chapters 3, 4, 5, 6, 7, and 8*.

### **PERFORMANCE BOND REQUIREMENTS**

Every plan of operations is conditioned on the operator filing a performance bond or other acceptable type of security payable to the NPS. This bond is in addition to any bonds that might be required by other regulatory agencies. If the operator fails to comply with the conditions in the plan of operations, the NPS can attach the bond to pay for any damage caused by the noncompliance. See *Chapter 10, Performance Bonds* for information on the NPS performance bond requirements.

### **WELLS THAT ARE DIRECTIONALLY DRILLED WITH SURFACE LOCATIONS OUTSIDE A PARK AND BOTTOMHOLE LOCATIONS INSIDE A PARK**

A well drilled underneath the park from a surface location outside the park is subject to the 9B regulations, but the NPS can grant an exemption from the 9B regulations if the NPS determines that "...such operation poses no significant threat of damage to park resources, both surface and subsurface, resulting from surface subsidence, fracture of geological formations with resultant fresh water aquifer contamination, or natural gas escape, or the like." (36 C.F.R. § 9.32(e)). Operators proposing to directional drill a well from outside a park unit to oil and gas within the park would prepare a § 9.32(e) application rather than a plan of operations. See *Chapter 5, Directionally Drilling a Well from Outside Park Boundaries to Inside a Park Unit* for information on how to prepare a § 9.32(e) application.



## CHANGES TO A PLAN OF OPERATIONS

Revisions to a plan of operations might be necessary due to changes in environmental conditions, operational needs, or to address a circumstance that was unforeseen when the plan of operations was first approved. Any activity that is not in the approved plan would require a revision to the plan of operations. Examples include: any new surface disturbance such as enlarging a wellpad to accommodate expanded production facilities, widening a road to improve access to the site; major workovers; deepening a well; and redrilling a well.

Either the operator or the NPS can initiate amendments to a plan of operations (36 C.F.R. § 9.40). Proposed revisions are made in writing with a description of the changes and why they are needed. Appendix C includes a sample letter (see *Plan of Operations Amendment*) that can be used by an operator to amend or update a plan of operations.

The proposed revisions must go through the NPS review process and an environmental analysis required under the National Environmental Policy Act (NEPA).

When the NPS initiates a revision, the process can take one of the following two paths:

1. If the revision is not being made to remove an immediate threat of significant injury to the park, then the NPS notifies the operator in writing 60 days prior to the date when the revision will become effective.
2. If the revision is necessary to remove an immediate threat of significant injury to the park, then the superintendent uses the suspension authority under the 9B regulations (36 C.F.R. § 9.33(c)).

If a revision is being done to avoid a threat of significant injury to park resources, the superintendent will require the operator to immediately suspend operations until the threat is removed or remedied. If the superintendent issues a suspension order, the operator will be notified in writing within 5 days with the reasons the operation needed to be shut down, and what must be done to resume operations. The operator has the right to appeal the suspension order under § 9.49, Appeals.

## SALE OR TRANSFER OF AN OPERATION

Under the 9B regulations, both the seller and buyer of an oil and gas operation have responsibilities if the operation that was sold was under an approved plan of operations (36 C.F.R. § 9.34).

The seller has 60 days to notify the superintendent with information about the transfer. The notification needs to include;

- the name and address of the new operator, and
- the description of the transferred interest.

The previous operator is responsible for the operations under the performance bond until the superintendent is notified of the transfer. At that time, the previous operator's bond may be released if the superintendent determines the operator has not retained any liability in the operation.



To continue operating, the new operator must either:

- accept in writing all the terms and conditions of the old plan of operations and file a performance bond, or
- cease operations and submit a new plan of operations to the NPS for review and approval.

In most cases, it makes sense for the new operator to ratify the old plan and file a performance bond. If and when the need arises, the new operator can then amend or submit a new plan of operations.

Appendix C includes sample letters that can be updated by an operator entitled, *Change of Operator Notification* (from new owner or from transferring owner).

### EXEMPTIONS TO THE 36 C.F.R. 9B REGULATIONS

The 9B regulations do not apply to every oil and gas operation that occurs in a park unit. The following classes of operations do not fall under the 9B regulations:

- Operations that do not access federally controlled lands or waters.
- Operations on federal leases (36 C.F.R. § 9.30(b)). Federal leasing is prohibited in all national parks with the exception of three national recreation areas (Lake Mead, Glen Canyon, and Whiskeytown). The few federal leases that remain in other parks are remnants from leasing before the area was designated as a unit of the National Park System. The Bureau of Land Management regulates federal lease operations under 43 C.F.R. § 3100.
- Operations on mining claims (36 C.F.R. § 9.30(b)). Activities resulting from valid existing mineral rights on patented or unpatented mining claims are covered by NPS regulations at 36 C.F.R., Part 9, Subpart A.
- Transportation pipelines associated with rights-of-way do not fall under the 9B regulations, but are subject to special use permits issued by the NPS. See *Chapter 8 – Transpark Pipelines* if the park has indicated that the pipeline operation requires a NPS permit.

### EXISTING OPERATIONS

Under the 9B regulations, an operator conducting “existing operations” may continue without submitting a plan of operations or filing a performance bond or security deposit. These operations are “grandfathered” (36 C.F.R. § 9.33).

An “existing operation” uses federal access, but meets one of the following conditions:

1. The operator was conducting operations under a valid state or federal permit as of January 8, 1979 (effective date of the 9B regulations),
2. The operator was conducting operations under a valid state or federal permit when the area became a new park unit, or
3. The operator was conducting operations under a valid state or federal permit when the area came into the park system by expansion of an existing unit.



If an operator was not required to obtain a federal or state permit prior to January 8, 1979, prior to the establishment of a new park unit, or prior to the expansion of an existing unit, he/she must come into compliance with the 9B regulations in accordance with the provisions of 36 C.F.R. § 9.33(b).

A state or federal permit is considered valid if:

- the permit was issued to the current operator on or before January 8, 1979, prior to the establishment of a new park unit, or prior to the expansion of an existing unit,
- the term of the permit has not expired, and
- the operations have not undergone any change requiring the operator to acquire a new permit since January 8, 1979, prior to the establishment of a new park unit, or prior to the expansion of an existing unit.

## **LOSS OF “EXISTING OPERATIONS” STATUS**

An existing operation can lose its exempt (grandfathered) status. If this happens, the operator must comply with the 9B regulations. This includes filing a plan of operations with the NPS and submitting a performance bond. An operator loses its "existing operation" status after its valid state or federal permit expires by its own terms.

The list below gives some examples of situations where a valid state or federal permit expires by its own terms:

- The operation has a change in operator.
- The operator proposes well work that requires new state approval. Examples include recompleting a well to a different producing zone (plug backs and deepenings), or well plugging and abandonment.
- The operator proposes to use additional federally owned lands or waters. New use of federal land or water in a park unit requires a new permit from the NPS. Examples include enlarging a wellpad to accommodate expanded production facilities or widening a road to improve access to the site.

## **SUSPENSION OF EXISTING OPERATIONS**

If "[a]t any time when [existing operations] pose an immediate threat of significant injury to federally owned or controlled lands or waters, the superintendent shall require the operator to suspend operations immediately until the threat is removed or remedied." (36 C.F.R. § 9.33(c))

The superintendent will notify the operator in writing (within 5 days) with the reasons the operation was shut down, and what must be done to resume the operations. The operator can appeal the suspension order under 36 C.F.R. § 9.49, Appeals.

Examples of an immediate threat of significant injury include, but are not limited to:

- escape of hydrogen sulfide or other toxic or noxious gas
- vegetation clearing or earth moving outside the area currently approved (by regulation or plan) for the operation



- uncontained or chronic oil, brine, or hazardous material spills
- well blow-out
- leaching or release of an environmental contaminant (e.g., contaminated stormwater runoff)
- fire or fire hazard
- unmaintained oil or brine storage tanks that lack secondary containment such as berms
- inadequate safeguard for controlling well pressures
- inadequate safeguards for protecting visitors and wildlife from serious injury
- damage to cultural resources

### PLUGGING AND RECLAMATION OF EXISTING OPERATIONS

Existing operations often lose their exempt status from the plan of operations and performance bond requirements because well plugging requires a new state permit. Prior to well plugging, the operator needs to:

1. file a plan of operations covering the well plugging and surface reclamation,
2. receive NPS approval, and
3. submit a performance bond.

It is very important for grandfathered operators to understand this aspect of the regulations, both environmentally and financially. The manner in which operations are conducted will directly affect the cost of the surface reclamation. It will also have a bearing on the sales price of the property because today's buyers are more aware of environmental liabilities.

### ADMINISTRATIVE APPEAL OF A NPS DECISION

An operator can formally appeal any decision made by the superintendent or the regional director (36 C.F.R. § 9.49). The appeals process is described below:

1. Within 30 days of receiving a decision, the operator files a written statement to the NPS official who made the decision. The statement describes in detail, how the decision disagrees with the facts, law, regulations, or is otherwise in error. In most cases the NPS official will be the superintendent or the regional director. The NPS has no obligation to act on appeals received after 30 days of NPS making its decision.
2. Upon receiving the appeal, the NPS official reviews the decision based on the operator's statement. The regulation says the review must be prompt, but gives no specific time frame.
3. If the NPS official changes his/her decision, the appeal process ends.
4. If the NPS official agrees with the original decision, the official prepares a written response to the operator. The statement explains why the decision will not change. The official also gives a copy of the statement and all supporting information to the next in the chain of command. An appeal only proceeds to the next level of NPS supervision. (The superintendent reports to the regional director who reports to the director of the NPS.)



5. The operator then has to provide a statement to the NPS official's supervisor. The operator states the disagreement(s) with the NPS official's reasons for allowing the original decision to stand. The operator has 30 days to file the exceptions. If the operator doesn't file exceptions, it means the operator drops the appeal. The appeal process then ends and the decision stands.
6. The regional director (or director) has 45 days after receiving the operator's exceptions to decide on the appeal. The decision on the appeal will be a written statement that lays out the facts of the case and the conclusions. The conclusions will be supported with reasons included in the statement.
7. Once the highest NPS official to review the appeal (regional director or director) makes a decision, the operator is bound by that decision. During the appeals process, an operator can petition to have the decision in question "stayed" (suspended). A stay will keep the decision from becoming effective until the appeal process is completed. A request for a stay can accompany the first appeal or be sent directly to the director. The NPS will promptly rule on requests for a stay (see 36 C.F.R. § 9.49 (e)).

At the conclusion of the administrative appeal process, an operator may further appeal its case in federal court.

## **DAMAGES AND PENALTIES**

Operators may be held liable for any damages to federally-owned or controlled lands, water, or resources resulting from failure to comply with:

- the plan of operations,
- the applicable permit under the existing operations provision of § 9.33, or
- where operations are temporarily approved under § 9.38, failure to comply with the terms of that temporary approval (§ 9.51(a)).

Additionally, the NPS has authority to recover up to treble damages from an operator under the Park System Resources Protection Act, 16 U.S.C. § 19jj. This statute a strict liability statute that authorizes the NPS to recover response costs and damages from a person who destroys, causes the loss of, or injures park system resources. For more information, see *Chapter 12 – Liability of operators, Contractors, and Subcontractors*.



## **9B TOPICS COVERED ELSEWHERE IN THIS HANDBOOK**

The following topics from the 9B regulations are covered in other chapters of this handbook.

- Use of Water (§ 9.35): Chapters 3, 4, and 7
- Plan of Operations Approval (§ 9.37): Chapter 2 – Plan of Operations
- Temporary Approval (§ 9.38): Chapter 2 - Plan of Operations
- Reclamation Requirements (§ 9.39): Chapters 3, 4, and 7 – Information Requirements lists and Chapter 7: Well Plugging and Surface Reclamation – Operating Stipulations Table
- Operating Standards (§ 9.41): Chapters 3, 4, and 7 – Operating Stipulations Tables
- Handling of Wastes (§ 9.45):– Chapters 3, 4, and 7 – Operating Stipulations Tables
- Cultural Resource Protection (§ 9.47):– Appendix B, Part B – Environmental Compliance
- Performance Bond (§ 9.48): Chapter 10 – Performance Bonds
- Damages and Penalties (§ 9.51): Chapter 12 – Liability of Operators, Their Contractors and Subcontractors
- Public Inspection of Documents (§ 9.52): Chapter 2 – Public Review and Comment on the Plan of Operations and NEPA Document

Some sections of the 9B regulations are self-explanatory and are reprinted in Appendix A., including:

- Definitions: § 9.31
- High Pressure Precautions: § 9.43
- Open Flows and Control of Wild Wells: § 9.44
- Well Records and Reports, Plots and Maps, Samples, Tests, and Surveys: § 9.42
- Accidents and Fires: § 9.46
- Use of Roads by Commercial Vehicles: § 9.50



## CHAPTER 2

# PLAN OF OPERATIONS PERMITTING PROCESS

### INTRODUCTION

A plan of operations (plan) is the heart of the 9B regulations. The operator is responsible for preparing the plan of operations. The plan is essentially the operator's blueprint of intended activities over the life of the oil and gas operation and may include exploration, well drilling, production, and well plugging and surface reclamation. It describes the proposed operation, including the equipment, methods, and materials to be used in the operation, access to the site, mitigation measures that will be implemented to protect park resources and values, environmental conditions in the vicinity of the site, alternatives to the proposal, and the environmental impacts of the proposed operation. When approved, the plan of operations serves as the operator's permit to conduct operations in a unit of the National Park System.

This chapter describes the plan of operations application and permitting process and is organized sequentially from the first steps in the preparation of a plan to its final approval. Table 2.1 outlines a typical plan of operations application and approval process.

NOTE: Operators that intend to access their nonfederal minerals underneath a national park unit by directionally drilling from a surface location outside of the park should refer to *Chapter 5 - Directionally Drilling a Well from Outside Park Boundaries to Inside a Park Unit* for a description of the application and approval process.

To assist an operator in developing a plan of operations, specific information requirements, operating stipulations, and recommended mitigation measures for each type of oil and gas operation are presented in *Chapter 3 - Geophysical Operations*, *Chapter 4 - Drilling and Production Operations*, *Chapter 5 - Directional Drilling Operations*, *Chapter 6 - Existing Oil and Gas Production Operations*, *Chapter 7 - Well Plugging and Surface Reclamation*, *Chapter 8 - Transpark Pipelines*, and *Chapter 9 - Flowlines and Gathering Lines*.

A comprehensive list and description of the legal and policy requirements applicable to oil and gas operations on NPS lands is included in *Appendix B - Current Legal and Policy Requirements for Nonfederal Oil and Gas Operations in National Park System Units*. *Appendix B, Part B - Environmental Compliance Requirements for the Major Laws Affecting Nonfederal Oil and Gas Operations* includes overviews of key environmental laws that apply to nonfederal oil and gas operations, including flowcharts outlining the primary compliance processes. These flowcharts are included in this handbook to aid the operator in understanding his/her responsibilities as well as to illustrate the legal requirements the NPS must comply with in order to approve a 9B oil and gas operation.



**Table 2.1.**  
**National Park Service Estimated Processing Time for a Plan of Operations**

<b>ACTION<sup>3</sup></b>	<b>NPS RESPONSE TIME</b>	<b>LIMITING FACTOR</b>
1. Operator contacts park regarding interest in conducting oil and gas operations. Operator provides written documentation demonstrating right to conduct operations in the park.	Same day	Subject to park staff availability
2. Park provides operator with a CD ROM (or NPS web address) of the operator's handbook which includes the 36 C.F.R. 9B regulations, plan of operations information requirements, and other pertinent information.	Same day	Subject to park staff availability
3. Operator meets with park staff to determine: resources that would be affected by the operation; environmental planning and compliance requirements; and affected local, state and federal agencies.	Variable – NPS provides assistance as needed. Scoping meeting typically lasts one day.	Subject to park staff and operator availability
4. Operator meets with park staff and affected federal, state, and local agencies to: identify resource issues, permitting requirements, impact mitigation strategies, and performance standards.	Variable – NPS provides assistance as needed.	Subject to park staff, other agency staff, and operator availability
5. Operator submits written request for temporary access to gather basic information needed to complete the plan of operations.	Variable - NPS provides assistance as needed.	Subject to operator response
6. Park issues 60-day temporary data collection permit which includes applicable park resource and visitor protection requirements.	1 - 2 days	Subject to park staff availability
7. Operator conducts necessary surveys as applicable, including natural and cultural surveys, and surveys and stakes the operations area.	Variable - NPS provides assistance as needed.	Subject to operator response or timing requirements
8. Operator submits plan of operations to park.	Variable - NPS provides assistance as needed.	Subject to operator response
9. NPS performs a completeness and technical adequacy review of the plan of operations. Park accepts plan of operations as complete or returns the plan to the operator with specific directions on how to revise the plan.	30 days	NPS policy from NPS procedures governing nonfederal oil and gas rights, 1992; and 36 C.F.R. § 9.36(c)
10. Operator revises plan of operations, as necessary.	Variable - NPS provides assistance as needed.	Subject to operator response
11. Park staff prepares NEPA document (categorical exclusion, memo to the files, environmental assessment, or environmental impact statement) or adopts operator's NEPA document, incorporates other environmental compliance (National Historic Preservation Act, wetlands, floodplains, Endangered Species Act, Coastal Zone Management Act etc.), and initiates required consultations with other agencies. Park completes public review process, finalizes decision documents, and notifies the operator if the plan has been approved, conditionally approved, or rejected.	60 days (includes 30-day public review of EA)	36 C.F.R. § 9.37, 36 C.F.R. § 9.52(b), NPS Director's Order 77-1 (Wetland Protection), NPS Director's Order 77-2 (Floodplain Management), and Director's Order-12 (Conservation Planning, Environmental Impact Analysis, and Decision Making). Operator is notified if additional time is needed per 36 C.F.R. § 9.37(b)(6).
12. Operator agrees to conditions of approval (if any), submits applicable state and federal permits, and files suitable performance bond with the NPS.	Variable	Subject to operator response
<b>TOTAL NPS RESPONSE TIME</b>	Minimum of 3 to 4 months	Dependent on compliance requirements

<sup>3</sup> Steps 1 through 6 may not occur sequentially as presented in Table 2.1 because project scoping and data collection are iterative, rather than linear processes.



## DEMONSTRATION OF AN OPERATOR'S OWNERSHIP RIGHT

To prevent damage to park resources and values and avoid wasting staff time, the NPS must ensure that a project proponent has bona fide property rights with respect to a mineral interest. Not surprisingly then, the first matter of business is for the NPS to verify the person's ownership right to oil and gas resources in the park.

Demonstration of ownership rights is a fundamental information requirement of the 9B regulations and is the first step in the oil and gas permitting process. The following types of documentation can be used to demonstrate the operator's property right to conduct oil and gas operations:

- lease,
- deed,
- assignment of rights, or
- designation of operator (may include a unit agreement).

Prior to an operator conducting any activities in a park unit, including data collection for the purpose of preparing a plan of operations, the operator must first demonstrate that he/she has an undisputed property right to the oil and gas resources in the park unit. In no event will the NPS issue a data collection permit or formally accept a plan of operations as complete if a prospective operator lacks documentation of property rights in all areas where operations are proposed.

For existing operations, the NPS may accept a copy of a state operating permit or equivalent documentation from the state agency responsible for regulating oil and gas activities, provided the state permitting process includes a demonstration of the permit holder's ownership right. For more information on existing operations, see *Chapter 6 Existing Oil and Gas Operations*.

*Appendix C* includes an *Operator's Ownership Right* sample letter that can be updated by an operator to demonstrate the operator's right to conduct operations in a unit of the National Park System.

## PROJECT SCOPING AND ONSITE MEETING

Scoping is the initial phase of the project planning process and involves the park staff and operator. Project scoping needs to be conducted as early as possible to be effective; when an operator demonstrates its ownership right, and before the operator begins to prepare a plan of operations.

Scoping is a process in which an operator describes the proposed oil and gas operation to the park staff; and together, the park staff and operator identify:

- applicable legal and policy requirements,
- roles and responsibilities,
- project-specific issues,
- alternative locations and methods for the operation,
- mitigation measures,



- available sources of data,
- additional data collection / information requirements, and
- project timeline.

Most often the park staff will conduct project scoping with the operator. Depending on the complexity of the proposal and the types of issues to be described and evaluated, participation by other state/federal/tribal agency staff, and NPS technical specialists from NPS Support Offices, Geologic Resources Division, and other Natural Resource Program Center offices may also be necessary at the scoping meeting.

Effective scoping helps the operator prepare a complete and environmentally sound plan of operations. Poor scoping can result in information deficiencies in the plan that could require revisions to the plan and result in delays in approving and beginning the operation.

### **DISCUSSION ITEMS FOR PROJECT SCOPING/ONSITE MEETING**

The following topics should be covered during the scoping/onsite meeting to assist operators in the preparation of a plan of operations:

#### **Operator**

The operator should describe the proposed operation. The discussion should include:

- type of operation,
- location,
- access to the operation's site,
- methods to be used, and
- proposed schedule.

#### **National Park Service**

The NPS will:

1. Describe the 36 C.F.R. 9B permitting process, including:
  - a. overview of the plan of operations preparation, review, and approval process,
  - b. content requirements for a plan of operations,
  - c. specific data/information requirements,
  - d. temporary permit for data collection, surveying, and staking the operations area,
  - e. other-agency consultation and permitting requirements,
  - f. plan of operations completeness and technical adequacy review,
  - g. NEPA and other environmental compliance documentation,
  - h. public review and comment, and
  - i. performance bonding.
2. Identify other applicable legal mandates and direction such as: park enabling act, Organic Act and General Authorities Act, National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), Coastal Zone Management Act (CZMA), Wetland Protection (DO 77-1), Floodplain Management (DO 77-2), applicable park planning documents (General



Management Plan, Statement for Management, Oil and Gas Management Plan etc.), and Park System Resource Protection Act (also known as 19jj).

3. Identify interested and affected state/federal/tribal agencies, such as, the U.S. Army Corps of Engineers (COE), State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), and adjacent landowners.
4. Identify roles and responsibilities of NPS staff, operator, other state/federal/tribal agencies (e.g. , determine who coordinates meeting with interested state/federal/tribal entities; prepares plan of operations, NEPA document, Biological Assessment (BA), wetlands and/or floodplains Statement of Findings (SOF); coordinates public involvement; consults with affected state and federal agencies; and issues permit(s)).
5. Review available NPS data for the proposed operations area and identify additional data collection/information needs.
6. If applicable to the proposed operation, discuss the requirement for a third party monitor. The NPS will provide the operator with the roles and responsibilities and necessary qualifications of the third party monitors. In some cases this information may not be developed until after the NPS technical adequacy review of the plan of operations.

### **Site Visit**

The operator and NPS should visit the proposed operations area, including the proposed access route(s), layout of seismic lines, well location, staging area(s), etc. During the site visit the operator and NPS will:

1. Identify resources and values that could potentially be affected by the operation. Use Table 2.2, Environmental Screening Form (ESF) as a basis for discussion. Identify information and data needs listed on the ESF.
2. Discuss alternative ways to develop the project. In order to minimize impacts, consider different:
  - a. locations and access routes,
  - b. types of equipment,
  - c. operating methods, and
  - d. times to conduct operations.
3. Identify potential impacts on park resources and values from the proposed operation and alternatives.
4. Develop mitigation measures to protect park resources and values. See *Tables of Operating Stipulations and Recommended Mitigation Measures for Geophysical Exploration Operations (Chapter 3), Drilling and Production Operations (Chapter 4), and Well Plugging and Surface Reclamation (Chapter 7)* in this handbook.
5. Develop a project schedule for data-collection, preparation of the plan of operations, and implementation of the proposal.

Following the scoping meeting, the park staff compiles the meeting notes and distributes them to the operator and NPS staff. The meeting notes summarize the decisions that were made at the meeting (required resources surveys, alternatives considered, mitigation measures etc.).







**Table 2.2. Environmental Screening Form**

**ENVIRONMENTAL SCREENING FORM (ESF)**

(Revised June 2004, per DM)

*This form should be attached to all NEPA documents sent to the regional director's office for signature. Sections A and B should be filled out by the project initiator (may be coupled with other park project initiation forms). Sections C, D, E, and G are to be completed by the interdisciplinary team members. While you may modify this form to fit your needs, you must ensure that the form includes information detailed below and must have your modifications reviewed and approved by the regional environmental coordinator. To access this form and other compliance project information, go to <http://pepc.nps.gov>.*

**A. PROJECT INFORMATION**

Park Name \_\_\_\_\_ Project/PMIS Number \_\_\_\_\_

Project Type (Check): ☐ Cyclic ☐ Cultural Cyclic ☐ Repair/Rehab ☐ ONPS  
☐ NRPP ☐ CRPP ☐ FLHP  
☐ Line Item ☐ Fee Demo ☐ Concession Reimbursable  
☐ Other (specify) \_\_\_\_\_

Project Location \_\_\_\_\_

Project Originator/Coordinator \_\_\_\_\_

Project Title \_\_\_\_\_

Contract # \_\_\_\_\_ Contractor Name \_\_\_\_\_

Administrative Record Location \_\_\_\_\_

Administrative Record Contact \_\_\_\_\_

**B. PROJECT DESCRIPTION/LOCATION** *(To begin the statutory compliance file, attach to this form, maps, site visit notes, agency consultation, data, reports, categorical exclusion form (if relevant), or other relevant materials.)*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Preliminary drawings attached? ☐ Yes ☐ No Background info attached? ☐ Yes ☐ No

Date form initiated \_\_\_\_\_ Anticipated compliance completion date \_\_\_\_\_

Projected advertisement/Day labor start \_\_\_\_\_ Projected construction start \_\_\_\_\_

Is project a hot topic (controversial or sensitive issues that should be brought to attention of Regional Director)?  
☐ Yes ☐ No

**C. RESOURCE EFFECTS TO CONSIDER** *(Please see section F, Instructions for Determining Appropriate NEPA Pathway, prior to completing this section. Also use the process described in DO-12, 2.9 and 2.10; 3.5(G) to (G)(5) and 5.4(F) to help determine the context, duration, and intensity of effects on resources.)*

	Identify potential effects to the following physical, natural, or cultural resources	No Effect	Negligible Effects	Minor Effects	Exceeds Minor Effects	Data Needed to Determine
1	Geological resources – soils, bedrock, streambeds, etc.					
2	From geohazards					
3	Air quality					
4	Soundscapes					
5	Water quality or quantity					
6	Streamflow characteristics					



## CHAPTER 2 - PLAN OF OPERATIONS PERMITTING PROCESS

### ENVIRONMENTAL SCREENING FORM (ESF)

(Revised June 2004, per DM)

-continued-

	Identify potential effects to the following physical, natural, or cultural resources	No Effect	Negligible Effects	Minor Effects	Exceeds Minor Effects	Data Needed to Determine
7	Marine or estuarine resources					
8	Floodplains or wetlands					
9	Land use, including occupancy, income, values, ownership, type of use					
10	Rare or unusual vegetation – old growth timber, riparian, alpine					
11	Species of special concern (plant or animal; state or federal listed or proposed for listing) of their habitat					
12	Unique ecosystems, biosphere reserves, World Heritage Sites					
13	Unique or important wildlife or wildlife habitat					
14	Unique, essential or important fish or fish habitat					
15	Introduce or promote non-native species (plant or animal)					
16	Recreation resources, including supply, demand, visitation, activities, etc.					
17	Visitor experience, aesthetic resources					
18	Archeological resources					
19	Prehistoric/historic structures					
20	Cultural landscapes					
21	Ethnographic resources					
22	Museum collections (objects, specimens, and archival and manuscript collections)					
23	Socioeconomics, including employment, occupation, income changes, tax base, infrastructure					
24	Minority and low income populations, ethnography, size, migration patterns, etc.					
25	Energy resources					
26	Other agency or tribal use plans or policies					
27	Resource, including energy, conservation potential, sustainability					
28	Urban quality, gateway communities, etc.					
29	Long-term management of resources or land/resource productivity					
30	Other important environmental resources (e.g., geothermal, paleontological resources)?					

Comments \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**ENVIRONMENTAL SCREENING FORM (ESF)**  
(Revised June 2004, per DM)  
-continued-

**D. MANDATORY CRITERIA**

<b>Mandatory Criteria: If implemented, would the proposal:</b>	<b>Yes</b>	<b>No</b>	<b>Comment or Data Needed to Determine</b>
A. Have significant impacts on public health or safety?			
B. Have significant impacts on such natural resources and unique geographic characteristics as historic or cultural resources; park, recreation, or refuge lands; wilderness areas; wild or scenic rivers; national natural landmarks; sole or principal drinking water aquifers; prime farmlands; wetlands (Executive Order 11990); floodplains (Executive Order 11988); and other ecologically significant or critical areas?			
C. Have highly controversial environmental effects or involve unresolved conflicts concerning alternative uses of available resources (NEPA section 102(2)(E))?			
D. Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?			
E. Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?			
F. Have a direct relationship to other actions with individually insignificant, but cumulatively significant, environmental effects?			
G. Have significant impacts on properties listed or eligible for listing on the National Register of Historic Places, as determined by either the bureau or office?			
H. Have significant impacts on species listed or proposed to be listed on the List of Endangered or Threatened Species, or have significant impacts on designated Critical Habitat for these species?			
I. Violate a federal law, or a state, local, or tribal law or requirement imposed for the protection of the environment?			
J. Have a disproportionately high and adverse effect on low income or minority populations (Executive Order 12898)?			
K. Limit access to and ceremonial use of Indian sacred sites on federal lands by Indian religious practitioners or significantly adversely affect the physical integrity of such sacred sites (Executive Order 13007)?			
L. Contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of such species (Federal Noxious Weed Control Act and Executive Order 13112)?			

For the purposes of interpreting these procedures within the NPS, any action that has the potential to violate the NPS Organic Act by impairing park resources or values would constitute an action that triggers the DOI exception for actions that threaten to violate a federal law for protection of the environment.



### ENVIRONMENTAL SCREENING FORM (ESF)

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-continued-

#### E. OTHER INFORMATION *(Please answer the following questions/provide requested information.)*

Are personnel preparing this form familiar with the site? ☐ Yes ☐ No

Did personnel visit site? ☐ Yes ☐ No *(If yes, attach meeting notes re: when site visit took place, who attended, etc.)*

Is the project in an approved plan such as a General Management Plan or an Implementation Plan with an accompanying NEPA document? ☐ Yes ☐ No If so, plan name \_\_\_\_\_

Is the project still consistent with the approved plan? ☐ Yes ☐ No

*(If no, you may need to prepare plan/EA or EIS.)*

Is the environmental document accurate and up-to-date? ☐ Yes ☐ No

*(If no, you may need to prepare plan/EA or EIS.)*

FONSI ☐ ROD ☐ *(Check one)* Date approved \_\_\_\_\_

Are there any interested or affected agencies or parties? ☐ Yes ☐ No

Did you make a diligent effort to contact them? ☐ Yes ☐ No ☐ NA

Has consultation with all affected agencies or tribes been completed? ☐ Yes ☐ No ☐ NA *(If yes, attach additional pages re: consultations, including the name, dates, and a summary of comments from other agencies or tribal contacts.)*

Are there any connected, cumulative, or similar actions as part of the proposed action (e.g., other development projects in area or identified in GMP, adequate/available utilities to accomplish project)? ☐ Yes ☐ No *(If yes, attach additional pages detailing the other actions.)*

#### F. INSTRUCTIONS FOR DETERMINING APPROPRIATE NEPA PATHWAY

First, always check DO-12, section 3.2, "Process to Follow," in determining whether the action is categorically excluded from additional NEPA analyses. Other sections within DO-12, including sections 2.9 and 2.10; 3.5; 4.5(G) and (G)(5); and 5.4(F), should also be consulted in determining the appropriate NEPA pathway. Complete the following tasks: conduct a site visit or ensure that staff is familiar with the site's specifics; consult with affected agencies, and/or tribes, and interested public; and complete this environmental screening form.

If your action is described in DO-12, section 3.3, "CEs for Which No Formal Documentation is Necessary," follow the instructions indicated in that section.

If your action is not described in DO-12, section 3.3, and IS described in section 3.4, AND you checked YES or identified "data needed to determine" impacts in any block in section D (Mandatory Criteria), this is an indication that there is potential for significant impacts to the human environment, therefore you must prepare an EA or EIS or supply missing information to determine context, duration, and intensity of impacts.

If your action is described in section 3.4 and NO is checked for all boxes in section D (Mandatory Criteria), AND there are either no effects or **all** of the potential effects identified in Section C (Resource Effects to Consider) are no more than minor intensity, usually there is no potential for significant impacts and an EA or EIS is not required. If, however, during internal scoping and further investigation, resource effects still remain unknown, or are at the minor to moderate level of intensity, and the potential for significant impacts may be likely, an EA or EIS is required.

In all cases, data collected to determine the appropriate NEPA pathway must be included in the administrative record.



ENVIRONMENTAL SCREENING FORM (ESF)

(Revised June 2004, per DM)

-continued-

**G. INTERDISCIPLINARY TEAM SIGNATORIES** *(All interdisciplinary team members must sign.) By signing this form, you affirm the following: you have either completed a site visit or are familiar with the specifics of the site; you have consulted with affected agencies and tribes; and you, to the best of your knowledge, have answered the questions posed in the checklist correctly.*

Interdisciplinary Team Leader Name	Discipline/Field of Expertise	Date
Technical Specialists Names	Discipline/Field of Expertise	Date

**H. SUPERVISORY SIGNATORY**

*Based on the environmental impact information contained in the statutory compliance files and in this environmental screening form, environmental documentation for the subject project is complete. If the project involves hot topics or sensitive issues, I have briefed the deputy or regional director.*

Recommended:

Compliance Specialist	Telephone Number	Date

Approved:

Superintendent	Telephone Number	Date







## APPLICATION FOR A TEMPORARY PERMIT

When scoping is completed, the operator and park staff have identified the proposed operations area (including access routes) and developed a list of resources and values that could potentially be affected by the proposed operation. The operator will then collect data in the operations area to describe the existing environmental conditions and incorporate this information in the plan of operations (36 C.F.R. § 9.36(16)(i)). The survey area includes all areas to be affected directly or indirectly by the operations, not just the immediate operations area. For some 3D seismic programs, it may not be feasible to select access routes, shotpoints, etc. over a large program area during the initial project scoping. When reconnaissance surveys are being conducted to actually develop proposed access routes, shotpoint locations, and necessary offsets, the NPS temporary approval may direct that the operator conduct resource surveys at the same time so that all resources are considered when selecting specific locations of operations.

The regional director may approve on a temporary basis, an operator's access on, across or through federally-owned or controlled lands or waters for the purpose of collecting basic information under 36 C.F.R. § 9.38(a)(1), Temporary Approval. A permit to survey and stake the proposed operations area for the purpose of collecting natural and cultural resource data, and to survey the site and access route is granted by the regional director for a period "...not in excess of sixty (60) days."

The NPS will only issue a data collection permit to a prospective operator after it receives the operator's documentation of its property right interest in the proposed operations area. Early in the project planning process, operators may be faced with a decision to complete the process of obtaining rights or modify their project to conduct operations only in the areas where they possess property rights. For example, in the case of seismic operations, a project may need to be modified because an operator is unable to obtain authorization to conduct operations from all of the mineral owners in the proposed project area.

Prior to collecting resource information, the operator should determine what data are available from the park and other state and federal agencies, and technical specialists. The resource information collected by the operator must be detailed enough for the NPS to analyze the potential impacts of the proposed operation in its National Environmental Policy Act (NEPA) document.

Information needed by the NPS to issue the temporary permit, includes:

- Name of operator,
- Description of proposed operations,
- Documentation demonstrating the operator's property right to explore for and/or develop nonfederal minerals underlying the park. (This information is not required if it has already been provided to the park to initiate the scoping process for the proposed operations),
- Type of survey(s) to be conducted,
- Location of survey(s) - include a map showing access routes and boundary of survey(s),
- Proposed date to start survey(s) (NOTE: a minimum 2-week advance notice to the NPS is recommended), and



- Type of equipment and methodology proposed to conduct the survey(s), including a description of the type of equipment/methods proposed to access and survey the proposed project area (e.g. by foot, vehicle, ATV, helicopter etc.).

To ensure the quality and accuracy of the data, it is critical that qualified professionals conduct all natural resource, cultural resource, and engineering surveys. Prior to the park issuing a data collection permit, NPS resources specialist(s) will review and approve the technical qualifications of the surveyors. This information is typically included in a scope of the work for the survey.

The 60-day temporary permit will be issued by the NPS via a letter to the operator, and will specify start and end dates. The park superintendent may include operating stipulations in the permit letter that would be applied to protect park resources and values, park management activities, and visitor uses and experiences. The permit letter must be carried by the individual(s) while they are conducting the survey(s) in the park. The operator or their subcontractors must coordinate site visits with the park to ensure that a park representative is available to accompany workers engaged in gathering data and/or surveying in the park.

*Appendix C – Sample Letters for Nonfederal Oil and Gas Operations* includes the sample letter - *Request for a Temporary Access Permit* and supplementary information that can be used by an operator to request a temporary access permit for data collection to conduct a new operation or to continue an existing operation.

### TYPES OF SURVEYS

Based on the data needs determined during project scoping, 60-day temporary permits are issued for the following types of surveys:

1. **Proposed operations area** – Conduct a field survey and stake the proposed operations area, including:
  - a. location and boundaries of existing and proposed access roads or routes to the operations site, wellpads, and other operational areas, and
  - b. topographic profile(s) of wellpad and access road, including cut and fill areas.
2. **Geologic resources** – Collect baseline information to describe soils, topography, and surface and subsurface geologic formations, and determine if unique geologic features (e.g. , filled chimneys, pimple mounds, salt diapirs, caves/karst, geothermal resources), and surface and subsurface geohazards (e.g., landslide areas, highly erodible soils, shrink-swell soils, zones of hydrogen sulfide, high pressure zones) occur or are likely to occur in the operations area.
3. **Paleontological resources** – Determine if fossil remains occur or are likely to occur in the operations area.
4. **Surface and groundwater hydrology** – Collect information to describe surface water and groundwater in the vicinity of the proposed operations area to establish a baseline for possible future clean-up and remediation activities.
5. **Floodplains** – In the absence of Flood Insurance Rate Maps (FIRM), hydrologic and hydraulic analyses will be required to determine if the operations area is located within or adjacent to the 100-year, 500-year, or extreme floodplain.



6. **Wetlands** – Determine if the operations area is located within or adjacent to wetlands and assess wetland functions and values.
7. **Vegetation** – Establish baseline vegetation conditions (percent composition and diversity), baseline data will be used to reclaim the operations area after completion of the operations and determine if threatened or endangered plants or their habitats occur or are likely to occur in the operations area.
8. **Fish and wildlife/species of management concern (threatened and endangered species)** – Collect baseline information on the fish and wildlife that inhabit the proposed operations area and determine if threatened or endangered animals or their habitats occur or are likely to occur in the operations area.
9. **Cultural resources** – Determine if ethnographic resources, archeological resources, historic structures, and/or cultural landscapes occur in the operations area and if resources are listed in or eligible for listing in the National Register of Historic Places.
10. **Coastal zone resources** – If an operation is proposed in a state that has an USDOC/NOAA-approved Coastal Zone Management Program, and potential exists for proposed operations to have a “spillover effect” on coastal resources located outside the park, identify coastal resources in the operations area that extend outside of the park.

## PLAN OF OPERATIONS PREPARATION AND SUBMITTAL

When site-specific resource information has been collected and analyzed,<sup>4</sup> and all required consultations and permit applications have been initiated with the appropriate entities, the operator, or a contractor paid by the operator, prepares the plan of operations. The operator should confirm with the park the type of media (e.g., printed or electronic version, CD-ROM) and the number of copies that are needed for NPS review. If printed copies are sent to the park, extra copies may be necessary so that the public may review the plan. The plan should be sent directly to the park representative that is responsible for overseeing the oil and gas operation. The staff is listed in *Appendix E – NPS Nonfederal Oil and Gas Program Contacts*.

## ADEQUACY DETERMINATION ON A PROPOSED PLAN OF OPERATIONS

A proposed plan of operations submitted by an operator will be officially accepted for formal review by the NPS when the regional director<sup>5</sup> determines that the plan:

1. contains all information required by the superintendent, and
2. is sufficiently detailed for the NPS to effectively analyze the impacts of the proposed operations on park resources and values.

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<sup>4</sup> The operator is required to conduct a pre-operational analysis to adequately describe the natural, social, and economic environments that would be affected by the operations (surveys may include: air quality, geology, topography, soils, paleontological resources, surface and subsurface hydrology, vegetation, floodplains, wetlands, fish and wildlife, threatened and endangered species, cultural resources, all water and oil and gas wells within a 2-mile radius of proposed operation) (36 C.F.R. § 9.36(a)(16)(i)).

<sup>5</sup> The 9B regulations specify that the regional director will officially accept a plan for formal review by the NPS (36 C.F.R. § 9.36(c)(1)). However, this responsibility may be delegated to the superintendent in some NPS regions.



The 9B regulations do not give a required time period for the NPS to make the adequacy determination. Every effort will be made to review the plan for completeness and respond to the operator within several weeks of receipt of the plan.

The NPS adequacy review will take place at different NPS offices at the same time. The superintendent prepares a response letter for the operator. If the plan is not accepted as adequate, the superintendent will respond in writing and explain what information is needed to complete and/or revise the plan.

### **PUBLIC REVIEW AND COMMENT ON THE PLAN OF OPERATIONS AND NEPA DOCUMENT**

Once the internal NPS adequacy review of the plan of operations has been completed and the plan is accepted by the NPS, the NPS prepares the environmental documentation required under the National Environmental Policy Act (NEPA). The plan and NEPA document are then made available for public review and comment (36 C.F.R. § 9.52(b)). The NPS policy is to have concurrent public review of a plan of operations, NEPA document, and if required, wetlands and floodplain Statements of Findings (SOF). The NPS required public review period for a plan of operations and environmental assessment is 30 days, and 60 days for an environmental impact statement. For more information on the NEPA planning process and other compliance requirements, see *Appendix B, Part B - Environmental Compliance*.

As part of the plan review process, the NPS also must comply with requirements under federal laws that mandate “consultation.” This may affect the timeline for the decision on the plan.

Required consultations for a plan of operations may include:

- Endangered Species Act (ESA) consultations with the U.S. Fish and Wildlife Service (FWS), and if applicable, the National Marine Fisheries Service (NMFS);
- National Historic Preservation Act (NHPA) consultations with the State Historic Preservation Office (SHPO), Tribal Historic Preservation Office (THPO), and if necessary, the Advisory Council on Historic Preservation (ACHP);
- Consultation with appropriate state and federal agencies if direct or indirect effects are expected to wetlands or floodplains under Executive Orders and NPS implementing guidelines such as the U.S. Army Corps of Engineers (COE); and
- Consultations with the state agency responsible for implementation of the Coastal Zone Management Program under the Coastal Zone Management Act (CZMA) if the operation(s) could affect resources in the coastal zone.

The compliance processes for the above statutes are presented in detail in *Appendix B, Part B - Environmental Compliance*.



## **NATIONAL PARK SERVICE APPROVAL STANDARDS AND DECISION ON A PROPOSED PLAN OF OPERATIONS**

### **APPROVAL STANDARDS**

The regional director must use the following approval standards when making a decision on a proposed plan of operations:

1. In all cases, the operator must use methods that are least damaging to the park's resources and provide protection of public health and safety (36 C.F.R. § 9.37(a)(1)).
2. Where operations occur on nonfederal property, operations cannot significantly damage federally-owned or controlled lands and waters (36 C.F.R. § 9.37(a)(2)).
3. Where operations occur on federally owned or controlled lands, the regional director cannot approve a plan if the operations would prevent the park from meeting its legal obligations of preserving its long-term natural and ecological integrity. If applying this standard would, under applicable law, constitute a taking of a property interest rather than an appropriate exercise of regulatory authority, the NPS may either approve the operations if it uses least damaging methods or acquire the mineral interest (36 C.F.R. § 9.37(a)(3)).
4. The plan must contain all of the information set out in § 9.36 as it applies to the type of operation that is proposed (36 C.F.R. § 9.37(a)(4)).

### **DECISION ON A PLAN OF OPERATIONS**

The NPS has 60 days to make a decision on the plan of operations after the plan has been determined to be technically adequate (36 C.F.R. § 9.37(b)). The 60-day NPS time period includes the preparation and public review of the NEPA document and compliance with all other applicable federal and state laws, regulations, federal executive orders, and NPS policies. Within 60 days, the regional director will make a determination and notify the operator in writing that the plan:

- is approved,
- is rejected and the reasons for the rejection,
- is conditionally approved, subject to the operator's acceptance of specific provisions and stipulations,
- must be modified prior to its approval, or
- must contain additional information to effectively analyze the impacts that the proposed operation would have on the preservation, management, and use of the NPS unit.

If there are circumstances that require additional processing time, the permitting process may be extended. The permitting process could be extended if:

- the analysis shows that a threatened or endangered species is present in the proposed project area and the NPS is required to undertake Endangered Species Act formal Section 7 consultation with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service (36 C.F.R. § 9.37(b)(6)),
- the analysis shows that cultural resources that are listed or eligible for listing on the National Register of Historic Places may be present in the proposed operations area. To ensure protection of cultural resources, it may be necessary to undertake formal



consultation under the National Historic Preservation Act § 106 with the State Historic Preservation Office, Tribal Historic Preservation Office, and/or the Advisory Council on Historic Preservation (36 C.F.R. § 9.37(b)(6)),

- the project is highly controversial or there is potential for significant impacts, then an environmental impact statement must be prepared and released for a mandatory 60-day public review and comment period (36 C.F.R. § 9.37(b)(5)), and/or
- the NPS needs additional time to provide opportunities for public comment and NPS analysis of these comments (36 C.F.R. § 9.37(b)(6)).

Failure of the NPS to make a determination on the plan of operations within the timeframes specified in § 9.37 constitutes a rejection of the plan. The operator has a right to appeal this decision under 36 C.F.R. § 9.49.

### NECESSARY STEPS PRIOR TO CONDUCTING OPERATIONS

- If the NPS includes conditions of approval in the approved plan of operations, the operator must agree in writing to comply with the operating stipulations specified in the NPS approval letter.
- An Affidavit of Compliance with other federal, state, and / or local requirements must be signed by the operator and be on file with the NPS. The affidavit must be signed by a representative of the company with authority to bind the company. See *Appendix C – Sample Letter for an Operator Affidavit of Compliance*.
- At the superintendent's request, operators will need to provide the NPS with a copy of all applicable federal, state, and local permits. If the permits are still pending, operators may submit a copy of the application for such permits. For more information on applicable permitting requirements, see *Appendix B, Part B – Environmental Compliance*.
- Submit performance bond with satisfactory surety that meets NPS requirements.
- The operator must notify the NPS at least 5 days prior to beginning an oil and gas operation on NPS lands. Operations include all onsite activities, such as, mobilization, site construction, drilling operations, well workovers, well plugging etc. This notification will help to ensure that park staff is available to inspect and monitor compliance with the approved plan of operations.



## CHAPTER 3 GEOPHYSICAL EXPLORATION OPERATIONS

This chapter includes the following information:

- NPS permitting process checklist for geophysical operations,
- Plan of operations information requirements for geophysical operations,
- Seismic shotpoint offset distances,
- Third part monitoring,
- Required operating stipulations and recommended mitigation measures, and
- Pictorial overview of geophysical operations.

### NPS PERMITTING PROCESS CHECKLIST FOR GEOPHYSICAL EXPLORATION

The following checklist outlines the permitting process for geophysical operations in units of the NPS. The items on the checklist are described throughout this handbook. This checklist can be used by an oil and gas operator to make sure that all of the required steps have been completed to prepare a plan of operations for NPS review.

- ☐ Operator contacts park regarding interest in conducting oil and gas operations (for more information see Ch. 2).
- ☐ Operator provides written documentation demonstrating property right to oil and gas in the park (for more information see Ch. 2).
- ☐ Operator meets with park staff to scope proposed project (for more information see Ch. 2).
- ☐ Operator meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information see Ch. 2).
- ☐ Operator requests temporary access permit to gather information needed to complete the plan of operations (for more information see Ch. 2).
- ☐ Operator conducts necessary surveys, including natural and cultural surveys, as applicable and surveys / stakes the operations area (for more information see Ch. 2).
- ☐ Operator prepares plan of operations and submits draft plan to the NPS (for more information see Ch. 2).

The Plan of Operations for Geophysical Exploration must include the following sections:

- ☐ I. Ownership and Contact Information
- ☐ II. Maps and Plats
- ☐ III. Timeline for Operations
- ☐ IV. Description of Operations
- ☐ V. Spill Control and Emergency Preparedness Plan
- ☐ VI. Reclamation Plan
- ☐ VII. Affidavits and Statements
- ☐ VIII. Other Applicable Permits
- ☐ IX. Background Environmental Information
- ☐ X. Relationship to Park Planning Documents



- ☐ NPS performs a completeness and technical review of the plan of operations (for more information see Ch. 2).
- ☐ Operator revises plan of operations, if necessary (for more information see Ch. 2).
- ☐ Park staff prepares NEPA document (or adopts the operator's or consultant prepared NEPA document), incorporates other environmental compliance, and initiates mandated consultations with other agencies (for more information see Ch. 2 and Appendix B).
- ☐ Park completes public review process, finalizes decision documents, and notifies the operator that the plan has been approved, conditionally approved, or rejected (for more information see Ch. 2).
- ☐ Operator agrees to conditions of approval (if any), submits applicable state and federal permits, and files performance bond with the NPS (for more information see Chs. 2 and 10).



## PLAN OF OPERATIONS INFORMATION REQUIREMENTS FOR GEOPHYSICAL EXPLORATION OPERATIONS

Below is an explanatory list of requirements that nonfederal oil and gas operators need to include in a plan of operations for geophysical exploration operations. These requirements are based on the regulatory provisions under 36 C.F.R. § 9.36. This list is also used by the NPS to determine if a proposed plan of operations is complete and sufficiently detailed to merit "official acceptance" for review and analysis in accordance with the regulations at 36 C.F.R. § 9.36(c).

A plan of operations may not need to address all of the information requirements presented below. The operator and NPS staff will narrow the list during project scoping. In some instances, the NPS may require additional information to effectively analyze the proposed operation (36 C.F.R. § 9.36(a)(18)). Any additional information requirements would be identified during project scoping.

The operator will submit the plan of operations, tender the performance bond, and be the responsible party for compliance with the plan of operations.

### I. OWNERSHIP AND CONTACT INFORMATION

The purpose of this section is to identify the "operator" as defined under the NPS regulations, to document the operator's property right to oil and gas in the park, and to identify primary company contacts for planning, field operations, and emergencies.

- A. Name(s) and address(es) of:
  - 1. Surface owner(s) (if other than the NPS), and
  - 2. Lessor (mineral owner).
- B. Name, address, and telephone number of the operator including:
  - 1. Person accountable for operations,
  - 2. Field representative, and
  - 3. Contact person in case of spill or other emergency.
- C. Copy of the instrument(s) demonstrating the operator's right to conduct geophysical operations for all tracts of land within the project area. Examples include:
  - 1. Lease,
  - 2. Deed,
  - 3. Assignment of rights, or
  - 4. Designation of operator.

NOTE: When an operator is proposing large-scale seismic programs that involve operations on many different tracts with numerous mineral owners, it may be difficult to obtain all of the desired permissions from all of the owners and the related property right documentation. In such cases operators may still be gathering the necessary property rights while developing a plan of operations. However, before the NPS will issue a data collection permit or accept the plan of operations as complete for formal processing, the operator must provide the NPS with documentation demonstrating that it has a right to conduct geophysical operations in all of the proposed project area.



### II. MAPS AND PLATS

The purpose of this section of a plan is to graphically show the operator's mineral tracts and the area of proposed activities in relation to the park, and the locations of man-made or environmental hazards that may affect the methods of operations. The scaled location plats are intended to clearly and accurately define the area that the operator has available for conducting well operations and to identify the area that the operator is responsible for reclaiming.

- A. Operation Location Map(s) – Provide map(s) showing the proposed seismic survey area. Use 1:24,000 scale USGS quadrangle map(s) and show the following:
  - 1. NPS park unit boundary,
  - 2. Each mineral tract or lease cross-referenced to the property right information provided in Section I. C.,
  - 3. Proposed locations of source and receiver lines within the park,
  - 4. Locations of pipelines, wells, or any other potential hazards within a one-mile radius of the proposed survey lines, and
  - 5. Locations of environmentally sensitive areas that might require avoidance or other mitigation measures.

### III. TIMELINE FOR OPERATIONS

The purpose of this section of the plan is to identify when operations will be conducted and how long they will last. Any proposals to avoid or modify operations due to seasonal timing restrictions should also be noted in this section.

- A. Provide an estimated timeline for the proposed operation, including the following information (as applicable):
  - 1. Estimated date to begin equipment transportation to the staging area,
  - 2. Estimated date to begin geophysical operations,
  - 3. Estimated geographic sequence of operations for the 3D seismic survey,
  - 4. Anticipated longevity of operations,
  - 5. Estimated date when reclamation will begin, and
  - 6. Estimated time to complete reclamation.

### IV. DESCRIPTION OF OPERATIONS

The description of operations should provide enough detail on the proposed methods, sequence, and equipment to assess the proposal's impacts on the environment. Thus, the amount of information in this section will vary depending both on the planned activities and the areas where they will be conducted. Address the following requirements as applicable, providing enough detail for the NPS to have a clear understanding of the proposal.

- A. Methods, sequence of work, and all equipment to be used in acquiring seismic data (include photographs of equipment):
  - 1. Vehicle description and use,



2. Source point locations and line layout,
3. Receiver lines configuration, and
4. Energy sources (e.g. explosives, vibroseis trucks, etc.).

NOTE: Operators cannot use sources of water inside the park without written permission of the regional director. The regional director can only approve a plan of operations that uses a source of water from inside the park if: 1) the operator's water right is superior to the United States claim, or 2) if the water right is subordinate to the U.S. government's, the operator shows that removal of the water would not damage park resources (36 C.F.R. § 9.35).

- B. Description of all actions to control, minimize, or prevent damage to the recreational, biological, scientific, cultural, and scenic resources of the park. Include those measures (place, time, methods, and equipment) that the operator and NPS identified during scoping and the onsite meeting to improve operations with respect to park resources, values, and visitor safety (as well as other measures developed by the operator during their plan preparation). This also includes all actions to be taken to comply with regulatory operating standards and state and federal permit requirements, as applicable. See Tables 3.2 and 3.3 for lists of required operating stipulations and recommended mitigation measures for geophysical operations.
- C. Description of all security measures that will be used to ensure public health and safety.
- D. Statement that operator will comply with operating standards of 36 C.F.R. § 9.41-9.46. Requests for variances should be accompanied with supporting information.

## **V. SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN**

The NPS has combined informational requirements and operating standards from the 9B regulations to develop the format for a Spill Control and Emergency Preparedness Plan. This plan covers the substances or site conditions that pose risks to human health and safety and the environment. It also describes the actions the operator would take to minimize these risks in the event of a spill or natural disaster (e.g., flood, fire, hurricane, or tornado). See *Chapter 11 – Spill Control and Emergency Preparedness Plan* in the Operator's Handbook for the organization and content of a Spill Control and Emergency Preparedness Plan.

## **VI. RECLAMATION PLAN**

The reclamation plan will describe the actions needed to meet the general regulatory reclamation standards<sup>6</sup> as well as site-specific reclamation goals. It will be based on the disturbance anticipated from the proposed operations (as described in Section IV.), and reclamation expectations of the NPS as identified during project scoping. For more information on site reclamation, see *Chapter 7 – Well Plugging and Surface Reclamation*. The operator should organize the reclamation plan with the following sections.

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<sup>6</sup> See § 9.39, Reclamation Requirements, and Chapter 7, Well Plugging and Surface Reclamation in this handbook.



### A. Reclamation Goals

1. Summarize the site-specific reclamation goals developed during project scoping. Site-specific goals might include a desired percent of vegetative ground cover, the type of plants, soil stabilization, repair of ruts, etc.
2. State the timeframes for reclamation. Describe when the reclamation activities would begin, how long they would last, and the schedule for monitoring the results of the reclamation.

### B. Reclamation Procedures

The 9B regulations identify steps that need to be completed at a minimum to satisfy reclamation standards for operations on federal surface.<sup>7</sup> The following steps have been adjusted to fit the impacts from seismic operations that commonly need active reclamation. They may be used as an outline for developing the plan's reclamation procedures. The operator can describe the methods and equipment that will be used to accomplish each of these steps.

1. Restore areas of disturbance around shotholes including natural topographic contours and vegetation. (NOTE: The method(s) of plugging shotholes should be covered in the description of operations section of the plan.)
2. Remove all equipment, stakes and flagging, and all other man-made debris that resulted from operations.
3. Restore trails created or altered by vehicles to their natural contours and vegetative cover.
4. Monitor and report on the results of the reclamation effort.
5. Remove or neutralize contaminating substances. The operator is responsible for removing soils or any other material that becomes contaminated. If there is reason to suspect soils or groundwater have been contaminated, the operator will likely need to collect and test samples to verify that contaminating substances have been removed or neutralized. Neutralization or removal of contamination means that contaminant concentrations will be reduced in soils (or groundwater) to a condition that will not adversely affect, injure, or damage federally-owned or controlled lands and waters, provides for the safe movement of native wildlife, and which does not jeopardize visitor health and safety.

### C. Reclamation Cost Estimate

The cost of reclamation in part determines the amount of the performance bond.<sup>8</sup> Provide an estimate of costs for a third party to complete the reclamation procedures in Section B above. Provide enough detail to support the total estimate for reclamation.

The NPS will verify and use the cost estimates to set the reclamation portion of the performance bond. If the operator chooses not to provide the cost estimate for reclamation, the performance bond may be set at the maximum amount allowed by regulation,<sup>9</sup> which is \$200,000 per operator per park unit. If the operator already holds a \$200,000 bond for other operations in the same park, it is unnecessary for the operator to provide the cost estimate information required by this section. Nonetheless, the operator will remain responsible for carrying out reclamation associated with his/her activities in the park.

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<sup>7</sup> For operations on private surface estate, see Chapter 7 in this handbook.

<sup>8</sup> See § 9.48(d)(1) and Chapter 10 in this handbook.

<sup>9</sup> See § 9.48(d)(3) and Chapter 10 in this handbook.



## **VII. AFFIDAVITS AND STATEMENTS**

Include an “Affidavit of Compliance” signed by an official that is authorized to legally bind the company as required by regulations at 36 C.F.R. § 9.36(a)(15). The affidavit should state that the proposed operations are in compliance with all applicable federal, state and local laws and regulations. An example Affidavit of Compliance is included in *Appendix C – Sample Letters for Nonfederal Oil and Gas Operations*.

## **VIII. OTHER APPLICABLE PERMITS**

At the superintendent’s request, operators will need to provide the NPS with a copy of all applicable federal, state, and local permits. If the permits are still pending, operators may submit a copy of the application for such permits.

## **IX. BACKGROUND ENVIRONMENTAL INFORMATION**

The purpose of this section of the plan is to present information on existing natural and cultural resources in the project area, assess the environmental impacts of the proposed operation, and discuss any technologically feasible alternatives for the proposed operation. Information that should be presented in this section will be determined during project scoping with park staff. The park may have some of the required natural and cultural resource information for the operator’s use in preparing this section of the plan.

- A. Description of natural resources in the proposed operation area as they relate to the design and implementation of the seismic survey.
  - 1. Generalized description of the surface and subsurface geology for the area of operations. Include the following in the discussion:
    - a. surface formation(s) and thickness;
    - b. generalized description of the subsurface geology, including stratigraphy and depths to formation tops;
    - c. proposed total depth of penetration of seismic waves and depth of potential (or known) producing formations;
    - d. soil type(s) and engineering properties such as permeability, porosity, erosion potential, etc.; and
    - e. description of paleontological resources known to occur or likely to occur in the project area (if applicable). The discussion should include the results of a paleontological survey of the project area performed by a qualified paleontologist.
  - 2. Hydrology and water quality, including the following:
    - a. proximity to surface water (intermittent or permanent watercourses, streams, ponds, lakes, springs, etc.);
    - b. depth to groundwater;
    - c. proximity to any wetland boundary (defined by site-specific wetland delineation);
    - d. proximity to the base floodplain, 100-year floodplain, and 500-year floodplain; and
    - e. water quality in nearby surface water and/or shallow groundwater.



3. Vegetation species composition in operation area, including predominant herbaceous, shrub, midstory and overstory species. (NOTE: This information is necessary to properly design a reclamation plan).
  4. Wildlife species composition in the proposed operation area.
  5. Federal or state threatened/endangered plant or wildlife species that inhabit or frequent the proposed operation area.
  6. Air quality in the proposed operation area, including information on pollutant levels and existing point sources for pollutants in the area.
  7. General description of baseline noise levels in the proposed operation area, including local sources contributing to increased noise levels.
- B. Description of cultural resources in the proposed operation area should include the following information:
1. Background information on archeological and historic resources documented in the general area, including review of the National Register of Historic Places.
  2. Results of an archeological and historic resource field survey of project area performed by a qualified archeologist approved by the NPS.
- C. Identification and proximity of park visitor use areas (e.g., trails, campgrounds, public roads, picnic areas, overlooks etc.) from the proposed operation area.
- D. Description of the anticipated direct, indirect, and cumulative effects of the proposed operation on the park natural and cultural resources, and socioeconomic environments listed above. (This is the operator's opportunity to support their conclusions on environmental effects of their operations.)

### **X. RELATIONSHIP TO PARK PLANNING DOCUMENTS**

The plan of operations must discuss how the proposed operation relates to park planning documents (General Management Plan, Oil and Gas Management Plan, etc.) in terms of considering and integrating operational measures described in the plan(s) to achieve park management objectives. The park's oil and gas contact where the operations are proposed will furnish a copy of all applicable park planning documents upon request.

### **SEISMIC SHOTPOINT OFFSET DISTANCES**

The 9B regulations state that "...surface operations shall at no time be conducted within 500 feet of...any structure or facility (excluding roads) used for unit interpretation, public recreation or for the administration of the unit, unless specifically authorized by an approved plan of operations." (36 C.F.R. § 9.41(a)) If the operator proposes to place shotpoints closer to a cultural object or facility than the distances identified in Table 3.1, the burden is on the operator to demonstrate that the reduced offset distances would have negligible effects on those resources. If the NPS requests that the operator conduct operations different than the 500 foot operating standard in the 9B regulations, the NPS will demonstrate that the variance to the offset distances is necessary to protect infrastructure and resources.



The following table developed by the International Association of Geophysical Contractors shows recommended offset distances from wells, buildings, and other infrastructure for the detonation of explosives at seismic shotpoints. While keeping the 9B regulatory 500-foot offset distance in mind, operators may use these guidelines in designing seismic surveys in park units.

**Table 3.1. Industry Recommended Minimum Safe Offset Distances from Wells, Buildings and Other Infrastructure for the Detonation of Explosives at Seismic Shotpoints**

OBJECT	CHARGE SIZE (IN POUNDS)							
	½	1	2 ½	3	5 ½	6-10	11-15	16-20
Pipeline less than 6" diameter	50'	100'	150'	150'	200'	250'	300'	400'
Pipeline 6" to 12" diameter	75'	150'	200'	200'	300'	400'	500'	600'
Pipeline greater than 12" diameter	100'	200'	300'	350'	400'	500'	600'	800'
Telephone lines	20'	20'	50'	50'	50'	56'	76'	80'
Railroad track or main paved highway	50'	100'	100'	150'	150'	220'	280'	350'
Electric power line (shotholes not to exceed 200' depth)	75'	100'	200'	200'	200'	200'	250'	300'
Water wells, excluding irrigation wells, buildings, underground cistern, and other similar objects	225'	300'	500'-600'	500'-600'	600'-1000'	800'	1000'	1200'
Brick and/or concrete block buildings	275'	400'	500'	600'	800'	1000'	1200'	1500'
Producing oil and gas wells	350'	450'	600'	700'	800'	900'	1000'	1000'
Irrigation wells	500'	800'	1000'	1200'	1500'	2000'	2500'	2500'

Source: Table adapted from the International Association of Geophysical Contractors (1998) by Acadian Geophysical, 1999.

## THIRD PARTY MONITORING

The NPS may require an operator to hire a third party monitor to oversee the geophysical operation. The purpose of third party monitoring is to ensure operator compliance with the terms of the approved plan of operations and to protect park resources and values.

The company hired to do the third party monitoring must meet the following three requirements:

1. Third party monitors shall not include any representatives or employees of the operator, or any contractors or subcontractors of the operator working on any task related to this project, or any persons who would have a financial or other interest in the outcome of the geophysical operation.
2. The persons hired to do the monitoring must meet the technical qualifications to monitor the specific resources in the NPS unit where the operations would occur (e.g., wetlands scientist, wildlife biologist, archeologist etc.).
3. The scope of work must meet the objectives of monitoring in the park.

The operator and park staff will work together during project scoping and development of the plan of operations to come up with an effective plan for monitoring the operations. During project scoping, the operator and NPS will discuss the requirement for third party monitoring and the technical qualifications that would be needed by the monitor(s). The NPS will provide the operator with a list of roles and responsibilities and necessary qualifications of the third party monitor(s). In some cases this information may not be developed until after the NPS technical adequacy review of the plan of operations. The operator will include details in the plan of operations concerning the use of a third party monitor and disclose that there will be no conflict of interest between the operator and the company that will be hired to do the monitoring and



that the monitor(s) will have the technical expertise to do the monitoring. Once the third party monitor(s) have been selected by the operator, a list of the persons and their qualifications must be provided to the NPS.

The NPS may develop stipulations that specify conditions of the third party monitoring (36 C.F.R. § 9.37(f)).<sup>10</sup> Examples of these stipulations include, but are not limited to:

- The third party monitor must be paid by the operator.
- The monitor must report directly to the park superintendent or his/her representative.
- The NPS will identify the frequency and type of compliance reports.
- If a violation of the terms of the monitoring contract occurs, the NPS would require immediate corrective actions from replacement of the monitor up to suspension of the approved plan of operations.
- The NPS may suspend the operations if the monitor demonstrates to the NPS that the operation poses an immediate threat of significant injury to federally owned or controlled lands or waters. (36 C.F.R. § 9.51(c)(2))

Third party monitors would be required to ensure operator compliance with the approved plan of operations. Monitoring may include making sure that:

- Access in the unit is along designated routes and by approved means (e.g., on foot or by vehicle).
- Vegetation trimming meets the park's specifications.
- Operations avoid rare, threatened or endangered plant and animals; archeological sites; watercourses; research plots; sensitive resource areas; and Special Management Areas.
- There are no spills of oil or contaminating or hazardous substances.
- Shotholes are drilled according to the approved plan.
- There is proper handling, transport, and storage of explosives.
- The operations area is cleaned up and reclaimed following the geophysical operation.

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<sup>10</sup> Under this provision all approved plans are conditioned upon the superintendent's right to access an operation to monitor and ensure compliance with a plan of operations. Since under this scenario a third party will handle monitoring, the superintendent can exercise his or her right to access and monitor the operation through the third party via specific stipulations in its approval letter.



## OPERATING STIPULATIONS AND MITIGATION MEASURES FOR GEOPHYSICAL EXPLORATION

The tables in the following section list operating stipulations (Table 3.2) required by the NPS and suggested mitigation measures (Table 3.3) for geophysical exploration on NPS lands. The primary resource(s) that would be protected by the operating stipulations and mitigation measures listed in the tables are denoted by a ✓ symbol.

Table 3.2 focuses on the NPS 36 C.F.R. 9B regulations but also includes operating stipulations required under other federal laws and regulations. The appropriate citation is shown in parentheses after each requirement. To ensure compliance with all applicable legal and policy mandates, it is the operator's responsibility to consult with the appropriate federal, state, and local agencies prior to beginning operations in a unit of the National Park System and determine which statutory and regulatory requirements would apply to each operation. An additional source of information on environmental protection measures for geophysical operations is the *Environmental Guidelines for Worldwide Geophysical Operations* published by the International Association of Geophysical Contractors.

Table 3.3 lists mitigation measures for geophysical exploration. Use of mitigation measures shown in the table are recommended by the NPS to ensure compliance with the NPS approval standard to utilize "...technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety" (36 C.F.R. § 9.37(a)(1)). Many of the mitigation measures are derived from environmental guidelines and publications developed by the oil and gas industry and environmental professionals and may not address every environmental topic or risk that may be encountered during oil and gas operations. These tables are intended to be a tool to be used during project planning. An operator can look through the tables to see which measures would apply to an operation and select the most appropriate measures to include in his/her plan. An operator has the discretion to select the most appropriate mitigation to meet the NPS least damaging approval standard.



**Table 3.2. Required Operating Stipulations for Geophysical Exploration Operations on National Park Service Lands**

Geophysical Exploration Required Operating Stipulations	RESOURCE PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience Human Health and Safety
In order to use surface or subsurface water from inside the park, the operator must demonstrate in the plan of operations that his/her water rights are superior to any claim of the U.S. to use the water, and where the use is subordinate to that of the U.S., that use of the water will not damage park resources. Since any use of park water has the potential to negatively affect water quality, quantity, and flow patterns, the operator should note what resources would benefit from the in-park water use and how they would benefit the resources. [36 C.F.R. § 9.35]				√				√			
Prepare an Emergency Response Plan to ensure safe operating procedures in the event of a reportable quantity spill; damage to wells, pipelines, or other structures; fire; explosion; medical evacuation; or other emergencies such as strong winds, heavy rainfall, swift currents, and flooding. [36 C.F.R. § 9.36(a)(10)(vi), 40 C.F.R. § 112]		√		√	√	√	√	√			√
Prior to beginning operations, in consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service (if applicable), and NPS, identify all threatened, endangered, and sensitive species that may be present in the project area. Based on the species and the proposed operation, operators may be required to conduct biological surveys in the project area. [36 C.F.R. § 9.36(a)(16)(i); Endangered Species Act of 1973 -16 USC 1531 <i>et. seq.</i> ]									√		
Conduct a pre-operational analysis to adequately describe the natural, social and economic environments that would be affected by the operations (including air quality, geology, topography, soils, surface and subsurface hydrology, vegetation, wetlands, fish and wildlife, threatened and endangered species, cultural resources, and all water and oil and gas wells) within a 2-mile radius of proposed operation. [36 C.F.R. § 9.36(a)(16)(i)]	√	√	√	√	√	√	√	√	√	√	
Conduct cultural resource surveys to document the location and significance of any cultural resource (includes various components of archeological, ethnographic, historic architectural, and historic landscape resources) that might be affected by operations. [36 C.F.R. §9.36 (a)(16)(i), 36 C.F.R. Part 63, 36 C.F.R. § 800.4]										√	
For geophysical operations using underground explosives, conduct a risk assessment of proposed operating methods (depth, size, pattern, and array of explosives) with respect to site conditions (landscape features and physical properties of soils, including depth and thickness of aquitards or water-retardant layers). [36 C.F.R. § 9.37(a)(1)]		√		√							
Discharge explosives at safe distances from pipelines, telephone lines, railroad tracks, roads, power lines, water wells, oil and gas wells, oil and gas production facilities, buildings, etc. Use accepted industry minimum safe offset distances, unless otherwise specified. [36 C.F.R. § 9.37(a)(1)]											√



## Geophysical Exploration Required Operating Stipulations

**THE APPLICABLE LEGAL CITATION IS NOTED IN [PARENTHESIS] AFTER THE STIPULATION.**

	RESOURCE PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience
Surface operations shall at no time be conducted within 500 feet of the banks of perennial, intermittent or ephemeral watercourses; or within 500 feet of the high pool shoreline of any natural or man-made impoundments...unless specifically authorized by an approved plan of operations. If necessary, the operators must specifically request exemptions from this standard in the plan of operations and demonstrate that the exemptions are necessary for acceptable data quality, can be conducted with insignificant affects on park waters or manmade infrastructure, and result in overall resource impact reduction. [36 C.F.R. § 9.41(a)]				√	√						
Protect all survey monuments, witness corners, reference monuments and bearing trees against destruction, obliteration, or damage from operations. Operator shall be responsible for the reestablishment, restoration, or referencing of any monuments, corners, or bearing trees which are destroyed, obliterated, or damaged by such operations. [36 C.F.R. § 9.41(b)]						√					
Possession of firearms by persons conducting oil and gas operations is prohibited in NPS units. [36 C.F.R. § 9.41(f)]								√	√		√
The operator shall take technologically feasible precautions to prevent accidents and fires. [36 C.F.R. § 9.46]											√
Operators shall not injure, alter, destroy, or collect any object, structure, or site of historical, archeological, or cultural value, without written authorization from the NPS. [36 C.F.R. § 9.47(a); 43 C.F.R. §3]			√							√	
Ensure that a qualified 3rd party monitor is present during appropriate operational phase(s). Once operations have commenced, the operator shall immediately bring to the attention of the superintendent any cultural or scientific resource, or species of special concern encountered that might be altered, harmed or destroyed by the operation and shall leave such discovery intact until told to proceed by the superintendent. The superintendent will evaluate the discoveries brought to his/her attention, and will determine within ten (10) days what action will be taken with respect to such discoveries. [36 C.F.R. § 9.47(b)]	√	√	√	√	√	√	√	√	√	√	√
Include stop work provisions in the event of a cultural or scientific discovery in operator's contracts. [36 C.F.R. § 9.47(b); 36 C.F.R. § 800.13(b)(3)]										√	
Use of park roads must be in accordance with procedures outlined in an approved plan of operations. [36 C.F.R. § 9.50]	√										√
Do not locate staging areas within the 100-year floodplain. If there is no practicable alternative to siting the staging area in the floodplain, design operations to minimize harm to the floodplain. [EO 11988 Sec 2 (a)(2)]				√	√						√



<b>Geophysical Exploration Required Operating Stipulations</b>  <b>THE APPLICABLE LEGAL CITATION IS NOTED IN [PARENTHESES] AFTER THE STIPULATION.</b>	RESOURCE PROTECTED									
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources
	Visitor Use and Experience	Human Health and Safety								
	Develop an adequate flood warning system which monitors one or more physical parameters (e.g., rainfall, runoff, streamflow) and provides warning of an impending flood to the operator, operator's contractors and subcontractors, visitors and park personnel with adequate time to permit evacuation; and use signs, high-water indicators, and other information indicating that a site is floodprone and suggesting appropriate actions in the event of flooding. [NPS Procedural Manual 77-2]	√								
	Wetlands (both Cowardin classification system and jurisdictional wetlands) must be delineated where proposed operations would directly or indirectly adversely impact wetlands. Wetland delineations shall be approved by the U.S. Army Corps of Engineers and the Water Resources Division of the NPS and incorporated in the Statement of Findings and Plan of Operations. [Executive Order 11990, NPS Procedural Manual 77-1 § 5.1]	√		√		√	√			
	Plan work to avoid known cultural resources. If work cannot avoid known cultural resources, assess and mitigate effects on National Register eligible or listed properties in consultation with State Historic Preservation Office and Advisory Council on Historic Preservation. [36 C.F.R. § 800.3-800.9]								√	
	An incidental take of a federally listed species must be immediately reported to the NPS and FWS, all other protected species would be reported to the NPS. [Endangered Species Act, 16 USC §§ 1531 – 1544, 50 C.F.R. Parts 402, 450]							√		



**Table 3.3. Recommended mitigation measures for geophysical exploration on National Park Service lands**

Geophysical Exploration Recommended Mitigation Measures	RESOURCE PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience Human Health and Safety
Hold daily safety and environmental meetings with crews to reinforce crew and public safety, environmental concerns, and operating procedures.											√
Minimize conflicts with visitors by avoiding designated visitor use areas. If operations are needed in or around designated visitor use areas for successful completion of the project, then schedule work during low visitor use times and/or implement strategies to minimize the sights, sounds, and duration of operations in and around designated visitor use areas.										√	√
Use minimum number of vehicles, boats, or aircraft necessary to provide efficient and safe access for personnel and equipment.	√	√	√	√	√	√	√	√	√	√	√
Reduce vehicle speeds on access roads to minimize dust. Consider spraying roads and access routes with freshwater to reduce dust.	√										
Use properly designed, maintained and operated equipment to reduce emissions such as proper engine fuel mixtures, regularly serviced exhaust systems, and proper engine tuning.	√										
Use designated access routes, designated roads, and natural routes (e.g., waterways) whenever possible during operations and during travel to and from the project area.		√		√						√	√
Locate primary staging areas outside of the park. Confine refueling, lubrication, and maintenance of vehicles and equipment to areas outside the park where feasible.		√		√							
Where feasible, use global positioning systems (GPS) technology to minimize the amount of vegetation removal when surveying source and receiver lines.						√				√	
In areas where vegetative cover precludes the use of traditional GPS survey equipment, use of non-satellite kinematic and inertial survey control systems to survey source and receiver lines to eliminate the need to trim or remove vegetation.						√				√	
Conduct operations during dormant (plant dormancy) seasons.						√					
Cut vegetation by hand, supplementing as necessary with chain saws or other motorized cutting equipment.										√	√
Selectively cut vegetation along source and receiver lines, offsets, and designated access routes as necessary to accommodate safe passage of personnel and equipment.						√				√	√
Leave small vegetation in place (low shrubs, and herbaceous vegetation), consistent with safe passage of personnel and equipment.						√		√		√	
Leave topsoil, rootstock, and seeds on lines and designated access routes to encourage natural revegetation.		√				√					
Clear vegetation in accordance with the park's current vegetation management plans or policies.						√				√	



Geophysical Exploration Recommended Mitigation Measures	RESOURCE PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience
Secure flagging, other markers, cables, or other equipment without cutting or slicing vegetation.						√					√
Do not permanently mark any tree in the park.											√
Use means of access other than land vehicles when soils are saturated to minimize compaction, displacement, and rutting of clayey soils.	√										
Conduct operations during dry seasons when soils are less susceptible to compaction, displacement and rutting.	√	√									
Use vehicles with low ground pressure to minimize surface impacts. In lieu of using large mechanized drilling equipment, use lightweight, walk behind tracked drills or hand augers as appropriate in the park.	√										
Use sonic drilling technology to reduce shothole cuttings.			√				√				
Plan efficient refueling of vehicles and equipment to minimize travel and chances for spills.	√		√								
Refuel or lubricate equipment over secondary containment such as drip pans, drip basins, or impenetrable polyvinyl covered by absorbent materials.	√		√								
Periodically check for leaks under all operating vehicles and equipment; contain and remove contaminated soil for proper disposal.	√		√								
Replace all cuttings in shotholes / boreholes, including proper tamping of cuttings during shothole plugging. Avoid backfilling shotholes too quickly to avoid bridging. Spread any remaining cuttings on the surface into a thin layer at each hole. Note: Plugging materials may be required for shotholes less than 20 feet deep.	√										√
Use high velocity seismic energy source charges and electric detonation systems that allow smaller energy sources with better signal strength and a high degree of safety.											√
Use existing stream crossings whenever practicable.			√								
Minimize stream crossings, if necessary to conduct operations, cross at right angles to the stream.			√								
Ensure that approaches to stream crossings do not alter natural drainage into the stream. Temporary runoff diversion and/or erosion control structures may be appropriate to minimize erosion and vegetation loss.			√		√						
Whenever practical, cross streams or watercourses where the water is shallow and the streambed or bottom is firm.			√					√	√		
Minimize width of survey lines and designated access routes, particularly at water crossings to minimize input of sediment and vegetation in watercourses.			√								
Avoid blocking or filling any natural drainage path.			√								
When traveling in water, use slow vehicle and boat speeds to minimize resource damage.			√		√			√	√		
When using boats, ensure adequate water depth to minimize bank erosion and effects on aquatic life.	√				√			√	√		



Geophysical Exploration Recommended Mitigation Measures	RESOURCE PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience
Secure portable fuel tanks to the boat for safety and to prevent loss.				√							√
Use loading poles or tamping poles to ensure charges are placed and seated at the proper depth, and shotholes are properly plugged with cuttings and/or other authorized materials. Use plugging materials that meet International Association of Geophysical Contractors (IAGC) standards.	√		√								√
Use plugging materials in tubes or casing which will expand appropriately. Recommended tube diameter is 75 percent of shot-hole diameter.	√		√								
Plugs should set at least 24 hours before detonation of charges.	√		√								
If a flowing shothole occurs (groundwater under artesian conditions), attempt to plug it immediately. If the flow is too great, use expansive plugging material inflatable plug above the aquifer and backfill with expansive plugging material to the surface.	√		√								
Clean vehicles and equipment prior to entering the project area to avoid introducing foreign plant materials.					√						
For vehicles, clear the undercarriage of brush to prevent fires when driving over dry areas. Use spark arresters and spark suppression accessories on equipment.					√						√
Avoid threatened, endangered and sensitive species and their habitats during project design.					√			√			
Use US Fish and Wildlife Service "Conservation Guidance for Plant and Animal Candidate Species" to plan and conduct operations that will minimize disturbances to these species.					√			√			
Provide field personnel with training in identification and habits of wildlife in the project area.								√	√		
If using helicopters, locate helipads as far apart as practical in existing clearings.								√	√		√
Consistent with safety, minimize the number of helicopter flyways.								√	√		√
Use GPS field asset tagging technology for real-time monitoring and helicopter support operations to minimize flight time and reduce the need for field staging areas.								√	√		√
Use long sling lines, consistent with safety, to minimize the effects of down draft from the rotor.								√	√		√
Avoid or bypass wildlife areas marked on the project map and/or in the field to minimize disruption to wildlife, especially in areas of active denning, nesting, spawning, migration, and feeding. Where interaction with wildlife is unavoidable, minimize the sights, sounds, and duration of operations to the maximum extent feasible.								√	√		
Report any sighting of threatened, endangered, or sensitive species or paleontological resources to the NPS.		√			√			√			
Inform visitors and area residents and users while planning and conducting an operation. For example, post warning and informational signs, notices in visitor centers, notices in local newspapers and publications, etc.										√	√



Geophysical Exploration Recommended Mitigation Measures	RESOURCE PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience
Conduct operations during low visitor use periods.										√	√
Adequately sign project area, especially at visible intersections and locations, indicating type of operation and other information and appropriate actions.										√	√
Immediately following completion of operations, remove survey stakes, flagging, trash, and other debris or waste from the project area.										√	
Do not burn vegetation, survey stakes, flagging, refuse, or other debris or waste incidental to maintenance or operation.	√									√	√
Provide trash bags and trash receptacles for cans, bottles, paper, and other trash generated daily by crews.										√	
Bury and/or secure capwire from undetonated or live charges to reduce risk to human health and safety.											√
Take appropriate measures to ensure all charges are fired. Disable misfired charges by breaking or cutting the capwire as deep below ground as practical.											√
When working in dry vegetation, prohibit smoking, or only allow smoking at designated times and locations.						√					√
Ensure fire-fighting equipment and personnel are available while operating in dry vegetation. Consider both fire danger and fire danger rating during planning and conduct of operations.						√					√
Use seed, mulch, or other authorized materials or structures to mitigate the potential for erosion. Use certified weed-free mulch, native seed, or sterile cover crops that are not sources of undesirable nonnative plant species.	√	√	√		√						



## GEOPHYSICAL OPERATIONS - A PICTORIAL OVERVIEW

Geophysical operations are of relatively short duration and can usually be planned and executed in a way that surface impacts will be temporary. Crews may be in the field for 1 to 4 weeks for a conventional single line survey, and several months or more for an average 3-dimensional survey. The intensity of surface impacts will be largely controlled by the methods of access and the equipment used to drill shotholes. The following resource issues are commonly associated with geophysical activities:

- Access along source and receiver lines may require varying levels of vegetation removal.
- Travel along source and receiver lines by overland vehicles may damage soils (compaction or rutting) and vegetation.
- Water quality may be degraded from sedimentation (eroded soils or shothole cuttings).
- Small spills and improperly handled wastes can degrade soils and waters, harm vegetation, fish, and wildlife, air quality, and aesthetics.
- Air quality is degraded from dust and engine emissions.
- The natural sound is interrupted by vehicles and drilling noises.
- Fish and wildlife are injured by human presence, vehicular injury, exposure to contaminants, loss or degradation of habitat, or unauthorized takings.
- Cultural resources may be threatened by direct disturbance, increased human accessibility and fire.
- Large crews that are active in an area may disrupt park visitor uses and experiences.

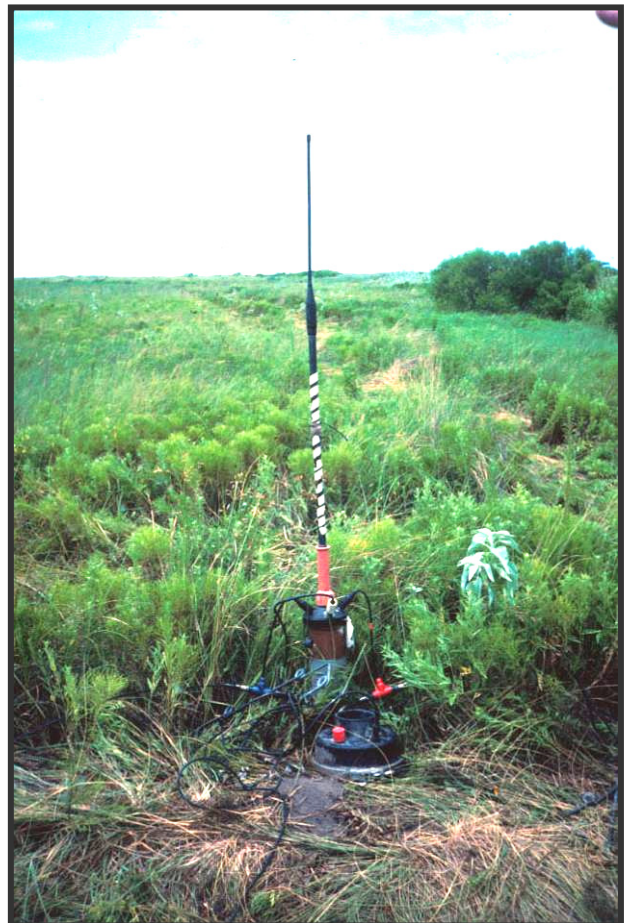




### STRATEGIES TO MINIMIZE IMPACTS FROM SEISMIC OPERATIONS

- Schedule operations to avoid conflicts with visitors and critical wildlife nesting or mating periods. Seasonal timing of operations may also help minimize impacts on soils, water, and vegetation.
- When siting and accessing seismic lines, use existing roads and trails to the maximum extent feasible.
- Position survey lines and access routes to minimize the number and size of stream crossings.
- Use global positioning devices instead of line of sight surveying to minimize the amount of vegetative cutting. Hand cut vegetation along seismic lines where a line of sight survey is necessary.
- Use vehicles that will not disturb the soils and vegetative root systems. Seasonal timing may help minimize impacts on vegetation. Foot access and hand portable drills may be feasible in areas where large vehicles would cause noticeable damage to soils and vegetation.
- Use foot access for receiver lines if vehicular access will require active reclamation steps.
- Consider the use of mini-shothole patterns so that smaller, less damaging equipment may be used to drill the shotholes.
- Minimize the number of passes along a line that uses vehicular access. Often single passes are achievable with careful project planning.
- In areas where cultural resources are expected, have a qualified archeologist accompany each survey crew to identify and avoid cultural sites.
- Offset shotpoints from structures, water bodies, and sensitive resource areas.

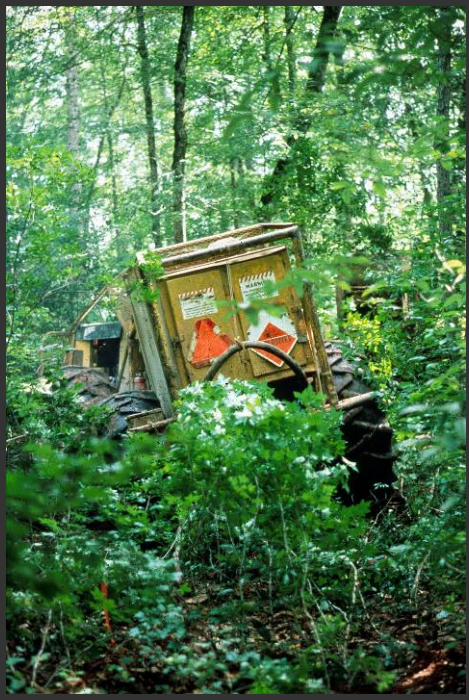
A recording station uses telemetry to transmit geophone data to the recording truck.



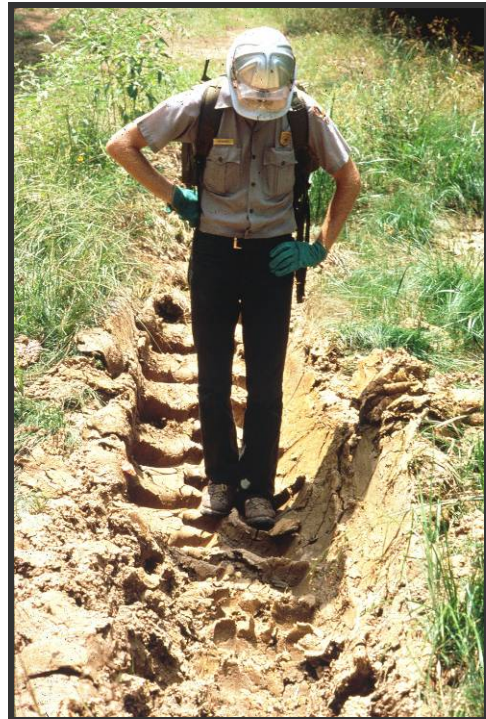


## PROPER SELECTION OF SHOTHOLE DRILLING EQUIPMENT

Proper selection of shothole drilling equipment is the key to reducing impacts on park resources.



Shotholes previously drilled to 100-foot depths have given way to mini-shothole patterns in some seismic surveys. The mini-shothole patterns may consist of 5 to 10 shotholes drilled to depths of 3 to 5 feet. Heavy articulated buggies that are used to drill deep shotholes can destroy small trees, create wide pathways, and leave sizeable ruts. When used at Big Thicket National Preserve, this method of access has resulted in less damage to park resources.



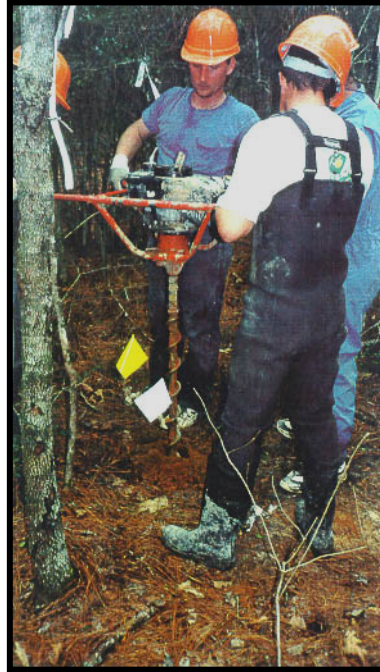




In this photo, trails were cut to provide access for large drilling equipment.



When the flagging is removed from this mini-hole seismic line (photo taken looking down the line), it will be difficult to identify the line's location.



Use of hand portable drills to drill mini-hole patterns that are used in some seismic surveys minimizes vegetation cutting and soil disturbance.



In other areas such as Big Cypress National Preserve, operators have used sonic drilling technologies to drill shotholes which eliminated drill cuttings on the surface that must later be cleaned up.



## USE OF EXISTING TRAILS AND ONE PASS STRATEGIES

In Big Cypress National Preserve, some areas have a high concentration of existing trails from recreational ATV and swamp buggy use. An operator successfully designed a 3D seismic survey with source lines maximizing the use of existing trails in the survey area. A muskeg carrier fitted with a drill was effective for drilling shotholes along the existing trails. Surface impacts were minimal and generally required no active reclamation measures.



Proper planning along a seismic line that requires vehicular access is the key to limiting the number of trips the vehicle makes up and down the line. One-pass operations are feasible in many instances. Helicopters have also been used successfully to move personnel, equipment, and supplies to minimize the number of vehicle passes.



### USE OF HELICOPTERS

Helicopter transport of drilling equipment precludes the need for new trails in sensitive and difficult to reclaim areas. Surface impacts are limited to the immediate area around each shothole.



In Big Cypress National Preserve the operator staged helicopters from an existing disturbed area, in this case, from an active production site.



For this 3D seismic survey, three heliportable drilling units kept a single helicopter busy and minimized the time the crew had to wait for equipment.



Four sling loads were used to move the air drilling unit, compressor, power unit, and toolbox from one shotpoint to the next.



## USE OF LOW IMPACT VEHICLES



The wide tracks on this shothole drilling rig distribute the vehicles weight over a large area giving it a very low pound per square inch displacement. Aluminum construction of many typically steel components contributes to the very low displacement of this tracked marsh buggy.

A person might leave footprints two inches deep on this sensitive mudflat environment, but the aluminum buggy did not create any ruts over 1/2 inch deep. Reclamation was restricted to just a few areas.

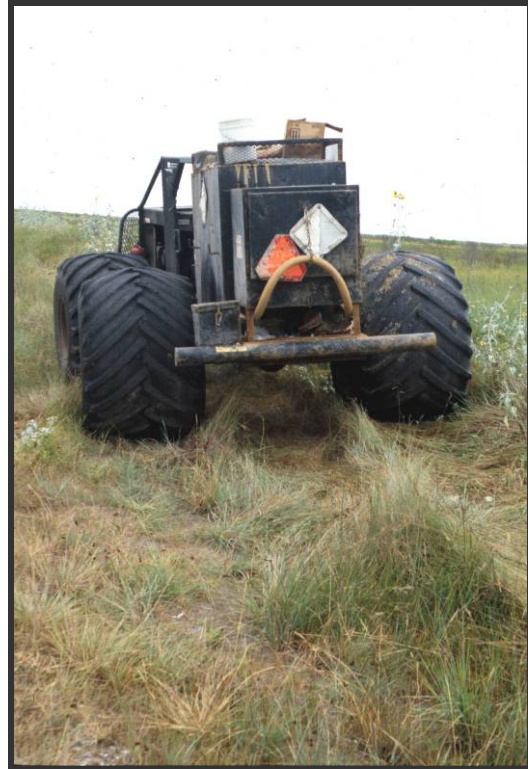


Conventional vehicles with tires created rutting in this mudflat area over 15 years ago. Restoration to pre-disturbance conditions would be difficult to accomplish in this type of environment.



**Avoid damage to the soil and root structure and eliminate costly reclamation projects.**

Use of vehicles with large “terra-tires” is another method used to distribute a vehicle’s weight, like on this water truck. ATV’s are designed with this principle, and may be appropriate for transporting personnel and equipment along survey lines.



Though the exposed blades of grass are damaged by the vehicle, the root systems and soil structure are not.



Soon after the survey is complete, the grass is growing again without the need for the company to perform any type of active reclamation.



## **CHAPTER 4**

# **DRILLING & PRODUCTION OPERATIONS**

This chapter includes the following information:

- NPS permitting process checklist for drilling and production operations,
- Plan of operations information requirements for drilling and production,
- Third party monitoring,
- Required operating stipulations and recommended mitigation measures, and
- Pictorial overview of drilling and production operations.

### **NPS PERMITTING PROCESS CHECKLIST FOR DRILLING AND PRODUCTION OPERATIONS**

The following checklist outlines the permitting process for drilling and production operations in units of the NPS. The items on the checklist are described throughout this handbook. This checklist can be used by an oil and gas operator to make sure that all of the required steps have been completed to prepare a plan of operations for NPS review.

- ☐ Operator contacts park regarding interest in conducting oil and gas operations (for more information, see Ch. 2).
- ☐ Operator provides written documentation demonstrating property right to oil and gas in the park (for more information, see Ch. 2).
- ☐ Operator meets with park staff to scope proposed project (for more information, see Ch. 2).
- ☐ Operator meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information, see Ch. 2).
- ☐ Operator requests temporary access permit to gather information needed to complete the plan of operations (for more information, see Ch. 2).
- ☐ Operator conducts necessary surveys, including natural and cultural surveys, as applicable and surveys / stakes the operations area (for more information, see Ch. 2).
- ☐ Operator prepares the plan of operations and submits the draft plan to the NPS (for more information, see Ch. 4).

The Plan of Operations for drilling and production operations must include the following sections:

- ☐ I. Ownership and Contact Information
- ☐ II. Maps and Plats
- ☐ III. Timeline for Operations
- ☐ IV. Description of Well Geology
- ☐ V. Description of Operations
- ☐ VI. Spill Control and Emergency Preparedness Plan
- ☐ VII. Well Plugging and Reclamation Plan
- ☐ VIII. Compliance with Operating Standards
- ☐ IX. Affidavits and Statements
- ☐ X. Other Applicable Permits



- ☐ XI. Background Environmental Information
- ☐ XII. Relationship to Park Planning Documents
- ☐ NPS performs a completeness and technical review of the plan of operations (for more information, see Ch. 2).
- ☐ Operator revises plan of operations, if necessary (for more information, see Ch. 2).
- ☐ Park staff prepares NEPA document (or adopts the operator's or consultant prepared NEPA document), incorporates other environmental compliance, and initiates mandated consultations with other agencies (for more information, see Ch. 2 and Appendix B).
- ☐ Park completes public review process, finalizes decision documents, and notifies the operator that the plan has been approved, conditionally approved, or rejected.
- ☐ Operator agrees to conditions of approval (if any), submits applicable state and federal permits, and files performance bond with the NPS (for more information, see Ch. 10).



## **PLAN OF OPERATIONS INFORMATION REQUIREMENTS FOR DRILLING AND PRODUCTION OPERATIONS**

Below is an explanatory list of requirements that nonfederal oil and gas operators need to include in a plan of operations for a drilling and/or production operation where the surface location is sited within the park. These requirements are based on the regulatory provisions under 36 C.F.R. §9.36. This list is also used by the NPS to determine if a proposed plan of operations is complete and sufficiently detailed to merit "official acceptance" for review and analysis in accordance with the regulations at 36 C.F.R. §9.36(c).

A plan of operations may not need to address all of the information requirements presented below. Information requirements should be tailored to the type of operation proposed (*e.g.*, drilling operation, production operation, pipeline construction and operation, well plugging, etc.). The list should be used in conjunction with the 36 C.F.R. Part 9B regulations to determine which items are applicable to the proposed operation, and are therefore required in a plan of operations. The operator and NPS staff will focus the list of information requirements during project scoping. In some instances, the NPS may require additional information to effectively analyze the proposed operation (36 C.F.R. §9.36(a)(18)). (For additional information, contact the park for assistance in determining information requirements for particular types of proposed operations.)

The operator will submit the plan of operations, tender the performance bond, and be the responsible party for compliance with the plan of operations.

### **I. OWNERSHIP AND CONTACT INFORMATION**

The purpose of this section is to identify the "operator" as defined under the NPS regulations, to document the operator's property right to oil and gas in the park, and to identify primary company contacts for planning, field operations, and emergencies.

A. Name(s) and address(es) of:

1. Surface owner, and
2. Lessor (mineral owner).

B. Name, address, and telephone number of:

1. Operator,
2. Lessee (if different than operator),
3. Field representative, and
4. Contact person in case of spill or other emergency.

C. Copy of instrument(s) demonstrating the operator's right to operate. Examples include:

1. Lease,
2. Deed,
3. Assignment of rights, or
4. Designation of operator.

NOTE: The operator must provide the NPS with documentation demonstrating that it has a property right to conduct drilling and production operations in all of the proposed project



area before the NPS will issue a data collection permit or accept the plan of operations as complete for formal processing.

### II. MAPS AND PLATS

The purpose of this section of a plan is to graphically show the operator's mineral tract(s) and the area of operations in relation to the park. The area of operations includes proposed new surface disturbance associated with the operations such as the wellpad, access road, and any other planned surface use. The scaled location plats are intended to clearly and accurately define the area that the operator has available for conducting well operations and to identify the area that the operator is responsible for reclaiming.

A. **Tract/Lease Boundary Map** - use 1:24,000 USGS quadrangle map(s) and show the following:

1. NPS park unit boundary,
2. Mineral tract/lease boundary, and
3. Drilling unit boundary.

B. **Operation Location Map** - use 1:24,000 USGS quadrangle map(s) and show the following:

1. Lease or mineral tract boundary and park boundary,
2. Proposed oil/gas well(s) and production facilities,
3. Existing access road(s),
4. Proposed new access road(s),
5. Existing flowlines/pipelines in area,
6. Proposed new flowlines/pipelines,
7. Helicopter landing zone (if applicable),
8. Location of any fill or borrow material necessary for operations, and
9. All existing wells within 1 mile radius of the area of operations (potable water, disposal, producing, shut-in, exploratory, and abandoned).

C. **Operation Plats** – Submit large-scaled plats showing the dimensions and equipment layout of the operations area. Show the following, as applicable:

1. Access road dimensions, including cross sections of cut and fill areas and road profile.
2. Wellpad dimensions for drilling operations, including cross sections of cut and fill areas.
3. Excavations for ditches, sumps etc. on or around wellpad (show cross-sections).
4. Drill rig and drilling equipment layout:
  - a. compressors, drill pipe, mud tanks, fuel storage, drilling mud storage, etc.;
  - b. area to be protected with liner, liner type and thickness;
  - c. temporary living quarters;
  - d. sanitary facilities; and
  - e. ring levee/berm and stormwater containment construction.
5. Wellpad dimensions for production operations, noting partial reclamation area, following drilling operations (if applicable).



6. Wellhead and production equipment layout:
  - a. tanks, flowlines, meters, heater treaters, separators, etc.;
  - b. flowline/pipeline control valves, pressure and volume regulators, monitors and alarms, and cathodic protection;
  - c. electrical powerlines;
  - d. ring levee/berm and stormwater containment construction;
  - e. produced water disposal well, associated equipment, and flowline;
  - f. enhanced recovery systems equipment; and
  - g. all other equipment necessary for operations.
- D. **Topographic Plats** – use scaled plats prepared by registered surveyor/engineer and show the following:
  1. Existing contours of proposed wellpad area,
  2. Existing contours of proposed access road area, and
  3. Existing contours of proposed new flowline/pipeline route.

### III. TIMELINE FOR OPERATIONS

The purpose of this section of the plan is to identify when operations will be conducted and how long they will last. Any alteration of normal operations due to seasonal timing considerations for natural resources or visitor uses should also be noted in this section.

- A. Provide an estimated timeline for the proposed operation, including the following information (as applicable):
  1. Date to begin site preparation and construction,
  2. Date to spud well,
  3. Days to drill to total depth,
  4. Days to test/complete well and start production,
  5. Anticipated longevity of operation,
  6. Date to begin reclamation, and
  7. Time to complete reclamation.

### IV. DESCRIPTION OF WELL GEOLOGY

- A. Provide the following information for the area of operations:
  1. Total depth of oil/gas well(s),
  2. Depth of anticipated producing zone(s) and formation name(s),
  3. Depth of useable quality water zone(s) (aquifers),
  4. Depth(s) of known brine zones and other minerals (coal, oil shale, etc.), and
  5. Depth(s) of abnormally high/low pressure or other geologic hazards (H<sub>2</sub>S, etc.) and methods to account for such conditions.



### V. DESCRIPTION OF OPERATIONS

The description of operations should provide enough detail about the proposed methods, sequence, and equipment for each component of the operation (e.g., road and pad construction, drilling, production, flowlines, etc.) to allow the NPS to assess the proposal's impacts on the environment. Specific actions that will be taken to minimize or eliminate adverse impacts on park resources and visitor related values should also be presented. The amount of information in this section will vary depending both on the planned activities and the environment where they will be conducted.

NOTE: Operators cannot use sources of water inside the park without written permission of the regional director. The regional director can only approve a plan of operations that uses a source of water from inside the park if: 1) the operator's water right is superior to the United States claim, or 2) if the water right is subordinate to the U.S. government's, the operator shows that removal of the water would not damage park resources (36 C.F.R. §9.35).

#### A. New Access Road and Pad Construction

1. Topsoil removal and storage;
2. Excavations (cut/fill) for road and pad;
3. Type and quantity of material for road and pad base (gravel, board mat, etc.);
4. Number, type and placement of culverts or bridges;
5. Pad slope to cellar or other point to collect spilled contaminants;
6. Cellar, mouse hole and rat hole construction;
7. Type, thickness and placement of liner on wellpad; and
8. Diking around pad to prevent contaminant release into adjacent lands/waters.

#### B. Drilling Operations

1. Mobilization of equipment.
2. Site security and public safety (e.g., traffic control, signing, road gate, security guard, etc.).
3. Freshwater quantity, source, transport, and storage.
4. Stormwater management.
5. Blowout preventers and other pressure control equipment:
  - a. minimum specifications and pressure ratings;
  - b. schematic diagram of pressure control equipment; and
  - c. testing procedures and frequencies.
6. Drilling program:
  - a. total depth and directional program;
  - b. hole size for each casing string;
  - c. setting depths of each string; and
  - d. casing size, grade, and weight of each string.



7. Mud program:

- a. mud types, properties, weights, and additives, for each well segment; and
- b. mud handling and containment system (e.g., number, type and size of mixing tanks and reserve fluid tanks; separation, storage and fate of cuttings; etc.).

NOTE: The NPS requires a closed loop “closed loop containerized mud system” for surface operations within park units to protect park resources.

8. Casing program.

9. Cementing program:

- a. types and amounts of cement,
- b. cement additives, and
- c. cementing procedures.

NOTE: For cementing surface casing or any other casing that protects useable quality water zones, include a description of methods to achieve proper mud and hole conditioning prior to cementing, pipe reciprocation during conditioning and cementing, proper preflush relative to adequate contact times and turbulent flow regime, proper slurry design for sufficient compressive strengths at critical zone isolation intervals, calculated slurry yield volumes, and pressure testing.

10. Testing/evaluation program:

- a. well logs,
- b. core Intervals, and
- c. drillstem test including handling of produced fluids.

11. Completion program:

- a. completion type (openhole, perforated, slotted liner, etc), and
- b. completion procedure including considerations for well control.

**C. Production Operations**

Production operations may be described "generically" if equipment and layout cannot be predicted; however, if the information is not supplied in the initial plan, a supplemental plan of operations may be required prior to the conduct of production operations. Describe the following, as applicable:

- 1. Site security and public safety (e.g., fencing, road gate, signing etc.).
- 2. Stormwater management.
- 3. Artificial lift equipment.
- 4. Pressure and flow control equipment:
  - a. tree configuration, specifications, and pressure ratings; and
  - b. downhole and/or flowline pressure or flow control equipment including testing procedures and frequencies.
- 5. Treating and separating process and equipment.
- 6. Produced water storage and disposal.



7. Tank battery, including number, type, size, and storage volume; berm or “firewall” dimensions; and type and thickness of liner.  
NOTE: Firewall dimensions must contain 1.5 times the volume of the largest tank, and an impermeable liner must be installed under the tank battery to protect soils and groundwater.
8. Removal/disposal of precipitation within tank battery firewall.
9. Flowline and pipelines:
  - a. size, type, length, depth, etc.;
  - b. inspection and testing procedures and frequency;
  - c. maximum and mean flow rate of product;
  - d. maximum and mean operating pressure;
  - e. cathodic protection methods;
  - f. pig launching/retrieving station(s); and
  - g. vegetation management along line routes.
10. Metering points, including LACT units, orifice meters, and turbine meters.
11. Sales point (if on lease).
12. Tanker pick-up points (if on lease).
13. Gas compressor, including type and size (if applicable).
14. Enhanced recovery methods and equipment including waterflooding, fireflooding, polymer flooding, and any other secondary or tertiary recovery facilities (if applicable).
15. Maintenance of access road and pad, including vegetation management.
16. Anticipated recompletion, stimulation, workover, and well plugging activities:
  - a. considerations for preventing oil, brine, chemicals, and other materials from reaching the ground (e.g. use of plastic liners beneath the workover rig, pipe racks, and other equipment as necessary; collection of all fluids and solids returned to the surface from the wellbore in metal tanks; waste disposal outside park, etc.); and
  - b. park notification prior to conducting such operations.

## VI. SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

The NPS has combined informational requirements and operating standards from the 9B regulations to develop the format for a Spill Control and Emergency Preparedness Plan. This plan covers the substances or site conditions that pose risks to human health and safety and the environment. It also describes the actions the operator would take to minimize these risks in the event of a spill or natural disaster (e.g., flood, fire, hurricane, or tornado). See *Chapter 11 – Spill Control and Emergency Preparedness Plan* in the Operator’s Handbook for the organization and content of a Spill Control and Emergency Preparedness Plan.

A Spill Control Emergency Preparedness Plan should describe all actions, equipment, procedures, training, etc. to control and effectively respond to releases of contaminating substances (oil, brine, drilling fluids, blow-out, or any other toxic or hazardous substance) to ensure protection of park resources and human health and safety.



## VII. WELL PLUGGING AND RECLAMATION PLAN

This section of the plan must describe all actions to be taken to achieve proper plugging of the well and reclamation of the area disturbed by the operation. Final reclamation of the site must be initiated as soon as possible following completion of the operation, and shall not be later than six months unless the regional director authorizes a longer period of time. For more information see *Chapter 7 – Well Plugging and Surface Reclamation*.

A. **Plugging Program** – describe the equipment and procedures for well plugging including the following:

1. Types of plugs and setting depths,
2. Casing removal, perforation depths, and cement placement technique,
3. Type and amount of cement required, and
4. Type of abandoned hole marker.

B. **Reclamation Plan** – The reclamation plan will describe the actions needed to meet the general regulatory reclamation standards<sup>11</sup> as well as site-specific reclamation goals. It will be based on the disturbance anticipated from the proposed operation and reclamation expectations of the NPS as identified during project scoping. The operator should organize the reclamation plan by the following sections.

### 1. Reclamation Goals

- a. summarize the site-specific reclamation goals developed during project scoping. Site-specific goals might include a desired percent of vegetative ground cover, the type of plants, soil stabilization, surface drainage characteristics, etc.
- b. state the timeframes for reclamation. Describe when reclamation activities would begin, how long reclamation activities would last, and the schedule for monitoring the results of the reclamation.

### 2. Reclamation Procedures - The 9B regulations identify the steps that need to be completed to satisfy reclamation standards for operations on federal surface.<sup>12</sup> The following steps may be used as an outline for developing the plan's reclamation procedures. The operator can describe the methods and equipment that will be used to accomplish each of these steps.

- a. removal of all above ground equipment, structures, debris and materials, including road and pad material.
- b. purging of buried pipe and removal or capping and abandonment in place.
- c. removal or neutralization of contaminating substances, including sampling and testing procedures.
- d. restoration of pre-construction topographic contours.
- e. replacement and preparation of topsoil for revegetation.
- f. reestablishment of native vegetation community, including monitoring protocol and target percent cover.

<sup>11</sup> See §9.39, Reclamation Requirements, and Chapter 7, Well Plugging and Surface Reclamation in this handbook.

<sup>12</sup> For operations on private surface estate, see Chapter 7, Well Plugging and Surface Reclamation - Differences in Reclamation Requirements – Federal and Private Surface Estate in this handbook.



3. Reclamation Cost Estimate - The cost of reclamation in part determines the amount of the performance bond.<sup>13</sup> It is an estimate of costs to complete the reclamation procedures in Item B above. The subtotals may be used to determine amounts by which to reduce the operator's performance bond if reclamation is to be performed in phases. At a minimum, there needs to be enough detail to support subtotals for each of the following subcategories:
  - a. well Plugging (Item A 1-4 above).
  - b. removal of structures, equipment, debris, roads, pads, pipelines etc. (Items B. 2 a and b above).
  - c. removal or neutralization of contaminating substances (Item B. 2 c above) including soil and water sampling and testing, soil and water remediation, disposal of contaminated soils or water, etc.
  - d. site and soil preparation (Items B. 2 d and e above).
  - e. vegetation and monitoring (Item B. 2 f above).

The NPS will verify and use the cost estimate to set the reclamation portion of the performance bond. If the operator chooses not to provide the cost estimates for reclamation, the performance bond may be set at the maximum amount allowed by regulation<sup>14</sup>, which is \$200,000 per operator per park unit. If the operator already holds a \$200,000 bond for other operations in the same park, it is unnecessary for the operator to provide the cost estimate information required by this section. Nonetheless, the operator will remain legally and financially responsible for fully reclaiming the operations area.

### VIII. COMPLIANCE WITH OPERATING STANDARDS

Describe how the operator will comply with the following operating standards at 36 C.F.R. §9.41-9.46. Requests for variances should be accompanied with supporting information.

- A. Surface operations shall not be conducted within 500 feet of a watercourse, high pool shoreline, mean high tideline, or any structure or facility (excluding roads) used for unit interpretation or administration, unless specifically authorized.
- B. Protection of all survey monuments, witness corners, reference monuments and bearing trees.
- C. Shut-in of well when drilling or production operations are suspended for 24 hours or more, but less than 30 days.
- D. Shut-in of well when production operations are suspended for 30 days or more.
- E. Posting of a sign showing operator name and operation identification number.
- F. Fencing around all wells, storage tanks, and high-pressure equipment as specified by the park superintendent.
- G. Posting of warning signs acceptable to the superintendent if operations are located in or near visitor use areas.
- H. Preventing accumulation of oil and other materials deemed to be fire and environmental hazards.
- I. Prompt removal of all equipment and materials not in use.

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<sup>13</sup> See §9.48(d)(1) and Chapter 10 this Handbook.

<sup>14</sup> See §9.48(d)(3) and Chapter 10 in this Handbook.



## **IX. AFFIDAVITS AND STATEMENTS**

Include an “Affidavit of Compliance” signed by an official that is authorized to legally bind the company as required by regulations at 36 C.F.R. §9.36(a)(15). The affidavit should state that the proposed operations are in compliance with all applicable federal, state and local laws and regulations. An example Affidavit of Compliance is included in *Appendix C – Sample Letters for Nonfederal Oil and Gas Operations*.

## **X. OTHER APPLICABLE PERMITS**

- A. Include a copy of the state drilling permit including the state requirements for protection of usable quality groundwater.
- B. At the superintendent’s request, operators will need to provide the NPS with a copy of all other applicable federal, state, and local permits. If the permits are still pending, operators may submit a copy of the application for such permits.

## **XI. BACKGROUND ENVIRONMENTAL INFORMATION**

The purpose of this section of the plan is to present information on existing natural and cultural resources in the project area, assess the environmental impacts of the proposed operation, and discuss any technologically feasible alternatives for the proposed operation. Information that should be presented in this section will be determined during project scoping with park staff. The park may have some of the required natural and cultural resource information for the operator’s use in preparing this section of the plan.

- A. Description of natural resources in the proposed operation area should include the following information:
  - 1. Soil type(s) and engineering properties such as permeability, porosity, erosion potential, etc.
  - 2. Baseline soil chemical analysis on the proposed wellpad area, including the following parameters (NOTE: These parameters may change based on the proposed use of chemicals and substances):
    - a. pH value
    - b. arsenic
    - c. total barium
    - d. cadmium
    - e. chromium
    - f. lead
    - g. mercury
    - h. selenium
    - i. silver
    - j. zinc
    - k. total petroleum hydrocarbon
    - l. electrical conductivity
    - m. sodium absorption ratio
    - n. exchangeable sodium percentage
  - 3. Paleontological resources known to occur or likely to occur in the project area (if applicable). The discussion should include the results of the paleontological survey of the project area performed by a qualified paleontologist.
  - 4. Hydrology and water quality, including the following:
    - a. drainage pattern of the project area;
    - b. proximity to surface water (intermittent or permanent watercourses, streams, ponds, lakes, springs, etc.);



- c. depth to groundwater;
  - d. proximity to any wetland boundary (defined by site-specific wetland delineation);
  - e. proximity to the base floodplain, 100-year floodplain, and 500-year floodplain; and
  - f. water quality in nearby surface water and/or shallow groundwater.
5. Vegetation species composition in access road and wellpad area, including predominant herbaceous, shrub, midstory, and overstory species. (NOTE: This information is necessary to properly design a reclamation plan).
  6. Wildlife species composition in the proposed operation area.
  7. Federal or state threatened / endangered plant or wildlife species that inhabit or frequent the proposed operation area.
  8. Air quality in the proposed operation area, including information on pollutant levels and existing point sources for pollutants in the area.
  9. General description of baseline noise levels in the proposed operation area, including local sources contributing to increased noise levels.
- B. Description of cultural resources in the proposed operation area should include the following information:
1. Background information on archeological and historic resources documented in the general area, including review of the National Register of Historic Places.
  2. Results of cultural resources survey of project area performed by a qualified archeologist approved by the NPS.
- C. Identification and proximity of park visitor use areas (e.g., trails, campgrounds, public roads, picnic areas, overlooks etc.) near the proposed operation area.
- D. Description of the anticipated direct, indirect, and cumulative effects of the proposed operation on the park natural and cultural resources, and socioeconomic environments listed above. (This is the operator's opportunity to support their conclusions on the environmental effects of their operations.)
- E. Description of all reasonable technologically feasible alternative methods of operation and associated environmental impacts.

## **XII. RELATIONSHIP TO PARK PLANNING DOCUMENTS**

The plan of operations must discuss how the proposed operation relates to park planning documents (General Management Plan, Oil and Gas Management Plan, etc.) in terms of considering and integrating operational measures described in the plan(s) to achieve park management objectives. The park's oil and gas contact will furnish a copy of all applicable park planning documents.



## **THIRD PARTY MONITORING**

The NPS may require an operator to hire a third party monitor to oversee certain aspects of the operation such as drilling, major workovers, well plugging, etc. The purpose of third party monitoring is to ensure operator compliance with the terms of the approved plan of operations and to protect park resources and values.

The company hired to do the third party monitoring must meet the following three requirements:

1. Third party monitors shall not include any representatives or employees of the operator, or any contractors or subcontractors of the operator working on any task related to this project, or any persons who would have a financial or other interest in the outcome of the drilling operation.
2. The persons hired to do the monitoring must meet the technical qualifications to monitor the specific resources in the NPS unit where the operations would occur (e.g., wetlands scientist, wildlife biologist, archeologist etc.).
3. The scope of work must meet the objectives of monitoring in the park.

The operator and park staff will work together during project scoping and development of the plan of operations to come up with an effective plan for monitoring the operations. During project scoping, the operator and NPS will discuss the requirement for third party monitoring and the technical qualifications that would be needed by the monitor(s). The NPS will provide the operator with a list of roles and responsibilities and necessary qualifications of the third party monitor(s). In some cases this information may not be developed until after the NPS technical adequacy review of the plan of operations. The operator will include details in the plan of operations concerning the use of a third party monitor and disclose that there will be no conflict of interest between the operator and the company that will be hired to do the monitoring and that the monitor(s) will have the technical expertise to do the monitoring. Once the third party monitor(s) have been selected by the operator, a list of the persons and their qualifications must be provided to the NPS.

The NPS may develop stipulations that specify conditions of the third party monitoring (36 C.F.R. § 9.37(f))<sup>15</sup>. Examples of these stipulations include, but are not limited to:

- The third party monitor must be paid by the operator.
- The monitor must report directly to the park superintendent or his/her representative.
- The NPS will identify the frequency and type of compliance reports.
- If a violation of the terms of the monitoring contract occurs, the NPS would require immediate corrective actions from replacement of the monitor up to suspension of the approved plan of operations.
- The NPS may suspend the operations if the monitor demonstrates to the NPS that the operation poses an immediate threat of significant injury to federally owned or controlled lands or waters. (36 C.F.R. § 9.51(c)(2))

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<sup>15</sup> Under this provision all approved plans are conditioned upon the superintendent's right to access an operation to monitor and ensure compliance with a plan of operations. Since under this scenario a third party will handle monitoring, the superintendent can exercise his or her right to access and monitor the operation through the third party via specific stipulations in its approval letter.



Third party monitors would be required to ensure operator compliance with the approved plan of operations. Monitoring may include making sure that:

- Access in the unit is along designated routes and by approved means (e.g., on foot or by vehicle),
- Vegetation clearing and earthmoving activities to construct the access road and wellpad including the secondary containment system (liner, berms etc.) follow the approved plan of operations,
- Operations avoid rare, threatened or endangered plant and animals, archeological sites, watercourses, research plots, and Special Management Areas / sensitive resource areas,
- There is proper handling, transport, and storage of hazardous and other contaminating substances,
- Well casing and cementing is done according to state and NPS requirements.
- When the well is plugged, the operations area is cleaned up and reclaimed according to the approved plan of operations.



## REQUIRED OPERATING STIPULATIONS AND RECOMMENDED MITIGATION MEASURES FOR DRILLING AND PRODUCTION OPERATIONS

The tables in the following section list operating stipulations (Table 4.1) required by the NPS and suggested mitigation measures (Table 4.2) for drilling and production operations on NPS lands. The primary resource(s) that would be protected by the operating stipulations and mitigation measures listed in the tables are denoted by a ✓ symbol.

Table 4.1 focuses on the NPS 36 C.F.R. 9B regulations, but also includes operating stipulations required under other federal laws and regulations. The appropriate citation is shown in parentheses after each requirement. To ensure compliance with all applicable legal and policy mandates, it is the operator's responsibility to consult with the appropriate federal, state, and local agencies prior to beginning operations in a unit of the National Park System and determine which statutory and regulatory requirements would apply to each operation.

Table 4.2 lists mitigation measures for drilling and production operations. Use of mitigation measures shown in the table are recommended by the NPS to ensure compliance with the NPS approval standard to utilize "...technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety" (36 C.F.R. §.9.37(a)(1)). Many of the mitigation measures are derived from environmental guidelines and publications developed by the oil and gas industry and environmental professionals and may not address every environmental topic or risk that may be encountered during oil and gas operations. These tables are intended to be a tool to be used during project planning. An operator can look through the tables to see which measures would apply to an operation and select the most appropriate measures to include in his/her plan. An operator has the discretion to select the most appropriate mitigation to meet the NPS least damaging approval standard.



**Table 4.1. Required Operating Stipulations for Drilling and Production Operations on NPS Lands**

ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Required Operating Stipulations	THE APPLICABLE LEGAL CITATION IS NOTED IN [PARENTHESIS] AFTER THE STIPULATION.	RESOURCES PROTECTED											
						Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
√	√			In order to use surface or subsurface water from inside the park, the operator must demonstrate in the plan of operations that his/her water rights are superior to any claim of the U.S. to use the water, and where the use is subordinate to that of the U.S., that use of the water will not damage park resources. Since any use of park water has the potential to negatively affect water quality, quantity, and flow patterns, the operator should note what resources would benefit from the in-park water use and how they would benefit. [36 C.F.R. § 9.35]				√					√				
	√	√	√	Prepare an Emergency Response Plan to ensure safe operating procedures in the event of a reportable quantity spill; damage to wells, pipelines, or other structures; fire; explosion; medical evacuation; or other emergencies such as strong winds, heavy rainfall, swift currents, and flooding and secure storage tanks and other production equipment to reduce structural and environmental risks. [36 C.F.R. §§ 9.36(a)(10)(vi), (a)(14), (d), 9.39(a)(1)(ii) & (2)(iii), 9.41(e) & (f), 9.43, 9.44, 9.45]		√		√	√	√	√	√			√		√
√	√		√	Prior to beginning operations, in consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service (if applicable), and NPS, identify all threatened, endangered, and sensitive species that may be present in the project area. Based on the species and the proposed operation, operators may be required to conduct biological surveys in the project area. [36 C.F.R. § 9.36(a)(16)(i); Endangered Species Act of 1973 -16 USC 1531 <i>et. seq.</i> ]										√			
√	√		√	Conduct cultural resource surveys to document the location and significance of any cultural resource (includes various components of archeological, ethnographic, historic architectural, and historic landscape resources) that might be affected by operations. [36 C.F.R. §9.36 (a)(16)(i), 36 C.F.R. § 63, 36 C.F.R. §800.4]											√		
√	√		√	Conduct a pre-operational analysis to adequately describe the natural, social and economic environments that would be affected by the operations (including air quality, geology, topography, soils, surface and subsurface hydrology, vegetation, wetlands, fish and wildlife, threatened and endangered species, cultural resources, and all water and oil and gas wells) within a 2-mile radius of proposed operation. [36 C.F.R. § 9.36(a)(16)(i)]	√	√	√	√	√	√	√	√	√	√	√		
	√			Use closed loop containerized mud system to minimize drilling mud volumes, drilling fluid wastes, and site disturbance. Earthen pits will not be permitted for nonfederal oil and gas operations inside NPS units [36 C.F.R. § 9.37(a)(1)].		√		√	√	√	√	√	√	√		√	



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Required Operating Stipulations	RESOURCES PROTECTED	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
THE APPLICABLE LEGAL CITATION IS NOTED IN [PARENTHESES] AFTER THE STIPULATION.																	
✓	✓	✓	✓	Surface operations shall at no time be conducted within 500 feet of the banks of perennial, intermittent or ephemeral watercourses; or within 500 feet of the high pool shoreline of any natural or man-made impoundments...unless specifically authorized by an approved plan of operations. If necessary, the operator must specifically request exemptions from this standard in the plan of operations and demonstrate that the exemptions are necessary for acceptable data quality, can be conducted with insignificant affects on park waters or manmade infrastructure, and result in overall resource impact reduction [36 C.F.R. § 9.41(a)].				✓	✓		✓						
✓	✓	✓	✓	Protect all survey monuments, witness corners, reference monuments and bearing trees against destruction, obliteration, or damage from operations. Operator shall be responsible for the reestablishment, restoration, or referencing of any monuments, corners, or bearing trees which are destroyed, obliterated, or damaged by such operations. [36 C.F.R. § 9.41(b)]						✓						✓	
	✓	✓		Whenever drilling or production operations are suspended for 24 hours, but less than 30 days, the wells shall be shut-in by closing wellhead valves or blowout prevention equipment. When production operations are suspended for 30 days or more, a suitable plug or other fittings acceptable to the park superintendent shall be used to close the well [36 C.F.R. §9.41(c)].												✓	✓
	✓	✓		Place signs at every operation or well in a conspicuous place and include the name of the operator or owner, well number, lease number, location, and phone number and take all necessary means and precautions to preserve these markings [36 C.F.R. § 9.41(d)].												✓	✓
		✓		Secure production operation sites with acceptable fencing around wells, storage tanks, all high-pressure equipment, and storage tanks, unless otherwise authorized by the park superintendent [36 C.F.R. § 9.41(e)].									✓			✓	✓
	✓	✓	✓	Operators shall remove from the park or store in an orderly manner, all scrap materials or other materials that are not in use or other materials deemed to be fire hazards from the vicinity of well locations and lease tanks [36 C.F.R. § 9.41(f)].												✓	✓
✓	✓	✓	✓	Possession of firearms by persons conducting oil and gas operations is prohibited in NPS units. [36 C.F.R. § 9.41(f)]									✓	✓		✓	✓
	✓	✓		Operators must use procedures and equipment of sufficient pressure rating to keep the well under control at all times. Surface casing must be cemented to surface unless otherwise permitted. All other casing strings must be securely cemented in place to ensure control of the well [36 C.F.R. § 9.43].													✓
	✓	✓		Operators must use procedures and equipment of sufficient pressure rating to prevent uncontrolled discharges of oil, gas, or brine. Operators must act quickly to control blowouts or burning wells. [36 C.F.R. § 9.44]													✓



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Required Operating Stipulations	THE APPLICABLE LEGAL CITATION IS NOTED IN [PARENTHESIS] AFTER THE STIPULATION.	RESOURCES PROTECTED											
						Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
	✓	✓		Oilfield brine, and all other waste and contaminating substances must be kept in the smallest practicable area, must be confined to prevent escape as a result of percolation, rain, high water or other causes, and such wastes must be stored and disposed of or removed from the area as quickly as practicable in such a manner as to prevent contamination, pollution, damage or injury to the lands, water (surface and subsurface), facilities, cultural resources, wildlife, and vegetation of or visitors of the unit [36 C.F.R. § 9.45].		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	✓	✓		The operator shall take technologically feasible precautions to prevent accidents and fires [36 C.F.R. § 9.46].												✓	
✓	✓	✓	✓	Operators shall not injure, alter, destroy, or collect any site, structure, object, or other value of historical, archeological, or other cultural scientific importance, in violation of the Antiquities Act without written authorization from the NPS [36 C.F.R. §9.47(a); 43 C.F.R. §3].										✓			
✓	✓		✓	Ensure that a qualified 3 <sup>rd</sup> party monitor is present during appropriate operational phase(s). Once operations have commenced, the operator shall immediately bring to the attention of the superintendent any cultural or scientific resource, or species of special concern encountered that might be altered, harmed or destroyed by the operation and shall leave such discovery intact until told to proceed by the superintendent. The superintendent will evaluate the discoveries brought to his/her attention, and will determine within ten (10) days what action will be taken with respect to such discoveries. [36 C.F.R. § 9.47(b)]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
✓	✓	✓	✓	Include stop work provisions in operator's contracts in the event of a cultural or scientific resource discovery [36 C.F.R. § 9.47(b); 36 C.F.R. § 800.13(b)(3)].			✓								✓		
✓	✓	✓	✓	Use of park roads must be in accordance with procedures outlined in an approved plan of operations [36 C.F.R. § 9.50].		✓				✓					✓	✓	
✓	✓	✓	✓	Dispose of stormwater in accordance with federal and state laws [33 U.S.C. §§ 1251 <i>et seq.</i> , Section 402 Permits].				✓								✓	
	✓	✓		If required by the park superintendent, provide laboratory analyses of soils, surface water, groundwater, and sediment before and after well drilling or production operations (or change of ownership or lease rights) [refer to NPS "Guideline for the Detection and Quantification of Contamination at Oil and Gas Operations" found in Appendix D of this document].		✓		✓									
	✓	✓		Cover or place netting on storage tanks to minimize the likelihood of accidental deaths of migratory birds [Migratory Bird Treaty Act -16 U.S.C. §§ 703-712; Executive Order 13186].								✓	✓				
✓	✓	✓	✓	Schedule work during times least likely to affect T & E species [Endangered Species Act, 16 U.S.C. §§ 1531-1544, 50 C.F.R. Parts 402 & 450].									✓				
✓	✓	✓	✓	Immediately report to the NPS and the FWS an incidental take of a federally listed species and immediately report to the NPS all other protected species. [Endangered Species Act, 16 USC §§ 1531 – 1544, 50 C.F.R. Parts 402, 450].									✓				



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Required Operating Stipulations	RESOURCES PROTECTED	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
√		√	√	Do not locate oil and gas well access roads and flowlines and gathering lines in the 100-year floodplain unless no practicable alternative exists. Where such operations must be located in the 100-year floodplain, appropriate mitigation measures must be taken to floodproof or elevate the road, flowline, or gathering line to minimize structural and environmental risks associated with flooding, including debris flows. [EO 11988 § 3 (b), NPS Procedural Manual 77-2 § (VI) (G)]						√							√
	√	√		Do not locate drilling and production pads or oil and gas processing and storage facilities and equipment, including heater treaters, separators, oil storage tanks, produced water storage tanks, etc., in the 500-year floodplain unless there is no practicable alternative. Where such operations must be located in the 500-year floodplain, appropriate mitigation measures must be taken to floodproof or elevate the structures to minimize the environmental risks associated with flooding. [EO 11988 § 3(b), NPS Procedural Manual 77-2 § (VI) (G)]						√							√
√	√	√	√	Wetlands (both Cowardin classification system and jurisdictional wetlands) must be delineated where proposed operations would directly or indirectly adversely impact wetlands. The wetland delineations shall be approved by the U.S. Army Corps of Engineers and the National Park Service, Water Resources Division, and be incorporated in the Statement of Findings and operator's proposed plan of operations. [Executive Order 11990, NPS Procedural Manual 77-1 § 5.1]								√					
√	√	√	√	When proposed operations cannot avoid direct and/or indirect impacts on wetlands, the operator shall compensate for direct and indirect impacts on wetlands by restoring degraded or former wetland habitats. Wetland restoration must, at a minimum, provide for one-for-one (1:1) wetland function replacement ( <i>i.e.</i> , focus on no net loss of wetland functions, not just wetland acreage). Compensation <u>shall</u> be performed prior to or at the same time impacts associated with approved oil and gas operations occur. [Executive Order 11990, NPS Procedural Manual 77-1 § 5.2 (C)]								√					
√	√	√	√	Plan work to avoid known cultural resources. If work cannot avoid known cultural resources, assess and mitigate effects on National Register eligible or listed properties in consultation with State Historic Preservation Office and Advisory Council on Historic Preservation. [36 C.F.R. § 800.3-800.9]											√		
		√		Firewalls constructed around storage tanks or tank batteries must be of sufficient size to contain at least 1.5 times the storage capacity of the largest enclosed tank. Firewalls must be properly constructed and maintained [40 C.F.R. § 112.7(e)(5)(B)].													√



**Table 4.2. Recommended Mitigation Measures for Drilling and Production Operations on NPS Lands**

ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Recommended Mitigation Measures	RESOURCES PROTECTED	RESOURCES PROTECTED											
						Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
✓	✓	✓	✓	Avoid direct impacts to unit resources and values by siting surface operations outside the boundaries of the park (applies to directionally drilled wells, and siting of production facilities).	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
✓	✓	✓	✓	Utilize existing disturbed areas (roads, pads) to the extent feasible when planning new operations.		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
✓	✓	✓	✓	Avoid or bypass wildlife areas, especially in areas of active denning, nesting, spawning, migration, or feeding. Where interaction with wildlife is unavoidable, minimize the sights, sounds and duration of operations to the maximum extent feasible.								✓	✓				
✓	✓	✓	✓	Before moving equipment on or off location, make sure machinery is plugged, drained, or otherwise secured to keep fluids from leaking during transport.		✓		✓									
✓	✓	✓	✓	Reduce vehicle speeds to reduce chances of injuring wildlife.								✓	✓				
✓	✓	✓	✓	Use seed, mulch, or other authorized materials or structures to mitigate the potential for erosion. Use certified weed-free mulch, native seed, or sterile cover crops that are not sources of undesirable nonnative plant species.		✓		✓		✓							
✓	✓	✓	✓	Use mechanical or physical methods to control vegetation along roadways, adjacent to wellpads, at wellheads, valves, meter stations, production facilities, etc.												✓	
✓	✓	✓	✓	Use NPS-approved herbicides to control vegetation where no other alternative method of control, including mechanical or physical methods exists.												✓	
✓	✓	✓	✓	Ensure that individuals applying herbicides are certified by the state for herbicide applications.												✓	
✓	✓	✓	✓	Apply pesticides when visitors are not in area and post signs in areas that have been treated until they are dry.											✓	✓	
✓	✓	✓	✓	Apply pesticides according to label directions, when applying outdoors (especially herbicides); do not apply during windy conditions.											✓	✓	
✓	✓	✓	✓	As authorized under an approved plan of operations, annually report the types and amounts of pesticide use to the park superintendent.												✓	
✓	✓	✓	✓	Do not burn vegetation, refuse, or other debris or wastes incidental to maintenance of operation.	✓											✓	
✓				Use the minimum road design standard sufficient to carry anticipated traffic and loads with reasonable safety and with minimum environmental impact.		✓										✓	
✓				Do not construct access roads on steep slopes. If there is no alternate access to wellpad, construct road with switchbacks to minimize steepness of roadway.		✓											
✓				Use gravel or other appropriate road surfacing materials on access roads to minimize erosion.		✓										✓	
✓				When possible, construct roads in drainage divides.		✓										✓	



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Recommended Mitigation Measures	RESOURCES PROTECTED											
					Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
✓				Use alternative construction methods, such as board roads, for temporary access to well locations.		✓										
✓				Avoid constructing access roads in areas with clayey soils. If not possible, roads should trend perpendicular to contours when crossing clayey soils. In permeable soils, plan roads to run parallel to contours and design to enhance recharge.		✓										
✓				Crown or outslope the road surface to dissipate surface runoff and minimize erosion of the roadbed.		✓										
✓				Install drainage structures (ditches, culverts, cross drains, wing ditches, etc.) and bridges to maintain hydrology of the site and adjoining wetlands, and to protect aquatic life and to allow for safe passage of wildlife.				✓			✓	✓				✓
✓				Post appropriate signs on access roads to indicate speed limits, animal crossings, turnouts, blind curves, etc.								✓	✓		✓	✓
✓				Sign, gate, and lock oil and gas access roads that are used solely by the operator.												✓
✓				Remove and reclaim all oil and gas access roads that are not necessary for the conduct of operations.		✓		✓								
✓				When designing access road, minimize the number of stream crossings. Crossings should be perpendicular to the stream, resulting in less vegetation clearing than oblique crossings.		✓		✓	✓	✓	✓	✓	✓			
✓	✓	✓		When possible, adding fill is preferable to grading and excavation to construct roadways, wellpads, berms, secondary containment, etc. All reasonable attempts should be made not to disrupt the hydrology and adjoining wetlands.		✓		✓		✓	✓					
	✓			Consistent with safe operations, plan and conduct operations to minimize site disturbance. Site operation on elevated areas outside of floodplain and wetland areas and use the minimum size wellpad necessary to drill and produce well.				✓	✓		✓					
	✓			Design wellpads to conform to the natural topography and other surface features of the area.		✓		✓		✓					✓	
	✓	✓		Avoid locating new drilling and production operations on steep slopes to minimize soil disturbance and disruption of natural drainage patterns. Locating operations on steep slopes would not be permitted unless operator uses methods least damaging to resources and assures protection of human health and safety.		✓		✓		✓						✓
	✓			Drill multiple wells from a single wellpad.		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
✓	✓			During project design and construction, leave vegetation in place and create a buffer along perimeter of wellpad and access road to protect water quality, to minimize erosion/sedimentation, and to improve aesthetics.		✓		✓		✓					✓	
	✓			Construct a berm or ring levee around the drilling location. Install impermeable liners underneath the drilling rig and associated equipment including fuel storage and transfer areas. Install the liner to direct fluids to a collection point(s) for recycling or disposal.		✓		✓								✓
	✓			Secure drilling site with appropriate fencing, gated access road, security guard, or signs.												✓



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Recommended Mitigation Measures	RESOURCES PROTECTED											
					Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
	✓			Manage traffic to and from operation using two-way communications or other procedure. Drilling operations that operate continuously may be required to hire qualified security personnel to monitor egress and ingress to the drill site.											✓	✓
✓	✓			Conduct drilling operations during the dry season to avoid soil disturbance and compaction and disruption of water drainages caused by temporary access roads.		✓		✓								
	✓			For air drilling, dampen particle discharge from the blooey line by treatment with a liquid sprinkler, scrubbers, or other effective controls at the blooey line discharge.	✓	✓		✓								
	✓			Use an inside-diameter wiping tool for drillpipe to reduce loss of drilling fluids.		✓		✓								
	✓			Maintain ample materials to increase drilling fluid density in an emergency situation. Install and maintain equipment capable of efficient, even delivery and mixing of drilling fluid weighting material.												✓
	✓	✓		For wells that may encounter hydrogen sulfide gas, prepare a contingency plan that provides an organized approach for alerting and protecting the public within an area of exposure prior to release, intentional or otherwise, of a potentially harmful volume of hydrogen sulfide.												✓
	✓	✓		Use fuels and control technologies that minimize release of air emissions from compressors, turbines, and other equipment.	✓											
	✓	✓		Prevent leaks and spills by practicing regular inspection and maintenance, and good housekeeping practices.		✓		✓								✓
	✓	✓		Reduce vehicle speed to minimize dust.	✓			✓		✓						
	✓	✓		Avoid or minimize flaring of gas from wells. Design facilities to use or sell wellhead gas.	✓										✓	✓
	✓	✓		Install and maintain catalytic converters on engines.	✓											
	✓	✓		Use natural gas engines or electric engines instead of engines fueled by diesel or other fuels.	✓											
	✓	✓		Maintain thief hatch seals on storage tanks to minimize the release of volatile organic compounds.	✓											
	✓	✓		When possible, use bulk drilling fluids, additives, and chemicals in reusable containers to reduce solid waste generation from empty sacks or buckets.		✓		✓								
	✓	✓		Use less volatile solvents and chemicals during operations. Properly store and label containers to prevent degradation, overflow, or contamination. Keep containers covered when not in use to decrease loss due to vaporization.	✓											✓
	✓	✓		Use nonhazardous products or less toxic substitutes whenever possible.												✓
	✓	✓		Use and maintain, or upgrade as necessary, existing wellpads and access roads rather constructing a new wellpad/access road if it is properly located for operation(s).		✓		✓		✓					✓	
	✓	✓		Stabilize wellpads to avoid or minimize erosion.		✓										



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Recommended Mitigation Measures	RESOURCES PROTECTED											
					Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
	✓	✓		Use secondary containment (impermeable liner) around fuel, crude, and brine tanks, vessels, and under tank battery load-line connections to collect leaks, drips, and spills. Design secondary containment to eliminate or minimize collection of precipitation.		✓		✓		✓						
	✓	✓		For drilling or workover operations, use a multi-layered or specialized impermeable liner system beneath the rig and associated equipment (including fuel and transfer areas). Use cellar as collection point for drilling fluid waste, rigwash, other fluids, etc.		✓		✓		✓						
	✓	✓		Contain garbage in animal-proof containers for disposal at approved facilities.								✓	✓			
	✓	✓		Store sanitary wastes in approved, above ground septic tank or system for disposal at approved facilities.				✓								✓
	✓	✓		Use biodegradable, lead-free pipe dope whenever possible.		✓		✓								
	✓	✓		Use drip pans, drip basins, or other impervious secondary containment to collect leaks, drips, and spills. Empty contents of container for recycling or proper disposal and reuse container.		✓		✓		✓						
	✓	✓		Collect and reuse rigwash or as make-up water in drilling and completion operations. Use high-pressure, low volume water supply for rigwash, to conserve water, and to minimize waste.		✓		✓		✓						
	✓	✓		Segregate or avoid mixing hazardous and nonhazardous chemicals to reduce the amount of hazardous waste for management.		✓		✓								✓
	✓	✓		Contour and/or ditch around chemical, fuel, lubricant, and waste storage areas to a collection point that is separate from other rig equipment and not into the cellar.		✓		✓								
	✓	✓		Improve work process and properly maintain facilities and equipment to minimize stormwater contamination. Note: "Contaminated stormwater runoff" includes, but is not limited to runoff which: (1) contains a hazardous substance in excess of reporting quantities defined at 40 C.F.R. § 117.3 or 40 C.F.R. § 302.4, (2) contains oil in excess of the reporting quantity defined at 40 C.F.R. § 110.3 (e.g., causes a visible sheen), or (3) contributes to a violation of a water quality standard.		✓		✓		✓						✓
	✓	✓		Keep lighting to the minimum needed for safe operations. Use well-designed lighting to direct light where it is needed, such as using low pressure sodium light sources or downward directed lighting. Shield or design lights to prevent offsite glare, and use nighttime lighting only where necessary.								✓	✓		✓	
	✓	✓		Design operations to use quieter equipment such as electric motors. Use appropriate sound-absorbing or sound-muffling equipment or materials, quiet design exhaust mufflers and acoustic covers, and acoustically insulated buildings. Direct noise away from visitor use areas, adjacent landowners, and developed areas.								✓	✓		✓	
	✓	✓		Install, test, and maintain pressure control equipment in proper working condition. Perform weekly pressure tests of the blowout prevention system.												✓



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Recommended Mitigation Measures	RESOURCES PROTECTED	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
	✓	✓		Construct and maintain firelane or firebreak along the perimeter of wellpads or production facilities. Use erosion control practices during firelane or firebreak construction and maintenance to mitigate the potential for erosion.			✓		✓		✓						✓
	✓	✓		Do not drill a water supply well deeper than the surface casing in areas where abnormal pressures might be encountered.					✓								
	✓	✓		Divert stormwater from the wellsite and avoid riparian areas, waterways and wetlands by contouring, grading, berming, or trenching.			✓		✓		✓						
	✓	✓		Protect usable quality aquifers by designing/implementing a surface casing and cementing program to place a properly designed cement slurry around a centered casing in a borehole of adequate size from which mud and mud cake has been removed. Specific measures include: -Cure any lost circulation problems prior to cementing. -Design hole size and casing size to provide a minimum of 1 inch clearance around pipe, but no more than 2 inches of clearance. -Implement a centralizer design (type and quantity) appropriate for hole conditions to achieve good casing centralization. When available, use borehole caliper information to place centralizers in locations where hole is in gauge. -Base mud circulation and conditioning on achieving hole stability rather than a specified volume. Condition mud to lower gel strength and viscosity. Proper hole conditioning is shown by a clean shaker, stable pump pressure and strokes at a constant throttle, and stable drag trends. -Reciprocate casing during hole conditioning and cementing. -Pump a preflush (water or engineered system depending on well conditions) in turbulent flow with enough volume to achieve 10 minutes contact time. Use fluid-loss additives as necessary to prevent preflush loss to high permeability zones. -Use lightweight or ultra-lightweight lead cement slurries if necessary to avoid lost circulation. -Design a large excess cement volume to account for uncertain annular volume and to improve mud removal efficiency. -Displace cement at maximum rate compatible with equipment and bottom-hole allowable pressure. -Prior to drilling out the surface casing shoe, verify surface casing integrity by pressure testing the surface casing as required by most state regulations and NPS standards as taken from Department of Interior Order No. 2, Section III. B.h. -After drilling between 10 and 20 feet of new formation, verify casing shoe integrity by testing the casing shoe to a minimum of the mud weight equivalent anticipated to control formation pressures at total depth.				✓									
		✓		Install surface controlled subsurface safety valves on wells capable of natural flow.			✓		✓		✓						✓



ROADS	DRILLING	PRODUCTION	FLOWLINES/PIPELINES	Drilling and Production Operations Recommended Mitigation Measures	RESOURCES PROTECTED	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
		✓		Use secondary containment under tank battery load-line connections.			✓		✓		✓						
		✓		Set storage tanks and other equipment on elevated and aerated base to prevent corrosion.			✓		✓		✓						
		✓		Design secondary containment to eliminate or minimize collection of precipitation.			✓		✓		✓						
		✓		Whenever possible, place workover wastes into production stream.			✓		✓		✓						
		✓		Use excess well completion, treatment, and stimulation fluids in other wells.			✓		✓		✓						
		✓		Reduce leakage from common points of friction and wear (e.g., stuffing box packing rubbers, valve stems), by using magnetic ion coating technology.			✓		✓		✓						
		✓		Treat production streams with biocide or inhibitor to reduce sulfide formation.			✓		✓		✓						
		✓		Paint production equipment to blend with the surrounding environment. The NPS must approve the selection of colors prior to painting oil and gas production equipment and facilities.												✓	
		✓		Reduce and control paint overspray; use a brush for small jobs.					✓								
		✓		Replace mercury manometers or other instruments with mercury-free instruments.			✓		✓		✓						✓
		✓		Use alternative methods to reduce sandblasting such as paint that does not require sandblast preparation, cathodic protection, or materials that do not need to be painted.			✓		✓		✓						
		✓		Design and maintain operation to reduce locations in the production system prone to NORM (Naturally Occurring Radioactive Materials) scale formation.			✓		✓		✓						✓
		✓		Periodically monitor for accumulations of NORM or NORM-containing materials to minimize volume of NORM-contaminated waste requiring disposal.			✓		✓		✓						✓
		✓		Store NORM-contaminated waste in above ground tanks for proper disposal.			✓		✓		✓						✓
		✓		Provide NORM management training for appropriate personnel of NORM-affected production facilities.													✓
		✓		Replace electrical equipment containing PCBs (polychlorinated biphenyls) with non-PCB containing equipment.			✓		✓		✓						✓
		✓		Cover the top of all open vent stacks with a screen or cage to prevent injury to birds and wildlife.									✓	✓			
		✓		Empty storage tanks and fill with water in preparation for flooding or major storm events (i.e., hurricanes).			✓		✓		✓						✓
		✓	✓	Provide for automatic shut-in of wells in response to pressure changes on the flowline to reduce spill volumes.			✓		✓		✓						✓
			✓	Install flowlines and pipelines adjacent to access roads to minimize surface disturbance. This would also facilitate easy access to the pipeline for maintenance or spill response.			✓		✓		✓					✓	✓
			✓	Use only metal pipe for above-ground flowlines, gathering lines, and pipelines to prevent damage to flowlines, gathering lines, and pipelines where controlled burns or wildfires could damage non-metallic pipes.			✓		✓								



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			✓	Minimize or avoid placing flowlines, gathering lines, and pipelines across waterways and in floodplains and wetlands. Where appropriate (based on site analysis), install flowlines, gathering lines, and pipelines via directional drilling underneath steep slopes, waterways, floodplains, and wetlands. Directionally drill underneath floodplains, waterways, and lakes to install new flowlines or to replace sections of existing pipelines.			✓		✓	✓	✓					✓	✓
			✓	When possible, flowlines, gathering lines, and pipelines should parallel drainage divides and access roads.			✓		✓	✓	✓					✓	✓
			✓	Pipeline crossings of perennial, intermittent, and ephemeral stream channels should be constructed to withstand floods of extreme magnitude to prevent breakage and subsequent accidental contamination of run-off during high flow events. Construct surface crossings to remain above the highest possible stream flows at each crossing, and construct subsurface crossings deep enough to remain undisturbed by scour throughout the passage of peak flows.			✓		✓	✓						✓	✓
			✓	During placement of flowlines, gathering lines, and pipelines, avoid blocking or filling natural drainages.					✓								✓
			✓	Design, operate, and maintain leak detection monitoring and the capability for immediate remote shutdown of pipelines in the event of a leak or spill.			✓		✓	✓	✓						✓
			✓	Where pipelines are proposed to cross streams, assess the potential for site degradation (erosion) and stream migration and design and install pipeline to prevent exposure of the pipeline.			✓		✓	✓	✓					✓	
			✓	To minimize spills, use block and check valves on pipeline segments that cross waterways, floodplains, and wetlands. Ensure integrity of pipeline joints, especially pipelines crossing these areas.			✓		✓	✓	✓	✓					
			✓	Routinely maintain vegetation (trimming, cutting) along pipeline rights-of-way and routes to allow monitoring of pipelines and rapid access in the event of a leak or spill.					✓	✓	✓					✓	✓
			✓	Regularly empty drips along gathering lines, flowlines and pipelines. Flood-proof drips to prevent the release of oil and produced waters.			✓		✓								
			✓	Use "smart pig" or other devices to test pipe wall thickness or integrity to determine the need for further pressure testing or pipeline replacement.			✓		✓	✓	✓						✓
			✓	Check thickness of pipeline to determine extent of internal corrosion at least annually.			✓		✓	✓	✓						✓
			✓	For above ground pipelines, partially rotate the lines to extend the life of the line from support contact wear and exposure of the upper half of the line.			✓		✓	✓	✓						✓
			✓	For above ground pipelines, provide supports that minimize contact of the pipeline with the ground. Supports should not restrict thermal expansion and contraction of the line, be close enough to eliminate sag, and designed for maximum loading conditions.			✓		✓	✓	✓						✓
			✓	Before placing a new pipeline in service or after replacing sections of an existing line, conduct hydrostatic test at a pressure 1.5 times the maximum designed working pressure for the system.			✓		✓	✓	✓						✓
			✓	"Pig" and pre-clean pipelines prior to hydrotesting to reduce the toxicity of hydrotest water.			✓		✓	✓	✓						✓



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			✓	Minimize internal corrosion by keeping both product and pipeline free of water.			✓		✓		✓						✓
			✓	For underground pipelines, use resistivity testing of soils to forecast external corrosion problems.			✓		✓		✓						✓
			✓	Maintain a good protective coating on pipe and joints at all times (both under- and above ground).			✓		✓		✓		✓				✓
			✓	Use cathodic protection for underground or submerged pipelines. Note: A typical cathodic protection system involves connecting the pipeline and a sacrificial anode to a direct current rectifier, thereby corroding the anode instead of the pipeline metal.			✓		✓		✓						✓
			✓	Maintain a program of regular visual, electric, magnetic, and/or acoustic inspections on pipe to assess its integrity under worst case operating conditions of pressure and temperature. If warranted based on the inspection program, conduct mechanical integrity pressure tests in accordance with standard practices.			✓		✓		✓						✓
			✓	Place and maintain warning signs at each public road crossing, railroad crossing, and trail; and in sufficient number along the remainder of each pipeline so that its location is accurately known. Post warning signs at intersections with roads and trails. If H <sub>2</sub> S could be present in pipeline, place warning signs adjacent to pipeline.												✓	✓







## DRILLING OPERATIONS – A PICTORIAL OVERVIEW

Similar to geophysical surveys, drilling operations are relatively short-term. However the intensity of impacts is much higher due to the equipment and materials needed to drill a well and the potential duration of the operation. The following resource issues are commonly associated with drilling activities:

- Pad construction results in soil removal (or compaction) and vegetation removal.
- Poorly constructed well sites may accelerate erosion and sedimentation further impacting soils, vegetation, water quality, fish, and wildlife.
- Uncontained oil, drilling muds, wastes, or other contaminants can degrade soils and surface and ground waters, harm vegetation, fish, and wildlife, and air quality.
- Poorly cased and cement wells (or improperly plugged wells) may lead to groundwater contamination.
- Wetlands may be damaged by construction of roads and pads or threatened by leaks and spills.
- Dark night skies can be impacted by night-time lighting on drilling rigs.
- Surface water quality may be degraded by leaks, spills, and stormwater discharges.
- Groundwater quality may be degraded by surface leaks and spills, casing leaks, and poorly plugged wells.
- Air quality may be degraded from flaring of gas, large spills, dust, and engine emissions.
- Natural sounds are interrupted by construction and drilling noises.
- Scenic quality disturbed by a tall drilling rigs, roads, pads, and miscellaneous equipment.
- Fish and wildlife may be injured by human presence, vehicles, exposure to contaminants, loss (degradation) of habitat, or unauthorized takings.
- Cultural resources may be threatened by increased human accessibility and fire.





### STRATEGIES FOR REDUCING IMPACTS FROM DRILLING OPERATIONS

- Directionally drill the well from a surface location outside the park. Operators will benefit from less regulatory control by the National Park Service and the NPS will benefit by removing all direct impacts to park resources.
- Maximize the use of existing roads, wellpads, and other surface disturbances.
- Use directional drilling from a single pad to reduce the number of wellpads and access roads needed to develop a field. This strategy could also be used to avoid environmentally sensitive areas.
- Time the drilling operation to avoid critical wildlife migration, breeding, nesting, and birthing or high visitor use periods. Seasonal weather conditions may also factor into the proper timing of the operation.



Advances in directional drilling make it a powerful tool for avoiding environmental impacts. The extra costs to directionally drill a well are often offset by savings in road and wellpad construction in units of the NPS. This aerial photograph shows the extensive surface disturbance from roads and pads for a normal well spacing in an oilfield.

This two-acre wellpad in Big Cypress National Preserve provides surface locations for three directionally-drilled wells and production facilities. Three straight holes with the associated wellpad, roads, and flowlines may have disturbed up to six additional acres.







This drilling and production pad on the North Slope of Alaska is developing an entire field from one location designed for 20 initial wells. The footprint from drilling and production is much smaller than what it would have been using conventional development with straight holes, multiple roads, and the necessary gathering system.



### DRILLING PAD DESIGN

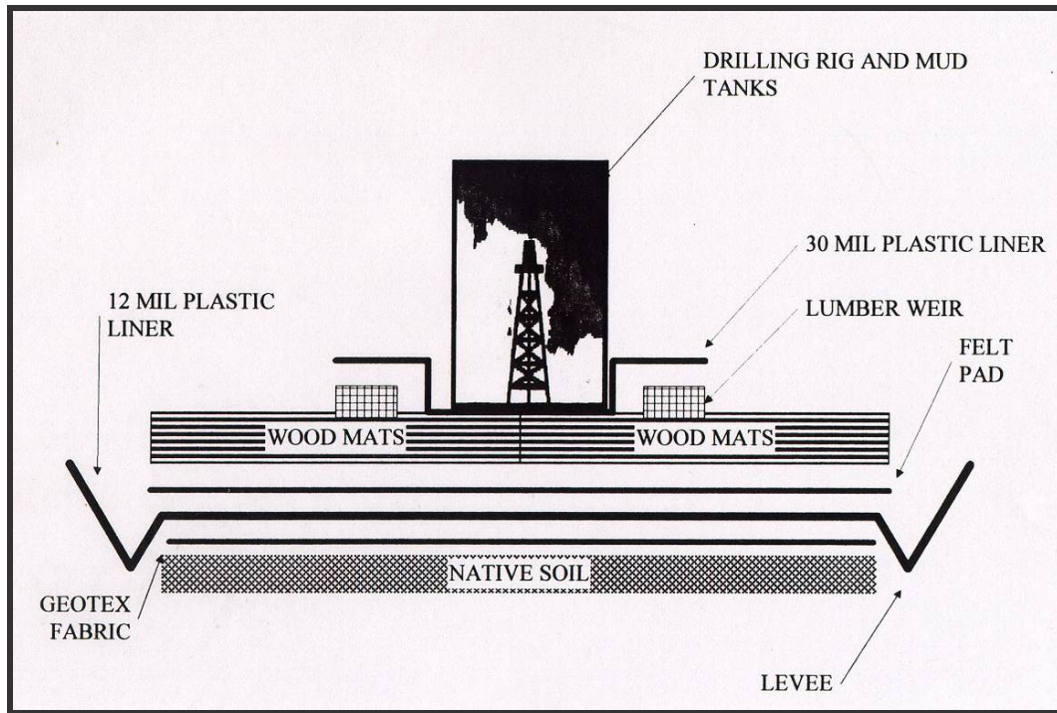
#### Strategies to Reduce Environmental Risks

- Use impervious liners under all of the rig equipment, mud tanks, pipe racks, and other sources of spills to prevent soil contamination and to provide for effective stormwater management.
- Slope wellpad to the well cellar or other low point to collect spills and contaminated stormwater that collects within the lined area.
- Build a berm and/or ring levee around the entire location to provide backup should a spill escape from the lined area under the rig components. The fill for the pad should be relatively impermeable so not much seepage should occur if a spill escapes the lined areas.
- Line and berm areas for storing fuels, lubricants, chemicals, and waste. Contour and/or ditch the storage areas to a collection point separate from other rig equipment and not into the cellar (to prevent mixing of Resource Conservation and Recovery Act "exempt" and "nonexempt" wastes).
- Seal the cellar, mouse hole, and rathole by grouting with cement or other methods to prevent seepage of contaminants.



This drilling location in Padre Island National Seashore incorporated all of the above strategies when designing and constructing the location.





The operator of this drilling operation in Big Thicket National Preserve used a configuration of geotex fabric, synthetic liners, and board mats to construct a zero-discharge location. A 30-mil liner under the rig and associated equipment provided the primary protection against spills and discharge of stormwater that would likely come in contact with contaminants. An 18-mil liner under the entire location, and across the ring levee, provided backup for the primary liner. Stormwater that collected in the ring levee could be inspected prior to discharge or disposal. A vacuum pump and hose setup was kept on location to easily collect and manage liquids that accumulated in the lined areas.



Shown above, the ring levee and wellpad are covered with a plastic liner and board mats are placed on the liner. Equipment is placed on primary liner (below).

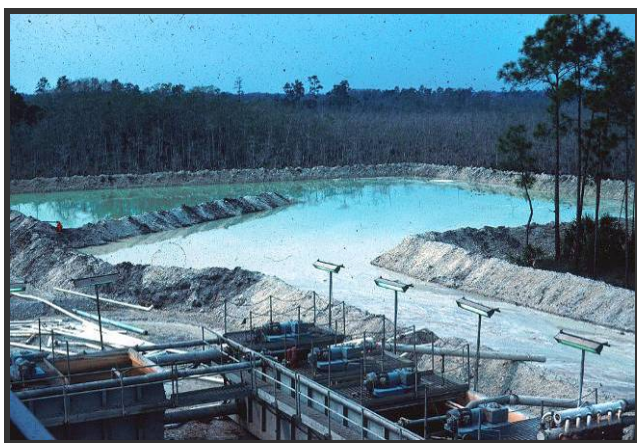




### ENVIRONMENTAL PRECAUTIONS DURING DRILLING OPERATIONS

#### Earthen Reserve Pits Versus Steel Tanks

- The NPS no longer allows the use of earthen pits, even lined pits, inside a park. Depending on state requirements, wells drilled from surface locations outside the park may use earthen pits provided the operator constructs and maintains the pit to prevent migration of its contents. However, if damage occurs to park resources in the event of a spill, the operator will be liable for that damage.
- Inside a park unit an operator must use a fully containerized, closed-loop drilling fluid system in place of an earthen reserve pit system. This technique drastically reduces the potential for soil and water contamination. The closed-loop system usually needs less area than an average reserve pit so the operator can reduce the overall drill site area and area of potential impact.



This earthen reserve pit would no longer be appropriate for operations inside a park. Pits create more surface disturbance and are more likely to leak contaminants to the environment.

Steel tanks that hold water, reserve mud, and cuttings replace the need for traditional earthen reserve pits.





## WELL CUTTINGS AND MUD DISPOSAL

- Use an efficient mud cleaning system and catch cuttings in steel tanks.
- Disposal of wastes will not be permitted inside a park.
- Dispose of mud and cuttings at an approved disposal site outside of the park.



Above, the well cuttings are loaded into a truck using a backhoe. To the left and below, the operator collected drill cuttings in 85-barrel steel boxes that were mounted on railroad tracks. The filled boxes were slid out and replaced by empty ones. After a box was filled, it was sealed and loaded on a truck and hauled to an approved disposal site outside of the park.

The closed loop containerized mud system was designed to efficiently remove drill cuttings from the mud, and included a Derrick Flo-Line Cleaner, a high-G mud cleaner, and a decanting centrifuge.





### HANDLING OF FUELS, LUBRICANTS, CHEMICALS, AND WASTE



The operator could provide a shed to keep sacked mud additives out of the weather, thus reducing the chances of a spill. Mud additives may have to be handled as hazardous materials if they are spilled before becoming part of the mud system.

Stained soil under the bulk lube oil storage tank and the engines indicate sloppy handling procedures. No secondary containment is provided. Lube oils do not qualify for the RCRA (Resource Conservation and Recovery Act) hazardous waste exemption for E&P (exploration and production)



This operator provided a lined area for storage of chemicals and lube oil. Unused fracturing fluids are not exempt E & P wastes. This operator has taken the precaution of separating fracturing operations from other areas to avoid mixing RCRA hazardous and nonhazardous waste.



Fuels must also be kept in separate secondary containment areas from muds, rig wash, etc. With no secondary containment under the storage tank (right), the stained soils become a hazardous waste.



In the photo on the left the operator is aware that secondary containment is a good idea for fuel storage, but fails to plan until the last moment which results in poor execution.



In the example to the left and below, the operator plans for secondary containment under fuel storage. As a result, the chance of a fuel spill causing significant cleanup problems has been virtually eliminated.





## **PRODUCTION OPERATIONS – A PICTORIAL OVERVIEW**

While production operations tend to cause less disruption to the natural environment than drilling operations, they carry their impacts over a much longer time frame. The following resource issues are commonly associated with production activities:

- Soil contamination from old production pits, leaks, and spills.
- Soil erosion and sedimentation associated with disturbed areas.
- Vegetation damage from leaks and spills, and fire.
- Wetlands damaged or threatened by leaks and spills.
- Surface water quality degraded by leaks, spills, and stormwater discharges.
- Groundwater quality degraded by surface leaks and spills, casing leaks, and poorly plugged wells.
- Air quality degradation from flaring of gas, large spills, pits, dust, and engine emissions.
- Natural sounds are interrupted from vehicles, pump jacks, pumps, compressors, etc.
- Scenic quality is broken up by permanent facilities, roads, pads, and miscellaneous equipment.
- Fish and wildlife are injured by human presence, vehicles, exposure to contaminants, loss (degradation) of habitat, or unauthorized takings.
- Cultural resources are threatened by increased human accessibility and fire.

Looking over the list above, one can readily see that leaks and spills of oil, brine, or other contaminants that may be used in operations are a key concern. Soils, vegetation, water quality, fish and wildlife, and air quality can all be adversely affected by the release of contaminants into the environment. Operators should strive to prevent releases by using good work practices and properly maintaining production equipment. Operators should also design secondary containment safeguards into their sites, and then respond quickly to clean up and remove spills that do occur.



## WELL SERVICING AND WORKOVER OPERATIONS

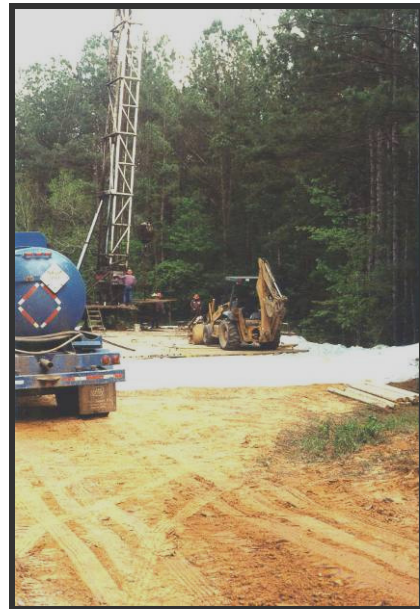
### Strategies for Clean Well Servicing and Workover Operations

- Maintain a sealed well cellar so that spills around the wellhead are easy to contain and remove. The cellar also helps in the production mode.
- Use a synthetic liner and board matting under rig components and construct berms/trenches to direct liquids to cellar.
- Use steel tanks to hold workover fluids and all liquids and solids returned from the well until they can be removed from the site.
- Contour and/or ditch around chemical, fuel, lubricant, and waste storage areas to a collection point separate from other rig equipment and not into the cellar (to prevent mixing RCRA "exempt" and "nonexempt" wastes).



### Proper Site Preparation Leads to Cleaner Operations

A worker forms a small, inner berm just around the wellhead, the area most prone to spills. A synthetic liner is laid down over the larger bermed area. Board mats set on top of the liner will help maintain its integrity during operations.



- Any spills underneath the rig and associated equipment can be washed to the cellar for collection.
- A small pump can be used to move liquids that might accumulate in the cellar to appropriate tanks or containers for reuse or disposal.



## PRACTICES TO AVOID DURING WELL SERVICING AND WORKOVER OPERATIONS



- The operator shown above did not consider spill control and containment during this operation. There are no berms or liner.
- Soils are soaked with oil within a 10-foot radius of the wellhead. Due to a general lack of good housekeeping, not only is the surrounding environment at risk but so are the health and safety of the workers.
- The location set-up has a strong likelihood for unlawful stormwater discharges. If stormwater comes into contact with any raw material, waste, or by-product, or an oil sheen is visible, the operator may not discharge the stormwater without a NPDES (National Pollutant Discharge Elimination System) permit issued by the Environmental Protection Agency.
- Though not clearly shown here, there is no well control equipment in place.



## SECONDARY CONTAINMENT FOR STORAGE TANKS AND SITE SECURITY



### Poor Operating Practices

- No diking is provided for the storage tank.
- In the event of a failure, tank contents will quickly move downhill and spread over a large area.
- There are no operator identification signs on the site.
- Tank valves are unlocked.
- There is no fencing in this public access area.

### Better Operating Practices

- A berm is in place to contain spills.
- A sign identifies the site name, operator, and emergency contact information.
- A fence with a locked gate protects wildlife, visitors, and guards against vandalism.



### Minimum Sign Information that is Required in a NPS Unit:

- Site Name
- Operator Name
- Emergency Contact Number



### BERM DESIGN AND CONSTRUCTION

- Berms should be constructed with materials sufficiently impervious to contain spills.
- Berms should be designed and constructed with sufficient perimeter and height to hold 1.5 times the volume of the largest tank.



This operator placed the synthetic liner (from the drilling operation) beneath the tanks. The liner was folded into the berm, which was then reinforced with a cement mixture.

Containment systems constructed with corrugated galvanized steel are commercially available as an alternative to earthen dikes.





## TANKER TRUCK LOADING



### Poor Design and Practices

- Poor design and careless procedures yield undesirable results.
- No secondary containment is provided beneath loading line connection.
- Sloppy loading procedures lead to spills.
- There are no clean up efforts at this site.

### Good Design and Practice

- Loading line connection over secondary container prevents and catches any drips or fluid loss when breaking the connection.
- Lid prevents rainwater from filling the container, which might displace oil. Oil should be removed as accumulation occurs.
- Clean site indicates careful loading procedures.



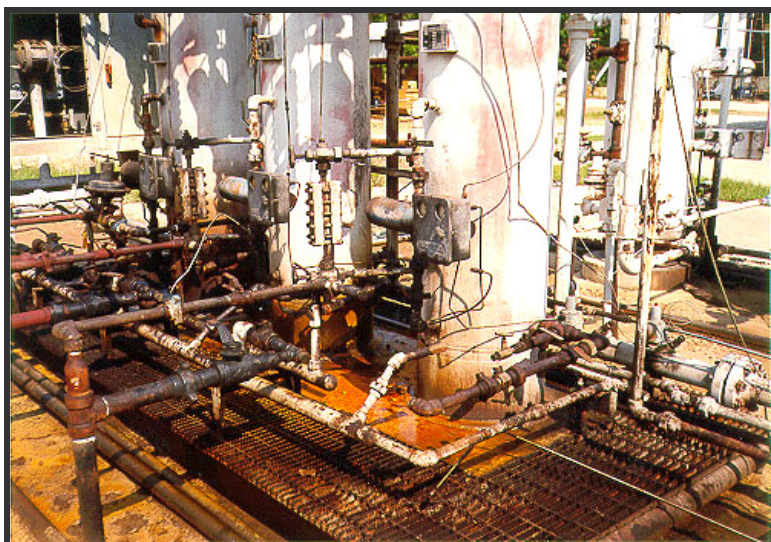
### Better Design

- Loading box located inside the tank's bermed, lined area adds another level of protection.
- Design is exemplary, but note the extension hose coming from the loading box. Could the truck driver's loading procedure negate all of the designed safeguards?



### STORMWATER MANAGEMENT

**The Law:** Operators must comply with Section 402(p) of the Clean Water Act regarding stormwater discharges. If stormwater comes into contact with any raw material, waste, or by-product, or an oil sheen is visible, the operator may not discharge the stormwater into waters of the United States without a NPDES (National Pollutant Discharge Elimination System) permit issued by the Environmental Protection Agency (EPA). “Waters” are very broadly defined and include any conveyance, including drystream channels, that lead to waterways. According to the EPA, the operator does not need a NPDES permit if discharged stormwater is not contaminated with, or comes in contact with, any raw material, intermediate product, finished product, by-product, or waste product. Permits for onshore discharges are issued by the states (which have been delegated primacy from the EPA), the EPA, or both.



Small leaks and drips around these separators indicate that the equipment is not adequately maintained or cleaned up. Stormwater comes in contact with oil and any other chemicals added to the production stream. Stormwater accumulates on the location until it flows through the unvalved, untended drainline shown below.

Oily absorbent material and sheen on the water below the drain indicate past discharges of contaminated stormwater. This is a violation of the Clean Water Act. Notice that the vegetation (lighter colored) has been damaged by the releases.





## Strategies to Effectively Comply with the Law on Stormwater Discharges

- Repair and clean up small leaks and spills so that stormwater cannot come in contact with raw material, waste, or by-products and become contaminated.
- Use secondary containment around tanks, vessels, chemical storage, and other sources of leaks and spills so that stormwater that may become contaminated is not discharged.
- Any drain lines through dikes should be equipped with valves/blinds that are normally closed and locked. Supervise discharges once the stormwater is determined to be uncontaminated.
- Provide for collection of contaminated stormwater to tanks or vessels for recycling or disposal.
- To reduce the volume of stormwater, use the smallest practicable area for installation of tanks, vessels, chemical storage, etc. Also, prevent stormwater from running onto the location using diversion ditches and/or diking.



This operator designed the separation, storage, and chemical injection facilities all within a relatively small lined and bermed area.

The smaller area limits the volume of stormwater that must be managed.

The operator also installed a small diaphragm pump that is plumbed to either discharge uncontaminated stormwater or recycle contaminated stormwater to the separation facilities. The pump is operated manually so that any stormwater can be inspected, then tended during discharge.





### CHEMICAL HANDLING

#### Strategies for Sound Chemical Handling

- Use secondary containment under chemical drums and bulk containers.
- Use bulk containers to remove the need for drum handling, drum storage, disposal or recycling of empty drums, all of which increase the chances for a spill.
- Inspect injection system (container, lines, and pump) regularly and perform maintenance as needed.
- Clean up and remove any chemicals that drip into secondary containers.
- Drain uncontaminated rainwater that collects in secondary containment or use a design that does not allow rainwater to collect in secondary containment.

#### Poor Chemical Handling

- The lack of secondary containment under drums is compounded by sloppy work habits.
- The chemical stained soils do not qualify for the RCRA Subtitle C exemption for oil and gas wastes and must be handled as hazardous waste.



#### Better Chemical Handling

- A bulk storage tank and the chemical injection pump, a common source of leaks and drips, are mounted over secondary containment.
- Clean work habits are readily apparent.



### Other Good Chemical Handling Practices

- Dubbed the “coffin container” by this operator, the method removes the need to deal with stormwater that may collect in the secondary containment.
- A simple plastic storage tub is adapted to provide secondary containment for the chemical pump.



The operator in this photo uses bulk chemical storage and places them inside the storage tank's lined and bermed area.





## VEGETATION AND EROSION MANAGEMENT



### Erosion Control

This gas well site is well maintained except for the erosion that is occurring. The operator could use drainage ditches combined with soil stabilization, such as grass seeding, to control erosion.

### Manage Vegetation on Site

Manage vegetation by cutting, using approved herbicides, or use of pad materials that inhibit plant growth. This operator maintains low vegetation on the wellsite to reduce the potential for erosion. There is also a small berm around the wellhead to contain small leaks.



Vegetation should never be allowed to reach a point where it becomes a fire hazard.

Operators should maintain an adequate fire break around their wells and storage facilities.

The operator of this well maintains an area free of vegetation around the clean, small pumpjack.



## SITE SECURITY

This gas well is located just off a blind curve on a public use road. No protection around the wellhead increases the risks to both the environment and to visitor safety.



A strong steel barrier fence protects this facility from traffic accidents. The yellow safety paint also helps to alert motorists to the presence of the well.



Fencing in areas used by the public adds to visitor safety and helps protect the operator's facility from tampering.

Locked gates on access roads can also be an effective means of site security.





### AESTHETICS



#### Noise Management

This compressor site is located near a visitor use area and noise from the facility was a primary visitor use issue.

To mitigate the noise problem, this operator maintained the standard muffling equipment, and also constructed an 8-foot corrugated metal wall to serve as an effective noise barrier.



#### Vegetative Screening

This well was sited in mature pine forest. This was done not only to move it away from the riparian corridor, but also to minimize its visibility from a primary use road.

The location was selected to protect a more sensitive environment and maintain the aesthetics of the area.





### GOOD HOUSEKEEPING OF THE OPERATIONS SITE

Good housekeeping of the site improves aesthetics, worker safety, and environmental protection.

- Remove trash, oilfield debris, and equipment that are no longer needed for the operation.
- Fence where appropriate to prevent access by the general public or wildlife.
- Post signs to warn of dangerous conditions such as flammable liquids or gases, high voltage, or hydrogen sulfide.
- Post signs with name of facility and operator along with emergency contact numbers.
- Control vegetation by cutting, mowing, or using approved herbicides to improve appearance and reduce fire hazard.
- Paint equipment (using colors compatible with the setting) to improve appearance and protect against external corrosion.
- Provide receptacles for trash and empty regularly or carry out trash as it is generated.

A well-maintained pump jack operation...



...versus a poorly-maintained pump jack operation.





This poorly-maintained tank battery lacks berm integrity, vegetation control, signing, fencing, paint, and secondary containment under the loading lines. A closer look would reveal trash, oilfield debris, and inoperable equipment.

...the opposite - a well maintained production facility.



Here are two similar flowing oil wells with obvious differences in site maintenance.





## ACCESS ROADS – A PICTORIAL OVERVIEW

A single lane, mile long access road will disturb about the same area as a 1.5-acre drilling pad. Unlike a square drilling pad, a road's impacts stretch along its distance often through very diverse environments. The following resource and management issues are commonly associated with road construction and maintenance:

- Road construction results in removal of vegetation and removal or compaction of soils.
- Poorly constructed access roads may accelerate erosion and sedimentation downslope, further impacting soils, vegetation, water, fish, and wildlife.
- Roads may intrude upon the viewshed.
- Dust from construction and use of roads can degrade local air quality.
- Roads may alter authorized and unauthorized use of park areas by providing new means of access.





### STRATEGIES TO REDUCE IMPACTS FROM OIL AND GAS ACCESS ROADS

- Use existing roads as much as practicable. Sometimes trails, primitive roads, or light duty roads can be upgraded to handle the needs of a drilling access road.
- Plan the road route using topographic and soils maps and aerial photographs while considering problem soils, streams, and road grade. Archeological information may also be available from parks during the initial road planning steps. Ground truth and adjust route as needed to avoid sensitive resource areas.
- Get water off the road with water bars, dips, and culverts along with wing ditches.
- Empty water bars, dips, culverts and wing ditches gently onto non-erosive, stable areas.
- Avoid siting access roads along steep slopes to reduce the area of cut and fill.
- Avoid fragile and difficult to reclaim ecosystems such as wetlands.
- Stabilize and revegetate cut and fill areas, ditches, and outlets to minimize erosion.
- Minimize the number and size of stream crossings. If a crossing cannot be avoided, properly design and install roadway to prevent obstruction of stream flow.

Road planning is a balancing act - weighing the road's function and construction and maintenance costs against environmental concerns. This road was routed on the slope to avoid the sensitive wetland area.



Weed free straw bales were placed to temporarily prevent sedimentation into the wetland. If the exploration well had been successful, the operator planned to control erosion and sedimentation over the long term by vegetating the cut and fill areas.



## ACCESS ROAD PROBLEMS

- Local soils may not be suitable road base material.
- No consideration was given to getting water off the road or to erosion and sedimentation problems.
- As a result, access is difficult at best during wet weather and maintenance issues are persistent. Erosion, sedimentation, and unnecessary new surface disturbance negatively effect the local environment.



## Remedies

- Bring in good road base material, crown the road and build a side ditch along the existing slope.
- Gently discharge water across the road using water bars, dips, and culverts making sure that the discharge areas are stable.
- Recontour and revegetate the areas of disturbance since users will now be able to stay on the road.



## No Access Road Problems

This road was built on soils similar to the photograph above. The key difference is the use of gravel to build a suitable road base. The road is crowned and discharges water into vegetated, stable areas. The operator controls vegetation on the roadway by mowing.





The two roads shown to the left and below are located near each other and are constructed in relatively level areas with similar soil types. In the photograph to the left, the operator built a compacted crowned road and placed ditches along the sides to keep water off the road. Below, the operator just bladed the road, and headed off cross country.

The bladed road collects rather than discharges water. Users trying to avoid getting stuck in the excessive ruts and potholes create more surface disturbance by driving off of the roadway in to undisturbed areas. Soon the 10-foot wide road has widened to 20 feet wide.



In the example to the left, the surface runoff on the bladed road concentrates the water flow down the roadway. This depletes water from some downslope areas, concentrates the flow in channels along the roadway, and dumps excessive water in other areas. Water erodes the road creating maintenance issues. The sediment-laden water is eventually discharged at some point along the road causing additional erosion and sedimentation.



Board roads are a viable alternative in some areas to provide temporary access for exploratory drilling. The road on the right, located in Big Cypress National Preserve provided suitable access to drill a well during the dry season.



The exploratory drilling was successful, and the road was upgraded using crushed limestone to provide all-weather access for the production phase of the operation. Installation of culverts has helped maintain the sheetflow that occurs during the wet season in the Preserve.



In the examples to the right, the operator upgraded a light duty road to handle the rigors of moving heavy drilling equipment. Commonly, road upgrades will have little, if any increased environmental impacts. In fact, some upgrades can improve environmental conditions by removing erosion problems and disruptions in the local drainage patterns.





### GATES AND SIGNS



The entrance point to oilfield roads should be controlled with gates and signs as appropriate.



When a road is gated and locked or a sign is posted to limit use of the road to authorized personnel only, it is a good idea to construct a turnout so that vehicles can turn around.



During drilling operations, a watchman was stationed at the entrance to this access road. The watchman limited road use to authorized personnel and used radio communications to control traffic along the single lane road. A gate and lock was also available for use.



## CHAPTER 5

### DIRECTIONALLY DRILLING A WELL FROM OUTSIDE PARK BOUNDARIES TO INSIDE A PARK UNIT

This chapter includes the following information:

- NPS permitting process checklist for § 9.32(e) operations,
- Scope of NPS regulatory authority for directional drilling operations,
- Operator benefits from drilling outside the park under a § 9.32(e) exemption,
- 36 C.F.R. § 9.32(e) application process,
- List of mitigation measures to minimize potential threats to park resources and values,
- Information requirements for § 9.32(e) directional drilling applications, and
- Implementation issues for directional drilling operations.

### NPS PERMITTING PROCESS CHECKLIST FOR § 9.32(E) OPERATIONS

The following checklist outlines the permitting process for directional drilling and production operations from surface locations outside park boundaries to nonfederal oil and gas inside NPS units. The items on the checklist are described throughout this handbook. This checklist can be used by an oil and gas operator to make sure that all of the required steps have been completed to prepare a § 9.32(e) application for NPS review.

- ☐ Operator contacts park regarding interest in conducting oil and gas operations from outside the boundaries of the park (for more information, see Ch. 2).
- ☐ Operator provides written documentation demonstrating property right to oil and gas inside the park (for more information, see Ch. 2).
- ☐ Operator meets with park staff to scope proposed project (for more information, see Ch. 2).
- ☐ Operator meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information, see Ch. 2).
- ☐ Operator conducts necessary surveys (as applicable), and surveys / stakes the operations area (for more information, see Ch. 2).
- ☐ Operator prepares § 9.32(e) application and submits it to the National Park Service.

The § 9.32(e) Application for directional drilling and production operations includes the following sections:

- ☐ I. Ownership and Contact Information
- ☐ II. Maps and Plats
- ☐ III. Timeline for Operation
- ☐ IV. Description of Well Geology
- ☐ V. Description of Operations
- ☐ VI. Spill Control and Emergency Preparedness Plan
- ☐ VII. Well Plugging Plan
- ☐ VIII. Affidavits and Statements
- ☐ IX. Other Applicable Permits/Plans



## CHAPTER 5 – APPLICATION FOR DIRECTIONALLY DRILLING A WELL

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- ☐ X. Background Environmental Information
- ☐ NPS performs a completeness and technical review of the § 9.32(e) application (for more information, see Chapter 2).
- ☐ Operator revises § 9.32(e) application, if necessary (for more information, see Chapter 2).
- ☐ Park staff prepares NEPA document (or adopts operator's or consultant's prepared NEPA document), incorporates other environmental compliance, and initiates mandated consultations with other agencies (for more information, see Chapter 2 and Appendix B).
- ☐ Park completes public review process, finalizes decision documents, and notifies the operator that the application has been approved, conditionally approved, or rejected (for more information, see Chapter 2).
- ☐ Operator agrees to conditions of approval (if any) and submits applicable state and federal permits (for more information, see Chapter 10).



## SCOPE OF NPS REGULATORY AUTHORITY FOR DIRECTIONAL DRILLING OPERATIONS

The NPS controls nonfederal oil and gas development in parks through the 36 C.F.R. 9B regulations, which apply to all activities associated with bona fide nonfederally owned oil and gas rights within any unit of the National Park System where “access is on, across, or through federally owned or controlled lands or waters.” (36 C.F.R. § 9.30(a)). Section 9.32(e) of the 36 C.F.R. 9B regulations governs operators that propose to develop their nonfederal oil and gas rights in a park by directionally drilling a well from a surface location outside unit boundaries to a location under federally owned or controlled lands within park boundaries. It is limited in scope to those aspects of the directional drilling operation occurring within park boundaries. As promulgated, § 9.32(e) does not provide a means for the NPS to assert regulatory authority under the 9B regulations over surface and subsurface operations occurring outside park boundaries.

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

### NPS REGULATORY OPTIONS

Through the § 9.32(e) application process, the NPS may determine that 1) an operator qualifies for an exemption from the regulations with no needed mitigation to protect park resources from activities occurring within park boundaries, 2) an operator qualifies for an exemption from the regulations with needed mitigation to protect subsurface park resources from activities occurring within park boundaries, or 3) an operator must submit a proposed plan of operations and a bond to the NPS for approval. Each one of these options is briefly described below.

1. **Exemption with No Mitigation:** This option would occur when there is no potential for surface or subsurface impacts in the park from the downhole activities (e.g., the wellbore does not intercept an aquifer within the park). Under this option, the NPS is not granting an approval or issuing a permit.
2. **Exemption With Mitigation:** This option would occur when the NPS determines there is no potential for surface impacts to park resources from downhole operations in the park and the operator adopts mitigation measures or conditions that reduce potential impacts on subsurface resources (e.g., an aquifer) to “no measurable effect.” As in option #1 above, the NPS is not granting an approval or issuing a permit.
3. **Plan of Operations:** This regulatory option would apply if NPS determines that it cannot make the requisite finding for a § 9.32(e) exemption because (1) impacts to surface



resources are involved, or (2) impacts to subsurface resources cannot be adequately mitigated to yield "no measurable effect." This option would also apply if an operator does not apply for an exemption and the NPS does not consider granting an exemption on its own initiative. In these cases a prospective operator must submit and obtain NPS approval of a proposed plan of operations and file a bond before commencing directional drilling activities inside a park. The required plan and bond will be limited in scope to those aspects of the directional drilling operation that occur within park boundaries. As a result, many of the general plan information requirements set forth under § 9.36 will not apply. Mitigation measures and/or conditions of approval would be integral to this option. Such mitigation could encompass the protection of cultural resources, cave/karst resources, aquifers, floodplains, wetlands and other surface resources from operations occurring inside the park. Under this option, an operator must have NPS approval of a proposed plan before commencing any activity in the boundaries of the park. The approved plan constitutes the operator's "permit."

### **OPERATOR BENEFITS FROM DRILLING OUTSIDE THE PARK UNDER A § 9.32(E) EXEMPTION**

In addition to the obvious benefits of protecting park resources and values, there are other reasons why operators may consider moving their surface location outside of the park. Cost savings in other areas of the operation could significantly offset the increased costs and operational risks of drilling a directional well from outside a unit of the NPS to a bottomhole inside the unit.

An operator might consider these factors when deciding on a surface location:

- Reduced cost of the § 9.32(e) application compared to a plan of operations,
- Reduced time for preparation and approval of a § 9.32(e) application compared to a plan of operations,
- No performance bond would be required for operations under a § 9.32(e) exemption,
- Reduced operational costs due to no NPS environmental operating requirements outside of a park,
- Reduced reclamation costs due to no NPS reclamation requirements outside a park, and
- Improved public relations by removing potential environmental threats from a NPS unit.



### **36 C.F.R. § 9.32(E) APPLICATION PROCESS**

Step 1: The operator decides if the well drilling objectives can be achieved using a surface location outside of the park.

Step 2: The operator scopes the project with the NPS and submits an application for a regulatory exemption from the plan of operations and performance bonding requirements. In the application, the operator provides the NPS with specific information that can be used to prepare the NEPA documentation (e.g., environmental assessment). The information would include contact and legal ownership information, a description of the operation, methods that would be used to minimize or avoid impacts on park resources and values, and supporting data collected for other agency permits.

Step 3: The NPS performs a completeness and technical adequacy review and with the available information, prepares the required NEPA documentation.

Step 4: Based on the environmental analysis, the NPS regional director decides if the operation as proposed poses a significant threat of damage to park resources. The regional director also decides whether there would be an “impairment” under the NPS Organic Act. If not, the regional director grants a regulatory exemption from the plan of operations and bonding requirements and other 9B provisions, as appropriate.

In general, distance from the park will be the primary mitigation measure used by the operator to avoid or minimize adverse impacts on park resources and values. In most cases fewer mitigation measures will be necessary if the operation is moved farther away from the park. Siting the well operation away from rivers that flow into the park or siting the operation downslope from the park would also reduce the potential for impacts on park resources.

An operator’s application needs to provide sufficient information to show the regional director that the downhole operations inside the park would not pose a significant threat of damage to park resources and values. The application should include a description of the mitigation measures that the operator proposes to use to reduce these threats below the “significant” threshold. Table 5.1 lists potential threats to park resources and values and describes strategies (mitigation measures) that the operator could use to avoid or reduce the potential impacts. The reader is also referred to Table 4.2 for a comprehensive list of recommended mitigation measures for drilling and production operations. Many of these measures may be required under state regulations.



**Table 5.1. Suggested Mitigation Measures to Minimize Potential Threats to Park Resources and Values from Directional Drilling Operations Outside a NPS Unit.**

THREAT TO PARK RESOURCES AND VALUES	MITIGATION MEASURE
<b>All park resources and public health and safety</b>	<ul style="list-style-type: none"> <li>• The primary mitigation measure is siting the drilling operations outside of the park. In most cases, increasing the distance between surface operations and the park boundary will reduce potential threats to park resources and values.</li> </ul>
<b>Contamination of park soils and surface and ground waters (aquifers)</b>	<ul style="list-style-type: none"> <li>• Site operations downslope from the park if possible.</li> <li>• If only upslope locations are feasible, then try to site operations at least 500 feet from the banks of watercourses.</li> <li>• Construct dikes, berms, or ring levee/ditch around drilling location.</li> <li>• Prepare and implement a Spill Control &amp; Emergency Preparedness Plan for drilling and production operations including identifying toxic or hazardous substances, spill prevention and containment actions, emergency contacts (including park staff contact), and type of response and clean-up materials and equipment available on site.</li> <li>• Use closed loop containerized mud system or lined reserve pits.</li> <li>• Use secondary containment around fuel, crude, and brine tanks and vessels.</li> <li>• Substitute less toxic materials where practicable.</li> <li>• Reduce and properly store wastes.</li> <li>• Run surface casing (or intermediate casing if appropriate) below fresh water aquifers and run cement to surface.</li> <li>• Control rig wash &amp; stormwater.</li> <li>• Plug well in accordance with state and NPS standards to protect fresh water aquifers.</li> </ul>
<b>Alteration of water quantity/quality in the park</b>	<ul style="list-style-type: none"> <li>• Use good stormwater discharge practices to prevent release of contaminants into the park.</li> <li>• Design access road and wellpad to prevent soil erosion in the park.</li> <li>• Design access road and wellpad so that it does not impede surface water flow into the park.</li> <li>• Avoid siting the wellpad in a floodplain or wetland. If floodplains or wetlands cannot be avoided, use mitigation to prevent release of contaminants into floodplains and wetlands and subsequently into the park.</li> </ul>
<b>Nuisance or safety hazard from hydrogen sulfide (or other gases)</b>	<ul style="list-style-type: none"> <li>• Develop H<sub>2</sub>S warning system and contingency plan if it may be encountered during drilling and production operations.</li> <li>• Use materials and equipment resistant to H<sub>2</sub>S stress cracking where necessary.</li> <li>• Install and maintain appropriate well control and safety equipment.</li> </ul>
<b>Fire hazard</b>	<ul style="list-style-type: none"> <li>• Practice good site housekeeping.</li> <li>• Use proper well control equipment and practices for both drilling and production operations.</li> <li>• Do not have open fires.</li> </ul>
<b>Alteration of topography in the park</b>	<ul style="list-style-type: none"> <li>• Prevent erosion from surface runoff.</li> <li>• Implement reservoir pressure maintenance if subsidence is known to occur with reservoir depletion.</li> </ul>
<b>Alteration of vegetative community in the park</b>	<ul style="list-style-type: none"> <li>• Avoid clearing of vegetation immediately adjacent to park boundary.</li> <li>• Consult with NPS staff on site maintenance and restoration methods to prevent the introduction of exotic plant species in the park.</li> </ul>
<b>Harm to park wildlife</b>	<ul style="list-style-type: none"> <li>• Advise all oil and gas personnel of NPS regulations regarding illegal taking of wildlife on adjacent park lands.</li> <li>• Restrict public access to the well site to reduce potential for wildlife “poaching” in the park.</li> <li>• Fence and net open pits if they attract wildlife.</li> </ul>
<b>Harm to threatened or endangered species</b>	<ul style="list-style-type: none"> <li>• Comply with the Endangered Species Act.</li> <li>• Avoid siting surface operations near threatened or endangered species habitat, particularly during nesting/breeding periods.</li> </ul>



<b>THREAT TO PARK RESOURCES AND VALUES</b>	<b>MITIGATION MEASURE</b>
<b>Damage to park cultural resources</b>	<ul style="list-style-type: none"> <li>• Avoid siting surface operations in close proximity to park cultural resources.</li> <li>• Use construction and operation methods to keep all drilling and production impacts localized on the wellpad.</li> <li>• Apply methods to reduce visual and noise intrusion if traditional Native American cultural sites in the park are located near the operation area.</li> </ul>
<b>Degrade air quality in the park</b>	<ul style="list-style-type: none"> <li>• Maintain engines in good running condition.</li> <li>• Control dust during access road and wellpad construction.</li> <li>• Flare gas instead of venting gas.</li> </ul>
<b>Adverse impacts to park visitor experience and safety</b>	<ul style="list-style-type: none"> <li>• Site operations as far away from visitor use areas as feasible.</li> <li>• Maintain vegetation near park boundary to screen operations from park visitor use areas such as trails, waterways, picnic sites, swimming beaches, overlooks, etc.</li> <li>• Use engine mufflers, vegetation, or other sound barriers to minimize operation noise affecting park resources and values.</li> <li>• Erect fences, post warning signs, and place a gate on the access road (as appropriate) to restrict public access to the well site.</li> </ul>

## **INFORMATION REQUIREMENTS FOR NPS TO PROCESS § 9.32(E) DIRECTIONAL DRILLING APPLICATIONS**

Below is an explanatory list of requirements that nonfederal oil and gas operators need to include in a § 9.32(e) application. These requirements are applicable for directional drilling operations where the surface location is outside park boundaries and the drillhole crosses into the park. This information may be supplemented with resource information collected by other federal agencies responsible for compliance and permitting portions of the proposed operation.

The NPS uses the list of requirements to determine if a proposed application is complete and merits NPS review to determine if “such operations pose no significant threat of damage to park resources, both surface and subsurface, resulting from surface subsidence, fracture of geological formations with resultant freshwater aquifer contamination, or natural gas escape, or the like.” (36 C.F.R. § 9.32(e)).

Most of the information listed below is required to make the § 9.32(e) determination. Other information as noted in sections VI, IX.B., and X.A. and B. can be provided at the operator’s discretion to assist the NPS in its environmental analysis required under the National Environmental Policy Act and in making the 36 C.F.R. § 9.32(e) determination.

### **I. OWNERSHIP AND CONTACT INFORMATION**

This information identifies who is responsible for the proposed operation, and provides a list of key contacts in case there is an accident that threatens park resources and values or public health and safety. It also documents that an oil and gas operator has a property right to explore for and develop nonfederal oil and gas located within a park.

A. The name, address and telephone number of the following:

1. Surface owner at the drilling site,
2. Operator,



3. Lessee,
  4. Field representative, and
  5. Contact person in case of spill or other emergency.
- B. Copy of the legal instrument demonstrating ownership of or a legal right to oil and gas beneath the park. Examples include:
1. Lease,
  2. Deed,
  3. Assignment of rights, or
  4. Designation of operator.

### **II. MAPS AND PLATS**

This section of the application should graphically show the operator's mineral tract(s) and the proposed surface location in relation to the park, and illustrate the local topography so that the NPS can assess potential threats to park resources and values.

- A. Tract/Lease Boundary Map - use 1:24,000 USGS quadrangle map(s) and show the following:
1. NPS park unit boundary,
  2. Mineral tract/lease boundary, and
  3. Drilling unit boundary.
- B. Operation Location Map - use 1:24,000 USGS quadrangle map(s) and show the following:
1. Lease or mineral tract boundary and park boundary,
  2. Proposed surface location of oil/gas well(s) and production facilities,
  3. Proposed bottom-hole location of well(s),
  4. Access routes,
  5. Existing flowlines/pipelines for intended use in area, and
  6. Proposed new flowlines/pipelines intended for use in area.

### **III. TIMELINE FOR OPERATION**

- A. Provide an estimated timeline for the proposed operation, and include the following information:
1. Date to begin site preparation and construction,
  2. Date to spud well,
  3. Time to drill to total depth, and
  4. Time to test/complete well and start production.



#### **IV. DESCRIPTION OF WELL GEOLOGY**

- A. Provide the following information for the proposed well:
1. Total depth of oil/gas well(s),
  2. Depth of anticipated producing zone(s) and formation name(s),
  3. Depth of useable quality water zone(s) (aquifers),
  4. Depth(s) of known brine zones, and other minerals (coal, oil shale, etc.),
  5. Depth(s) of abnormally high/low pressure or other geologic hazards (H<sub>2</sub>S, etc.) and methods to account for such conditions, and
  6. If applicable, the potential for encountering geothermal or cave/karst resources.

#### **V. DESCRIPTION OF OPERATIONS**

- A. Drilling / Production Operations – Describe the following:
1. Drilling program, including total depth, directional program, depth that the wellbore will cross into the park, and hole size for each casing string.
  2. Casing program, including setting depths of each string; casing size, grade and weight of each string; and placement of centralizers.
  3. Cementing program, including types and amounts of cement, additives, and cementing procedures.
  4. NOTE: If the surface hole will be drilled through useable quality water zone(s) (aquifers) beneath the park, include a description of methods to achieve proper mud and hole conditioning prior to cementing, pipe reciprocation during conditioning and cementing, proper preflush relative to adequate contact times and turbulent flow regime, proper slurry design for sufficient compressive strengths at critical zone isolation intervals, calculated slurry yield volumes, and pressure testing of surface casing.
  5. Mud program, including types, properties, weights, and additives for each well segment; handling and containment system; and liquid and solid disposal.
  6. Completion program, including type of completion (openhole, perforated, dual, etc.) and procedures to ensure well control.

#### **VI. SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN**

At the operator's discretion, a Spill Control and Emergency Preparedness Plan can be submitted to the NPS that describes all actions, equipment, procedures, training, etc. to control and effectively respond to releases of contaminating substances (oil, brine, drilling fluids, blow-out, or any other toxic or hazardous substance) to ensure protection of park resources and human health and safety. See *Chapter 11 – Spill Control and Emergency Preparedness Plan* in the Operator's Handbook for the recommended organization and content of a Spill Control and Emergency Preparedness Plan.

#### **VII. WELL PLUGGING PLAN**

Describe plugging program, including types of plugs, setting depths, casing removal, type and amount of cement, and cement placement techniques.



**VIII. AFFIDAVITS AND STATEMENTS**

- A. Include a statement that operator is fully accountable for all contractor and subcontractor compliance with the § 9.32(e) application.
- B. Include a statement that the superintendent (or designee) shall have access to the site to monitor and ensure compliance with the approved § 9.32(e) application for the downhole operations within the unit.

**IX. OTHER APPLICABLE PERMITS/PLANS**

- A. Include a copy of state drilling permit including state requirements for protecting usable quality groundwater.
- B. At the operator's discretion to help expedite the NPS fulfillment of its compliance responsibilities, include copies of, or application for, all other permits/approvals, including supporting information, required by other federal, state or local agencies. Examples of other permits and requirements may include:
  - 1. U.S. Army Corps of Engineers nationwide or individual permit for “dredge and fill” of wetlands under § 404 of the Clean Water Act,
  - 2. Federal Emergency Management Agency certificate for operations in floodplains, and
  - 3. EPA Spill Prevention Control and Countermeasure Plan for drilling, workover, and production operations.

**X. BACKGROUND ENVIRONMENTAL INFORMATION**

- A. At the operator's discretion, list proposed mitigation measures that the operator will take to protect the park from potential adverse effects of the operation. These measures should be based on federal, state and local regulatory requirements and project scoping / site visit and discussions with NPS staff. This information will help the NPS prepare the environmental documentation required under the National Environmental Policy Act.
- B. At the operator's discretion, the operator can provide other available environmental information to assist the NPS in assessing impacts on park resources and values and may include:
  - 1. Site specific resource surveys,
  - 2. Area topography,
  - 3. Surface waters and drainage patterns,
  - 4. Proximity to wetlands and floodplains and
  - 5. Other resource information gathered by the operator to comply with other agency's permitting requirements.



## IMPLEMENTATION ISSUES FOR DIRECTIONAL DRILLING OPERATIONS

Park managers and staff most often apply the 9B regulations in the context of a nonfederal oil and gas operation occurring wholly within a park; that is, where both the surface and subsurface operation takes place within park boundaries. This is not the case when an operator directionally drills and produces a well inside a park from a surface location outside park boundaries. Because the Service's 9B regulatory authority is limited to those aspects of a directional drilling operation actually occurring within park boundaries, park managers and staff must make adjustments in the scope of regulatory actions they may take under such a scenario. For example, while the NPS typically limits the size and configuration of a wellpad inside a park, the NPS cannot do so where the well pad is located outside park boundaries.

### COLLECTION OF RESOURCE INFORMATION BY PROSPECTIVE OPERATORS

The NPS may only require a prospective operator of a directional drilling operation to conduct resource surveys inside a park when there is a correlation between downhole operations within the park and potential impacts on park resources and values. Specific data collection requirements outside of the park are described below.

**Cultural Resources Surveys:** Cultural resources surveys would not be required for lands outside park units that could be affected by § 9.32(e) directional drilling proposals, unless required by the state (located on state surface) or through other permitting requirements (e.g., Clean Water Act § 404) by other federal agencies, but may be required by the NPS for areas inside the park if the downhole operations could have an effect on cultural resources in the park.

**Threatened and Endangered Species Surveys:** The operator may be required to contract and pay for a qualified biologist(s) to conduct a threatened and endangered species survey of the operations area both inside and outside of the park unit, if this information is not available and is required as a result of the Endangered Species Act Section 7 consultation process.

**Floodplains Delineations:** A floodplain assessment would not be required by the NPS for surface operation's areas sited outside of a park unit. If there is another agency with floodplains jurisdiction, an operator may be required to contract with a qualified hydrologist to prepare a floodplain assessment within the proposed project area, which may include areas both inside and outside of the park unit.

**Wetlands Delineations:** A wetlands delineation would not be required by the NPS for the surface operation's area located outside of a park unit. The operator is responsible for consulting with the U.S. Army Corps of Engineers (COE) regarding the applicability of Clean Water Act § 404 permitting and the COE's requirements for wetlands delineations.

**Coastal Zone Management Surveys:** A survey of coastal natural resource areas would not be required by the NPS for the surface operation's area located outside of a park unit. If there is another federal agency with jurisdiction of coastal areas, an operator may be required to contract with a qualified professional to survey Coastal Natural Resource Areas within the operations area, which may include areas both inside and outside of the park unit. The operator is responsible for consulting with the U.S. Army Corps of Engineers (COE) regarding the applicability of Clean Water Act § 404 permitting.



## **CHAPTER 5 – APPLICATION FOR DIRECTIONALLY DRILLING A WELL**

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Prior to completing its § 9.32(e) determination, the NPS has the discretion to wait for the outcome of the operator's compliance and permitting processes with other state and federal agencies in order to receive information on specific resources and mitigation measures applied by those agencies.

### **MITIGATION MEASURES**

Operators are urged to adopt mitigation measures to protect park resources and values both within and outside of NPS units. Mitigation measures are defined by the National Park Service as modifications of the proposal that eliminate or reduce a proposal's potential impact on a particular resource or value. Mitigation measures would be required by the NPS and incorporated by a prospective operator in a § 9.32(e) application to ensure the downhole integrity of the wellbore and to avoid or minimize other potential impacts on park resources from the downhole operations within the park.

Where connected actions outside of the park could have potential indirect impacts on park resources and values, parks would also work cooperatively with operators to urge them to adopt mitigation measures to protect park resources from activities occurring outside park boundaries. The NPS would also work closely with other state and federal agencies during their environmental compliance or permitting processes and request that those entities attach mitigation measures or conditions of approval as part of their approval processes.

NOTE: The NPS may require mitigation measures on operations inside and/or outside park boundaries to protect federally threatened or endangered species and critical habitat under the authority of the Endangered Species Act (ESA), not the 9B regulations. The ability of the NPS to do so would arise only if the NPS is the lead federal agency responsible for ESA § 7 consultation and only if mitigation measures are necessary to protect threatened or endangered species and critical habitat from impacts associated with the directional drilling operation both inside and outside park boundaries.

If damages occur to park resources from external operations, an operator may be liable under 16 U.S.C. § 1911 and other appropriate statutes, and may need to compensate the government for the damages. As a result, operators have an additional incentive to minimize the potential for impacts to park resources from their operations.

### **CONDITIONS OF APPROVAL**

Conditions of approval are mitigation measures that the NPS requires at the time it issues a § 9.32(e) determination. Conditions include mitigation measures that were not included in the operator's application or plan of operations, and are derived from NPS technical review, public involvement, and other-agency consultations. Conditions for a directional drilling operation would relate to mitigating potential impacts on park resources, both surface and subsurface, from the downhole operations within the park.

Other agencies often require "conditions of approval" under their permitting authority. To the extent that park protection concerns exist with activities occurring outside park boundaries, the NPS would urge other agencies to include mitigation measures as part of their conditions of approval.



## TIMEFRAME FOR ACTING ON A REQUEST FOR AN EXEMPTION

The 9B regulations do not specify a timeframe for acting on an operator's application for exemption, however, parks are directed to not exceed the 60-day timeframe (with a permissible 30-day extension) specified in the regulations for acting on a proposed plan of operations.

## NPS ACCESS TO SURFACE LOCATION OUTSIDE PARK BOUNDARIES

If the United States does not own the surface estate where operations are located outside the park, NPS access to these operations must be coordinated with the operator, including obtaining the operator's permission to be on location. NPS access also must relate to obtaining information to complete the needed compliance work or to ensuring compliance with mitigation measures related to downhole operations inside the park. The 9B regulations provide no authority for requiring an operator to grant the NPS access for the purpose of observing compliance with terms unrelated to the downhole activities in the park.

## MONITORING

The National Park Service's ability to monitor and inspect directional drilling operations is limited to downhole operations within the park (e.g., surface casing, cementing, plugging operations, etc.). As a practical matter, monitoring of downhole activities inside the park can only be accomplished from the surface location outside the park. As a result, the NPS may need to access the surface location and should make such access a condition of an exemption under option #2 or a condition of approval under option #3. The NPS would coordinate the timing of such access with the operator.

To ensure that directional drilling operations inside a park are being conducted in accordance with an exemption determination or an approved plan, the NPS has two monitoring options. The Service can have a qualified individual (NPS employee or a mutually agreed upon third-party contractor hired by the operator) on location to witness the well casing, cementing and well plugging programs within the park, or the NPS can require the operator to submit drilling records that demonstrate that the well casing, cementing program, and plugging program were completed as proposed. Selection of the appropriate option or combination of options should be worked out with the operator.

## ENFORCEMENT

The Service's enforcement role for each of the regulatory options is as follows:

1. **Exemption with No Mitigation:** Since this option includes an exemption rather than an approval, and no mitigation measures/conditions are required to protect park resources and values, there would be no enforcement role for the NPS.
2. **Exemption with Mitigation:** If the operation is not in compliance with the mitigation/conditions required to protect subsurface resources in the park, the NPS would provide notice to the operator to cure the violation before the NPS invokes suspension or revocation authority.



3. **Plan of Operations:** If an operator is not in compliance with his/her approved plan, the NPS would provide notice to the operator to cure the violation as it relates to operations occurring within park boundaries before the NPS invokes suspension or revocation authority under § 9.51(c).

Under all 3 options, if the NPS is the lead federal agency for ESA § 7 consultation and requires mitigation to protect federally threatened or endangered species and critical habitat, the Service would have authority under the ESA (not the 9B regulations) to enforce that mitigation.

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

### TRANSFERABILITY OF A DIRECTIONAL DRILLING OPERATION

A regulatory exemption for a directional drilling operation under 36 C.F.R. § 9.32(e) may be transferred to another operator in a manner comparable to that for an approved plan of operations under 36 C.F.R. § 9.34.



**Table 5.2. Summary of Compliance Requirements for Directional Drilling Proposals from Surface Locations Outside a Park**

OPTION	SCOPE OF NEPA ANALYSIS	ENDANGERED SPECIES ACT	NATIONAL HISTORIC PRESERVATION ACT	FLOODPLAINS EXECUTIVE ORDER	WETLANDS EXECUTIVE ORDER	MITIGATION MEASURES
<b>Exemption with No Mitigation</b>	The NEPA analysis (most likely an EA) would focus on environmental effects from the downhole operations in the park. The potential impacts of the connected actions on park resources and values would also be disclosed. Impacts outside the park would be qualitatively assessed.	<p>Granting an exemption is non-discretionary under this option. ESA § 7 consultation for activities occurring in the park is not required because there would be no effect on federally listed threatened and endangered species and/or critical habitat.</p> <p>In the event that connected operations outside the park could affect a T&amp;E species or critical habitat in or outside the park, consultation and mitigation under the ESA would be required. The NPS would be the lead federal agency carrying out the ESA consultations outside of the park if there is no other federal entity with broader regulatory involvement.</p>	<p>There is no potential for impact on cultural resources in the park from the downhole operations in the park.</p> <p>The NPS has no NHPA § 106 responsibility for wells that originate on non-federal lands located outside the park, where the wellbore crosses in to the park to extract non-federally-owned hydrocarbons from beneath the park. The Advisory Council on Historic Preservation concurred with this finding on September 13, 2004.</p>	There is no potential for impact to federally-owned or controlled floodplains in the park from the downhole operations in the park. No action is required by the NPS under the Executive Order. Other federal agencies having broader permitting authority for the proposal would need to comply with the Executive Order if floodplains would be affected by the operation.	There is no potential for impact to federally-owned or controlled wetlands in the park from the downhole operations in the park. No action is required by the NPS under the Executive Order. Other federal agencies having broader permitting authority for the proposal would need to comply with the Executive Order if wetlands would be affected by the operation.	<ul style="list-style-type: none"> <li>- NPS mitigation measures/ conditions would not be applied to the exemption.</li> <li>- The operator can voluntarily apply mitigation measures to reduce indirect impacts on park resources and values from connected actions outside the park.</li> <li>- The NPS will work cooperatively with other agencies during their permitting processes to identify potential impacts on park resources and values and recommend mitigation measures/conditions of approval.</li> <li>- If NPS is “lead” federal agency following ESA § 7 consultation, the Service may require mitigation measures/ conditions to protect threatened and endangered species and habitat both inside and outside the park.</li> </ul>



OPTION	SCOPE OF NEPA ANALYSIS	ENDANGERED SPECIES ACT	NATIONAL HISTORIC PRESERVATION ACT	FLOODPLAINS EXECUTIVE ORDER	WETLANDS EXECUTIVE ORDER	MITIGATION MEASURES
<b>Exemption with Mitigation</b>	Same as Option #1	<p>Granting an exemption is discretionary under this option. NPS is required to determine if federally listed threatened and endangered species and/or critical habitat may be affected inside the park from in-park operations.</p> <p>The NPS would be the lead federal agency carrying out the consultations both inside and outside of the park if there is no other federal entity with broader regulatory involvement.</p>	Same as Option #1	Mitigation/conditions applied to ensure the integrity of downhole operations in the park reduces the likelihood of impacts to floodplains in the park; no action is required by the NPS under the Floodplains Executive Order.	Mitigation/conditions applied to ensure the integrity of downhole operations in the park reduces the likelihood of impacts to wetlands in the park; no action is required by the NPS under the Wetlands Executive Order.	The compliance responsibilities are the same as Option #1, except: NPS may require mitigation measures/conditions to reduce impacts to subsurface park resources associated with downhole operations inside the park.
<b>Plan of Operations</b>	Same as Option #1	Same as Option #2.	If potential impacts to cultural resources could not be mitigated, the NPS would follow its standard procedures for conducting consultations with the SHPO/THPO but focus its consultation on the downhole operations inside the park.	Same as Option #2. If potential impacts to floodplains could not be mitigated, the NPS must follow its standard procedures in the NPS Director's Order/ Procedures Manual and prepare a <i>Floodplains Statement of Findings</i> pertaining to the downhole operations within the park.	Same as Option #2. If potential impacts to wetlands could not be mitigated, the NPS must follow its standard procedures in the NPS Director's Order/ Procedures Manual and prepare a <i>Wetlands Statement of Findings</i> pertaining to the downhole operations within the park.	Same as Option #2.



## **CHAPTER 6**

# **EXISTING OIL AND GAS PRODUCTION OPERATIONS**

**(Operations that are grandfathered or have lost their grandfathered status)**

This chapter includes the following information:

- NPS permitting process checklist for existing oil and gas operations that have lost their exempt status,
- Definition of an existing operation,
- Loss of “existing operations” status,
- Suspension of existing operations,
- Plugging and reclamation of existing operations,
- Plan of operations information requirements for existing production operations, and
- Third party monitoring.

### **NPS PERMITTING PROCESS CHECKLIST FOR OPERATIONS THAT HAVE LOST THEIR GRANDFATHERED STATUS**

The following checklist outlines the permitting process for existing operations that have lost their grandfathered status. The items on the checklist are described throughout this handbook. This checklist can be used by an oil and gas operator to make sure that all of the required steps have been completed to prepare a plan of operations for NPS review.

- ☐ Operator notifies park superintendent that an oil and gas operation has lost its grandfathered status. In some cases, the NPS may notify the operator if the NPS determines that an operation has lost its exempt status.
- ☐ Operator meets with park staff to discuss 36 C.F.R. 9B requirements (for more information, see Ch. 1).
- ☐ Operator meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information, see Ch. 2).
- ☐ Operator requests temporary access permit to gather information needed to complete the plan of operations. This would be necessary if the surveys cover an area larger than the existing operations area. The NPS must be notified of the techniques proposed for the surveys (for more information, see Ch. 2).
- ☐ Operator conducts necessary surveys, which may include natural and cultural surveys. The types of surveys would be determined during scoping with park staff (for more information, see Ch. 2).
- ☐ Operator prepares plan of operations and submits draft plan to the National Park Service (for more information, see Ch. 4 for drilling and production or Ch. 7 for well plugging and surface reclamation).



## CHAPTER 6 – EXISTING OIL AND GAS OPERATIONS

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The Plan of Operations for existing production operations that have lost their grandfathered status must include the following sections:

- ☐ I. Ownership and Contact Information
  - ☐ II. Maps and Plats
  - ☐ III. Timeline for Operations
  - ☐ IV. Description of Area Geology
  - ☐ V. Description of Operations
  - ☐ VI. Spill Control and Emergency Preparedness Plan
  - ☐ VII. Well Plugging and Reclamation Plan
  - ☐ VIII. Affidavits and Statements
  - ☐ IX. Other Applicable Permits
  - ☐ X. Background Environmental Information
  - ☐ XI. Relationship to Park Planning Documents
- ☐ NPS performs a completeness and technical review of the plan of operations (for more information, see Ch. 2).
  - ☐ Operator revises plan of operations, if necessary (for more information, see Ch. 2).
  - ☐ Park staff prepares NEPA document (or adopts operator's or consultant prepared NEPA document), incorporates other environmental compliance, and initiates mandated consultations with other agencies (for more information, see Ch. 2 and Appendix B).
  - ☐ Park completes public review process, finalizes decision documents, and notifies the operator that the plan has been approved, conditionally approved, or rejected (for more information, see Ch. 2).
  - ☐ Operator agrees to conditions of approval (if any), submits applicable state and federal permits, and files performance bond with the NPS (for more information, see Ch. 10).



## DEFINITION OF AN EXISTING OPERATION

In the 9B regulations, an operator conducting “existing operations” may continue without submitting a plan of operations or filing a performance bond or security deposit. These operations are “grandfathered” (36 C.F.R. § 9.33).

An “existing operation” uses federal access, but meets one of the following conditions:

1. The operator was conducting operations under a valid state or federal permit as of January 8, 1979 (the effective date of the regulations),
2. The operator was conducting operations under a valid state or federal permit when the area became a new park unit, or
3. The operator was conducting operations under a valid state or federal permit when the area came into the park system by expansion of an existing unit.

If an operator was not required to obtain a federal or state permit prior to January 8, 1979, prior to the establishment of a new park unit, or prior to the expansion of an existing unit, the operation must come into compliance with the 9B regulations in accordance with the provisions of 36 C.F.R. § 9.33(b).

A state or federal permit is considered valid if:

- the permit was issued to the current operator on or before January 8, 1979, prior to the establishment of a new park unit, or prior to the expansion of an existing unit,
- the term of the permit has not expired, and
- the operations have not undergone any change requiring the operator to acquire a new permit since January 8, 1979, prior to the establishment of a new park unit, or prior to the expansion of an existing unit.

## LOSS OF “EXISTING OPERATIONS” STATUS

An existing operation can lose its exempt (grandfathered) status. If this happens, the operator must comply with the 9B regulations. This includes filing a plan of operations with the NPS and submitting a performance bond. An operator loses its “existing operation” status after its valid state or federal permit expires by its own terms.

The list below gives some examples of situations where a valid state or federal permit expires by its own terms:

- The operation has a change in operator.
- The operator proposes well work that requires new state approval. Examples include recompleting a well to a different producing zone (plug backs and deepenings), or plugging and abandonment.
- The operator proposes to use additional federally owned lands or waters. New use of federal land or water in a park unit requires a new permit from the NPS. Common examples include enlarging a wellpad to accommodate expanded production facilities or widening a road to improve access to the site.



### SUSPENSION OF EXISTING OPERATIONS

While existing operations may be exempt from the plan of operations and bonding requirements, they may come under NPS suspension authority. If "[a]t any time when [existing] operations which are allowed to continue under § 9.33 (a) and (b) pose an immediate threat of significant injury to federally owned or controlled lands or waters, the superintendent shall require the operator to suspend operations immediately until the threat is removed or remedied." (36 C.F.R. § 9.33(c))

The superintendent will notify the operator in writing (within 5 days) with the reasons the operation was suspended, and what must be done to resume operations. The operator can appeal the suspension order under 36 C.F.R. § 9.49, Appeals.

Examples of an immediate threat of significant injury include, but are not limited to:

- escape of hydrogen sulfide or other toxic or noxious gas,
- vegetation clearing or earth moving outside the area currently approved (by regulation or plan) for operations,
- uncontained or chronic oil, brine, or hazardous material spills,
- well blow-out,
- leaching or release of an environmental contaminant (e.g., contaminated stormwater runoff),
- fire or fire hazard,
- unmaintained oil or brine storage tanks that lack secondary containment such as berms,
- inadequate safeguard for controlling well pressures,
- inadequate safeguards for protecting visitors and wildlife from serious injury, or
- damage to cultural resources.

### PLUGGING AND RECLAMATION OF EXISTING OPERATIONS

Existing operations often lose their exempt status from the plan of operations and performance bond requirements because well plugging requires a new state permit. Prior to well plugging, the operator needs to:

1. File a plan of operations covering the well plugging and surface reclamation,
2. Receive NPS approval, and
3. Submit a performance bond.

It is very important for grandfathered operators to understand this aspect of the regulations, both environmentally and financially. The manner in which operations are conducted will directly affect the cost of the surface reclamation. It will also have a bearing on the sales price of the property because today's buyers are more aware of environmental liabilities.

Chapter 7 of this handbook covers information requirements for well plugging and surface reclamation, includes a guide to NPS well plugging requirements, and lists required operating stipulations and recommended mitigation measures.



## **PLAN OF OPERATIONS INFORMATION REQUIREMENTS FOR EXISTING PRODUCTION OPERATIONS**

Below is an explanatory list of requirements that nonfederal oil and gas operators need to include in a plan of operations for existing production operations that lose their grandfathered status. These requirements are based on the regulatory provisions under 36 C.F.R. § 9.36. These requirements are modified from the information requirements for drilling and production operations shown in Chapter 4 and do not include the drilling requirements for a proposed operation. This list is also used by the NPS to determine if a proposed plan of operations is complete and sufficiently detailed to merit "official acceptance" for review and analysis in accordance with the regulations at 36 C.F.R. § 9.36(c).

A plan of operations may not need to address all of the information requirements presented in this list. Information requirements should be tailored to the type of operation now subject to a plan of operations (e.g., producing well, on-site treatment and temporary storage, well flowline, field gathering line system, well plugging etc.). The list should be used in conjunction with the 36 C.F.R. Part 9B regulations to determine which items are applicable to the proposed operation, and are therefore required in a plan of operations. The operator and NPS staff will focus the list of required information during project scoping. In some instances, the NPS may require additional information to effectively analyze the proposed operation (36 C.F.R. § 9.36(a)(18)). For additional information, contact the park for assistance in determining information requirements for particular types of proposed operations.

The operator will submit the plan of operations, tender the performance bond, and be the responsible party for compliance with the plan of operations.

### **I. OWNERSHIP AND CONTACT INFORMATION**

The purpose of this section of a plan is to identify the "operator" as defined under the NPS regulations, to document the operator's property right to oil and gas in the park, and to identify primary company contacts for planning, field operations, and emergencies.

**A. Name(s) and address(es) of:**

1. Surface owner (if other than the NPS), and
2. Lessor (mineral owner).

**B. Name, address, and telephone number of:**

1. Operator,
2. Lessee (if different than operator)
3. Person accountable for operations,
4. Field representative, and
5. Emergency contact.

**C. Copy of instrument(s) demonstrating the operator's right to operate. Examples include:**

1. Lease,
2. Deed,
3. Assignment of rights, or
4. Designation of operator (may include a unit agreement).



### II. MAPS AND PLATS

The purpose of this section of a plan is to graphically show the operator's mineral tract(s) and the area of operations in relation to the park. The area of operations includes present and past surface disturbance associated with the operations including the access road(s), well(s), and facilities. The scaled location plats are intended to clearly and accurately define the area that the operator has available for conducting operations and to identify the area that the operator is responsible for reclaiming.

- A. **Tract/Lease Boundary Map** - use 1:24,000 USGS quadrangle map(s) and show the following:
1. NPS park unit boundary,
  2. Mineral tract/lease boundary, and
  3. Each mineral tract or lease should be cross-referenced to the property right information provided in Section I.C. and should include the tract's legal description: (quarter-quarter, section, township range, meridian, and distances from section lines; or land abstract name and number.)
- B. **Operation Location Map** - use 1:24,000 USGS quadrangle map(s) and show the following, as applicable:
1. Lease or mineral tract boundary and park boundary,
  2. Existing oil and gas wells and facilities in the operations area,
  3. Proposed new oil and gas wells and facilities,
  4. Existing access road(s),
  5. Proposed new access road(s),
  6. Existing flowlines/pipelines in the area of operations,
  7. Proposed new flowlines/pipelines in the area of operations,
  8. Helicopter landing zone (if applicable),
  9. Location of any fill or borrow materials necessary for operations, and
  10. All existing wells within 1 mile radius of the area of operations (potable water, disposal, producing, shut-in, exploratory, and abandoned).
- C. **Operation Plats** - Submit large-scaled plats showing the dimensions and equipment layout of the operations area. Show the following as applicable:
1. Access road dimensions (including cross sections of cut and fill areas if required).
  2. Wellpad dimensions (including cross sections of cut and fill areas if required).
  3. Excavations for ditches, sumps, etc. on or around wellpad (show cross-sections).
  4. All areas to be protected with liners, including liner type and thickness.
  5. Temporary living quarters (e.g., trailers).
  6. Location and type of sanitary facilities.
  7. Wellhead and all associated equipment, including:
  8. tanks, flowlines, meters, heater treaters, separators, etc.;
  9. flowline and pipeline control valves, pressure and volume regulators, monitors and alarms, and cathodic protection (rectifiers) stations;
  10. electrical powerlines;



11. location and dimensions of berms constructed around the wellpad, tanks, and other production equipment;
12. produced water disposal well, associated equipment, and flowline;
13. enhanced recovery systems and equipment; and
14. all other equipment necessary for operations.

- D. **Topographic Plats** - Include scaled plats prepared by registered surveyor/engineer showing:  
Topographic map of the area of operations including access roads and pipeline routes. In addition to topography, the map needs to identify surface waters in relation to the area of operations.

### **III. TIMELINE FOR OPERATIONS**

The purpose of this section of the plan is to identify when operations will be conducted and how long they will last. Any alteration of normal operations due to seasonal timing considerations for natural resources or visitor uses should also be noted in this section.

- A. Estimated remaining life of operations,
- B. Estimated date when reclamation will begin. (NOTE: Reclamation must begin as soon as possible after completion of approved operations, but no later than 6 months thereafter unless specifically approved by the regional director), and
- C. Estimated time to complete reclamation.

### **IV. DESCRIPTION OF AREA GEOLOGY**

The purpose of this section of a plan is to provide a general discussion on the geological conditions as they relate to continued well operation and eventual plugging operations. For existing operations, the operator needs to provide the following information to help the NPS determine a) that all usable quality freshwater zones are protected, b) that anticipated geological conditions are planned for with regards to well control, and c) well plugging requirements.

- A. Total depth of well(s),
- B. Depths of present and future producing zones,
- C. Depth to which freshwater must be protected (*e.g.*, depths of known usable quality freshwater zones),
- D. Depths of all known brine zones, and other minerals such as coal or oil shale,
- E. Depths of zones with abnormally high or low pressures, or other geological hazards, and
- F. A brief discussion of any drilling or production practices in the area that are used to account for geologic conditions (*e.g.*, heavy muds used for high pressures, oil or saltwater muds)



used to drill expanding clays or shales, unusual casing/cementing programs, hydrogen sulfide safety plans, etc.).

### V. DESCRIPTION OF OPERATIONS

The description of operations should provide enough detail on the proposed methods, sequence, and equipment for each component of the operation to allow the NPS to assess the impacts of the operation on the environment. The amount of information in this section will vary depending both on the type of operations and the environment where they will be conducted.

For descriptions of equipment and facilities, a brief discussion with photographs is easier and more effective than lengthy descriptions. Describe the following, as applicable:

#### A. Existing and Proposed Production Facilities

1. Artificial lift surface equipment.
2. Tank battery (number, type, size, volume, etc.) and berm or "firewall" construction and maintenance. NOTE: firewall dimensions must contain 1.5 times the volume of the largest tank. Discuss methods to protect soils and groundwater below storage tanks.
3. Treating and separating process and equipment.
4. Produced water storage and disposal.
5. Removal/disposal of impounded precipitation within the tank firewall (if applicable).
6. Flowlines and pipelines:
  - a. size, type, length, depth, etc.;
  - b. inspection and testing procedures and frequency;
  - c. maximum and mean flow rate of product;
  - d. maximum and mean operating pressure;
  - e. cathodic protection methods;
  - f. "pig" launching/retrieving station(s); and
  - g. maintenance, including vegetation management.
7. Pressure control equipment:
  - a. description of pressure control equipment including minimum specifications and pressure ratings,
  - b. schematic diagram of pressure control equipment; and
  - c. description of testing procedures and frequencies.
8. Metering points, including LACT units, orifice meters, and turbine meters.
9. Sales point (if on lease).
10. Tanker truck pick-up points (if on lease).
11. Gas compression (if applicable).
12. Enhanced oil recovery facilities including waterflooding, fireflooding, polymer flooding, and any other secondary or tertiary recovery facilities (if applicable).
13. Maintenance of access road surface and vegetation encroachment.



**B. Well Completions, Stimulations and Workovers**

1. Blowout preventer(s) and other pressure control equipment to be used during workover operations including pressure rating, testing procedures and frequencies.
2. Workover and treating fluid types, properties and additives (be specific), weights, and rationale for use.
3. Precautions to prevent oil, brine, chemicals, and other materials from reaching the ground during well completion, workovers, and plugging operations. Precautions will include use of plastic liners beneath the workover rig, pipe racks, and other equipment as necessary. All fluids and solids returned to the surface from the wellbore shall be collected in metal tanks and disposed outside the park.
4. Description of waste handling and disposal procedures.
5. Anticipated frequency and park notification prior to conducting such operations.

**C. Water Requirements, Amount, Source, Transportation, Storage, etc.****D. Well Casing and Cementing History and Completion Equipment**

1. Casing size, grade, and weight of each string;
2. Setting depths of each string;
3. Cementing history; and
4. Completion equipment and setting depths.

**E. Well Plugging Procedures**

1. Types of plugs and setting depths,
2. Type and amount of cement required,
3. Plugging fluid properties (NOTE: Each of the intervals between plugs must be filled with mud having sufficient density to exert hydrostatic pressure exceeding the greatest formation pressure encountered while drilling. In the absence of known data, the federal regulations require a minimum mud weight of 9.0 pounds per gallon, and
4. Type of abandoned hole marker.

(NOTE: For more information on well plugging and surface reclamation see *Chapter 7 - Well Plugging and Surface Reclamation*.)

**F. Additional Ancillary Facilities****G. All Actions to be Taken to Comply with Regulatory Operating Standards. Describe how the operator will comply with the following operating standards at 36 C.F.R. §§ 9.41-9.46. Requests for variances should be accompanied with supporting information.**

1. Surface operations shall not be conducted within 500 feet of a watercourse, high pool shoreline, mean high tideline, or any structure or facility (excluding roads) used for unit interpretation or administration, unless specifically authorized.
2. Protection of all survey monuments, witness corners, reference monuments and bearing trees.
3. Shut-in of well when drilling or production operations are suspended for 24 hours or more, but less than 30 days.



4. Shut-in of well when production operations are suspended for 30 days or more.
5. Posting of a sign showing operator name and operation identification number.
6. Fencing around all wells, storage tanks, and high-pressure equipment as specified by the park superintendent.
7. Posting of warning signs acceptable to the superintendent if operations are located in or near visitor use areas.
8. Preventing accumulation of oil and other materials deemed to be fire and environmental hazards.
9. Prompt removal of all equipment and materials not in use.
10. Operator accountability for all contractors and subcontractors compliance with the requirements of an approved plan of operations.

H. All Security Measures to Ensure Public Health and Safety

### VI. SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

The NPS has combined informational requirements and operating standards from the 9B regulations to develop the format for a Spill Control and Emergency Preparedness Plan. This plan covers the substances or site conditions that pose risks to human health and safety and the environment. It also describes the actions the operator would take to minimize these risks in the event of a spill or natural disaster (e.g., flood, fire, hurricane, or tornado). See *Chapter 11 – Spill Control and Emergency Preparedness Plan* in the Operator's Handbook for the organization and content of a Spill Control and Emergency Preparedness Plan.

A Spill Control Emergency Preparedness Plan should describe all actions, equipment, procedures, training, etc. to control and effectively respond to releases of contaminating substances (oil, brine, drilling fluids, blow-out, or any other toxic or hazardous substance) to ensure protection of park resources and human health and safety.

### VII. WELL PLUGGING AND RECLAMATION PLAN

This section of the plan must describe all actions to be taken to achieve proper plugging of the well(s) and reclamation of surface estate disturbed by the operation. Final reclamation of the site must be initiated as soon as possible following completion of the operation, and shall not be later than six months unless the regional director authorizes a longer period of time. For more information see Chapter 7. The well plugging and surface reclamation plan must address the following:

- A. Removal of all structures, equipment, supplies and debris from the site (e.g., trailers, storage buildings, tanks, all drilling equipment, production equipment, pipe, powerlines, flowlines, liners, chemicals, barrels, trash, etc., except items required for continuation of approved operations.
- B. Removal and disposal of all drilling muds and cuttings.



- C. Plugging of the well(s) as specified in the plan and in accordance with Federal Onshore Oil and Gas Order No. 2 and applicable state regulations. For more information, see *Chapter 7 – Well Plugging and Surface Reclamation*.
- D. Removal of all wellpad and road base material, including culverts and bridges.
- E. Soil testing to determine if contaminating substances are present in concentrations that pose a threat to wildlife populations or human health, or will jeopardize re-establishment of native vegetation.
- F. Actions necessary to remove or neutralize any contaminating substances.
- G. Reestablishing topographic contours of the pad and access road, and replacing top soil to support revegetation.
- H. Reestablishment of the native vegetation community in all disturbed areas, including:
  - 1. Surface preparation (e.g., ripping, discing, scarifying, etc.);
  - 2. Seeding and/or transplanting of native species, including seed or transplant sources, seed or transplant collection methods if native species are not available from commercial sources, seed mixture, percent live seed, seeding rate and method (e.g., broadcast, seed drill, hydroseed, etc.), and mulching methods;
  - 3. Watering methods, amounts, and frequency (if necessary);
  - 4. Target species composition and percent cover;
  - 5. Actions to prevent establishment of exotic plant species in the reclamation area; and
  - 6. Monitoring methods and frequency to determine success of revegetation efforts (e.g., species survival, vegetation density, diversity, percent cover, etc.) and to identify problem areas which may require additional actions.
- I. Itemize the estimated costs to accomplish the above reclamation actions. Cost estimates should address the following at a minimum:
  - 1. Rental cost of all equipment to be used in plugging, equipment removal, and surface reclamation actions, including equipment operator wage based on projected hours of work;
  - 2. All necessary supplies and materials, such as well plugs, cement, soil amendments; seed, plants, or tree purchase; mulch; erosion control material; etc.;
  - 3. Water and trucking fees; and
  - 4. All other personnel costs, including wages for seeding or transplanting vegetation, monitoring vegetation success, and controlling exotic species.

## **VIII. AFFIDAVITS AND STATEMENTS**

Include an “Affidavit of Compliance” signed by an official that is authorized to legally bind the company as required by regulations at 36 C.F.R. § 9.36(a)(15). The affidavit should state that the proposed operations are in compliance with all applicable federal, state and local laws and regulations. An example Affidavit of Compliance is included in *Appendix C – Sample Letters for Nonfederal Oil and Gas Operations*.



### IX. OTHER APPLICABLE PERMITS

At the superintendent's request, operators will need to provide the NPS with a copy of all applicable federal, state, and local permits. If the permits are still pending, operators may submit a copy of the application for such permits.

### X. BACKGROUND ENVIRONMENTAL INFORMATION

The purpose of this section of the plan is to present information on existing natural and cultural resources in the project area, specify actions that will be taken to minimize adverse impacts to surface resources, assess the environmental impacts of the existing operation, and discuss any technologically feasible development alternatives. The park may have some of the required natural and cultural resource information for the operator's use in preparing this section of the plan.

- A. Description of natural resources in the proposed operation area should include the following information:
1. Written and/or photographic documentation that the soils, waters, vegetation, and wildlife outside the area of operations have not been directly impacted due to contaminants moving off location or contaminating substances left unconfined on location. If evidence exists to the contrary, corrective actions need to be addressed in Section V., Description of Operations, and Section VII., Well Plugging and Reclamation Plan.
  2. Soil type(s) and engineering properties such as permeability, porosity, erosion potential, etc.
  3. Area hydrology and water quality, including the following:
    - a. drainage pattern of the project area;
    - b. proximity to surface water (intermittent or permanent watercourses, streams, ponds, lakes, springs, etc.);
    - c. depth to groundwater;
    - d. proximity to any wetland boundary (defined by site-specific wetland delineation);
    - e. proximity to the base floodplain, 100 year floodplain, and 500 year floodplain; and
    - f. water quality in nearby surface water and/or shallow groundwater.
  4. Vegetation species composition in access road and well pad area, including predominant herbaceous, shrub, midstory and overstory species. (NOTE: This information is necessary to properly design a reclamation plan.)
  5. General wildlife species composition in the proposed operation area.
  6. Federal or state threatened / endangered plant or wildlife species that inhabit or frequent the proposed operation area.
  7. Air quality in the proposed operation area, including information on pollutant levels and existing point sources for pollutants in the area.
  8. General description of baseline noise levels in the proposed operation area, including local sources contributing to increased noise levels.



- B. Description of cultural resources in the proposed operation area should include the following information:
  - 1. Background information on archeological and historic resources documented in the general area, including review of the National Register of Historic Places.
  - 2. If required, results of an archeological and historic resource field survey of project area performed by a qualified archeologist approved by the NPS.
- C. Identification and proximity of park visitor use areas (*e.g.*, trails, campgrounds, public roads, picnic areas, etc.) near the proposed operation area.
- D. Description of specific actions that the operator will take to avoid and/or minimize adverse impacts to park natural and cultural resources and visitor-related values (*e.g.*, the wellpad will be properly maintained to contain and collect all spilled contaminating substances, closed loop fluid system will be used during well workover to minimize soil and groundwater contamination, well-bore cuttings will be deposited in containers, all fluid and cuttings will be removed for off-site disposal, post-operation soil testing will be conducted to determine if any contamination has occurred, all contaminating substances will be removed or neutralized, a liner will be installed beneath all production tanks, production equipment will be painted a color that blends with the natural vegetation, existing vegetation will be used to screen the operation from park visitor use areas and park roads, flowlines will be located adjacent to access roads to minimize disturbance, chain link fence will be constructed around the production site to prevent visitor entry, mufflers will be installed on all combustion engines to reduce noise, etc.).
- E. Description of the anticipated direct, indirect, and cumulative effects of the proposed operation on the park land features and uses, wildlife, vegetation, soils, water resources, air quality, noise, and social and economic environments.

## **XI. RELATIONSHIP TO PARK PLANNING DOCUMENTS**

The plan of operations must discuss how the proposed operation relates to park planning documents (General Management Plan, Oil and Gas Management Plan, etc.) in terms of considering and integrating operational measures to achieve park management objectives. The park oil and gas contact where the operations are proposed will furnish a copy of all applicable park planning documents upon request.

## **THIRD PARTY MONITORING**

The NPS may require an operator to hire a third party monitor to oversee certain aspects of the operation such as major workovers, well plugging, etc. The purpose of third party monitoring is to ensure operator compliance with the terms of the approved plan of operations and to protect park resources and values.

The company hired to do the third party monitoring must meet the following three requirements:

- 1. Third party monitors shall not include any representatives or employees of the operator, or any contractors or subcontractors of the operator working on any task related to this project, or any persons who would have a financial or other interest in the outcome of the production operation.



## CHAPTER 6 – EXISTING OIL AND GAS OPERATIONS

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2. The persons hired to do the monitoring must meet the technical qualifications to monitor the specific resources in the NPS unit where the operations would occur (e.g., wetlands scientist, wildlife biologist, archeologist etc.).
3. The scope of work must meet the objectives of monitoring in the park.

The operator and park staff will work together during project scoping and development of the plan of operations to come up with an effective plan for monitoring the operations. During project scoping, the operator and NPS will discuss the requirement for third party monitoring and the technical qualifications that would be needed by the monitor(s). The NPS will provide the operator with a list of roles and responsibilities and necessary qualifications of the third party monitor(s). In some cases this information may not be developed until after the NPS technical adequacy review of the plan of operations. The operator will include details in the plan of operations concerning the use of a third party monitor and disclose that there will be no conflict of interest between the operator and the company that will be hired to do the monitoring and that the monitor(s) will have the technical expertise to do the monitoring. Once the third party monitor(s) have been selected by the operator, a list of the persons and their qualifications must be provided to the NPS.

The NPS may develop stipulations that specify conditions of the third party monitoring (36 C.F.R. § 9.37(f))<sup>16</sup>. Examples of these stipulations include, but are not limited to:

- The third party monitor must be paid by the operator.
- The monitor must report directly to the park superintendent or his/her representative.
- The NPS will identify the frequency and type of compliance reports.
- If a violation of the terms of the monitoring contract occurs, the NPS would require immediate corrective actions from replacement of the monitor up to suspension of the approved plan of operations.
- The NPS may suspend the operations if the monitor demonstrates to the NPS that the operation poses an immediate threat of significant injury to federally owned or controlled lands or waters. (36 C.F.R. § 9.51(c)(2))

Third party monitors would be required to ensure operator compliance with the approved plan of operations. Monitoring may include making sure that:

- access in the unit is along designated routes and by approved means (e.g., on foot or by vehicle),
- there is proper handling, transport, and storage of hazardous and other contaminating substances,
- major workovers comply with the approved plan of operations,
- the well is plugged in accordance with the approved plan of operations, and
- the operations area is cleaned up and reclaimed according to the approved plan of operations.

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<sup>16</sup> Under this provision all approved plans are conditioned upon the superintendent's right to access an operation to monitor and ensure compliance with a plan of operations. Since under this scenario a third party will handle monitoring, the superintendent can exercise his or her right to access and monitor the operation through the third party via specific stipulations in its approval letter.



## **CHAPTER 7**

# **WELL PLUGGING AND SURFACE RECLAMATION**

This chapter includes the following information:

- NPS permitting process checklist for well plugging and surface reclamation,
- NPS well plugging guide for nonfederal oil and gas wells,
- Surface reclamation overview,
- Plan of operations information requirements for plugging and reclamation,
- Third party monitoring,
- Required operating stipulations and recommended mitigation measures, and
- Pictorial overview of reclamation activities.

### **NPS PERMITTING PROCESS CHECKLIST FOR WELL PLUGGING AND SURFACE RECLAMATION**

The following checklist outlines the permitting process for well plugging and surface reclamation in units of the NPS. The items on the checklist are described throughout this handbook. This checklist can be used by an oil and gas operator to make sure that all of the required steps have been completed to prepare a plan of operations for NPS review.

- ☐ Operator contacts park superintendent of their intent to plug an oil and gas well and reclaim the operations area (for more information, see Ch. 2).
- ☐ Operator meets with park staff to discuss 36 C.F.R. 9B requirements (for more information, see Chs. 1 and 2).
- ☐ Operator meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information, see Ch. 2).
- ☐ Operator requests temporary access permit to gather information needed to complete the plan of operations (for more information, see Ch. 2).
- ☐ Operator conducts necessary surveys, including natural and cultural resource surveys, as applicable and surveys / stakes the operations area (for more information, see Ch. 2).
- ☐ Operator prepares plan of operations and submits draft plan to the NPS (for more information, see Ch. 7 for well plugging and surface reclamation).

The plan of operations for well plugging and surface reclamation must include the following sections:

- ☐ I. Ownership and Contact Information
- ☐ II. Maps and Plats
- ☐ III. Timeline for Operations
- ☐ IV. Geologic Information
- ☐ V. Description of Well Plugging Operations
- ☐ VI. Spill Control and Emergency Preparedness Plan



## CHAPTER 7 – WELL PLUGGING AND SURFACE RECLAMATION

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- ☐ VII. Surface Reclamation Plan
- ☐ VIII. Affidavits and Statements
- ☐ IX. Other Applicable Permits
- ☐ X. Background Environmental Information
- ☐ NPS performs a completeness and technical review of the plan of operations (for more information, see Ch. 2).
- ☐ Operator revises plan of operations, if necessary (for more information, see Ch. 2).
- ☐ Park staff prepares NEPA document (or adopts operator's or consultant prepared NEPA document), incorporates other environmental compliance, and initiates mandated consultations with other agencies (for more information, see Ch. 2 and Appendix B).
- ☐ Park completes public review process, finalizes decision documents, and notifies the operator that the plan has been approved, conditionally approved, or rejected (for more information, see Ch. 2).
- ☐ Operator agrees to conditions of approval (if any), submits applicable state and federal permits, and files performance bond with the NPS (for more information, see Ch. 10).



## NATIONAL PARK SERVICE WELL PLUGGING GUIDE FOR NONFEDERAL OIL AND GAS WELLS

This section is intended to help operators plan the downhole aspects of plugging operations so that they will meet NPS standards. The second part of this section provides examples of how wells might be plugged by NPS standards.

Though this section deals with well plugging, operators should keep in mind that plugging is just the first step in their reclamation responsibilities. Sloppy plugging operations can hinder surface reclamation. Precautions should be taken to prevent oil, brine, chemicals, cement, and other materials from further contaminating the area. The effective use of plastic liners beneath the workover rig, pipe racks, fuel storage, and other equipment should be used as necessary. All fluids and solids returned to the surface from the wellbore should be collected in metal tanks and disposed of at an approved disposal site outside of the park.

The NPS is not responsible for protecting private mineral interests. Where plugs are set solely to protect nonfederal mineral resources such as oil, gas, coal, potash, etc., the NPS will defer to the state requirements.

For operators that are used to working on federal onshore leases, it is useful to know that the NPS has adopted the minimum standards of the *Department of Interior's Onshore Oil and Gas Order Number 2, Section III.G., Drilling Abandonment* for plugging wells in parks. The plugging requirements of Onshore Order No. 2 were written specifically for plugging newly drilled wells. However, the NPS has applied the same standards to the permanent abandonment of exhausted producers or service wells.

### WELL PLUGGING GOALS

The NPS goals in plugging a well are:

- to protect the zones of usable quality water;
- to prevent escape of oil, gas, or other fluids to the surface or zones of usable quality water; and
- leave the surface in a clean and safe condition that sets the stage for surface reclamation.

The following well plugging objectives have been developed to meet the NPS well plugging goals:

1. Set cement plug(s) to isolate all formations bearing oil, gas, geothermal resources, and other prospectively valuable minerals from zones of usable-quality water.
2. Set cement plug(s) to isolate all formations bearing usable-quality water.
3. Set a cement plug to isolate the surface casing (or intermediate casing) from open hole below the casing shoe.
4. Set a cement plug to seal the well at the surface.
5. Remove surface casing below grade and cap the well.



### GENERAL CEMENTING REQUIREMENTS

The plugging operation needs to include the general NPS requirements that are explained below. When NPS standards differ from state requirements, the operator should use the stricter requirement to meet both state and federal standards. The NPS may approve variations from these standards if the operator can demonstrate that the intent of a standard will be achieved to the degree that mechanical conditions of the well will allow.

#### Cement Quality

All cement for plugging shall be an approved API oil well cement without volume extenders and shall be mixed in accordance with API standards. Slurry weights shall be reported on the cementing report. The NPS may require specified cementing compositions be used in special situations; for example, when high temperature, salt sections, or highly corrosive sections are present.

#### Cement Volumes

All cement plugs except the surface plug shall have sufficient slurry volume to fill at least 100 feet of hole, plus an additional 10 percent of slurry for each 1,000 feet of depth. No plug, except the surface plug, shall be less than 25 sacks of cement without prior approval. These requirements address the ability to mix and place uncontaminated cement at depth. The cement and workover fluids tend to mix at the lead and tail end of the cement slurry as it is pumped downhole. The clean cement in the middle provides the plug's integrity. An additional washout factor may be applied when plugging openhole sections.

#### Cement Placement

Cement plugs must be placed by the circulation or squeeze method through tubing or drill pipe. The dump bailer method may be used only to place cement caps above a bridge plug or retainer.

#### Plugging Fluid

Each of the intervals between plugs must be filled with mud having sufficient density to exert hydrostatic pressure exceeding the greatest formation pressure encountered while drilling.

In the absence of known data, the NPS requires a minimum mud weight of 9.0 pounds per gallon.

#### Static Hole and Testing Plugs

The hole shall be in a static condition while placing any plugs. Where the fluid level will not remain static, the plug that is set shall be tested by either tagging with the working pipe string, or pressuring to a minimum surface pressure of 1,000 pounds per square inch. A successful pressure test will have no more than a 10 per cent drop during a 15-minute period. The pressure test method can only be used in cased hole. The NPS has the option to require testing (by tagging or pressure) of any plug to ensure its integrity.

#### Uncemented Annular Space

Whenever a cement plug is required at a depth where the annular space is not cemented, the uncemented annular section must be cemented by perforating the casing and pumping cement into the annular space. At shallow depths, small diameter pipe can be run in the annular space and cement circulated in place.



## **REQUIRED PLUGS**

The following sections summarize where cement plugs need to be placed in a well to meet the NPS goals.

### **Zones of Production**

The NPS requires cement to be placed across the top perforated interval and extend at least 50 feet below the bottom of that perforated interval (except where limited by total depth) and 50 feet above the top perforations.

Instead of the cement plug, a bridge plug or retainer can be set above the perforations and capped with cement. The bridge plug method can be used if there is no exposed open hole below the perforations. The NPS requires the bridge plug to be placed between 50 and 100 feet above the top perforation and capped with 50 feet of cement. If a bailer is used to place cement on top of the bridge plug, then 35 feet is enough.

As stated previously, the NPS will defer to state requirements for plugs set solely to isolate zones bearing nonfederal mineral resources such as oil, gas, coal, potash, etc. The NPS will require that a plug set to isolate the uppermost producing horizon meets NPS standards if the next plug scheduled is to protect the base of the deepest usable quality water zone.

### **Zones Containing Liquid or Gas with the Potential to Migrate**

Any zone that contains liquid or gas with the potential to migrate requires a plug extending from at least 50 feet below its bottom to at least 50 feet above its top. This requirement pertains only to abandonment of an openhole section or an uncemented cased hole section where there are no cement plugs scheduled between the zone containing liquid or gas with the potential to migrate and the base of the deepest usable quality water zone.

### **Casing Removed from the Hole**

If any casing is cut and recovered and removal of the casing exposes an openhole section, a cement plug shall be placed to extend at least 50 feet above and below the casing stub. This requirement pertains only to casing stubs where there are no cement plugs scheduled between the stub and the base of the deepest usable quality water zone.

### **Usable-Quality Water Zones**

Plugs must be set to protect the zones of usable-quality water. Often, state agencies make the determination of the deepest usable water zone. In general, a 100-foot cement plug is to be centered at the base of the deepest usable-quality water zone. Whenever a cement plug is the only isolating medium for a zone of usable water quality, the NPS standard is to test that plug as described above. When designing the well plugging procedure, operators should plan for testing of plugs that are the only isolating medium for zones of usable quality water.

### **The Surface Casing Shoe**

A plug must be set across the shoe of the surface casing (or intermediate casing shoe as appropriate) to extend a minimum of 50 feet above and below the shoe.

If an inner casing string(s) has been cemented across the shoe of the surface casing, then a minimum 100-foot plug is placed in the inner string with its center at the surface casing shoe depth.



If the inner casing string(s) are not cemented, the operator has one of two choices. The operator can choose to cut and recover casing so that a plug can be set directly across the surface casing shoe. The operator can also choose to perforate the casing and circulate cement behind the inner casing string across the surface casing shoe.

If casing is removed, the NPS may require a cement plug to be placed to extend at least 50 feet above and below the casing stub. It may be beneficial for operators to cut the casing at a depth so that one plug could be set to meet requirements for both the casing stub and the exposed casing shoe.

### **The Surface Plug**

The NPS standard is a 50-foot surface plug. The plug is placed in the smallest casing and all uncemented annuli that extend to the surface. The top of the plug is placed as close to the eventual casing cutoff point as possible.

### **Surface Cap**

The operator should discuss the surface cap and well marker with the park while they are preparing the plan of operations. In many cases, the park will not want a visible well marker.

In all instances, the casings need to be cut at the base of the cellar or 3 feet below final restored ground level, whichever is deeper. If there will be no surface marker, the well bore then needs to be covered with a metal plate at least ¼ inch thick and welded in place. The operator needs to leave a weep hole in the metal plate.

For a visible well marker, the park will approve an acceptable marker. The marker should be permanently affixed to the well. For example, in place of a metal plate, the operator may use a 4-inch pipe, 10 feet in length, embedded in cement with a 5-foot section left above the ground.

For either a visible marker or below grade marker, the well name, state permit and/or API number, and location and other pertinent well identification information should be permanently inscribed on the marker.

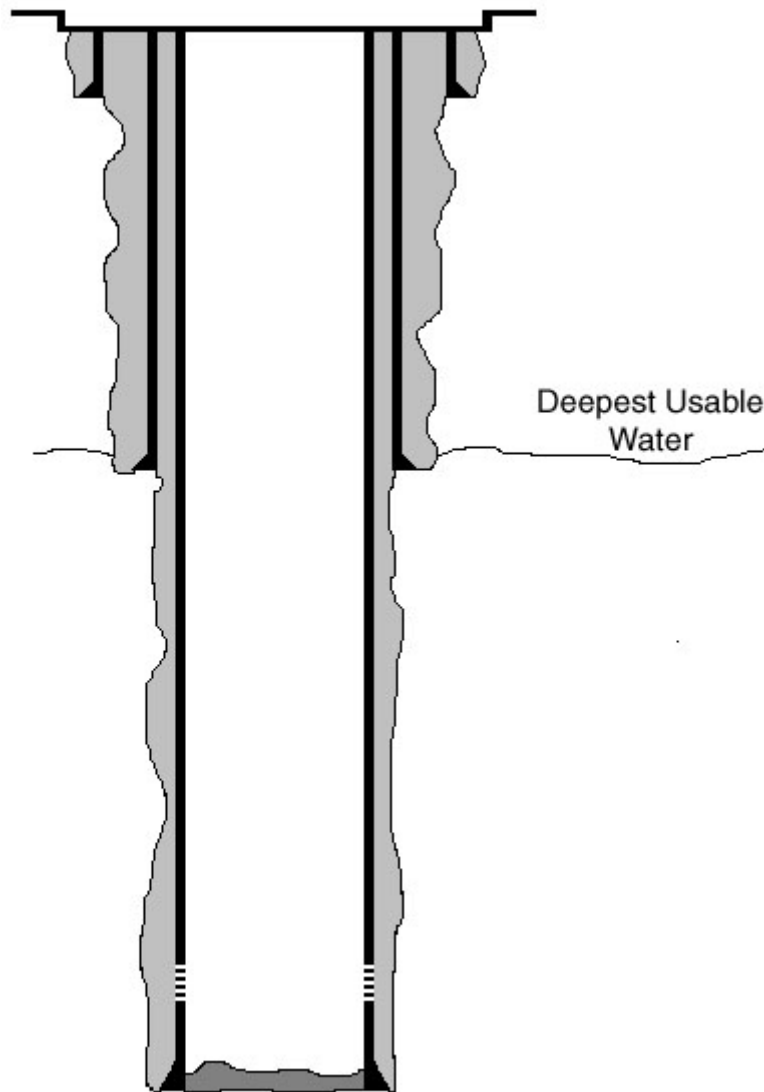
The operator would then fill in the cellar with material approved in their plan of operations and proceed to surface reclamation.



## PLUGGING EXAMPLES

### WELL EXAMPLE NO. 1 - SURFACE CASING JUST BELOW USABLE WATER DEPTH

- Production casing is set through producing zone and cemented to surface.
- Surface casing is set just below the deepest usable quality water.
- Surface casing is cemented to surface.



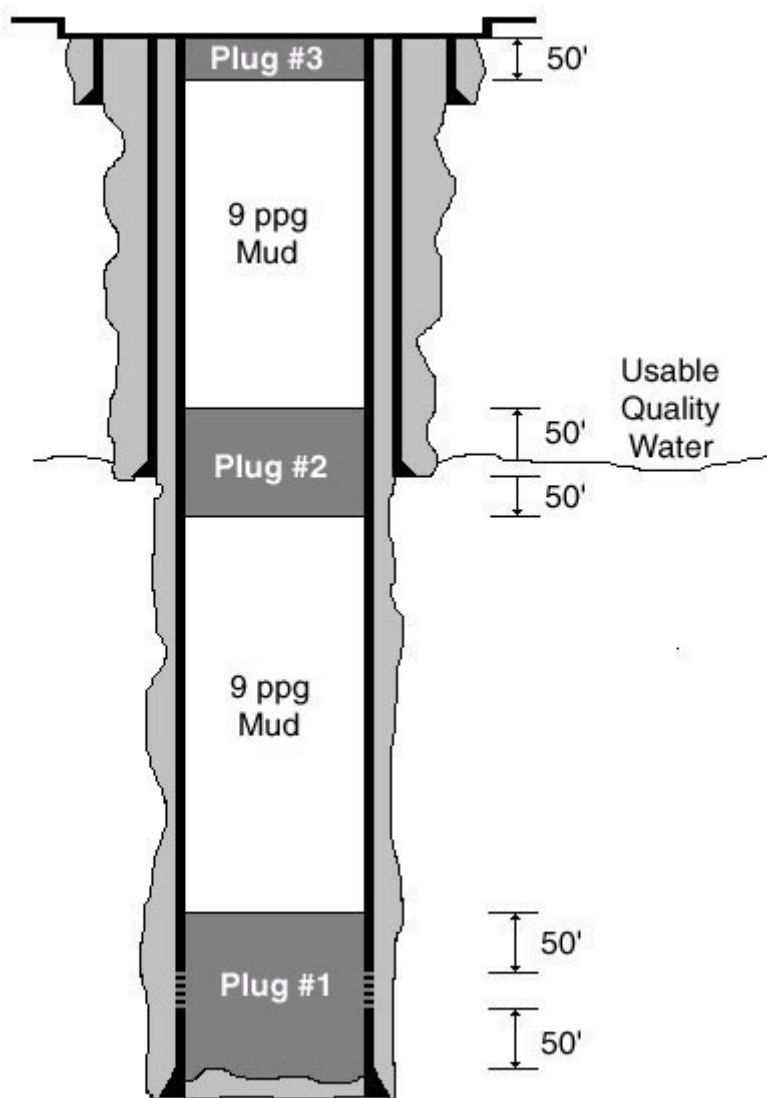


### Plugging for Well Example No. 1

**Plug #1** is set to isolate the top producing zone. Since Plug #2 will be set to isolate the base of the deepest usable water zone, then Plug #1 must meet NPS standards. In this example, the plugged back depth is about 50 feet below the bottom perforation, so Plug #1 is set to extend from plugged back depth to at least 50 feet above the top perforation. Had there been open producing zones below Plug #1 in this well, the NPS would defer to state requirements for plugging the deeper intervals.

**Plug #2** serves two purposes. Since the surface casing is set just below the base of the deepest usable quality water zone, a single plug can be set to isolate the surface casing shoe and the base of the deepest usable water zone. The plug would extend at least 50 feet below the casing shoe to at least 50 feet above the base of the usable water zone.

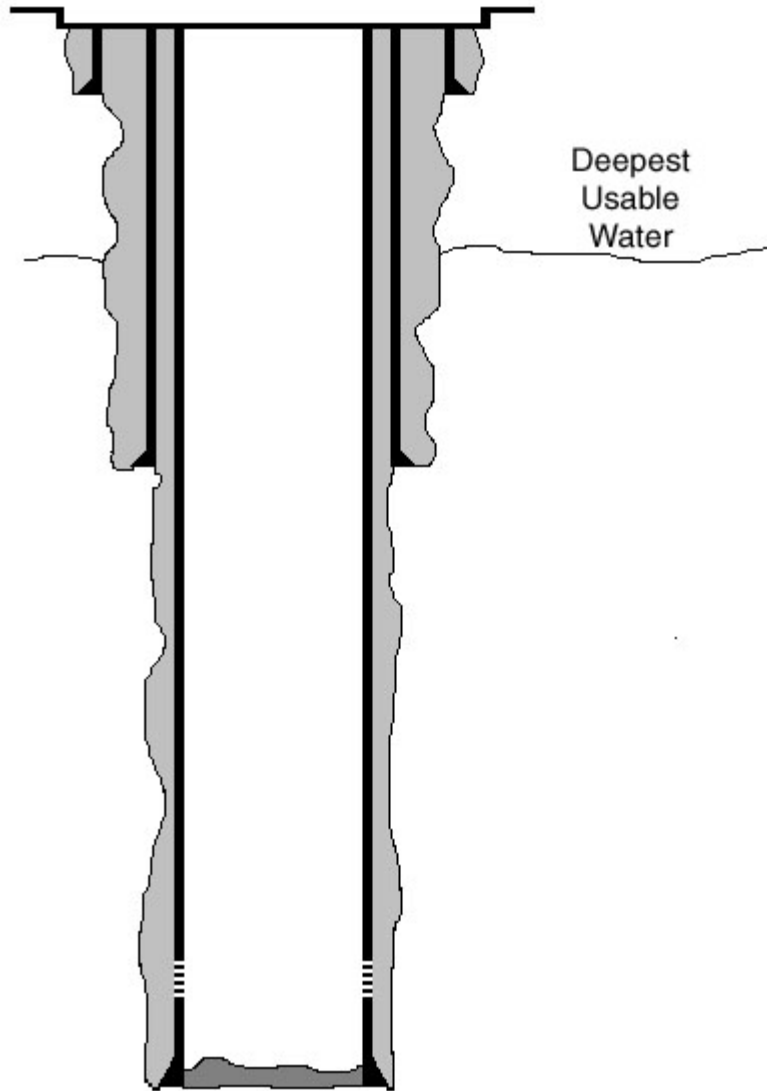
**Plug #3** is the surface plug. The NPS standard is a 50-foot surface plug. Since the annular spaces are all cemented to surface, the surface plug only needs to be set inside the production casing and extend at least 50 feet below the anticipated casing removal point.





**WELL EXAMPLE NO. 2 - FULLY CEMENTED PRODUCTION CASING**

- Production casing is set through the producing zone and cemented to surface.
- Surface casing is set well below the deepest usable quality water.
- Surface casing is cemented to surface.





### Plugging for Well Example No. 2

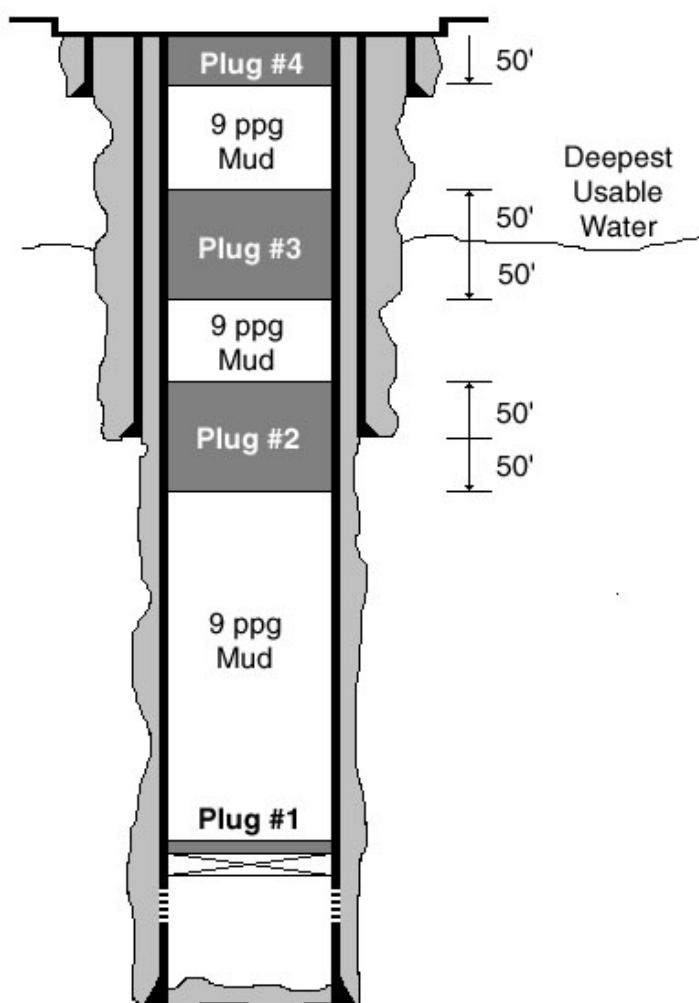
**Plug #1** is set to isolate the top producing zone. Since the next plug scheduled is not set to protect the base of the deepest usable quality water zone, the NPS defers to a state plugging requirement. In this example, a cast iron bridge plug was set just above the perforated interval and capped with 20 feet of cement as allowed under State of Texas regulations.

Note: The bridge plug method would have met the NPS standard if it were set between 50 and 100 feet above the top perforation and capped with 50 feet of cement (35 feet if cement is placed with a dump bailer).

**Plug #2** is set to isolate the surface casing shoe and the base of the deepest usable water zone. The plug would extend at least 50 feet below and 50 feet above the casing shoe.

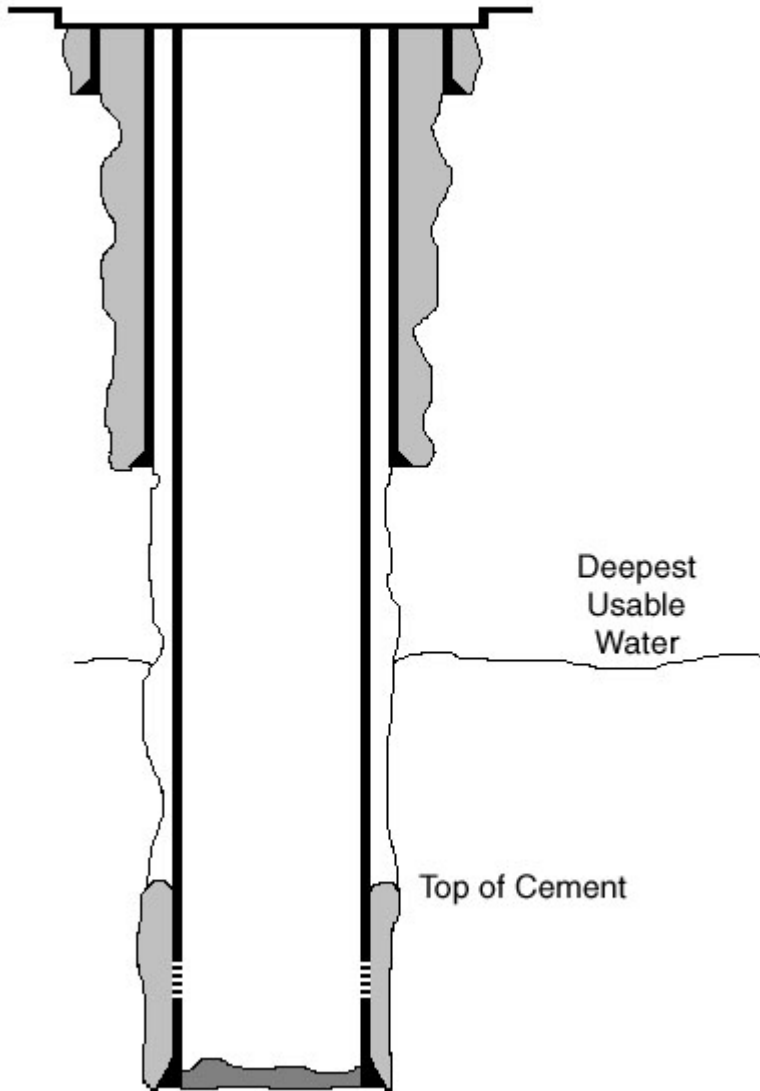
**Plug #3** is set to isolate the base of the deepest usable quality water zone. The plug would extend at least 50 feet below and 50 feet above the base of the deepest usable quality water zone.

**Plug #4** is the surface plug. The NPS standard is a 50-foot surface plug. Since the annular spaces are all cemented to surface, the surface plug only needs to be set inside the production casing and extend at least 50 feet below the anticipated casing removal point.





### WELL EXAMPLE NO. 3 - PARTIALLY CEMENTED PRODUCTION CASING



- Production casing is set through producing zone but not cemented to surface.
- Surface casing is set well above the deepest usable quality water.
- Surface casing is cemented to surface.

Since the production casing is not cemented across the deepest usable water zone or the surface casing shoe, cement will need to be placed behind the production casing to achieve zone isolation. The operator could take three approaches:

1. The production casing could be perforated at appropriate depths, and the cement circulated behind the pipe. This option is demonstrated in Plugging Well Example No. 3A.
2. The production casing could be removed, thus exposing the intervals that require placement of cement plugs. This option is demonstrated in Plugging Well Example No. 3B.
3. The operator could also use a combination of the first two options.



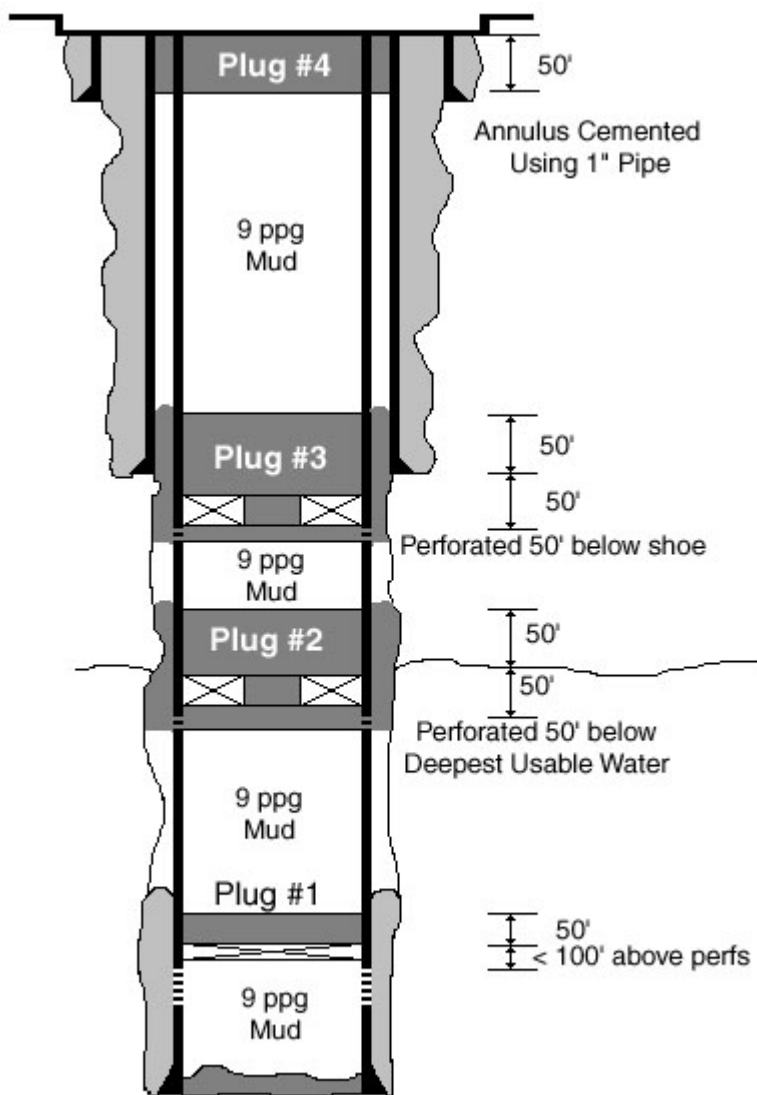
### Plugging for Well Example No. 3A - Production Casing Left in Place

**Plug #1** is set to isolate the top producing zone. Since the next plug scheduled is set to protect the base of the deepest usable quality water zone, it must meet NPS standards. In this example, a cast iron bridge plug was set between 50 and 100 feet above the top perforation and capped with 50 feet of cement. If the operator elected to place cement on top of the bridge plug using a bailer, then 35 feet of cement would have been sufficient.

**Plug #2** is set to isolate the base of the deepest usable quality water zone. The operator will need to use an approved method to place cement behind the production casing across the base of the deepest usable quality water zone. In this example, cement is placed by perforating the production casing and cementing through a retainer. The operator could also use a retrievable cementing tool in place of the retainer. The perforations would be placed at least 50 feet below the base of the zone. The cement volume and pumping schedule is then designed to place cement from 50 feet below to 50 feet above the base of the usable water zone both inside and outside the production casing. The NPS would require testing of this plug since it is the only isolating medium for a usable quality water zone.

**Plug #3** is set to isolate the surface casing shoe. Again, the annular space is not cement so the operator perforates the casing and places cement in the same manner as Plug #2.

**Plug #4** is the surface plug. The NPS standard is a 50-foot surface plug. The annular space between the production and surface casing must also be cemented. In this example, the operator elected to cement the annulus by running 1" pipe (at least 50' below the eventual casing removal point) and circulating cement in place.





### Plugging for Well Example No. 3B - Production Casing Removed

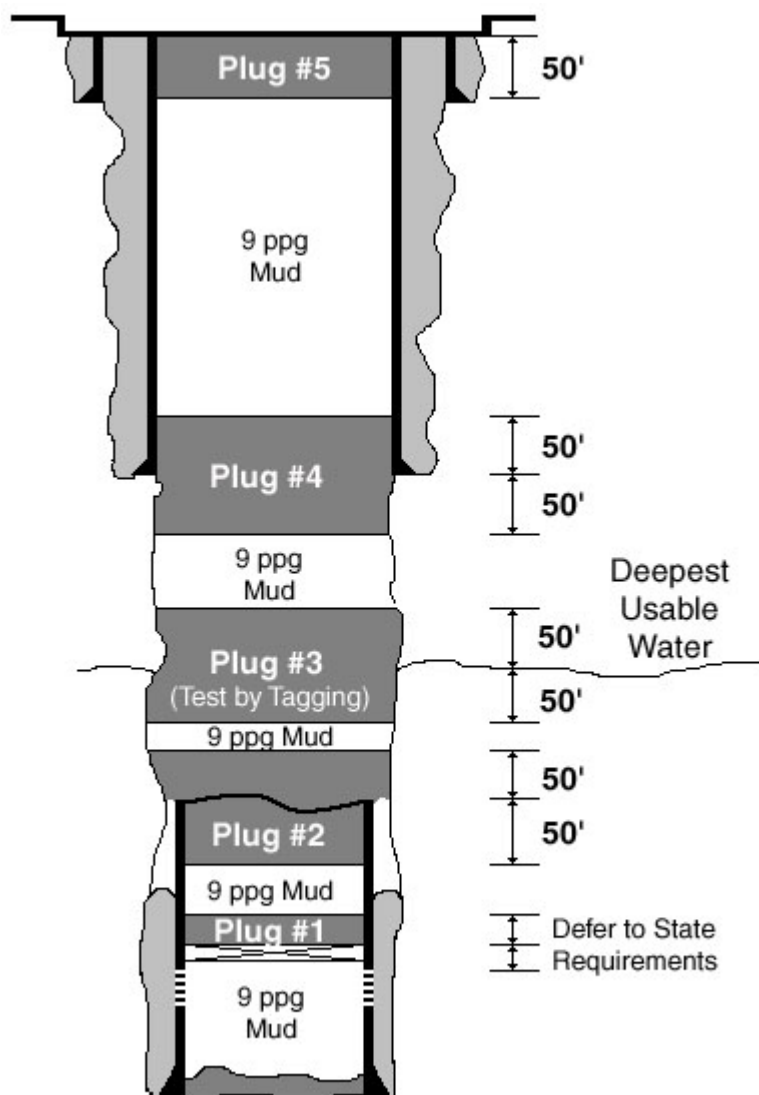
**Plug #1** is set to isolate the top producing zone. Since the next plug scheduled is not set to protect the base of the deepest usable quality water zone, the NPS defers to a state plugging requirement. In this example, the operator elected to cut and recover the production casing at its freepoint, which was well below the deepest usable quality water zone.

**Plug #2** is set to isolate the stub where the production casing was cut and removed. The NPS standard is to place a cement plug extending from 50 feet below to 50 feet above the casing stub.

**Plug #3** is set to isolate the base of the deepest usable quality water zone. The plug would extend from at least 50 feet below to at least 50 feet above the base of the deepest usable quality water zone. The operator could have cut the casing closer to the deepest usable quality water zone and combine Plug #2 and Plug #3. Since this Plug #3 is the only isolating medium for a usable quality water zone, the operator must test the plug by tagging it with the drill string. Pressure test of the plug is not appropriate since the plug is set in an open hole.

**Plug #4** is set to isolate the surface casing shoe. The plug would extend from at least 50 feet below to at least 50 feet above the casing shoe.

**Plug #5** is the surface plug. The NPS standard is a 50-foot surface plug. Since the production casing was removed, there are no remaining uncemented annular spaces. The surface plug only needs to be set inside the surface casing and extend at least 50 feet below the anticipated casing removal point.



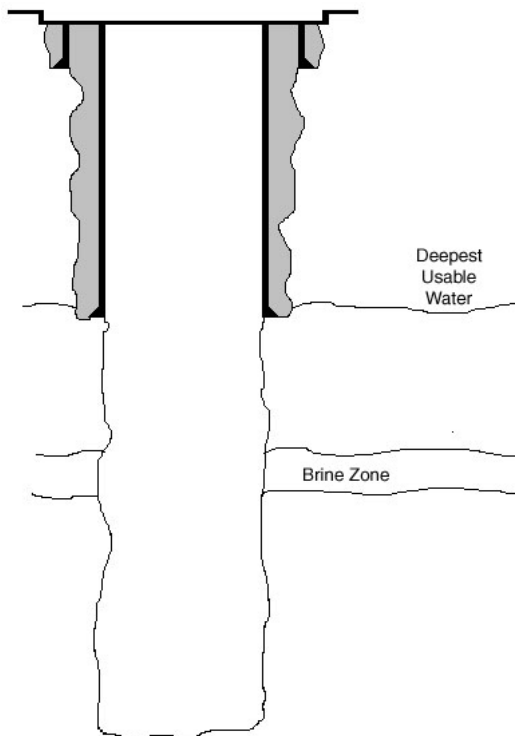


### WELL EXAMPLE NO. 4 - NEWLY DRILLED DRY HOLE

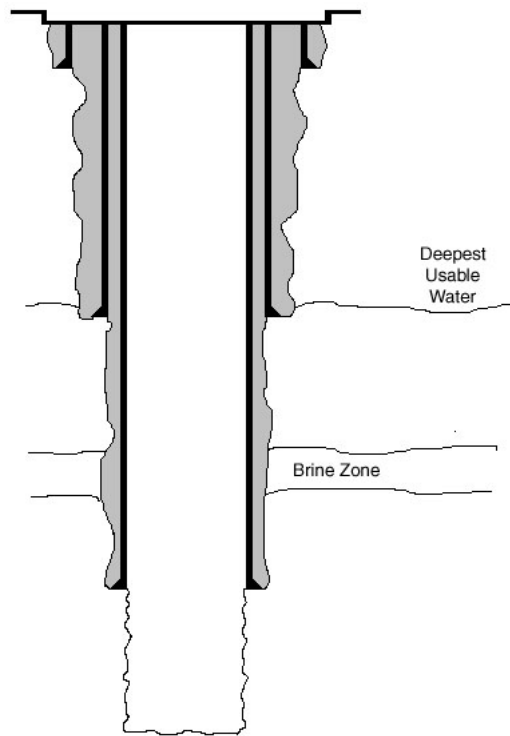
The two wellbore diagrams below show common examples of newly drilled dry holes. The first well has surface casing set just below the deepest usable quality water zone and cemented to surface. A permeable brine zone was encountered while drilling to the deeper hydrocarbon target zones.

The second well is the same, but with a string of intermediate casing, which is also cemented to surface. The brine zone is isolated behind the intermediate string.

**Example 4A**



**Example 4B**

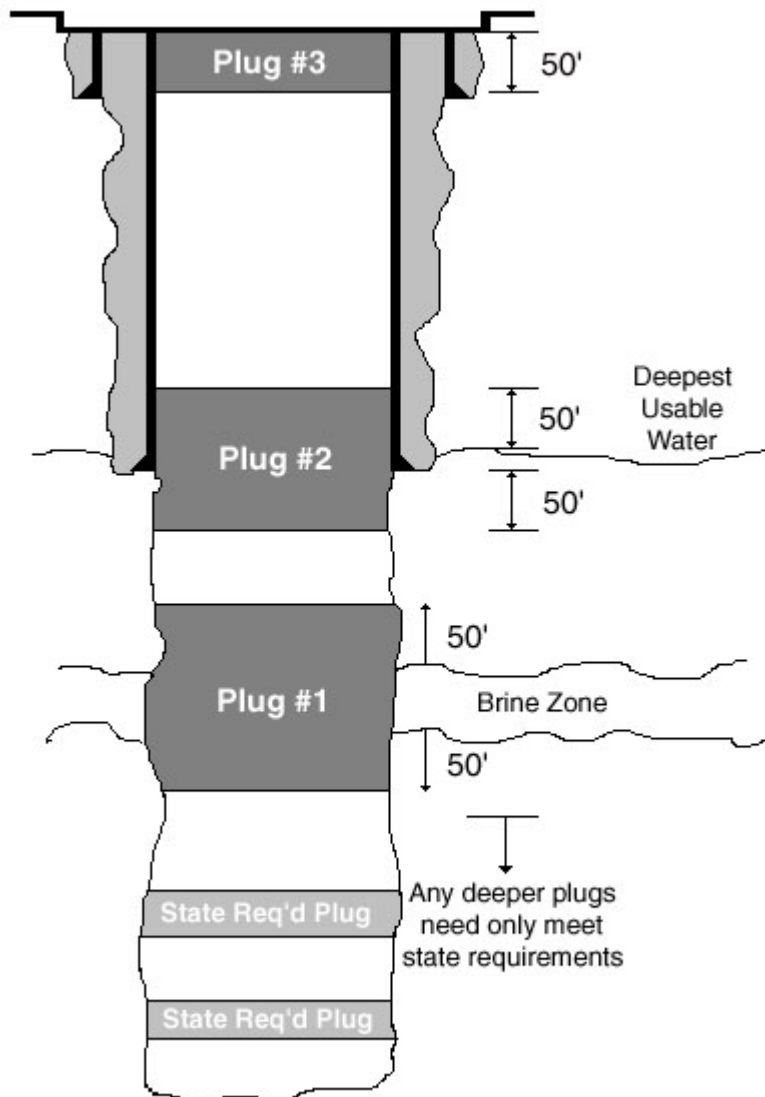




### Plugging for Well Example No. 4A - Newly Drilled Dry Hole

**Plug #1** is required by the NPS to isolate a “zone containing liquid or gas with the potential to migrate” in an openhole section where there are no cement plugs scheduled between it and the base of the deepest usable quality water zone. The plug extends from at least 50 feet below the brine zone’s bottom to at least 50 feet above its top.

The NPS would defer to state requirements for any plugs set deeper than Plug #1. If the state had required a cement plug somewhere between Plug #1 and Plug #2, then the NPS could waive the requirement for Plug #1. The NPS would not require Plug #1 provided the state required plug met the general NPS requirements for cement quality, quantity, and placement technique.



**Plug #2** is set to isolate the surface casing shoe and also serves to isolate the deepest usable quality water zone. The plug is placed to extend from at least 50 feet below the casing shoe to at least 50 feet above the base of the deepest usable quality water zone.

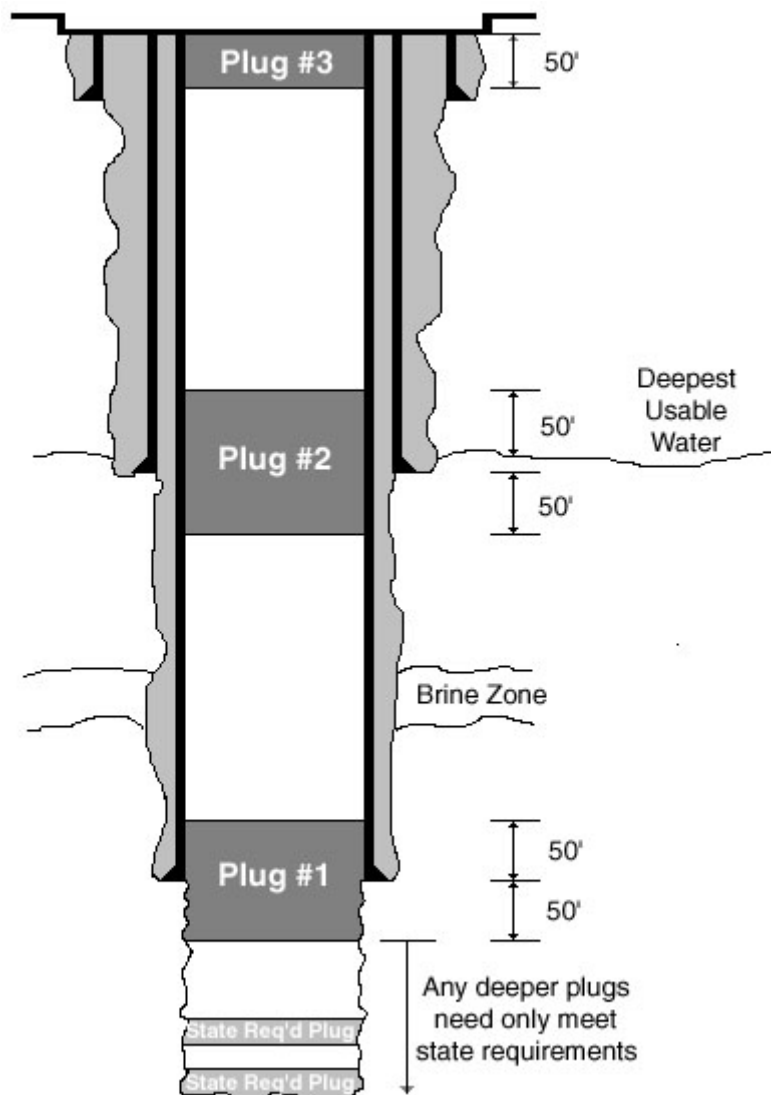
**Plug #3** is the surface plug. The NPS standard is a 50-foot surface plug. The surface plug only needs to be set inside the surface casing and extend at least 50 feet below the anticipated casing removal point.



## Plugging for Well Example No. 4B - Newly Drilled Dry Hole with Intermediate Casing

**Plug #1** is set to isolate the intermediate casing shoe. It is set to extend from at least 50 feet below to at least 50 feet above the casing shoe. Since Plug #1 is between the base of the deepest usable quality water zone and any deeper plugs, the NPS would defer to state requirements for any plugs set below Plug #1.

The brine zone does not require a cement plug to meet NPS standards since it is isolated behind a cemented section of casing.



**Plug #2**, as in the previous example, is set to isolate the surface casing shoe and also serves to isolate the deepest usable quality water zone. The plug is placed to extend from at least 50 feet below the casing shoe to at least 50 feet above the base of the deepest usable quality water zone.

**Plug #3** is the surface plug. The NPS standard is a 50-foot surface plug. Since the all annuli have been cemented to surface, the surface plug only needs to be set inside the intermediate casing and extend at least 50 feet below the anticipated casing removal point.



## **SURFACE RECLAMATION**

In NPS terms for oil and gas operations, reclamation means returning lands and waters that were disturbed by operations to a condition that meets the park's goals and the 9B requirements. Developing a good reclamation program for the plan of operations then becomes a two-step process:

1. Identify reclamation goals that are clear and measurable, and
2. Develop a step-by-step process to achieve the goals.

In most cases, reclamation will result in returning the disturbed areas to the natural conditions and processes that existed before the operations began. In some instances, however, the NPS may designate the disturbed area for a different use than it had prior to operations. For example, the NPS may want to keep a road and wellpad to provide for visitor use or administrative access. The reclamation program would be much different for these two situations. Also, reclamation requirements under the regulations are different depending on whether or not the operations are on federal property.

The operator cannot design a surface reclamation program until the goals of reclamation are clearly defined. The regulations provide the basis for Step 1 by setting the minimum standards or goals for reclamation (36 C.F.R. § 9.39). For Step 2, park resource managers will be an excellent source of information for specific reclamation strategies and methods that have been used successfully in their parks. Operators may also have firsthand experience with reclamation in environments similar to those covered by the subject plan of operations.

### **WHEN SURFACE RECLAMATION MUST BE STARTED**

Section 9.39(a) requires that reclamation begin according to timeframes specified in an operator's approved plan of operations. If the plan of operations does not give a timeframe, then reclamation must begin within six (6) months from the time operations ended.

### **DIFFERENCES IN RECLAMATION REQUIREMENTS – FEDERAL AND PRIVATE SURFACE ESTATE**

In the regulations, operations on federal lands have higher reclamation standards than operations on private lands. The majority of existing operations are located on federal surface estate, so most operators must meet the higher reclamation standard.

**For federal lands**, the main standard is for operators to “return the area to natural conditions and processes” (36 C.F.R. § 9.39(a)(2)). The regulations then provide seven steps that need to be completed at a minimum to satisfy the standard. These are:

1. Remove all above ground structures, equipment, and roads no longer needed for future operations.
2. Remove all other man-made debris that resulted from operations.
3. Remove or neutralize contaminating substances.
4. Plug and abandon all nonproductive wells and fill any excavations.
5. Restore the natural contour of the land.



## CHAPTER 7 – WELL PLUGGING AND SURFACE RECLAMATION

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6. Place the natural soils needed for vegetation.
7. Reestablish native vegetative communities.

These steps then provide an outline for an operator's reclamation program. For the reclamation section in the plan of operations, the operator can describe the methods and equipment that will be used to accomplish each of the seven steps.

For Step 3, the operator is responsible for removing soils or any other materials that become contaminated. If there is reason to suspect soils or groundwater have been contaminated, the operator will likely need to collect and test samples to verify that contaminating substances have been removed or neutralized. See *Appendix D, Guideline for the Detection and Quantification of Contamination at Oil and Gas Operations*. Neutralization of contamination means that contaminant concentrations will be reduced in soils (or groundwater) to a condition that will not adversely affect, injure, or damage federally-owned or controlled lands and waters, provides for the safe movement of native wildlife, and which does not jeopardize visitor health and safety.

For Step 5, wetland areas directly and indirectly affected by operations must be returned to their preexisting elevations, and soil, hydrology, and native vegetation communities must be restored as soon as practicable after completion of the operation. Reclamation requirements in wetlands are very precise with regard to the elevation of the land surface with respect to the water table. This, more than anything else dictates the resulting plant communities that will be reestablished in the restored wetland. For more information, refer to the wetland Best Management Practices listed in *Appendix B, Part B* of this handbook (NPS Procedures Manual 77-1, Appendix B).

For Step 7, the reestablishment of native vegetative communities should include specific measures (e.g., percent and composition of vegetative ground cover) and a schedule to monitor the success of the reclamation.

Finally, the regulations state that reclamation is unacceptable (for federal surface) unless it provides:

- safe use of the area by wildlife and park visitors,
- plant growth native to the area, and
- normal surface and subsurface water flow (36 C.F.R. § 9.39(b)).

**For private surface estate**, the regulations provide two standards (36 C.F.R. § 9.39(a)(1)). The operator shall, at a minimum:

1. Remove or neutralize any contaminating substances (36 C.F.R. § 9.39(a)(1)(i)), and
2. Rehabilitate the area to a condition that would not constitute a nuisance or would not adversely affect, injure, or damage federally owned or controlled lands or waters (36 C.F.R. § 9.39(a)(1)(ii)).

The first standard is the same as described above for reclamation on federal surface estate.

The second standard uses the terms "nuisance" and "adversely affect, injure, or damage," Important factors that an operator needs to consider when designing a reclamation program that satisfies this standard would include, but are not limited to:

- Proper plug and abandonment of wells,
- Prevention of erosion and downslope sedimentation on or towards federal property,



- Restoration of the natural surface drainage pattern(s),
- Maintenance of water quality,
- Prevention of influx of plant species not native to the area,
- Protection of wildlife, and
- Protection of public safety.

Section 9.39(a)(ii) includes a specific requirement to remove all “above ground structures and equipment” no longer needed for future operations. Roads and wellpads are structures that the NPS would probably require to be removed unless the surface owner expressly wanted them to stay.

## **PLAN OF OPERATIONS INFORMATION REQUIREMENTS FOR WELL PLUGGING AND SURFACE RECLAMATION**

Below is an explanatory list of requirements that nonfederal oil and gas operators need to include in a plan of operations for permanent well plugging and surface reclamation. These requirements are based on the regulatory provisions under 36 C.F.R. § 9.36. This list is also used by the NPS to determine if a proposed plan of operations is complete and sufficiently detailed to merit "official acceptance" for review and analysis in accordance with the regulations at 36 C.F.R. § 9.36(c).

A plan of operations may not need to address all of the information requirements presented below. The operator and NPS staff may narrow the list during project scoping. In some instances, the NPS may require additional information so that it may effectively analyze the impacts of the proposed operation (36 C.F.R. § 9.36(a)(18)). This additional information also would be identified during project scoping.

The operator will submit the proposed plan of operations, tender the performance bond, and be the responsible party for compliance with the approved plan of operations.

### **I. OWNERSHIP AND CONTACT INFORMATION**

The purpose of this section of the plan is to identify the “operator,” to document the operator’s property right to oil and gas in the park, and to identify primary company contacts for planning, field operations, and emergencies.

#### **A. Name and address of:**

1. Surface owner (if other than the NPS), and
2. Lessor (mineral owner).

#### **B. Name, address, and telephone number of:**

1. Operator,
2. Lessee (if different than operator),
3. Person accountable for operations,
4. Field representative, and
5. Emergency contact.



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- C. Copy of the instrument(s) demonstrating the legal responsibility for well plugging and reclamation. Examples include:
1. Lease,
  2. Deed,
  3. Assignment of rights, or
  4. Designation of operator.

### **II. MAPS AND PLATS**

The purpose of this section of the plan is to graphically show the operator's mineral tracts and the area of operations. The area of operations includes present and past surface disturbance associated with the operations, including wells, facilities, and access roads. It is very important to clearly and accurately define the area of operations. The operations plat provides the basis for defining the operator's area of responsibility for reclamation.

- A. Tract/Lease Boundary Map - use 1:24,000 USGS quadrangle map(s) and show the following:
1. NPS park unit boundary, and
  2. Each mineral tract/lease cross-referenced to the "right to operate" information provided in Section I. C.
- B. Location Map - use 1:24,000 USGS quadrangle map(s) and show the following:
1. Lease or mineral tract boundary and park boundary,
  2. Existing access road(s) to be reclaimed,
  3. Disturbed areas associated with well(s) and/or facilities locations, and
  4. Location of all existing flowlines and pipelines in the area of operations.
- C. Area of Operations - Define the area of operations using maps, plats, and photographs (supplement with discussion if necessary). Show and/or describe the following, as applicable:
1. Access road dimensions;
  2. Plat of disturbed areas associated with wells and other surface facilities, pad dimensions (including all excavations for ditches, sumps, pits, etc. on and around the sites); and
  3. Supplement plats with an inventory of existing surface equipment and photographs documenting existing conditions.



### **III. TIMELINE FOR OPERATIONS**

The purpose of this section of the plan is assist the NPS in scheduling plugging operations to minimize or avoid conflicts with park operations and visitor use, and impacts on park resources. Any alteration of normal operations due to seasonal timing considerations to protect natural resources or visitor uses should also be noted in this section.

A. Estimated time to mobilize, plug well, and demobilize.

B. Estimated date when reclamation will begin.

NOTE: Reclamation must begin as soon as possible after completion of the approved operations, but no later than 6 months thereafter unless specifically approved by the regional director (36 C.F.R. § 9.39(a)).

C. Estimated time to complete reclamation.

### **IV. GEOLOGIC INFORMATION**

The purpose of this section of the plan is to provide the geological information needed to determine setting depths of cement plugs. The operator needs to provide the following information to help the NPS determine a) that all usable quality freshwater zones are protected, b) that anticipated geological conditions are planned for with regard to well control, and c) anticipated well plugging requirements.

A. Total depth of well(s);

B. Depths of producing zones;

C. Depth to which freshwater must be protected (*i.e.*, depths of known usable quality freshwater zones);

D. Depths of all known brine zones, and other minerals such as coal or oil shale;

E. Depths of zones with abnormally high or low pressures, or other geological hazards; and

F. A brief discussion of any drilling or production practices in the area that are used to account for geologic conditions (*e.g.*, heavy muds used for high pressures, oil or saltwater muds used to drill expanding clays or shales, unusual casing/cementing programs, hydrogen sulfide safety plans, etc.).

### **V. DESCRIPTION OF WELL PLUGGING OPERATIONS**

The description of plugging operations in the plan should provide enough detail on the proposed methods, sequence, and equipment to demonstrate that the plugging design complies with NPS plugging procedures covered in this chapter of the handbook. It should also demonstrate that operations will not further degrade the area of operations or surrounding area.



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Provide a description of the proposed methods, sequence, and equipment for the topics listed in this section. Describe the specific actions that the operator will implement to minimize or eliminate adverse impacts on park resources and visitor related values. Table 7.2 includes a list of mitigation measures to protect these resources and values.

NOTE: Operators cannot use sources of water inside the park without written permission of the regional director. The regional director can only approve a plan of operations that uses a source of water from inside the park if one of two conditions exist: 1) the operator owns a superior water right to that of the U.S. Government, or 2) if the water right is subordinate to the U.S. government's, the operator shows that removal of the water would not damage park resources (36 C.F.R. § 9.35).

**A. Well Information** - Detail existing wellbore information including:

1. Total depth and plugged back depth;
2. All casing sizes, grades, weights, and setting depths;
3. Casing cementing history including calculated or measured tops of cement behind casing strings; and
4. Downhole production equipment.

**B. Access** - Describe actions needed to clear or improve the access route and operation site to enable plugging and surface reclamation.

**C. Well Plugging Design**

1. Types of plugs and setting depths;
2. Casing removal, perforation depths, and cement placement technique;
3. Type and amount of cement required;
4. Plugging fluid properties; and
5. NOTE: each of the intervals between plugs must be filled with mud having sufficient density to exert hydrostatic pressure exceeding the greatest formation pressure encountered while drilling. In the absence of know data, the NPS requires a minimum mud weight of 9.0 pounds per gallon.
6. Type of abandoned hole marker.

**D. Well Plugging Considerations**

1. Considerations for well control (e.g., well blowdown and/or fluid loading, blowout prevention equipment, etc.):
2. Considerations for preventing oil, brine, chemicals, and other materials from reaching the ground (e.g., use of plastic liners beneath the plugging rig, pipe racks, and other equipment as necessary; collection of all fluids and solids returned to the surface from the wellbore in metal tanks; waste disposal outside park, etc.) and surrounding area (stormwater management); and
3. Identify potential threats to public health and safety from conduct of the proposed operations and provide a discussion of all measures to remove or minimize these threats.



## **VI. SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN**

The NPS has combined informational requirements and operating standards from the 9B regulations to develop the format for a Spill Control and Emergency Preparedness Plan. This plan covers the substances or site conditions that pose risks to human health and safety and the environment. It also describes the actions the operator would take to minimize these risks in the event of a spill or natural disaster (e.g., flood, fire, hurricane, or tornado). See *Chapter 11 – Spill Control and Emergency Preparedness Plan* in the Operator's Handbook for the organization and content of a Spill Control and Emergency Preparedness Plan.

A Spill Control and Emergency Preparedness Plan should describe all actions, equipment, procedures, training, etc. to control and effectively respond to releases of contaminating substances (oil, brine, drilling fluids, blow-out, or any other toxic or hazardous substance) to ensure protection of park resources and human health and safety.

## **VII. SURFACE RECLAMATION PLAN**

The reclamation plan will describe the actions needed to meet the general regulatory reclamation standards as well as site-specific reclamation goals (36 C.F.R. § 9.39). The procedures of the reclamation plan then will be based on the disturbance anticipated from the proposed operations (as described in Section II C.), and reclamation expectations of the NPS as identified during project scoping. The operator should organize the reclamation plan by the following sections.

### **A. Reclamation Goals**

1. Summarize the site-specific reclamation goals developed during project scoping. Site-specific goals might include a desired percent of vegetative ground cover as well as the type of plants, soil stabilization, surface drainage characteristics, etc.; and
2. State the timeframes for reclamation. Describe when reclamation activities will begin, duration of reclamation activities, and the schedule for monitoring the results of the reclamation effort.

### **B. Reclamation Procedures**

The 9B regulations provide steps that need to be completed to satisfy reclamation standards for operations on federally owned surface. In addition to well plugging, the following list may be used as an outline for developing the plan's surface reclamation procedures. The operator can describe the methods and equipment that will be used to accomplish each of these steps.

1. Remove all above ground structures, equipment, roads (and pad material) no longer needed for future operations.
2. Remove all other man-made debris that resulted from operations.
3. Remove or neutralize contaminating substances. For this step, the operator is responsible for removing soils or any other material that becomes contaminated. If there is reason to suspect soils or groundwater have been contaminated, the operator will likely need to collect and test samples<sup>17</sup> to verify that contaminating substances have been removed or neutralized. Neutralization or removal of contamination means that

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<sup>17</sup> For more information, see *Appendix D - The Guideline for the Detection and Quantification of Contamination at Oil and Gas Operations*



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contaminant concentrations will be reduced in soils (or groundwater) to a condition that will not adversely affect, injure, or damage federally-owned or controlled lands and waters, provides for the safe movement of native wildlife, and which does not jeopardize visitor health and safety.

4. Restore the natural contour of the land.
5. Place and prepare the natural soils needed for vegetation.
6. Reestablish native vegetative communities. In addition to the revegetation procedure, this section should include steps for monitoring progress of the reclamation effort.

### C. Reclamation Cost Estimate

The cost of reclamation in part determines the amount of the performance bond (36 C.F.R. § 9.48(d)(1)). Provide an estimate of costs for a third party to complete the reclamation procedures in Item B above. At a minimum, provide enough detail to support subtotals for each of the following subcategories:

1. Well plugging;
2. Removal of structures, equipment, roads, pads, debris, etc. (Items B. 1 and 2 above);
3. Removal or neutralization of contaminating substances (Item B. 3 above) including soil and water sampling and testing, soil and water remediation, disposal of contaminated soils or water, etc.;
4. Site and soil preparation (Items B. 4 and 5 above); and
5. Vegetation and monitoring (Item B. 6 above).

The NPS will verify and use the cost estimates to set the reclamation portion of the performance bond. The subtotals may be used to determine amounts by which to reduce the operator's performance bond if reclamation is to be performed in phases.

If the operator chooses not to provide the cost estimates for reclamation, the performance bond may be set at the maximum amount allowed by regulation, which is \$50,000 per well (36 C.F.R. § 9.48(d)(2)) or \$200,000 per operator per park unit (36 C.F.R. § 9.48(d)(3)). If the operator already holds a \$200,000 bond for other operations in the same park, it is unnecessary for the operator to provide the cost estimate information required by this section. The operator, nonetheless, will be legally and financially responsible for fully reclaiming the site. The NPS can seek up to treble damages for any unauthorized impacts to park resources under 16 USC § 19jj.

## VIII. AFFIDAVITS AND STATEMENTS

Include an "Affidavit of Compliance" signed by an official that is authorized to legally bind the company as required by regulations at 36 C.F.R. § 9.36(a)(15). The affidavit should state that the proposed operations are in compliance with all applicable federal, state and local laws and regulations. An example Affidavit of Compliance is included in *Appendix C – Sample Letters for Nonfederal Oil and Gas Operations*.

## IX. OTHER APPLICABLE PERMITS

At the superintendent's request, operators will need to provide the NPS with a copy of all applicable federal, state, and local permits. If the permits are still pending, operators may submit a copy of the application for such permits.



**X. BACKGROUND ENVIRONMENTAL INFORMATION**

This section of the plan of operations presents information on existing natural and cultural resources in the project area, specify actions that will be taken to minimize adverse impacts on surface resources, assess the environmental impacts of the proposed operation, and discuss any technologically feasible abandonment and reclamation alternatives. Information that should be presented in this section will be determined during project scoping with park staff. The park may have some of the required natural and cultural resource information for the operator's use in preparing this section of the plan.

- A. Description of natural resources in the proposed operation area should include the following information:
  - 1. Soil types and properties such as permeability, porosity, erosion potential.
  - 2. Vegetation species composition in access road and wellpad area, including predominant herbaceous, shrub, midstory, and overstory species. (NOTE: This information is necessary to properly design a reclamation plan).
  - 3. Federal or state threatened / endangered plant or wildlife species that inhabit or frequent the proposed operation area.
  - 4. Written and/or photographic documentation that the soil, water (surface and groundwater), wetlands, vegetation, and wildlife outside the area of operations have not been directly impacted due to contaminants moving off location or contaminating substances left unconfined on location. If evidence exists to the contrary, those impacted areas are considered part of the area of operations and must be included in the reclamation plan.
- B. Identification and proximity of park visitor use areas (e.g., trails, campgrounds, public roads, picnic areas, overlooks etc.) near the proposed operation area.
- C. Description of the expected results of reclamation on the park land features and uses, wildlife, vegetation, soils, water resources, air quality, noise, and social and economic environments.

**THIRD PARTY MONITORING**

The NPS may require an operator to hire a third party monitor to oversee certain aspects of well plugging and surface reclamation. The purpose of third party monitoring is to ensure operator compliance with the terms of the approved plan of operations and to protect park resources and values.

The company hired to do the third party monitoring must meet the following three requirements:

- 1. Third party monitors shall not include any representatives or employees of the operator, or any contractors or subcontractors to the operator working on any task related to this project, or any persons who would have a financial or other interest in the outcome of the production operation.
- 2. The persons hired to do the monitoring must meet the technical qualifications to monitor the specific resources in the NPS unit where the operations would occur (e.g., wetlands scientist, wildlife biologist, archeologist etc.).
- 3. The scope of work must meet the objectives of monitoring in the park.



## CHAPTER 7 – WELL PLUGGING AND SURFACE RECLAMATION

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The operator and park staff will work together during project scoping and development of the plan of operations to come up with an effective plan for monitoring the operations. During project scoping, the operator and NPS will discuss the requirement for third party monitoring and the technical qualifications that would be needed by the monitor(s). The NPS will provide the operator with a list of roles and responsibilities and necessary qualifications of the third party monitor(s). In some cases this information may not be developed until after the NPS technical adequacy review of the plan of operations. The operator will include details in the plan of operations concerning the use of a third party monitor and disclose that there will be no conflict of interest between the operator and the company that will be hired to do the monitoring and that the monitor(s) will have the technical expertise to do the monitoring. Once the third party monitor(s) have been selected by the operator, a list of the persons and their qualifications must be provided to the NPS.

The NPS may develop stipulations that specify conditions of the third party monitoring (36 C.F.R. § 9.37(f))<sup>18</sup>. Examples of these stipulations include, but are not limited to:

- The third party monitor must be paid by the operator.
- The monitor must report directly to the park superintendent or his/her representative.
- The NPS will identify the frequency and type of compliance reports.
- If a violation of the terms of the monitoring contract occurs, the NPS would require immediate corrective actions from replacement of the monitor up to suspension of the approved plan of operations.
- The NPS may suspend the operations if the monitor demonstrates to the NPS that the operation poses an immediate threat of significant injury to federally owned or controlled lands or waters (36 C.F.R. § 9.51(c)(2)).

Third party monitors would be required to ensure operator compliance with the approved plan of operations. Monitoring may include making sure that:

- access in the unit is along designated routes and by approved means (e.g., on foot or by vehicle);
- there is proper handling, transport, and storage of hazardous and other contaminating substances;
- the well is plugged in accordance with the approved plan of operations; and
- the operations area is cleaned up and reclaimed according to the approved plan of operations.

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<sup>18</sup> Under this provision all approved plans are conditioned upon the superintendent's right to access an operation to monitor and ensure compliance with a plan of operations. Since under this scenario a third party will handle monitoring, the superintendent can exercise his or her right to access and monitor the operation through the third party via specific stipulations in its approval letter.



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## REQUIRED OPERATING STIPULATIONS AND RECOMMENDED MITIGATION MEASURES FOR WELL PLUGGING AND SURFACE RECLAMATION

The tables in the following section list operating stipulations (Table 7.1) required by the NPS and suggested mitigation measures (Table 7.2) for well plugging and surface reclamation on NPS lands. The primary resource(s) that would be protected by the operating stipulations and mitigation measures listed in the tables are denoted by a √ symbol. Other resources that would benefit from the protective measures are marked with a + symbol.

Table 7.1 focuses on the NPS 36 C.F.R. 9 B regulations but also includes operating stipulations required under other federal laws and regulations. The appropriate citation is shown in parentheses after each requirement. To ensure compliance with all applicable legal and policy mandates, it is the operator's responsibility to consult with the appropriate federal, state, and local agencies prior to beginning operations in a unit of the National Park System, and determine which statutory and regulatory requirements would apply to each operation.

Table 7.2 lists mitigation measures for well plugging and surface reclamation. Use of mitigation measures shown in the table are recommended by the NPS to ensure compliance with the NPS approval standard to utilize "...technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety" (36 C.F.R. § 9.37(a)(1)). Many of the mitigation measures are derived from environmental guidelines and publications developed by the oil and gas industry and environmental professionals and may not address every environmental topic or risk that may be encountered during oil and gas operations. These tables are intended to be a tool to be used during project planning. An operator can look through the tables to see which measures would apply to an operation and select the most appropriate measures to include in his/her plan. An operator has the discretion to select the most appropriate mitigation to meet the NPS least damaging approval standard.



**Table 7.1. Required Operating Stipulations for Well Plugging and Surface Reclamation of Oil and Gas Wells on NPS Lands**

Well Plugging and Surface Reclamation Required Operating Stipulations	RESOURCES PROTECTED											
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience	Human Health and Safety
The applicable legal citation is noted in [parenthesis] after the stipulation.												
The operator is required to submit a detailed description of reclamation activities as a part of the Plan of Operations to comply with the requirements of 36 C.F.R. § 9.39 – Reclamation Requirements. [36 C.F.R. § 9.36(a)(12)]	+	+	+	+	+	+	+	+	+	+	+	+
Reclamation actions must begin as soon as possible, and no later than 6 months following completion of operations, unless a longer period of time is authorized in writing by the regional director. [36 C.F.R. § 9.39(a)]	+	✓	+	✓	✓	✓	✓	✓	✓	+	✓	✓
Plug wells to meet the minimum requirements of the NPS. [Chapter 7 of this handbook]		✓		✓	+	✓	✓	+	+		+	✓
Remove from the unit all above ground structures, equipment, and roads used for operations, except for structures, equipment and roads that are to be used for continuing operations which are the subject of another approved Plan of Operations or of a plan which has been submitted for approval, or unless otherwise authorized by the regional director. [36 C.F.R. § 9.39(a)(2)(i)]		+		+	+	+	+	+	+		✓	✓
Remove all debris resulting from the operations. [36 C.F.R. § 9.39(a)(2)(ii)]								+			✓	
Remove or neutralize any contaminating substances. [36 C.F.R. § 9.39(a)(2)(iii)]		✓		✓	+	+	+	+	+		+	✓
Plug and cap all nonproductive wells and fill dump holes, ditches and other excavations. [36 C.F.R. § 9.39(a)(2)(iv)]											✓	✓
Restore topographic contours to reasonably conform to the contours that existed prior to initiation of operations. [36 C.F.R. § 9.39(a)(2)(v)]		✓		+	+	+	+	+	+		✓	
Replace natural topsoil necessary for vegetative restoration. [36 C.F.R. § 9.39(a)(2)(vi)]		+		+	+	✓	+	+	+		+	
Re-establish native vegetative communities. [36 C.F.R. § 9.39(a)(2)(vii)]		+		+	+	✓	+	+	+		+	
Reclamation must provide for the safe movement of native wildlife, must re-establish native vegetative communities, the normal flow of surface and reasonable flow of subsurface waters, and must return the area to a condition that does not jeopardize visitor safety or public use of the unit. [36 C.F.R. § 9.39(b)]		+		✓	+	✓	+	✓	✓		✓	
Return wetland areas directly and indirectly affected by operations to their preexisting elevations, and restore soil, hydrology, and native vegetation communities as soon as practicable. [NPS Procedures Manual 77-1, Appendix 2]		+		+	+	+	✓	+	+		+	
When proposed operations cannot avoid direct and/or indirect adverse impacts on wetlands, the operator shall compensate for direct and indirect impacts on wetlands by restoring degraded or former wetland habitats. Compensation will be at a minimum 1:1 ratio. In other words, at least one acre of wetlands must be restored for each acre destroyed or degraded. The focus will be on the replacement of comparable wetland types and functions, not just wetland acreage. Compensation shall be performed prior to or at the same time impacts associated that approved oil and gas operations occur. [NPS Director's Order 77-1 and NPS Procedures Manual 77-1 § 5.2(C)]		+		+	+	+	✓	+	+		+	



**Table 7.2. Recommended Mitigation Measures for Well Plugging and Surface Reclamation of Oil and Gas Wells on NPS Lands**

Well Plugging and Surface Reclamation Recommended Mitigation Measures	RESOURCES PROTECTED										
	Air Quality	Geology and Soils	Paleontological Resources	Water (Surface and G.W.)	Floodplains	Vegetation	Wetlands	Fish and Wildlife	T & E Species	Cultural Resources	Visitor Use and Experience
Set adequate surface plugs and cut casing below the expected lateral migration and water level changes of the stream channel to avoid future exposure when plugging wells within geomorphically active zones (e.g., the active meander belt of a river).				+	+				+	+	√
Take necessary precautions to prevent oil, brine, chemicals, and other materials from reaching the ground during well plugging operations. Precautions include the use of plastic liners beneath the workover rig, pipe racks, and other equipment as necessary.		√		√	+	√	+	+	+		+
Collect all fluids and solids returned to the surface from the wellbore in metal tanks and dispose of them in an approved disposal facility outside of the park.		√		√	+	+	+	+	+		+
Remove all fill material down to the original predisturbance level. Soil surveys for the area can assure that the soil profile is re-established after the excavation is completed.		√		+	+	√	+	+	+	+	
Repair compacted soils by disking.		√		+	+	+	+	+	+		+
Revegetate cut-and-fill slopes and use good civil engineering practices to maintain disturbed areas in a stable condition to avoid erosion and sedimentation.		√		√	+	√	+	+	+	+	
Assure that topsoil brought in from outside sources is "clean" of non-native weed seed and plant materials.		√			+	√	+				+
Use seed, mulch, or other authorized materials or structures to mitigate the potential for erosion. Use certified weed-free mulch, native seed, or sterile cover crops that are not sources of undesirable nonnative plant species.		√		√		√					
Provide for natural succession of vegetative species (herbaceous species, then woody species) and to reduce chance of introduction of exotic plant species by seeding areas with native seed materials.					+	√	+	+	+		
Consider active revegetation and erosion control measures (i.e., reestablishing contours, seedbed preparation, planting seeds, planting or transplanting seedlings, adding mulch or other authorized materials to reduce the potential for erosion etc.) if natural growth is unacceptable.		√		√	+	√	+	+	+		+
Optimize survival of vegetation by planting during wet seasons (usually spring or fall).		+		+	+	√	+	+	+		
Determine target composition and percent cover for vegetation based on site (pre-operational) analysis. Determine criteria for successful reclamation. For example, reclamation of vegetation may be acceptable if new growth includes similar species composition and the cover approximates a defined percentage of the pre-operations vegetative cover over a defined time period.		+		+	+	√	+	+	+		+







## SURFACE RECLAMATION - A PICTORIAL OVERVIEW

If the operator considers reclamation requirements from the very beginning of project planning, it will pay off during reclamation operations.

The reclamation goals of a project should be established during project planning, then a step-by-step procedure that will accomplish these goals should be designed and implemented. Throughout the planning and operational stages, the operator should consider what can be done to make any of the reclamation steps easier.



Prepare for reclamation from the beginning of the project. Drilling is not yet completed on this well, but the reclamation plan was set in motion before the rig ever reached the location. In this case, the goal for reclamation was to return the site to the natural conditions and processes that existed prior to disturbance.

To ensure successful reclamation of the site, an operator should:

- Consider site restoration requirements as part of the initial site selection. In this example, site selection included a fairly level upland site with little disruption of natural drainage, minimal cut/fill requirements, and vegetation clearing limited to grasses and shrubs.
- Take photos of the site prior to disturbance. Test representative soil samples for select metals (e.g., barium, lead), pH, oil & grease, conductivity, sodium absorption ratio, exchangeable sodium percent, and chlorides.
- Stockpile topsoil and larger rocks for use in site reclamation.
- Properly design and construct berms and liners to guard against contamination of the site. In a park, the mud system would have been a closed loop containerized mud system instead of earthen pits.



### Site Reclamation

- Remove all equipment and materials.
- Dewater pit contents (this would only apply to operations outside of a park).
- Conduct post-operations soil sampling and testing for comparison with pre-operational conditions.



- Restore the natural contours once the site is determined to be free of significant contamination.

- Spread the topsoil that was stockpiled over the site.







- Seed the site with native grasses and other vegetation.
- Operators can often optimize revegetation efforts by properly timing reseeding.
- Spreading mulch over the site is often an effective means of preventing erosion until plants take hold.



After seeding, the operator monitored and documented the progress of vegetative growth. This successful restoration did not happen by chance, but through careful planning and execution.



### Road Reclamation

Road reclamation follows the same steps as are shown in the previous example.



Replace the soil and distribute seed mixture. Note the small furrows perpendicular to the grade to help minimize erosion.



Restore the natural topographic contours.



Monitor and document the progress of the reclamation activities.



## CHAPTER 8 TRANSPARK PIPELINES

This chapter includes the following information:

- NPS permitting process checklist for transpark pipelines,
- NPS regulation of transpark pipelines,
- Rights-of-way for new oil and gas transpark pipelines in NPS units,
- National Park Service special use permits,
- Special Use Permit information requirements for transpark pipelines,
- Third party monitoring, and
- Other agencies responsible for regulating oil and gas pipelines.

### NPS PERMITTING PROCESS CHECKLIST FOR TRANSPARK PIPELINES

The following checklist outlines the permitting process for constructing, operating, and maintaining transpark pipelines in units of the NPS. This checklist can be used by a pipeline operator to prepare a Special Use Permit (SUP) for NPS review.

- ☐ Applicant contacts park regarding interest in constructing a pipeline through the park.
- ☐ Applicant provides written documentation demonstrating property right to conduct operations through the park.
- ☐ Applicant meets with park staff to scope proposed project (for more information, see Ch. 2).
- ☐ Applicant meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information, see Ch. 2).
- ☐ Applicant requests temporary access permit to gather information needed to complete the application for a special use permit (for more information, see Ch. 2).
- ☐ Applicant conducts necessary surveys, including natural and cultural surveys, as applicable and surveys / stakes the pipeline route (for more information, see Ch. 2).
- ☐ Applicant prepares special use permit application and submits it to the NPS.

The special use permit application for constructing and operating a transpark pipeline must include the following sections:

- ☐ I. Ownership and Contact Information
- ☐ II. Maps and Plats
- ☐ III. Timeline for Operations
- ☐ IV. Description of Operations
- ☐ V. Spill Control and Emergency Preparedness Plan
- ☐ VI. Reclamation Plan
- ☐ VII. Affidavits and Statements
- ☐ VIII. Other Applicable Permits
- ☐ IX. Environmental Information to Comply with NEPA and NHPA



## CHAPTER 8 – TRANSPARK PIPELINES

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- ☐ NPS performs a completeness and technical review of the SUP application (for more information, see Ch. 2).
- ☐ Applicant revises SUP application, if necessary.
- ☐ Applicant (or contractor hired by the applicant) prepares NEPA document, submits it to the NPS for approval to release for public review, and initiates mandated consultations with other agencies (for more information, see Ch. 2 and Appendix B).
- ☐ Park releases NEPA document for public review, completes public review process, finalizes decision documents, and notifies the applicant that the SUP has been approved, conditionally approved, or rejected.
- ☐ Applicant agrees to conditions of approval (if any), submits applicable state and federal permits, and files performance bond with the NPS.



## NPS REGULATION OF TRANSPARK PIPELINES

Construction, operation, and maintenance of transpark oil and gas pipelines and their associated rights-of-ways lie outside the scope of the 9B regulations. They are owned and operated by persons exercising rights not tied to the oil and gas ownership beneath the park. Generally, transpark pipelines begin and end outside the park, are associated with a right-of-way, and do not support 9B operations in the park.

Activities associated with transpark pipelines will be subject to special use permits as discussed in this chapter. Where pipeline operators accept delivery of oil or gas from a 9B operation via a gathering system, the line is either regulated by the 9B regulations or a special use permit, depending on who owns and operates the gathering system and/or who owns the product inside it. Generally, 9B operations end at the point of product sale, which is usually the same location as the change in pipeline system ownership. Thus, a transpark pipeline operation includes lines from the point of product sale to the main pipeline and includes the segment of pipeline from its entry and exit across park land. For more information on gathering lines and flowlines, see *Chapter 9 - Gathering Lines and Flowlines* in this handbook.

Transpark pipeline operators should note that if park system resources are damaged from pipeline operation in a park unit, the NPS can exercise its authority under the Park System Resource Protection Act (Public Law No. 101-337, 104 Stat. 379), codified as amended at 16 U.S.C. §§ 19jj through 19jj-4 (2000), to undertake all necessary actions to protect park system resources. Operators may be held liable to the United States for the government's response costs as well as for any damages to park system resources. For more information on an operator's liability, see *Chapter 12 – Liability of Operators, Their Contractors and Subcontractors*.

## RIGHTS-OF-WAY FOR NEW OIL AND GAS TRANSPARK PIPELINES IN NPS UNITS

The general NPS rights-of-way statute contained at 16 U.S.C. § 5 does not authorize the NPS to issue oil and gas pipeline rights-of-way across lands in the National Park System. Thus, the NPS may not issue rights-of-way under the regulations at 36 C.F.R. Part 14 in any NPS unit.

The enabling acts for a few NPS units give the NPS discretionary authority to issue rights-of-way for oil and gas pipelines. Prior to proposing a transpark pipeline through a NPS unit, the applicant must contact the park superintendent to determine if such authority exists in the park for a new rights-of-way.

In most parks there is no statutory authority for granting new rights-of-way for oil and gas pipelines. New pipelines may be constructed within existing rights-of-way in any park in conformance with the terms of the legal document creating the rights-of-way. When an entity seeks to construct a new pipeline carrying natural gas, it must first obtain a *certificate of public convenience and necessity* from the Federal Energy Regulatory Commission (FERC) (see 18 C.F.R. § 157.7).



### NATIONAL PARK SERVICE SPECIAL USE PERMITS

The NPS has regulatory authority to control activities within rights-of-way associated with transpark oil and gas pipelines in regulations at 36 C.F.R. Parts 1-5. To the extent that a proposed activity in a right-of-way triggers the general regulations, a Special Use Permit must be obtained from the NPS before the activity can proceed. Mowing and trimming vegetation, inspection or testing pipelines, removal of fluids from oil and gas pipelines and installing, shutting down or replacing pipelines, are common activities in pipeline rights-of-way requiring a NPS Special Use Permit (SUP). 36 C.F.R. § 5.3 *Business Activities* covers maintenance activities along a pipeline corridor. 36 C.F.R. § 5.7 *Construction of Buildings or Other Facilities* covers pipeline construction on NPS lands. The park superintendent has the approval authority for Special Use Permits (36 C.F.R. § 1.6).

Pursuant to NPS *Reference Manual 53: Special Park Uses*, which became effective in April 2000, Special Use Permits may only be issued if the proposed activity will not:

- cause injury or damage to park resources;
- be contrary to the purposes for which the park was established;
- unreasonably impair the atmosphere or peace and tranquility maintained in wilderness, natural, historic or commemorative locations within the park;
- unreasonably interfere with the interpretive visitor service or other program activities, or with the administrative activities of the NPS;
- substantially impair the operation of public facilities or services of NPS concessionaires or contractors;
- present a clear and present danger to public health and safety; or
- result in significant conflict with other existing uses.

If issued, the Special Use Permit must contain:

- an adequate performance bond, that will cover the cost of restoration, repair, rehabilitation and clean-up of the area; and
- any other terms and conditions that the park deems necessary to protect park resources or public safety (see 36 C.F.R. § 1.6(e)).

Performance bonds are the permittee's guarantee of compliance with permit conditions and reimbursement to the park for damage to resources and/or facilities as a result of the permittee's activities. In lieu of a surety bond, a permittee may elect to deposit U.S. bonds or notes, a certified or cashier's check, bank draft, money order, or cash equal to the amount of the required performance bond. A listing of bonding companies authorized to issue bonds to the United States may be found in U.S. Treasury Circular 570. Circular 570 is available on the web at: <http://www.fms.treas.gov/c570/c570.html>.

Pursuant to 16 U.S.C. § 3a, the NPS is authorized to "recover all costs of providing necessary services associated with special use permits...." Such costs include preparation of National Environmental Policy Act (NEPA) documentation, as well as other NPS costs incurred in managing, facilitating, or supporting the special park use (e.g., meetings, travel, and clerical work) from the time the inquiry is first received until the permit is signed and issued. Pursuant to 31 U.S.C. § 9701, the NPS may also charge permittees fees for the value of the benefits received by the permittee arising from the use of NPS lands and facilities.



In interpreting these statutes, the NPS has stated that it will not recover costs or charge fees when the requested special park use involves the exercise of a right pertaining to water, property, minerals, access, Native American religious practices, or the rights guaranteed by the First Amendment of the U.S. Constitution (see NPS Director's Order 53 at page C10-2).

Further cost recovery authority is found at Section 110(g) of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470h-2(g), which authorizes Federal agencies, including the NPS, to charge "reasonable costs" of the agencies' historic resource preservation responsibilities to federal licensees and permittees as a condition to the issuance of the license or permit. This statutory authority is supported by Department of the Interior guidance, case law, and secondary legal sources. The NPS retains the discretion to recover reasonable archeological resource mitigation costs from licensees or permittees, including those possessing property rights in the NPS unit.

The SUP permit will either be short-term (not to exceed 1 year) or long-term (not to exceed 5 years). If the SUP is issued as a long-term permit, the park will conduct an annual administrative and operational review to determine the continued appropriateness of the operation and to ensure that there is no impairment or derogation of park resources and values. Special Use Permits can be renewed if the specified use continues to meet the conditions of the permit. SUPs may be revoked upon the operator's violation of applicable law or any conditions in the permit.

## **SPECIAL USE PERMIT INFORMATION REQUIREMENTS FOR TRANSPARK PIPELINES**

Below is an explanatory list of information requirements that pipeline permittees need to include in a Special Use Permit application for a transpark pipeline. These information requirements have been adapted from the provisions outlined in NPS Reference Manual 53 (Chapter 6, Exhibit 1). The park will also use this information to evaluate the application and determine the appropriate environmental and cultural documents required under the National Environmental Policy Act (NEPA), the National Historic Preservation Act (NHPA), and other regulatory requirements.

An application for a Special Use Permit should be brief but complete. Maps, site plans and cross-sections must be provided where applicable.

The permittee will submit the application for a special use permit, prepare the NEPA documentation for NPS review, tender the performance bond, and be the responsible party for compliance with the special use permit.

### **I. OWNERSHIP AND CONTACT INFORMATION**

- A. Name(s), address(es), and phone number of:
  - 1. Pipeline company
- B. Name, address and telephone number of the permittee including:
  - 1. Person accountable for operations,



## **CHAPTER 8 – TRANSPARK PIPELINES**

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2. Field representative, and
  3. Contact person in case of spill or other emergency.
- C. Copy of the instrument(s) demonstrating the permittee's right to construct and operate a transpark pipeline within the rights-of-way (ROW).
1. Affidavit of ownership, and
  2. Documentation establishing the ROW.

### **II. MAPS AND PLATS**

The purpose of this section of a SUP application is to graphically show the permittee's area of proposed activities in relation to the park, and the locations of man-made or environmental hazards, park facilities, and visitor use areas that may affect the methods of operations.

- A. Provide map(s) showing the proposed pipeline route. Use 1:24,000 scale USGS quadrangle map(s) and show the following:
1. NPS park unit boundary;
  2. Locations of pipeline(s). Mark the entire area of surface disturbance on the map, including the dimensions of the pipeline(s);
  3. Locations of wells, or any other potential hazards within a one-mile radius of the proposed pipeline(s); and
  4. Locations of environmentally sensitive areas that might require avoidance or other mitigation measures.

### **III. TIMELINE FOR OPERATIONS**

The purpose of this section of a SUP application is to identify when the transpark pipeline operations will be conducted and how long they are expected to last. Any proposals to modify construction operations due to seasonal timing restrictions should also be noted in this section.

- A. Provide an estimated timeline for the proposed pipeline, including the following information (as applicable):
1. Estimated date to begin equipment transportation to the staging area,
  2. Estimated date to begin construction of the pipeline,
  3. Anticipated longevity of pipeline operations,
  4. Estimated date when reclamation will begin, and
  5. Estimated time to complete reclamation.

### **IV. DESCRIPTION OF OPERATIONS**

The description of operations should provide enough detail on the proposed methods, sequence, and equipment to assess the proposal's affects on the environment. Thus the amount of information in this section of a SUP application will vary depending on both the planned activities and the environment where they will be conducted. Address the following



requirements as applicable, providing enough detail for the NPS to have a clear understanding of the proposal.

- A. Methods, sequence of work, and all equipment to be used in pipeline construction, operation, and maintenance:
  1. Specific location and dimensions of the proposal (written description; engineering drawings; site plan; pre-disturbance and post-disturbance cross-sections; photos; and other descriptive information).
  2. Description of construction and operation of the pipeline:
    - a. list all major equipment / structures to be constructed;
    - b. type and size of equipment, frequency of use;
    - c. size, type, length, depth, of pipeline(s);
    - d. inspection and testing procedures and frequency;
    - e. type of product to be transported in the pipeline (e.g., oil, gas);
    - f. maximum and mean flow rate of product;
    - g. maximum and mean operating pressure;
    - h. cathodic protection methods; and
    - i. "pig" launching/retrieving station(s).
  3. Description of routine and periodic maintenance activities (testing, cleaning, mowing, trimming etc.):
    - a. frequency,
    - b. mode and location of access,
    - c. types of equipment to be used, and
    - d. vegetation management along line routes (e.g., mowing, trimming etc.).
- B. Description of all actions to control, minimize, or prevent damage to the recreational, biological, scientific, cultural, and scenic resources of the park. These include those mitigation measures (methods and equipment) that the permittee and NPS identified during project scoping and the onsite meeting to improve operations with respect to park resources and visitor safety as well as any other measures developed by the permittee during the preparation of their SUP application. This also includes all actions to be taken to comply with regulatory operating standards and state and federal permit requirements, as applicable.
- C. Description of all security measures that will be used to ensure public health and safety.

## V. SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

The NPS has combined informational requirements and operating standards from the 9B regulations to develop the format for a Spill Control and Emergency Preparedness Plan. This plan covers the substances or site conditions that pose risks to human health and safety and the environment. It also describes the actions the operator would take to minimize these risks in the event of a spill or natural disaster (e.g., flood, fire, hurricane, or tornado). See *Chapter 11 – Spill Control and Emergency Preparedness Plan* in the Operator's Handbook for the organization and content of a Spill Control and Emergency Preparedness Plan.



A Spill Control Emergency Preparedness Plan should describe all actions, equipment, procedures, training, etc. to control and effectively respond to releases of contaminating substances (oil, gas, or any other toxic or hazardous substance) to ensure protection of park resources and human health and safety.

### VI. RECLAMATION PLAN

#### A. Reclamation Goals

1. Summarize the site-specific reclamation goals developed during project scoping. Site-specific goals might include a desired percent of vegetative ground cover, plant species, soil stabilization, rutting repair, etc.
2. State the timeframes for reclamation. Describe when the reclamation activities would begin, how long they would last, and the schedule for monitoring the results of the reclamation.

#### B. Reclamation Procedures

The following steps need to be completed at a minimum to reclaim the operations site. The permittee can describe the methods and equipment that will be used to accomplish each of these steps.

1. Remove pipeline(s) or abandon pipeline in-place (this is up to discretion of the park superintendent) and fill in any excavations.
2. Remove all above ground structures, equipment, and roads.
3. Remove all other man-made debris that resulted from operations.
4. Remove or neutralize contaminating substances. For this step, the permittee is responsible for removing soils or any other material that becomes contaminated. If there is reason to suspect soils or groundwater have been contaminated, the permittee will likely need to collect and test samples to verify that contaminating substances have been removed or neutralized. For information on NPS sampling protocols, see *Appendix D – Guideline for the Detection and Quantification of Contamination as Oil and Gas Operations*. Neutralization or removal of contamination means that contaminant concentrations will be reduced in soils (or groundwater) to a condition that will not adversely affect, injure, or damage federally-owned or controlled lands and waters, provides for the safe movement of native wildlife, and which does not jeopardize visitor health and safety.
5. Restore the natural contour of the land.
6. Place and prepare the natural soils needed for vegetation.
7. Re-establish native vegetative communities (describe seed mix and rates of application, exotic species control methods, water control or diversion structures, and erosion control measures). In addition to the revegetation procedure, this section should include the steps for monitoring progress of the reclamation effort.

#### C. Cost Estimate

Include a cost estimate for removing pipelines(s) and reclaiming the area to conform with the natural topography and vegetation types native to the area of operations.



**VII. AFFIDAVITS AND STATEMENTS**

- A. Include an “Affidavit of Compliance” signed by an authorized official of the company. The affidavit should state that the proposed operations are in compliance with all applicable federal, state and local laws and regulations.
- B. Include a statement that the applicant is fully accountable for all contractor and subcontractor compliance with the requirements of the approved special use permit.
- C. Include a statement that the superintendent, or his/her representative, shall have reasonable access to the site as is necessary to monitor and ensure compliance with the special use permit.

**VIII. OTHER APPLICABLE PERMITS**

At the superintendent’s request, operators will need to provide the NPS with a copy of all applicable federal, state, and local permits. If the permits are still pending, operators may submit a copy of the application for such permits.

**IX. ENVIRONMENTAL INFORMATION TO COMPLY WITH NEPA AND NHPA**

Compliance with the National Environmental Policy Act and the National Historic Preservation Act is the responsibility of the applicant for the special use permit. The content and format of the NEPA document must comply with NPS Director’s Order 12 and Handbook (Conservation Planning, Environmental Impact Analysis, and Decision Making). For more information on NEPA compliance see *Appendix B, Part B*.

**THIRD PARTY MONITORING**

Depending on the geographic extent of a transpark pipeline, the NPS may require a permittee to hire a third party monitor to oversee pipeline construction. The purpose of third party monitoring is to ensure compliance with the terms of the approved special use permit and protection of park resources and values. The NPS may develop stipulations that specify conditions of the third party monitoring. Examples of additional stipulations include, but are not limited to:

- The NPS must approve the selection of the monitor and the terms of the permittee’s contract with the third party monitor;
- The third party monitor would be paid by the permittee;
- The contract must include a provision requiring the monitor to report directly to the NPS, and not to the company, and identify the frequency of reports (daily, weekly, monthly); and
- The NPS may suspend the special use permit if the quality of the monitoring performed is unsatisfactory to the NPS.



## **OTHER AGENCIES RESPONSIBLE FOR REGULATING OIL AND GAS PIPELINES**

### **U.S. DEPARTMENT OF TRANSPORTATION (DOT)**

The federal Department of Transportation is responsible for safety and environmental protection for pipelines. This agency regulates the design, construction, operation, maintenance, and emergency response pertaining to both oil and gas pipelines under the Pipeline Safety Act of 1992. The act covers both interstate and intrastate pipelines.

- The DOT regulations cover testing, reporting, inspection, maintenance, corrosion control, and spill contingency plans of these pipelines. State regulations often mirror the federal requirements that govern intrastate pipelines.
- Regulations at 49 C.F.R. Parts 191 and 192 govern gas. Regulations at 49 C.F.R. Part 195 govern oil. Under the regulations oil is considered a hazardous liquid.
- The regulations contain a number of exceptions, including grandfathering. The regulations do not cover flowlines.
- The DOT has jurisdiction over the operation and maintenance of pipelines.
- Both criminal and civil penalties can be invoked under these regulations.

### **FEDERAL ENERGY REGULATORY COMMISSION (FERC)**

The Federal Energy Regulatory Commission is responsible for establishing just and reasonable pricing for moving both natural gas and oil through pipelines in interstate commerce throughout the country. FERC has no jurisdiction over the construction of oil pipelines but does play a substantive role in granting permission for building new pipelines that carry gas. Under the Natural Gas Act of 1938, FERC must issue a company a certificate of public conveyance and necessity before the company can construct an interstate gas pipeline (see 18 C.F.R. § 157.7). Essentially, FERC determines “where” new gas pipelines can be built while DOT regulates the “hows” from a public safety and resource protection perspective. FERC does not oversee the construction of oil and gas pipelines or regulate the supply and price of oil or oil products. In addition to authorizing the siting of natural gas lines, FERC also is responsible for establishing just and reasonable pricing rates for moving both natural gas and oil through pipelines in interstate commerce throughout the country.

### **STATE AGENCIES**

State agencies (e.g., Railroad Commission of Texas) are responsible for the regulation of intrastate pipelines if they have been approved by the DOT. States can impose more rigorous requirements on intrastate pipelines than are required under federal law. The operator must check with the requirements in the state where the operation is occurring for specific information on these requirements.



## **CHAPTER 9**

### **36 C.F.R. 9B FLOWLINES AND GATHERING LINES**

This chapter includes the following information:

- NPS regulation of existing flowlines and gathering lines,
- NPS regulation of new flowlines and gathering lines, and
- NPS permitting process checklist for flowlines and gathering lines.

#### **NPS REGULATION OF EXISTING FLOWLINES AND GATHERING LINES**

An approved plan of operations is not required for an existing flowline or gathering line that transports nonfederal oil and gas on, across, or through a NPS unit provided the operation meets all criteria for an existing operation pursuant to 36 C.F.R. § 9.33 (for more information, see *Chapter 6 – Existing Oil and Gas Production Operations*).

However, an operator authorized to conduct operations pursuant to this exemption will lose its exempt status and will be subject to the requirement to have an approved plan of operations and must also comply with other 9B requirements, if one of the following occurs:

- The operator proposes any construction, alteration, modification, or change in pipeline (flowline and gathering lines) requiring the issuance of a new state or federal permit;
- The operator proposes any construction, alteration, modification, maintenance, or change in pipeline (flowline and gathering lines) requiring the use or occupancy of additional federally controlled lands or waters; or
- The operator transfers the interest in the pipeline to a new owner/operator.

Note that the superintendent has the authority to suspend any existing operation, including the transport of oil and gas via flowlines and gathering lines if the operation poses an immediate threat of significant injury to federally owned or controlled lands or waters pursuant to 36 C.F.R. 9.33(c).

#### **NPS REGULATION OF NEW FLOWLINES AND GATHERING LINES**

The 9B regulations govern all operations within a NPS unit in connection with nonfederally owned oil and gas. The regulations at 36 C.F.R. § 9.31(c) define operations to include “construction or use of ...pipelines” to transport nonfederal oil and gas. Thus, operators proposing to construct a flowline or gathering line in connection with nonfederal oil and gas within a unit, or on a pipeline rights-of-way that predates the unit, must obtain NPS approval of a plan of operations prior to such construction providing the proposed pipeline is on, across or through federally owned or controlled lands or waters in the unit. If a nonfederal oil and gas operation in a park connects to a transpark pipeline via a flowline or a gathering line then that portion of the flowline or gathering crossing the park, up to the point of product sale and change



in pipeline system ownership, is subject to the 9B regulations, including the plan of operations requirement.

New flowlines and gathering lines that are proposed in connection with a nonfederal oil and gas operation, (oil and gas in a pipeline prior to the point of sale of the oil and gas) must be under a plan of operations. Typically, the installation, operation, and maintenance of these lines are covered in an operator's plan of operations for the production phase of the oil and gas operation. Operations that have lost their exempt status under 36 C.F.R. § 9.33 must also be under a plan of operations that includes the flowlines and gathering lines associated with the operation.

### **NPS PERMITTING PROCESS CHECKLIST FOR FLOWLINES AND GATHERING LINES**

The transport of oil and gas associated with a nonfederal operation must be included in the plan of operation that covers the proposed production phase of the operation. The information requirements would be the same as are presented in Chapter 4 – Drilling and Production Operations. The major steps in completing a plan of operations for flowlines and gathering lines would include the following:

- ☐ Operator contacts park regarding interest in conducting oil and gas operations (for more information, see Ch. 2).
- ☐ Operator provides written documentation demonstrating right to conduct operations in the park (for more information, see Ch. 2).
- ☐ Operator meets with park staff to scope proposed project (for more information, see Ch. 2).
- ☐ Operator meets with affected federal, state, and local agencies to identify resource issues, permitting requirements, and impact mitigation strategies (for more information, see Ch. 2).
- ☐ Operator requests temporary access permit to gather information needed to complete the plan of operations (for more information, see Ch. 2).
- ☐ Operator conducts necessary surveys, including natural and cultural surveys, as applicable and surveys / stakes the operations area (for more information, see Ch. 2).
- ☐ Operator prepares the plan of operations and submits the draft plan to the National Park Service (for more information, see Ch. 4).
- ☐ The Plan of Operations for flowlines and gathering lines must include the following sections:
  - ☐ I. Lease and Ownership Information
  - ☐ II. Maps and Plats
  - ☐ III. Timeline for Operations
  - ☐ IV. Description of Operations
  - ☐ V. Spill Control and Emergency Preparedness Plan
  - ☐ VI. Reclamation Plan
  - ☐ VII. Affidavits and Statements
  - ☐ VIII. Other Applicable Permits
  - ☐ IX. Background Environmental Information
  - ☐ X. Relationship to Park Planning Documents
- ☐ NPS performs a completeness and technical review of the plan of operations (for more information, see Ch. 2).
- ☐ Operator revises plan of operations, if necessary (for more information, see Ch. 2).



- ☐ Park staff prepares NEPA document (or adopts operator's or consultant prepared NEPA document), incorporates other environmental compliance, and initiates mandated consultations with other agencies (for more information, see Ch. 2 and Appendix B).
- ☐ Park completes public review process, finalizes decision documents, and notifies the operator that the plan has been approved, conditionally approved, or rejected.
- ☐ Operator agrees to conditions of approval (if any), submits applicable state and federal permits, and files performance bond with the NPS (for more information, see Ch. 10).







## **CHAPTER 10 PERFORMANCE BONDS**

### **PERFORMANCE BOND REQUIREMENT**

The National Park Service's 9B regulations require that an operator file a performance bond for all types of nonfederal oil and gas operations and all phases of the operation(s). The bond is in addition to any other bonds the operator may have to provide to the state or other federal agencies. A performance bond is a measure of insurance (currently up to \$200,000) for the NPS so that the operator will comply with the terms and conditions of the approved plan. The bond amount is not, however, the limit of liability for damage to park resources. Under the 9B regulations the operator is responsible for all damages to park resources for failure to comply with the approved plan of operations; temporary approval permit; or where existing operations are allowed to continue, failure to comply with the applicable permit. Depending upon the type of damage, an operator may also be held liable under other statutes including the Park System Resource Protection Act, 16 (U.S.C. § 19jj), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Oil Pollution Act (OPA). For additional information on these laws, see *Appendix B, Part A - Federal Laws, Regulations, and Policies That May Be Applicable to Nonfederal Oil and Gas Operations in NPS Units*.

Either the NPS or the operator can petition to amend the amount of the performance bond. The regional director of the NPS is responsible for determining the proper bond amount. Below is some key information regarding performance bonds, including: the types of performance bonds that are acceptable to the NPS, basic information that should be included in the bond, and how the regional director will determine an appropriate bond amount for a particular operation.

### **ACCEPTABLE TYPES OF SECURITIES**

- Corporate Surety Bond (most common type of surety used),
- Irrevocable Letter of Credit,
- Cash,
- Cashier's Check,
- Certified Check,
- U.S. Postal Money Order,
- U.S. Treasury Bond,
- U.S. Treasury Bill, or
- U.S. Treasury Note.



## REQUIREMENTS FOR CORPORATE SURETY BONDS AND IRREVOCABLE LETTERS OF CREDIT

### CORPORATE SURETY BONDS

Corporate surety bonds must:

- be issued by an acceptable surety company,
- be in an acceptable bond format,
- adequately cover the total bond amount,
- include authorized signatures, and
- be issued by a surety company that consents to liability and waives notice for revisions, amendments, or other modifications to the plan of operations covered by the bond.

A sample *Form for a Performance Bond* is included at the end of this chapter.

### CRITERIA FOR ACCEPTABLE SURETY COMPANIES

Surety companies must:

- be listed in the most recent Department of the Treasury Circular 570 (circular lists companies holding certificates of authority as acceptable sureties on bonds payable to the federal government). Circular 570 is available on the web at: <http://www.fms.treas.gov/c570/c570.html>,
- be licensed to transact business in the state in which the company or its agent executes the bond. (license information is in Circular 570),
- appoint an agent to accept federal service of process on behalf of the company in the federal judicial district where the principal resides, where the obligation is to be performed, and in Washington D.C. (process agent information is included in Circular 570), and
- have an underwriting limitation sufficient to cover the penal sum of the bond, or furnish a coinsurance or reinsurance agreement with another company identified in Circular 570.

### IRREVOCABLE LETTER OF CREDIT

An irrevocable letter of credit must:

- be issued by a bank that is a member of the Federal Reserve System, or insured by the FDIC,
- include one and only one letter of credit number,
- carry a Standard and Poors “A” rating,
- be clearly irrevocable,
- include the name of the principal,
- state the maximum limit of credit extended,
- include a credit limit that equals or exceeds bond amount,



- include an authorization to draw sight drafts upon the issuing institution in favor the National Park Service,
- clearly state that the letter of credit number appearing on a sight draft is sufficient for honoring that sight draft, and
- include an expiration date for presentation of drafts for payment.

A sample *Model Letter of Credit* that can be used by an operator is included at the end of this chapter.

## **BOND AMOUNTS AND LIMITATIONS**

The regional director is responsible for determining the proper amount of the operator's performance bond. The operator's bond amount is determined as follows:

**estimated cost of reclamation + liability amount = total bond amount**

### **COST OF RECLAMATION**

The cost of reclamation includes the following:

- plugging the well(s) (if applicable),
- removing all equipment and debris,
- restoring topographic grade,
- replacing topsoil,
- vegetation planting/seeding,
- exotic species control, and
- monitoring the success of the reclamation.

### **LIABILITY AMOUNT**

The liability amount includes the following:

- potential amount of oil that may be spilled, in a worse case scenario, and the estimated cost to contain and clean up such a spill and restore damaged resources;
- potential amount of hazardous substances and waste that may be spilled, in a worst case scenario, and the estimated cost to contain and clean up such a spill and restore damaged resources;
- potential extent of damage to park resources resulting from a fire, and the cost to contain and extinguish a fire and restore damaged resources; and
- potential for release of harmful or toxic gas, and the cost to secure the area and restore damaged resources.



## REGULATORY LIMITATIONS ON TOTAL BOND AMOUNTS

### LIABILITY CAP

- \$5,000 for a single party geophysical operation;
- \$25,000 for a multiple party geophysical operation (e.g., most 3D seismic operations); or
- \$50,000 for each exploratory well, production, or pipeline operation.

### CAP ON TOTAL BOND AMOUNT

- For a single operation or multiple operations the total bond amount may not exceed \$200,000.
- For a production operation, the maximum the NPS could require is \$200,000 (\$150,000 for reclamation + \$50,000 for liability).
- If one operator is conducting multiple operations in a single park, the total bond amount the NPS can require of the operator for **all** of its operations is \$200,000.
- Bonds are for each specific park, and are not for a NPS system-wide or government blanket bond.

## GETTING A PERFORMANCE BOND RELEASED

### TRANSFER OF OPERATIONS

If an operator transfers a production operation to another operator, the transferring operator remains liable under the bond until the superintendent is given notice of the transfer (within 60 days of the transfer) and the superintendent determines that the transferring operator is in compliance with plan of operations at the time of the transfer.

*A Model Form for a Performance Bond and Model Letter of Credit* are shown on the next page to assist operators in securing a performance bond for their operation(s).



## MODEL FORM FOR A PERFORMANCE BOND (CORPORATE SURETY BOND)

### PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WE,                     (operator)                    , as Principal, and                     (surety)                    , a corporation duly incorporated under the laws of the State of                     (state)                    , and authorized to do business in the State of                     (state in which park is located)                    , as Surety, are held and firmly bound unto the U.S. Department of the Interior, National Park Service ("NPS"), Director,                     (NPS region)                     Region ("regional director") in the sum of                     (spell out dollar amount)                     (\$000,000.00) for the payment of which we hereby bind ourselves, our heirs, executors and administrators, jointly and severally by these presents.

THE CONDITIONS OF THIS BOND ARE SUCH that the Principal has submitted to the NPS a plan of operations to conduct                     (type of operation)                     in                     (park name)                    ,                     (state)                    , in accordance with the requirements of 36 C.F.R. Part 9, Subpart B. Upon NPS approval of the plan of operations, the Principal shall faithfully comply with all terms and conditions of the plan, or any revision, amendments, or modifications thereto [hereinafter "approved plan of operations"], including all applicable federal, state, and local laws. The Principal and Surety shall be held jointly and severally liable for any and all damages to federally owned or controlled lands, waters, or resources resulting from the Principal's failure to comply with the terms and conditions of the approved plan of operations. If, at any time during operations, reasonable efforts to secure the Principal's compliance with any provision of the approved plan of operations fail, the regional director may attach any or all of the bond amount necessary to remediate or reclaim federally owned or controlled lands, waters, or resources damaged by the Principal's failure to comply with the terms and conditions of the approved plan of operations. The regional director may also require that the Surety perform reclamation in accordance with the approved plan of operations. Surety hereby waives notice for revisions, amendments or other modifications to the approved plan of operations covered by the bond. The Principal and Surety agree to hold the United States and its departments, agencies, and employees harmless from any damages or liabilities incurred by reason of his/her engaging in said business.

NOW, THEREFORE, notwithstanding any other provision of law or regulations, until such time as the regional director has notified the Principal that it has successfully reclaimed the area of operations and has performed all other duties and responsibilities as described in the approved plan of operations, for a                     (type of operation)                     at                     (park name)                     in,                     (state)                     according to the requirements of 36 C.F.R. Part 9, Subpart B, and has protected the United States and its departments, agencies, and employees from any damage or liability claim as herein before stated, this obligation shall remain in full force and effect.

This bond may be terminated as to future acts of the Principal upon written notice by the Surety. Written notice shall be given at least sixty (60) days prior to termination. Said notice shall be sent to superintendent, Attention:                     (full name and address of resource manager in charge of park's nonfederal oil and gas operations)                     by certified mail.



## CHAPTER 10 - PERFORMANCE BONDS

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This agreement supplements, and is not in lieu of, the terms, conditions, duties and responsibilities contained in 36 C.F.R. Part 9, Subpart B, or in any other federal, state, or local law or regulation. This agreement shall not limit any claims or causes of action against the Principal or Surety otherwise available to the United States under any other federal law or regulation to protect, reclaim, or remediate federally owned or controlled lands, waters, or resources in           (park name)          ,           (state)          . This bond becomes effective on the     day of                     , 20   , and is continuous in nature until terminated.

SIGNED:

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Principal

Date

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Surety

Date



## MODEL LETTER OF CREDIT

**NOTE:** This letter is optional. Operators may elect to convey its interest to undertake nonfederal oil and gas operations in the park to the park's nonfederal oil and gas program contact by telephone. However, the park's receipt of a copy of the operator's legal instrument is required to begin the 36 C.F.R. 9B permitting process.

To: United States Department of the Interior  
National Park Service  
(insert name of park)  
(insert mailing address for park)

### IRREVOCABLE LETTER OF CREDIT

Issuing Financial Institution: (insert name)  
Telephone No: (insert 10-digit number)  
Address: (insert full mailing address)  
O&G Lease No. (insert name and any assigned name/title)  
Date Issued: (insert date)  
Letter of Credit No. (insert number)  
Amount: (insert dollar amount)

On behalf of (insert name of operator and full mailing address), as Obligor, we (insert name of issuing financial institution) hereby establish an irrevocable Letter of Credit (LOC) in favor of the United States Department of the Interior, National Park Service, (insert name of park) (NPS) and agree to immediately pay upon demand by and to the NPS the full amount of (spell-out dollar amount) (\$000,000.00) upon receipt of written demand by the NPS.

This LOC is effective the date issued and will expire exactly one year from the date issued. In the absence of a notice from the bank to the NPS at least 30 days prior to the stated or any extended expiration date not to renew the LOC, the LOC will be automatically renewed in full force and effect for an additional one year period.

Upon receipt by the NPS of a non-renewal notice from us, the NPS may draw on us by sight draft identified by Letter of Credit No. (insert number) for up to the amount of this LOC, prior to the expiration thereof, provided that such draft is accompanied by a statement signed by the Regional Director of the (insert name of NPS region) Region or his designee to the effect that no satisfactory replacement bond has been provided by the Obligor. It is also understood that, at any time this LOC is in effect the NPS may draw on us by sight draft identified by Letter of Credit No. (insert number) for any amount, up to the full amount, to cover any default by Obligor with respect to its obligations under the Plan of Operations for the above referenced lease. Such drawings shall be accompanied by a statement signed by the Regional Director of the (insert name of NPS region) Region or his designee to the effect that the obligor has been determined to be in default and the amount drawn represents the reasonable amount as determined by NPS of such default.



## CHAPTER 10 - PERFORMANCE BONDS

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It shall not be required for the NPS in order to draw on this LOC to furnish the original letter; however, it is understood as a condition of any payment thereunder that the face amount of the letter shall automatically be reduced by any payment made by the bank and that the NPS will promptly surrender the original letter when and if the bank shall tender to the NPS the full amount of funds represented by this letter; such surrender to occur as soon as reasonably practical after full payment is made. The original letter shall also be surrendered promptly following its expiration provided that no drawing on such letter was made prior to such expiration.

We assure that the amount of credit herein established will not be reduced for any reason during the effectiveness of this letter without the prior written approval of the NPS.

Letter of Credit No. (insert number)

We certify that the deposits of this bank are Federally Insured by the Federal Deposit Insurance Corporation and that this bank is a member of the Federal Reserve System.

(insert name of issuing financial institution)

by:

---

Vice President

ATTEST:

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Senior Vice President



## **CHAPTER 11**

# **SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN**

Based on authority in several sections of the 9B regulations, the NPS requires operators to submit a Spill Control and Emergency Preparedness Plan with the plan of operations.<sup>19</sup>

The NPS asks operators to answer the following questions in the Spill Control and Emergency Preparedness Plan:

1. What substances or conditions are present on the location or may be encountered during operations that pose risks to human health and safety or the environment?
2. How does the operator plan to manage such substances or conditions to minimize the risks to human health and safety and the environment?
3. What actions will the operator take should an emergency or spill event occur?

In developing a Spill Control and Emergency Preparedness Plan, operators should obtain copies of park emergency response plans (e.g., hurricane preparedness plans, fire management plans) that are relevant to the proposed operations. Applicable emergency response procedures from the park's plans must be incorporated into the proposed plan of operations and Spill Control and Emergency Preparedness Plan.

## **SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN ELEMENTS**

The Spill Control and Emergency Preparedness Plan should follow the format described below. An example Spill Control and Emergency Preparedness Plan is included at the end of this chapter.

Sections A and B should answer the first question: What substances or conditions are present on location or may be encountered during operations that pose risks to human health and safety or the environment?

### **SECTION A – IDENTIFICATION OF CONTAMINATING OR TOXIC SUBSTANCES USED ON SITE OR EXPECTED TO BE ENCOUNTERED DURING OPERATIONS**

Identify substances on the location or expected to be encountered during operations, which if released, pose a threat to human health and safety or the surrounding environment.

This information is best presented by using a table that lists all of the fuels, chemicals, materials, and additives to be used or encountered during the conduct of operations. The table should list the product name, its hazardous content, and its hazardous effect (e.g., flammable, corrosive, irritant, etc.). Most materials and chemicals have Material Safety Data Sheets (MSDS) that can be provided by the suppliers. The MSDS will identify the product's hazardous ingredients, physical/chemical properties, fire and explosion hazards, reactivity, health effects

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<sup>19</sup> See 36 C.F.R. §§ 9.36(a)(10)(vi), 9.36(a)(14), § 9.36(a)(18), 9.36(d), 9.39(a)(1)(i), 9.39(a)(1)(ii), 9.39(a)(2)(iii), 9.41(e), 9.41(f), 9.43, 9.44, 9.45, and 9.46.



and first aid procedures, environmental concerns, and necessary protective control measures. The operator should attach a MSDS for each item listed in the table. Table 11.1 is an example of the type of information that should be included in the Spill Control and Emergency Preparedness Plan.

### **SECTION B – IDENTIFICATION OF ABNORMAL PRESSURE, TEMPERATURE, OR OTHER HAZARDOUS CONDITIONS ON SITE OR EXPECTED TO BE ENCOUNTERED DURING OPERATIONS**

Identify pressure or temperature conditions that will require special precautions to ensure protection of human health and safety and the environment.

This section normally applies to drilling operations, but may also be a factor for naturally flowing wells, heated process systems, or gas compression operations.

For drilling operations, the operator would identify any overpressured or lost circulation zones that may be encountered while drilling. The operator would then describe measures that will be taken to control formation pressure or lost circulation.

The operator should also note any production processes that involve very high pressures or temperatures.

In addition to hazardous conditions that may emanate from the conduct of operations, this section also needs to identify hazards external to operations that could reasonably be expected to occur over the life of the project. For example, a drilling operation conducted in a hurricane zone during hurricane season would need to identify hurricanes as an expected hazardous condition. This section needs to include those hazardous conditions identified in the park's Emergency Response Plans or otherwise known to exist in the area of operations.

### **SECTION C – MANAGEMENT MEASURES TO MINIMIZE THE RISKS TO HUMAN HEALTH AND SAFETY AND THE ENVIRONMENT**

Section C should answer the second question: How does the operator plan to manage such substances or conditions to minimize the risks to human health and safety and the environment?

The operator should describe:

- The direction, rate of flow, and total quantity of oil, brine, or drilling mud which could be discharged as a result of each major type of failure (e.g., tank failure, flowline failure, loss of well control),
- Design and use of secondary containment (e.g., berms, dikes, ring levees, liners, drip pans, curbing),
- Sumps and collection systems,
- Facility drainage and practices for inspecting, and then discharging, recycling, or disposing of stormwater,
- Frequency of flowline, tank, equipment, and general site inspections by personnel,



- Chemicals and other additives handling and storage practices,
- Fuel and/or crude oil storage and transfer operations,
- Any automatic sensing, alarm, or automatic control systems (including automatic surface or subsurface shut-in valves for flowing wells),
- Personnel training and spill prevention procedures,
- Site security (e.g., fencing, gates, security guards or other personnel), and
- When applicable, special equipment, facility design, or day-to-day measures that serve to mitigate the potential for spills or accidents that might occur due to external hazards such as hurricanes, electrical storms, floods, fires, etc.

In Section C, the operator should also describe practices for managing wastes.

Section 9.45 of the 9B regulations, Handling of Wastes provides the standard for handling wastes:

“Oilfield brine, and all other waste and contaminating substances must be kept in the smallest practicable area, must be confined so as to prevent escape as a result of percolation, rain, high water or other causes, and such wastes must be stored and disposed of or removed from the area as quickly as practicable in such a manner as to prevent contamination, pollution, damage or injury to the lands, water (surface and subsurface), facilities, cultural resources, wildlife, and vegetation or visitors of the unit.”

Although § 9.45 was written to apply to waste, the same standards apply to handling oil, drilling muds and cuttings, produced fluids, and chemicals, or other substances described in Section A. The example Spill Control and Emergency Preparedness Plan in this chapter illustrates a good way to present this information.

Readily available emergency and spill response equipment reduces the risks to human health and safety and the environment. This section should include a description of personnel, equipment, and materials needed to quickly control and remove spills. The response equipment and materials should be categorized by what will be maintained;

- At the operation's site,
- On the pumper's (or other personnel's) vehicle, and
- Off-site.

The NPS does not require emergency response equipment to be maintained on location if the threat of a spill is low, secondary containment is adequate, the pumper's vehicle carries a spill kit capable of handling small incidents, and the emergency response times for larger incidents are reasonable.

The steps that an operator might take to minimize risks of high pressure or temperature include use of properly designed equipment and good operating / maintenance practices, and use of site security measures such as warning signs, fences, and locked gates. Fencing is required where wells and associated facilities are in areas frequented by visitors or wildlife (36 C.F.R. § 9.41(e)).



## CHAPTER 11 - SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

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Tables 4.1 and 4.2 in Chapter 4 list operating stipulations and recommended mitigation measures that can also be used to design drilling and production operations that adequately considers spill prevention and control.

Section D and E answer the last question: What actions will the operator take should an undesirable event occur? In other words, what is the operator's contingency plan for spills, releases, fires, or other undesirable events?

### SECTION D – CONTINGENCY ACTIONS FOR SPILLS

In this section the operator outlines the contingency actions that would be taken in consultation with the park in the event of a release of contaminating or toxic substances. Operators need to make sure that their emergency response actions do not conflict with NPS emergency response procedures. Although contingency actions may vary based on individual company policies, operators need to outline detailed procedures to:

1. Control the source,
2. Secure the site (if necessary),
3. Contain the release (include steps to be taken and list onsite containment equipment such as booms, sandbags, etc.),
4. Clean up the release of contaminating or toxic substances (include steps to be taken and list clean-up equipment such as simmers, heavy equipment, vacuum trucks, etc.), and
5. Report the incident.

**Note:** Even though the verbal report of a spill event is listed as number 5, the operator should call the superintendent at the earliest practical time. The operator must also notify the National Response Center to obtain a case number for the incident and identify the state and local reporting requirements, if applicable.

### Spill Reporting

State and federal regulations require formal notification for certain types of spill or release events. This section of the Spill Control and Emergency Preparedness Plan should list the reporting requirements that apply to the facilities covered in the plan of operations. In addition to the reporting requirements of other federal, state, or local authorities, operators in units of the National Park System are required to report spill incidents to the park superintendent or the designated park official. The following statement needs to be included in this section of the plan:

"For all releases to the ground of contaminating or toxic substances, [operator] will promptly report the following initial information to [park superintendent]: the time the spill was discovered; the type of product released; the location; estimated spill volume; cause of spill; area covered; estimated rate of release if spill is ongoing; direction of oil movement; description of 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. For releases in excess of five barrels in the aggregate, [operator] will provide a written report to [park superintendent] within 10 working days of the incident. In addition to the information reported in the initial notification, the written report will include steps that will be or have been taken to prevent recurrence of the incident."



## **Emergency Response**

Emergency response to spill events will focus on the safety of company personnel and the public as a first priority and then spill control and containment of the release. Once the spill is controlled and the safety of personnel and the public is ensured, the emergency response shifts to containment and minimization of environmental impacts. Cleanup and repair work are typically performed as projects and not as an emergency response. The National Park Service's role during the initial emergency phase is to receive notification from the operator, evaluate information, and lend appropriate assistance.

When the spill response shifts to containment, the NPS role changes to one of active review and approval. In the case of a spill, the intent of the NPS is to minimize the area affected by the release. At the same time, containment efforts should not cause more environmental damage than the spill itself. Therefore, immediate involvement of the NPS in the containment decision-making process is critical if the spilled contaminants have or threaten to move beyond the operation's area.

To clarify the NPS role in emergency response actions, the operator should include the following statement in the Spill Control and Emergency Preparedness Plan:

"[Operator] will consult with the [park superintendent] and obtain the [park superintendent's] consent prior to performing ground and vegetative disturbing activities outside of the approved area of operations."

## **Clean up and Removal of Contaminating or Toxic Substances**

For spills that are contained within the approved area of operations, the NPS does not expect initial clean up to meet the same standards that will eventually apply to reclamation of the site. 36 C.F.R. § 9.45, Handling of Waste sets the standard for clean up and removal of the spills within the approved area of operations.

The clean up standards based on Section 9.45, Handling of Waste are summarized below:

- The spilled materials must be kept in the smallest practical area. This means mixing of contaminated soils with clean soils to achieve lower contaminant concentrations is not an option.
- The spilled materials must be confined to prevent migration of contaminants via percolation, rain, high water, or other means.
- The spilled materials (as well as soils or water contaminated by them) that cannot be recycled to the operations processes are a waste and must be stored and disposed of or removed from the area as quickly as practicable.
- The clean up and removal of contaminants may not cause additional damage to park resources or threaten human health and safety.

A well-developed and implemented spill control strategy will ease the clean up of the leaks, spills, and other releases that could occur. Spills will usually be controlled by the secondary containment used in operations. Again, refer to the example Spill Control and Emergency Preparedness Plan at the end of this chapter for an understanding of how to document the procedures for clean up and removal of contaminating or toxic substances.



An operator may use bioremediation or other on site clean up options, after consultation and agreement with the park superintendent, the regional response team, and state and local regulatory agencies overseeing the clean up operations. The superintendent would only allow onsite remediation efforts to disturb additional surface area if there is a clear benefit to park resources over other alternatives. In other words, use of additional surface area to remediate spills onsite is not a likely option.

Should a spill reach beyond the operator's approved area of operations, the operator will need to take actions to restore the disturbed area to the natural conditions and processes that existed before the spill.

Reclamation standards require removing or neutralizing any contaminating substances (36 C.F.R. § 9.39(a)(2)(iii)). Neutralization of contamination means that contaminant concentrations will be reduced in soils to a condition that will not adversely affect, injure, or damage federally-owned or controlled lands, waters, and other resources, provides for the safe movement of native wildlife, and which does not jeopardize visitor safety or public use of the park (36 C.F.R. § 9.39(b)). If warranted, the operator will need to test soils to verify that contaminating substances have been removed or neutralized.

### **SECTION E – CONTINGENCY ACTIONS FOR EMERGENCIES OTHER THAN SPILLS**

During scoping, the operator and NPS will identify the need for developing and coordinating contingency actions for emergencies other than spills. The NPS intent is to prevent unnecessary damage to park resources. The approach is twofold. First, the operator needs to be aware of hazards that are not necessarily inherent to its operations, but that could affect them. Second, the operator needs to take all reasonable precautions, with due regard to personnel safety, to remove or minimize potential of spills cause by the external hazards. Primary considerations in developing and implementing emergency preparedness procedures in order of importance are: 1) personnel safety, 2) pollution prevention, and 3) equipment/facility protection.

Contingency actions will vary widely depending on the nature of the hazard, but in general this section should include:

- A description of the expected hazard, when it may occur, and potential consequences to personnel, spill potential, and facilities.
- Communication protocol among NPS management, NPS field personnel, operator management, and operator field personnel. This should include up-to-date names and 24/7 contact numbers.
- Description of preparedness measures taken in advance of the expected hazard. For example, maintenance of fire breaks around facilities in anticipation of a forest or grass fire hazard.
- Description of preparedness measures taken when there is an increased possibility of the hazard occurring. For example, stepped-up communications, securing or removal of potential pollutants, etc. when fires are burning in the area, but not immediately endangering the site or its access.
- Description of preparedness measures taken if occurrence of the hazard is imminent. For example, stepped-up communications, evacuation procedures, etc.



- Description of actions to be taken once the hazard is passed.

The roles and responsibilities of both the NPS and operator should be developed to conform with existing NPS and operator procedures. Also, if no specific hazards are identified, but the park has a general emergency response plan, then the operator and park need to determine and document their respective roles and responsibilities in this section of the Spill Control and Emergency Preparedness Plan.

## SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLANS

If determined to be adequate by the superintendent, a Spill Prevention Control and Countermeasure Plan, approved under 40 C.F.R. Part 112, may be used to satisfy most of the Spill Control and Emergency Preparedness Plan requirements. The SPCC addresses facilities where oil spills would pollute or threaten to pollute waters of the United States. Many facilities in parks will meet the criteria for having to have an SPCC plan. If this is the case, a properly prepared SPCC plan may be referenced and incorporated as an attachment to the Spill Control and Emergency Preparedness Plan. In addition to the SPCC plan, the operator still needs to provide the following:

1. A list of contaminating or toxic substances along with their MSDS as described in Section A above and a statement that the provisions of the SPCC apply to these in addition to oil.
2. The statements supporting NPS spill reporting requirements as follows:

"For all releases to the ground of contaminating or toxic substances, [operator] will promptly report the following initial information to [park superintendent]: the time the spill was discovered; the type of product released; the location; estimated spill volume; cause of spill; area covered; estimated rate of release if spill is ongoing; direction of oil movement; description of 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. For releases in excess of five barrels in the aggregate, [operator] will provide a written report to [park superintendent] within 10 working days of the incident. In addition to the information reported in the initial notification, the written report will include steps that will be or have been taken to prevent recurrence of the incident."

## SAMPLE SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

The following example can be used as a template by an operator when preparing a Spill Control and Emergency Preparedness Plan for a proposed plan of operations.

In the Spill Control and Emergency Preparedness Plan shown below, the NPS includes **NOTES** (shown in **bold**) to help explain the plan content. The **NOTES** would not be included in the actual plan.



## CHAPTER 11 - SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

In this example, Tidy Oil Company has just acquired several oil and gas operations inside a national park. The operations consist of two oil wells on pumpjacks, and a tank battery that includes separators, two 1000-barrel oil tanks, and one 1000-barrel saltwater tank. The oil and brine is trucked and gas that is not used as lease fuel is flared. Tidy also plans to drill an additional development well, which it expects to be a flowing oil and gas well with its own separation and storage facility.

### SECTION A – IDENTIFICATION OF CONTAMINATING OR TOXIC SUBSTANCES USED ON SITE OR EXPECTED TO BE ENCOUNTERED DURING OPERATIONS

During the operations of producing oil and gas from the existing and drilling proposed wells, the substances listed in Table 11.1 are used or expected to be encountered. Table 11.1 lists each substance by generic product name, its use in operations, its hazardous content, and its hazardous effect. A copy of the Material Safety Data Sheet (MSDS) for each item listed in Table 11.1 is also attached. The MSDS lists proper safety procedures and protective devices for using each product as well as first aid information in the event of exposure.

**Table 11.1. Contaminating and Toxic Substances**

DRILLING OPERATIONS				
PRODUCT NAME	HAZARDOUS CONTENT	HAZARDOUS EFFECT	USE	MSDS ATTACHED
Gel (Wyoming Bentonite)	Silica (2-6%)	Carcinogen, Irritant	Mud Additive	Yes
Barite	Silica (2-6%)	Carcinogen, Irritant	Mud Weighting	Yes
Caustic Soda	Sodium Hydroxide	Corrosive	Mud Additive	Yes
Poly-Plus (Liquid)	Petroleum Distillates	Irritant, Toxic	Mud Additive	Yes
PolyPac	Cellulose	Irritant	Mud Additive	Yes
Lignite	Silica (3%)	Carcinogen, Irritant	Mud Additive	Yes
Lime	Calcium Hydroxide	Moderately Caustic Irritant	Mud Additive	Yes
Soda Ash	Sodium Carbonate	Irritant	Mud Additive	Yes
Cottonseed Hulls	None	Allergen	Lost Circulation Material	Yes
Cement	Portland Cement	Irritant	Cementing	Yes
Diesel	Diesel	Fire Hazard, Irritant, Toxic	Fuel	Yes
PRODUCTION OPERATIONS				
PRODUCT NAME	HAZARDOUS CONTENT	HAZARDOUS EFFECT	USE	MSDS ATTACHED
Natural Gas	Methane, Ethane, etc.	Extreme Fire Hazard, Asphyxiant	Produced from wells	Yes
Crude Oil	Mixture of Paraffins, Naphthenes, and Aromatics	Fire Hazard, Irritant, Toxic	Produced from wells	Yes
Demulsifier	Blend of sulfanates, oxyalkylated phenolic resins, and alkanolamines in aromatic and alcohol solvent	Irritant, toxic	Production stream additive	Yes



## **SECTION B – IDENTIFICATION OF ABNORMAL PRESSURE, TEMPERATURE, OR OTHER HAZARDOUS CONDITIONS ON SITE OR EXPECTED TO BE ENCOUNTERED DURING OPERATIONS**

Tidy Oil does not expect any abnormal pressures, temperatures, or other hazardous conditions that require any special precautions during the course of drilling and production operations.

Tidy's existing wells are no longer capable of flowing naturally. The proposed Tidy Well No. 3 is expected to flow naturally at first, but will eventually require artificial lift. Bottomhole pressures ranging from 1500 to 2200 psi and a bottomhole temperature of 130° F are normal for a partially depleted reservoir at 5000 feet depth. Surface operating pressures are expected to be less than 500 psi. Gas not used as lease fuels is compressed to 300 psi for delivery to the AAA Pipeline.

Hydrogen sulfide gas, overpressured zones, or extreme lost circulation zones are not known to exist in the area and are not expected to be encountered while drilling the Tidy No. 3 well.

Operations are located in a wooded area that is prone to forest fires. The park also conducts prescribed burns from time to time in the area. Tidy's operations could exacerbate a fire or complicate response to one.

## **SECTION C – MANAGEMENT MEASURES TO MINIMIZE THE RISKS TO HUMAN HEALTH AND SAFETY AND THE ENVIRONMENT**

### **Drilling Operations**

Tidy Oil has a number of strategies to prevent and contain contaminating substance spills during drilling operations. Site construction (as described in detail in Section V., Description of Operations) includes construction of a ditch and ring levee around the entire drill site. The area underneath the drilling rig, pumps, jetting pits, mixing tanks, pipe racks, compressors, generator house, BOP accumulator, tool houses, and fuel and chemical storage is lined with 18 mil impervious PVC liner. After setting the conductor casing, the cellar will be sealed on the bottom with cement and around the sides with epoxy and corrugated steel.

Any rainwater, rig wash, and spilled liquids within the lined area will flow to the cellar where they can be collected for recycling into the closed loop containerized mud system or disposal. Rainwater that collects outside the lined area will be visually inspected for sheen and tested for conductivity prior to supervised discharge. Any contaminated stormwater will be recycled into the mud system or vacuumed up for disposal.

Leak sources on the drill site include mud tanks, diesel fuel tank, chemical and lubricating oil drums, piping, machinery, hydraulic systems, mud additives, and the well itself. All of these items are maintained within a lined area as previously described. Other than a complete loss of well control, the largest spill potential would be the rupture of a mud storage tank (300 barrels). The capacity of the diesel storage tank is 180 barrels. The lined area could contain a spill of 1200 barrels. Any spills within the lined area would be contained and picked up.

The possibility of a well blowout is extremely small. Open flow potentials of wells in the field are less than 1000 barrels of oil per day. The area enclosed by the ditch and ring levee could hold up to 18,000 barrels of fluid. Tidy would respond as quickly as possible to control a blowout. A



## CHAPTER 11 - SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN

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spill that escaped the drilling location would move to the northeast towards Fish Creek, which is about 3000 feet from the drill site. Should it become necessary, Tidy would consult with the superintendent to build berms to prevent a catastrophic spill from reaching the creek. A topographic map is included in Section II of the Plan of Operations.

Other preventive practices to be used during drilling include:

- Employees and contractors will be properly trained to reduce the number of human errors that often cause spills.
- Visual inspection during rig-up to assure the satisfactory condition of storage tanks, piping, fittings, and other rig equipment that normally hold contaminating substances such as drilling mud, oil, fuel, lubricating oil, hydraulic fluid, etc.
- During operations, employees and contractors will be observant for signs of spills or leaks and the need for equipment maintenance.
- The drill rig is manned by personnel trained in well control.
- Blowout preventers will be installed after setting the surface casing. All blowout prevention equipment is visually inspected daily. The blind and pipe rams are function tested daily or as operations permit. The rams and annular preventer are pressure tested weekly.
- Equipment oil and coolant changes will be performed prior to mobilizing on location rather than on-site.
- Less toxic substances will be substituted for more toxic substance where practical.
- Secondary containment areas will be inspected daily for integrity.
- Placement of temporary liners under service equipment such as logging units, cementing equipment, etc.
- A security guard will be posted where the well access road leaves the public park road to keep visitors from entering the location and to direct rig traffic on the single lane road.

The following cleanup equipment will be available at the drill site for immediate use by on-site personnel in response to small spills, and for initial spill containment and clean up efforts in response to larger spills that may require additional contractor assistance:

- Two 100-foot containment booms,
- 10 bales absorbent pads,
- 10 bales absorbent sweep,
- One 2-inch pump with hose,
- One case of disposal bags, and
- Assortment of shovels, rakes, etc.

Also, a front-end loader is kept on location during drilling operations and is available if needed to contain a spill.

The drilling location is designed to include adequate distance between equipment and the adjacent forest to serve as a firebreak.



## **Production Operations**

Tidy Oil has a number of strategies to prevent and contain contaminating substance spills during production operations.

Leak sources that are common to each of the production sites are the wellheads, flowlines, separation equipment, storage tanks, and the chemical storage and injection systems.

The greatest leak potential would be the rupture of a full 1000-barrel storage tank. All storage tanks have secondary containment within bermed areas. In the event of a tank failure, free liquids would be vacuumed up and returned to storage tanks or disposed of offsite.

Should Tidy Oil No. 3 become a producer, separation and storage facilities will be located within a lined, bermed area as described in Section V, Description of Operations. The berm will be designed to hold 1500 barrels (150% of the largest tank). If Tidy No. 3 is completed as a flowing well, the wellhead will include an automatic shutoff wing valve. The valve will automatically close off production from the well if there is a loss of flowline pressure.

Tidy Oil No. 2 and 3 are no longer capable of natural flow. Each well produces about 50 barrels of oil and 200 barrels of salt water per day on pump jack. The Tidy No. 2 and 3 tanks are also within a bermed area that has a compacted clay bottom. Outside the bermed areas, the largest conceivable spill from a well would be 50 barrels of oil and 200 barrels of saltwater resulting from a flowline break that goes undetected for a 24-hour period. The ditch and ring levee configuration around each well is capable of holding at least one week's production.

Rainwater that collects in bermed areas or in the drip pans will be inspected for sheen and tested for conductivity prior to discharge. All stormwater discharges are supervised and recorded. Any stormwater that is found to be contaminated will be pumped into the brine storage tank and ultimately disposed of at an approved facility outside of the park.

Other preventive practices to be used during production include:

- Secondary containment under chemical bulk storage containers is provided by drip pans. The chemical pumps are also located beneath the chemical tank on the drip pans.
- Loading connections for the oil and brine tanks are located within the bermed areas. Drip basins are provided under each connection point. Any oil or brine leaked into the drip basin during loading operation is removed promptly.
- Training on spill prevention, control, and clean up measures is conducted for each employee on an annual basis. Employees and contractors are trained on the specifics of this Spill Control and Emergency Preparedness Plan.
- The gauger visually inspects the wellhead, piping, valves, tanks, vessels, and chemical injection system on a daily basis for signs of leakage or maintenance needs.
- The gauger also walks the parameter of each location at least weekly or after heavy rains and checks the ditch for accumulation of anything other than rainwater.
- The gauger inspects secondary containment areas for integrity daily.
- Inspect all oil and brine tanks for signs of excessive external corrosion which may lead to tank failure.
- Inspect base of tanks for signs of bottom leaks.
- Flowlines to Tidy No. 1 and No. 2 are walked every 6 months or immediately if there is any evidence of a flowline leak.



- Inspect valves for proper position and locks, if applicable.
- The existing tank battery is fenced with a locked gate, as are the pump jacks at the Tidy No. 1 and 2 wells. If Tidy No. 3 becomes a producer, a fence will be constructed around the well and production facilities.

No emergency response equipment will be kept on location during production operations. The gauger's truck is equipped with one bundle of absorbent pads, two 10-foot absorbent booms, a hand-held fire extinguisher, shovels, rake, and an assortment of hand tools.

### SECTION D – CONTINGENCY ACTIONS FOR SPILLS

In the event of a spill, Tidy Oil's actions will focus on:

1. Controlling the source to prevent further spillage.
2. Securing the site if necessary.
3. Containing the spilled material to the smallest practical area.
4. Cleaning up the spill.
5. Reporting the spill to appropriate agencies.

#### Spill Reporting

Although reporting the spill is listed as #5 above, Tidy Oil will provide the superintendent a verbal notification of a spill event at the earliest practical time. The company supervisor will determine from onsite personnel the following information and report it to the superintendent:

- The location of the spill and the time it was discovered;
- The type of product released;
- Estimated spill volume and area covered;
- Description of contaminated area;
- Estimated rate of release if spill is ongoing;
- Cause of spill;
- Direction of oil movement;
- Proximity to surface waters, roads, or trails;
- Weather conditions;
- What steps are being taken to remedy the situation; and,
- Initial response equipment required.

For releases in excess of five barrels in the aggregate, Tidy Oil will provide a written report to the superintendent within 10 working days of the incident. In addition to the information reported in the initial notification, the written report will include steps that will be or have been taken to prevent recurrence of the incident.

**NOTE:** State and federal regulations require formal notification for certain types of spill or release events. The operator should list those agencies here along with the reporting criteria.



## **Emergency Response**

The largest reasonable anticipated spill events will be contained within bermed areas or at least contained to the location by the surrounding ditch and ring levee.

In the event a spill is encountered, initial response actions will be aimed at controlling the spill, then containing spilled materials. The gauger or other person(s) onsite will immediately assess the situation and take steps to control the source of the spill (if it can be done safely) by shutting valves, shutting down equipment, or closing in wells as needed.

For small spills, onsite personnel will use equipment on hand to contain the spread of the spill. This would typically involve placing absorbent pads or booms, or by constructing a retaining dike from dirt, boards, synthetic absorbents, hay, straw, etc. Small spills will be picked up immediately with absorbent materials. All contaminated cleanup materials will be stored in impermeable, weatherproof containers until removed from the site. All contaminated materials will be disposed of outside of the park according to state and federal guidelines.

For larger spills, the company supervisor will be notified of the spill. For drilling operations, the company representative on location will direct response actions for spill events. The company supervisor will direct actions to immediately isolate and shut off the source of the material being spilled (if it can be done safely). The supervisor will assess containment needs and call out contract equipment and services as determined necessary. Onsite personnel will use equipment and materials on hand to slow the spread of oil or contaminants until additional equipment/services can reach the site.

In the rare event that spilled materials escape from the location, Tidy Oil will consult with the park superintendent and obtain the superintendent's consent prior to mobilizing equipment that may have lingering impacts to natural resources outside the area of operations. In the event immediate response is necessary, approval will be sought via telephone conversation with the superintendent or designated representative.

If a tank truck is involved in a spill incident outside the approved area of operations, but inside the park, Tidy Oil will respond in the same manner as spills within the approved area of operations. The county sheriff's department will be contacted to help control traffic if a tank truck experiences a spill outside of Tidy Oil's area of operations.

At the same time steps are being taken to control and contain the spill, the supervisor will determine what steps may be needed to protect park visitors. Such actions might include locking the gate to the location or blocking the private lease access route from the main park road. Other than the park road, Tidy Oil's operations are not near any areas used by visitors on a regular basis. The only time visitor evacuation of the immediate area might be necessary would be during uncontrolled escape of oil and gas from a well blowout. Tidy Oil would request assistance from the park and local law enforcement as needed to close the park road for all except emergency response personnel.

## **Clean up and Removal of Contaminating or Toxic Substances**

Clean up and removal of spills within the containment areas will be performed using accepted industry practices. Such practices include the pickup of free liquids with vacuum equipment, application of absorbent booms, materials, and pads; removal of contaminated wellpad material, and replacement with clean wellpad material. In place of treatment of contaminated wellpad material could be used as an option to offsite disposal if approved by the superintendent.



## **CHAPTER 11 - SPILL CONTROL AND EMERGENCY PREPAREDNESS PLAN**

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Tidy will not mobilize response or cleanup equipment (that could cause damage to park resources) outside the approved area of operations without first obtaining consent of the superintendent.

All contaminated cleanup materials will be stored in impermeable, weatherproof containers and removed from the site as early as practical. All contaminated materials will be disposed of outside of the park according to state and federal guidelines.

Clean up and removal of spills within Tidy's approved area of operations will meet the standards of 36 C.F.R. § 9.45, Handling of Waste.

Should a spill occur or reach beyond Tidy Oil's approved area of operations, the operator will take actions to restore the disturbed area to the natural conditions and processes that existed before the spill. Cleanup operations will be the same as discussed above for clean up of spills within containment areas except:

1. Tidy Oil will consult with the superintendent and obtain the superintendent's consent prior to mobilizing equipment that may have ongoing impacts to natural resources, and
2. Restoration of the affected area will be performed in consultation with the superintendent and meet the same standards as the Reclamation Plan provided in Section VII of this plan of operations.

### **SECTION E – CONTINGENCY ACTIONS FOR EMERGENCIES OTHER THAN SPILLS**

Operations are located in a wooded area that is prone to forest fires. The park also conducts prescribed burns from time to time in the area. Fires may occur at any time, but unplanned fires are most likely during the dry season from May through September. The park's prescribed burns typically occur in April through June. Uncontrolled fires present a serious threat to personnel safety. In addition, by its flammable nature, oil and gas increases the danger to company personnel and could complicate response to the fire and increase risks to firefighters.

Tidy's field foreman [name, number] will take information from the park's fire chief [name, number] including fire danger levels and actual fires burning in the area. Tidy will immediately inform the park superintendent of any fires it spots in or near the park. The foreman will provide weekly, daily, or hourly fire status and direction to field personnel, the regularity depending on fire danger level or proximity of actual fires to wells sites and access routes, and directions consistent with those of the fire's incident commander.

Tidy will take measures at the operations site in advanced preparation of a fire. Tidy will maintain firebreaks around its drilling and production facilities at all times. Vegetation will be mechanically controlled to maintain firebreaks. Also, Tidy will prevent and remove accumulations of oil wastes or other materials deemed to be fire hazards from the vicinity of the operation's area. Tidy's safety training for its field personnel include fire safety. Tidy has provided the park with location data for all its facilities including gathering lines and access roads for use in its fire incident command. Also, the gathering lines that cross through wooded areas are clearly marked in the field with orange plastic stakes.

In the event a fire could reasonably be expected to reach a Tidy facility, Tidy will lower crude stocks to a minimum, make sure firebreaks are clear of vegetation or other flammable materials,



and wrap-up or hold-off on any non-routine work. Only personnel essential to daily operations will then remain onsite. The Tidy field foreman will maintain communications with the fire's incident command team.

Should the fire become an imminent threat to pass through/around operations, all equipment will be powered down, and wells shut by closing all wellhead valves. Field personnel will evacuate the area as directed by the Tidy foreman in communication with the incident command.

Once incident command has given clearance to re-enter the site, Tidy will take full inventory of the facility and make any repairs necessary. Should a spill have occurred, Tidy will implement the procedures of Section D.

Other Emergencies: Because of the inland location and distance from waterbodies, flooding and hurricanes are extremely unlikely



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## **CHAPTER 12**

### **LIABILITY OF OPERATORS, CONTRACTORS AND SUBCONTRACTORS**

Any oil and gas operation that requires access on, across or through federally-owned or controlled lands or waters would be subject to the NPS's statutory mandates, regulatory provisions, policies, and federal Executive Orders. The NPS regulatory requirements establish standards for conducting oil and gas activities so that park managers can ensure that these activities are conducted in a manner that protects park resources and values and do not impair park resources and values.

#### **36 C.F.R. PART 9 SUBPART B**

Operators will be held fully accountable for their contractor's or subcontractor's compliance with the requirements of the approved plan of operations (36 C.F.R. § 9.41(g)). Undertaking any operation within the boundaries of any NPS unit in violation of the 36 C.F.R. 9B regulations shall be deemed a trespass against the United States and shall be cause for revocation of approval of the plan of operations (36 C.F.R. § 9.51(c)). Further, the operator shall be held liable for any damages to federally-owned or controlled lands, water, or resources resulting from his/her failure to comply with:

- the approved plan of operations under § 9.37,
- the applicable permit where existing operations are continued pursuant to § 9.33, or
- the terms of the temporarily approved operation under § 9.38.

#### **PARK SYSTEM RESOURCE PROTECTION ACT**

The Park System Resource Protection Act (16 U.S.C. § 19jj) (the Act) makes any person who destroys, causes the loss of, or injures any park system resource strictly liable to the United States for response costs and for damages resulting from such destruction, loss, or injury. A park system resource includes any living or non-living resource located within the boundaries of a NPS unit, except for resources owned by a non-federal entity. Because the statute imposes strict liability, the only defenses arise when an act of god or war caused the damage, a third party who constituted neither an employee or nor an agent of the owner/operator caused solely the damage, or an activity authorized by federal or state law caused the damage.

The Act authorizes the Secretary of the Interior to request the Department of Justice to file a civil action for the costs of replacing, restoring or acquiring the equivalent of a park system resource; the value of any loss of use pending its restoration; replacement, or acquisition, the cost of damage assessments; and the cost of response including actions to prevent, to minimize, or to abate injury.

The Act applies to nonfederal oil and gas activities on National Park System units. Operators need to ensure that they operate within the specifications of their approved 9B plan, comply with all other applicable legal requirements, and take precautions to avoid actions that may damage park system resources.



## CHAPTER 12 - LIABILITY

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The Act provides the following comprehensive definitions for both response costs and damages:

**Response costs** means the costs of actions taken by the Secretary of the Interior to prevent or minimize destruction or loss of or injury to park system resources; or to abate or minimize the imminent risk of such destruction, loss, or injury; or to monitor ongoing effects of incidents causing such destruction, loss or injury.

**Damages** include the following:

1. Compensation for -
  - the cost of replacing, restoring, or acquiring the equivalent of a park system resource; and
  - the value of any significant loss of use of a park system resource pending its restoration or replacement or the acquisition of an equivalent resource; or
  - the value of the park system resource in the event the resource cannot be replaced or restored.
2. The cost of damage assessments under the Act.

The above provisions embody a very broad articulation of the scope of liability that attaches to private activities in parks. In addition, under 16 U.S.C. § 19jj-1(d), Congress makes clear that the provisions of the Act are "in addition to any other liability which may arise under federal or state law." With respect to nonfederal oil and gas activities in parks in general, an operator's liability for damages to park resources may easily exceed the amount of the bonds set under 36 C.F.R. § 9.48(d). Under 16 U.S.C. § 19jj, the NPS can recover the costs associated with such damages.

## OTHER APPLICABLE LAWS AND REGULATIONS

Specific liability provisions for protection of cultural resources is provided for under 36 C.F.R. 9B and 43 C.F.R. 3. Under these provisions, the operator shall not injure, alter, destroy, or collect any site, structure, object, or other value of historical, archeological, or cultural scientific importance. Violations shall be punishable by law under trespass regulations, the Antiquities Act, and the Archeological Resources Protection Act for fines and possible costs for any cultural resources damaged by vehicular traffic or collection.

Protection of threatened and endangered species and their habitat is provided for under the Endangered Species Act (16 U.S.C. §§ 1531-1544 and implementing regulations at 50 C.F.R. Parts 10, 17, 23, 81, 217, 222, 225 402, and 450; and 36 C.F.R. Part 13). Harming an endangered species without an authorization (*e.g.*, Section 7 Incidental Take Permit) would result in substantial fines.

"The Service will take affirmative and aggressive action to ensure that all NPS costs and damages associated with the release of contaminants are borne by those responsible for the contamination of NPS property." (USDI, NPS Management Policies, 2006, § 9.1.6.2). Liability provisions for community right-to-know, and rapid response and cleanup of releases of oil, gas, or contaminating and hazardous substances are required by the following list of regulations, executive orders, and federal laws. A summary of each of these is provided in Appendix B.



- NPS Nonfederal Oil and Gas Rights regulations - 36 C.F.R. §§ 9.31(o) and 9.45;
- Park System Resource Protection Act -16 U.S.C. § 19jj;
- Resource Conservation and Recovery Act - 42 U.S.C. §§ 6901 *et seq.*; 40 C.F.R. Parts 240-282; 49 C.F.R. Parts 171-179;
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended - 42 U.S.C. §§ 9601-9675; 40 C.F.R. Parts 279, 300, 302, 307, 355, and 373;
- Executive Order No. 12088 – Federal Compliance with Pollution Control Standards - 3 C.F.R. 1978 Comp. p. 243, as amended by Executive Order No. 12580 - 3 C.F.R. 1987 Comp. p. 193;
- Oil Pollution Act - 33 U.S.C. §§ 2701-2761; 15 C.F.R. Part 990; 30 C.F.R. Part 253; 33 C.F.R. Parts 135 and 150; 40 C.F.R. Part 112;
- Pipeline Safety Act of 1992 - 49 U.S.C. § 60101 *et seq.*; 49 C.F.R. Subtitle B, Ch 1, Parts 190-199; 49 C.F.R. Parts 190-199;
- Federal Water Pollution Control Act of 1972 - 33 U.S.C. §§ 1251*et seq.*; 33 C.F.R. Parts 320-330; 40 C.F.R. Parts 110, 112, 116, 117, 230-232; and
- Spill Prevention Control and Countermeasure Plan - 40 C.F.R. Part 112.







## APPENDIX A

### 36 C.F.R. PART 9 SUBPART B NON-FEDERAL OIL AND GAS RIGHTS REGULATIONS

AUTHORITY: Act of August 25, 1916, 39 Stat. 535 (16 U.S.C. §§ 1, *et seq.*); and the acts establishing the units of the National Park System, including but not limited to: Act of April 25, 1947, 61 Stat. 54 (16 U.S.C. §§ 241, *et seq.*); Act of July 2, 1958, 72 Stat. 285 (16 U.S.C. §§ 410, *et seq.*); Act of October 27, 1972, 86 Stat. 1312 (16 U.S.C. §§ 460dd, *et seq.*); Act of October 11, 1974, 88 Stat. 1256 (16 U.S.C. §§ 698 -- 698e); Act of October 11, 1974, 88 Stat. 1258 (16 U.S.C. §§ 698f -- 698m); Act of December 27, 1974, 88 Stat. 1787 (16 U.S.C. §§ 460ff *et seq.*).

SOURCE: 43 FR 57825, Dec. 8, 1978, unless otherwise noted.

#### § 9.30 Purpose and scope.

(a) These regulations control all activities within any unit of the National Park System in the exercise of rights to oil and gas not owned by the United States where access is on, across or through federally owned or controlled lands or waters. Such rights arise most frequently in one of two situations: (1) When the land is owned in fee, including the right to the oil and gas, or (2) When in a transfer of the surface estate to the United States, the grantor reserved the rights to the oil and gas. These regulations are designed to insure that activities undertaken pursuant to these rights are conducted in a manner consistent with the purposes for which the National Park System and each unit thereof were created, to prevent or minimize damage to the environment and other resource values, and to insure to the extent feasible that all units of the National Park System are left unimpaired for the enjoyment of future generations.

These regulations are not intended to result in the taking of a property interest, but rather to impose reasonable regulations on activities which involve and affect federally-owned lands.

(b) Regulations controlling the exercise of minerals rights obtained under the Mining Law of 1872 in units of the National Park System can be found at 36 C.F.R. Part 9, Subpart A. In area where oil and gas are owned by the United States, and leasing is authorized, the applicable regulations can be found at 43 C.F.R., Group 3100.

(c) These regulations allow operators the flexibility to design plans of operations only for that phase of operations contemplated. Each plan need only describe those functions for which the operator wants immediate approval. For instance, it is impossible to define, at the beginning of exploratory activity, the design that production facilities might take. For this reason, an operator may submit a plan which applies only to the exploratory phase, allowing careful preparation of a plan for the production phase after exploration is completed. This allows for phased reclamation and bonding at a level commensurate with the level of operations approved. However, it must be noted that because of potential cumulative impacts, and because of qualitative differences in the nature of the operations, approval of a plan of operations covering one phase of operations does not guarantee later approval of a plan of operations covering a subsequent phase.

[43 FR 57825, Dec. 8, 1978, as amended at 44 FR 37914, June 29, 1979]



**§9.31 Definitions.**

The terms used in this Subpart shall have the following meanings:

- (a) Secretary. The Secretary of the Interior.
- (b) Director. The Director of the National Park Service or his designee.
- (c) Operations. All functions, work and activities within a unit in connection with exploration for and development of oil and gas resources, the right to which is not owned by the United States, including: gathering basic information required to comply with this subpart, prospecting, exploration, surveying, preproduction development and production; gathering, onsite storage, transport or processing of petroleum products; surveillance, inspection, monitoring, or maintenance of equipment; reclamation of the surface disturbed by such activities; and all activities and uses reasonably incident thereto performed within a unit, including construction or use of roads, pipelines, or other means of access or transportation on, across, or through federally owned or controlled lands and waters, regardless of whether such activities and uses take place on Federal, State or private lands.
- (d) Operator. A person conducting or proposing to conduct operations.
- (e) Person. Any individual, firm, partnership, corporation, association, or other entity.
- (f) Superintendent. The Superintendent, or his designee, of the unit of the National Park System containing lands subject to the rights covered by these regulations.
- (g) Commercial Vehicle. Any motorized equipment used in direct or indirect support of operations.
- (h) Unit. Any National Park System area.
- (i) Owner. The owner, or his legal representative, of the rights to oil and gas being exercised.
- (j) Designated Roads. Those existing roads determined by the Superintendent in accordance with 36 C.F.R. 1.5 and § 4.19 to be open for the use of the general public or for the exclusive use of an operator.
- (k) Oil. Any viscous combustible liquid hydrocarbon or solid hydrocarbon substance easily liquifiable on warming which occurs naturally in the earth, including drip gasoline or other natural condensates recovered from gas without resort to manufacturing process.
- (l) Gas. Any fluid, either combustible or noncombustible, which is produced in a natural state from the earth and which maintains a gaseous or rarefied state at ordinary temperature and pressure conditions.
- (m) Site. Those lands or waters on which operations are to be carried out.
- (n) Contaminating substances. Those substances, including but not limited to, salt water or any other injurious or toxic chemical, waste oil or waste emulsified oil, basic sediment, mud with



injurious or toxic additives, or injurious or toxic substances produced or used in the drilling, development, production, transportation, or on-site storage, refining, and processing of oil and gas.

(o) Statement for Management. A National Park Service planning document used to guide short- and long-term management of a unit; to determine the nature and extent of planning required to meet the unit's management objectives; and, in the absence of more specific planning documents, to provide a general framework for directing park operations and communicating park objectives to the public.

[43 F R 57825, Dec. 8, 1978; 44 FR 37914, June 29, 1979, as amended at 60 FR 55791, Nov. 3 1995; 62 FR 30234, June 3, 1997]

### **§ 9.32 Access.**

(a) No access on, across or through lands or waters owned or controlled by the United States to a site for operations will be granted except for operations covered by § 9.33 and, except as provided by § 9.38, until the operator has filed a plan of operations pursuant to § 9.36 and has had the plan of operations approved in accordance with § 9.37. An approved plan of operations serves as the operator's access permit.

(b) No operations shall be conducted on a site within a unit, access to which is on, across or through federally owned or controlled lands or waters except in accordance with an approved plan of operations, the terms of § 9.33 or approval under § 9.38.

(c) Any operator intending to use aircraft of any kind for access to a federally-owned or controlled site must comply with these regulations. Failure of an operator to receive the proper approval under these regulations prior to using aircraft in this manner is a violation of both these regulations and 36 C.F.R. 2.17.

(d) No access to a site outside a unit will be permitted across unit lands unless such access is by foot, pack animal, or designated road. Persons using designated roads for access to such a site must comply with the terms of § 9.50 where applicable.

(e) Any operator on a site outside the boundaries of a unit must comply with these regulations if he is using directional drilling techniques which result in the drill hole crossing into the unit and passing under any land or water the surface of which is owned by the United States. Except, that the operator need not comply in those areas where, upon application of the operator or upon his own action, the Regional Director is able to determine from available data, that such operations pose no significant threat of damage to park resources, both surface and subsurface, resulting from surface subsidence fracture of geological formations with resultant fresh water aquifer contamination, or natural gas escape, or the like.

### **§ 9.33 Existing operations.**

(a) Any person conducting operations on January 8, 1979 in accordance with a Federal or State issued permit may continue to do so as provided by this section. After expiration of such existing permits no operations shall be conducted except under an approved plan of operations, unless access is granted by the Regional Director under § 9.38.



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(1) All Federal special use permits dealing with access on, across or through lands or waters owned or controlled by the United States to a site for the conduct of operations within any unit issued prior to January 8, 1979 shall expire according to their terms and shall not be renewed, unless by the terms of the existing permit it must be renewed.

(2) All operations on a site in a unit access to which is on, across, or through federally owned or controlled lands or waters conducted pursuant to a valid State access permit may be continued for the term of that permit, exclusive of any renewal period whether mandatory or discretionary, if conducted in accordance with the permit.

(b) Any person conducting operations on January 8, 1979 in a unit where Federal or State permits were not required prior to January 8, 1979 may continue those operations pending a final decision on his plan of operations; Provided, That:

(1) The operator (within thirty (30) days of January 8, 1979), notifies the Superintendent in writing of the nature and location of the operations; and

(2) Within sixty (60) days after such notification, the operator submits, in accordance with these regulations, a substantially complete proposed plan of operations for those operations;

(3) Failure to comply with § 9.33(b) (1) and (2) shall constitute grounds for the suspension of operations.

(c) At any time when operations which are allowed to continue under § 9.33 (a) and (b) pose an immediate threat of significant injury to federally owned or controlled lands or waters, the Superintendent shall require the operator to suspend operations immediately until the threat is removed or remedied. The Superintendent must, within five (5) days of this suspension notify the operator in writing of the reasons for the suspension and of his right to appeal the suspension under § 9.49.

[43 FR 57825, Dec. 8, 1978; 44 FR 37914, June 29, 1979]

### **§ 9.34 Transfers of interest.**

(a) Whenever an owner of rights being exercised under an approved plan of operations sells, assigns, bequeaths, or otherwise conveys all or any part of those rights, he, his agent, executor, or representative must notify the Superintendent within sixty (60) days of the transfer of: the site(s) involved; the name and address of the person to whom an interest has been conveyed; and a description of the interest transferred. Failure to so notify the Superintendent shall render the approval of any previously approved plan of operations void.

(b) The transferring owner shall remain responsible for compliance with the plan of operations and shall remain liable under his bond until such time as the Superintendent is notified of the transfer in accordance with paragraph (a). At that time the Superintendent will prohibit the new owner from operating until such time as the new owner has filed with the Superintendent: (1) A statement ratifying the existing plan of operations and stating his intent to be bound thereby, or a new plan of operations, and (2) a suitable substitute performance bond which complies with the requirements of § 9.48.



**§ 9.35 Use of water.**

No operator may use for operations any water from a point of diversion which is within the boundaries of any unit unless authorized in writing by the Regional Director. The Regional Director shall not approve a plan of operations requiring the use of water from such source unless the operator shows either that his right to the use of the water is superior to any claim of the United States to the water, or where the operator's claim to the water is subordinate to that of the United States that the removal of the water from the water system will not damage the unit's resources. In either situation, the operator's use of water must comply with appropriate State water laws.

**§ 9.36 Plan of operations.**

(a) The proposed plan of operations shall include, as appropriate to the proposed operations, the following:

(1) The names and legal addresses of the following persons: The operator and the owner(s) or lessee(s) (if rights are State-owned) other than the operator;

(2) Copy of the lease, deed, designation of operator, or assignment of rights upon which the operator's right to conduct operations is based;

(3) A map or maps showing the location of the perimeter of the area where the operator has the right to conduct operations, as described in § 9.36(a)(2), referenced to the State plane coordinate system or other public land survey as acceptable to the Superintendent;

(4) A map or maps showing the location, as determined by a registered land surveyor or civil engineer, of a point within a site of operations showing its relationship to the perimeter of the area described in § 9.36(a)(2) and to the perimeter of the site of operations; the location of existing and proposed access roads or routes to the site; the boundaries of proposed surface disturbance; the location of proposed drilling; location and description of all surface facilities including sumps, reserve pits and ponds; location of tank batteries, production facilities and gathering, service and transmission lines; wellsite layout; sources of construction materials such as fill; and the location of ancillary facilities such as camps, sanitary facilities, water supply and disposal facilities, and airstrips. The point within the site of operations identified by registered land surveyor or civil engineer shall be marked with a permanent ground monument acceptable to the Superintendent, shall contain the point's State plane coordinate values, and shall be placed at least to an accuracy of third order, class I, unless otherwise authorized by the Superintendent;

(5) A description of the major equipment to be used in the operations, including a description of equipment and methods to be used for the transport of all waters used in or produced by operations, and of the proposed method of transporting such equipment to and from the site;

(6) An estimated timetable for any phase of operations for which approval is sought and the anticipated date of operation completion;

(7) The geologic name of the surface formation;

(8) The proposed drilling depth, and the estimated tops of important geologic markers;



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(9) The estimated depths at which anticipated water, brines, oil, gas, or other mineral bearing formations are expected to be encountered;

(10) The nature and extent of the known deposit or reservoir to be produced and a description of the proposed operations, including:

(i) The proposed casing program, including the size, grade, and weight of each string, and whether it is new or used;

(ii) The proposed setting depth of each casing string, and the amount of type of cement, including additives, to be used;

(iii) The operator's minimum specifications for pressure control equipment which is to be used, a schematic diagram thereof showing sizes, pressure ratings, and the testing procedures and testing frequency;

(iv) The type and characteristics of the proposed circulating medium or mediums to be employed for rotary drilling and the quantities and types of mud and weighting material to be maintained;

(v) The testing, logging, and coring programs to be followed;

(vi) Anticipated abnormal pressures or temperatures expected to be encountered; or potential hazards to persons and the environment such as hydrogen sulfide gas or oil spills, along with plans for mitigation of such hazards;

(11) A description of the steps to be taken to comply with the applicable operating standards of § 9.41 of this subpart;

(12) Provisions for reclamation which will result in compliance with the requirements of § 9.39:

(13) A breakdown of the estimated costs to be incurred during the implementation of the reclamation plan;

(14) Methods for disposal of all rubbish and other solid and liquid wastes, and contaminating substances;

(15) An affidavit stating that the operations planned are in compliance with all applicable Federal, State and local laws and regulations

(16) Background information, including:

(i) A description of the natural, cultural, social and economic environments to be affected by operations, including a description and/or map(s) of the location of all water, abandoned, temporarily abandoned, disposal, production, and drilling wells of public record within a two-mile radius of the proposed site. Where such information is available from documents identified in § 9.36(d), specific reference to the document and the location within the document where such information can be found will be sufficient to satisfy this requirement

(ii) The anticipated direct and indirect effects of the operations on the unit's natural, cultural, social, and economic environment;



(iii) Steps to be taken to insure minimum surface disturbance and to mitigate any adverse environmental effects, and a discussion of the impacts which cannot be mitigated

(iv) Measures to protect surface and subsurface waters by means of casing and cement, etc.

(v) All reasonable technologically feasible alternative methods of operations their costs, and their environmental effects, and

(vi) The effects of the steps to be taken to achieve reclamation

(17) Any other facets of the proposed operations which the operator wishes to point out for consideration; and

(18) Any additional information that is required to enable the Superintendent to establish whether the operator has the right to conduct operations as specified in the plan of operations; to effectively analyze the effects that the operations will have on the preservation, management and public use of the unit, and to make a recommendation to the Regional Director regarding approval or disapproval of the plan of operations and the amount of the performance bond to be posted.

(b) Where any information required to be submitted as part of a proposed plan of operations has been submitted to the Superintendent in substantially the same form in a prior approved plan of operations, a specific cross-reference to that information contained in the prior approved plan of operations will be sufficient to incorporate it into the proposed plan and will satisfy the applicable requirement of this section.

(c) Information and materials submitted in compliance with this section will not constitute a plan of operations until information required by § 9.36(a) (1) through (18), which the Superintendent determines as pertinent to the type of operations proposed, has been submitted to and determined adequate by the Regional Director.

(d) In all cases the plan of operations must consider and discuss the unit's Statement for Management and other planning documents as furnished by the Superintendent, and activities to control, minimize or prevent damage to the recreational, biological physical, scientific, cultural, and scenic resources of the unit, and any reclamation procedures suggested by the Superintendent.

[43 FR 57825, Dec. 8, 1978; 44 FR 37914, June 29, 1979]

### **§ 9.37 Plan of operations approval.**

(a) The Regional Director shall not approve a plan of operations:

(1) Until the operator shows that the operations will be conducted in a manner which utilizes technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety.

(2) For operations at a site the surface estate of which is not owned by the federal government, where operations would constitute a nuisance to federal lands or waters in the vicinity of the operations, would significantly injure federally-owned or controlled lands and waters; or

(3) For operations at a site the surface estate of which is owned or controlled by the federal government, where operations would substantially interfere with management of the unit to ensure



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the preservation of its natural and ecological integrity in perpetuity, or would significantly injure the federally-owned or controlled lands or waters; Provided, however, that if the application of this standard would under applicable law, constitute a taking of a property interest rather than an appropriate exercise of regulatory authority, the plan of operations may be approved if the operations would be conducted in accordance with paragraph (a)(1) of this section, unless a decision is made to acquire the mineral interest.

(4) Where the plan of operations does not satisfy each of the requirements of § 9.36 applicable to the operations proposed.

(b) Within sixty (60) days of the receipt of a plan of operations, the Regional Director shall make an environmental analysis of such plan, and:

(1) Notify the operator that the plan of operations has been approved or rejected, and, if rejected, the reasons for the rejection; or

(2) Notify the operator that the plan of operations has been conditionally approved, subject to the operator's acceptance of specific provisions and stipulations; or

(3) Notify the operator of any modification of the plan of operations which is necessary before such plan will be approved or of additional information needed to effectively analyze the effects that the operations will have on the preservation, management and use of the unit, and to make a decision regarding approval or disapproval of the plan of operations and the amount of the performance bond to be posted; or

(4) Notify the operator that the plan of operations is being reviewed, but that more time, not to exceed an additional thirty days, is necessary to complete such review, and setting forth the reasons why additional time is required. Provided, however, That days during which the area of operations is inaccessible for such reasons as inclement weather, natural catastrophe acts of God, etc., for inspection shall not be included when computing either this time period, or that in subsection (b) above; or

(5) Notify the operator that the plan of operations has been reviewed, but cannot be considered for approval until forty-five (45) days after a final environmental statement has been prepared and filed with the Environmental Protection Agency; or

(6) Notify the operator that the plan of operations is being reviewed, but that more time to provide opportunities for public participation in the plan of operations review and to provide sufficient time to analyze public comments received is necessary. Within thirty (30) days after closure of the public comment period specified by the Regional Director, he shall comply with § 9.37(b) (1) through (5).

(c) The Regional Director shall act as expeditiously as possible upon a proposed plan of operations consistent with the nature and scope of the operations proposed. Failure to act within the time limits specified in this section shall constitute a rejection of the plan of operations from which the operator shall have a right to appeal under § 9.49.

(d) The Regional Director's analysis shall include:

(1) An examination of all information submitted by the operator;

(2) An evaluation of measures and timing required to comply with reclamation requirements;



(3) An evaluation of necessary conditions and amount of the bond or security deposit (See § 9.48);

(4) An evaluation of the need for any additional requirements in the plan;

(5) A determination regarding the impact of this operation and cumulative impacts of all proposed and existing operations on the management of the unit; and

(6) A determination whether implementation by the operator of an approved plan of operations would be a major Federal action significantly affecting the quality of the human environment or would be sufficiently controversial to warrant preparation of an environmental statement pursuant to section 102(2)(c) of the National Environmental Policy Act of 1969.

(e) Prior to approval of a plan of operations, the Regional Director shall determine whether any properties included in, or eligible for inclusion in the National Register of Historic Places or National Registry of Natural Landmarks may be affected by the proposed operations. This determination will require the acquisition of adequate information, such as that resulting from field surveys, in order to properly determine the presence and significance of cultural resources within the areas to be affected by operations. Whenever National Register properties or properties eligible for inclusion in the National Register would be affected by operations, the Regional Director shall comply with Section 106 of the Historic Preservations Act of 1966 as implemented by 36 C.F.R. Part 800.

(f) Approval 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.

[43 FR 57825, Dec. 8, 1978; 44 FR 37914, June 29, 1979]

### **§ 9.38 Temporary approval.**

(a) The Regional Director may approve on a temporary basis:

(1) Access on, across or through federally-owned or controlled lands or waters for the purpose of collecting basic information necessary to enable timely compliance with these regulations. Such temporary approval shall be for a period not in excess of sixty (60) days.

(2) The continuance of existing operations, if their suspension would result in an unreasonable economic burden or injury to the operator; provided that such operations must be conducted in accordance with all applicable laws, and in a manner prescribed by the Regional Director designed to minimize or prevent significant environmental damage; and provided that within sixty (60) days of the granting of such temporary approval the operator either:

(i) Submits an initial substantially complete plan of operations; or

(ii) If a proposed plan of operations has been submitted, responds to any outstanding requests for additional information.

(b) The Regional Director may approve new operations on a temporary basis only when:

(1) The Regional Director finds that the operations will not cause significant environmental damage or result in significant new or additional surface disturbance to the unit; and either



(2) The operator can demonstrate a compelling reason for the failure to have had timely approval of a proposed plan of operations; or

(3) The operator can demonstrate that failure to grant such approval will result in an unreasonable economic burden or injury to the operator.

[43 FR 57825, Dec. 8, 1978, as amended at 44 FR 37914, June 29, 1979]

**§ 9.39 Reclamation requirements.**

(a) Within the time specified by the reclamation provisions of the plan of operations, which shall be as soon as possible after completion of approved operations and shall not be later than six (6) months thereafter unless a longer period of time is authorized in writing by the Regional Director, each operator shall initiate reclamation as follows:

(1) Where the Federal government does not own the surface estate. the operator shall at a minimum:

(i) Remove or neutralize any contaminating substances; and

(ii) Rehabilitate the area of operations to a condition which would not constitute a nuisance or would not adversely affect, injure, or damage federally-owned lands or waters, including removal of above ground structures and equipment used for operations, except that such structures and equipment may remain where they are to be used for continuing operations which are the subject of another approved plan of operations or of a plan which has been submitted for approval.

(2) On any site where the surface estate is owned or controlled by the Federal government, each operator must take steps to restore natural conditions and processes. These steps shall include but are not limited to:

(i) Removing all above ground structures, equipment and roads used for operations, except that such structures, equipment and roads may remain where they are to be used for continuing operations which are the subject of another approved plan of operations or of a plan which has been submitted for approval, or unless otherwise authorized by the Regional Director consistent with the unit purpose and management objectives;

(ii) Removing all other man-made debris resulting from operations;

(iii) Removing or neutralizing any contaminating substances;

(iv) Plugging and capping all nonproductive wells and filling dump holes, ditches, reserve pits and other excavations;

(v) Grading to reasonably conform the contour of the area of operations to a contour similar to that which existed prior to the initiation of operations, where such grading will not jeopardize reclamation;

(vi) Replacing the natural topsoil necessary for vegetative restoration; and

(vii) Reestablishing native vegetative communities.



(b) Reclamation under paragraph (a)(2) of this section is unacceptable unless it provides for the safe movement of native wildlife, the reestablishment of native vegetative communities, the normal flow of surface and reasonable flow of subsurface waters, and the return of the area to a condition which does not jeopardize visitor safety or public use of the unit.

#### **§ 9.40 Supplementation or revision of plan of operations.**

(a) A proposal to supplement or revise an approved plan of operations may be made by either the operator or the Regional Director to adjust the plan to changed conditions or to address conditions not previously contemplated by notifying the appropriate party in writing of the proposed alteration and the justification therefore.

(b) Any proposed supplementation or revision of a plan of operations initiated under paragraph (a) of this section by either party shall be reviewed and acted on by the Regional Director in accordance with § 9.37. If failure to implement proposed changes would not pose an immediate threat of significant injury to federally-owned or controlled lands or waters, the operator will be notified in writing sixty (60) days prior to the date such changes become effective, during which time the operator may submit comments on proposed changes. If failure to implement proposed changes would pose immediate threat of significant injury to federally-owned or controlled lands or waters, the provisions of § 9.33(c) apply.

#### **§ 9.41 Operating Standards.**

The following standards shall apply to operations within a unit:

(a) Surface operations shall at no time be conducted within 500 feet of the banks of perennial, intermittent or ephemeral watercourses; or within 500 feet of the high pool shoreline of natural or man-made impoundments; or within 500 feet of the mean high tide line; or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit unless specifically authorized by an approved plan of operations.

(b) The operator shall protect all survey monuments, witness corners, reference monuments and bearing trees against destruction, obliteration, or damage from operations and shall be responsible for the reestablishment, restoration, or referencing of any monuments, corners and bearing trees which are destroyed, obliterated, or damaged by such operations.

(c) Whenever drilling or producing operations are suspended for 24 hours or more, but less than 30 days, the wells shall be shut in by closing wellhead valves or blowout prevention equipment. When producing operations are suspended for 30 days or more, a suitable plug or other fittings acceptable to the Superintendent shall be used to close the wells.

(d) The operator shall mark each and every operating derrick or well in a conspicuous place with his name or the name of the owner, and the number and location of the well, and shall take all necessary means and precautions to preserve these markings.

(e) Around existing or future installations, e.g., well, storage tanks, all high pressure facilities, fences shall be built for protection of unit visitors and wildlife, and protection of said facilities unless otherwise authorized by the Superintendent. Fences erected for protection of unit visitors and wildlife shall be of a design and material acceptable to the Superintendent, and where appropriate,



shall have at least one gate which is of sufficient width to allow access by fire trucks. Hazards within visitor use areas will be clearly marked with warning signs acceptable to the Superintendent.

(f) The operator shall carry on all operations and maintain the site at all times in a safe and workmanlike manner, having due regard for the preservation of the environment of the unit. The operator shall take reasonable steps to prevent and shall remove accumulations of oil or other materials deemed to be fire hazards from the vicinity of well locations and lease tanks, and shall remove from the property or store in an orderly manner all scrap or other materials not in use.

(g) Operators will be held fully accountable for their contractor's or subcontractor's compliance with the requirements of the approved plan of operations.

[43 FR 57825, Dec. 8, 1978; 44 FR 37915, June 29, 1979]

#### **§ 9.42 Well records and reports, plots and maps, samples, tests and surveys.**

Any technical data gathered during the drilling of any well, including daily drilling reports and geological reports, which are submitted to the State pursuant to State regulations, or to any other bureau or agency of the Federal government shall be available for inspection by the Superintendent upon his request.

#### **§ 9.43 Precautions necessary in areas where high pressures are likely to exist.**

When drilling in "wildcat" territory, or in any field where high pressures are likely to exist, the operator shall take all necessary precautions for keeping the well under control at all times and shall install and maintain the proper high-pressure fittings and equipment to assure proper well control. Under such conditions the surface string must be cemented through its length, unless another procedure is authorized or prescribed by the Superintendent, and all strings of casing must be securely anchored.

#### **§ 9.44 Open flows and control of "wild" wells.**

The operator shall take all technologically feasible precautions to prevent any oil, gas, or water well from blowing open or becoming "wild," and shall take immediate steps and exercise due diligence to bring under control any "wild" well, or burning oil or gas well.

#### **§ 9.45 Handling of wastes.**

Oilfield brine, and all other waste and contaminating substances must be kept in the smallest practicable area, must be confined so as to prevent escape as a result of percolation, rain high water or other causes, and such wastes must be stored and disposed of or removed from the area as quickly as practicable in such a manner as to prevent contamination, pollution, damage or injury to the lands, water (surface and subsurface), facilities, cultural resources, wildlife, and vegetation of or visitors of the unit.

#### **§ 9.46 Accidents and fires.**

The operator shall take technologically feasible precautions to prevent accidents and fires, shall notify the Superintendent within 24 hours of all accidents involving serious personal injury or



death, or fires on the site, and shall submit a full written report thereon within ninety (90) days. This report supersedes the requirement outlined in 36 C.F.R. 2.17, but does not relieve persons from the responsibility of making any other accident reports which may be required under State or local laws.

#### **§ 9.47 Cultural resource protection.**

(a) Where the surface estate of the site is owned by the United States, the operator shall not, without written authorization of the Superintendent, injure, alter, destroy, or collect any site, structure, object, or other value of historical, archeological, or other cultural scientific importance in violation of the Antiquities Act (16 U.S.C. 431-433 (See 43 C.F.R. Part 3).

(b) Once approved operations have commenced, the operator shall immediately bring to the attention of the Superintendent any cultural or scientific resource encountered that might be altered or destroyed by his operation and shall leave such discovery intact until told to proceed by the Superintendent. The Superintendent will evaluate the discoveries brought to his attention, and will determine within ten (10) working days what action will be taken with respect to such discoveries.

#### **§ 9.48 Performance bond.**

(a) Prior to approval of a plan of operations, the operator shall be required to file a suitable performance bond with satisfactory surety, payable to the Secretary or his designee. The bond shall be conditioned upon faithful compliance with applicable regulations, and the plan of operations as approved, revised or supplemented. This performance bond is in addition to and not in lieu of any bond or security deposit required by other regulatory authorities.

(b) In lieu of a performance bond, an operator may elect to deposit with the Secretary or his designee, cash or negotiable bonds of the U.S. Government. The cash deposit or the market value of such securities shall be at least equal to the required sum of the bond. When bonds are to serve as security, there must be provided to the Secretary a power of attorney.

(c) In the event that an approved plan of operations is revised or supplemented in accordance with § 9.40, the Regional Director may adjust the amount of the bond or security deposit to conform to the modified plan of operations.

(d) The bond or security deposit shall be in an amount:

(1) Equal to the estimated cost of reclaiming the site, either in its entirety or in phases, that has been damaged or destroyed as a result of operations conducted in accordance with an approved, supplemented, plan of operations; plus

(2) An amount set by the Superintendent consistent with the type of operations proposed, to bond against the liability imposed by § 9.51(a); to provide the means for rapid and effective cleanup; and to minimize damages resulting from an oil spill, the escape of gas, wastes, contaminating substances, or fire caused by operations. This amount shall not exceed twenty-five thousand dollars (\$25,000) for geophysical surveys when using more than one field party or five thousand dollars (\$5,000) when operating with only one field party, and shall not exceed fifty thousand dollars (\$50,000) for each wellsite or other operation.

(3) When an operator's total bond or security deposit with the National Park Service amounts to two hundred thousand dollars (\$200,000) for activities conducted within a given unit, no further



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bond requirements shall be collected for additional activities conducted within that unit, and the operator may substitute a blanket bond of two hundred thousand dollars (\$200,000) for all operations conducted within the unit.

(e) The operator's and his surety's responsibility and liability under the bond or security deposit shall continue until such time as the Superintendent determines that successful reclamation of the area of operations has occurred and, where a well has been drilled, the well has been properly plugged and abandoned. If all efforts to secure the operator's compliance with pertinent provisions of the approved plan of operations are unsuccessful, the operator's surety company will be required to perform reclamation in accordance with the approved plan of operations.

(f) Within thirty (30) days after determining that all reclamation requirements of an approved plan of operations are completed, including proper abandonment of the well, the Regional Director shall notify the operator that the period of liability under the bond or security deposit has been terminated.

[43 FR 57825, Dec. 8, 1978; 44 FR 37915 June 29, 1979]

### **§ 9.49 Appeals.**

(a) Any operator aggrieved by a decision of the Regional Director in connection with the regulations in this Subpart may file with the Regional Director a written statement setting forth in detail the respects in which the decision is contrary to, or is in conflict with the facts, the law, or these regulations, or is otherwise in error. No such appeal will be considered unless it is filed with the Regional Director within thirty (30) days after the date of notification to the operator of the action or decision complained of. Upon receipt of such written statement from the aggrieved operator, the Regional Director shall promptly review the action or decision and either reverse his original decision or prepare his own statement, explaining that decision and the reasons therefor, and forward the statement and record on appeal to the Director for review and decision. Copies of the Regional Director's statement shall be furnished to the aggrieved operator, who shall have thirty (30) days within which to file exceptions to the Regional Director's decision. The Department has the discretion to initiate a hearing before the Office of Hearing and Appeals in a particular case (See 43 C.F.R. 4.700).

(b) The official files of the National Park Service on the proposed plan of operations and any testimony and documents submitted by the parties on which the decision of the Regional Director was based shall constitute the record on appeal. The Regional Director shall maintain the record under separate cover and shall certify that it was the record on which his decision was based at the time it was forwarded to the Director of the National Park Service. The National Park Service shall make the record available to the operator upon request.

(c) If the Director considers the record inadequate to support the decision on appeal, he may provide for the production of such additional evidence or information as may be appropriate, or may remand the case to the Regional Director, with appropriate instructions for further action.

(d) On or before the expiration of forty-five (45) days after his receipt of the exceptions to the Regional Director's decision, the Director shall make his decision in writing: provided however, that if more than forty-five (45) days are required for a decision after the exceptions are received, the Director shall notify the parties to the appeal and specify the reason(s) for delay. The decision of the Director shall include: (1) A statement of facts; (2) conclusions; and (3) reasons upon which the



conclusions are based. The decision of the Director shall be the final administrative action of the agency on a proposed plan of operations.

(e) A decision of the Regional Director from which an appeal is taken shall not be automatically stayed by the filing of a statement of appeal. A request for a stay may accompany the statement of appeal or may be directed to the Director. The Director shall promptly rule on requests for stays. A decision of the Director on request for a stay shall constitute a final administrative decision.

(f) Where, under this Subpart, the Superintendent has the authority to make the original decision, appeals may be taken in the manner provided by this section, as if the decision had been made by the Regional Director, except that the original statement of appeal shall be filed with the Superintendent, and if he decides not to reverse his original decision, the Regional Director shall have, except as noted below, the final review authority. The only decision of a Regional Director under this paragraph which shall be appealable by the Director is an appeal from a suspension under § 9.51(b). Such an appeal shall follow the procedure of paragraphs (a)-(3) of this section.

[43 FR 57825, Dec. 8, 1978; 44 FR 37915, June 29, 1979]

### **§ 9.50 Use of roads by commercial vehicles.**

(a) After January 8, 1978, no commercial vehicle shall use roads administered by the National Park Service without being registered with the Superintendent. Roads must be used in accordance with procedures outlined in an approved plan of operations.

(1) A fee shall be charged for such registration and use based upon a posted fee schedule. The fee schedule posted shall be subject to change upon sixty (60) days of notice.

(2) An adjustment of the fee may be made at the discretion of the Superintendent where a cooperative maintenance agreement is entered into with the operator.

(b) No commercial vehicle which exceeds roadway load limits specified by the Superintendent shall be used on roads administered by the National Park Service unless authorized in writing by the Superintendent, or unless authorized by an approved plan of operations.

(c) Should a commercial vehicle used in operations cause damage to roads, resources or other facilities of the National Park Service, the operator shall be liable for all damages so caused.

### **§ 9.51 Damages and penalties.**

(a) The operator shall be held liable for any damages to federally-owned or controlled lands, waters, or resources resulting from his failure to comply with either his plan of operations, or where operations are continued pursuant to § 9.33, failure to comply with the applicable permit or, where operations are temporarily approved under § 9.38, failure to comply with the terms of that approval.

(b) The operator agrees, as a condition for receiving an approved plan of operations, that he will hold harmless the United States and its employees from any damages or claims for injury or death of persons and damage or loss of property by any person or persons arising out of any acts or omissions by the operator, his agents, employees or subcontractors done in the course of operations.



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(c) Undertaking any operations within the boundaries of any unit in violation of this Subpart shall be deemed a trespass against the United States and shall be cause for revocation of approval of the plan of operations.

(1) When a violation by an operator under an approved plan of operations is discovered, and if it does not pose an immediate threat of significant injury to federally-owned or controlled lands or waters, the operator will be notified in writing by the Superintendent and will be given ten (10) days to correct the violation; if the violation is not corrected within ten (10) days approval of the plan of operations will be suspended until such time as the violation is corrected.

(2) If the violation poses an immediate threat of significant injury to federally-owned or controlled lands or waters, approval of the plan of operations will be immediately suspended until such time as the violation is corrected. The operator will be notified in writing within five (5) days of any suspension and shall have the right to appeal that decision under § 9.48.

(3) Failure to correct any violation or damage to federally owned or controlled lands, waters or resources caused by such violations will result in revocation of plan of operations approval.

[43 FR 57825, Dec. 8, 1978; 44 FR 37915, June 29, 1979]

### **§ 9.52 Public inspection of documents.**

(a) When a Superintendent receives a request for permission for access on, across or through federally-owned or controlled lands or waters for the purpose of conducting operations, the Superintendent shall publish a notice of this request in a newspaper of general circulation in the county(s) in which the lands are situated, or in such publications as deemed appropriate by the Superintendent.

(b) Upon receipt of the plan of operations in accordance with § 9.35(c), the Superintendent shall publish a notice in the FEDERAL REGISTER advising the availability of the plan for public review and comment. Written comments received within thirty (30) days will become a part of the official record. As a result of comments received or if otherwise deemed appropriate by the Superintendent, he may provide additional opportunity for public participation to review the plan of operations.

(c) Any document required to be submitted pursuant to the regulations in this Subpart shall be made available for public inspection at the office of the Superintendent during normal business hours, unless otherwise available pursuant to § 9.51(b). This does not include those records only made available for the Superintendent's inspection under § 9.41 of this Subpart or those records determined by the Superintendent to contain proprietary or confidential information. The availability of such records for inspection shall be governed by the rules and regulations found at 43 C.F.R. Part 2.

[43 FR 57825, Dec. 8, 1978; 44 FR 37915, June 29, 1979]



## APPENDIX B

# FEDERAL LAWS, REGULATIONS, EXECUTIVE ORDERS, POLICIES, AND GUIDELINES THAT APPLY TO NONFEDERAL OIL AND GAS OPERATIONS

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This appendix includes the following sections:

1. **Part A** - description of the federal laws, executive orders, and NPS policies that may be applicable to persons that want to conduct nonfederal oil and gas operations in units of the National Park System.

The first four laws pertain specifically to the National Park Service. They are followed by:

- Other federal laws and regulations,
- Executive Orders, and
- NPS policies, guidelines, and procedures.

Part A is intended to acquaint the reader with many of the legal and policy requirements that apply to nonfederal oil and gas operations in units of the National Park System. These descriptions are not meant as legal interpretations and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. Congress may change statutes and agencies may update their regulations and policies. During project planning, operators are responsible for ensuring they have current and complete information on legal and policy requirements for nonfederal oil and gas operations on NPS lands.

2. **Part B** - overview of the compliance processes for the National Environmental Policy Act, and for the protection of cultural resources, threatened and endangered species, wetlands, floodplains, and coastal zones. This section also includes operating requirements (stipulations) to protect each of these resources and a flowchart illustrating the process taken by the NPS (and operator) to comply with these requirements.
3. **Part C** - a list of the federal, state and local permits that may be required for nonfederal oil and gas operations.
4. **Part D** – the applicability of solid waste disposal regulations to nonfederal oil and gas operations.

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<sup>20</sup> The following persons have contributed to this appendix: Lisa Norby, Petroleum Geologist, NPS; Pat O'Dell, Petroleum Engineer, NPS; Edward Kassman, regulatory specialist, NPS; Madoline Wallace, environmental protection specialist, former NPS employee; Sandy Hamilton, environmental protection specialist, NPS; and Michael Graetz, law student, NPS.



## PART A - FEDERAL LAWS, EXECUTIVE ORDERS, AND NPS POLICES THAT MAY BE APPLICABLE TO NONFEDERAL OIL AND GAS OPERATIONS IN NPS UNITS

Table B.1, summarizes many, but not all, of the legal and policy mandates governing the exercise of nonfederal oil and gas operations in national park units. These include statutes, regulations, executive orders and policies. This appendix contains summary descriptions of many of the Current Legal and Policy Requirements listed in the following table.

**Table B.1. Legal and Policy Mandates Pertaining to Nonfederal Oil and Gas Operations**

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
<b>National Park Service Statutes and Applicable Regulations</b>	
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
National Park Service 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 Rights regulations – 36 C.F.R. Part 9, Subpart B	All, e.g., air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, T&E species, visitor use and experience
Park System Resource Protection Act, 16 U.S.C. § 191j	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
<b>NPS Enabling Statutes that Reference Nonfederal Oil and Gas</b>	
Enabling Act for Big Cypress National Preserve, 16 U.S.C. §§ 698f – 698m-4	Natural, scenic, hydrologic, floral and faunal resources; recreational values
Enabling Act for Big South Fork National River and Recreation Area (Water Resources Act of 1974) 16 U.S.C. § 460ee	Hydrologic, fish and wildlife, cultural, historic, archeologic, and geologic resources; scenic and recreational values
Enabling Act for Big Thicket National Preserve, 16 U.S.C. §§ 698 – 698e	Natural, scenic, and recreational resources and values; and ecologic values
Enabling Act for Jean Lafitte National Historic Park, 16 U.S.C. §§ 230 – 230i	Natural, cultural, scenic, historic resources
Enabling Act for New River Gorge National River, 16 U.S.C. §§ 460m-15 – 460m-30	Natural, scenic and historic resources, values and objects; recreational values
Enabling Act for Obed Wild and Scenic River, 16 U.S.C. § 1274(15)	Hydrologic, geologic, fish and wildlife, historic, and cultural resources; recreational and scenic values; primitive character
Enabling Act for Padre Island National Seashore, 16 U.S.C. §§ 459d – 459d-7	Seashore, recreational values
Enabling Act for Tallgrass Prairie National Preserve, 16 U.S.C. §§ 698u – 698u-7	Ecologic, natural, and wildlife resources; scenic and historic values
<b>Other Applicable Federal Laws and Regulations</b>	
American Indian Religious Freedom Act, as amended, 42 U.S.C. §§ 1996 – 1996a; 43 C.F.R. Part 7	Cultural and historic resources



## APPENDIX B – LEGAL AND POLICY REQUIREMENTS

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Antiquities Act of 1906, 16 U.S.C. §§ 431-433; 43 C.F.R. Part 3	Cultural, historic, archeological, paleontological resources
Archeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa – 470mm; 18 C.F.R. Part 1312; 36 C.F.R. Part 296; 43 C.F.R. Part 7	Archeological resources
Clean Air Act, as amended, 42 U.S.C. §§ 7401-7671q; 40 C.F.R. Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; 48 C.F.R. Part 23	Air resources
Coastal Zone Management Act of 1972, 16 U.S.C. § 1451 <i>et seq.</i> , 15 C.F.R. 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 C.F.R. Parts 279, 300, 302, 307, 355, and 373	Human health and welfare and the environment
Endangered Species Act of 1973, as amended, 16 U.S.C. §§ 1531-1544; 36 C.F.R. Part 13; 50 C.F.R. 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 (FWS) or the National Marine Fisheries Service (NMFS).
Farmland Protection Policy Act, 7 U.S.C. §§ 4201-4209, 7 C.F.R. Part 658	Prime and unique farmland and soils
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 C.F.R. Parts 152-180, except Part 157	Human health and safety and the environment
Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701 <i>et seq.</i> ; 43 C.F.R. Part 2200 for land exchanges and 43 C.F.R. Parts 1700-9000 for all other BLM activities	Federal lands and resources administered by the Bureau of Land Management
Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. §§ 1251 <i>et seq.</i> ; 33 C.F.R. Parts 320-330; 40 C.F.R. Parts 110, 112, 116, 117, 122, and 230-232	Water resources, wetlands, and waters of the U.S.
Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661 – 666c	Water resources, fish and wildlife
Historic Sites, Buildings, and Antiquities Act (Historic Sites Act of 1935), 16 U.S.C. §§ 461-467; 18 C.F.R. Part 6; 36 C.F.R. 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 C.F.R. § 904; 50 C.F.R. Parts 10, 11, 12, 14, and 300	Fish and wildlife, vegetation
Migratory Bird Treaty Act, as amended, 16 U.S.C. §§ 703-712; 50 C.F.R. Parts 10, 12, 20, and 21	Migratory birds
National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 <i>et seq.</i> ; 40 C.F.R. Parts 1500-1508	Human environment (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 <i>et seq.</i> ; 36 C.F.R. Parts 18, 60, 63, 78, 79, 800	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 C.F.R. Part 10	Native American human remains, funerary objects, sacred objects, objects of cultural patrimony
Noise Control Act of 1972, 42 U.S.C. §§ 4901-4918; 40 C.F.R. Part 211	Human health and welfare
Oil Pollution Act, 33 U.S.C. §§ 2701-2762; 15 C.F.R. Part 990; 30 C.F.R. Part 253; 33 C.F.R. Parts 135 and 150; 40 C.F.R. Part 112	Water resources, natural resources
Pipeline Safety Act of 1992, 49 U.S.C. §§ 60101 <i>et seq.</i> ; 49 C.F.R. Parts 190-199	Human health and safety, the environment



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AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 <i>et seq.</i> ; 40 C.F.R. Parts 240-282; 49 C.F.R. 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 C.F.R. Parts 114, 115, 116, 320-325, and 333	Shorelines and navigable waterways, tidal waters, wetlands
Safe Drinking Water Act of 1974, 42 U.S.C. §§ 300f <i>et seq.</i> ; 40 C.F.R. Parts 141-148	Human health, water resources
Wild and Scenic Rivers Act of 1968, 16 U.S.C. §§1271 <i>et seq.</i> ; 36 C.F.R. Part 297	Water resources, recreational values, geologic resources, fish and wildlife, historic, cultural and other similar values
Executive Orders	
Executive Order No. 11593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971), 3 C.F.R. 1971 Comp., 36 C.F.R. §§ 60, 61, 63, 800	Cultural resources
Executive Order No. 11644 – Use of Off-Road Vehicles on the Public Lands, 37 Fed. Reg. 2877 (1972) reprinted in 42 U.S.C. § 4321, as amended by Executive Order No. 11989 (1977), 42 Fed. Reg. 26959; Executive Order No. 12608 (1987), § 21, 52 Fed. Reg. 34617	Natural and cultural resources, aesthetic and scenic values
Executive Order No. 11988 – Floodplain Management, 42 Fed. Reg. 26951 (1977), 3 C.F.R. 121 Comp., as amended by Executive Order No. 12148 (1979), 44 Fed. Reg. 43239, 3 C.F.R. 1979 Comp., p. 412	Floodplains, human health, safety, and welfare
Executive Order No. 11990 – Protection of Wetlands, 42 Fed. Reg. 26961 (1977), 3 C.F.R. 121	Wetlands
Executive Order No. 12088 – Federal Compliance with Pollution Control Standards, 43 Fed. Reg. 47707 (1978); as amended by Executive Order No. 12580 – Superfund Implementation, 52 Fed. Reg. 2923 (1987)	Natural resources, human health and safety
Executive Order No. 12630 – Governmental Actions and Interference with Constitutionally Protected Property Rights, 53 Fed. Reg. 8859 (1988)	Private property rights, public funds
Executive Order No. 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, amended by Executive Order No. 12948, 60 Fed. Reg. 6379 (1995)	Human health and safety
Executive Order No. 13007 – Indian Sacred Sites, 61 Fed. Reg. 26771 (1996)	Native Americans' sacred sites
Executive Order No. 13112 – Invasive Species, 64 Fed. Reg. 6183 (1999), as amended by Executive Order 13286, 68 Fed. Reg. 10619 (2003)	Vegetation and wildlife
Executive Order No. 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)	Migratory birds
Executive Order No. 13212 – Actions to Expedite Energy-Related Projects, 66 Fed. Reg. 28357 (2001), as amended by Executive Order No. 13302, 68 Fed. Reg. 27429 (2003)	Production, transmission, conservation of energy
Executive Order No. 13352 – Facilitation of Cooperative Conservation, 69 Fed. Reg. 52989 (2004)	Natural resources, property rights, public health and safety
Federal Policies, Guidelines and Procedures	
NPS Management Policies (2006)	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, visual resources
Dept. of the Interior, Departmental Manual, 516 DM 1 - 15 –NEPA policies (2005)	All resources including cultural resources, historic resources, natural resources, human health and safety



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AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Dept. of the Interior, Departmental Manual, 517 DM 1 - Pesticides (1981)	Human health and safety, the environment
Dept. of the Interior, Departmental Manual, 519 DM 1 - 2 – Protection of the Cultural Environment (1994)	Archeological, prehistoric resources, historic resources, Native American human remains, cultural objects
Department of the Interior, Departmental Manual, 520 DM 1 – Protection of the Natural Environment - Floodplain Management and Wetlands Protection Procedures (2001)	Floodplains and wetlands
Dept. of the Interior, Onshore Oil and Gas Order Number 2, Section III, Drilling Abandonment Requirements, 53 Fed. Reg. 46,810 - 46,811 (1988)	Human health and safety
NPS Director's Order 12 and Handbook – Conservation Planning, Environmental Impact Analysis, and Decision Making (2001)	All resources including natural resources, cultural resources, human health and safety, socioeconomic environment, visitor use
NPS Director's Order 28 – Cultural Resource Management (1998)	Cultural, historic, and ethnographic resources
NPS Director's Order 28A – Archeology (2004)	Archeological resources
NPS Director's Order 47 – Sound Preservation and Noise Management (2000)	Natural soundscapes
NPS Director's Order and Reference Manual 53 – Special Park Uses (2005)	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, visual resources.
RM 77 – Natural Resources Management (2004)	Natural resources
NPS Director's Order and Procedural Manual 77-1 – Wetland Protection (2002)	Wetlands
NPS Director's Order 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 Director's Order 28 – Cultural Resource Management	Cultural and historic resources
Government-to-Government Relations with Native American Tribal Governments, Presidential Memorandum (April 29, 1994)	Native Americans – Tribal rights and interests



## NATIONAL PARK SERVICE LAWS

### NATIONAL PARK SERVICE ORGANIC ACT OF 1916, as amended, 16 U.S.C. §§ 1 et seq.

**Resources afforded protection:** 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, visual resources

**Applicable regulation(s):** 36 C.F.R. Parts 1-10, 12-14, 20, 21, 25, 28, 30, 34, and 51

Through this Act, Congress established the National Park Service and mandated that it “shall promote and regulate the use of federal areas known as national parks, monuments...by such means and measures as conform to the fundamental purpose of said parks, monuments...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.”

Section 3 of the Organic Act provides the Secretary of the Interior with the authority to adopt rules and regulations to govern the use and the management of park units. Through this provision of the Organic Act, the NPS promulgated regulations governing the exercise of nonfederal oil and gas rights at 36 C.F.R. Part 9, Subpart B. These regulations control all activities during the exercise of rights to oil and gas not owned by the United States where access is on, across or through federally owned or controlled lands or waters within any NPS unit. The NPS does not intend the regulations to result in the taking of a property interest, but rather to impose reasonable regulations on activities that involve and affect federally owned lands. These regulations are written to ensure that operators conduct oil and gas activities in a manner consistent with the purposes for which Congress created the NPS unit. Likewise, the regulations prevent or minimize damage to the environment and other resource values and insure that all NPS units remain unimpaired for the enjoyment of future generations.

The courts have consistently interpreted the Organic Act and its amendments to elevate resource conservation above visitor recreation. Michigan United Conservation Clubs v. Lujan, 949 F.2d 202, 206 (6th Cir. 1991) states, “Congress placed specific emphasis on conservation.” National Rifle Association of America v. Potter, 628 F. Supp. 903, 909 (D.D.C. 1986) states, “In the Organic Act Congress speaks of but a single purpose, namely, conservation.” The NPS Management Policies (NPS 2006) also recognize that resource conservation takes precedence over visitor recreation. The policy dictates, “when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant.”

Because conservation remains predominant, the NPS seeks to avoid or minimize adverse impacts on park resources and values; however, the NPS has the discretion to allow impacts when necessary to fulfill park purposes (NPS 2006, §§ 1.4.3, 1.4.3.1). While some actions and activities cause impacts, the NPS cannot allow an adverse impact that constitutes resource impairment (NPS 2006, § 1.4.3). The Organic Act prohibits actions that impair park resources unless a law directly and specifically allows for the acts (16 U.S.C. § 1a-1). An action constitutes an impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS 2006, § 1.4.5). An impact on any park resource or value may constitute an impairment,



but an impact would be more likely to constitute an impairment to the extent that it has a major adverse effect on a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park, or
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or
- identified in the park's general management plan or other relevant NPS planning documents as being of significance. (NPS 2006 § 1.4.5)

To determine impairment, the NPS must evaluate "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" (NPS 2006, § 1.4.5).

### **NATIONAL PARK SYSTEM GENERAL AUTHORITIES ACT, 16 U.S.C. §§ 1a-1 et seq.**

**Resources afforded protection:** 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, visual resources

**Applicable regulation(s):** 36 C.F.R. Parts 1-199

This act affirmed 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 purpose of this act was "to include all such areas in the system and to clarify the authorities applicable to the system." The act made it clear that the NPS Organic Act and other protective mandates apply equally to all units of the system. Further, amendments stated that NPS management of park units should not "derogat[e] . . . the purposes and values for which these various areas have been established."

### **NATIONAL PARK SERVICE OMNIBUS MANAGEMENT ACT OF 1998, 16 U.S.C. §§ 5901 et seq.**

**Resources afforded protection:** any living or non-living resource

**Applicable regulation(s):** none

This statute requires the Secretary of the Interior to continually improve the NPS's ability to provide management, protection and interpretation of National Park System resources. The statute directs the NPS to manage the units by employing high quality science and information; to inventory the system's resources to create baseline information so that NPS can monitor and analyze future data to determine trends in the resources' conditions; and to use the results of the scientific studies for park management. In the oil and gas context, this requires operators to support their plans of operations with scientific data. Further, it requires the operators to monitor their operations area to ensure that their operations do not adversely impact the park's resources.



**PARK SYSTEM RESOURCE PROTECTION ACT,  
16 U.S.C. § 19jj**

**Resources afforded protection:** 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

**Applicable regulation(s):** none

The Park System Resource Protection Act makes any person who destroys, causes the loss of, or injures any park system resource strictly liable to the United States for response costs and for damages resulting from such destruction, loss, or injury. A park system resource includes any living or non-living resource located within the boundaries of a NPS unit, except for resources owned by a non-federal entity. Because the statute imposes strict liability the only defenses arise when an act of god or war caused the damage, a third party who constituted neither an employee or nor an agent of the owner/operator caused solely the damage, or an activity authorized by federal or state law caused the damage.

The Park System Resources Protection Act authorizes the Secretary of the Interior to request the Department of Justice to file a civil action for the costs of replacing, restoring or acquiring the equivalent of a park system resource; the value of any use loss pending its restoration; replacement, or acquisition, the cost of damage assessments; and the cost of response including actions to prevent, to minimize, or to abate injury. Response costs include actions taken by the NPS "...to prevent or minimize destruction, loss of, or injury to park system resources; to abate or minimize the imminent risk of such destruction, loss or injury; or to monitor ongoing effects of incidents causing such destruction, loss or injury."

The Park System Resource Protection Act applies to nonfederal oil and gas activities in units of the National Park System. Operators need to make sure that they operate within the specifications of their approved 9B plan, comply with all other relevant legal requirements, and take precautions to avoid actions that may damage park system resources.

**OTHER APPLICABLE FEDERAL LAWS AND REGULATIONS**

**AMERICAN INDIAN RELIGIOUS FREEDOM ACT,  
as amended, 42 U.S.C. §§ 1996 –1996a**

**Resources afforded protection:** cultural and historic resources

**Applicable regulation(s):** 43 C.F.R. Part 7

This Act requires the federal government to protect and to preserve Native Americans', Eskimos', Aleuts', and Native Hawaiians' inherent right to believe, to express, and to exercise their traditional religions. It allows them to access, to use, and to possess sacred objects and gives them the freedom to worship through ceremonials and traditional rites. It further directs various federal departments, agencies, and other administrative bodies to evaluate their policies and procedures in consultation with native traditional religious leaders to determine changes necessary to protect and preserve Native American religious cultural rights and practices.



If the NPS anticipates a conflict between proposed oil and gas operations and tribal religious rights, it will consult with the tribe as part of the 9B plan approval process. To ensure compliance with this Act, the NPS will consult with tribes during the plan of operations approval process.

**ANTIQUITIES ACT OF 1906,  
16 U.S.C. §§ 431 – 433**

**Resources afforded protection:** cultural, historic, archeological and paleontological resources  
**Applicable regulation(s):** 43 C.F.R. Part 3

As the Archeological Resources Protection Act's forerunner, the Antiquities Act constituted the first general act providing protection for archeological resources. It protects all historic and prehistoric ruins or monuments on federal lands and prohibits their excavation, destruction, injury or appropriation without the departmental secretary's permission. It also authorizes the President of the United States' to proclaim as national monuments public lands having historic landmarks, historic and prehistoric structures, and other objects of historic or of scientific interest. The Antiquities Act also authorizes the President to reserve federal lands, to accept private lands, and to accept relinquishment of unperfected claims for that purpose.

The Act authorizes the departmental secretary to issue permits to qualified institutions to examine ruins, excavate archeological sites, and gather objects of antiquity. Regulations at 43 C.F.R. Part 3 establish procedures for permitting the excavation or collection of prehistoric and historic objects on federal lands. ARPA permits replace Antiquities Act permits.

Operators who excavate, injure, destroy or appropriate any "object of antiquity" while engaging in mineral activities on federal lands without or contrary to an approved plan of operations violate the Antiquities Act and trigger its penalties.

**ARCHEOLOGICAL RESOURCES PROTECTION ACT OF 1979,  
16 U.S.C. §§ 470aa –470mm**

**Resources afforded protection:** archeological resources  
**Applicable regulation(s):** 18 C.F.R. § 1312; 36 C.F.R. Part 79, 296; 43 C.F.R. Part 7

Congress enacted the Archeological Resources Protection Act (ARPA) to preserve and protect archeological resources and sites on federal and Indian lands. The law makes it illegal to excavate or to remove from federal or Indian lands any archeological resources without a permit from the federal land manager. It also prohibits the removal, sale, receipt, and interstate transport of archeological resources obtained illegally (*i.e.*, without permits) from federal or Indian lands.

Agencies may issue permits only to educational or to scientific institutions if the resulting activities will increase knowledge about archeological resources. The law defines archeological resources as material remains of past human life or activities that are of archeological interest and are at least 100 years old. All materials collected on federal lands as a result of permitted activities remain the property of the United States. Those excavated from Indian lands remain the property of the Indian or Indian tribe having rights of ownership over such resources.



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Congress amended the law to require development of plans for surveying public lands for archeological resources and of systems for reporting incidents of suspected violations.

ARPA also fosters cooperation between governmental authorities, professionals, and the public. The ARPA permit process ensures that individuals and organizations wishing to work with federal resources have the necessary professional qualifications and that these persons follow federal standards and guidelines for research and curation. The process allows the State Historic Preservation Officer (SHPO) to review and comment on ARPA permit applications. Federal agencies do not issue ARPA permits to themselves or to their contractors. The scope of work and contractor's proposal, which constitute the contract, insures that contractors comply with federal standards and guidelines. The ARPA permit replaces the permit required by the Antiquities Act of 1906.

ARPA imposes severe criminal and civil penalties on anyone who excavates, removes, damages, or otherwise alters or defaces archeological resources without a permit. However, ARPA applies only to lands owned by the United States and lands held in trust by the United States for Indian tribes and individual Indians. ARPA does not apply on the nonfederal surface estate.

A contractor hired by an operator to conduct a cultural resource survey that involves any collection of archeological resources, whether or not excavation or subsurface testing is involved, must obtain an ARPA permit. Operations under an approved 9B plan do not need an ARPA permit for incidental disturbance of archeological resources because these operations occur exclusively for purposes other than excavation or removal of archeological resources. General earth-moving excavations performed under an approved plan of operations do not constitute "excavation or removal" of archeological resources. However, agencies require an ARPA permit before an operator under 36 C.F.R. Part 9B salvages previously unknown archeological resources discovered during operations.

ARPA regulations appear at 43 C.F.R. Part 7, Subparts A and B. Subpart A - "Protection of Archeological Resources, Uniform Regulations," promulgated pursuant to ARPA's section 10(a) jointly by the Secretaries of Interior, Agriculture, and Defense, and the Chairman of the Board of the Tennessee Valley Authority, establishes the uniform definitions, standards, and procedures that all federal land managers must follow when providing protection for archeological resources located on public and on Indian lands. Subpart B - "Department of the Interior Supplemental Regulations," provides definitions, standards, and procedures for federal land managers to protect archeological resources and provides further guidance for Interior bureaus concerning definitions, permitting procedures, and civil penalty hearings. In addition, NPS regulations at 36 C.F.R. § 9.47 discuss 9B plans and archeological resources.

Operators who remove, excavate, damage, alter, or deface archeological resources without or contrary to an approved plan of operations, while on federal property violate ARPA and trigger both its civil and criminal penalties.



**CLEAN AIR ACT,  
as amended, 42 U.S.C. §§ 7401 – 7671q**

**Resources afforded protection:** air resources

**Applicable regulation(s):** 40 C.F.R. Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; and 48 C.F.R. Part 23

The Clean Air Act (CAA) seeks to “protect and enhance” the quality of the nation’s air resources; to promote the public health and welfare and the productive capacity of its population; to initiate and to accelerate a national research and development program to achieve the prevention and control of air pollution; to provide technical and financial assistance to state and local governments for aid in their development and execution of air pollution programs; and to encourage and to assist the development and the operation of regional air pollution control programs.

The Act requires the U.S. Environmental Protection Agency (EPA) to establish national primary standards to protect human health and more stringent national secondary standards to protect human welfare (National Ambient Air Quality Standards or NAAQS). The statute makes states and local governments responsible for the prevention or control of air pollution. NAAQS exist for sulfur dioxide, particulate matter, ozone, nitrogen dioxide, carbon monoxide, and lead.

Divided into air quality control regions, states must submit Implementation Plans for EPA approval. These plans provide strategies for the implementation, maintenance, and enforcement of national primary and secondary ambient air quality standards for each air quality control region.

Other provisions of the Act include: new source review permit programs, standards of performance for new stationary sources (NSPS), motor vehicle emission and fuel standards, national emission standards for hazardous air pollutants (NESHAPS), studies of particulate emissions from motor vehicles, studies of the cumulative effect of all substances and activities that may affect the stratosphere (especially ozone in the stratosphere), programs to Prevent Significant air quality Deterioration (PSD) in areas attaining the NAAQS, and programs to protect visibility in large national parks and wilderness areas.

All sources of air pollution, including publicly or privately owned facilities, must meet all federal, state, and local requirements under the CAA. In most cases, States and local authorities regulate air pollution control. For the National Park Service, the Prevention of Significant Deterioration of Air Quality (PSD) (42 U.S.C. §§ 7470-7475) and the Visibility Protection (42 U.S.C. § 7479) constitute the most important CAA sections.

The PSD provisions establish a classification system for the United States’ clean air areas, which include those designated as Class I, Class II or Class III. National Park System units are designated as Class I or Class II areas. This classification indicates the additional increment of air quality degradation from particulate matter, sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), allowed in that area. Class I areas may only degrade by a very small increment of new pollution while Class III areas can degrade substantially. There are currently no Class III areas designated in the country.

As part of the Prevention of Significant Deterioration (PSD) program, Congress designated many National Parks and wilderness areas (including U.S. Fish and Wildlife Service and U.S. Forest Service wilderness areas) mandatory Class I areas. Because states may not



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redesignate these areas, Congress provided those areas with maximum protection from future air quality degradation. EPA designated all other parts of the country where air quality did not violate the national ambient air quality standards Class II areas where moderate pollution increases may occur. States or Indian tribes may reclassify Class II areas as Class III, thus, allowing significant pollution increases. However, no entity can designate certain Class II areas, such as national monuments and national recreation areas, as Class III but only Class II, or, at the option of the state, Class I.

Generally, the PSD rules apply only to major new or expanding facilities planning to locate or expand operations in clean air areas. An operator of a facility seeking a new source permit for location or for expansion in a clean air area must meet several requirements including National Ambient Air Quality Standards; PSD Classes I, II and III air pollution increments; and, a special "adverse impact determination" for Class I areas.

To protect the scenic value of visibility in National Parks and wilderness areas, Congress established a national visibility goal in section 169A of the CAA. Congress stated the agencies' goals as "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory class I federal areas which impairment results from manmade air pollution". Under current EPA regulations, the thirty-six states with mandatory Class I areas must assure reasonable progress toward the national visibility goal with respect to impairment reasonably attributed to major stationary sources of air pollution. EPA reviews new major stationary sources under permitting programs (*i.e.*, PSD and nonattainment area new source review) to assure visibility protection of Class I areas from potential future emissions.

These permitting programs also require that new major sources analyze visibility and other air quality impacts in the general area affected by the new source's emissions regardless of the classification of the area as Class I or Class II. If oil and gas development and operations result in major emissions of air pollutants as defined in PSD and nonattainment area permitting provisions, then such major emitting facilities would need to comply with these requirements as well as any other applicable, federal, state, and local air quality rules and regulations. EPA issued new regulations in July 1999 to address visibility impairment caused by regional haze, but implementation of this program will not occur for several more years.

The Clean Air Act Amendments of 1990 required EPA to promulgate rules to ensure that federal actions conform to appropriate nonattainment area SIPs. These rules prohibit federal agencies from taking any action that causes or contributes to any new violation of the NAAQS, increases the frequency or severity of an existing violation, or delays the timely attainment of a standard. The NPS will need to make a conformity determination for any oil and gas permitting decisions made under this management plan as it pertains to existing ozone nonattainment SIPs applicable in the area of the parks.



**COASTAL ZONE MANAGEMENT ACT OF 1972,  
as amended, (16 U.S.C. § 1451 et seq.)**

**Resources afforded protection:** coastal waters and adjacent shoreline areas, coastal uses and natural resources

**Applicable regulation(s):** 15 C.F.R. Parts 923, 930, 933

Congress enacted the Coastal Zone Management Act (CZMA) to preserve, protect, develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The purpose of the Act is to improve the nation's management of coastal resources, which have been irretrievably damaged or lost due to poorly planned development. Specific concerns were the loss of living marine resources and wildlife habitat, decreasing open space for public use, and shoreline erosion. Congress also recognized the need to resolve conflicts between various uses that were competing for coastal lands and waters (USDOC, NOAA, 1988a). The "coastal zone" means the coastal waters and the adjacent shorelands of the United States. It also includes coastal zones of the Great Lakes.

The CZMA establishes a state-federal partnership in which the states take the lead in managing their coastal resources by developing state CZM programs and plans, while the federal government provides financial and technical assistance. In section 309, the CZMA encourages each state, through a Coastal Zone Enhancement Grants Program, to improve continually its CZM program in one or more of eight identified national priority areas:

- coastal wetlands management and protection,
- natural hazards management (including potential sea and Great Lakes level rise),
- public access improvements,
- reduction in marine debris,
- assessment of cumulative and secondary impacts of coastal growth and development,
- special area management planning,
- ocean resource planning, and
- siting of coastal energy and government facilities.

Approved state CZM programs must provide a mechanism for public participation in permitting processes, consistency determinations and other similar decisions. They must also provide a mechanism to ensure that all state agencies will adhere to the program, and contain enforceable policies and mechanisms to implement the applicable requirements of the state's Coastal Nonpoint Pollution Control Program.

The CZMA requires federal agencies to act in a manner consistent with federally approved state management programs. Federal consistency under the CZMA means that federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone must be consistent with the enforceable policies of a coastal state's or territory's federally approved coastal management program. In states that do not have a coastal zone management program approved by the Secretary of Commerce, the requirement for a consistency review and state concurrence does not apply.

The National Oceanic and Atmospheric Administration's (NOAA) coastal zone management program regulations (15 C.F.R. Part 923) require that the boundary of a state's coastal zone



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must exclude federal lands. Units of the National Park System such as Big Thicket National Preserve are excluded from the boundaries of a state's coastal zone. However, the Coastal Zone Reauthorization Amendments in 1990 declared that all federal agency activities, whether located in or outside of the coastal zone, are subject to the consistency requirements of Section 307(c) of the CZMA if the activities affect natural resources, land uses, or water uses in the coastal zone. Additionally, the Texas Coastal Management Program/Final Environmental Impact Statement, prepared in 1996 by the NOAA's Office of Ocean and Coastal Resource Management and the State of Texas Coastal Coordination Council states that, "While activities on excluded federal lands are not required to comply with the TCMP goals and policies, an activity that has spillover effects on CNRAs is subject to the federal consistency requirement (Part II, 2-5)".

NPS Management Policies require that the NPS comply with the provisions of Executive Order 11988 (Floodplain Management) and state coastal zone management plans prepared under the Coastal Zone Management Act (NPS Management Policies, Chapter 4:8.1.1). Several NPS units have nonfederal oil and gas rights in the coastal zone. Jean Lafitte National Historical Park, Padre Island National Seashore, and a segment of the Beaumont Unit of Big Thicket National Preserve are examples of units that contain nonfederal oil and gas rights located in the coastal zone.

In the event that the NPS is considering issuing an access or surface use permit through the approval of a plan of operations, and the proposed nonfederal oil and gas operation may have a spillover effect on CNRAs, the NPS will consult with the Texas General Land Office for a consistency determination. In these cases, the Coastal Coordination Council must refer a consistency certification within 45 days of receipt by the Council Secretary of an administratively complete consistency certification, or the action is conclusively presumed to be consistent.

### **COMPREHNSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980, as amended, 42 U.S.C. §§ 9601 – 9675**

**Resources afforded protection:** human health and welfare and the environment

**Applicable regulation(s):** 40 C.F.R. Parts 279, 300, 302, 307, 355, and 373

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as "Superfund," provides for cleanup of sites contaminated by hazardous substances in the United States. CERCLA defines "hazardous substance" as any substance: listed under the Resources Conservation and Recovery Act (42 U.S.C. § 6921) as hazardous waste or having the characteristics identified under that section; listed under the Clean Water Act (33 U.S.C. § 1321(b)(2)(a)) as a hazardous substance or (33 U.S.C. § 1317(a)) as a toxic pollutant; listed under the Clean Air Act (42 U.S.C. § 7412) as a hazardous air pollutant; listed under the Toxic Substances Control Act (15 U.S.C. § 2606) as an imminently hazardous chemical substance or mixture; or listed under CERCLA (42 U.S.C. § 9602) as a hazardous substance.

CERCLA explicitly excludes petroleum from the definition of hazardous substance, including crude oil or any fraction of petroleum that is not otherwise specifically listed or designated as a hazardous substance under statutory provisions listed above. It also excludes natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable as fuel from the definition of hazardous substances. (42 U.S.C. § 9601(14)).



Owners or operators of a facility that stored, treated, or disposed of hazardous substances must notify EPA of the location and of the type of waste at the site. EPA puts the most seriously contaminated sites on a National Priorities List (NPL) and updates it annually. Sites on the NPL are eligible for long-term clean up actions funded by the EPA administered Superfund program.

CERCLA also includes reporting requirements for spills or other releases of hazardous substances. CERCLA requires persons in charge of a vessel or facility to report releases (except federally permitted releases) of hazardous substances into the environment to the National Response Center. If releases constitute less than the reportable quantity established by EPA (40 C.F.R. § 302.4), then it does not have to be reported. Failure to report a reportable quantity release warrants a fine of up to \$10,000 and imprisonment not to exceed one year (42 U.S.C. § 9603). "Release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, dumping or disposing into the environment. "Release" also includes the abandonment of barrels or containers that contain hazardous substances.

CERCLA directs the president to revise and to publish a National Contingency Plan (NCP) for the cleanup of petroleum and hazardous waste spills. EPA developed the original NCP under section 311 of the Clean Water Act. The NCP details how the EPA will respond to spills of oil or hazardous substances regulated under CERCLA and/or the Clean Water Act. EPA publishes the plan, called the National Oil and Hazardous Substances Pollution Contingency Plan, at 40 C.F.R. Part 300.

CERCLA authorizes the EPA to clean up sites using the Superfund, to issue administrative orders requiring potentially responsible parties (PRPs) to clean up sites, and to obtain court orders requiring PRPs to clean up sites. If EPA uses the Superfund, then CERCLA authorizes EPA to sue PRPs to recover costs of the cleanup. PRPs who have incurred costs cleaning up may sue other PRP's to recover part of the cost of the cleanup.

Under CERCLA, the EPA tries to find all PRPs, including the present owner or operator of a vessel or facility that released or threatened a release of hazardous substances, past owners or operators of a vessel or facility at the time of disposal of the hazardous substance; persons who arranged for disposal of the hazardous substance at the facility; and persons who transported a hazardous substance to the facility.

However, if the PRP can establish that the release or threatened release and the resulting damages occurred solely by an act of God, an act of war, or an unforeseen act or omission of a third party who neither constituted an agent nor an employee of the PRP, then no liability attaches. CERCLA provides an innocent landowner defense under limited circumstances.

Persons liable under CERCLA remain responsible for all response costs incurred by the United States, a state or an Indian tribe. They may also incur liability for damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing the injury, and for the destruction or loss of natural resources. Furthermore they may be responsible for costs of certain health assessments or studies.

CERCLA imposes strict liability meaning the government does not have to prove that the person intended to release, acted negligently in releasing, or caused the release of a hazardous substance into the environment. Moreover, in most cases, any of the liable parties may be held responsible for the entire cost of the cleanup. To recover part of the cleanup costs, the party then sues other liable parties for contribution.



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Operators and their contractors should thoroughly investigate waste disposal sites before sending hazardous substances. They should check to make sure disposal sites have the relevant state and federal permits and that the disposal company has provided enough money to properly close the site. If a release occurs from the disposal site, then the persons who disposed of hazardous substances could incur large cleanup bills.

Operators should avoid releases of hazardous substances. Release of an operator's performance bond required under 36 C.F.R. § 9.48 does not affect possible subsequent liability under CERCLA for releases of a hazardous substance into the environment.

### **ENDANGERED SPECIES ACT OF 1973, as amended, 16 U.S.C. §§ 1531 – 1544**

**Resources afforded protection:** 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 (FWS) or the National Marine Fisheries Service (NMFS). Distinct population segments of species of vertebrate fish or wildlife, which interbreed when mature, may also be listed as threatened or endangered, and are afforded protection.

**Applicable regulation(s):** 36 C.F.R. Part 13; and 50 C.F.R. Parts 10, 17, 23, 81, 217, 222, 225 402, and 450

The Endangered Species Act (ESA) requires federal agencies to ensure that their activities (authorized, funded, or carried out) will not jeopardize the continued existence of any listed threatened or endangered species or result in the destruction or adverse modification of critical habitat of such species. The FWS and NMFS administer the Act. The ESA makes it illegal to "take" an endangered species of fish or wildlife without a permit from the FWS or NMFS. "Taking" includes direct killing, hurting, trapping, or harassing. It also includes disrupting a habitat critical to the species' survival. Protective regulations issued at the time of listing for a threatened species of fish or wildlife may also prohibit or limit taking of the species without a permit.

Other federal agencies must formally consult with the FWS or NMFS when they believe that their own actions (including permitting) may affect a listed or a proposed threatened or endangered (T & E) species. The ESA prohibits agency actions occurring within the United States that jeopardize the continued existence of a T & E species and/or destroy or adversely affect designated critical habitat necessary for the species' survival.

When an operator submits a proposed plan of operations, the NPS and operators must comply with the requirements of the Endangered Species Act and the regulations FWS and NMFS have promulgated to implement it (50 C.F.R. Part 402). First, the NPS requests the FWS or NMFS to provide a list of proposed or listed species and proposed or designated critical habitat in the proposed operations area.

If the FWS or NMFS advises the NPS that listed or proposed T&E species may be present, then the NPS must prepare a biological assessment (BA). The BA evaluates the potential effects of the action on listed and proposed species and designated and proposed critical habitat. The BA will be concurrently released for public review and comment with the National Environmental Policy Act (NEPA) document (most likely an environmental assessment). The BA should include a list of listed and proposed threatened or endangered species occurring in the project



area; impacts the project could have on these species and their habitat; project measures intended to mitigate, or reduce adverse impacts to these species and their habitat; and a description of the formal and informal consultation with the FWS or NMFS.

If the BA indicates that the action will not adversely affect any remaining listed species or designated critical habitat and the FWS or NMFS concurs, then formal consultation is not required. Likewise, if the BA indicates that the action is not likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat, and FWS or NMFS concurs, then a conference is not required.

However, if the BA indicates that the action will adversely affect a listed species or critical habitat, then the NPS must formally consult with the FWS or NMFS. At the end of the consultation, the FWS or NMFS provides the NPS and the applicant with its "biological opinion." If the opinion finds the proposed action will jeopardize the continued existence of the species or result in the destruction or adverse modification of designated critical habitat, then the FWS or NMFS must suggest reasonable and prudent alternatives to the proposed action. If the FWS or NMFS cannot develop any reasonable and prudent alternatives, then it will indicate that to the best of its knowledge there are no reasonable and prudent alternatives exist. The FWS or NMFS may also formulate conservation recommendations, which will help the NPS reduce or eliminate the impacts the proposed action may have on listed species or designated critical habitat. The NPS will comply with prescribed alternatives when approving the plan of operations or implementing any other related action.

The NPS cannot approve a plan of operations if the FWS or NMFS has found that, no matter how the proposed operation is modified, it will result in "jeopardy" to a listed species or "destruction or adverse modification to habitat" critical to a listed species. Jeopardizing a listed species or habitat critical to a listed species' survival constitutes a "significant injury to federal lands" in the meaning of 36 C.F.R. Part 9B. The 36 C.F.R. Part 9B regulations do not allow the NPS to approve proposed plan of operations that will result in a "significant injury to federal lands."

## **FARMLAND PROTECTION POLICY ACT, 7 U.S.C. §§ 4201, 4209**

**Resources afforded protection:** prime and unique farmland and soils

**Applicable regulation(s):** 7 C.F.R. Part 658

Federal agencies must assess the effects of their actions on prime or unique farmland and land of statewide or local importance classified by the U.S. Department of Agriculture's Natural Resources Conservation Service. The FPPA does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. Prime farmland is land that has the physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber. Unique farmland is land other than prime farmland



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that is used for production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. Farmland that is of statewide or local importance for the production of food feed, fiber, forage, or oilseed crops, as determined by the appropriate state or unit of local government agency or agencies, and that the Secretary determines should be considered as farmland for the purposes of this subtitle.

### **FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT, as amended (commonly referred to as FEDERAL ENVIRONMENTAL PESTICIDE CONTROL ACT OF 1972), 7 U.S.C. §§ 136 et. seq.**

**Resources afforded protection:** human health and safety, and the environment

**Applicable regulation(s):** 40 C.F.R. Parts 152-180, except Part 157

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, regulates pesticides in the United States. FIFRA prohibits the distribution or sale of unregistered pesticides and establishes procedures for registering pesticides with the EPA. EPA has the authority to suspend or to cancel registrations for pesticides, which cause unreasonable adverse effects on the environment. To gain registration approval, a pesticide must meet EPA criteria regarding efficacy, labeling, and environmental safety. The statute makes it illegal to use a pesticide in a manner inconsistent with its labeling. EPA determines whether it should classify pesticides for general or restricted use. People may only use pesticides classified for restricted use under the direct supervision of a certified applicator or subject to other restrictions imposed by regulation.

FIFRA also requires EPA to establish regulations for storage and disposal of pesticide containers, excess pesticides, and pesticides with canceled registration. The Act also outlines penalties, indemnities, and administrative procedures. In addition, EPA may exempt from any provision of the Act any federal or state agency, if it determines emergency conditions, requiring such exemption, exist.

The appropriate NPS pesticide specialist must review and approve use of pesticides, including herbicides and rodenticides, before anyone can use them in units of the National Park System, including those where nonfederal oil and gas operations occur. An NPS Integrated Pest Management Specialist must review and approve the proposed use of herbicides for clearing areas for oil and gas operations. The parks follow Department of the Interior Departmental Manual - 517; Reference Manual – 77, Natural Resources Management; and NPS Procedures for Pesticide Use Requests when considering proposals for pesticide use in NPS units.

### **FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976, 43 U.S.C. §§ 1701 et seq.**

**Resources afforded protection:** federal lands and resources administered by the Bureau of Land Management

**Applicable regulation(s):** 43 C.F.R. Part 2200 for land exchanges and 43 C.F.R. Parts 1700-9000 for all other BLM activities

The Federal Land Policy and Management Act (FLPMA), also known as the “BLM Organic Act”, controls Bureau of Land Management’s (BLM) administration of more than three hundred million



acres of federal lands in the western United States and Alaska. FLPMA also contains a land exchange authority (43 U.S.C. § 1716) under which the Secretary of the Interior may exchange federal lands or interests outside National Park System units for nonfederal lands or interests within National Park System units. When appropriate, the NPS and BLM may use this exchange authority to acquire private mineral interests in National Park System units.

BLM regulations at 43 C.F.R. Part 2200 govern federal land exchanges authorized by FLPMA. The regulations describe the appraisal and other procedures BLM uses while conducting land exchanges. However, if the enabling or exchange act for a unit remains inconsistent with these regulations, then the enabling or exchange act applies.

### **FEDERAL WATER POLLUTION CONTROL ACT OF 1972, (commonly referred to as Clean Water Act), 33 U.S.C. §§ 1251 *et. seq.***

**Resources afforded protection:** water resources, wetlands, and waters of the U.S.

**Applicable regulation(s):** 33 C.F.R. §§ 320-330; and 40 C.F.R. Parts 110, 112, 116, 117, 122, and 230-232

Originally titled the Federal Water Pollution Control Act of 1972 (FWPCA) and significantly amended in 1977 and 1987, the Clean Water Act established a federal policy to restore and to maintain the chemical, physical, and biological integrity of the nation's waters; to enhance the quality of water resources; and to prevent, control and abate water pollution.

To achieve this objective, the FWPCA establishes the ultimate goal of eliminating the discharge of pollutants into navigable waters of the United States and the interim goal of maintaining water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water. The FWPCA prohibits the discharge of toxic pollutants in toxic amounts; provides federal assistance to construct publicly owned waste treatment works; develops and implements area-wide waste treatment management processes to assure adequate control of source pollutants in each state; makes a major research and demonstration effort to develop technology necessary to eliminate the discharge of pollutants into navigable waters, waters of the contiguous zone, and the oceans; and develops and implements programs for the control of nonpoint sources of pollution to control both point and nonpoint sources of pollution.

As with most environmental programs, the FWPCA requires that states set and enforce water quality standards to meet minimum federal (EPA) requirements, including: effluent limitations for point sources of pollution; permits for discharges of pollutants into waters of the United States; and permits for discharges of dredged or fill material into waters of the U.S., including wetlands.

The following sections of the CWA remain relevant to oil and gas operators in National Park System units: Section 311 - spill reporting and spill control; Section 401 - state certification of project compliance; Section 402 - National Pollutant Discharge Elimination System (NPDES); Section 404 - Corps of Engineers dredge and fill permits.

#### Section 311 (33 U.S.C. § 1321)

Under section 311 no person can discharge oil or hazardous substances in harmful quantities into or upon navigable waters of the U.S., into or upon adjoining shorelines, or into or upon waters of the contiguous zone. Likewise, a person cannot discharge in connection with



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activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974. For oil, a harmful quantity (*i.e.*, quantity that requires reporting) equals that amount which causes a violation of the applicable water quality standard or that amount which causes a film, sheen, or discoloration of the water surface. Persons who discharge a reportable quantity” must report the spill as soon as possible to the U.S. Coast Guard, EPA, and/or state agency, which agency depends on the geographic location of the spill and the type of substance spilled.

Hazardous substances are handled differently. Title 40 C.F.R. Part 116 lists about 300 hazardous substances. Title 40 C.F.R. Part 117 defines the reportable quantities for each substance. The reporting requirements of 40 C.F.R. Part 117 do not apply to permitted discharges. (See Section 402 permits below.) Failure to report a discharge can result in criminal penalties including fines and imprisonment. Section 311 also provides for federal cleanup of the spill and places the costs of cleanup on the entity that caused the spill. The section also protects the person in charge who reports the spill from criminal prosecution, but offers no immunity from civil penalties that may apply.

Under section 311, EPA issued regulations (40 C.F.R. Part 112) to prevent the discharge of oil and hazardous substances into the navigable waters of the United States. These regulations require that any of the facilities described below prepare a Spill Prevention Control and Countermeasure Plan (SPCCP). 40 C.F.R. Part 112 addresses the requirements for a SPCC Plan.

The SPCCP requirement applies to non-transportation related onshore and offshore facilities that drill, produce, gather, store, process, refine, transfer, distribute or consume oil or oil products. It only applies if the facilities due to their location, could potentially discharge oil in harmful quantities into or on the navigable waters of the United States or the adjoining shoreline. (Note: facilities with an underground storage capacity less than 42,000 gallons, or facilities with an above-ground storage capacity less than 1,320 gallons, are exempt from this requirement.)

Under its regulations at 36 C.F.R. Part 9B, the NPS requires a nonfederal oil and gas operator to submit a Spill Control and Emergency Preparedness Plan to deal with oil spills and other environmental hazards. A copy of the SPCCP, if one is required under 40 C.F.R. Part 112, will often meet most of the requirements for the Spill Control and Emergency Preparedness Plan under 36 C.F.R. Part 9B.

### Section 401 Water Quality Certification (33 U.S.C. § 1341)

Section 401 requires certification from the state or interstate water control agency that a proposed activity complies with established effluent limitations and water quality standards. Applicants for federal permits or licenses must obtain this certification from the state agency that has been delegated authority to administer the FWPCA.

### Section 402 Permits (33 U.S.C. § 1342(I)(2))

Under the National Pollutant Discharge Elimination System (NPDES), the EPA controls the discharges of pollutants from their point source into waters of the United States by using a permitting system. A "point source" could be a tank battery, for example. Any entity proposing to or discharging waste flows into U. S. waters needs a NPDES permit. EPA or states with EPA-approved programs issue NPDES permits.

The NPDES permit sets specific discharge limits. The limits rely on most recent pollution control technology, water quality standards, and government imposed schedules for installation



of new pollution control equipment. The permit gives directions to the operator for monitoring and reporting discharges. The regulations provide for individual permits, group permits for like facilities, and general permits.

The Water Quality Act of 1987 amended the CWA to address stormwater runoff from industrial facilities. EPA requires a NPDES stormwater runoff permit for runoff that may touch machinery or contaminated material onsite and cause contamination of adjacent property. Industrial facilities include oil and gas exploration, production and development operations. The EPA published its rule on NPDES permit application regulations for storm water discharges at 55 Fed. Reg. 47990 (November 16, 1990).

The CWA exempts mining and oil and gas operations from the Section 402 stormwater permit requirements if,

"...discharges of stormwater runoff from mining operations, oil and gas exploration, production, processing, or treatment operations or transmission facilities, [are] composed entirely of flows which are from conveyances or systems of conveyances (including but not limited to pipes, conduits, ditches, and channels) used for collecting and conveying precipitation runoff and...are not contaminated by contact with, or do not come into contact with, any overburden, raw material, intermediate products, finished product, by-product, or waste products located on the site of such operations." (33 U.S.C. § 1342(l)(2))

"Contaminated storm water runoff" includes runoff containing a hazardous substance in excess of reporting quantities established at 40 C.F.R. § 117.3 or 40 C.F.R. § 302.4, containing oil in excess of the reporting quantity established at 40 C.F.R. § 110.3 (e.g., causes a visible sheen), or contributing to a violation of a water quality standard.

The EPA issued a Final Rule on June 12, 2006 that permanently exempts the NPDES stormwater permitting requirements for oil and gas construction activities under Section 402 of the Act (Federal Register Vol. 71 No. 112 6/12/2006). Discharges containing contaminated stormwater run-off require NPDES permits. The Final rule additionally clarifies that stormwater containing sediment run-off (associated with gas well construction activities) is not considered contaminated and will not trigger NPDES permitting requirements (40 C.F.R. § 122.26(a)(2)(ii)).

### Section 404 Permits (33 U.S.C. § 1344)

Under section 404, anyone who discharges dredge or fill material into navigable waters needs a permit from the U.S. Army Corps of Engineers. "Navigable waters" mean "...those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce." (33 C.F.R. § 329.4)

A determination of navigability, once made, applies over the entire surface of the waterbody and remains in effect even if later actions or events impede or destroy its navigability.

Section 404 regulates discharges into virtually all surface waters where the use, degradation, or destruction of these waters could affect interstate commerce. It also applies to all tributaries and adjacent wetlands of such waters. The COE defines wetlands as areas "inundated or saturated by surface or ground water at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions..." (33 C.F.R. § 328.3(b)).



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The Corps of Engineers may issue individual permits or general permits on a state, regional, or nationwide basis. It issues general permits for certain kinds of similar activities in wetlands that will cause only minimal adverse effects on the environment. General permits do not cover many operators of nonfederal oil and gas properties in National Parks. They must obtain an individual "404" permit to conduct any operations that involve dredging or discharge of fill material into wetlands.

Under the 404 permit program, the COE may issue individual permits or general permits on a state, regional, or nationwide basis. COE uses general permits for certain categories of activities that have only minimal adverse and cumulative effects on the environment. Many operators of nonfederal oil and gas properties in National Parks do not hold general permits. Operators must obtain an individual "404" permit to conduct operations that involve dredging or discharging fill material into wetlands.

Before the issuance of either a NPDES or section 404 permit, the applicant must obtain a section 401 certification. This declaration states that any discharge complies with all applicable effluent limitations and water quality standards.

The NPS cannot waive CWA requirements for oil and gas operators. An operator has full responsibility for obtaining section 402 (NPDES) or/and section 404 (dredge and fill) permits and for reporting spills of oil, or other contaminating and hazardous substances.

### **FISH AND WILDLIFE COORDINATION ACT, 16 U.S.C. §§ 661 – 666c 1935), 16 U.S.C. §§ 461 – 467**

**Resources afforded protection:** water resources, fish and wildlife  
**Applicable regulation(s):** none

This Act applies to major federal water resources development plans (impounding, diverting, deepening the channel, or otherwise controlling or modifying streams or other bodies of water). Requires federal agencies to consult with the Fish and Wildlife Service and applicable state agencies whenever such plans result in alteration of a body of water. The Act requires that wildlife conservation receive equal consideration with other features of water resource development. It also triggers coordination with the Fish and Wildlife Service upon application for a 404 permit.

### **HISTORIC SITES, BUILDINGS, AND ANTIQUITIES ACT (Historic Sites Act of 1935), 16 U.S.C. §§ 461 – 467**

**Resources afforded protection:** historic sites, buildings and objects  
**Applicable regulation(s):** 18 C.F.R. Part 6; and 36 C.F.R. Parts 1, 62, 63, and 65

This Act establishes a national policy "to preserve for public use, historic sites, buildings, and objects of national significance for the inspiration and benefit" of the American people. The Act authorizes the designation of national historic sites and landmarks, authorizes interagency efforts to preserve historic resources, and establishes fines for violations of the Act. It authorizes surveys of historic and archeological sites, buildings, and objects to determine which remain significant, and provides for the restoration, reconstruction, rehabilitation, preservation,



and maintenance of historic and prehistoric properties of national significance. The Act authorizes the Secretary of the Interior, through the National Park Service, to conduct surveys and studies, to collect information, and purchase significant historic properties. The Secretary may also restore, preserve, maintain, and rehabilitate structures and sites; establish museums; and operate and manage historic sites, and develop educational programs.

**LACEY ACT,  
as amended, 16 U.S.C. §§ 3371 *et seq.***

**Resources afforded protection:** fish and wildlife, vegetation

**Applicable regulation(s):** 15 C.F.R. 904; 50 C.F.R. Parts 10, 11, 12, 14, and 300

The Lacey Act prohibits the import, export, transport, sales, receipt, acquisition, or purchase of fish, wildlife, or plants that are taken, possessed, transported, or sold in violation of any federal law, treaty, regulation or Indian tribal law. The act also makes illegal importing, exporting, transporting, selling, receiving, acquiring, or purchasing in interstate or foreign commerce any fish, wildlife or plants taken, possessed, transported or sold in violation of a state law or state regulation (or foreign law for fish and wildlife, but not for plants). The Act also establishes marking requirements for containers or packages containing fish or wildlife.

The 1981 amendments to the Act strengthened federal laws and improved federal assistance to states and foreign governments for enforcement of fish and wildlife laws. The Act has significant civil and criminal penalties for violations and has emerged as a vital tool in efforts to control smuggling and trade in illegally taken fish and wildlife.

The U.S. Fish and Wildlife Service regulations implementing the Lacey Act and other related laws describe the procedures for the assessment of civil penalties (50 C.F.R. Part 11) and for government seizure and forfeiture (50 C.F.R. Part 12).

**MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT,  
16 U.S.C. § 1801**

**Resources afforded protection:** commercial and recreational fisheries, fish habitat

**Applicable regulation(s):** none

The Magnuson Act provides for the management of the nations' fisheries within the exclusive economic zone. Regulations on commercial fishing activities are prescribed consistent with the terms of fishery management plans adopted through a collaborative process involving regional fishery management councils. Although the restrictions on commercial and recreational fishing activities are enforceable against those activities through criminal and civil sanctions, the Magnuson Act does not impose prohibitions on activities other than commercial and recreational fishing. To improve the conservation of any essential fish habitat identified by the Secretary of Commerce, the Magnuson Act requires that each "federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat . . . ." 16 U.S.C. § 1855(b)(2). This consultation requirement provides the Secretary of Commerce with the opportunity to offer recommendations to the federal action agency on ways to avoid, mitigate, or offset the impact of the proposed action on essential habitat. While the



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federal agency is not bound to implement such recommendations, it must explain its reasons for not following them.

### **MARINE MAMMAL PROTECTION ACT (MMPA), as amended, 16 U.S.C. §§ 1361 – 1407**

**Resources afforded protection:** marine mammals

**Applicable regulation(s):** none

The MMPA, enacted in 1972, was the first modern wildlife conservation law adopted at the federal level. Using dramatic, broad-scale moratoria on the taking and importation of marine mammals and marine mammal products, as well as the imposition of an absolute preemption on all state laws that relate to the taking of marine mammals (subject to an opportunity for transfer of management authority), the Congress adopted the MMPA to conserve these species and their marine habitats. The MMPA prohibits the taking of marine mammals within the United States (both territorial and resource jurisdiction) and on the high seas (for persons subject to U.S. jurisdiction). No permit or authorization may be issued for the taking of a marine mammal (for activities other than commercial fishing) unless one of the following exceptions applies:

1. The permitted taking would be for public display purposes (non-depleted marine mammals only), scientific research, photography for educational or commercial purposes (harassment take only), or enhancing the survival or recovery of a marine mammal species or stock, consistent with the requirements of Section 104.
2. The Secretary of the Interior (or Commerce for cetaceans and pinnipeds other than walruses) decides to waive the taking moratorium for a particular marine mammal species or stock after determining that such species or stock is at its “optimum sustainable population” level and adopts regulations for such taking under Section 103 pursuant to the formal rulemaking requirements of the APA [agency rulemaking on the record with an opportunity for a formal hearing before an administrative law judge].
3. The activity involves the non-lethal deterrence of marine mammals to prevent damage to fishing gear or catch or to other private or public property, consistent with guidelines adopted by the Secretary under Section 101(a)(4).
4. Incidental take of small numbers of marine mammals may be authorized by regulation for specified activities that occur within a specific geographic area for a period of not more than 5 years, provided that the total of such taking will have a negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of the species for the subsistence uses of Alaska natives (if the incidental take involves harassment only, regulations are not necessary and the Secretary may issue annual authorizations). In the event of a conflict between the terms of the Endangered Species Act and the Marine Mammal Protection Act, the more restrictive requirement of the MMPA takes precedence (16 U.S.C. § 1543).



**MIGRATORY BIRD TREATY ACT,  
as amended, 16 U.S.C. §§ 703 – 712**

**Resources afforded protection:** migratory birds

**Applicable regulation(s):** 50 C.F.R. Parts 10, 12, 20, and 21

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States, Canada, Japan, Mexico, and Russia for the protection of migratory birds. Unless permitted by regulations, under the MBTA a person cannot attempt or succeed at pursuing, hunting, taking, capturing, or killing, possessing, offering to sell, selling, bartering, purchasing, delivering, shipping, exporting, importing, transporting, carrying or receiving any migratory bird, body part (e.g. feathers), nest, egg, or product. The U.S. Fish and Wildlife Service regulations provide procedures for obtaining a migratory bird permit (50 C.F.R. Part 21). Regulations at 50 C.F.R. 20 cover hunting of migratory birds, and regulations at 50 C.F.R. Part 12 cover seizure and forfeiture procedures.

Operators and their employees should avoid actions with respect to migratory birds that could violate the Migratory Bird Treaty Act (e.g. destroying nests and eggs or picking up dead birds).

**NATIONAL ENVIRONMENTAL POLICY ACT OF 1969,  
42 U.S.C. §§ 4321 et seq.**

**Resources afforded protection:** human environment (e.g. cultural and historic resources, natural resources, biodiversity, human health and safety, socioeconomic environment, visitor use and experience)

**Applicable regulation(s):** 40 C.F.R. Parts 1500-1508

The National Environmental Policy Act (NEPA) mandates that federal agencies assess the environmental effects of a proposed action and engage the public in the analyses of environmental impacts before agencies make decisions affecting the human environment. NEPA requires that federal agencies “utilize a systematic interdisciplinary approach” to ensure the integrated use of resource information in federal decision-making affecting the environment. Federal agencies must complete all analyses, public input, and NEPA documentation in time to aid decision-making. Initiating or completing environmental analysis after making a decision, whether formally or informally, violates both the spirit and the letter of NEPA.

Besides setting environmental planning policy goals, NEPA created the Council on Environmental Quality (CEQ), an agency of the president’s office, as the “caretaker” of NEPA. CEQ published NEPA regulations in 1978 (40 C.F.R. Parts 1500-1508). The CEQ regulations apply to all federal agencies and require each agency to “implement procedures to make the NEPA process more useful to agency decision-makers and the public” (40 C.F.R. 1500.2). Agencies must review and update their regulations as necessary. In 1981 CEQ also published a guidance document titled “Forty Most Asked Questions Concerning CEQ’s NEPA Regulations” (46 Fed. Reg. 18026, (1981)). Director’s Order 12 and Handbook (2001) is the National Park Service’s guidance on implementing NEPA.

The NEPA process constitutes an essential component of conservation planning and resource management through the integration of scientific and technical information into management decisions. In order to be effective, agencies cannot fulfill NEPA compliance by conducting an



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after-the-fact "compliance" effort. A well-crafted NEPA analysis provides useful information about the environmental pros and cons (*i.e.* impacts) of a variety of reasonable choices (alternatives), similar to an economic cost-benefit analysis, technical planning, or logistical planning. It remains an essential prelude to the effective management of park resources.

NEPA represents a procedural or process-oriented statute rather than a substantive or substance-oriented statute. Other substantive laws may prevent an agency from taking action or components of an action which have "too great" an impact on a particular resource. Within the NPS, the process of environmental analysis under NEPA provides the needed information to make substantive decisions for the long-term conservation of resources.

NEPA has a broad reach. NEPA is triggered whenever there is a major federal action, regardless of who proposes the action (NPS, private individuals, federal agencies, states, or local governments) or whether the action could impact the human environment. Even though the CEQ regulations give less emphasis to the socioeconomic environment than the physical or natural environment, the NPS considers the socioeconomic environment as an integral part of the human environment. Consequently, NPS will do NEPA analysis even if the impacts remain primarily socioeconomic, including potential impacts on minority and low-income communities (see Executive Order No. 12948, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

The National Park Service undertakes its environmental analyses in a number of ways. When the NPS considers taking a "major federal action", it prepares an environmental assessment (EA) to assess the impacts of the proposed operation and to determine if the NPS must prepare an environmental impact statement (EIS). If, based on the EA's analysis and public comments, the NPS determines that the proposed action would not significantly affect the human environment, the NPS would prepare a decision document called a Finding of No Significant Impact (FONSI). Conversely, if NPS determines the proposed action would likely cause significant effects on the human environment, then it prepares an EIS. The NPS may prepare an EIS, without first preparing an EA if the action will likely cause significant environmental impacts. If the proposal has been previously analyzed in site-specific detail, a "memo to files" may be prepared. Some actions or types of proposals fall under a NEPA "categorical exclusion" (CE). A categorical exclusion is used where the proposal meets specific criteria defined under Department of the Interior regulations and NPS Director's Order 12, for activities that do not have the potential for measurable impacts on park resources.

### **NATIONAL HISTORIC PRESERVATION ACT OF 1966, as amended, 16 U.S.C. §§ 470 – 470x-6**

**Resources afforded protection:** cultural and historic properties listed in or determined to be eligible for listing in the National Register of Historic Places

**Applicable regulation(s):** 36 C.F.R. Parts 60, 63, 65, 78, 79, 800, 801, and 810

The National Historic Preservation Act (NHPA) declared a national policy of historic preservation. It encouraged preservation on the state and the private levels, authorized the Secretary of the Interior to expand and to maintain a National Register of Historic Places, established the Advisory Council on Historic Preservation, and required federal agencies to conduct studies of potential effects of their proposed actions on National Register properties and to provide the Advisory Council opportunities to comment (§ 106). The Advisory Council



has promulgated regulations, "Protection of Historic and Cultural Properties," at 36 C.F.R. Part 800, to implement section 106 and presidential directives issued under it.

The NHPA also required federal agencies to identify, evaluate, and nominate cultural resources for inclusion in the National Register. Likewise, agencies must manage for preservation those National Register eligible or listed properties that under their jurisdiction or control.

In 1980 Congress passed a series of amendments to the NHPA and other preservation legislation. These amendments: codified portions of Executive Order No. 11593, which required inventories of federal resources and federal agency programs to protect historic resources; clarified that federal agencies can exclude inventory and evaluation of resources from the one percent fund limit under the 1974 amendments to the Reservoir Salvage Act; and authorizes federal agencies to charge federal permittees and licensees reasonable costs for protection activities.

The 1992 amendments to the Act explicitly call for Native American consultations when potential traditional cultural properties may be on federal lands. If such properties are discovered through the consultations, they should be evaluated for possible eligibility and/or listing in the National Register of Historic Places.

The NPS must consider the potential effects of any proposed oil and gas activities on cultural resources listed on or eligible for listing on the National Register. This responsibility cannot be delegated to nonfederal parties. NPS regulations at 36 C.F.R. § 9.37(e) state that the regional director may not approve a proposed plan of operations until the NPS complies with the NHPA. NPS regulations also require that operators provide the information needed for the NPS to make the determinations required under the NHPA. Operators must submit, as part of the environmental section in a proposed plan of operations, a description of the environment to be affected, including the natural and cultural environment.

In general, the NPS will have surveyed its lands as required by section 110 of the NHPA. The NPS cultural resource survey typically constitutes a careful inspection of the ground surface. The NPS uses standard archeological methodology that may include exploratory subsurface testing. The data from the survey indicate whether the lands fulfill the eligibility requirements for listing on the National Register. Operators may obtain data gathered during NPS surveys for the environmental section of the proposed plan.

When an operator submits a proposed plan of operations, the NPS reviews the cultural resources section. Based upon that review, the staff's knowledge of the affected area's history and prehistory, and the NPS cultural resource surveys, the regional director determines if the operations would affect a property listed or eligible for listing on the National Register.

If the NPS finds that the operations would not affect a property listed or eligible for listing, the NPS consults with the State Historic Preservation Officer (SHPO) to obtain agreement. If the SHPO agrees with the NPS, then the regional director may issue an archeological clearance for any ground-disturbing operations on federal park lands.

However, if the NPS finds that operations would affect listed or eligible properties, then the NPS prepares an "Assessment of Effect on Cultural Resources". The NPS then consults with the SHPO to determine what steps to take to protect the site. If the NPS and the SHPO cannot agree on a course of action, then the matter is referred to the Advisory Council on Historic



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Preservation (ACHP). If the operation may affect a park also designated a National Historic Landmark, then the NPS must automatically consult with the ACHP.

Even if the property is listed on the National Register, private surface owners may take any lawful action they want on their own property. Under the authority of the NPS Organic Act and certain unit enabling legislation directing the NPS to regulate mineral activities to protect natural and cultural resources, the NPS can include stipulations in its plan approval to protect cultural resources on private property inside unit boundaries during the course of mineral operations.

NPS regulations at 36 C.F.R. § 9.47 require operators to stop all operations and to notify the superintendent if cultural resources are “discovered during operations. For the NPS to meet its obligations under the NHPA and the NPS Organic Act, an operator must notify the NPS of cultural resources that may be destroyed by a NPS-approved oil and gas operation. The notification requirement applies even though the operator may own the cultural resources. Notification gives the NPS an opportunity to judge the historic value of the resources, and, if warranted, acquire them from the owner.

An operator under 36 C.F.R. Part 9B may have to salvage cultural resources discovered in the course of operations. The operator may salvage the resources only after the NPS, in consultation with the SHPO, approves a mitigation and salvage plan and chooses a contractor to do the data recovery.

### **NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT, 25 U.S.C. §§ 3001 – 3013**

**Resources afforded protection:** Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony

**Applicable regulation(s):** 43 C.F.R. Part 10

The Native American Graves Protection and Repatriation Act (NAGPRA) protects Native American and Native Hawaiian cultural items and establishes a process for the authorized removal of human remains, funerary objects, sacred objects, and objects of cultural patrimony for sites located on lands owned or controlled by the federal government. The Act also provides for the transfer of ownership of cultural objects to Native American or Native Hawaiian individuals, organizations, or tribes. It addresses the recovery, treatment, and repatriation of Native American and Native Hawaiian cultural items by federal agencies and museums. NAGPRA contains data gathering, reporting, consultation, and permitting provisions. The Act emphasizes consultation with Native American and Native Hawaiian organizations to ensure that these entities play a major role in the treatment of specific cultural objects.

Regulations at 43 C.F.R. Part 10 address the rights of lineal descendants, Indian tribes, and Native Hawaiian organizations to Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. They require federal agencies and institutions that receive federal funds to provide information about these items to these people and, upon presentation of a valid request, to dispose of or to repatriate these objects to them. Section 10.4 describes the regulatory requirements under NAGPRA for inadvertent discoveries of human these items.



Appendix R - “NAGPRA Compliance,” in NPS Director’s Order 28 - Cultural Resources Management, describe NPS-specific guidance for implementing NAGPRA. If NPS anticipates an operation may impact Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony protected by NAGPRA, then it will consult with the appropriate Native American or Native Hawaiian organization as part of the 9B plan approval process.

### **NOISE CONTROL ACT OF 1972, 42 U.S.C. §§ 4901 – 4918**

**Resources afforded protection:** human health and welfare

**Applicable regulation(s):** 40 C.F.R. Part 211

The Act establishes a national policy to promote an environment free from noise that jeopardizes the public’s health and welfare. To accomplish this, the Act provides for the coordination of federal research and activities to control noise, authorizes the establishment of federal noise emission standards for products distributed in commerce, and provides information to the public respecting the noise emission reduction characteristics of such products.

The Act authorizes and directs that federal agencies carry out the programs within their control in a manner that furthers the Act’s policies. Agencies having jurisdiction over any property or facility or engaged in any activity resulting or potentially resulting in increased noise must comply with federal, state, interstate, or local requirements. Agencies must, upon request, furnish information to the EPA regarding the nature, scope, and results of noise research and noise control programs and must consult with EPA in prescribing standards or regulations respecting noise. The Act also provides for citizen lawsuits. Any person may commence civil action against the United States or any government instrumentality or agency that violates any noise control requirement.

Operators must ensure that their facilities, equipment, and operations comply with all applicable federal, state, interstate, or local noise emission requirements. NPS management policies provide that the NPS will strive to preserve the natural quiet and natural sounds associated with the physical and biological resources of the parks (e.g. waves breaking on the shore, wind in the trees, and bird and wildlife sounds). NPS should prevent or minimize unnatural sounds that adversely affect park resources or values or the visitors’ enjoyment of them.

### **OIL POLLUTION ACT, 33 U.S.C. §§ 2701 – 2762**

**Resources afforded protection:** water resources, natural resources

**Applicable regulation(s):** 15 C.F.R. Part 990; 30 C.F.R. Part 253; 33 C.F.R. Parts 135 and 150; 40 C.F.R. Part 112

The Oil Pollution Act (OPA) expands the federal role in spill response, establishes contingency planning requirements for vessels and certain facilities, establishes the Oil Spill Liability Trust Fund, increases liability for spills of oil or hazardous substances from vessels and facilities, creates requirements for double hulls on new tankers, and increases requirements for research and development of spill response technologies.



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OPA imposes liability for removal costs and damages resulting from discharge of oil into the U.S.'s navigable waters, its adjoining shorelines, or the exclusive economic zone. Damages incurred include injuries to natural resources, loss of natural resources, and loss of use of natural resources. Natural resources include land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other resources belonging to the United States, state, local, foreign governments or Indian tribes.

Liability does not apply to discharges allowed by a permit issued under a federal, state or local law. In addition, liability does not apply if the responsible party establishes that the discharge, damages, or removal costs occurred solely because of an act of God, an act of war, or a third party who constitutes neither an agent nor employee of the responsible party. However, despite these defenses, the responsible party remains liable if he fails to report the incident, help or cooperate as requested, or comply with certain orders. Also, OPA has increased penalties for regulatory noncompliance, broadened the response and enforcement authorities of the federal government, and preserved state authority to establish law governing oil spill prevention and response.

OPA provides new requirements for government and industry oil spill contingency planning. The "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP) was expanded to encompass a three-tiered approach. The federal government directs all public and private response efforts for certain types of spill events. Area committees, composed of federal, state, and local government officials, must develop detailed, location-specific Area Contingency Plans. Owners or operators of vessels and certain facilities that pose a serious threat to the environment must prepare their own facility response plans.

OPA may require operators of nonfederal oil and gas operations in units of the National Park System to develop contingency plans. Contingency plans developed to meet the requirements of OPA may also satisfy the NPS 9B requirement for a contingency plan. NPS would determine if the OPA required plan meets NPS requirements as part of the 9B plan approval process.

### **PIPELINE SAFETY ACT OF 1992, 49 U.S.C. §§ 60101 et seq.**

**Resources Afforded Protection:** human health and safety, and the environment

**Applicable Regulation(s):** 49 C.F.R. Parts 190-199

This Act allows the Department of Transportation (DOT) to create and to enforce oil and gas pipeline safety regulations. The act creates design, construction, maintenance, and testing standards for all new, changed, or relocated interstate and intrastate pipelines. DOT's Office of Pipeline Safety regulates interstate pipeline safety but state agencies may also be approved to regulate intrastate pipelines. States that get approval to implement the program may enforce stricter standards than those in the Act. Violations of the Act can lead to civil and criminal penalties. The Act replaced the Hazardous Liquid Pipeline Safety Act of 1979, the Hazardous Materials Transportation Act, and the Natural Gas Pipeline Safety Act of 1968.

Oil and gas pipelines exist within several units of the National Park System. Operators of oil and gas pipelines crossing NPS units must comply with the Pipeline Safety Act of 1992. NPS regulations at 36 C.F.R. 9B require a 9B plan of operations for the construction or use of oil and gas pipelines (flowlines and gathering lines) in connection with nonfederal oil and gas



operations within a NPS unit. Transpark pipelines (those owned and operated by persons or entities exercising rights not tied to the oil and gas ownership within the park boundary) located in rights-of-way that predate the establishment of the park unit do not qualify as an existing operations exempted from a plan of operations by 36 C.F.R. § 9.33. Rather, the NPS will issue a Special Use Permit (SUP) to regulate maintenance activities along the right-of-way corridor, including but not limited to mowing and trimming vegetation, pipeline inspection and testing, removal of fluids from oil and gas pipelines, and installing, shutting down, or replacing pipelines (36 C.F.R. § 1.6).

## **RESOURCE CONSERVATION AND RECOVERY ACT, 42 U.S.C. §§ 6901 et seq.**

**Resources afforded protection:** natural resources, human health and safety

**Applicable regulation(s):** 40 C.F.R. 240-282 and 49 C.F.R. Parts 171-179

The Resource Conservation and Recovery Act (RCRA) seeks to promote the protection of health and the environment and to conserve valuable material and energy resources. RCRA regulates the management of hazardous waste from generation to final disposal. The law consists of nine subtitles. Two subtitles create significant regulatory programs: Subtitle C establishes a hazardous waste program from generation to disposal; Subtitle D addresses disposal of nonhazardous solid waste. "Solid waste" includes garbage, refuse, and other discarded materials. It includes solids, liquids, and containerized gases.

The requirements of Subtitle C apply if the waste falls under EPA's criteria governing hazardous waste. EPA codified the regulatory criteria for hazardous waste at 40 C.F.R. Parts 260 and 261. EPA codified a list of hazardous wastes (known as listed wastes) in Subpart D of Part 261. Subpart C of Part 261 establishes the criteria for determining whether a solid waste constitutes a hazardous waste by exhibiting a characteristic of corrosivity, reactivity, ignitability, or toxicity (known as characteristic waste). EPA can regulate a solid waste because it either appears on the hazardous waste lists or displays a characteristic of a hazardous waste.

The 1980 amendments to RCRA excluded certain oil, gas, and geothermal drilling and production wastes from the hazardous waste requirements of Subtitle C. The amendments specifically exempt drilling fluids, produced water, and other drilling and production wastes. In 1988, the EPA decided to keep the exemption for oil and gas exploration and production wastes. State agencies regulate the exempted wastes under the less strict Subtitle D governing nonhazardous waste.

Oil field workers must understand how RCRA works because mistakes can be costly for operators. The Act dictates that when Subtitle C and Subtitle D wastes are mixed, the mixture becomes a Subtitle C hazardous waste. It does not matter if the mixture loses all of its hazardous characteristics. For example, if the rig mechanic dumps used motor oil into the reserve pit, the entire volume of drilling muds, cuttings, rig wash, excess cement, and completion fluids becomes a hazardous waste. This remains true even if it does not exhibit hazardous properties.

RCRA provides for strict civil and criminal penalties. Persons who do not comply with RCRA will receive fines of as much as \$25,000 per day per violation. It does not matter whether or not EPA first served the person with a compliance order. It is up to the operator to know and



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comply with RCRA. The operator cannot wait to receive a compliance order and make corrections to avoid a penalty. Also, RCRA's criminal penalties can fine an operator as much as \$50,000 and imprison the operator for as many as two years if they "knowingly" cause transportation of hazardous materials without a manifest.

In addition, the RCRA exemption from Subtitle C for oil and gas drilling and production waste does not exclude these wastes from the operation of RCRA section 7003. Section 7003 allows EPA to compel any person who contributed or contributes to the handling, storage, treatment, transportation or disposal of the hazardous waste in a manner that causes an imminent and substantial danger to take any action to protect human health and the environment. Because this can include expensive cleanup actions to protect human health and the environment, operators should handle waste from their operations in such a way that it does not contaminate the environment either now or in the future.

Regardless of oil and gas exploration and production wastes' exemption from Subtitle C regulation, the NPS will likely require operators to dispose of all wastes associated with the oil and gas operation outside of the park. NPS requirements for waste disposal in an operator's plan of operations will provide for the strict protection of park resources and values.

### **RIVERS AND HARBORS ACT OF 1899, As Amended, 33 U.S.C. §§ 401 *et seq.***

**Resources afforded protection:** shorelines and navigable waterways, tidal waters, wetlands  
**Applicable regulation(s):** 33 C.F.R. Parts 114, 115, 116, 320 -325, and 333

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable waterway of the United States. In order to obstruct or alter the waterway, a person must obtain a permit from the Army Corps of Engineers. Activities requiring a permit include constructing structures in or over any waters of the U.S., excavating material from the water, conducting stream channelization, and depositing materials in such waters.

### **SAFE DRINKING WATER ACT OF 1974, 42 U.S.C. §§ 300f *et seq.***

**Resources afforded protection:** human health, water resources  
**Applicable regulation(s):** 40 C.F.R. Parts 141-148

The Safe Drinking Water Act (SDWA) protects the safety of drinking water supplies throughout the United States by establishing national standards enforceable by each state. The Act provides for the establishment of primary regulations to protect human health and of secondary regulations relating to the taste, odor, and appearance of drinking water. Primary drinking water regulations include either a maximum contaminant level (MCL) or a prescribed treatment technique that prevents adverse health effects to humans. A MCL constitutes the permissible level of a contaminant in water delivered to any user of a public water system. States should only use prescribed treatment techniques when a MCL remains uneconomical or technologically infeasible.

The Act's 1986 amendments require EPA to publish a list of contaminants every three years, which EPA knows or anticipates will occur in public water systems.



The most important part of the SDWA as far as the NPS and petroleum operators are concerned is the Underground Injection Control (UIC) permit program. Under the program, the EPA regulates underground injection of wastes or other materials. The EPA has authorized many states to administer the UIC permit program.

Owners of underground injection wells must obtain permits or be authorized by rule under the UIC program to operate the wells. The permit holder must prove to the state or federal permitting agency that, through sound and prudent practice and well construction, the underground injection will not endanger drinking water sources. The NPS will approve a plan of operations involving underground injection only when the wells have valid UIC permits.

The UIC program defines five classes of underground injection wells. Class II wells may relate to oil and gas operations in National Parks. The following fluids may be injected into Class II wells: 1). waste fluids produced by oil and gas operations and that are exempt from the hazardous waste requirements of RCRA, subtitle C (for example, produced brine, recovered treatment fluids, and waste waters from gas plants), 2). fluids used for enhanced recovery of oil and natural gas, and 3). fluids for below ground storage of hydrocarbons.

### **WILD AND SCENIC RIVERS ACT, as amended 16 U.S.C. §§ 1271 et seq.**

**Resources afforded protection:** water resources, recreational values, geologic resources, fish and wildlife, historic, cultural and other similar values

**Applicable regulation(s):** 36 C.F.R. § 297

The Wild and Scenic Rivers Act (Act) was passed by Congress in October 1968. The Act establishes a policy that certain rivers in the U.S. which, with their immediate environments, possess outstanding remarkable scenic, recreational, geologic, fish, and wildlife, historic, cultural and other similar values shall be preserved in free-flowing condition, and that their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Act identifies specific river reaches for designation as wild and scenic, and provides criteria to be used for classifying additional river reaches. “Wild river areas” are those rivers or sections of rivers that are free from impoundments and generally are inaccessible except by trail, with watersheds or shorelines essentially primitive and the waters are unpolluted. “Scenic river areas” are those rivers or sections of rivers that are free from impoundments, with shorelines or watersheds that are still largely primitive and shorelines undeveloped, but the river is accessible in places by roads. “Recreational river areas” are rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The national Wild and Scenic River system was established to protect the environmental values of free-flowing streams from degradation by impacting activities, including water resources projects. The system is jointly administered by the U.S. Forest Service and the National Park Service. U. S. Army Corps of Engineers activities on the streams included in the system are subject to review by whichever of these agencies is responsible for the specific stream. In all planning for the use and development of water and related land resources, consideration shall be given to potential national wild, scenic, and recreational river areas, and all river basin and project plan reports submitted to Congress shall consider and discuss such potential.



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Under the Wild and Scenic Rivers Act, valid existing mineral rights within the Wild and Scenic river boundary remain in effect, and activities may be allowed if the projects avoid or minimize surface disturbance, water sedimentation, pollution, and visual impairment. Based on the park's enabling statute and applicable regulations, reasonable access to develop nonfederal oil and gas rights will be permitted. Compliance with the Clean Water Act or non-degradation of existing water quality, whichever is more protective is required, including the development and implementation of management actions that protect and enhance water quality.

### **EXECUTIVE ORDERS**

#### **EXECUTIVE ORDER NO. 11593 – PROTECTION AND ENHANCEMENT OF THE CULTURAL ENVIRONMENT, 36 Fed. Reg.8921 (1971)**

**Resources afforded protection:** cultural resources

**Applicable regulation(s):** 3 C.F.R. 1971 Comp., 36 C.F.R. §§ 60, 61, 63, 800

Executive Order No. 11593 instructs all federal agencies to support the preservation of cultural properties. It directs them to identify and nominate cultural properties under their jurisdiction to the National Register. Moreover, the executive order states that federal agencies must “exercise caution...to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”

#### **EXECUTIVE ORDER NO. 11644 – USE OF OFF-ROAD VEHICLES ON THE PUBLIC LANDS, 37 FR 2877 (1972), reprinted in 42 U.S.C. § 4321, as amended by Executive Order No. 11989 (1977), 42 Fed. Reg. 26959; Executive Order No. 12608 (1987), § 21, 52 Fed. Reg. 34617**

**Resources afforded protection:** natural resources, aesthetic and scenic values

The order establishes a uniform federal policy to ensure that use of off-road vehicles on public lands are controlled and directed to protect resources, promote safety of all users of those lands and to minimize conflicts among users. Areas and trails shall be located in units of the National Park System only if the director determines that such use in those areas will not adversely affect their natural, aesthetic or scenic values. Within six months of the date of this order, each respective director shall designate specific areas and trails on public lands on which the use of off-road vehicles may be permitted, and areas in which the use of off-road vehicles may not be permitted, and set a date by which such designation of all public lands shall be completed. Those regulations shall direct that the designation of such areas and trails will be based upon the protection of the resources of the public lands, promotion of the safety of all users of those lands, and minimization of conflicts among the various uses of those lands.

Executive Order No. 11989 promulgates guidelines for the controlled use of off-road vehicles on public lands. The order directs that agency heads shall, whenever he determines that the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation,



wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence.

**EXECUTIVE ORDER NO. 11988 – FLOODPLAIN MANAGEMENT OF 1977,  
42 FED. REG. 26951 (1977), as amended by Executive Order No. 12148 (1979), 44  
Fed. Reg. 43239, 3 C.F.R. 1979 COMP., P. 412**

**Resources afforded protection:** floodplains, human health, safety, and welfare

Executive Order No. 11988 seeks to avoid, where practicable alternatives exist, the short-term and long-term adverse impacts associated with floodplain development. In carrying out agency responsibilities, federal agencies must reduce the risk of flood losses, minimize the impacts of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by floodplains. If an agency proposes an action in a floodplain, then the agency must consider alternatives to avoid adverse effects and incompatible development in the floodplain. Agencies must also provide opportunity for early public review of any plans for actions in floodplains.

**EXECUTIVE ORDER NO. 11990 – PROTECTION OF WETLANDS,  
42 Fed. Reg. 26961 (1977)**

**Resources afforded protection:** wetlands

Executive Order No. 11990 seeks to avoid adverse impacts on wetlands when there is a practicable alternative. Executive agencies, in carrying out their land management responsibilities, must minimize wetlands destruction, loss, or degradation and preserve and enhance the wetlands' natural and beneficial values.

**EXECUTIVE ORDER NO. 12088 –  
FEDERAL COMPLIANCE WITH POLLUTION CONTROL STANDARDS,  
43 Fed. Reg. 47707 (1978), amended by Executive Order No. 12580, Superfund  
Implementation, 52 Fed. Reg. 2923 (1987)**

**Resources afforded protection:** natural resources, human health and safety

Executive Order No. 12088 delegates each executive agency head the responsibility for taking all necessary actions to prevent, control, and abate environmental pollution. It gives the EPA authority to conduct reviews and inspections for the purpose of monitoring federal facility compliance with pollution control standards. Section 1-101 requires prevention, control, and abatement of pollution from federal facilities. Section 1-201 requires federal agencies to cooperate with state, interstate, and local agencies to prevent, to control, and to abate environmental pollution.



**EXECUTIVE ORDER NO. 12630 –  
GOVERNMENTAL ACTIONS AND INTERFERENCE WITH CONSTITUTIONALLY  
PROTECTED PROPERTY RIGHTS,  
53 Fed. Reg. 8859 (1988)**

**Resources afforded protection:** private property rights, public funds

Executive Order No. 12630 seeks the following: to assist agencies in reviewing their actions to prevent unnecessary takings and in proposing, planning, and implementing agency actions with due regard for the constitutional protections provided by the 5th Amendment to the U.S. Constitution; to account in decision-making for those takings necessitated by statutory mandate; and to reduce the risk of undue or inadvertent burdens on the federal treasury resulting from lawful government action.

When an agency requires a private party to obtain a permit to undertake a specific use of private property, any conditions imposed on the permit must substantially advance the governmental interest that is impacted by the land use. The permitting processes must be kept to the minimum necessary so that the government does not interfere with the use of private property during the process.

**EXECUTIVE ORDER NO. 12898 –  
FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY  
POPULATIONS AND LOW-INCOME POPULATIONS,  
as amended by Executive Order No. 12948, 60 Fed. Reg. 6379 (1995)**

**Resources afforded protection:** human health and safety

This executive order requires that federal agencies incorporate environmental justice into their mission. Environmental justice promotes the fair treatment of people of all races, incomes, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no person or group of people should receive a disproportionate share of the negative environmental impacts from the execution of this country's domestic and foreign policy programs.

**EXECUTIVE ORDER NO. 13007 – INDIAN SACRED SITES,  
61 Fed. Reg. 26771 (1996)**

**Resources afforded protection:** Native Americans' sacred sites

To the extent practicable, permitted, and consistent with essential agency functions, all federal land management agencies must accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Consistent with this executive order, if a proposed plan of operations may affect the physical integrity of, the ceremonial use of or the access to these sites by Native American religious practitioners in federally recognized tribes, then the superintendent will consult with the tribe as part of the 9B approval process.



**EXECUTIVE ORDER NO. 13112 – INVASIVE SPECIES,  
64 Fed. Reg. 6183 (1999), as amended by Executive Order 13286, 68 Fed. Reg.  
10619 (2003)**

**Resources afforded protection:** vegetation and wildlife

This executive order seeks to prevent the introduction of invasive species, to provide for their control, and to minimize the economic, ecological, and human health impacts they cause. It outlines federal agency duties, creates a new Invasive Species Council, defines the council's duties, and authorizes the creation an Invasive Species Management Plan. Executive Order No. 13112 also creates a framework for planning and for coordination involving all stakeholders, which it defines as states, tribal entities, local government agencies, academic institutions, scientific communities, and non-governmental entities such as environmental groups, agricultural groups, conservation organizations, trade groups, commercial interests, and private landowners.

Federal agencies should use the programs and authorities to prevent the introduction of invasive species; detect and respond rapidly to control populations of such species in a cost-effective and an environmentally sound manner; monitor invasive species populations accurately and reliably; provide for restoration of native species and habitat conditions in invaded ecosystems; conduct research on invasive species and develop technologies to prevent their introduction; provide environmentally sound control of invasive species; promote public education on invasive species and means to address them.

The order directs agencies not to authorize, fund, or carry out any action likely to cause or promote the introduction or the spread of invasive species in the United States or elsewhere. However, agencies can determine that the benefits outweigh the potential harm and ensure that they take prudent measures to minimize harm. Federal agencies should consult with the Invasive Species Council and undertake actions consistent with the Invasive Species Management Plan with the cooperation of stakeholders.

**EXECUTIVE ORDER NO. 13186 –  
RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS,  
66 Fed. Reg. 3853 (2001)**

**Resources afforded protection:** migratory birds

This executive order defines federal agency responsibilities to protect migratory bird populations, in furtherance of the purposes of the migratory bird conventions, the Migratory Bird Treaty Act (16 U.S.C. §§ 703-711), the Bald and Golden Eagle Protection Acts (16 U.S.C. §§ 668-668d), the Fish and Wildlife Coordination Act (16 U.S.C. §§ 661-666c), the Endangered Species Act of 1973 (16 U.S.C. §§ 1531-1544), the National Environmental Policy Act of 1969 (42 U.S.C. §§ 4321-4347), and other pertinent statutes.

This executive order directs each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement, within two years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service that shall promote the conservation of migratory bird populations.



**EXECUTIVE ORDER NO. 13212 –  
ACTIONS TO EXPEDITE ENERGY – RELATED PROJECTS,  
66 Fed. Reg. 28357 (2001), as amended by Executive Order 13302, 68 Fed. Reg.  
27429 (2003)**

**Resources afforded protection:** all resources, production, transmission, and conservation of energy

This executive order establishes an interagency task force to coordinate, monitor, and assist executive departments and federal agencies to expedite the increased production, transmission, and conservation of energy, in a safe and environmentally sound manner. Specifically, it provides for executive departments and federal agencies where appropriate to expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections, to the extent permitted by law and regulations.

**EXECUTIVE ORDER 13352 – FACILITATION OF COOPERATIVE CONSERVATION,  
69 Fed. Reg. 52989 (2004)**

**Resources afforded protection:** natural resources, property rights, public health and safety

This order seeks to ensure that laws relating to the environment and natural resources are implemented “in a manner that promotes cooperative conservation, with an emphasis on appropriate inclusion of local participation in Federal decision making.” The Secretary of the Interior is directed to implement laws in a way that: “(i) facilitates cooperative conservation; (ii) takes appropriate account of and respects the interests of persons with ownership or other legally recognized interests in land and other natural resources; (iii) properly accommodates local participation in Federal decision making; and (iv) provides that the programs, projects, and activities are consistent with protecting public health and safety.”

## **POLICIES, GUIDELINES, AND PROCEDURES**

**NATIONAL PARK SERVICE MANAGEMENT POLICIES (2006)**

**Resources afforded protection:** 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, visual resources

The NPS Management Policies is the service-wide policy document of the National Park Service. These policies provide the overall foundation, set the framework, and provide direction for management decisions within the NPS. Management policy direction may be general or specific; it may prescribe the process through which decisions are made, how an action is to be accomplished, or the results to be achieved. Management Policies guide NPS staff to manage National Park System units consistently and professionally to achieve the Congressional mandate of the National Park System. Adherence to NPS policy is mandatory, unless



specifically waived or modified by the Secretary, the Assistant Secretary, or the Director of the NPS.

These policies cover park system planning, land protection, natural resource management, cultural resource management, wilderness preservation and management, interpretation and education, use of the parks, park facilities, and commercial visitor services.

The second tier of NPS policies (level 2 guidance) are Director's Orders which clarify or supplement the NPS Management Policies. As they are completed, Director's Orders will replace existing NPS guidelines and special directives. The most detailed and comprehensive guidance implementing service-wide policy, called level 3 guidance, are handbooks or reference manuals and are a compilation of legal references, operating policies, standards, procedures, general information, recommendations, and examples to assist field staff in carrying out the NPS Management Policies.

**DEPARTMENT OF THE INTERIOR, DEPARTMENTAL MANUAL,  
516 DM 1 – 15 – NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (2005)**

**Resources afforded protection:** all resources including cultural resources, historic resources, natural resources, human health and safety

Section 516 of the Departmental Manual establishes the Department of Interior's policies for implementing the National Environmental Policy Act. It includes policies about initiating the NEPA process, categorical exclusions, and preparing environmental assessments and environmental impact statements.

**DEPARTMENT OF THE INTERIOR, DEPARTMENTAL MANUAL, 517 DM 1 –  
PESTICIDES (1981)**

**Resources afforded protection:** human health and safety and the environment

DM 517 establishes Department of the Interior policy for the use of pesticides on the lands and waters under its jurisdiction and for compliance with the Federal Insecticide, Fungicide, and Rodenticide Act.

**DEPARTMENT OF THE INTERIOR, DEPARTMENTAL MANUAL, 519 DM 1 - 2 –  
PROTECTION OF THE CULTURAL ENVIRONMENT (1994)**

**Resources afforded protection:** archeological, prehistoric resources, historic resources, Native American human remains, and cultural objects

DM 519 describes the policies and responsibilities of the Department of the Interior for managing, preserving, and protecting prehistoric resources, historic resources, Native American human remains, and Native American cultural objects located on Indian and public lands administered by the Department.



**DEPARTMENT OF THE INTERIOR, DEPARTMENT MANUAL, 520 DM 1 – PROTECTION OF THE NATURAL ENVIRONMENT – FLOODPLAIN MANAGEMENT AND WETLANDS PROTECTION PROCEDURES (2001)**

**Resources afforded protection:** wetlands and floodplains

DM 520 describes the policies and responsibilities of the Department of the Interior for implementing Executive Order No. 11988, Floodplain Management (May 24, 1977) and Executive Order No. 1199, Protection of Wetlands (May 24, 1977). The Department's policy is to:

- A. Exercise leadership and take action to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of wetlands and floodplains;
- B. Avoid the direct or indirect support of wetland or floodplain development whenever there is a practicable alternative;
- C. Reduce the risk of flood loss and minimize the impact of floods on human health, safety and welfare;
- D. Restore and preserve the natural and beneficial values served by floodplains and wetlands;
- E. Develop an integrated process to involve the public in the floodplain management decision making process;
- F. Incorporate the Unified National Program for Floodplain Management into relevant Departmental programs.

**NPS DIRECTOR'S ORDER 12 AND HANDBOOK – CONSERVATION PLANNING, ENVIRONMENTAL IMPACT ANALYSIS, AND DECISION MAKING (2001)**

**Resources afforded protection:** all resources including natural resources, cultural resources, human health and safety, socioeconomic environment, visitor use

Director's Order 12 and Handbook sets forth policy and procedures for the NPS to comply with the National Environmental Policy Act (NEPA), including direction on the analysis process and documentation of environmental impact assessments. The Director's Order and handbook are derived in whole or part from the CEQ regulations and Department of Interior NEPA guidelines. Director's Order 12 and the handbook include specific NPS requirements beyond those imposed by CEQ to help facilitate the mandates of the Organic Act, other laws and policies that guide NPS actions, and to help NPS managers and staff make day-to-day decisions related to implementation of the NEPA.

**NPS DIRECTOR'S ORDER 28 – CULTURAL RESOURCE MANAGEMENT (1998)**

**Resources afforded protection:** cultural, historic, and ethnographic resources

Director's Order 28 is the comprehensive guideline for management of cultural resources in units of the National Park Service. It elaborates on the policies articulated in the "NPS



Management Policies” and offers guidance in applying federal laws and the Secretary’s Standards to establish, to maintain, and to refine park cultural resource programs. Director’s Order 28 also establishes procedures for complying with NHPA sections 10 and 106.

Director’s Order 28, Appendix R: NAGPRA Compliance provides direction on complying with the Native American Graves Protection and Repatriation Act. Appendix R requires that an operator who inadvertently discovers human remains, funerary objects, sacred objects, or objects of cultural patrimony immediately notify the park’s superintendent first by telephone and then in writing. The operator must stop activity in the area of the discovery for a specified time and make a reasonable effort to protect the human remains or objects. The superintendent will notify the appropriate Native American tribes or Native Hawaiian organizations and begin consultation about the disposition of the items.

### **DIRECTOR’S ORDER 28A – ARCHEOLOGY (2004)**

**Resources afforded protection:** archeological resources

DO 28A promotes a common management framework for planning, reviewing and undertaking archeological activities and other activities that may affect archeological resources within the National Park System. This DO also addresses the manner in which the Service will meet its archeological assistance responsibilities outside the national parks. General archeological requirements are covered in DO-28: Cultural Resource Management (<http://www.nps.gov/policy/DOrders/DOrder28.html>), and the Cultural Resource Management Guideline Release No. 5 ([http://www.cr.nps.gov/history/online\\_books/nps28/28contents.htm](http://www.cr.nps.gov/history/online_books/nps28/28contents.htm)).

### **DIRECTOR’S ORDER 47 – SOUND PRESERVATION AND NOISE MANAGEMENT (2000)**

**Resources afforded protection:** natural soundscapes

The purpose of this Director’s Order is to articulate National Park Service operational policies that will require, to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources. For nonfederal oil and gas operations, soundscape management goals are to reduce noise to minimum levels consistent with the appropriate service or activity, as long as that service or activity continues to be needed.

### **DIRECTOR’S ORDER 53 AND REFERENCE MANUAL 53 – SPECIAL PARK USES (2005)**

**Resources afforded protection:** 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, visual resources

DO 53 defines and clarifies legal and policy requirements for special uses in NPS units and describes Special Use Permit (SUP) requirements and provisions. Applicable regulations for Special Use Permits are 36 C.F.R. Parts 1 – 5.



## **APPENDIX B – LEGAL AND POLICY REQUIREMENTS**

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Special park uses are defined as activities that take place in a unit of the National Park System and: provide a benefit to an individual, group or organization, rather than the public at large; require written authorization and some degree of management control from the NPS in order to protect park resources and the public interest; are not prohibited by law or regulation; and are neither initiated, sponsored, nor conducted by the NPS. A special park use may involve either rights or privileges, and may or may not support the purposes for which a park was established.

The NPS applies the Special Use Permit regulations at 36 C.F.R. Parts 1 – 5 and guidance in Director's Order/Reference Manual 53 to control activities within rights-of-way associated with transpark oil and gas pipelines. Mowing and trimming vegetation, inspection or testing pipelines, removal of fluids from oil and gas pipelines and installing, shutting down or replacing pipelines, are common activities in pipeline rights-of-way requiring an approved NPS Special Use Permit. Special Use Permits for transpark pipelines must be approved before these activities can occur. The SUP must include a performance bond and mitigation measures to protect park resources, values, and ensure the protection of public health and safety.

### **RM 77 – NATURAL RESOURCE MANAGEMENT (2004)**

**Resources afforded protection:** all natural resources

Natural Resource Management Reference Manual 77 offers comprehensive guidance to National Park Service employees responsible for managing, preserving, and protecting the natural resources found in National Park System units. It guides the actions of park managers so that natural resource activities comply with federal law, federal regulation, Department of Interior policy, and National Park Service policy. Natural resources include native plants, native animals, water, air, soils, topographic features, geologic features, paleontologic resources, natural quiet, and clear night skies. Reference Manual 77 covers natural resources management, uses in parks, planning, and program administration and management. A listing of topics included in RM 77 can be found at: <http://www.nature.nps.gov/rm77/>.

Reference Manual 77 serves as the primary “Level 3” guidance on natural resource management in units of the National Park System, replacing NPS-77, The Natural Resource Management Guideline, issued in 1991 under the previous NPS guideline series. The transition of NPS-77 into Reference Manual 77 is still in progress. Some sections are still being revised while others have undergone a field review with comments from the field incorporated as applicable.

### **NPS DIRECTOR'S ORDER AND PROCEDURAL MANUAL 77-1 – WETLAND PROTECTION (2002)**

**Resources afforded protection:** wetlands

NPS Director's Order 77-1 and Procedural Manual implement Executive Order No. 11990, Protection of Wetlands. They establish policies, requirements, and standards to protect wetlands. Operators must perform a wetlands delineation when proposed operations could potentially cause direct and/or indirect impacts to wetlands. The Corps of Engineers and the NPS review the wetlands delineation for adequacy. When proposed operations cannot avoid direct and/or indirect impacts on wetlands, the operator must compensate for these impacts by



restoring a disturbed wetlands area in the unit at a minimum 1:1 compensation ratio. The compensation ratio can be greater if the functional values of the site being impacted are high and the restored wetlands will be of a lower functional value. Operators must perform the compensation before or concurrently with the occurrence of impacts associated with approved oil and gas operations. When operations are completed, the operator must restore the site to its pre-impact wetlands condition.

NPS must comply with Executive Order No. 11990 and the NPS Wetland Protection Guideline (DO 77-1) as part of the 36 C.F.R. 9B procedure for approving a plan of operations for nonfederal oil and gas operations within a unit of the National Park System.

## **NPS DIRECTOR'S ORDER AND PROCEDURAL MANUAL 77-2 – FLOODPLAIN MANAGEMENT (2003)**

### **Resources afforded protection: floodplains**

Director's Order and Procedural Manual 77-2 replaces NPS Special Directive 93-4 and provides NPS policies and procedures for implementing Executive Order No. 11988, Floodplain Management. NPS policy seeks to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare; and restore and preserve the natural and beneficial values served by floodplains.

The NPS will protect and preserve the natural resources and functions of floodplains; avoid the long- and short-term environmental effects associated with the occupancy and modification of floodplains; avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks; and restore, when practicable natural floodplain values previously affected by land use activities within floodplains. If it is not practicable to locate or relocate development or inappropriate human activities outside the floodplain, the NPS will, prepare a Statement of Findings in accordance with the Procedural Manual 77-2; take all reasonable actions to minimize the impact to the natural resources in floodplains; use nonstructural methods to reduce hazards to human life and property; and ensure that structures and facilities located in floodplains are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 C.F.R. Part 60).

The Director's Order requires the NPS to classify proposed actions into one of three action classes - the 100-year (base floodplain), 500-year, or extreme regulatory floodplain. If a preliminary floodplain assessment shows that the area may experience flooding, then the applicable regulatory floodplain must be shown on a map, and information on flood conditions and hazards must be developed.

During project planning, the NPS identifies and evaluates practicable alternative sites for the proposal outside of the regulatory floodplain. If practicable sites are identified, NPS policy gives preference to locating the proposed action at a site outside the regulatory floodplain. If there is no practicable alternative site for the proposal, then the NPS will apply mitigation measures to protect floodplain resources, values, and human life and property.

NPS must comply with Executive Order No. 11988 and the NPS Floodplain Management Guideline as part of the 36 C.F.R. 9B process for approving a plan of operations for nonfederal oil and gas operations within a unit of the National Park System.



**SECRETARY OF THE INTERIOR’S “STANDARDS AND GUIDELINES FOR  
ARCHAEOLOGY AND HISTORIC PRESERVATION,”  
48 FR 44716 (1983) (also published as Appendix C of NPS Director’s Order 28 –  
Cultural Resource Management)**

**Resources afforded protection:** cultural and historic resources

Prepared under the authority of sections 101(f), (g), and (h) and 110 of the National Historic Preservation Act, the Standards and Guidelines provide basic technical standards, guidelines, and advice about archeological and historical preservation activities and methods. While the standards and guidelines are not regulatory, NPS Director’s Order 28 requires the NPS to comply with their substantive and procedural requirements.

**GOVERNMENT-TO-GOVERNMENT RELATIONS WITH NATIVE AMERICAN TRIBAL  
GOVERNMENTS,  
Presidential Memorandum signed April 29, 1994**

**Resources afforded protection:** Native Americans

In order to ensure that NPS recognizes and respects the rights of sovereign tribal governments, this memorandum instructs each executive department and agency to operate in a government-to-government relationship with federally recognized tribes and to consult with tribal governments prior to taking any action that might affect them. The memorandum directs agencies to assess the impacts of their programs and policies on tribes and to take their rights and concerns into consideration during development of any plan, programs, or projects. NPS must also remove any impediments to working directly with tribal governments in designing agency plans, programs, and projects. Finally, it instructs agencies to try to work cooperatively to carry out the intent of the memorandum and to tailor federal programs to meet the unique needs of tribal communities.



## PART B - ENVIRONMENTAL COMPLIANCE

Numerous federal laws, regulations, executive orders, and NPS policies are used by the NPS to assist in its resource protection efforts. The following section summarizes the primary federal requirements that are used to protect park resources:

- All park resources – National Environmental Protection Act,
- Cultural resources – National Historic Preservation Act,
- Threatened and endangered species and their habitat – Endangered Species Act,
- Floodplains – Executive Order No. 11988 and NPS Director's Order 77-2 and accompanying Procedural Manual,
- Wetlands – Executive Order No. 11990 and NPS Director's Order 77-1 and accompanying Procedural Manual, and
- Coastal natural resource areas – Coastal Zone Management Act and approved state coastal zone management program.

This section includes a description of the resource, an overview of the compliance process, operating requirements (stipulations) to protect the particular resource, and a flowchart illustrating the process taken by the NPS (and operator) to comply with these requirements. Tasks that are required by the oil and gas operator are shown in **bold** in each of the flowcharts.

### NATIONAL ENVIRONMENTAL POLICY ACT

The NPS plan of operations permitting process requires compliance with the National Environmental Policy Act (NEPA). NEPA mandates that federal agencies assess the environmental effects (impacts) of proposed federal actions, including approving permits for private actions on federal land or involving federal resources. The analysis of environmental effects in the NEPA document will be used by the regional director to determine if the operation meets the applicable approval standards at 36 C.F.R. § 9.37.

NEPA requires the NPS and other federal agencies to:

- include public input in the decision-making process,
- use a systematic approach which assures that all federal agencies fully explore alternative courses of action for the proposal,
- consider the environmental impacts of the proposed actions, and
- identify steps to mitigate environmental damage.

NEPA at § 1502.25(b) requires that the NEPA document "...list all the federal permits, licenses and other entitlements that are needed to implement the proposal." For this reason, the NPS recommends that operators include this information in his/her plan of operations. For more information see Question # 9 *NEPA's 40 Most Asked Questions*.

Once a plan is determined to be technically adequate, the NPS must prepare a Categorical Exclusion form (CE), Memo to the Files, environmental assessment (EA) or environmental impact statement (EIS) on the plan of operations (36 C.F.R. § 9.37(b)). Most often, an EA is the appropriate level of NEPA documentation. If the project is highly controversial or there is the potential for major (significant) environmental impacts, the NPS would be required to prepare an



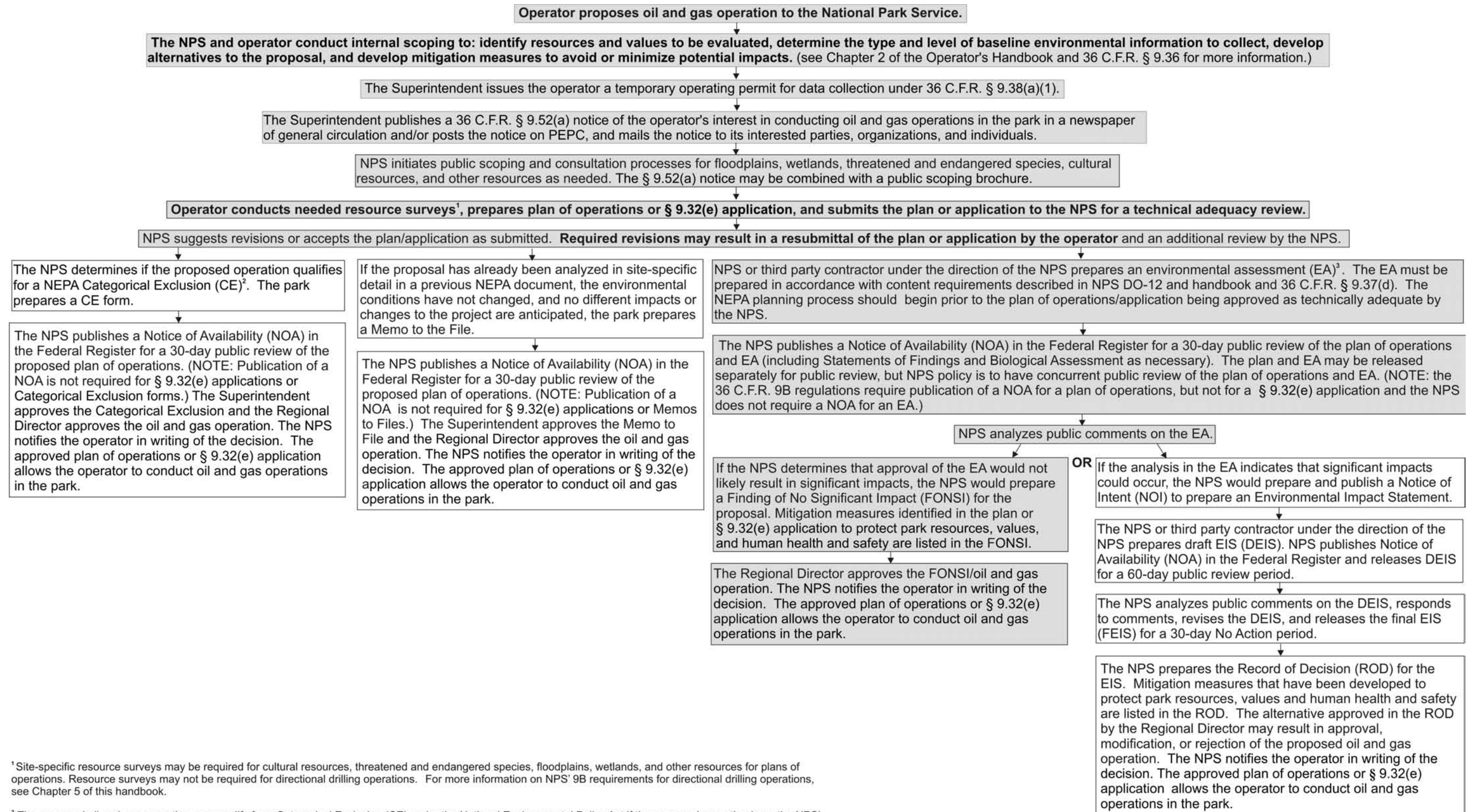
## **APPENDIX B – LEGAL AND POLICY REQUIREMENTS**

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environmental impact statement (EIS) on the proposal. Figure B.1 illustrates the NEPA process that must be followed for a proposed plan of operations or § 9.32(e) application and highlights the compliance responsibilities of the oil and gas operator and NPS.

The NPS is responsible for the content and accuracy of the NEPA document (CE, Memo to the Files, EA or EIS) and decision document (FONSI for an EA or ROD for an EIS). Preparation of an environmental assessment or environmental impact statement must be done either by the NPS or under the direction of the NPS, typically through a third party contract. The operator's responsibility lies in supplying the necessary site-specific, resource information so that the NPS can analyze the potential impacts of the proposed operation on park resources and values.





<sup>1</sup> Site-specific resource surveys may be required for cultural resources, threatened and endangered species, floodplains, wetlands, and other resources for plans of operations. Resource surveys may not be required for directional drilling operations. For more information on NPS' 9B requirements for directional drilling operations, see Chapter 5 of this handbook.

<sup>2</sup> The proposed oil and gas operation may qualify for a Categorical Exclusion (CE) under the National Environmental Policy Act if the proposed operation is on the NPS' Categorical Exclusion list, does not qualify for any of the exceptions to CEs, requires minimal mitigation, and would result in minor or less impacts on the human environment (NPS Director's Order 12 and Handbook). CEs may apply for data collection, transfer of an approved operation to a new operator, amendment or supplement to an approved operation, maintenance of oil and gas access roads, installation of oil and gas support equipment within the existing operations area (e.g., compressors, fencing, overhead utilities), and well plugging and surface reclamation.

<sup>3</sup> There may be rare occasions where a proposed oil and gas operation could result in significant impacts on the environment and an Environmental Impact Statement (EIS) is prepared for the proposal rather than an Environmental Assessment (EA).

**Figure B.1 Generalized 36 CFR 9B and NEPA Process Flowchart for Nonfederal Oil and Gas Operations.** Items shown in **bold** are the operator's responsibility. The **shaded** tasks represent the most common NEPA pathway for nonfederal oil and gas operations.







## PROTECTION OF CULTURAL RESOURCES

The NPS Organic Act, the 36 C.F.R. 9B regulations, and many of the parks' enabling legislations require the protection of cultural resources. The overarching statute that protects cultural resources, including archeological resources, historic sites and structures, cultural landscapes, and ethnographic resources is the National Historic Preservation Act (NHPA). Under § 106 of the Act, potential impacts to National Register eligible or listed cultural resources (referred to as historic properties) must be determined once an “undertaking” is identified. This section of the handbook outlines the Section 106 process the NPS uses to protect historic properties whenever an undertaking occurs. Figure B.2 illustrates the cultural resource compliance process and the compliance responsibilities of the oil and gas operator and NPS.

In order to protect cultural resources, the following operating stipulations are required for all nonfederal oil and gas operations in NPS units.

### Stipulations for Protecting Cultural Resources

1. **Cultural Resource Surveys.** Cultural resource surveys must be conducted to document the location and significance of any cultural resource (includes various components of archeological resources, structures, cultural landscapes, ethnographic resources, and museum objects) that might be affected by operations (36 C.F.R. § 9.36 (a)(16)(i), 36 C.F.R. § 63, 36 C.F.R. § 800.4).

Cultural resource surveys must be conducted by qualified cultural resource professionals who have knowledge of, and experience with, the specific cultural resources in question. A final report must be prepared for the cultural resource survey that allows the NPS, in conjunction with the State Historic Preservation Office (SHPO) and Tribal Historic Preservation Office (THPO) to determine National Register of Historic Places (NRHP) eligibility and effect (no historic properties affected, no adverse effect, or adverse effect). Additional work beyond the initial survey may be necessary before a Determination of Eligibility (DOE) on the National Register of Historic Places can be made.

National Park Service cultural resource professionals, in conjunction with the SHPO/THPO must determine whether the existing survey information is adequate and up-to-date. If cultural resource surveys have been previously conducted in the proposed operations area, the NPS/SHPO/THPO cultural resource experts determine the continuing adequacy of the survey(s). In some cases an updated survey may not be necessary.

**Note for proposed § 9.32(e) directional drilling operations:** Cultural resources surveys would not be required for lands outside park units that could be affected by § 9.32(e) directional drilling proposals, unless required by the state (located on state surface) or through other permitting requirements by other federal agencies (*i.e.*, Clean Water Act § 404), but may be required by the NPS for areas inside the park if the downhole operations could have an effect on cultural resources in the park.



## APPENDIX B – LEGAL AND POLICY REQUIREMENTS

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2. Plan Work to Avoid Known Cultural Resources. If this is not possible, assess and mitigate effects on National Register eligible or listed properties in consultation with State/Tribal Historic Preservation Office and Advisory Council on Historic Preservation (36 C.F.R. §§ 800.3-800.9).
3. Cultural Resource Monitoring of Operations. Operations shall employ a qualified archeologist to monitor all ground-disturbing activities, including maintenance activities (36 C.F.R. § 9.47(b)). Qualified archeologists are those who meet the Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation.

Ground disturbance is defined as earth-moving activities, including cut-and-fill, rutting, trenching, and blading roads, drilling and production pads, flowline and gathering line routes, staging areas, storage areas, and heavy equipment parking areas. The range of environments and cultural resources varies a great deal among park units, so the operator and park staff must define what does not constitute ground-disturbing activities for each proposal. All newly recorded archeological sites will be recorded both on state computerized sites forms and NPS Archeological Sites Management Information System (ASMIS) forms. GPS locations (requested in NAD 83) and site location maps will also be required.

4. Inadvertent Discovery of Cultural Resources. If any unknown cultural resources are discovered during the conduct of approved operations, and the resources might be altered or destroyed by the operations, the operator must cease operations in the immediate area and notify the park superintendent.

In the event that the discovery includes Native American human remains, associated funerary objects, sacred objects, or objects of cultural patrimony, the operator must comply with the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA - 25 U.S.C. §§ 3001-3013). Specific procedures to be followed are described in 36 C.F.R. § 10.4.

In either case, the operator must leave the discovery intact until the superintendent grants permission to proceed with the operations (36 C.F.R. § 9.47(b)). Before any further activities occur, a qualified cultural resource expert will assess the cultural resources, evaluate their National Register eligibility, and consult with the SHPO/THPO. Minor recordation, stabilization, or data-recovery may be necessary during this action and will be conducted at the operator's expense. Until the eligibility of the discovered historic properties can be determined, no further disturbance to the cultural resources may occur. Any plans for mitigating the adverse impacts on historic properties will be subject to approval of the NPS, and it is the responsibility of the operator to provide for any necessary mitigation efforts.

If planned mitigation measures are likely to result in the excavation of Native American human remains, associated funerary objects, sacred objects or objects of cultural patrimony, mitigation will also require implementation of a Plan of Action as required by NAGPRA. Procedures of planned excavations are specified in 36 C.F.R. § 10.3.



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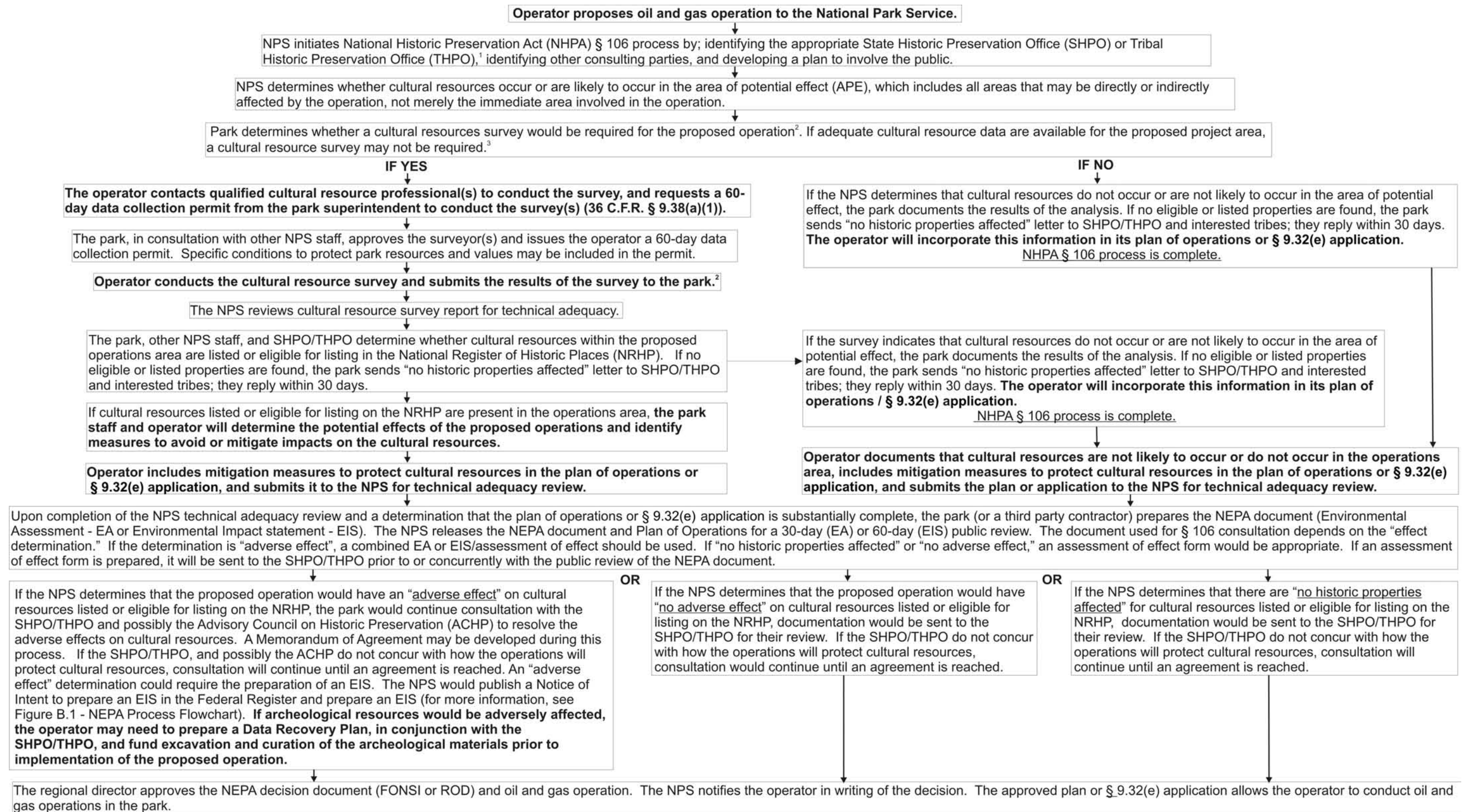
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5. **Damage to Previously Identified Sites.** If, in its operations, a nonfederal oil and gas operator damages, or is found to have damaged, any historic or prehistoric ruin, monument, or site, or any object of antiquity subject to the Antiquities Act of 1906, Archeological Resources Protection Act of 1979 (16 U.S.C. § 470), and the National Historic Preservation Act, as amended, the operator will prepare and implement a data recovery plan at his/her expense and hire a qualified permitted archeologist to carry out the specific instructions of the NPS.
6. **Prohibition of Collecting Artifacts.** Employees and subcontractors working for the operator shall be informed that any collection of artifacts is punishable by law under the Antiquities Act of 1906 and the Archeological Resources Protection Act of 1979. Both fines and civil penalties are possible for collecting artifacts under these federal laws.









<sup>1</sup> Consult with the THPO instead of the SHPO if the cultural resources affected are in an area where THPO has been recognized (e.g., for all NPS units within the Navajo Nation).

<sup>2</sup> Cultural resources surveys would not be required for lands outside park units that could be affected by § 9.32(e) directional drilling proposals, unless required by the state (located on state surface) or through other permitting requirements by other federal agencies (i.e., § 404 of CWA), but may be required by the NPS for areas inside the park if the downhole operations could have an effect on cultural resources in the park. For more information on NPS' 9B requirements for directional drilling operations, see Chapter 5 of this handbook.

<sup>3</sup> In addition to locating/identifying cultural resources, the survey should include recommendations on the eligibility of the discovered sites for inclusion in the National Register of Historic Places. The actual nomination of these resources for NHRP is done with SHPO and/or THPO, as appropriate (§ 110). (Flowchart revised 10/16/06)

**Figure B.2. Cultural Resources Compliance Flowchart for Nonfederal Oil and Gas Operations.** Tasks shown in bold are the operator's responsibility.







## PROTECTION OF THREATENED AND ENDANGERED SPECIES AND THEIR HABITAT

Section 7 of the Endangered Species Act, requires that the NPS ensure that an operator's proposed operation within a park unit does not jeopardize the continued existence of federally listed threatened and endangered plant and wildlife species or result in destruction or adverse modification of the critical habitat of these species. If the National Park Service determines that the proposed operation may affect a listed species or critical habitat, it must consult with the U.S. Fish and Wildlife Service (FWS) and / or the National Marine Fisheries Service (NMFS).

According to NPS Management Policies, the NPS "...will inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition, the Service will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance." (NPS 2006, § 4.4.2.3)

Figure B.3 illustrates the process that the NPS must use to protect threatened and endangered plant and animal species on NPS lands and highlights the compliance responsibilities of the oil and gas operator and NPS.

In order to protect threatened and endangered species and their habitat, the following operating stipulations are required for all nonfederal oil and gas operations in NPS units.

### Stipulations for Protecting Threatened and Endangered Plant and Animal Species

1. **Required Agency Consultations.** Prior to beginning operations, the NPS will consult with the U.S. Fish and Wildlife Service, National Marine Fisheries Service (if applicable), and state parks and wildlife departments to identify threatened, endangered, and sensitive species that may be present in the project area. If there is not adequate T & E survey data, operators may be required to conduct biological surveys in the proposed operations area (36 C.F.R. § 9.36(a)(16)(I); Endangered Species Act of 1973 -16 U.S.C. §§ 1531 et seq.; Executive Order No. 13186).

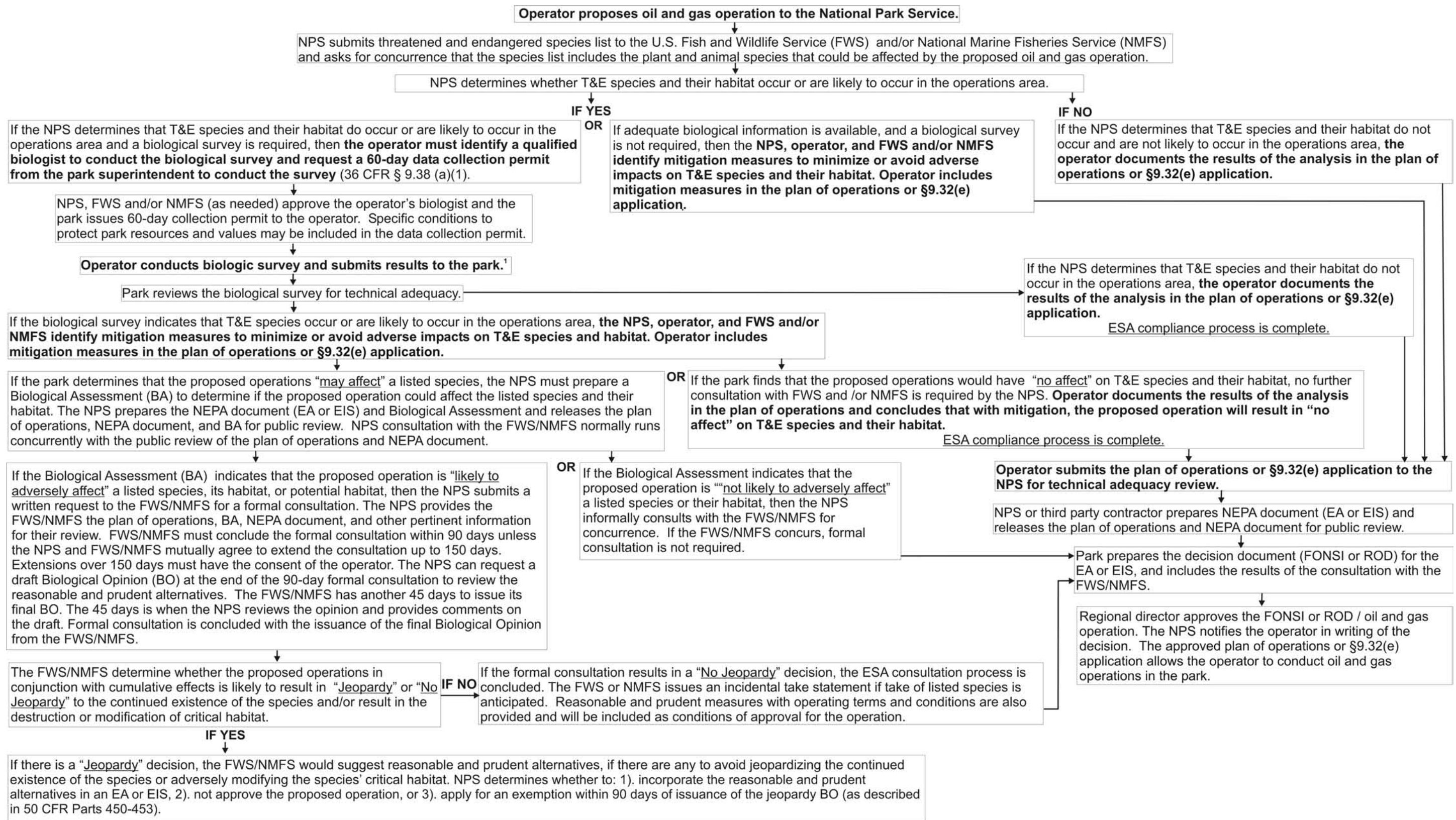
**Note for proposed 9.32(e) operations:** The operator may be required to contract and pay for a qualified biologist(s) to conduct a threatened and endangered species survey of the operations area both inside and outside of the park unit, if this information is not available and is required as a result of the Endangered Species Act 7 consultation process.

2. **Schedule Work to Avoid T&E Species.** Operators must schedule work during times least likely to affect threatened and endangered species (Endangered Species Act, 16 U.S.C. §§ 1531-1544, 50 C.F.R. Parts 402 & 450).









<sup>1</sup> **Note for proposed § 9.32(e) directional drilling operations:** The operator may be required to contract and pay for a qualified biologist to conduct a threatened and endangered species survey of the operations area, both inside and outside of the park unit if this information is not available and is required as a result of the Endangered Species Act 7 consultation process. For more information on NPS' 9B requirements for directional drilling operations, see Chapter 5 of this handbook.

(Flowchart revised 12/6/04)

**Figure B.3. Endangered Species Act Compliance Flowchart for Nonfederal Oil and Gas Operations.** Tasks shown in **bold** are the operator's responsibility.







## PROTECTION OF FLOODPLAINS

Executive Order No. 11988, “Floodplain Management”, dated May 24, 1977, was passed to ensure that short and long-term adverse affects associated with the occupancy and modification of floodplains will be avoided wherever possible. Where no practicable alternatives exist to siting oil and gas operations in a floodplain, mitigating measures (utilizing nonstructural methods when possible) will be implemented to minimize potential harm to life, property, and the natural values of floodplains. National Park Service Director’s Order 77-2: “Floodplain Management” and accompanying procedural manual, (September 8, 2003) outlines requirements for implementing the floodplain protection and management actions under the executive order.

Figure B.4 illustrates the process that the NPS must use to protect floodplains on NPS lands and highlights the compliance responsibilities of the oil and gas operator and the NPS.

In order to protect floodplain functions and values, the following operating stipulations are required for all nonfederal oil and gas operations that are conducted within the 100-year, 500-year, or extreme floodplain in a NPS unit.

### Stipulations for Protecting Floodplains

1. Delineate Floodplains. Conduct a pre-operational analysis to adequately describe the natural environment that would be affected by the operations, including delineating floodplains. (36 C.F.R. § 9.36(a)(16))(i)).

**Note for proposed 9.32(e) operations:** A floodplain assessment would not be required by the NPS for a surface operation’s areas sited outside of a park unit. If there is another agency with floodplains jurisdiction, an operator may be required to contract with a qualified hydrologist to prepare a floodplain assessment within the proposed project area, which may include areas both inside and outside of the park unit. If the downhole operations could have an effect on floodplains inside the park, the NPS may require the operator to hire a qualified hydrologist to conduct a floodplains assessment inside of the park.

2. Use of Qualified Professionals. Information on flood conditions and hazards, and development of appropriate floodplain management actions should be determined by qualified professionals (NPS Procedural Manual § 77-2 VI(D)).
3. Site Operations to Avoid Watercourses. “Surface operations shall at no time be conducted within 500 feet of the banks of perennial, intermittent or ephemeral watercourses; or within 500 feet of the high pool shoreline of natural or man-made impoundments...unless specifically authorized by an approved plan of operations.” (36 C.F.R. § 9.41(a)) If necessary, the operator must specifically request an exemption from this standard in the plan of operations and demonstrate that the exemptions are necessary for acceptable data quality, can be conducted with insignificant affects on park waters or manmade infrastructure, and result in overall resource impact reduction.
4. Site Operations to Avoid Regulatory Floodplains.
  - a. **Siting of Oil and Gas Access Roads and Above-ground Flowlines and Gathering Lines.** The construction of roads used exclusively to access oil and gas operations and the construction and operation of above-ground flowlines and gathering lines fall into the NPS Class I Actions category. The associated regulatory floodplain is the 100-year floodplain (EO 11988 § 3 (b)).



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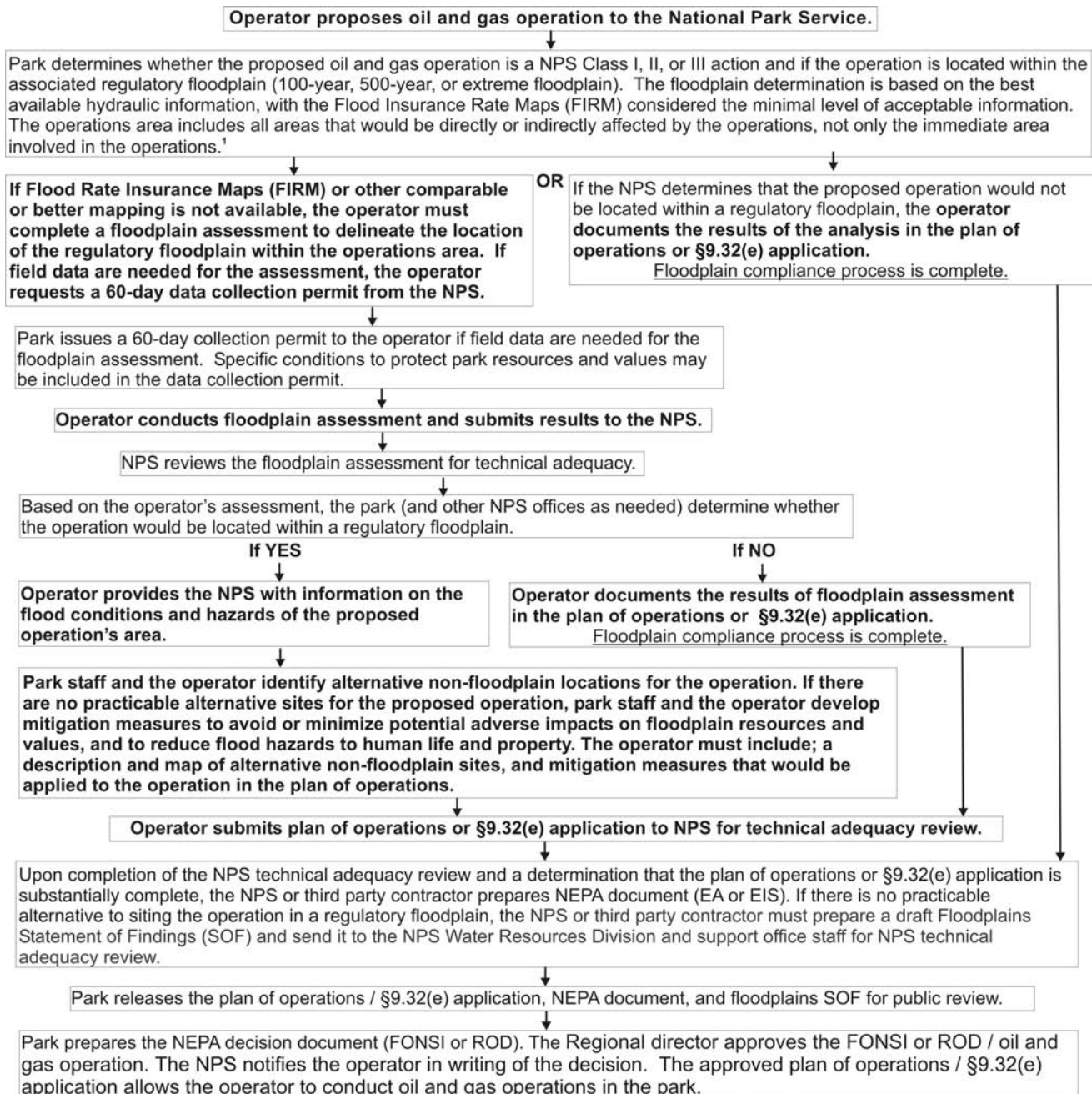
- b. Oil and gas access roads and flowlines and gathering lines should not be constructed within the 100-year floodplain unless there is no practicable alternative. Where such operations must be located within the 100-year floodplain, appropriate mitigation measures must be taken to flood-proof the lines and roads to minimize structural and environmental risks associated with flooding.
- c. **Siting of Drilling and Production Operations and Oil and Gas Storage Facilities.** Actions that would create an added disastrous dimension to the flood event (called critical actions) are Class II Actions. The associated regulatory floodplain is the 500-year floodplain. Examples of critical actions include well drilling, construction and operation of treatment and storage facilities, and storage of toxic, hazardous and/or water-reactive materials. Most oil and gas operations are classified as critical actions (Class II) (Executive Order No. 11988 , § 3 (b)).

Drilling operations, wellheads, oil and gas processing and storage facilities and equipment, including heater treaters, separators, oil and produced water storage tanks should not be located within the 500-year floodplain (critical action floodplain) unless there is no practicable alternative. Where such operations must be located within the 500-year floodplain, appropriate mitigation measures must be taken to flood-proof or elevate the site to minimize structural and environmental risks associated with flooding.

Storage tanks shall be firmly secured to reduce risk of tank failure during high winds and flooding. Storage tanks shall be emptied and filled with water in preparation for hurricanes or flooding.

- 5. Floodplain Statement of Findings. When use of the regulatory floodplain cannot be avoided, a Floodplain Statement (SOF) of Findings must be prepared according to direction provided in NPS Director's Order 77-2. At a minimum, the SOF must contain:
  - a. the reasoning behind the determination of the absence of a practicable alternative non-floodplain location,
  - b. description of the hydraulic conditions associated with flooding at the site including expected advance warning time, and
  - c. a description of how mitigation will be implemented to protect people and floodplain natural resources and values.
  - d. The mitigation plan will include an Emergency Response Plan setting forth operating procedures during emergencies and may include a flood warning system, when appropriate.





<sup>1</sup> **Note for proposed § 9.32(e) directional drilling operations** - A floodplain assessment would not be required by the NPS for surface operations areas sited outside of a park unit. If there is another agency with floodplains jurisdiction, an operator may be required to contract with a qualified hydrologist to prepare a floodplain assessment within the proposed project area, which may include areas both inside and outside of the park unit. If the downhole operations could have an effect on floodplains inside the park, the NPS may require the operator to hire a qualified hydrologist to conduct a floodplains assessment inside of the park. For more information on NPS' 9B requirements for directional drilling operations, see Chapter 5 of this handbook.

(Flowchart revised 5/2/2006)

**Figure B.4. Floodplains Protection Compliance Flowchart for Nonfederal Oil and Gas Operations.**

Tasks shown in **bold** are the operator's responsibility.







## PROTECTION OF WETLANDS

Executive Order No. 11990, “Protection of Wetlands”, dated May 24, 1977, requires that agencies avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative and that all practicable measures to minimize harm to wetlands have been incorporated into the proposal. Where no practicable alternatives exist, mitigating measures will be implemented to avoid and minimize potential harm to wetland area and wetland functions. The NPS policy for protecting wetland resources and values are provided in Director’s Order 77-1 and its accompanying Procedural Manual.

Figure B.5 illustrates the process that the NPS must use to protect wetlands on NPS lands and highlights the compliance responsibilities of the oil and gas operator and the NPS.

In order to protect wetland functions and values, the following stipulations are required for all nonfederal oil and gas operations in NPS units.

### Stipulations for Protecting Wetlands

1. Site Operations to Avoid Streams and Impoundments. “Surface operations shall at no time be conducted within 500 feet of the banks of perennial, intermittent or ephemeral watercourses; or within 500 feet of the high pool shoreline of any natural or man-made impoundments...unless specifically authorized by an approved plan of operations.” (36 C.F.R. § 9.41(a)) If necessary, the operator must specifically request an exemption from this standard in the plan of operations and demonstrate that the exemptions are necessary for acceptable data quality, can be conducted with insignificant affects on park waters or manmade infrastructure, and result in overall resource impact reduction.
2. Delineate Wetlands. Wetlands classified according to the *U.S. Fish and Wildlife Service’s Classification of Wetlands and Deepwater Habitats of the U.S.* must be delineated by the operator where proposed operations would directly or indirectly adversely impact wetlands. Formal wetlands delineations must be conducted by a person with a wetlands delineation training certificate from a recognized provider or Society of Wetlands Scientists (SWS) Professional Wetland Scientist certification. The wetland delineation should be conducted to reflect the definition of wetlands as defined by the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife’s classification. The wetland delineation must include a wetland functions assessment for the proposed operations area. The wetland delineations shall be approved by the U.S. Army Corps of Engineers and/or the Water Resources Division of the National Park Service, and incorporated into the operator’s plan of operations and the Wetland Statement of Findings (36 C.F.R. § 9.36(a)(16))(i), NPS Director’s Order 77-1, and NPS Procedures Manual 77-1 § 5.1). The WSOF will be released for public review concurrently with the NEPA document.
3. Wetland Statement of Findings. When the proposed operation cannot be designed to avoid direct and/or indirect adverse impacts to wetlands, the NPS (or a third party contractor under the direction of the NPS) shall prepare a Wetland Statement of Findings according to Section 5.3 E: Content and Signature Procedures for Wetland Statements of Findings (NPS Procedures Manual 77-1).

A wetland delineation must be completed as a foundation document, but not included in the Wetland Statement of Findings. The Statement of Findings for wetlands must contain:



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- a. A detailed description of the project procedures and equipment that will affect wetlands. For example, the dimensions of drilling equipment, fill or excavation procedures, pipeline length and width of disturbance area, extent of vegetation clearing, drainage, etc.
- b. A map at sufficiently large scale to show the locations, boundaries, and types of wetlands at the project site and the aspects of the preferred alternative that would have adverse impacts on them.
- c. A detailed description of the affected wetlands (e.g., plant species and communities, hydrology, wetland classification, etc.) and their ecological, recreational, cultural, hydrologic, aesthetic, and other functions and values. Abundance of the affected wetland habitat types in the NPS unit/area/region should be included in this analysis.

Examples of wetland functions and values to be considered in this analysis include:

- biotic functions (e.g., fish and wildlife habitat, floral and faunal productivity, native species and habitat diversity, threatened and endangered species),
- hydrologic functions (e.g., flood attenuation, streamflow maintenance, ground water recharge and discharge, water supply, erosion and sediment control, water purification, detrital export to downstream systems),
- cultural values (e.g., aesthetics, education, historical values, archeological values, recreation, interpretation),
- research/scientific values (e.g., "reference sites" for research on unimpacted ecosystems), and
- economic values (e.g., flood protection, fisheries, tourism).

Several methods are available (or are being developed) to assess wetland functions and values for a site and to predict which will be degraded or lost (and, therefore, need to be compensated for) if a project is implemented. The NPS Water Resources Division can provide information on current methods to assess wetland functions and values.

- d. Full disclosure of the adverse impacts on the wetland habitats, processes, functions, and values at the site and acreages affected, by wetland type. This should include the total area of impact including dredge, fill, vegetation clearing, drainage, rutting from vehicle tires or tracks, etc., each broken down by wetland classification type (according to the FWS Cowardin classification).
- e. A concise description of alternatives considered in addition to the preferred alternative.
- f. The reasons why the preferred alternative must be located and designed such that it has adverse impacts on wetlands, and why no non-wetland alternatives or those with fewer wetland impacts were chosen. A discussion of the various factors and trade-offs considered in arriving at this decision must be included.
- g. A description of how the preferred alternative was designed to minimize wetland impacts to the greatest extent practicable.
- h. A description of compensation proposed, *i.e.*, what wetland area(s) will be restored to compensate for this loss or degradation (consistency with the NPS "no net loss of wetlands" goal found in Director's Order 77-1). This portion of the SOF must include:



- a large scale map of the compensation site,
  - a description of wetland types to be restored, functions to be restored, and the degree to which they replace functions lost at the project site,
  - a description of the restoration process (e.g., excavation, grading, hydrologic restoration, structure removal, plantings, etc.),
  - the anticipated schedule for project completion,
  - the anticipated time-frame for full functioning of the compensation wetlands,
  - monitoring and maintenance requirements, and
  - the funding source for the project consistent with the funding source restrictions listed in Section 5.2.C of NPS Procedural Manual 77-1.
4. Compensation for Loss of Wetlands. When proposed operations cannot avoid direct and/or indirect adverse impacts to wetlands, the operator shall compensate for direct and indirect impacts on wetlands by restoring degraded or former wetland habitats. Compensation will be at a minimum 1:1 ratio. In other words, at least one acre of wetlands must be restored for each acre of wetland that is destroyed or degraded. The focus will be on the replacement of comparable wetland types and functions, not just wetland acreage. Compensation shall be performed prior to or at the same time impacts associated with the approved oil and gas operations occur (NPS Director's Order 77-1 and NPS Procedures Manual 77-1 § 5.2(C)).

Final compensation ratios may need to be greater than 1:1 in cases where:

- the functional values of the site being impacted are determined to be high and the restored wetlands will be of lower functional value;
- it will take a number of years for the restored site to become fully functional; or
- the likelihood of full restoration success is unclear.

If the adverse impacts on wetlands (direct plus indirect impacts) from the entire project totals less than 0.1 acre, then wetland compensation is strongly encouraged but may be waived by the NPS if the loss of wetland functions is considered to be minimal.

The compensation site shall be located in the park. Compensation shall be performed prior to or at the time impacts associated with proposed nonfederal oil and gas operations are anticipated to occur. On completion of operations that have directly and/or indirectly impacted wetlands, restoration of the site shall be done to return the impacted wetlands to their pre-disturbance condition.

Areas within the park that may be restored as compensation for wetland impacts associated with nonfederal oil and gas operations, in priority order, are:

- poorly restored abandoned oil and gas access roads and drilling locations, and
- wetlands that have been adversely affected by past actions.

When the minimum 1:1 wetland compensation ratio cannot be performed in the park because no areas remain to be restored, operators shall be required by the NPS to perform the minimum 1:1 wetland compensation ratio in another NPS unit.

When potential wetland impacts from proposed nonfederal oil and gas operations would require wetland compensation ratios greater than 1:1, operators would be required to perform the initial 1:1 compensation by restoring disturbed wetland areas as described above. Operators would



## APPENDIX B – LEGAL AND POLICY REQUIREMENTS

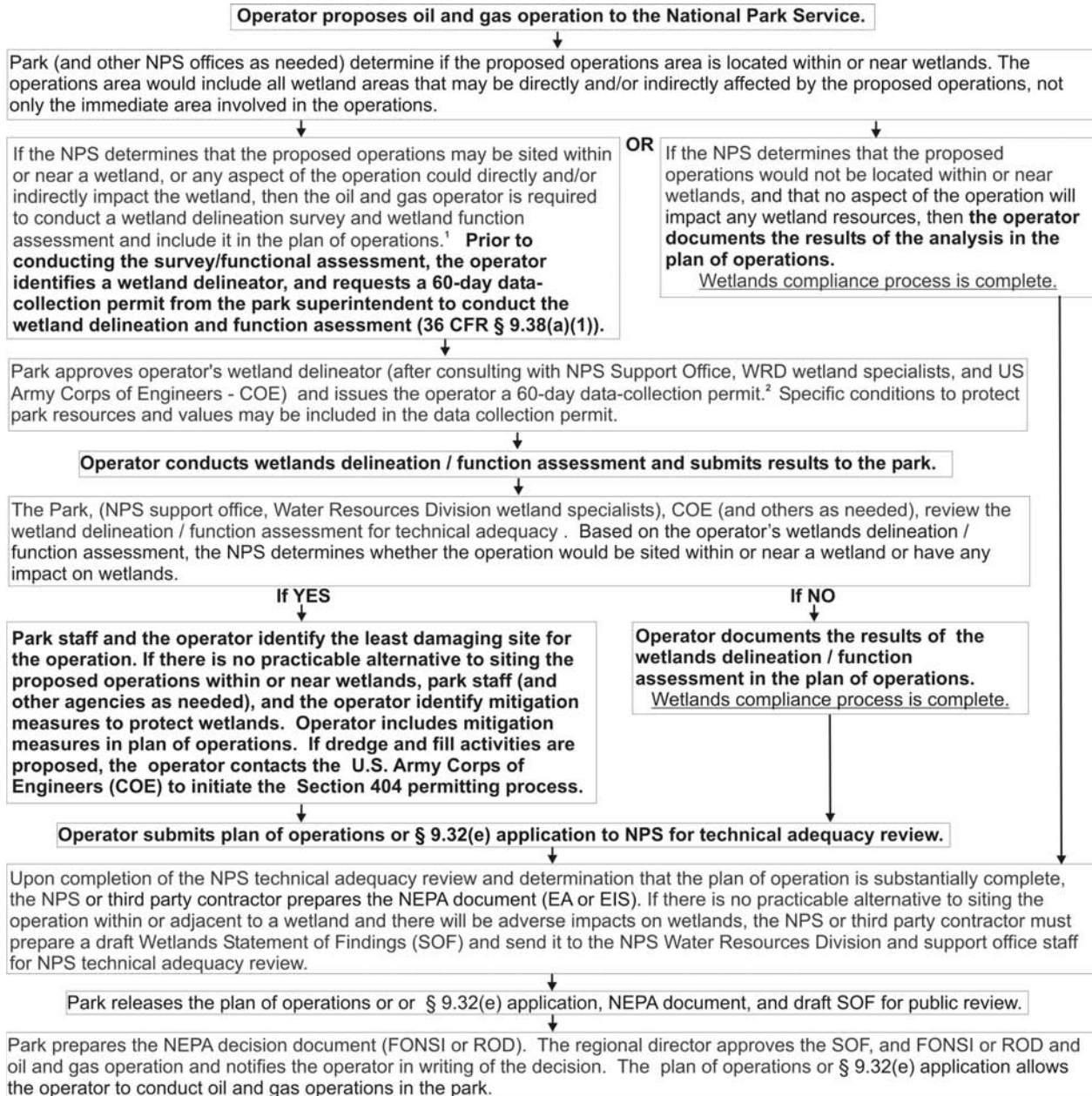
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then have two options to perform the remaining wetland compensation: by restoring additional disturbed wetland areas as described above, or by performing a commensurate portion of an “in-lieu” project by constructing segments of educational and interpretive elevated boardwalks at sites designated by the park superintendent. These wetland projects shall be decided upon, planned and designed by the park, and all environmental compliance performed by the NPS. A commensurate portion would be based on the costs for the initial 1:1 compensation described above.

In addition to the operating stipulations listed above, the following Best Management Practices (BMPs) are required when an operation has the potential to have adverse impacts on wetlands (NPS Procedures Manual 77-1, Appendix 2):

1. **Effects on Hydrology:** Action must have only negligible effects on site hydrology, including flow, circulation, velocities, hydroperiods, water level fluctuations, and so on.
2. **Water Quality Protection and Certification:** Action is conducted so as to avoid degrading water quality to the maximum extent practicable. Measures must be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering the waterway of wetlands. Action is consistent with state water quality standards and Clean Water Act Section 401 certification requirements (check with appropriate state agency).
3. **Erosion and Siltation Controls:** Appropriate erosion and siltation controls must be maintained during construction, and all exposed soil or fill material must be permanently stabilized at the earliest practicable date.
4. **Effects on Fauna:** Action must have only negligible effects on the normal movement, migration, reproduction, or health of aquatic or terrestrial fauna, including at low flow conditions.
5. **Proper Maintenance:** Structure or fill must be properly maintained so as to avoid adverse impacts on aquatic environments or public safety.
6. **Heavy Equipment Use:** Heavy equipment use in wetlands must be avoided if at all possible. Heavy equipment used in wetlands must be placed on mats, or other measures must be taken to minimize soil and plant root disturbance and to preserve pre-construction elevations.
7. **Stockpiling Material:** Whenever possible, excavated material must be placed on an upland site. However, when this is not feasible, temporary stockpiling of excavated material in wetlands must be placed on filter cloth, mats, or some other semi-permeable surface, or comparable measures must be taken to ensure that underlying wetland habitat is protected. The material must be stabilized with straw bales, filter cloth, or other appropriate means to prevent reentry into waterway or wetland.
8. **Removal of Stockpiles and Other Temporary Disturbances During Construction:** Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable. Wetland areas temporarily disturbed by stockpiling or other activities during construction must be returned to their preexisting elevations, and soil, hydrology, and native vegetation communities must be restored as soon as practicable.
9. **Topsoil Storage and Reuse:** Revegetation of disturbed areas should be facilitated by salvaging and storing existing topsoil and reusing it in restoration efforts in accordance with NPS policies and guidance. Topsoil storage must be for as short a time as possible to prevent loss of seed and root viability, loss of organic matter, and degradation of the soil microbial community.
10. **Native Plants:** Where plantings or seeding are required, native plant material must be obtained and used in accordance with NPS policies and guidance. Management technologies must be implemented to foster rapid development of target native plant communities and to eliminate invasion by exotic or other undesirable species.





<sup>1</sup>Note for proposed § 9.32(e) directional drilling operations: A wetlands delineation would not be required by the NPS for the surface operation's area located outside of a park unit. The operator is responsible for consulting with the U.S. Army Corps of Engineers (COE) regarding the applicability of Clean Water Act § 404 permitting and the COE's requirements for wetlands delineations. If the downhole operations could have an effect on wetlands inside the park, the NPS may require the operator to hire a qualified wetlands scientist to conduct a wetlands delineation inside the park.

<sup>2</sup>Formal wetlands delineations must be conducted by a person with a wetlands delineation training certificate from a recognized provider or SWS Professional Wetland Scientist certification.  
(Flowchart revised 5/2/2006)

**Figure B.5. Wetlands Protection Compliance Flowchart for Nonfederal Oil and Gas Operations.**  
Tasks shown in **bold** are the operator's responsibility.







## **MANAGEMENT OF COASTAL RESOURCES**

The Coastal Zone Management Act (CZMA) was enacted to preserve, protect, develop, and where possible, restore or enhance the resources of the nation's coastal zone. The purpose of the Act is to improve the nation's management of coastal resources. Specific concerns in the coastal zone include; the loss of living marine resources and wildlife habitat, decreases in open space for public use, and shoreline erosion. The "coastal zone" means the coastal waters and the adjacent shorelands of the United States. It also includes coastal zones of the Great Lakes.

The CZMA established a state-federal partnership in which the states take the lead in managing their coastal resources by developing state CZM programs and plans, while the federal government (U.S. Department of Commerce, National Oceanic and Atmospheric Administration) provides financial and technical assistance. The Act requires federal agencies to act in a manner consistent with federally approved state management programs. Federal consistency under the CZMA means that federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone must be consistent with the enforceable policies of a coastal state's or territory's federally-approved coastal management program. In states that do not have a coastal zone management program approved by the Secretary of Commerce, the requirement for a consistency review and state concurrence does not apply.

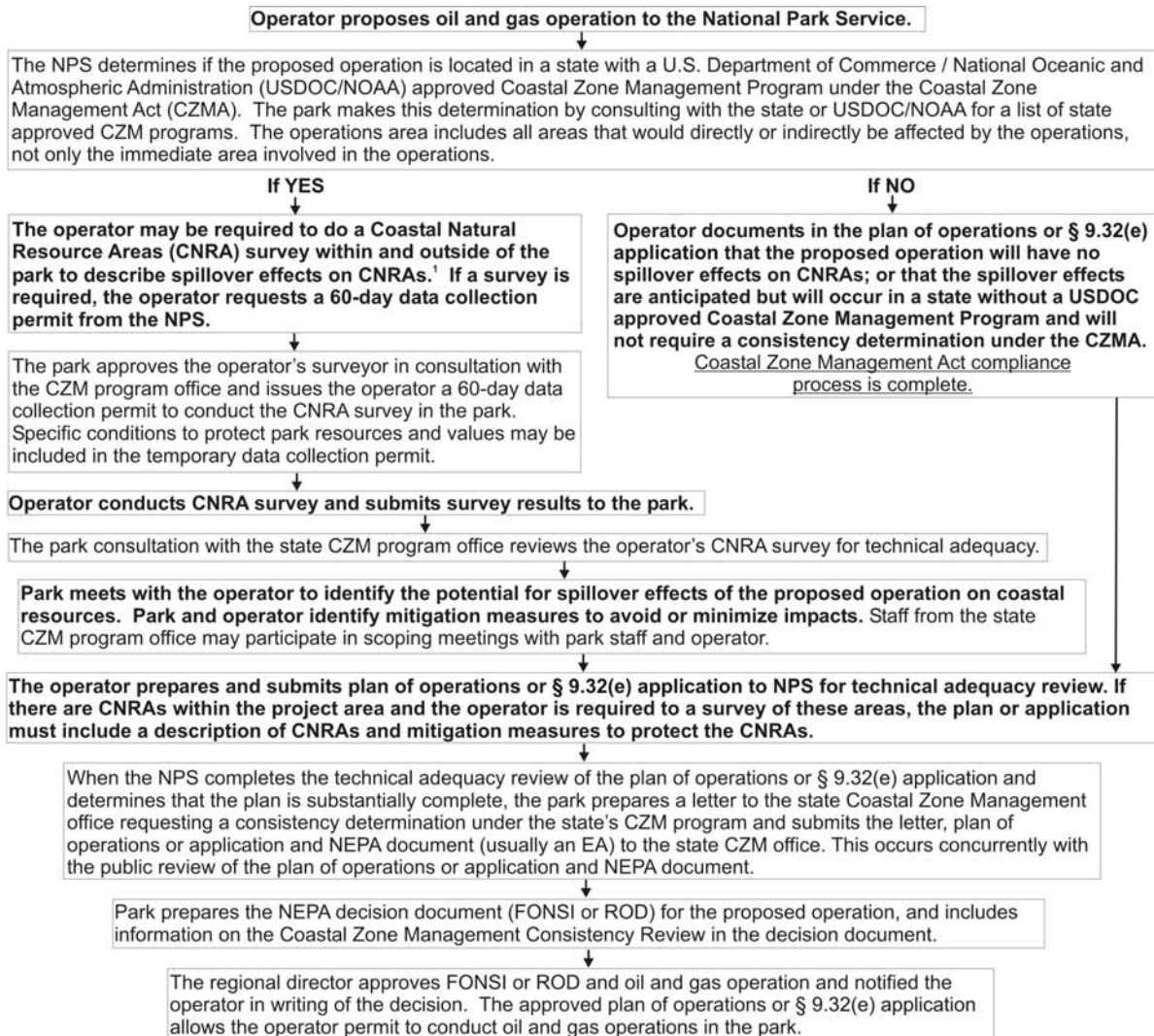
All federal agency activities, whether in or outside of the coastal zone, must comply with the consistency requirements of Section 307(c) of the CZMA if the activities affect natural resources, land uses, or water uses in the coastal zone. In addition, the NPS Management Policies (2006) require that the NPS comply with state coastal zone management plans prepared under the Coastal Zone Management Act.

When the NPS is considering issuing a permit for nonfederal oil and gas operations under its 36 C.F.R. 9B regulations, and the proposed operation may have a spillover effect on Coastal Zone Natural Areas (CNRAs), the NPS will consult with the state agency responsible for carrying out the state approved CZM program for a consistency determination. In these cases, the state agency provides a consistency certification within 45 days of receipt of an administratively complete consistency certification, or the action is presumed to be consistent.

Figure B.6 illustrates the process that the NPS must use to protect coastal resources on NPS lands and highlights the compliance responsibilities of the oil and gas operator and the NPS.



## APPENDIX B – LEGAL AND POLICY REQUIREMENTS



<sup>1</sup>Note for proposed § 9.32(e) directional drilling operations: A survey of coastal natural resource areas would not be required by the NPS for the surface operation's area located outside of a park unit. If there is another federal agency with jurisdiction of coastal areas, an operator may be required to contract with a qualified professional to survey Coastal Natural Resource Areas within the operations area, which may include areas both inside and outside of the park unit. The operator is responsible for consulting with the U.S. Army Corps of Engineers (COE) regarding the applicability of Clean Water Act § 404 permitting. If the downhole operations could have an effect on coastal natural resource areas inside the park, the NPS may require the operator to hire a qualified professional to conduct a survey of these areas inside the park.

(Flowchart revised 1/5/05)

**Figure B.6. Generalized Coastal Zone Management Compliance Flowchart for Nonfederal Oil and Gas Operations.** Tasks shown in **bold** are the operator's responsibility.



## PART C - FEDERAL, STATE, AND LOCAL PERMITS FOR NONFEDERAL OIL AND GAS OPERATIONS

The permits shown in Table B.2 may be required for a nonfederal oil and gas operation, depending on the type of operation, scope, and location. The operator, not the National Park Service, is responsible for obtaining the permits listed in the following table.

**Table B.2. Federal, State, and Local Permits That May be Required for a Nonfederal Oil and Gas Operation in Units of the National Park System.**

PERMIT	LAW OR REGULATION	RESPONSIBLE AGENCY
Plan of operations	Nonfederal Oil and Gas Rights Regulations, 36 C.F.R. Part 9, Subpart B	National Park Service
Permits to drill a well, treat and store oil and gas products, plug/abandon a well, and construct/operate intrastate oil and gas pipelines	Statewide oil and gas rules or regulations	state oil and gas division
Special use permit to construct and maintain surface for a transpark oil and gas pipeline in an existing right-of-way	36 C.F.R. Parts 1-5	National Park Service
Interstate oil and gas pipeline permit	49 C.F.R. Subtitle B, Ch. 1, Parts 190-199	U.S. Department of Transportation
Underground injection well permit	Safe Drinking Water Act of 1974	Environmental Protection Agency, via state oil and gas division or state water quality division
Prevention of significant deterioration (PSD) of air quality and/or visibility permit	Clean Air Act	Environmental Protection Agency, via state air quality division
National pollutant discharge elimination system (NPDES) permit	Federal Water Pollution Control Act of 1972 (a.k.a. Clean Water Act), Section 402	Environmental Protection Agency, via state water quality division
Section 10 permit to obstruct or alter a navigable waterway of the United States	Rivers and Harbors Act of 1899	U.S. Army Corps of Engineers
Section 404 permit to discharge dredge or fill material into waters of the U.S.	Federal Water Pollution Control Act of 1972 (a.k.a. Clean Water Act), Section 404	Environmental Protection Agency, via U.S. Army Corps of Engineers
Integrated pest management (IPM) permit to use a pesticide or herbicide	Federal Insecticide, Fungicide, and Rodenticide Act	National Park Service, via the NPS plan of operations
Floodplain management permit	State or local floodplain regulations	State or local floodplain management agency
Permit to "take" a T/E species	Endangered Species Act	U.S. Fish and Wildlife Service and/or National Marine Fisheries Service
Determination of consistency with state Coastal Zone Management Plan	Coastal Zone Management Act	Department of Commerce, via state coastal zone management agency
Archeological Resources Protection Act (ARPA) permit "to excavate or remove any archeological resources located on public lands or Indian lands and to carry out activities associated with such excavation or removal." (16 U.S.C. § 470cc(a))	Archeological Resources Protection Act of 1979	National Park Service



## **PART D – THE APPLICABILITY OF SOILD WASTE DISPOSAL REGULATIONS TO NONFEDERAL OIL AND GAS OPERATIONS**

Regulations at 36 C.F.R. Part 6 govern the handling of “solid waste” in park units. While the Part 6 regulations cover activities other than mining, this summary will address only that portion of the Part 6 regulations dealing with mining activities, which includes oil and gas. Part 6 applies on wholly private, state and federal lands within the park boundary and applies regardless of the jurisdictional arrangement in a park.

“Solid Waste from Mining” is defined as:

“Mining overburden, mining byproducts, solid waste from the extraction, processing and beneficiation of ores and minerals, drilling fluids, produced waters, and other wastes associated with exploration, development, or production of oil, natural gas or geothermal energy and any garbage, refuse or sludge associated with mining and minerals operations.”

The Mining provision of Part 6 distinguishes between “new” and “existing” operations.

### **NEW OPERATIONS**

New operations are defined as those proposed after January 25, 1995.

These operations “may not establish or operate a new solid waste disposal site within a unit.” This means that any waste generated must be used for reclamation (temporary stockpile of waste is acceptable, if used for reclamation or removed at the end of operations), taken to an approved NPS landfill, or taken out of the park to a municipal landfill. Approved 9B plans usually cover the handling of solid waste generated by the operation.

### **EXISTING OPERATIONS**

Existing operations are defined as those in operation as of January 25, 1995.

If the existing operation is EXEMPT from the 9B regulations:

- The operator must request a part 6 permit. Without the Part 6 permit the operator is subject to the § 6.12 penalty provision (criminal penalties) or suspension.

If the existing operation is UNDER A 9B PLAN:

- The 9B plan already covers the handling of solid waste

If the operator submits a plan revision and it solid waste is generated as a result of the plan, that solid waste must be used for reclamation (temporary stockpile of waste is acceptable if it is used for reclamation or removed at the end of operations), taken to an approved NPS landfill, or taken out of the park to a municipal landfill.



## APPENDIX C

### SAMPLE LETTERS FOR NONFEDERAL OIL AND GAS OPERATIONS

This appendix contains sample letters that are commonly used by the nonfederal oil and gas operator to correspond with the National Park Service. The following letters have been prepared to assist the operator in preparing for and conducting operations in units of the National Park System:

- Demonstration of an Operator's Ownership Right
- Request for a Temporary Access Permit
- Plan of Operations Amendment
- Request for Temporary Approval to Continue Operations
- Change of Operator Notification (from transferring owner)
- Change of Operator Notification (from new Owner)
- Operator Affidavit of Compliance

NOTE: In addition to the above sample letters, a model form and letter of credit for performance bonds are included in *Chapter 10 – Performance Bonds*.

The information that must be added by the operator to finalize the correspondence is shown in parentheses and **bold text**. There are also notes to the operator marked with “**NOTE TO OPERATOR.**”







## DEMONSTRATION OF AN OPERATOR'S OWNERSHIP RIGHT

### SAMPLE LETTER

(insert date)

Superintendent (insert name)  
(insert park name)  
(insert address)

Attn: (insert name of park's oil and gas program administrator)

Dear Superintendent (insert name):

Enclosed is a copy of the (insert title of the legal instrument; *i.e.* Assignment and Bill of Sale, Lease Agreement, Geophysical Exploration Permit, etc.) that demonstrates (insert company name's) ownership right to (insert description of type of activity; *i.e.* conduct a 3-D seismic survey, or develop nonfederal oil and gas interests) within the park.

(Insert company name) proposes to (insert a brief description of the proposed operation and location). We would like to undertake these operations in (insert projected timeline).

Please send information, including a CD ROM of the NPS Operator's Handbook for Nonfederal Oil and Gas Development in Units of the National Park System, that will assist us in obtaining a permit under the National Park Service's Nonfederal Oil and Gas Rights Regulations (36 C.F.R. Part 9, Subpart B). If you have questions, I can be reached at (insert telephone number).

Sincerely,

(insert name)  
(insert title)

Enclosure







## REQUEST FOR TEMPORARY ACCESS PERMIT

### SAMPLE LETTER

(insert date)

Regional Director (insert name)  
(insert name of region )  
(insert address)

Attn: (insert name of park's oil and gas program administrator)

Dear (insert name of Regional Director):

**(Insert company name)** is requesting a 60-day temporary access permit for the purpose of **(select one)**:

- ☐ ☐ collecting basic information necessary to prepare a plan of operations, pursuant to 36 C.F.R. § 9.38(a)(1);
- ☐ ☐ continuing existing operations, pursuant to 36 C.F.R. § 9.38(a)(2); or
- ☐ ☐ conducting new operations, pursuant to 36 C.F.R. § 9.38(b).

**(Insert company name)** proposes to **(insert a brief description of the proposed activity and location)**. A map of the area is enclosed, showing access routes and boundary of survey(s).

**NOTE TO OPERATOR:** If requesting a 60-day data collection permit to gather information to prepare a plan of operations pursuant to 36 C.F.R. § 9.38(a)(1), include the following information:

1. Describe the type of survey(s) to be conducted;
2. Give the proposed date to start survey(s) (a minimum 2-week advance is recommended). If applicable, specify if a timeframe is important; *i.e.* to perform a biological survey when a species is likely to be documented);
3. Describe the type of equipment and methodology proposed to conduct the survey(s), including a description of the type of equipment/method proposed to access the survey area (on foot, by vehicle, ATV, etc.);
4. Include the statement: (Insert company name) will notify the park nonfederal oil and gas program coordinator at least 72 hours in advance of beginning work in the park; and
5. Include the statement: (Insert company name) representatives and its contractors and subcontractors will carry a copy of the temporary operating permit on them whenever performing work in the park.

**NOTE TO OPERATOR:** If requesting a 60-day permit to continue existing operations pursuant to 36 C.F.R. § 9.38(a)(2), include the following information:

**(Insert company name)** requests the temporary operating permit with the following disclosure and stipulations:



## APPENDIX C – SAMPLE LETTERS

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1. The suspension of existing operations would result in an unreasonable economic burden or injury to the **(insert company name)**;
2. The continuation of existing operations will be conducted in accordance with all applicable laws, and in a manner prescribed by the regional director designed to minimize or prevent significant environmental damage;
3. The Superintendent or his/her designated representative would be allowed access into the operations area at any time to perform routine inspections and monitor compliance with the temporary operating permit;
4. **(Insert company name)** commits that its representatives, contractors and subcontractors will carry a copy of the temporary operating permit on them whenever performing work in the park, and;
5. Within 60 days of the granting of the temporary operating permit, **(insert company name)** shall submit an initial substantially complete plan of operations.

**NOTE TO OPERATOR:** If requesting a 60-day permit to conduct new operations pursuant to 36 C.F.R. § 9.38(b), include the following information:

**(Insert company name)** requests the temporary operating permit with the following disclosure and stipulations:

1. **(Insert company name)** can demonstrate a compelling reason for the failure to have had timely approval of a proposed plan of operations. (Describe compelling reason for not having had timely approval of a proposed plan of operations.)
2. **(Insert company name)** can demonstrate that failure to grant such approval will result in an unreasonable economic burden or injury to the **(insert company name)**. (Describe how failure to receive a temporary operating permit would result in an unreasonable economic burden or injury to the company.);
3. The Superintendent or his/her designated representative is allowed access into the operations area at any time to inspect operations and monitor for compliance with the approved temporary operating permit;
4. **(Insert company name)** will notifying the park nonfederal oil and gas program coordinator at least 72 hours in advance of beginning work in the park;
5. **(Insert company name)** representatives, contractors and subcontractors will carry a copy of the temporary operating permit on them whenever performing work in the park, and;
6. Within 60 days of the granting of the temporary operating permit, **(insert company name)** shall submit an initial substantially complete plan of operations.

**NOTE TO OPERATOR:** If you are requesting a temporary access permit for a park that is located in the Intermountain Region, then the letter should be addressed to the park Superintendent since this authority has been delegated from the Regional Director to the park Superintendent in this region.

If you have questions, I can be reached at **(insert telephone number)**.

Sincerely,  
**(insert name)**  
**(insert title)**

Enclosure



## PLAN OF OPERATIONS AMMENDMENT

### SAMPLE LETTER

(insert date)

Superintendent (insert name)

(insert park name)

(insert address)

Attn: (insert name of park's oil and gas program administrator)

Dear Superintendent (insert name):

(Insert company name) proposes to amend its approved plan of operations for (insert title of approved plan of operations) dated (insert date plan of operations was approved – this is typically the date the NEPA Finding of No Significant Impact that was signed by the Regional Director). The amendment we propose is to (insert brief description). Enclosed is the amendment to the approved plan of operations. We would like to implement the amendment in (insert projected timeline).

Please review the proposed amendment to the plan of operations for technical adequacy and advise us of any additional information requirements. If you have questions, I can be reached at (insert telephone number).

Sincerely,

(insert name)

(insert title)

Enclosure







## REQUEST TEMPORARY APPROVAL TO CONTINUE OPERATIONS

### SAMPLE LETTER

(Date)

Superintendent **(insert name)**  
**(insert park name)**  
**(insert address)**

Dear Superintendent **(insert name)**:

Pursuant to 36 C.F.R. § 9.34(b), I am notifying you that **(insert company name)**, has assumed ownership of the **(insert name of operation and location)**, from **(insert name of previous operator)**, effective **(enter date of transfer)**. Enclosed is a copy of the **(insert title of the legal instrument; i.e. Assignment and Bill of Sale, Lease Agreement, etc.)**.

As specified in the legal instrument transferring ownership of the operations, **(insert company name)**, has assumed all responsibilities for the operations – past and present.

**(Insert company name)**, is requesting a 60-day temporary approval permit to activate and continue operation of the **(insert type of operation)** under the following conditions:

- The suspension of operations would result in an unreasonable economic burden or injury to **(insert company name)**, because           **(explain)**          .
- The operations will be conducted in accordance with all applicable laws.
- Operations will be conducted in a manner to minimize or prevent significant environmental damage by           **(explain what measures you will be using to minimize resource impacts and public safety concerns)**          ; and
- Within sixty (60) days of the granting of such temporary approval, **insert company name)**, will submit an initial substantially complete plan of operations.

If you have any questions, please contact me at **(enter phone number)**.

Sincerely,

**(enter name)**  
**(enter title)**

Enclosure:  
Documentation of right to operate







**CHANGE OF OPERATOR NOTIFICATION  
(FROM TRANSFERRING OWNER)**

**SAMPLE LETTER**

(insert date)

Superintendent (insert name)  
(insert park name)  
(insert address)

Attn: (insert name of park's oil and gas program administrator)

Dear Superintendent (insert name):

(Insert company name) has been operating (insert description or title of operations) under a plan of operations approved on (insert date). Pursuant to the notification requirements of 36 C.F.R. § 9.34(a), I am notifying you that (insert company name) has (insert one: sold, assigned, bequeathed, or conveyed) ownership of the operations to (insert name of Company operations have been transferred to) on (insert date). Enclosed is a copy of the (insert title of the legal instrument; *i.e.* Assignment and Bill of Sale, Lease Agreement, etc.).

As specified in the legal instrument transferring ownership of the operations, (insert name of Company that operations have been transferred to) has assumed all responsibilities for the operations – past and present. Please send us a letter, returning the (select: performance bond, letter of credit or other type of security tendered) and documenting that the term of liability under the approved plan of operations has ended for (insert company name).

If you have questions, I can be reached at (insert telephone number).

Sincerely,

(insert name and title – must be signed by the  
operator, his agent, executor, or representative)

Enclosure







## CHANGE OF OPERATOR NOTIFICATION (FROM NEW OWNER)

### SAMPLE LETTER

(insert date)

Superintendent (insert name)  
(insert park name)  
(insert address)

Attn: (insert name of park's oil and gas program administrator)

Dear Superintendent (insert name):

Pursuant to the notification requirements of 36 C.F.R. § 9.34(b), I am notifying you that **(insert company name)** has assumed ownership of the **(insert description or title of operations)**, from **(insert name of transferred Company)**, effective **(insert date)**. These operations were conducted under a plan of operations titled **(insert title)**, approved on **(insert date plan of operations was approved – typically this is the date the NEPA Finding of No Significant Impact that was signed by the regional director of the NPS)**.

**(Insert company name)** is ratifying the approved plan of operations of **(insert date)**, and will be bound by the terms and conditions specified in the plan. **(Insert company name)** will continue operations as described in the plan of operations; and will make no changes unless approved by the National Park Service through an amendment to the approved plan of operations. To ratify the approved plan of operations, we are enclosing:

- ☐ A list of the names and legal addresses of the following persons: The operator, and the owner(s) or lessee(s) if rights are State-owned) other than the operator (36 C.F.R. § 9.36(a)(1);
- ☐ Copy of the lease, deed, designation of operator, or assignment of rights upon which the operator's right to conduct operations is based (36 C.F.R. § 9.36(a)(2); and
- ☐ An affidavit stating that the operations planned are in compliance with all applicable Federal, State and local laws and regulations (36 C.F.R. § 9.36(a)(15).
- ☐ A (insert performance bond, letter of credit, or other acceptable type of security) in the amount of (insert dollar amount).

Please advise us of the continuing adequacy of the plan of operations, or of any specific amendments that may be needed.



## **APPENDIX C – SAMPLE LETTERS**

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**NOTE TO OPERATOR:** If the Company proposes to make changes to the operations or to conduct operations differently than described in the approved plan of operations, include a statement here to describe the Company's intent to prepare an amendment to the approved plan of operations and describe the nature of the changes to be addressed; or state that the Company intends to prepare a new plan of operations.)

If you have questions, I can be reached at **(insert telephone number)**.

Sincerely,

**(insert name and title – must be signed by the operator, his agent, executor, or representative)**



## OPERATOR AFFIDAVIT OF COMPLIANCE

### SAMPLE LETTER

(insert date)

Superintendent (insert name)

(insert park name)

(insert address)

Attn: (insert name of park's oil and gas program administrator)

Re: Affidavit of Compliance for (insert name of operation)

Dear Superintendent (insert name):

(Insert name of operator) proposed plan of operations for (insert description of operation) in (insert name of park) is, and will continue to be in compliance with all applicable federal, state, and local laws and regulations.

Sincerely,

(insert signature)

#### Company Management Approval

Name: \_(Insert name of approving official authorized to legally bind the company)\_

Title: \_(Insert title of official)\_

Date: \_(Insert date)\_







## **APPENDIX D**

# **GUIDELINE FOR THE DETECTION AND QUANTIFICATION OF CONTAMINATION AT OIL AND GAS OPERATIONS**

**Prepared by  
Mark VanMouwerik  
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Water Resources Division  
National Park Service  
Fort Collins, Colorado  
November 1999  
(updated October 2006)**

### **WHAT IS THE PURPOSE OF THIS DOCUMENT?**

This document is to be used as a guideline for collecting samples at sites within National Park Service (NPS) units where there are oil or gas operations. Samples will indicate whether or not contamination exists at the site as a result of an operation.

Operators must test for specific contaminants at an operation's site. It is important that operators employ uniform procedures when collecting samples so that results taken at different times by different people at the same site can be reliably compared. This guideline presents methodology for analyzing soil, sediment, groundwater, and surface water.

Specifically, these guidelines explain: 1) when owner/operators must collect samples, 2) what contaminants to test for, 3) how to collect samples, 4) quality assurance/quality control, 5) how to analyze samples in the laboratory, 6) required detection limits and choosing environmental benchmarks, and 7) sample plan and reporting requirements.

Note that in this guideline "superintendent" refers to the superintendent and/or members of his/her staff who will represent him/her on these issues. In many cases, the superintendent's actual involvement may be only that of approving the recommendations of the staff member(s).

### **WHEN AND WHERE TO COLLECT SAMPLES**

The superintendent can require sampling by an operator at a site if it has recently experienced a release, has a history of releases, or the facility is operated in a manner that poses a risk of releasing crude oil, natural gas condensates, produced water, or any other "contaminating substance" associated with an oil or gas operation.

Sampling can occur at any time during or after an operation. ("After" refers to when an owner/operator sells the operation, transfers its leasing rights, or closes the operation and abandons the site.) In most instances, sampling by the operator should be conducted under the direction of a Sampling and Analysis Plan that has been approved by the superintendent to ensure all work will be performed in a professional manner, meets the resource protection needs of the park, and with the knowledge of the appropriate park staff.



## **APPENDIX C – SAMPLE LETTERS**

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Sampling will be biased, not random, focusing on areas where contamination is obvious (visible) or suspected (such as near production or storage facilities). The exact sample locations and number of samples collected are site-specific and will be determined by the superintendent, or proposed by the site operator in a Sampling and Analysis Plan or Work Plan submitted to the superintendent for review and approval. Owner/operators are responsible for sample collection, sample analyses, and reporting of results, not NPS.

Sample data from a nearby (but off-site) “clean” location is necessary for determining “background” concentrations at the site for the contaminants of concern. A comparison of the contaminated site data with “background” data will allow resource managers to determine how contaminated the site is. If the site has been remediated, comparisons of sample data with “background” data can indicate if the clean-up met the superintendent’s remediation goals for the site.

Note that incoming owner/operators at new or existing oil or gas operations may wish to test the site for contamination before they begin operations. If they choose to do so, it is strongly suggested they test for the contaminants and use the methodology given in this guideline so that if samples are required during or after the operation for any reason, all data can be reliably compared.

### **WHAT CONTAMINANTS TO TEST FOR**

Contaminating substances that can be found at oil and gas sites are primarily crude oil, natural gas condensate, produced water, drilling mud, lube (motor) oil, and solvents. The individual contaminants found in these substances are listed in Table D-1. Though other contaminants also are found in these substances, those in Table D-1 were chosen because of their greater environmental toxicity and because they are good indicators of the presence of the contaminating substance(s) of interest.

During the investigation of a contaminated site, sampling and analyses for some or all of the individual contaminants found in that contaminating substance should occur. Two lists of contaminants were compiled and are designated as “Tier I” (the smaller group, indicated by “xx” in Table D-1) and “Tier II” (the more comprehensive group, indicated by both “xx” and “x”). Having two tiers to choose from allows the superintendent flexibility in what contaminants he/she requires that the operator test for. The Tier I contaminants are included in the Tier II contaminants and therefore will always be tested for.

Tier I sampling should be conducted when basic information is needed. For instance, if contamination at a site is suspected but not known, testing for Tier I contaminants will confirm this and will also provide an indication as to the severity of contamination. Tier I sampling might also be conducted where park natural resources (e.g., groundwater, vegetation, or surface water) are at low/no risk.



**Table D-1. Contaminants to Test for When Investigating Various Types of Contamination at Oil and Gas Sites.**

Contaminants that should be tested for during Tier I sampling are indicated by “xx”, while those with either an “x” or “xx” should be tested for during Tier II sampling.

contaminant	where found: soil/sediment = S groundwater/ surface water = W	----- Contaminating substances individual contaminants are associated with: -----					
		crude oil	condensate <sup>j</sup>	produced water	drilling mud	lube (motor) oil	solvents <sup>k</sup>
PAHs <sup>a</sup>	S, W	x	x	x	x	x	x
TPH <sup>b</sup>	S, W	xx	xx	x	x	xx	xx
BTEX <sup>c</sup>	S, W	x	xx	x	x	x	xx
metals <sup>d</sup>							
arsenic	S, W	x		x	x	x	
barium	S, W	x		xx	xx	x	
cadmium	S, W	x		x	x		
chromium	S, W	x		x	xx	x	
copper	S, W	x		x	x	x	
iron	S, W		x				
lead	S, W	x		x	x	xx	
magnesium	S, W	x		x	x	x	
mercury <sup>e</sup>	S, W	x		x	x		
nickel	S, W	xx		x		x	
selenium	S, W	x			x		
strontium	S, W	x		xx			
vanadium	S, W	xx		x	x		
zinc	S, W	x		xx	x	xx	
ammonia <sup>f</sup>	W	x		x			
calcium	W			x	x	x	
chloride	S, W			xx			
potassium	W	x		x	x		
sodium	S, W			xx	xx	xx	
sulfates	W			x			
gross alpha emissions <sup>g</sup>	W			x			
radium-226 <sup>g</sup>	S			xx			
pentachlorophenol	S, W				x		
surfactants	S, W				x		
pH	S, W	x	x	x	x		
conductivity/salinity <sup>h</sup>	S, W		x	xx	xx		
TDS	W			x	x		
grain size	S	x	x	x	xx	x	
total organic carbon	S	x	x	x	x	x	x
percent moisture <sup>i</sup>	S	xx	xx	xx	xx	xx	xx
static water level <sup>j</sup>	W	xx	xx	xx	xx	xx	xx
temperature	W	xx	xx	xx	xx	xx	xx



### Notes for Table D-1:

a = Polycyclic Aromatic Hydrocarbons (PAHs). The lab analysis required in this guideline detects approximately 38 individual compounds including the priority pollutant “parent” compounds and their alkylated homologs. See Table D-2 for a full list of these. Note that these 38 compounds are measured with a single analytical test (*i.e.* there is not a separate test for each compound). Only test the groundwater for PAHs if ongoing surface water contamination from adjacent contaminated soil, sediment, or aquifer is suspected.

b = Total Petroleum Hydrocarbons. Certain “ranges” of hydrocarbons should be analyzed for, depending on the contaminating substance. For crude oil, a “full range” or “wide range” TPH scan should be conducted; for natural gas condensate a “lighter end” TPH scan, like for “gasoline range organics” (GRO) or total volatile petroleum hydrocarbons (TVPH) C<sub>6</sub>-C<sub>10</sub> should be conducted; and for diesel fuel a TPH scan for “diesel range organics” (DRO) or total extractable petroleum hydrocarbons (TEPH) C<sub>11</sub>-C<sub>34</sub> should be conducted. See section VI.A for details.

c = Benzene, Toluene, Ethylbenzene, Xylene. Only test for these in soil, sediment, or surface water if contamination is very recent and sampling is for initial (preliminary) assessment purposes.

d = analyze all metals for the “total recoverable” fraction

e = analyze soil (or sediment) for mercury only if there is a suspicion or it is known that mercury manometers were used on-site in the past (natural gas operations only)

f = report both the “total” and “unionized” fractions

g = note that if gross alpha in water exceeds a certain level, further testing for radioactive elements may be required. Radium-226 analyses must use gamma spectroscopy; this test takes approx. 30 days. At sites where produced water contamination may be more recent (in the last 10 yrs), gamma ray emissions in the soil can be preliminarily measured in the field (*e.g.* with a MicroRmeter) to determine if the radium-226 soil analyses are necessary.

h = salinity can be calculated from conductivity measurements

i = percent moisture is necessary to calculate the required dry weight and wet weight units

j = for groundwater only

k = can be from a gas production facility or a gas pipeline

l = various solvents can be used on-site (*e.g.* benzene, toluene, ethylbenzene, xylene, various petroleum products, etc.). Analyte tested for depends on the particular solvent used on-site.



**Table D-2. Polycyclic Aromatic Hydrocarbons (PAHs) Detected by the Recommended “Expanded Scan” Analysis for PAHs**

These compounds include the so-called priority pollutant “parent” compounds plus their alkylated homologs. Note that the 38 compounds below are measured with a single analytical test (that is, there is not a separate analytical test for each compound).

Acenaphthene	Dibenzothiophene, C3-
Acenaphthylene	Fluoranthene
Anthracene	Fluoranthenes/Pyrenes, C1-
Benzo(a)anthracene	Fluorene
Benzo(b)fluoranthene	Fluorene, C1-
Benzo(k)fluoranthene	Fluorene, C2-
Benzo(g,h,i)perylene	Fluorene, C3-
Benzo(e)pyrene	Ideno(1,2,3,c,d)pyrene
Benzo(a)pyrene	Naphthalene
Biphenyl	Naphthalene, C1-
Chrysene	Naphthalene, C2-
Chrysene, C1-	Naphthalene, C3-
Chrysene, C2-	Naphthalene, C4-
Chrysene, C3-	Perylene
Chrysene, C4-	Phenanthrene
Dibenzo(a,h)anthracene	Phenanthrenes/Anthracenes, C1-
Dibenzothiophene	Phenanthrenes/Anthracenes, C2-
Dibenzothiophene, C1-	Phenanthrenes/Anthracenes, C3-
Dibenzothiophene, C2-	Phenanthrenes/Anthracenes, C4-

Tier II sampling should be conducted when more detailed information is needed. For instance, if clean-up activities at a site have been completed, testing for Tier II contaminants will confirm whether all (or nearly all) of the contaminants have, in fact, been removed. Tier II sampling might also be conducted at sites where important park natural resources are at a higher risk of being exposed to contaminants and where more stringent cleanup standards than those promulgated by a state regulatory body may be appropriate.

The superintendent will determine whether Tier I or II is necessary. Some combination of the two may also be used. He/she may also choose to omit or add contaminants to the Tier I or II lists should the situation warrant it.

Note that Table D-1 does not include all possible contaminants associated with oil or gas operations. Other contaminating substances involved are: caustic solutions used in natural gas sweetening (these can contain sodium, pH, amines, and EDTA contaminants); glycols used in natural gas dehydration; and surfactants, acidizing agents, corrosion inhibitors, solvents, biocides, etc. used in oil or gas well workover and completion. The superintendent may require testing for contaminants associated with these substances if he/she suspects they were released on-site.



### HOW TO COLLECT SAMPLES

#### A. Sample Locations

1. **Soil** - Background samples should be collected from an area as close to the site as possible where it is certain no contaminating substances from the site could have reached (from surface runoff, off-site dumping, migration from wind, etc.).

For soils that are known to be contaminated, samples should be collected from the spot and depth where contamination appears to be highest. For sites containing suspected soil contamination, seek out areas near production facilities, storage tanks, valves, etc., and adjacent low points in the topography where contaminated runoff may have passed over or “puddled up” and concentrated. Collect sample at a depth where contamination would be highest: in most cases probably the top one to two inches. Note that releases in very porous (e.g. sandy) soil may percolate down and pool immediately above deeper, less porous soil layers (e.g. clay or silt strata, particularly if saturated), pool at the water table, or concentrate in highly organic layers.

For sites where contaminated soils have already been removed, a sample should be collected in the top inch or so of the newly exposed soil to insure that all the contaminants that percolated down into the soil were, in fact, removed. (Note: At hydrocarbon release sites, screening of soils at the base of the excavation for volatile organic compounds/VOCs with a photo-ionization detector could improve the confidence that Tier II sample selection is sufficient to confirm a site is clean).

All samples will be grab samples. (As a rule, composite samples should not be collected). Where contamination is suspected but not known, an auger or tube type sampling device should be used to capture equal amounts of soil over the depth of the profile; depending on the properties of the soil (e.g. hardness or porosity). However, other devices (such as a trowel) may work better in some situations. Sample collectors may have to communicate with the laboratory to ensure that enough soil is collected for the various analyses.

For BTEX samples, see section B.1. below.

The total number of samples to be collected will be site-specific and determined by the superintendent. Enough samples should be collected and analyzed to meet the Tier I or Tier II sampling objective (see section III).

2. **Sediment** - Background samples should be collected from sediment adjacent to the sediments in question, but where it is reasonably certain no contaminating substances from the site (or other sites in the area) could have reached (from surface runoff, off-site dumping, etc.).

As with soils, sediments known to be contaminated should be sampled from the spot and depth where contamination appears to be the highest. For suspected sediment contamination, seek out areas near production facilities, storage tanks, valves, etc., and



adjacent areas where potentially contaminated sediment in runoff could have settled out. Sample the sediment that has accumulated since the spill/release began. In some cases this may be the top ¼ inch, in others it may be the top several inches.

For sites where contaminated sediments have already been removed, samples should be collected in the newly exposed sediment to insure that all contaminants were, in fact, removed.

All samples will be grab samples. (As a rule, composite samples should not be collected.) Where contamination is suspected but not known, or the layer of contaminated sediment is more than a few inches thick, an auger or tube type sampling device should be used to capture equal amounts of sediment over the depth of the profile; depending on the properties of the sediment (e.g. hardness or porosity) and the depth of the water. However, other devices may work better. Sample collectors may have to communicate with the laboratory to ensure that enough sediment is collected for the various analyses.

The total number of samples to be collected will be site-specific and determined by the superintendent. Enough samples should be collected and analyzed to meet the Tier I or Tier II sampling objective (see section III).

3. **Groundwater** - Groundwater samples should be collected if the superintendent determines that hydrogeological conditions at the site are such that groundwater resources under or near the site are reasonably at risk. Samples can be collected either via established monitoring wells or with “push” technology (such as Geoprobe®).

It is critical that: a) sampling occurs in the right areas (for example, one location must be upgradient of the potential point of impact and at least two must be downgradient); and b) wells are screened at the appropriate depths to intercept any contaminant plume(s). (This will require knowledge of the local hydrogeology and the contaminants involved and their environmental fate characteristics). If “push” technology is used to collect soil samples for lab analysis or for on-site screening of various media (soil, groundwater) for contaminants and samples are collected on more than one occasion, care must be taken to sample the exact same locations and at the same depths in the aquifer. Typically, once contamination is found in groundwater using screening methodologies, monitoring wells are required by state regulatory agencies to ensure sample quality and integrity is sufficient to base regulatory decisions.

“Low-flow” sample collection methods should be used as per the EPA guidance document in IV.B.3 below.

Groundwater samples should not be filtered.

For BTEX samples, see section B.3. below.



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All samples will be grab samples. (As a rule, composite samples should not be collected.) Sample collectors may have to communicate with the laboratory to ensure that a large enough sample is collected for the various analyses.

The total number of samples to be collected will be site-specific and determined by the superintendent or through his/her approval of the owner/operator's Sampling and Analysis Plan after consultation with park resource staff. Enough samples should be collected and analyzed to meet the Tier I or Tier II sampling objective (see section III).

4. **Surface Water** - Background samples should be collected upstream of any possible inputs of contaminated water (e.g. surface runoff or shallow groundwater) from the site.

Where contamination is obvious, such as in a surface sheen, collect samples right at the surface, avoiding any scum, algae, or other detritus on the water surface if possible (and note in fieldbook if present). Where a contaminating substance such as chlorinated solvents (dense nonaqueous phase liquids, or DNAPLs) was released or is suspected at the bottom of an aquifer (e.g. above a clay layer or aquitard), then collect samples at a depth immediately above the base of the aquifer, the depth of the first fine-grained layer below the water table, or both. If surface water contamination is suspected, but it is unknown whether the contaminants are "floaters" or "sinkers," collect samples at a depth of 3-12 inches.

For BTEX samples, see section B.4. below.

Again, all samples will be grab samples. (As a rule, composite samples should not be collected). Sample collectors may have to communicate with the laboratory to ensure that a large enough sample is collected for the various analyses.

The total number of samples to be collected will be site-specific and determined by the superintendent. Factors such as flow, depth, and the size of the water body are important here. Enough samples should be collected and analyzed to meet the Tier I or Tier II sampling objective (see section III).

### B. Sample Collection Methodologies

Acceptable sampling methodology must be used so that results are as representative as possible. Sample collection can be complex and should be conducted by experienced professionals (typically a contractor). This can also help if the values or methods are challenged by one of the interested parties involved (state regulatory agency, park, owner/operator etc.). Furthermore, experienced professionals are also trained in the appropriate precautions to protect the health and safety of the sample collector(s) from exposure to potentially harmful contaminants or hazardous situations that could develop.

Methodologies that should be used are typically those accepted/sanctioned by the appropriate state regulatory agency or are found in publications of widely recognized organizations (e.g. EPA, NOAA) that conduct environmental research. Acceptable methodologies are listed below for each environmental media (soil, sediment, etc.). In



general, the state is authorized as the lead regulatory agency and should be the initial contact for appropriate sampling methodologies to employ when various environmental media are believed contaminated. In site-specific situations where a sensitive park resource is threatened and more stringent cleanup than that required by a state agency may be appropriate, park staff should consult WASO support offices as needed for appropriate criteria prior to discussion of more stringent cleanup levels with the owner/operator. If sample collection methodologies other than the above are used, they must contain the following to be acceptable: 1) applicability of the procedure, 2) equipment required, 3) detailed description of procedures to be followed in collecting the samples, 4) common problems encountered and corrective actions to be followed, and 5) precautions to be taken. The methodology to be used must be cited in the sample plan. A basic description of collection methodology should be included in the report to the superintendent (section VIII).

1. **Soil** - Methods from source documents published by the following organizations are acceptable:
  - State Governing Regulatory Agency
  - U.S. EPA
  - American Society for Testing and Materials
  - U.S. Department of the Interior
  - American Petroleum Institute

Note that when collecting soil samples for BTEX analysis, specialized equipment and collection methods are necessary. Use a coring device such as the EnCore™ sampler or disposable plastic syringes. For detailed guidance, see section 4.1 and method 5035 in Chapter 4 of EPA's SW-846, Update III (full reference in section VI.A. below).

2. **Sediment** - Methods from source documents published by the following organizations are acceptable:
  - State Governing Regulatory Agency
  - U.S. EPA
  - American Society for Testing and Materials
  - U.S. Department of the Interior
  - American Petroleum Institute
3. **Groundwater** - Use: Environmental Protection Agency, RCRA Ground-Water Monitoring: Draft Technical Guidance, EPA/530/R-93-001, EPA: Office of Solid Waste, Washington, D.C. (1992); or Publications of State Governing Regulatory Agency (DEQ, DEM, State EPA etc.).

"Low-flow" sampling should be conducted; for guidance, see:

Puls, R.W. and M.J. Barcelona, Ground Water Issue: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. EPA/540/S-95/504, EPA: Office of Solid Waste and Emergency Response, Washington, D.C. (1996).



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Note that when collecting water samples for BTEX analysis, specialized equipment and collection methods are necessary. For detailed guidance, see section 4.1 and method 5030B in Chapter 4 of EPA's SW-846, Update III (full reference in section VI.A. below).

4. **Surface Water** - Methods from source documents published by the following organizations are acceptable:
- - State Governing Regulatory Agency
  - - U.S. EPA
  - - American Society for Testing and Materials
  - - U.S. Department of the Interior
  - - American Petroleum Institute

Also recommended is this NPS guidance: Stednick, J.D. and D.M. Gilbert, Water Quality Inventory Protocol: Riverine Environments. National Park Service, Water Resources Division, Technical Report no. NPS/NRWRD/NRTR-98/177. Fort Collins, CO, p.103 (1998).

Note that when collecting water samples for BTEX analysis, specialized equipment and collection methods are necessary. For detailed guidance, see section 4.1 and method 5030B in Chapter 4 of EPA's SW-846, Update III (full reference in section VI.A. below).

### C. Sample Containers, Preservation, Storage

Refer to documents listed in sections VI.A. below and IV.B. above for specific guidance, including 40 C.F.R. Part 136, if necessary. EPA's SW-846, Update III is especially helpful.

Note that sediment samples should not be acidified for metals and that neither groundwater nor surface water samples should be filtered. Remember special conditions when sampling for BTEX (see section 4.1 and methods 5030 and 5035 in Chapter Four of SW-846, Update III) and for any metals requiring unusually low detection limits.

### D. Chain of Custody

Proper chain-of-custody procedures must be used in sample handling (collection, shipping, storage, analysis). For examples, see Standard Methods for the Examination of Water and Wastewater for general guidance, and SW-846, Update III, Chapter 9, section 9.2.2.7 for detailed guidance.

## QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) plans or Quality Assurance Project Plans (QAPPs) ensure that the data generated are scientifically valid, defensible, and of known precision and accuracy. Some of the basic elements of QA/QC or QAPP plans are:

- data quality objectives (DQO)



- field operating procedures (such as sample management, decontamination, equipment calibration, etc.)
- field QA/QC requirements (such as data handling, collection of control samples like blanks, spikes and duplicates, etc.)
- lab operating procedures (such as sample management, equipment calibration, etc.)
- lab QA/QC procedures (such as data handling, control samples, etc.).

A QA/QC plan should be in place before any sampling begins. Basic QA/QC procedures to be followed should be described briefly in the sample plan (section VIII). If a certain QA/QC guidance document is used, it should be cited in the sample plan. Many guidance documents are available—several through EPA—including the following, recommended here:

Environmental Protection Agency, Test Methods For Evaluating Solid Waste, Physical/Chemical Methods (SW-846), 3rd edition, Update III, Chapter One. EPA: Office of Solid Waste and Emergency Response, EPA, Washington, D.C. (1997).

Adherence to the QA/QC plan should be documented throughout the project and demonstrated in the final report to the superintendent.

Aspects of quality assurance that may be helpful can be found in:

Environmental Protection Agency, The Volunteer Monitor's Guide to Quality Assurance Project Plans, EPA: Office of Wetlands, Ocean and Watersheds 4503F. EPA publication number: EPA 841-B-96-003 (1996). Also available at:  
<http://www.epa.gov/owow/monitoring/volunteer/qappcover.htm>

## **HOW TO ANALYZE SAMPLES IN THE LABORATORY**

### **A. Analytical Methods**

Metals analyses must use the methods in EPA's SW-846, Update III (or more recent). This applies to soil, sediment, groundwater, and surface water samples. Groundwater and surface water methods can also include EPA's 200 series for metals, or the 1600 series where extremely low (state-of-the-art) detection limits are desired. The full reference for the SW-846 document is:

Environmental Protection Agency, Test Methods For Evaluating Solid Waste, Physical/Chemical Methods (SW-846), 3rd edition, Update III. EPA: Office of Solid Waste and Emergency Response, Washington, D.C, (1997).

Polycyclic aromatic hydrocarbon (PAH) analyses must use a modification of method 8270 in EPA's SW-846, Update III. Developed by the National Oceanic and Atmospheric Administration (NOAA), this method is referred to as "GC/MS method 8270 in selective ion mode (SIM)", and is informally referred to as the "expanded scan" for PAHs. Consult the following for a detailed explanation of methodology:



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Lauenstein, G.G., and A.Y. Cantillo, Sampling and Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993-1996 Update, NOAA Technical Memorandum NOS ORCA 130. p.233, (1998).

Total petroleum hydrocarbons (TPH) analyses will be for certain “ranges” of hydrocarbons, depending on the contaminating substance present. For crude oil, a **“wide range” or “full range” TPH scan** should be conducted to measure the heavier fractions. For natural gas condensate a “lighter end” TPH scan, such as for **“gasoline range organics” (GRO)**, should be conducted. For diesel fuel, a TPH scan for **“diesel range organics” (DRO)** should be conducted to measure the mid-range fractions. Although many analytical methods are available for TPH, samples should be analyzed using only GC/FID (gas chromatograph/flame ionization detection) methodology. Method 8015B in EPA’s SW-846, Update III is highly recommended.

Benzene, toluene, ethylbenzene, and xylene (BTEX) analyses should use method 8260B in EPA’s SW-846, Update III. Analysis for BTEX compounds is typically done in place of a TPH analysis when a refined product is released as opposed to crude oil.

Ammonia analyses should use EPA method 350.1 (or equivalent APHA method 4500-NH<sub>3</sub> H, or USGS method 4523-85). Samples should not be filtered.

For all other contaminants in Table D-1, use methods approved in 40 C.F.R. Part 136 (EPA, Standard Methods for the Examination of Water and Wastewater (latest edition), ASTM, or USGS). Methods in the NPS, Water Resources Division “Water quality inventory protocol” (section IV.B.4 above) can also be used.

### B. Laboratories

Samples must be sent to an experienced lab that can: 1) perform the above analytical methods; 2) achieve the required detection limits (section VII below); 3) perform the required QA/QC procedures (section V above); and 4) provide the information required in the sample plan and the final report to the superintendent (section VIII below).

Note that in regards to the PAH analytical method (as specified in VI.A. above), only a few labs nationwide (perhaps a dozen) currently can perform this analysis. Many of these same labs can also “fingerprint” samples; that is, by analyzing hydrocarbon-contaminated samples, they can identify the type and source of the petroleum product at the site. A partial list of these labs follows (no government endorsement implied):

Arthur D. Little, Inc.  
25 Acorn Park  
Cambridge, MA. 02140  
(617) 498-5000

Battell Marine Science Lab  
1529 West Sequim Bay Rd.  
Sequim, WA 98382  
(360) 683-4151

Geochemical and Environmental  
Research Group  
Texas A&M University  
833 Graham Rd.  
College Station, TX. 77845  
(409) 862-2323 ext. 115

Woods Hole Group, Environmental Labs  
375 Paramount Drive, Suite B  
Raynham, MA 02767-5154  
(508) 822-9300 or 563-5030



## DETECTION LIMITS

Note: The term “detection limit” used herein refers to what is commonly called the “reporting limit” and occasionally called the “quantitation limit.” A detection limit is what a lab (using a particular instrument in some combination with analytical method and skill level of operator) can quantify low levels of a contaminant substance with acceptable confidence. It does not refer to the sometimes much lower “instrument detection limit” or “method detection limit” where how well the value obtained represents the true value may be of low confidence. Also note that detection limits should not be confused with cleanup standards or cleanup criteria. Required cleanup levels/criteria are usually set by state regulatory authorities as the acceptable contaminant residue (usually well above detection limits) that may remain in some environmental media after a remedial effort has occurred. NPS is authorized to require more stringent cleanup criteria on a case-by-case basis, particularly in site-specific situations where sensitive ecological resources could be threatened. Widely accepted, peer-reviewed research may then be used to support the NPS position that state criteria are not sufficiently protective and lower cleanup criteria are warranted.

Labs should achieve the detection limits (DLs) provided in Table D-3 below. These DLs are below federal (and presumably state) standards and most other criteria currently in the literature. Therefore, analytical methods that achieve these DLs will be able to indicate if most standards and criteria are being met. Note, however, that the DLs for two contaminants—PAHs and mercury—are above some of the more strict standards or criteria that exist. This is because many labs cannot achieve DLs this low, and the DLs in the table were chosen so that most experienced and well-equipped labs could achieve them. Lower DLs are achievable for PAHs and mercury at some labs that have the expertise and special instrumentation (see section VI.B. above for examples).

If the natural resources at or near the site are particularly sensitive, pristine, or important to the park, the superintendent may wish to choose the strictest available standard or criteria as the remediation goal. He/she would then have to request some lower DLs (lower than those in Table D-3) from the lab for PAHs and mercury.

For the contaminants in Table D-1 that are not listed in Table D-3, commonly reported DLs are acceptable.



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**Table D-3. Maximum Acceptable Detection Limits (“Reporting Limits”) for Surface Water, Groundwater, Soil, and Sediment Samples.**

Lower detection limits are also acceptable.

Contaminant	Detection limit for surface water and groundwater samples	Detection limit for soil and sediment samples (dry weight)
PAHs	10 ppt <sup>a</sup>	1 ppb <sup>c</sup>
TPH	50 ppb	0.1 ppm
benzene	1 ppb	25 ppb
toluene	5 ppb	25 ppb
ethylbenzene	5 ppb	25 ppb
xylene	5 ppb	25 ppb
ammonia	0.05 ppm	--
arsenic	5 ppb	0.5 ppm
barium	1 ppb	1 ppm
cadmium	0.5 ppb	0.2 ppm
chromium	3 ppb	1 ppm
copper	5 ppb	1 ppm
iron	0.1 ppm	10 ppm
lead	1 ppb	5 ppm
mercury	0.2 ppb <sup>b</sup>	0.2 ppm <sup>d</sup>
nickel	5 ppb	5 ppm
selenium	1 ppb	1 ppm
strontium	10 ppb	5 ppm
vanadium	10 ppb	1 ppm
zinc	10 ppb	5 ppm

water units:

ppm = parts per million = milligrams per liter = mg/L

ppb = parts per billion = micrograms per liter = ug/L

ppt = parts per trillion = nanograms per liter = ng/L

soil/sediment units:

ppm = parts per million = milligrams per kilogram = mg/kg = micrograms per gram = ug/g

ppb = parts per billion = micrograms per kilogram = ug/kg = nanograms per gram = ng/g

a - DLs as low as 1 ppt may be achievable

b - DLs as low as 0.1 ppb, or even 10 ppt, may be achievable

c - DLs as low as 0.25 ppb may be achievable

d - DLs as low as 25 ppb, or even 1 ppb, may be achievable

For an extensive list of federal standards and other published environmental criteria for most of the contaminants in Table D-1, consult NPS Water Resources Divisions’ “Environmental Contaminants Encyclopedia” at the website <http://www.aqd.nps.gov/toxic>. Note that there may be state standards, other criteria, or in some cases, updated federal standards that are not listed in this Encyclopedia.



## **SAMPLE PLAN AND REPORTING REQUIREMENTS**

### **A. Sample Plan**

The owner/operator should submit a Sampling and Analysis Plan to the superintendent for approval before samples are collected. The plan must include:

- sampling objectives (such as, “identify contaminants and concentrations involved,” “determine spatial extent of spill,” “determine if remediation is complete,” etc.)
- the contaminating substances being investigated (such as crude oil, natural gas condensate, produced water, etc.)
- list of individual contaminants that will be tested for (see Table D-1)
- analytical methods to be used (see section VI. A.)
- type of samples to be collected (such as soil, sediment, groundwater, or surface water)
- citation and brief description of sample collection methodology to be used (see section IV. B.)
- specific sample locations and number of samples at each (superintendent will walk the site and choose exact locations; this information may not be available until the time when samples are actually collected)
- total number of samples (this information may not be available until the time when samples are actually collected)
- acknowledgment that detection limits (that is, “reporting limits”) specified herein (section VII) will be achieved
- brief description of QA/QC procedures to be followed and citation of any guidance document used (see section V)
- acknowledgment that proper chain-of-custody procedures will be initiated and followed

### **B. Reporting Requirements**

Upon completing sample collection and analyses, the owner/operator shall submit a report to the superintendent. This report shall include:

- sample ID number/name
- description of sample locations (include maps, sketches, or photos)
- sample depth
- brief description of spill area (apparent extent of spill, topography, vegetation, surface water features, apparent soil conditions, etc.)
- date and time of sampling
- name of sample collector
- information pertinent to the sample collection methodology used (sampling devices used, how samples were collected, etc.)
- sample containers used, any preservation methods, and storage conditions of samples
- date and time of analyses
- name of chemist/technician performing analyses



## APPENDIX D – DETECTION AND QUANTIFICATION OF CONTAMINANTS

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- type of sample (soil, sediment, groundwater, or surface water)
- sample fraction measured (such as “total”, “total recoverable”, etc.)
- analytical results and units (mg/kg, µg/L, etc.)
- percent moisture (for soil/sediment samples)
- wet weight *and* dry weight units (for soil/sediment samples)
- analytical methods used
- detection limits (that is, “reporting limits”) achieved
- method detection limits (MDL) for the analytical methods used
- indication of analyses done in the field (such as pH, conductivity, etc.)
- field observations made while collecting samples
- lab and field QA/QC results and procedures followed
- name of analytic equipment used
- appropriate chain-of-custody forms



## **APPENDIX E**

### **NATIONAL PARK SERVICE NONFEDERAL OIL AND GAS PROGRAM CONTACTS**

#### **WASHINGTON OFFICE, GEOLOGIC RESOURCES DIVISION**

(staff are duty stationed in Lakewood, CO)

Dave Shaver, Chief, Geologic Resources Division, telephone 303-969-2094

Carol McCoy, Branch Chief, Planning, Evaluation, and Permits Branch,  
telephone 303-969-2096

Ed Kassman, Environmental Protection Specialist, telephone 303-969-2146

Lisa Norby, Petroleum Geologist, telephone 303-969-2318

Pat O'Dell, Petroleum Engineer, telephone 303-969-2013

#### **REGIONAL MINERALS COORDINATORS**

**Intermountain Region** (covers AZ, CO, MT, NM, OK, TX, UT, and WY)

Linda Dansby, telephone 505-988-6095

**Midwest Region** (covers AR, IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, and WI)

John Sowl, telephone 402-661-1872

**Northeast Region** (covers CT, DE, KY, MA, ME, NH, NY, PA, RI, VA, VT, and WV)

Dave Reynolds, telephone 215-597-5372

**Southeast Region** (covers AL, FL, GA, LA, MS, NC, SC, and TN)

Don Hargrove, telephone 239-695-1150 (collateral duty with BICY oil and gas management)

#### **NPS CONTACTS IN PARKS WITH NONFEDERAL OIL AND GAS OPERATIONS**

**Alibates Flint Quarries National Monument / Lake Meredith National Recreation Area (TX)**

Superintendent, Karren Brown, telephone 806-857-3151

Chief of Resource Management, Paul Eubank, telephone 806-857-0309

Environmental Protection Specialist, Arlene Wimer 806-865-2874 (ext. 35)

**Aztec Ruins National Monument (NM)**

Superintendent, Dennis Caruth, telephone 505-334-6174 (ext. 22)

Chief of Resource Management Terry Nichols, telephone 505-334-6174 (ext. 23)



## **APPENDIX F – NPS OIL AND GAS CONTACTS**

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### **Big Cypress National Preserve (FL)**

Superintendent, Karen Gustin, telephone 239-695-1101

Chief of Resource Management, Ron Clark, telephone 239-695-1106

Natural Resource Specialist, Don Hargrove, telephone 239-695-1150

### **Big South Fork National Recreation Area (TN)**

Superintendent, Reed Detring, telephone 423-569-9778

Chief of Resource Management, Tom Blount, telephone 423-569-2404 (ext. 252)

Biological Science Technician, Etta Spradlin, telephone 423-569-2404 (ext. 254)

### **Big Thicket National Preserve (TX)**

Superintendent, Todd Brindle, telephone 409-951-6801

Chief of Resource Management, Curtis Hoagland, telephone 409-951-6820

Biologist, Natural Resource Program Manager, Dusty Pate, telephone 409-951-6822

### **Cuyahoga Valley National Park (OH)**

Superintendent, John Debo, telephone 440-546-5903

Chief of Resource Management & Visitor Protection, Lisa Petit, telephone 330-650-5071 (ext. 1)

Biologist, Meg Plona, telephone 330-342-0764 (ext. 2)

### **Gauley River National Recreation Area (WV) / New River Gorge National River (WV)**

Superintendent, Calvin Hite, telephone 304-465-6511

Chief of Resource Management, Ken Stephens, telephone 304-465-6531

Natural Resource Specialist, Gene Clare, telephone 304-465-6544

### **Jean Lafitte National Historical Park (LA)**

Superintendent, David Luchsinger, telephone 504-589-3882 (ext. 137)

Chief of Resource Management, David Muth, telephone 504-589-3882 (ext. 128)

Natural Resource Management Specialist, Nancy Walters, telephone 504-589-3882 (ext. 119)

### **Obed Wild and Scenic River (TN)**

Unit Manager, Philip Campbell, telephone 423-346-6294

Chief of Resource Management, Rebecca Schapansky, telephone 423-346-6294 (ext. 27)

Biological Science Technician, Etta Spradlin, telephone 423-569-2404 (ext. 254)

### **Padre Island National Seashore (TX)**

Superintendent, Colin Campbell, telephone 361-949-8173 (ext. 222)

Chief of Resource Management & Science, Darrell Echols, telephone 361-949-8173 (ext. 223)

Environmental Protection Specialist Mark Biel, telephone 361-949-8173 (ext. 234)

### **Tallgrass Prairie National Preserve (KS)**

Superintendent, Steve Miller, telephone 620-273-6034

Natural Resource Program Manager, Kristin Hase, telephone 620-273-6034

Natural Resource Specialist, Vacant



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## GLOSSARY

**abandonment** – the termination of oil and gas production operations, removal of facilities, plugging of the well bore, and reclamation of surface disturbances.

**access** – any way, means, or method of entering or traversing on, across, or through federally owned or controlled lands or waters (36 C.F.R. § 9.30(a)), including but not limited to: vehicle, watercraft, fixed-wing aircraft, helicopter, offroad vehicle, mobile heavy equipment, snowmobile, pack animal, and foot.

**action** – any federal activity including (but not limited to) acquiring, managing, and disposing of federal lands and facilities; facilitating human occupation or visitation; providing federally undertaken, financed, or assisted construction and improvements; and conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, and regulating and licensing activities.

**affected environment** – term used in the National Environmental Policy Act (NEPA) to denote surface or subsurface resources (including social and economic elements) within or adjacent to a geographic area that could potentially be affected by a proposed action; the environment of the area to be affected or created by the alternatives under consideration. (40 C.F.R. § 1502.15)

**alternative** – combination of management prescriptions applied in specific amounts and locations to achieve desired management goals and objectives.

**alternative, no-action** – an alternative that maintains established trends or management direction. For an oil and gas operation it typically means that the action as proposed would not occur.

**aquifer** – a water-bearing rock, rock formation, or group of formations. Aquifers can be either unconfined or confined.

**assignment of rights** – the transfer by a party of all of its right to real property, or of any estate or right therein, such as rights in a lease.

**base flood** – a flood which has a one percent chance of occurring in any given year (also known as the 100-year flood). This term is used by the National Flood Insurance Program to indicate the minimum level of flooding to be used by a community in its floodplain management regulations.

**base floodplain** – 100-year floodplain.

**blowout** – an uncontrolled explosion of gas, oil, or other fluids from a drilling well. A blowout occurs when formation pressure exceeds the pressure applied to it by the column of drilling fluid and when blowout prevention equipment is absent or fails.

**blowout preventer (BOP)** – one of several valves installed at the wellhead to prevent the escape of pressure either in the annular space between the casing and drill pipe or in open hole (*i.e.*, hole with no drill pipe) during drilling or completion operations.



## GLOSSARY

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**brine** – water containing relatively large concentrations of dissolved salts, particularly sodium chloride. Brine has higher salt concentrations than ocean water.

**cementing casing** – to fill the annulus between the casing and hole with cement to support the casing and prevent fluid migration between permeable zones.

**Christmas tree** – the control valves, pressure gauges, and chokes assembled at the top of a well to control the flow of oil and gas after the well has been completed.

**closed loop containerized mud system** – a fully containerized, closed-loop drilling fluid system that holds water, drilling mud and well cuttings. Inside a NPS unit an operator must use a closed loop containerized mud system in place of an earthen reserve pit system.

**Code of Federal Regulations (C.F.R.)** – a publication that codifies the general and permanent rules and regulations published in the Federal Register by the Executive Branch departments and agencies of the federal government, and which carry the force of law.

**completion** – the activities and methods to prepare a well for production. Includes installation of equipment for production from an oil or gas well.

**conditions of approval (COAs)** – provisions or requirements under which a Plan of Operations is approved.

**contaminating substance** – those substances, including but not limited to, saltwater or any other injurious or toxic chemical; waste oil or waste emulsified oil; basic sediment; mud with injurious or toxic substances produced or used in the drilling, development, production, transportation, or on-site storage, refining, and processing of oil and gas.

**critical habitat** – the specific areas within the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of the Endangered Species Act, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species at the time it is listed...upon a determination by the Secretary that such areas are essential for the conservation of the species.

**cultural landscape** – a geographic area, including both cultural and natural resources and the wildlife and domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. There are four general types of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

**cultural resource** – cultural resources include archeological sites; historic sites, buildings, and districts; cultural landscapes; and traditional cultural properties.

**deed** – a conveyance of realty; a writing signed by a grantor, whereby title to realty is transferred from one to another.

**Department of the Interior manual (DM)** – the compilation of policies, procedures, and guidelines governing operations of the various bureaus of the Department of the Interior.



**designation of operator** – appointment or assignment denoting person or entity responsible for an oil and gas operation.

**Director** – the Director of the National Park Service.

**drilling fluid ("mud")** – circulating fluid, one function of which is to lift cuttings out of the wellbore and to the surface. While a mixture of clay, water, and other chemical additives is the most common drilling fluid, wells can also be drilled using oil-based muds, air, or water as the drilling fluid.

**directional drilling** – intentional deviation of a wellbore from the vertical (90 degrees). Although wellbores are normally drilled vertically, it is sometimes necessary or advantageous to drill at an angle from the vertical.

**dry hole** – any well incapable of producing oil or gas in commercial quantities. A dry hole may produce water, gas, or even oil, but not enough to justify production.

**effects** – see “impacts”

**endangered species** – any species which is in danger of extinction throughout all or a significant portion of its range.

**environmental assessment (EA)** – a concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. An EA includes a brief discussion of the need for a proposal, the alternatives considered, the environmental impacts of the proposed action and alternatives, and a list of agencies and individuals consulted.

**environmental impact statement (EIS)** – a document prepared to analyze the impacts on the environment of a proposed project or action and released to the public for comment and review. EISs are prepared when there is the potential for major impacts on natural, cultural or socioeconomic resources. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed project or action.

**Executive Orders, memoranda, or proclamations** – regulations having the force of law issued by the President of the United States to the Executive branch of the federal government.

**Federal Register** – daily publication of the National Archives and Records Administration that updates the Code of Federal Regulations, in which the public may review the regulations and legal notices issued by federal agencies.

**federally owned and controlled lands** – land that the United States possesses fee title through purchase, donation, public domain, or condemnation. It also includes land that the United States holds any interest, such as a lease, easement, rights-of-way, or cooperative agreement.

**federally owned and controlled waters** – all surface waters in the boundaries of a National Park System unit without regard to whether the title to the submerged lands lies with the United States or another party.



## GLOSSARY

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**floodplain** – the lowland and relatively flat areas adjoining inland and coastal waters including floodprone areas of offshore islands, and including at a minimum, that area subject to temporary inundation by a regulatory flood.

**flowlines and gathering lines** – lines or pipelines that transport produced fluids (e.g., oil, gas, brine) from the wellhead to storage, treatment or transportation facilities.

**gas** – any fluid, either combustible or noncombustible, which is produced in a natural state from the earth, and which maintains a gaseous or rarefied state at ordinary temperature and pressures (36 C.F.R. § 9.31(m)).

**geophysical exploration** – geophysical exploration consists primarily of 3-D seismic operations and typically involves selective cutting of vegetation along source and receiver lines, drilling shotholes along source lines, placing explosives at the bottom of each shothole, placing cables and other recording equipment along receiver lines, detonating explosives, and recording the data generated from the soundwaves.

**hydrocarbons** – organic compounds consisting of hydrogen and carbon, such as petroleum, crude oil or natural gas, whose densities, boiling points, and freezing points increase as their molecular weights increase. The smallest molecules of hydrocarbons are gaseous; the largest are solids. Petroleum is a mixture of many different hydrocarbons.

**impacts** – the likely effects of an action upon specific natural, cultural, or socioeconomic resources. Impacts may be beneficial, or adverse and direct, indirect, and / or cumulative.

**lease** – a legal document executed between a landowner, as lessor, and a company or individual, as lessee, that grants the right to develop the premises for minerals or other products.

**lessor** – one who leases real property. Typically, in park units the lessor is the mineral owner.

**management policies** – the *National Park Service Management Policies* set the basic service-wide policy of the National Park Service. They provide the overall foundation, set the framework, and provide direction for management decisions within the NPS. The management of the National Park System and NPS programs is guided by the U.S. Constitution, public laws, proclamations, executive orders, rules and regulations, and directives of the Secretary of the Interior and the Assistant Secretary for Fish and Wildlife and Parks. Other laws, regulations, and policies related to the administration of federal programs, although not cited, may also apply.

**mitigation** – “Mitigation” as defined in the National Environmental Policy Act (NEPA) (40 C.F.R. 1508.20), includes:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impact of repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.



**National Park system** – the total sum of the land and water now and hereafter administered by the Secretary of the Interior through the National Park Service for park, monument, historic, parkway, recreational, or other purposes.

**natural floodplain values** – attributes of floodplains which contribute to ecosystem quality, including soils, vegetation, wildlife habitat, dissipation of flood energy, sedimentation processes, ground water (including riparian ground water) recharge, etc.

**natural gas** – highly compressible, highly expandable mixture of hydrocarbons having a low specific gravity and occurring naturally in a gaseous form. Besides hydrocarbon gases, natural gas may contain appreciable quantities of nitrogen, helium, carbon dioxide, and contaminants.

**oil** – any viscous, combustible liquid hydrocarbon or solid hydrocarbon substance easily liquefiable on warming, which occurs naturally in the earth, including drip gasoline or other natural condensates recovered from gas without resort to manufacturing processes.

**operations** – "all functions, work and activities within a unit in connection with exploration for and development of oil and gas resources." (36 C.F.R. § 9.31(c)). Operations include, but are not limited to:

- reconnaissance to gather natural and cultural resources information;
- line-of-sight surveying and staking;
- geophysical exploration;
- exploratory drilling;
- production, gathering, storage, processing, and transport of petroleum products;
- inspection, monitoring, and maintenance of equipment;
- well "work-over" activity;
- construction, maintenance, and use of pipelines;
- well plugging and abandonment;
- reclamation of the surface; and
- construction or use of roads, or other means of access or transportation, on, across, or through federally owned or controlled lands or waters.

**operator** – person(s) who may have rights to explore and develop nonfederally owned oil and gas in NPS units, including:

- owners: individuals, corporations, local and state governments, Indian tribes (when the tribe owns the oil and gas in fee)., etc.;
- lessees: individuals or corporations that lease oil and gas from the owner; and
- contractors: individuals or corporations under contract with the owner, lessee, or operator.

**Organic Act** – The law that established the National Park Service in 1916.

**permeability** – the capacity to transmit fluids or gases through soil or rock materials; the degree of permeability depends upon the size and shape of the pore spaces and interconnections, and the extent of the interconnections.



## GLOSSARY

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**plan of operations** – information submitted by an operator describing how proposed oil and gas operations would be conducted in a unit of the National Park System pursuant to the NPS's Nonfederal Oil and Gas Rights Regulations, 36 C.F.R. 9B, and containing information requirements pertinent to the type of operations being proposed (36 C.F.R. § 9.36(a) through (d)).

**practicable** – capable of being done within existing constraints. The test of what is practicable depends upon the situation and includes consideration of the pertinent factors such as environment, cost, or technology.

**production** – phase of mineral extraction where minerals are made available for treatment and use.

**Public Law** – law or statute of the United States.

**reclamation** – the process of returning disturbed land to a condition that will be approximately equivalent to the pre-disturbance condition terms of sustained support of functional physical processes, biological productivity, biological organisms, and land uses.

**recovery plan** – plan required for each listed threatened/endangered species and generated by a task force under the leadership of the U.S. Fish and Wildlife Service. The plan describes the specific management actions necessary to restore the threatened or endangered species to recovery status, including the estimated cost and time involved. The FWS coordinator oversees implementation of the plan.

**Regional Director** – chief decision-maker in each of the seven regions of the NPS.

**regulations** – rules or orders prescribed by federal agencies to regulate conduct, and published in the C.F.R..

**regulatory floodplain** – specific floodplain which is subject to regulation by Executive Order 11988, "Floodplain Management," and the NPS's Floodplain Management Guideline (#93-4). For Class I Actions, the Base Floodplain (100-year) is the regulatory floodplain; for Class II Actions, the 500-year return period floodplain is the regulatory floodplain; for Class III Actions, the Extreme floodplain is the regulatory floodplain.

**revegetation** – reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance, such as seedbed preparation, reseeding, and mulching.

**scoping** – scoping is done during the initial phase of project planning to seek input from a variety of sources. This input is used to identify issues, areas requiring additional study, alternative methods and locations, and topics to be analyzed in the National Environmental Policy Act (NEPA) document. Scoping is done internally with NPS staff and the operator, and externally with the interested public, other agencies, and stakeholders.

**seismic hole or shothole** – any hole drilled for the purpose of obtaining geophysical information to be used in the exploration or development of oil, gas, or other mineral resources. Explosives are placed in the shothole, are covered with soil, and are detonated to generate a seismic wave. This information is processed by a computer to generate a image of the subsurface geologic conditions.



**shut-in well** – an oil and gas well in which the inlet and outlet valves have been shut off so that it is capable of production but is temporarily not producing.

**split estate** – situation where the mineral estate is owned or controlled by a different party than the owner of the land surface in the same area.

**Superintendent** – senior on-site NPS official in a park. The superintendent works closely with his/her staff to ensure protection of park resources and values during development of nonfederal oil and gas in units of the park.

**taking** – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

**threatened species** – any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**unit agreement** – an agreement combining leased tracts on a fieldwide or reservoir wide scale so that many tracts may be treated as one to facilitate operations such as enhanced recovery projects.

**United States Code (USC)** – the systematic collection of the existing laws of the United States, organized under 50 separate titles. The citation 16 USC refers to section 1 of title 16.

**vertical drilling** – drilling of a well vertically (90 degrees) to reach a target zone straight underneath the surface location.

**wetlands** – lands that are transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: 1) at least periodically, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil; and 3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year. (Classification of Wetlands and Deepwater Habitats of the United States by Cowardin *et al.* 1979)

**workover** – work performed on an existing well to improve, maintain, or restore a well's production. A workover is done using a truck-mounted rig and typically lasts one to several weeks.







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## **EXHIBIT 5**

### **MINERAL MANAGEMENT PLAN COMPLIANCE**



## **BCNP MMP GEOPHYSICAL SEISMIC OPERATING STIPULATIONS AND ACTIONS TO BE TAKEN BY THE OPERATOR TO COMPLY**

In order to achieve the intent of Big Cypress National Preserve (BCNP) environmental protection regulations, U.S. Department of the Interior-National Park Service (USDOI-NPS) developed a comprehensive set of operational stipulations applicable to the various phases of oil and gas development in the BCNP. These stipulations were adopted and implemented as part of the BCNP Mineral Management Plan (MMP). Each stipulation applicable to the Nobles Grade 3-D (NG3-D) seismic operation is presented below followed by a brief description of actions taken by the operator to comply.

### **Ten Percent Area of Influence Stipulation**

*At any one time only ten percent of the preserve could be subject to the influences of oil and gas exploration and development activities.*

**Action(s) taken to comply:** Pursuant to the BCNP Growth Management Plan (GMP), Appendix B, the “influence” of oil and gas exploration and development activities including those influences directly attributable to NG3-D program field operations will not exceed ten percent of the BCNP at any one time. See the Plan of Operations (POP) Section 5.12 and Exhibit 14 for a detailed analysis.

### **Important Resource Area Protection Stipulation**

*Important resource areas include vegetation and landform resources such as cypress strands/mixed-hardwood swamps/sloughs and cypress domes, marshes, hardwood hammocks, old-growth pinelands, and mangrove forests; wildlife resources such as red-cockaded woodpecker (*Picoides borealis*) RCW colonies (i.e., clusters), Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) habitat, active bald eagle (*Haliaeetus leucocephalus*) nesting sites, and known Florida panther (*Puma concolor coryi*) areas; and cultural resources such as archaeological sites and Miccosukee Indian cultural sites. No surface occupancy for the placement of access roads, pads or pipelines is permitted in or on any vegetation community or on cultural site identified as important resource area. The use of motorized vehicles for the conduct of geophysical exploration is not permitted in or on any cultural site or vegetation community identified as an important resource area, except old-growth pinelands as specified under Geophysical Operation Stipulation 14. Important wildlife resource areas will be avoided in accordance with applicable operational stipulations.*



**Action(s) taken to comply:** The Operator is aware of the wide range of important resource areas and cultural resource values present in the revised NG3-D program area. They represent the focus of the Operator's planning and design efforts to implement avoidance and mitigation strategies including seismic design Modification Protocols discussed in Section 5 of the POP. During survey activities, the Operator will continue to identify and monitor activities throughout the work segments of program field operations. The Operator invites the reader to refer to the entire plan, Sections 5 and 10 in particular, for a comprehensive discussion of actions taken to comply with the provisions of this stipulation.

### **Wetland Impact Mitigation Stipulation**

*All operators proposing to conduct operations that are subject to compliance with Section 404 (dredge and fill requirements) of the Federal Water Pollution Control Act (commonly known as the Clean Water Act, 33 USC 1251 et seq. [1988]) are required to perform at least one-to-one mitigation (i.e., reclaim at least one acre of disturbed land for each acre of land to be directly impacted). Such impact mitigation will be a condition of plan of operations approval by the NPS regional director. Required mitigation actions will be determined by the NPS in consultation with the U.S. Army Corps of Engineers (COE), Environmental Protection Agency (EPA), and appropriate state agencies. This stipulation would be in addition to the reclamation requirements specified at 36 Code of Federal Regulations (CFR) 9.39.*

**Action(s) taken to comply:** The Operator acknowledges that it must comply with applicable laws, including the Clean Water Act. For the NG3-D survey, no discharge of dredged or fill material into the waters of the United States are planned, so no Clean Water Act permit or mitigation will be needed. As discussed in Section 9.4 of the POP, on January 30, 2014, the COE informed the Operator that such a permit would not be required. The Operator believes that disturbance from the NG3-D seismic survey will be *de minimis* and not require mitigation.

### **Bear Island Stipulation**

*Oil and gas drilling and production operations in the Bear Island unit are subject to the above stipulations and all applicable operational stipulations. In addition, the area of direct impact in the Bear Island unit may not exceed the acreage of reclaimed access roads, pads and pipelines in the unit as of May 1, 1991.*

**Action(s) taken to comply:** Over the past 20 years since the BCNP-GMP was implemented, approximately 50 percent of the 1991 estimated oil and gas direct impacts in Bear Island have been recovered (see discussion in Section 5.13 of the POP). No drilling and production activities are proposed in this POP. The Applicant estimates that temporary impacts from the NG3-D seismic survey operation that are within the BCNP's Bear Island unit will not cause the May 1,



1991 estimated direct impact total to be exceeded; the proposed geophysical operations expected to be *de minimis* and in compliance with this stipulation.

### **Geophysical Operational Stipulations**

*The following operational stipulations are tailored to the specific phases of oil and gas exploration and development. These stipulations are designed to minimize the impacts of oil and gas operations.*

**BCNP MMP Stipulation #1:** *The operator, in conducting activities approved in a plan of operations, must comply with all federal, state, and local laws, regulations, and ordinances applicable to the area or activities covered by the plan of operations, and the operator must provide an affidavit specifying such compliance.*

**Action(s) taken to comply:** The Operator has identified regulatory requirements that may govern the proposed geophysical seismic operations and will comply with applicable state, federal, and local laws, regulations, and ordinances, and the approved plan as discussed in Section 9 of the POP. The Operator has executed an Affidavit of Compliance (see Section 8 of the POP).

**BCNP MMP Stipulation #2:** *An approval of a plan of operations for geophysical survey work does not in any way constitute an approval of any subsequent actions for exploration, removal, or development of oil and gas resources in the area of operations.*

**Action(s) taken to comply:** The Operator acknowledges this and will seek approvals for other oil and gas operations as necessary.

**BCNP MMP Stipulation #3:** *The operator must exercise diligence in protecting from damage the land and property of the United States covered by and used in connection with a plan of operations. Furthermore, the operator must repair, or compensate for, any damage resulting from the violation of the terms of a plan of operations or any law or regulation applicable to the National Park Service by the operator, his agents, or employees, or through negligence of the operator, his agents, or employees.*

**Action(s) taken to comply:** The Operator understands and will comply. In addition, the Operator will provide a surety (see Section 7.4 of the POP) payable to the NPS as required by 36 CFR §9.48(d) (3).

**BCNP MMP Stipulation #4:** *The operator must provide the superintendent with the grants of permission from the mineral owners to access such property. The operator must also provide the*



*superintendent a listing of those mineral owners not granting access permission for the current proposed operation.*

**Action(s) taken to comply:** The POP is largely targeted at Collier-owned mineral interests from whom the Operator has acquired the right to conduct seismic exploration and which comprise most of the survey area (see Sections 2 and 8 and Exhibit 2 of the POP). Although this survey is designed primarily to evaluate undivided Collier-owned oil and gas minerals interests that comprise the majority of the survey area, divided minority third-party (non-Collier) mineral interests co-exist with Collier divided mineral ownership in a few sections of the survey. There are also several sections that include 100 percent non-Collier mineral interest (or sections in which Collier has no ownership interest). For the revised NG3-D survey area, the Operator has provided documentation in Exhibit 2 of the POP for the Collier interest it currently controls. The Operator is in the process of securing the balance of additional Collier sections as well as non-Collier interest and expects to demonstrate control of those interests to USDO-I-NPS prior to commencement of operations (see Section 2 of the POP). Prior to commencement of operations, the Operator will identify to USDO-I-NPS any interests within the revised survey area that it does not control and will avoid occupying the surface area over such interests with equipment and will instruct third-party processors to delete (or “gap”) geophysical data from such areas.

**BCNP MMP Stipulation #5:** *BCNP headquarters must be contacted at least one week before entering the unit to conduct operations.*

**Action(s) taken to comply:** The Operator understands and will comply.

**BCNP MMP Stipulation #6:** *The operator must take necessary precautions to prevent and suppress wild land fires. In connection with the operations as approved by the NPS, fire prevention and suppression equipment as required by the NPS must be provided. During times of high or extreme fire danger, operations may be temporarily suspended at the discretion of the superintendent. All fire safety measures and orders issued by the Big Cypress fire management officer or superintendent during high fire danger periods are to be complied with.*

**Action(s) taken to comply:** The Operator will insure that contractors take precautions to prevent accidents and fires. These precautions will include, but not be limited to, safety training, fire prevention training, availability of fire suppression equipment, monitoring of fire conditions, coordination with NPS fire teams, and daily briefings on evolving field issues that may relate to safe working conditions and fire prevention as required by 36 CFR §9.46 and by MMP geophysical Stipulation #6. The Operator’s fire plan is discussed in Section 6.5.3 of the POP. Fire prevention and suppression equipment will be provided on field equipment. Before conditions within the BCNP reach a level of critical fire concern, the Operator would appreciate



the opportunity to discuss alternatives which the survey operations might employ in order to avert a suspension of operations.

**BCNP MMP Stipulation #7:** *Geophysical operations are to be located or scheduled to avoid the following:*

- *Known archaeological, historic, and cultural sites and apparent sites, when observed;*

**Action(s) taken to comply:** The Operator will comply with this stipulation. As detailed in the POP, the Operator in cooperation with the USDO-I-NPS Southeastern Archaeological Center and from its familiarity with Collier Resource Company's 2006 Nobles Grade 3-D seismic survey plan already has knowledge in roughly 40 percent of the revised NG3-D survey area of known and potential areas where historical, archaeological, and cultural sites may be found. The Operator, through its archaeological consultant, is in the process of securing similar information over the remaining area. The Operator will develop an archaeological avoidance model and provide qualified archaeologists in the field to identify objects or avoid potential sites that may have historical, archaeological, or cultural value. The operator intends to fully comply with 36 CFR §9.47(a); 43 CFR §3, (Antiquities Act (16 U.S.C. 431-433)).

- *The NPS must be notified within 24 hours if possible sites are observed;*

**Action(s) taken to comply:** The Operator will have qualified archaeologists in the field to monitor the field operations. The USDO-I-NPS will be notified within 24 hours if possible sites are observed. The field crews will be instructed to avoid areas where cultural, archaeological, or scientific resources might occur. The operator intends to fully comply with 36 CFR §9.47(a); 43 CFR §3.

- *Major recreational use and hunting periods to the extent practicable, based on the area of proposed operations and expected level of recreational use or hunting activity;*

**Action(s) taken to comply:** The Operator will comply with stipulations that require operations during dry periods and periods of dormancy for plant growth during the period December through May. This period overlaps hunting season and periods of recreational use by winter visitors. To the extent practical, the Operator's proposed operations will be integrated into other ongoing BCNP user activities. Trail users and hunters may see and hear operations by helicopters and drilling equipment. The Operator plans to provide notice to the user public concerning operations and activities that they may see, hear, or encounter during a visit to the BCNP (see discussion in Section 5 of the POP).



- *Periods of extreme or high fire danger;*

**Action(s) taken to comply:** The Operator will insure that contractors take precautions to prevent accidents and fires. These precautions will include, but not be limited to, safety training, fire prevention training, monitoring of fire conditions, coordination with USDO-I-NPS fire teams, and daily briefings on evolving field issues that may relate to safe working conditions and fire prevention as required by 36 CFR §9.46.

- *Known bald eagle nesting sites - the NPS must be notified immediately if apparent nesting sites are observed;*

**Action(s) taken to comply:** The Operator has obtained the most up-to-date information available on bald eagle nesting sites and placed the information in the Geographic Information System (GIS) database for the project. No known bald eagle nesting sites are found within the reduced NG3-D program area. Should nesting sites be identified, appropriate avoidance measures will be implemented.

- *Known RCW colonies (i.e., clusters) - the NPS must be notified immediately if apparent colonies are observed;*

**Action(s) taken to comply:** The Operator has obtained the most up-to-date information available on RCW clusters and placed the information in the GIS database for the NG3-D project. Only two known RCW clusters are found within the NG3-D program area. The Operator will impose appropriate buffer areas around known nests. Seismic crews will be made aware of RCW nest characteristics and report the presence of any new nests observed.

- *Buffer zones recommended by the NPS to minimize disturbance to sensitive wildlife;*

**Action(s) taken to comply:** The Operator has obtained the most up-to-date information available on sensitive wildlife areas including Florida panther denning areas and placed the information in the GIS database for the project. The Operator proposes to avoid denning areas through coordination with the USDO-I-NPS and the Florida Fish and Wildlife Conservation Commission panther observations and tracking program. The Operator's field operations will be modified to create buffers around sensitive areas in consultation with USDO-I-NPS staff.

- *Seasons, periods, or times of critical wildlife use by threatened or endangered species, such as nesting, breeding, and birthing periods; and*



**Action(s) taken to comply:** The Operator has obtained the most up-to-date information available on rookeries and nesting and breeding areas and the information was placed in the GIS database for the project. Known critical wildlife use issues found within the program area will be the subject of special procedures such as panther denning buffer areas as discussed above.

- *Periods of high precipitation and/or with standing surface water (the wet season normally May through October).*

**Action(s) taken to comply:** The Operator intends to conduct operations during the dry season from approximately December through May (depending on conditions). Should standing water be encountered during the “dry” season, the operator anticipates no adverse effects because of the types of equipment, methods, and use of already disturbed areas being employed in the plan. However, the Operator prefers not to operate vibroseis buggies in standing water and, therefore, would delay operations at wet locations and possibly move to other dry parts of the survey or “offset” or skip such areas until wet areas dry out.

**BCNP MMP Stipulation #8:** *Geophysical operations are not allowed within 1.25 miles of a bald eagle nest during the nesting season. If an active bald eagle nest is discovered within 1.25 miles of a seismic operation, activity will be halted during the nesting season within a 1.25-mile radius of the nest.*

**Action(s) taken to comply:** The Operator has obtained the most up-to-date information available on bald eagle nesting sites and placed the information in the GIS database for the project. No known bald eagle nesting sites are found within the reduced NG3-D program area. Should nesting sites be documented, appropriate buffer areas will be established in consultation with the USDOI-NPS to mitigate disturbance.

**BCNP MMP Stipulation #9:** *Motorized geophysical vehicles are not permitted within 0.5 mile of RCW cavity trees during the nesting season. Helicopters may not be operated within 0.75 mile of RCW cavity trees at any time. Shotholes may not be drilled within 0.25 mile of RCW cavity trees at any time.*

**Action(s) taken to comply:** The Operator does not intend to conduct a dynamite-sourced seismic survey, but rather use vibroseis technology. The Operator has obtained the most up-to-date information available on RCW clusters and placed the information in the GIS database for the project. Only two known RCW clusters are found within the revised NG3-D program area. In consultation with the USDOI-NPS, the Operator intends to provide appropriate buffers to mitigate survey effects.



**BCNP MMP Stipulation #10:** *Archaeologists approved by the NPS must accompany the line survey crew to identify and avoid cultural sites.*

**Action(s) taken to comply:** The Operator intends to obtain the most up-to-date information regarding known cultural and Native American ceremonial sites in the NG3-D seismic survey area. Such information will be incorporated in the planning and the creation of an avoidance model to assist in the placement of and accessing receiver and vibrating locations. The Operator's archaeological consultant has prepared a plan to have a qualified person in the field to monitor operations. The field crews will be instructed to avoid areas where cultural, archaeological, or scientific resources might occur. The operator intends to fully comply with 36 CFR §9.47(a); 43 CFR §3.

**BCNP MMP Stipulation #11:** *Areas identified by the NPS during pre-operation reconnaissance as being sensitive to off-road vehicle impacts must be accessed by means other than motorized vehicle.*

**Action(s) taken to comply:** High resolution imagery and information in GIS format has been used to plan vehicle routes and the location of source and receiver points. The Operator intends to use a helicopter to assist in receiver deployment, checking, and pickup operations which are largely on-foot operations. The Operator intends to consult daily with NPS to discuss access routing and other field issues. The proposed plan will meet offset and buffer requirements for avoiding threatened, endangered, and sensitive species and their habitats.

**BCNP MMP Stipulation #12:** *NPS observers will oversee the surveying, drilling, and reclamation phases of geophysical operations within the preserve. These observers will advise the operator on site-specific operations pursuant to the approved plan of operations (e.g., adequacy of reclamation) on a day-to-day basis. Any conflicts arising from daily consultation will be mediated by the superintendent.*

**Action(s) taken to comply:** The Operator does not plan to conduct drilling operation in the proposed NG3-D seismic survey. The vibroseis observer(s) required by USDO-I-NPS will include individual(s) who have specialized ecological training to meet this stipulation.

**BCNP MMP Stipulation #13:** *Vehicles must be of a size and design reflecting the best available technology that will cause the least adverse impact to vegetation and soils. Operators are to maximize the use of existing trails to minimize new surface disturbance. All operation support vehicles (e.g., vehicles used to transport personnel or sundry supplies) and all vehicles used during surveying and staking operations are restricted to existing roads and designated trails.*



**Action(s) taken to comply:** The most prominent theme of the revised NG3-D POP is the Operator's compliance with USDOI-NPS requirements relative to the use of existing roads, trails, and other existing or previously disturbed areas for program field operations to minimize or eliminate potential surface impacts to the extent feasible. Survey operations are planned to be "stakeless" as much as possible. Receiver line deployment, checking, and pickup operations are designed, to the extent feasible, to be "on-foot." The Operator has employed modification protocols to relocate a majority of vibration points to existing roads and trails. Existing disturbed areas (abandoned drilling sites) and open areas have been utilized for staging areas. The majority of these sites are adjacent to Interstate 75 facilities. The Operator has selected vibroseis technology and buggies equipped with flotation or balloon-type tires to produce an extremely high-quality seismic record while minimizing surface impacts compared to other methods. No drilling operations are planned thus avoiding the challenges of associated logistical support, penetrating underlying cap rock layer, preparing and keeping the hole open in order to place dynamite charges, and subsurface detonations. To achieve with other seismic methods the same outcome equivalent to vibroseis technology would essentially result in substantially greater surface impacts.

**BCNP MMP Stipulation #14:** *Motorized vehicles for the conduct of geophysical surveys are not permitted in the Loop or Deep lake unit, on any cultural site, or in any vegetation community, except old-growth pine lands, identified under the "Important Resource Area Protection Stipulation." Access to such areas is limited to foot and helicopter access only, and shothole drilling is limited to the use of hand-portable drilling equipment. The use of motorized vehicles for the conduct of geophysical exploration may be allowed in old-growth pinelands, providing (1) the operator comply with other applicable stipulations, and (2) the NPS determines that vehicle use in such areas will not significantly impact unit resources and values.*

**Action(s) taken to comply:** The operations described in the revise NG3-D POP (Figure 5.30) do not include work in the Loop or Deep Lake units. The Operator will comply with this stipulation. Sensitive vegetation communities will be avoided in the program area or if used, only on the existing trail systems in areas that have been scouted and confirmed by the USDOI-NPS as not likely to suffer adverse impacts to unit resources and values.

**BCNP MMP Stipulation #15:** *During the survey phase all helicopter landing zones are to be selected to minimize the number of trees to be cut. All helicopter operations must be in compliance with FAA standards for the transport of personnel, equipment, and normal operating procedures. Helicopter landing zones are to be certified by NPS staff.*

**Action(s) taken to comply:** The Operator will comply with this stipulation. The Operator intends to conduct the survey work primarily "on-foot" to the extent feasible. Consultations with the USDOI-NPS will occur prior to and during survey and scouting operations to identify needed



helicopter landing zones for support operations. Landing zones, if needed, will be selected to avoid or minimize tree cutting to the extent feasible. The field landing zones will be inspected and certified by USDOI-NPS staff before use.

**BCNP MMP Stipulation #16:** *Vegetation cutting and trimming will be allowed for line-of-sight surveys only, and no cutting of vegetation will be allowed below the height or beyond the width of 36 inches. No cypress trees of any size may be cut or trimmed because of their extremely slow growth rates. Vegetation cutting or trimming in vegetation communities identified under the "Important Resource Area Protection Stipulation" may be allowed only where (1) the operator can conclusively demonstrate that the use of global positioning devices or similar technology will not satisfy surveying requirements and accuracy, and (2) the NPS determines that vegetation cutting or trimming in such areas will not significantly impact unit resources and values.*

**Action(s) taken to comply:** Brush cutting and vegetative trimming will be minimized to the extent feasible. Vegetation trimming, if needed, for survey access and receiver layout will be the minor side trimming of trees and brush. Roots and soil will not be disturbed.

**BCNP MMP Stipulation #17:** *No vegetation may be "bulldozed" as a result of vehicle operation; vegetation must be capable of returning to an undisturbed condition following completion of the operations.*

**Action(s) taken to comply:** The operator does not intend to bulldoze vegetation. The Operator has employed high resolution imagery and GIS to modify its initial seismic design in order to avoid BCNP IRAs. In the field, it intends to scout for equipment access and provide routes to vibration source points that will provide a minimum impact to vegetation. Vibroseis buggy access to off-trail vibration points will be accomplished via natural open areas to the extent practical. Implementation of the Operator's "one pass" program design concept will serve to prevent the potential for new trail access. Low shrubs and herbaceous vegetation may be bent over temporarily by the passage of equipment, but it will not be bulldozed, removed, or the root stock dug up or destroyed.

**BCNP MMP Stipulation #18:** *Hand-transported or airlifted drilling units must be used in any area that cannot be traversed by wheeled, trailered, or other non-portable equipment.*

**Action(s) taken to comply:** The Operator does not intend to utilize drilling units. However, it has modified its initial seismic survey design as discussed in Stipulation #17 above and intends to comply with this stipulation by avoiding, to the extent feasible, sensitive areas (see Section 5 of the POP).



**BCNP MMP Stipulation #19:** *Survey lines are to be gapped across sections where a legally necessary party has not given permission for access; such areas are to be designated on maps provided by the operator.*

**Action(s) taken to comply:** As discussed in Stipulation #4, the Operator does not plan to use surface estate or conduct an exploration of a mineral interest within the NG3-D survey area where it has no right to do so and will show these areas on a map to the USDO-I-NPS prior to commencement of operations. The demonstration of exploration right does not require the Operator to control all mineral interests in any given governmental section where one owner may own an undivided interest in the entire section and the Operator controls that interest. The Operator does not consider the lack of a surface occupancy permit to bar utilization of trails or defined passage ways to proceed from one area of the survey to another where the Operator does have right of exploration and surface occupancy.

**BCNP MMP Stipulation #20:** *No shotholes may be drilled in vegetation communities identified under the "Important Resource Area Protection Stipulation" unless (1) the operator can conclusively demonstrate that acquisition of seismic data in such areas is not possible through the sole use of cable and geophones, and (2) the NPS determines that the drilling of shotholes in such areas will not significantly impact unit resources and values. Shotholes are not permitted on or in the immediate vicinity of any cultural, historic, or archaeological site.*

**Action(s) taken to comply:** The Operator does not plan to use “shotholes” in the NG3-D seismic survey. The Operator is aware of the wide range of important resource areas and cultural resource values present in the NG3-D program area. They represent the focus of the Operator’s planning and vibroseis design work segments and will continue to be the subject of ongoing identification and monitoring activities throughout the phases of NG3-D program field operations. The Operator invites the reader to refer to the POP, Section 5 in particular, for a comprehensive discussion of actions taken to comply with the provisions of this stipulation.

**BCNP MMP Stipulation #21:** *All shothole drilling operations must occur within corridors identified on maps by survey crews; a lateral offset may be permitted to avoid sensitive/impassable habitats.*

**Action(s) taken to comply:** The Operator does not plan to use “shotholes” in the NG3-D seismic survey. The vibroseis program is designed and has been modified to minimize or eliminate potential impacts to BCNP environmental and natural resource values by maximizing the use of existing roads, trails, and other existing or previously disturbed areas, to the extent feasible, and offsetting source and receiver points to avoid sensitive and impassable habitats where necessary. The Operator will coordinate with the USDO-I-NPS the need for offsetting should the need arise.



**BCNP MMP Stipulation #22:** *During the shothole drilling phase, the use of a drilling bucket, or comparable device, to collect drill cuttings is required.*

**Action(s) taken to comply:** The NG3-D vibroseis seismic survey does not employ dynamite generated seismic acoustical signals and thus the need to drill shotholes. The equipment and technique suggested by this stipulation will not be needed.

**BCNP MMP Stipulation #23:** *Charges must be loaded or stored in accordance with the state fire marshal's regulations.*

**Action(s) taken to comply:** The NG3-D vibroseis seismic survey does not employ dynamite generated seismic acoustical signals. The requirements imposed on the Operator in this stipulation will not be needed.

**BCNP MMP Stipulation #24:** *Magazines must be secured in the field in accordance with the state fire marshal's regulations.*

**Action(s) taken to comply:** The NG3-D vibroseis seismic survey does not employ dynamite to generate seismic acoustical signals. The requirements imposed on the Operator in this stipulation will not be needed.

**BCNP MMP Stipulation #25:** *Area closures must be posted in accordance with 36 CFR 1.5.*

**Action(s) taken to comply:** The Operator intends to coordinate activities with BCNP staff to post area closures as may be required.

**BCNP MMP Stipulation #26:** *No geophones/cables may be stored or staged on preserve lands without NPS approval.*

**Action(s) taken to comply:** The Operator intends to store geophone receivers, Geospace Seismic Recorder boxes and batteries, and their transportation trailers only on approved staging sites which are identified in the NG3-D seismic survey and approved by the USDO-I-NPS.

**BCNP MMP Stipulation #27:** *Bentonite may be used only to seal above the dynamite charge. Bentonite may not be used to backfill shotholes. Bentonite bags stored in staging areas must be sufficiently covered and waterproofed to prevent concretion as a result of rain, flooding, or dew.*

**Action(s) taken to comply:** The Operator does not intend to drill, place dynamite down shotholes, and use bentonite to seal off the hole. The NG3-D seismic survey will use vibroseis



technology thus avoiding shothole drilling, handling, and use of associated materials and techniques that are the subject of this stipulation.

**BCNP MMP Stipulation #28:** *Drip pans must be provided under fuel containers and vehicle refueling centers; fuel storage containers must be elevated; fire safety and cleanup equipment must be on site.*

**Action(s) taken to comply:** The Operator intends to comply with this stipulation. See Sections 5 and 6 of the POP.

**BCNP MMP Stipulation #29:** *During all phases of geophysical operations the temporary mixing zone (measured for 39 days) for turbidity is not to extend for more than 20 feet downstream or radially from the hole or vehicle traverse corridors; containment devices (e.g., turbidity screens) are to be used as necessary, or operations must temporarily cease to prevent turbidity in excess of 29 NTUs above background levels outside the mixing zones, and operations may not resume unless appropriate measures have been taken to prevent a reoccurrence of turbidity violations. The lead drill crew observer must collect samples to be given to the Big Cypress hydrologist to determine the background turbidity level.*

**Action(s) taken to comply:** The Operator does not anticipate significant impacts attributable to turbidity because of dry season operations and the absence of shothole drilling and drill cuttings. The NG3-D seismic survey will use vibroseis technology to replace dynamite generated seismic acoustic signals. In the event that inundated areas are encountered, vibroseis operations will be rerouted to other areas until wet conditions improve. However, the Operator will be prepared to conduct field monitoring of turbidity at the direction of USDOI-NPS staff and Florida water quality standards will be adhered to at all times during field operations.

**BCNP MMP Stipulation #30:** *Florida water quality standards must be adhered to at all times.*

**Action(s) taken to comply:** See the Operator's response to BCNP MMP Stipulation #29 above.

**BCNP MMP Stipulation #31:** *In consultation with the Florida Department of Transportation (FDOT), signs displaying the message "Trucks Entering Highway" must be erected on major highways in the area of operations to caution drivers about the presence of geophysical vehicular traffic.*

**Action(s) taken to comply:** The Operator will implement a FDOT approved highway traffic safety plan prior to the start of program field operations.



**BCNP MMP Stipulation #32:** *All shotholes must be backfilled with drill cuttings and native materials. Nonnative material (e.g., bentonite or other material not found in the south Florida area) may not be used to backfill shotholes. Reclamation must be completed to the satisfaction of the superintendent.*

**Action(s) taken to comply:** The Operator intends to use vibroseis technology in the NG3-D seismic survey and not dynamite. As such, this stipulation is not applicable. However, the Operator will complete reclamation resulting from planned operations to the satisfaction of the superintendent's satisfaction.

**BCNP MMP Stipulation #33:** *The "cap" of native soils and vegetation must be replaced as the top component of the hole during backfilling so as to resemble natural soil and vegetative conditions to the maximum extent possible.*

**Action(s) taken to comply:** The Operator intends to use vibroseis technology in the NG3-D seismic survey and not dynamite requiring the drilling of shotholes. As such, this stipulation is not applicable.

**BCNP MMP Stipulation #34:** *Excess shothole cuttings must either be removed and disposed of off-site or used to backfill other shotholes in the immediate area, providing the pH value of cuttings is within 1:0 pH unit of surface soil values. The operator, in consultation of the National Park Service, must identify acidic soil areas. Non-acidic drill hole cuttings must be dispersed at the ratio of 0.5 cubic foot per 50 square feet around each hole so that any elevation change is limited to 0.25 inch.*

**Action(s) taken to comply:** The Operator intends to use vibroseis technology in the NG3-D seismic survey and not dynamite requiring the drilling of shotholes. As such, this stipulation is not applicable.

**BCNP MMP Stipulation #35:** *All trash and debris resulting from operations, including plastic flagging, stakes and other temporary markers put in place by the operator must be removed from the preserve.*

**Action(s) taken to comply:** Cleanup and restoration activities will be conducted in compliance with 36 CFR §9.39, BCNP MMP geophysical operational stipulations and the 2006 NPS Operators Handbook reclamation suggestions and guidelines. See Section 7 of the POP for a complete discussion of the operators' reclamation plan.



**BCNP MMP Stipulation #36:** *All wires and detonation caps must be removed from the preserve.*

**Action(s) taken to comply:** The Operator intends to use vibroseis technology in the NG3-D seismic survey and not dynamite requiring the drilling of shotholes. As such, this stipulation is not applicable.

**BCNP MMP Stipulation #37:** *Ruts and vehicle tracks resulting from approved geophysical operations must be restored to original contour conditions within 14 days following completion of the recording, and reclamation must be completed to the satisfaction of the superintendent.*

**Action(s) taken to comply:** The Operator will have clean-up and restoration crews working throughout the revised NG3-D survey area to clean up debris, flagging, and trash and to restore soils to the original contour. Since the Operator intends to conduct survey activities as much as possible without stakes and flags, clean up of these items and resulting trash and waste materials will be much reduced from past surveys. This work will be coordinated on a daily basis with USDO-I-NPS staff and field observers.

**BCNP MMP Stipulation #38:** *Reclamation must be conducted on a contemporary basis with the operations, or no later than 30 days following the completion of operations, excepting inclement weather conditions. Preserve headquarters must be contacted upon completion of reclamation work by telephoning (813) 695-2000 during normal business hours.*

**Action(s) taken to comply:** The Operator will have clean-up and restoration crews working throughout the revised NG3-D survey area to clean up debris, flagging, and trash and to restore soils to the original contour. This work will be coordinated on a daily basis with USDO-I-NPS staff and field observers. Reclamation and clean-up work will be finished within 30 days following completion of operations.



**EXHIBIT 6**

**COLLIER-FDOT I-75 RIGHT-OF-WAY PURCHASE AGREEMENT**



State of Florida Department of Transportation  
RIGHT OF WAY PURCHASE AGREEMENT

COUNTY: COLLIER

W.P.I. NO.: 1142185

STATE ROAD NO.: 93 (I-75)

FAP NO.: 1-75-4(75)51

STATE OF FLORIDA

COUNTY OF COLLIER

This confirmation of an agreement made and entered into on the 14th day of October, A.D. 1987, by and between Barron Collier III, individually, and Harold S. Lynton, Marguerite R. Collier, Lamar Gable, Trustees for Marguerite R. Collier, and Harold S. Lynton, Lamar Gable, Juliet C. Sproul, Trustees for Juliet C. Sproul, and Harold S. Lynton, Lamar Gable, Barron Collier III, Trustees for Barron Collier III, hereinafter referred to as SELLER, and the STATE OF FLORIDA for the use and benefit of the State of Florida Department of Transportation, hereinafter referred to as PURCHASER,

WITNESSETH,

For and in consideration of the mutual covenants and conditions herein contained SELLER has agreed to sell and PURCHASER has agreed to buy the following property upon the following terms and conditions:

I. DESCRIPTION

Real estate identified as Parcel 156 and shown on Right of Way Maps for section 03075-2402, incorporated herein by reference, more particularly described as:

The South 125 feet of the North 325 feet of Sections 1, 2, 3, 4, 5 and 6, Township 50 South, Range 34 East, Collier County, Florida, containing 92.453 acres, more or less.

TOGETHER WITH all rights of ingress, egress, light, air and view between the Grantor's remaining property and State Road 93 (I-75) along the North line of the above described property,

AND,

All rights of access, ingress, egress, light, air and view between State Road 93 (I-75) and the East 1/2 of Section 31 and all of Sections 32, 33, and 35 LESS existing right of way in Township 49 South, Range 33 East; Sections 31 and 33 LESS existing right of way, Township 49 South, Range 34 East along the Northerly Right of Way line of State Road 93 (I-75).

LESS AND EXCEPT therefrom all oil, gas and mineral rights, PROVIDED, that the rights of ingress and egress to and from Interstate 75 for the purpose of exploration for and



production and removal of oil, gas and minerals on and under the above described lands and contiguous lands of the grantors shall be provided to the grantors, their heirs, successors and assigns under the terms and conditions set forth in Exhibit "A" attached hereto and made a part hereof.

## II. PURCHASE PRICE

- (a) Amount to be paid by PURCHASER to SELLER at closing.....\$15,440,880.00
- (b) Amount to be paid by PURCHASER to SELLER upon surrender of possession....\$ -0-

TOTAL PURCHASE PRICE                      \$15,440,880.00

## III. CONDITIONS AND LIMITATIONS

- (a) It is mutually understood that this Right of Way Purchase Agreement is executed by PURCHASER subject to final agency acceptance as required by Section 119.07, Florida Statutes. Notice of final agency acceptance shall be evidenced by the signature of PURCHASER in Section VI herein and delivery to SELLER not sooner than 30 days from the date first written above.
- (b) SELLER is responsible for all taxes due and owing on the property as of the date of closing. SELLER agrees that all current taxes for the year in which this agreement is made on the property acquired shall be prorated and SELLER agrees to pay his and/or her share of said prorated taxes as of the date of closing.
- (c) Any extension of occupancy beyond the date of closing must be authorized by the PURCHASER in writing. During the period from the date of closing until the SELLER surrenders possession to the PURCHASER, the SELLER shall exercise diligent care in protecting the property from theft and vandalism. All personal property included in the purchase price shall be delivered to PURCHASER in the same condition existing as of the date of this agreement.
- (d) SELLER is responsible for delivering unencumbered title to PURCHASER at closing,\*Any sums which PURCHASER must expend to clear encumbrances shall be deducted at closing from the purchase price shown in Section II.
- (e) Between the date of this agreement and closing date, SELLER shall not grant additional rights of ingress and egress to or from State Road 84 through SELLER S

MRC  
MRC

lg  
LG

JCS  
JCS

\* Subject, however, to easements, restrictions, reservations



property to other property owners in the "Stairstep Area" located south of State Road 84.

- (f) The purchase price stated in Section II includes all fees and costs of any kind incurred by the SELLER during the negotiation process, including, but not limited to, attorney fees and appraisals.

(g) \*

#### IV. CLOSING DATE

This transaction shall be closed and the instrument of conveyance delivered within 60 days of the date of final agency acceptance.

#### V. TYPEWRITTEN OR HANDWRITTEN PROVISIONS

Typewritten or handwritten provisions inserted herein or attached hereto as Addenda, and initialed by all parties, shall control all printed provisions in conflict therewith.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed in their respective names.

SELLER:

BUYER:

Barron Collier III  
Barron Collier III

STATE OF FLORIDA DEPARTMENT  
OF TRANSPORTATION

Harold S. Lynton  
Harold S. Lynton

BY: [Signature]  
It's Agent

Marguerite R. Collier  
Marguerite R. Collier

Lamar Gable  
Lamar Gable

Juliet C. Sproul  
Juliet C. Sproul

#### VI. FINAL AGENCY ACCEPTANCE

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

\*The deed to be delivered by Seller and accepted by Buyer at closing shall contain the following provision:

By acceptance of this deed the Grantee agrees to the terms and conditions to be performed on its part.

BC III WAC  
BC III MRC  
HSL 19  
HSL LG  
JCS  
JCS F.D.C



EXHIBIT "A"

Ingress and egress to and from State Road 93 (I-75) will be provided to the grantors, their heirs, successors and assigns for the purpose of exploration for and production and removal of oil, gas and minerals under the following terms and conditions:

A. LOCATION:

The following seven (7) access points, which coincide with currently existing roads, are identified:

1. T50S, R32E, Sec. 6 (Baxter Island 6-2 Road) Milepost 32
2. T50S, R32E, Sec. 3 (Osceola Camp Road) Milepost 35
3. T49S, R32E, Sec. 36 (Percy Brown Road) Milepost 38
4. T50S, R33E, Sec. 6 (Hughes and Hughes Road) Milepost 39
5. T50S, R33E, Sec. 3 (Turkey Foot Road) Milepost 42
6. T50S, R34E, Sec. 4 (Lamar Road) Milepost 48
7. T49S, R34E, Sec. 35 (Richter Road) Milepost 49

The above locations were selected with due consideration to environmental concerns, adequacy of the access provided and the likelihood that permits can be obtained for the construction of the necessary roads. It is recognized that adjustments may be necessary to the actual location of each access point due to conditions in effect at the time the access point is to be utilized. A maximum of seven (7) sites are guaranteed to ensure reasonable access to all areas.

In addition to the foregoing, if and when access from and to oil, gas and minerals via Turner River Road and/or Golden Gate Estate roads is lost, the Florida Department of Transportation (the "Department") will cooperate with the oil, gas and mineral rights owners, and their heirs, successors, assigns and lessees, in attempting to secure reasonable and sufficient access to service the oil, gas and mineral interests in the Turner River Road and Golden Gate Estate areas.

B. TYPES OF ACCESS:

Three (3) different types of access will be provided for the utilization of oil, gas and mineral rights. Permits will be issued separately for each type of access. The types are as follows:



(a). Geophysical Exploration

No road construction is required and access shall be permitted through removal of a section of fencing and replacing this with a locked gate. No physical modification of the highway facility will be permitted. Maintenance of traffic at standards in existence at the issuance of the permit and security of the gate shall be the responsibility of the permittee. Upon completion of the exploration period, the gate will be removed and the fencing will be restored to its original condition.

(b). Well Exploration

A limerock turnout and connection will be constructed. A section of the limited access fencing will be removed and replaced with a locked gate. The permittee will be required to maintain traffic flow in Interstate 75 during utilization of the access road by exploration trucks and equipment. Upon completion of exploration, if the access point is not to be used for production and removal, the turnout will be removed and gate and the fence will be restored to its original condition. Responsibility for security of the locked gate will rest with the permittee.

(c). Production and Removal

This activity will require access by both production equipment and tank trucks. Should projected traffic counts indicate a need, acceleration/deceleration lanes and paved connections will be required. A section of the limited access fence will be removed and replaced with a locked gate. After the need for access has ceased, all improvements will be removed and the interstate facility will be restored to its original condition. Responsibility for the security of the locked gate will rest with the permittee.

The Department will provide, at its expense, for the installation and removal of all improvements within the Department's rights of way which are deemed by the Department or the Federal Highway Administration to be necessary pursuant to subparagraph (a), (b) and (c) above and permits therefor.



C. PERMITS

A permit will be required for utilization of a mineral access point. Such a permit shall be issued by the Department upon receipt by the Department of an application filed by the person or entity proposing utilization of the access. Each permit application shall contain the following:

1. Identification of the party or parties requesting issuance of the permit and the location of the requested access site.
2. A statement of the applicant's interest in the mineral rights.
3. A statement of the anticipated use.
4. The overall duration of the anticipated use.
5. The frequency of use anticipated during the permit period.
6. Design and construction details for exit, entrance, gate and related facilities.
7. Operations and maintenance plans including security, signing, maintenance and protection of traffic both for use and non-use periods.

Ultimate approval of each permit application shall be based on:

- A. Assurance that the safety and operational integrity of the Interstate and its traffic will be protected and that controls will be in place to assure use of gates for permitted use only.
- B. A finding by the Department that all permits necessary for the exploration and/or production and removal activities have been or will be issued by the pertinent regulatory agencies.



**EXHIBIT 7**

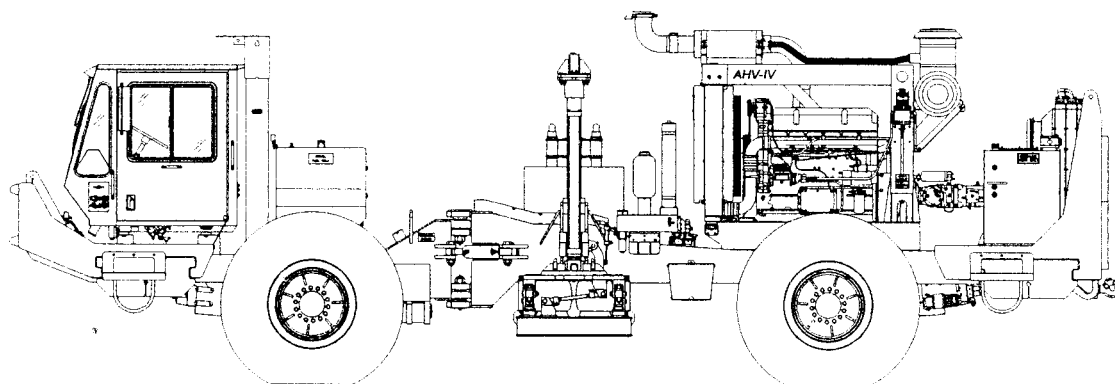
**VIBROSEIS EQUIPMENT**





**INPUT/OUTPUT, Inc.**

## **AHV-IV PLS-362 Powershift**





## Appendix A

# AHV-IV SPECIFICATIONS

These specifications cover the components, assemblies, and systems that comprise an AHV-IV Vibrator Buggy. Refer to the *Electronics Manual* for detailed specifications on the vibrator control electronics unit.

### A.1 Vibrator Specifications

- Mass model: PLS-362-A, P Wave.
- Mass weight: 8,120 lb (3,684 kg).
- Peak force: 61,800 lbf (275 kN).
- Piston area: 20.6 in<sup>2</sup> (132.9 cm<sup>2</sup>).
- Usable stroke: 3.87 in. (9.83 cm).
- Frequency range: 5 to 250 Hz.
- Displacement limit: 6.3 Hz.
- Mass balancing: Air Bag.
- Mass accumulators: Flow thru type, one liter each in servo valve supply and return ports.
- Stilt structure: Patented, tie rod type construction with inner and outer legs, hydraulically adjusted actuator preload and leg pre-stress.
- Baseplate dimensions: Approximately 7.2 x 42 x 92 in. (18.3 x 106.7 x 233.7 cm).
- Baseplate area: 3,876 in<sup>2</sup> (25,000 cm<sup>2</sup>).
- Baseplate construction: Fabricated, tube type.
- Driven structure weight: 4,020 lb (1,824 kg).
- Lift stroke: 38 in (86 cm).
- Lift cylinder: 4.0 in (10.2 cm) bore, 38 in (96.5 cm) stroke with cast iron piston rings.
- Lift actuation: Auxilliary manifold mounted solenoid operated cartridge valves for actuation, speed and down pressure control and adjustment.
- Lift synchronization: Flange mounted crossbeam.
- Servo valve: Atlas 240H, optional DR modification, Moog pilot stage valve.
- Vibrator pump: Dual Denison P7 series, 7.25 in<sup>3</sup> per revolution. Combined displacement rated at 168 gpm (636 lpm) at 2679 rpm.
- Hydraulic reservoir: Fabricated, 45 gal (170 l) capacity, for vibrator and drive systems.
- System accumulators: Parker 2.5 gal (9.5 l) high and low pressure. Top loading bladder style.
- Hydraulic oil filtration: Schroeder triple high and low filters for system circuits, Parker HP manifold mounted servo filter, 3 micron absolute.



- Hydraulic system pressure: 3,200 psi (218 bar) HP, 200 psi (14 bar) LP.
- Heat exchanger: Heavy duty 8 row steel core with forced air cooling. Hydraulic fan drive with crowley multi-wing fan. Hinged guard for cleaning.
- Vibrator isolation: Air Bags - 3 per side.

## A.2 Vehicle Specifications

- Buggy model: AHV-IV articulated and hydrostatically driven vibrator buggy.
- Axle: John Deere Model 1400 series planetary axle with wet disc brakes, 26.18:1 gear ratio and selectable differential lock.
- Air compressor: 12 cfm, water cooled.
- Air conditioning: Dash mounted AC, engine mounted condenser with engine driven compressor. Charged with HFC 134A refrigerant.
- Brakes, parking: Spring applied, hydraulic release, floating caliper disc brake, mounted on the front and rear drive transmission output.
- Brakes, service: Wet disc brakes enclosed in axle. Accumulator circuit provides power braking for over twenty (20) stops after engine has shut down.
- Cab: Fabricated steel construction insulated to minimize sound level, full dash instrumentation, adjustable driver's seat, combination passenger seat and tool box, heating and air conditioning, windshield wipers and dome light.
- Drivetrain: 6 speed powershift/automatic. Front and rear, Mechanics 7C driveshaft.
- Drive pumps: Sundstrand 90 series, 6.1 in<sup>3</sup> (100 cc) per revolution variable displacement.
- Drive motors: Sundstrand 90 series 6.1 in<sup>3</sup> (100 cc) per revolution fixed displacement.
- Drive system hydraulic pressure: 4250 psi (289 bar) maximum.
- Electrical: 12 V DC system with 12/24V 105A alternator and two 12 V heavy-duty batteries, 12 V engine ignition system, 24 V engine cranking system.
- Engine Model: Detroit Diesel 60 Series DDEC.
- Engine cooling: Water cooled, heavy duty radiator.
- Engine filtration: Full flow lube oil filter, primary fuel filter. Davco fuel filter/water separator. Donaldson 3 stage STG16, primary and secondary elements with exhaust aspirator.
- Frame: Fabricated, heavy duty front and rear frame assemblies, front and rear bumpers with tow hooks, 30 deg articulating and 16.5 deg oscillating center joint.
- Fuel Tank: Fabricated, 220 (832.79 l) capacity.
- Heat Exchanger Drive System: Heavy duty 8 row steel core with forced air cooling.
- Lighting: Front headlights, rear tail lights, turn directional signals, emergency flashers and brake lights, optional outside work lights.
- Pump drive: Terrell 2 pump, 1.41:1 speed up ratio.
- Road speed: 16 mph (26 kph) maximum.



- Seatbelts: 3 point, retractable for driver and passenger seat.
- Steering: Articulated, hydraulically powered steering, Char Lynn orbitrol steering control valve, 4 x 12-in (10 x 30 cm) steering cylinders.
- Transmission: Funk short drop 2163 series, 6 speed powershift.
- Transmission Gear Ratios:

## Power Shift

Gear Forward Reverse

1st	6.50	6.50
2nd	4.42	
3rd	3.68	3.68
4th	2.50	
5th	1.77	
6th	1.00	

- Tractive effort:

1st	1.51 MPH 98.50% Gradability
2nd	2.68 MPH 55.74% Gradability
3rd	3.68 MPH 42.48% Gradability
4th	6.21 MPH 24.03% Gradability
5th	8.77 MPH 17.01% Gradability
6th	16.0 MPH 09.23% Gradability
(Theoretical with no loss of traction)	

## A.3 Engine Specifications

- Model: Detroit Diesel Series 60.
- Type: Water-cooled, turbo charged and after-cooled, four-cycle diesel.
- Cylinders: In-Line Six, overhead cam.
- Displacement: 774 in.<sup>3</sup> (12.7 Liter).
- Horsepower: 450 bhp (335 kw) at 1,900 rpm.
- Weight: 2,670 lb (1211 kg).
- RPM (setup): 600 rpm idle, 1,900 maximum rpm.
- Fuel Consumption: 6 to 9 gal/hr (23 to 34 l/hr) depending on conditions.
- Torque: 1,244 ft lb @ 1,900 rpm.
- Air Cleaner: Donaldson 3-stage STG16, Primary and secondary elements with exhaust aspirator.
- User selectable— Audio/Visual warning only or full shutdown: Coolant temperature, Coolant Level, Oil Pressure, Oil Temperature, and Low Hydraulic Fluid. Lamp check on start-up.
- Fuel Filters: Davco Primary W/water separator and spin-on secondary.
- Engine Coolant: 50/50 Anti freeze & coolant inhibitor.



# **AHV4-PLS 362 VIBRATOR BUGGY**

## **W/FRAME ROLL-OVER-PROTECTION**

**UNITS 5954; 5955; 5956; 5957, 5958**

**DETROIT SERIES 60 DDEC ENGINE**

**JOHN DEERE 1400 SERIES AXLE W/DIF-LOCK**

**FUNK 6-SPEED POWER SHIFT TRANSMISSION**

**PELTON 240HD SERVO VALVE W/DR MODIFICATION**

**FIRESTONE 66X44X25-16PLY TIRES W/CUSTOM WHEELS**

**GREER 5 GALLON ACCUMULATORS**

**R134A-AIR CONDITIONING.**

**REAR FENDERS**

**30,000 LB. WINCH**

**GROSS VEHICLE WEIGHT: 67,100LB.**

**FRONT AXLE WEIGHT: 33,240LB.**

**REAR AXLE WEIGHT: 33,860LB.**

**HOLD DOWN WEIGHT: 60,000LB. @ 2,150PSI**

**MASS WEIGHT: 8,120LB.**

**BASEPLATE WEIGHT: 4,020LB.**

**OUTPUT: 61,800LB.**

**(38) SLIDE ON WEIGHTS W/WINCH**

**(18) REAR SLIDE ON WEIGHTS**



**INPUT/OUTPUT, INC.**



## AHV4-PLS 362 VIBRATOR BUGGY ADDITIONAL DIMENSIONS

WIDTH:	66 X 44 X 25 FIRESTONE FLOTATION TIRES
HEIGHT AT CAB	118 INCHES
HEIGHT AT ROLL BAR (ROPS)	129 INCHES
HIEGHT AT CROSSBEAM	123 INCHES
HEIGHT AT EXHAUST	134 INCHES
WHEELBASE	172 INCHES
GROUND CLEARANCE	18 INCHES

TURN RADIUS APPROXIMATE  
INSIDE 195 INCHES  
OUTSIDE 350 INCHES



## **EXHIBIT 8**

### **FIELD TESTING OF VIBROSEIS BUGGY**



**NOBLES GRADE 3D SEISMIC SURVEY  
FIELD TESTING OF VIBROSEIS BUGGY**

**September 2014**



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Exhibit H. Initial Field Testing Photographs (December 6, 2013).....	H-1
Exhibit I. Follow-Up Site Review Photographs (June 6, 2014).....	I-1
Exhibit J. CD with Field Testing Video .....	J-1



## **1.0 INTRODUCTION**

This report documents the field testing of an Input/Output, Inc. AHV-IV PLS-362 Powershift Vibroseis Buggy (Vibroseis Buggy) proposed to be utilized to conduct the Nobles Grade 3-D (NG3-D) seismic exploration survey (Project) within the Big Cypress National Preserve and Addition Lands (Preserve). Field testing of this equipment was conducted on December 6, 2013 on privately owned lands located approximately seven miles from the Preserve (Exhibit A).

The field testing was performed by the seismic contractor, Dawson Geophysical, in conjunction with the Applicant, Burnett Oil Company, Inc. (BOCI). A follow-up site review was conducted by Passarella & Associates, Inc. (PAI) on June 6, 2014 to qualitatively document the conditions of the testing areas six months after the testing occurred. This report documents the results of both the initial field testing and subsequent site review.

## **2.0 DESCRIPTION OF EQUIPMENT**

Vibroseis Buggies are proposed to be utilized to obtain seismic data for the Project, rather than other industry approved survey methodologies using dynamite which have historically been used in the Preserve. Vibroseis Buggies generate seismic acoustic signals by using a hydraulically lowered steel plate that vibrates the earth through a range of pre-planned and electronically-controlled frequencies. As stated above, the Vibroseis Buggy proposed to be used is an Input/Output, Inc. AHV-IV PLS-362 Powershift Vibroseis Buggy. The specifications for this equipment are attached as Exhibit B.

Vibroseis Buggies have diesel powered engines mounted in the rear and a vibrating pad in the center that lowers and propagates sound waves into the ground. The cab contains sophisticated electronics that generate precise frequencies for sound wave generation and Global Positioning System (GPS) precision navigation and mapping systems for effectively moving through a survey area. Vibroseis technology requires fewer survey stakes for cab navigation, and also allows for easier cleanup. Vibroseis Buggies are articulated, providing short-radius turn maneuverability. A “hinge” in the middle of the vehicle between the cab and engines provides the articulating characteristic. This articulation allows the equipment to weave between tight areas and avoid or minimize potential vegetative impacts. A photograph of a Vibroseis Buggy with these features labeled is provided as Exhibit C.

The Vibroseis Buggy used for the field test was equipped with oversized balloon/flotation tires (Exhibit C). The wide, smooth treaded tires are designed to displace the weight of the buggy which allows it to move through sensitive areas with minimum impact (or footprint). According to Dawson Geophysical, these Vibroseis Buggies have been successfully used in and over other sensitive habitats and terrain with little to no impact. It is noted on Page 54 of the United States Department of the Interior-National Park Service (USDOI-NPS) Big Cypress National Preserve (BCNP) 2006 Operators



Handbook (Exhibit D) that vehicles with large tires that distribute the vehicle's weight may be appropriate for transporting personnel and equipment along survey lines. The second photograph displayed on Exhibit D shows that although the exposed blades of grass were initially damaged by a vehicle with large tires, the root systems and soil structures were not disturbed. The last photograph in Exhibit D shows that soon after the survey was complete, the grass was growing again without the need for active reclamation.

### **3.0 FIELD TESTING SITE**

A portion of the Collier Ranch located in Sections 30 and 31, Township 47 South, Range 31 East, Hendry County was used to conduct the field testing of the Vibroseis Buggy. The field testing site is located just off of Highway 839 (County Line Road) approximately seven miles north of the Preserve (Exhibit A). The property was selected based on its proximity to the Preserve, and because it contains habitats and soils similar to those that can be found within portions of the Preserve.

The field testing took place in two different areas: one being an upland pasture and the other a wetland habitat (Exhibit E). The testing took place in the dry season to mirror the time of year that Project field operations will be conducted. Dry season operations minimize potential impacts to wetland habitats by avoiding/minimizing rutting and soil compaction resulting from the movement of equipment across saturated or inundated soils.

A map depicting the National Resources Conservation Service (NRCS) (formerly the Soil Conservation Service) soils survey for the field testing site is provided as Exhibit F. This data was originally created in 1990. Descriptions of the soil types within the field testing site based on the 1990 data are included as Exhibit G.

### **4.0 FIELD TESTING OBJECTIVES**

The purpose of the field testing was to simulate the proposed vibroseis operations in an environment similar to the conditions of the Preserve, as well as document conditions of the testing areas six months after the testing occurred. The following provides a description of the field testing objectives:

- 1) *Display Vibroseis Process*: provide a visual representation and timed example of the proposed Vibroseis Buggy operation;
- 2) *Determine Potential Surface Impacts*: determine potential impacts to vegetation and soil in both upland and wetland habitats found in Southwest Florida;
- 3) *Determine Vibration Perceptibility*: determine potential detection and perceptibility of a pad vibration (or sweep);



- 4) *Assess Equipment Maneuverability*: assess the maneuverability of the equipment between canopy and sub-canopy vegetation; and
- 5) *Document Conditions Following Test*: document environmental conditions six months following the test to determine if the testing areas had recovered.

## 5.0 METHODOLOGY

The field testing was performed on December 6, 2013 by the seismic contractor, Dawson Geophysical, in conjunction with the Applicant, BOCI. Several other parties were in attendance including representatives from PAI, Collier Resource Company, Duncan Oil and Gas Consulting, Florida Wildlife Federation (Nancy Payton), and the Florida Department of Environmental Protection (FDEP) (Timothy Schwan and Michael LeBlanc). Representatives from the USDOJ-NPS BCNP, U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (COE), and several other non-governmental organizations were invited but did not attend.

The field testing of the Vibroseis Buggy employed a “one pass” design which is consistent with what is proposed for the Project’s seismic survey. A typical transect was established in both an upland and a wetland habitat (Exhibit E). A single “sweep” was conducted at 82.5± foot intervals along the transect which mimics the proposed survey methodology. The initial field testing process consisted of the following:

- Approached a “source” point;
- Stopped and hydraulically lowered the vibration pad;
- Sweep occurred for roughly 16 to 24 seconds;
- The vibration pad was retracted;
- Buggy departed to the next “source” point; and
- Repeated the above steps at the next “source” point.

Visual observations (including photographs and videos) of the vibroseis process, as well as impacts to vegetation and soils were made. Particular attention was made to the Vibroseis pad locations after a “sweep.” Audible and physical observations were also made in regards to the actual pad vibration.

Following the initial Vibroseis Buggy field test described above, the equipment was driven into a forested area to assess the dexterity of the equipment. The Vibroseis Buggy drove between trees and shrubs spaced at varying distances to display the equipment’s articulation feature. Visual observations (including photographs and videos) of the articulation feature were also made.

A follow-up site review was conducted by PAI on June 6, 2014 to qualitatively document the conditions of the Vibroseis Buggy testing areas six months after the testing occurred. The site review also consisted of visual observations and associated photographs.



## **6.0 RESULTS**

Photographs taken during the initial field testing conducted on December 6, 2013 are depicted in Exhibit H. Photographs taken during the follow-up site review conducted on June 6, 2014 are depicted in Exhibit I. The short video clip of the initial field testing is provided on a Compact Disc (CD) provided as Exhibit J. Summaries of the field testing observations by objective are provided below.

### **6.1 Vibroseis Process**

The attendees observed the mechanics of the machine as it approached a “source” point; stopped and hydraulically lowered the vibration pad (which put the weight of the buggy on the pad insuring acoustical coupling to the ground); sweep (vibrated) for roughly 16 to 24 seconds; retracted the vibration pad (which transferred the weight back to the oversized tires); departed to the next “source” point; and repeated at next “source” point. Attendees were impressed with the equipment and the ease and timeliness of its function. Please refer to the video clip of the initial field testing provided on a CD as Exhibit J to view the Vibroseis process.

### **6.2 Surface Impacts**

Visible surface impacts to vegetation and soils were minimal, and in some cases undetectable. The oversized “balloon” tires spread the weight of the equipment over the tire footprint which reduced the pressure on vegetation and soils beneath them. The oversized tires did push over/matt down vegetation as they passed; however, the root systems were left in place and were not dislodged from the ground. Soil rutting and compaction did not occur along the tire track areas. In addition, the pad impression areas displayed similar characteristics. The following provides additional information on surface impacts within the upland versus wetland habitats.

#### **6.2.1 Upland Pasture**

The upland pasture test area was dominated by bahiagrass (*Paspalum notatum*). The ground was completely dry. Almost no evidence of impact to vegetation or soils occurred. The bahiagrass was bent in the direction of the tire tracks, but the grass blades were not broken. Also, no soil rutting or compaction was evident. The area where the vibrating pad made contact with the ground exhibited similar characteristics. Please refer to Exhibits H and J for documentation of the very minimal impacts.

#### **6.2.2 Wetland Habitat**

The wetland test area was conducted in a wet prairie/freshwater marsh habitat dominated by various wetland grasses, sedges, and rushes. The ground surface was saturated. This area also exhibited minimal evidence of impact to vegetation or soils. The tire tracks and pad impression were slightly more evident in the wetland than the upland, mostly due to



the height of the grasses in this area. Please refer to Exhibits H and J for documentation of the minimal impacts.

### **6.3 Vibration Perceptibility**

Although no measurements of vibration were taken during the field test, individuals standing near the buggy could feel slight vibrations during the 16 to 24 second sweep (vibrating period). Generally, the most perceptible vibrations occurred immediately after commencement of the sweep. Vibrations perceived between 250 and 300 feet from the buggy during the vibration period seemed to be substantially less pronounced. This implicated that buggy induced vibrations should be nearly, if not fully, attenuated at a distance of approximately 600 feet (or two football fields). Witnesses of the Vibroseis Buggy testing who had previously experienced dynamite generated seismic signal demonstrations commented that the buggy induced vibration levels were less perceptible than those produced by detonation of buried explosive energy source charges.

### **6.4 Equipment Maneuverability**

Several simulations of the Vibroseis Buggy's ability to perform tight-radius turns were successfully made. The articulation feature on the Vibroseis Buggy resulted in high maneuverability of the equipment between canopy and sub-canopy vegetation. The equipment was able to move between trees and shrubs spaced at varying distances. Documentation of the equipment maneuverability between two closely spaced trees is included in Exhibits H and J.

### **6.5 Follow-Up Site Review**

A follow-up site visit was conducted by PAI on June 6, 2014 to review the condition of the testing areas six months after the testing occurred. The areas were assessed in comparison to their appearance both before and immediately after the test. In general, the test areas had completely restored in the upland pasture and had almost recovered in the wetland habitat. While tire tracks of matted vegetation were still somewhat visible in the wetland area, movements of the vibroseis vehicles in the upland areas were indiscernible and could not be verified in the field. Photographs of the test areas six months after the testing occurred are provided as Exhibit I.

## **7.0 DISCUSSION**

The initial field testing of the Vibroseis Buggy successfully exhibited the vibration process, determined potential surface impacts and vibration perceptibility, and assessed the maneuverability of the equipment in habitats and soils similar to those that can be found within portions of the Preserve.

Feedback received from parties attending the demonstration was very positive. Attendees agreed that the field test: 1) was impressive and the process was faster than imagined; 2)



resulted in minimal impacts that were at times difficult to distinguish from the surrounding landscape; 3) was quieter and less of a vibration was felt than anticipated; and 4) displayed the Vibroseis Buggy's ability to perform tight-radius turns between trees and shrubs.

The follow-up site review qualitatively documented that the test areas had completely restored in the upland pasture and had almost recovered in the wetland habitat. Full restoration is anticipated within the wetland area by the end of the 2014 growing season.

The following provides a summary of the environmental benefits of the Vibroseis Buggy:

- Non-explosive seismic signal source technology eliminates the need for drilling and the setting and detonation of explosive charges to create a seismic signal.
- The low ground tire pressure distributes the weight of the vehicle to avoid soil rutting and/or compaction.
- Low impact balloon/flotation tires allow vegetation to simply fold over and avoid/minimize potential root disturbance.
- The equipment is highly maneuverable and capable of moving between trees and shrubs without breaking or damaging them.
- Vibroseis technology allows for easy cleanup by requiring fewer survey stakes for navigation.



**EXHIBIT A**

**VIBROSEIS FIELD TESTING SITE**  
**LOCATION MAP**



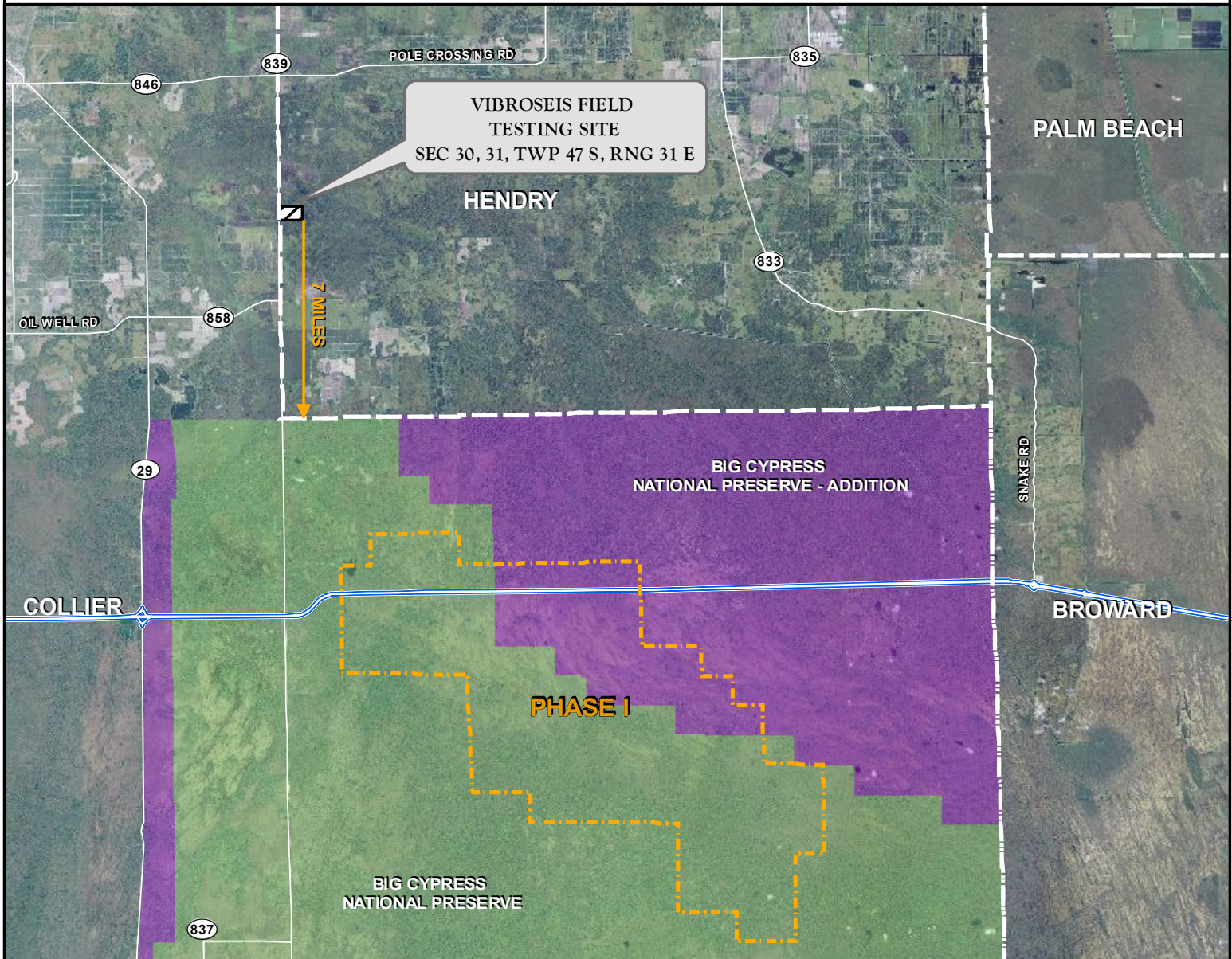
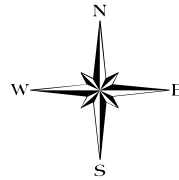
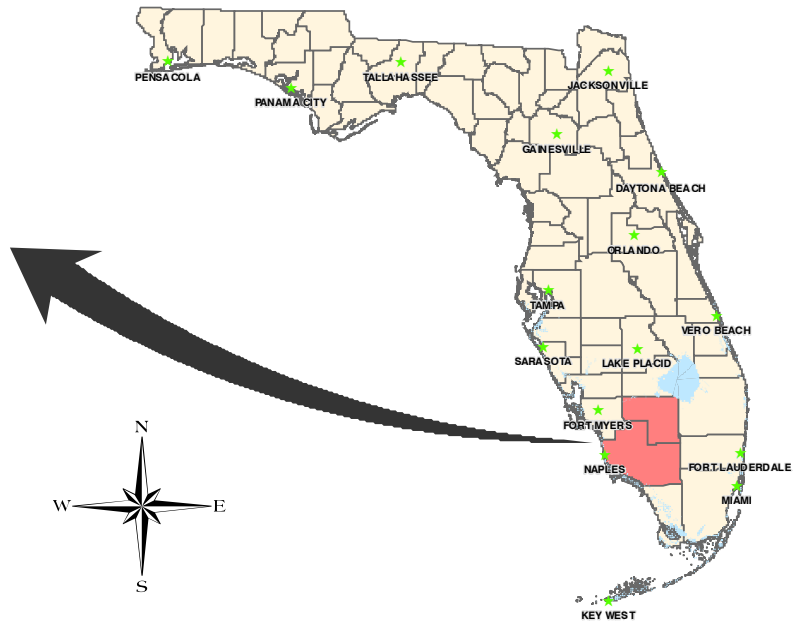
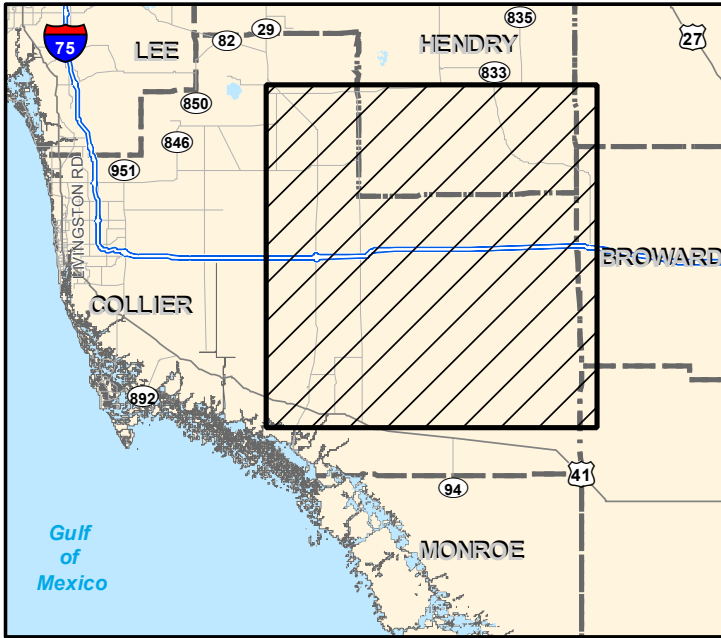


EXHIBIT A. VIBROSEIS FIELD TESTING SITE  
LOCATION MAP  
NOBLES GRADE 3-D

DRAWN BY	DATE
F.L.	6/17/14
REVIEWED BY	DATE
K.C.P.	6/17/14
REVISED	DATE





**EXHIBIT B**

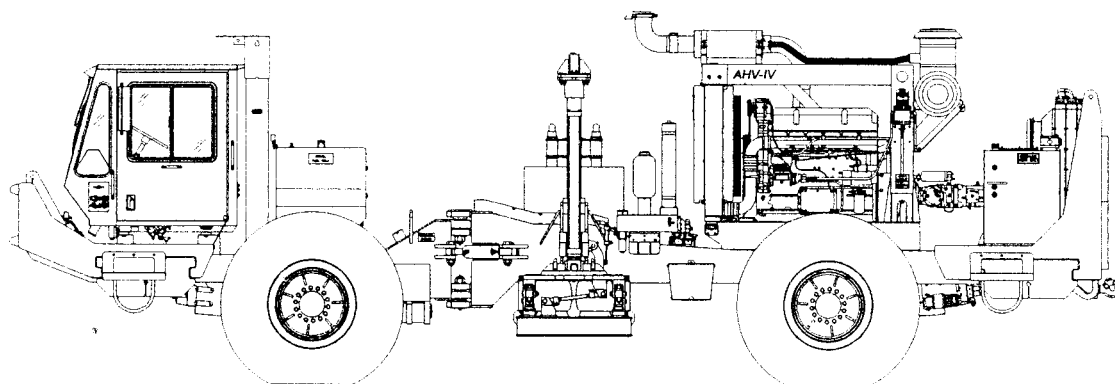
**INPUT/OUTPUT, INC. AHV-IV PLS-362 POWERSHIFT  
VIBROSEIS BUGGY SPECIFICATIONS**





**INPUT/OUTPUT, Inc.**

## **AHV-IV PLS-362 Powershift**





## Appendix A

# AHV-IV SPECIFICATIONS

These specifications cover the components, assemblies, and systems that comprise an AHV-IV Vibrator Buggy. Refer to the *Electronics Manual* for detailed specifications on the vibrator control electronics unit.

### A.1 Vibrator Specifications

- Mass model: PLS-362-A, P Wave.
- Mass weight: 8,120 lb (3,684 kg).
- Peak force: 61,800 lbf (275 kN).
- Piston area: 20.6 in<sup>2</sup> (132.9 cm<sup>2</sup>).
- Usable stroke: 3.87 in. (9.83 cm).
- Frequency range: 5 to 250 Hz.
- Displacement limit: 6.3 Hz.
- Mass balancing: Air Bag.
- Mass accumulators: Flow thru type, one liter each in servo valve supply and return ports.
- Stilt structure: Patented, tie rod type construction with inner and outer legs, hydraulically adjusted actuator preload and leg pre-stress.
- Baseplate dimensions: Approximately 7.2 x 42 x 92 in. (18.3 x 106.7 x 233.7 cm).
- Baseplate area: 3,876 in<sup>2</sup> (25,000 cm<sup>2</sup>).
- Baseplate construction: Fabricated, tube type.
- Driven structure weight: 4,020 lb (1,824 kg).
- Lift stroke: 38 in (86 cm).
- Lift cylinder: 4.0 in (10.2 cm) bore, 38 in (96.5 cm) stroke with cast iron piston rings.
- Lift actuation: Auxilliary manifold mounted solenoid operated cartridge valves for actuation, speed and down pressure control and adjustment.
- Lift synchronization: Flange mounted crossbeam.
- Servo valve: Atlas 240H, optional DR modification, Moog pilot stage valve.
- Vibrator pump: Dual Denison P7 series, 7.25 in<sup>3</sup> per revolution. Combined displacement rated at 168 gpm (636 lpm) at 2679 rpm.
- Hydraulic reservoir: Fabricated, 45 gal (170 l) capacity, for vibrator and drive systems.
- System accumulators: Parker 2.5 gal (9.5 l) high and low pressure. Top loading bladder style.
- Hydraulic oil filtration: Schroeder triple high and low filters for system circuits, Parker HP manifold mounted servo filter, 3 micron absolute.



- Hydraulic system pressure: 3,200 psi (218 bar) HP, 200 psi (14 bar) LP.
- Heat exchanger: Heavy duty 8 row steel core with forced air cooling. Hydraulic fan drive with crowley multi-wing fan. Hinged guard for cleaning.
- Vibrator isolation: Air Bags - 3 per side.

## A.2 Vehicle Specifications

- Buggy model: AHV-IV articulated and hydrostatically driven vibrator buggy.
- Axle: John Deere Model 1400 series planetary axle with wet disc brakes, 26.18:1 gear ratio and selectable differential lock.
- Air compressor: 12 cfm, water cooled.
- Air conditioning: Dash mounted AC, engine mounted condenser with engine driven compressor. Charged with HFC 134A refrigerant.
- Brakes, parking: Spring applied, hydraulic release, floating caliper disc brake, mounted on the front and rear drive transmission output.
- Brakes, service: Wet disc brakes enclosed in axle. Accumulator circuit provides power braking for over twenty (20) stops after engine has shut down.
- Cab: Fabricated steel construction insulated to minimize sound level, full dash instrumentation, adjustable driver's seat, combination passenger seat and tool box, heating and air conditioning, windshield wipers and dome light.
- Drivetrain: 6 speed powershift/automatic. Front and rear, Mechanics 7C driveshaft.
- Drive pumps: Sundstrand 90 series, 6.1 in<sup>3</sup> (100 cc) per revolution variable displacement.
- Drive motors: Sundstrand 90 series 6.1 in<sup>3</sup> (100 cc) per revolution fixed displacement.
- Drive system hydraulic pressure: 4250 psi (289 bar) maximum.
- Electrical: 12 V DC system with 12/24V 105A alternator and two 12 V heavy-duty batteries, 12 V engine ignition system, 24 V engine cranking system.
- Engine Model: Detroit Diesel 60 Series DDEC.
- Engine cooling: Water cooled, heavy duty radiator.
- Engine filtration: Full flow lube oil filter, primary fuel filter. Davco fuel filter/water separator. Donaldson 3 stage STG16, primary and secondary elements with exhaust aspirator.
- Frame: Fabricated, heavy duty front and rear frame assemblies, front and rear bumpers with tow hooks, 30 deg articulating and 16.5 deg oscillating center joint.
- Fuel Tank: Fabricated, 220 (832.79 l) capacity.
- Heat Exchanger Drive System: Heavy duty 8 row steel core with forced air cooling.
- Lighting: Front headlights, rear tail lights, turn directional signals, emergency flashers and brake lights, optional outside work lights.
- Pump drive: Terrell 2 pump, 1.41:1 speed up ratio.
- Road speed: 16 mph (26 kph) maximum.



- Seatbelts: 3 point, retractable for driver and passenger seat.
- Steering: Articulated, hydraulically powered steering, Char Lynn orbitrol steering control valve, 4 x 12-in (10 x 30 cm) steering cylinders.
- Transmission: Funk short drop 2163 series, 6 speed powershift.
- Transmission Gear Ratios:

## Power Shift

Gear Forward Reverse

1st	6.50	6.50
2nd	4.42	
3rd	3.68	3.68
4th	2.50	
5th	1.77	
6th	1.00	

- Tractive effort:

1st	1.51 MPH 98.50% Gradability
2nd	2.68 MPH 55.74% Gradability
3rd	3.68 MPH 42.48% Gradability
4th	6.21 MPH 24.03% Gradability
5th	8.77 MPH 17.01% Gradability
6th	16.0 MPH 09.23% Gradability
(Theoretical with no loss of traction)	

## A.3 Engine Specifications

- Model: Detroit Diesel Series 60.
- Type: Water-cooled, turbo charged and after-cooled, four-cycle diesel.
- Cylinders: In-Line Six, overhead cam.
- Displacement: 774 in.<sup>3</sup> (12.7 Liter).
- Horsepower: 450 bhp (335 kw) at 1,900 rpm.
- Weight: 2,670 lb (1211 kg).
- RPM (setup): 600 rpm idle, 1,900 maximum rpm.
- Fuel Consumption: 6 to 9 gal/hr (23 to 34 l/hr) depending on conditions.
- Torque: 1,244 ft lb @ 1,900 rpm.
- Air Cleaner: Donaldson 3-stage STG16, Primary and secondary elements with exhaust aspirator.
- User selectable— Audio/Visual warning only or full shutdown: Coolant temperature, Coolant Level, Oil Pressure, Oil Temperature, and Low Hydraulic Fluid. Lamp check on start-up.
- Fuel Filters: Davco Primary W/water separator and spin-on secondary.
- Engine Coolant: 50/50 Anti freeze & coolant inhibitor.



# **AHV4-PLS 362 VIBRATOR BUGGY**

## **W/FRAME ROLL-OVER-PROTECTION**

**UNITS 5954; 5955; 5956; 5957, 5958**

**DETROIT SERIES 60 DDEC ENGINE**

**JOHN DEERE 1400 SERIES AXLE W/DIF-LOCK**

**FUNK 6-SPEED POWER SHIFT TRANSMISSION**

**PELTON 240HD SERVO VALVE W/DR MODIFICATION**

**FIRESTONE 66X44X25-16PLY TIRES W/CUSTOM WHEELS**

**GREER 5 GALLON ACCUMULATORS**

**R134A-AIR CONDITIONING.**

**REAR FENDERS**

**30,000 LB. WINCH**

**GROSS VEHICLE WEIGHT: 67,100LB.**

**FRONT AXLE WEIGHT: 33,240LB.**

**REAR AXLE WEIGHT: 33,860LB.**

**HOLD DOWN WEIGHT: 60,000LB. @ 2,150PSI**

**MASS WEIGHT: 8,120LB.**

**BASEPLATE WEIGHT: 4,020LB.**

**OUTPUT: 61,800LB.**

**(38) SLIDE ON WEIGHTS W/WINCH**

**(18) REAR SLIDE ON WEIGHTS**



**INPUT/OUTPUT, INC.**



## AHV4-PLS 362 VIBRATOR BUGGY ADDITIONAL DIMENSIONS

WIDTH:	66 X 44 X 25 FIRESTONE FLOTATION TIRES
HEIGHT AT CAB	118 INCHES
HEIGHT AT ROLL BAR (ROPS)	129 INCHES
HIEGHT AT CROSSBEAM	123 INCHES
HEIGHT AT EXHAUST	134 INCHES
WHEELBASE	172 INCHES
GROUND CLEARANCE	18 INCHES

TURN RADIUS APPROXIMATE  
INSIDE 195 INCHES  
OUTSIDE 350 INCHES



**EXHIBIT C**

**PHOTOGRAPH OF VIBROSEIS BUGGY  
WITH FEATURES LABELED**



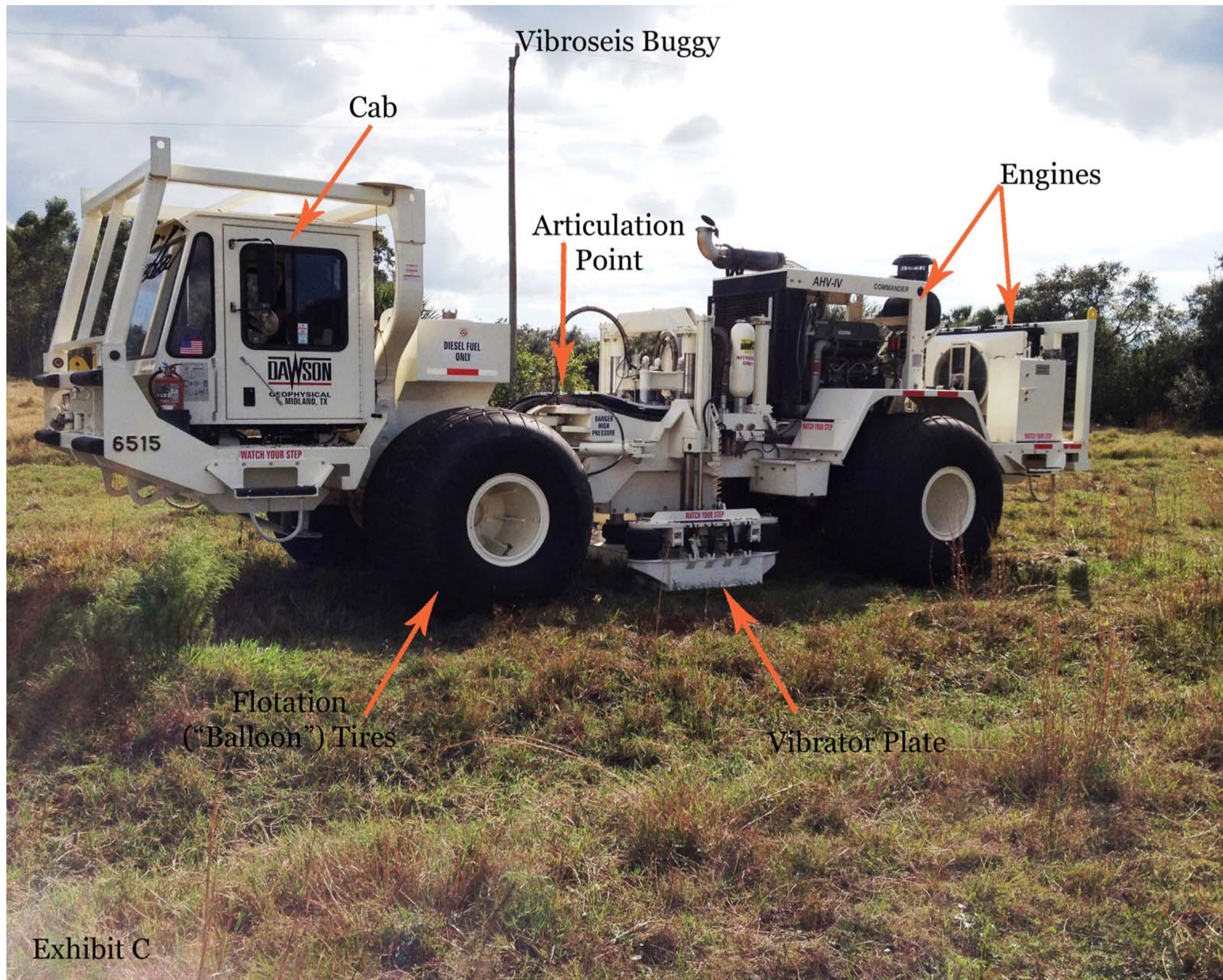


Exhibit C



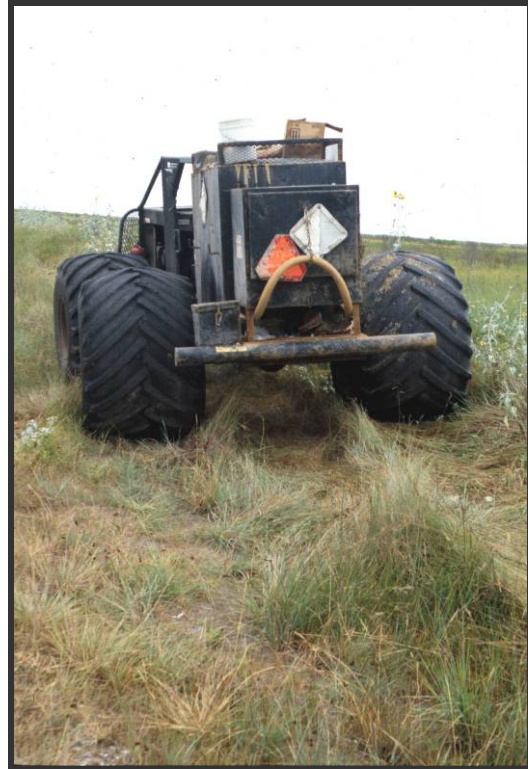
**EXHIBIT D**

**PAGE 54 OF USDOJ-NPS 2006 OPERATORS HANDBOOK**



**Avoid damage to the soil and root structure and eliminate costly reclamation projects.**

Use of vehicles with large “terra-tires” is another method used to distribute a vehicle’s weight, like on this water truck. ATV’s are designed with this principle, and may be appropriate for transporting personnel and equipment along survey lines.



Though the exposed blades of grass are damaged by the vehicle, the root systems and soil structure are not.



Soon after the survey is complete, the grass is growing again without the need for the company to perform any type of active reclamation.

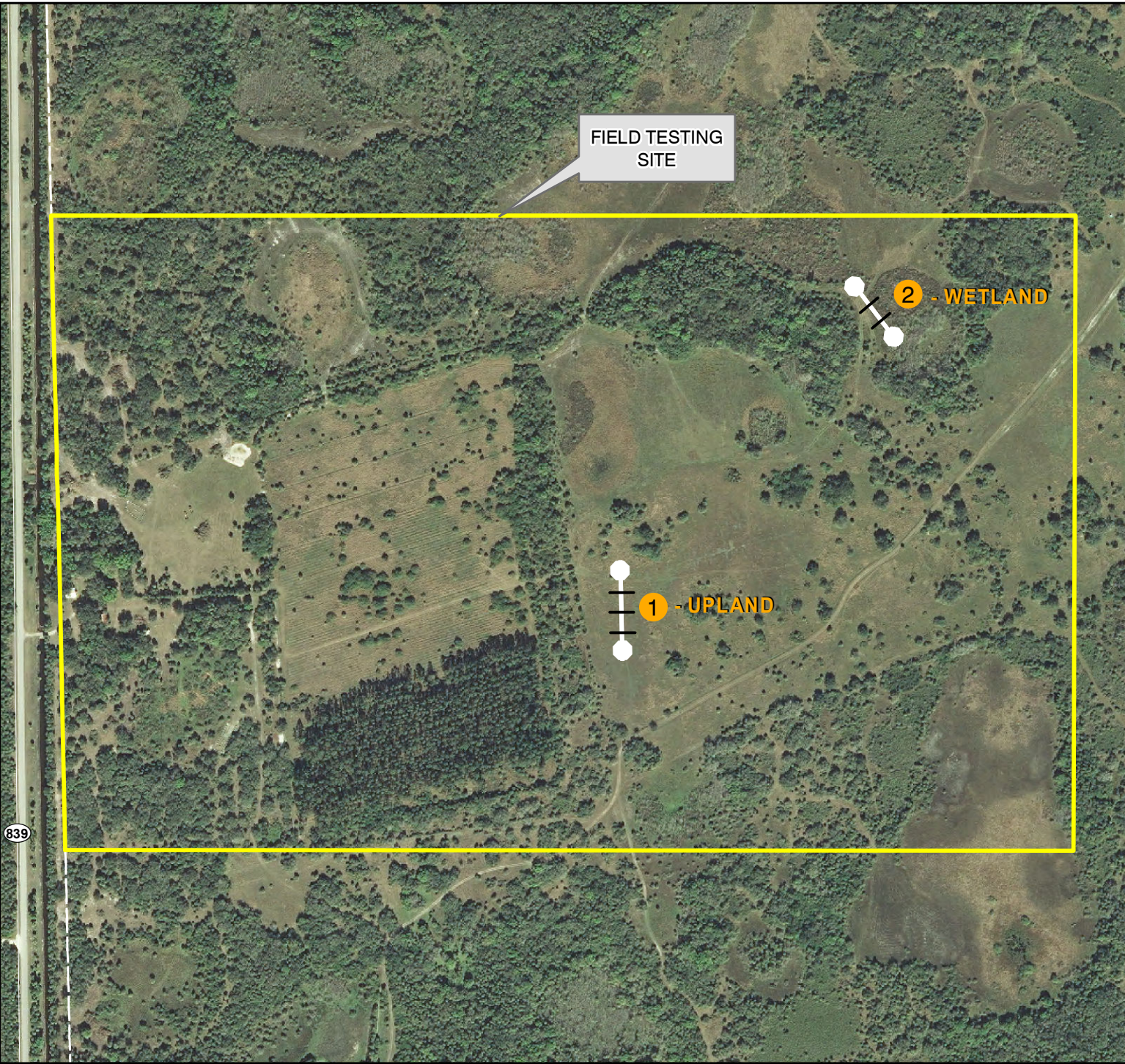


**EXHIBIT E**


**VIBROSEIS FIELD TESTING MAP  
WITH TRANSECTS AND SWEEP LOCATIONS**





J:\2013\1380c207\GIS\2013\PLAN OF OPERATIONS\FIGURES\DEMONSTRATION SITE\EXHIBIT E DEMO LOCATION MAP 7-17-14.MXD - 7/29/2014 @ 3:27:05 PM





**LEGEND**

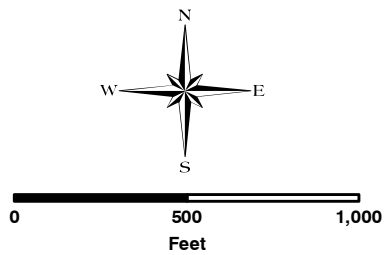
 FIELD TESTING SITE

 VIBROSEIS TESTING LOCATION - UPLAND

 VIBROSEIS TESTING LOCATION - WETLAND

 TESTING TRANSECT

 SWEEP LOCATIONS



NOTES:  
AERIAL PHOTOGRAPHS FOR COLLIER COUNTY  
WERE ACQUIRED FROM THE COLLIER COUNTY  
PROPERTY APPRAISER'S OFFICE WITH A FLIGHT  
DATE OF JANUARY 2014.

EXHIBIT E. VIBROSEIS FIELD TESTING MAP WITH  
TRANSECT AND SWEEP LOCATIONS  
NOBLES GRADE 3-D

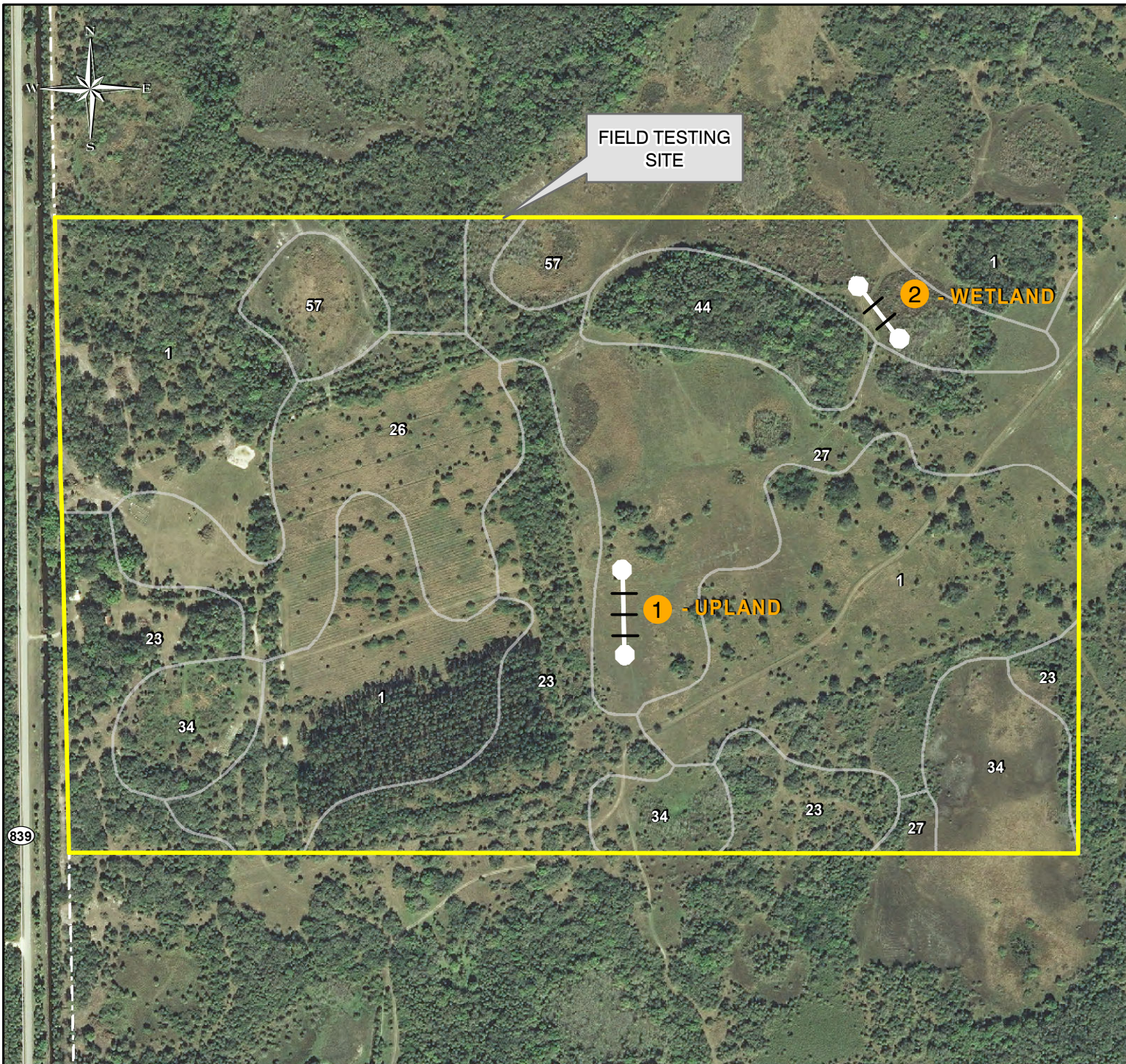
DRAWN BY	DATE
F.L.	6/17/14
REVIEWED BY	DATE
K.C.P.	6/17/14
REVISED	DATE





**EXHIBIT F**  
**VIBROSEIS FIELD TESTING SOILS MAP**





# LEGEND

- FIELD TESTING SITE
- VIBROSEIS TESTING LOCATION - UPLAND
- VIBROSEIS TESTING LOCATION - WETLAND
- TESTING TRANSECT
- SWEEP LOCATIONS

Soil Unit	Description
1	BOCA SAND
23	HALLANDALE SAND
26	HOLOPAW SAND, LIMESTONE SUBSTRATUM
27	RIVIERA SAND, LIMESTONE SUBSTRATUM
34	CHOBEE FINE SANDY LOAM, LIMESTONE SUBSTRATUM, DEPRESSIONAL
44	JUPITER FINE SAND
57	CHOBEE FINE SANDY LOAM, DEPRESSIONAL

0 500 1,000  
Feet

## NOTES:

AERIAL PHOTOGRAPHS FOR COLLIER COUNTY WERE ACQUIRED FROM THE COLLIER COUNTY PROPERTY APPRAISER'S OFFICE WITH A FLIGHT DATE OF JANUARY 2014.

SOILS MAPPING WAS ACQUIRED FROM THE FLORIDA GEOGRAPHIC DATA LIBRARY WEBSITE OCTOBER 2007 AND CREATED BY THE NATURAL RESOURCES CONSERVATION SERVICE 1990.

## EXHIBIT F. VIBROSEIS FIELD TESTING SOILS MAP NOBLES GRADE 3-D

DRAWN BY	DATE
F.L.	6/17/14
REVIEWED BY	DATE
K.C.P.	6/17/14
REVISED	DATE



**PASSARELLA**  
& ASSOCIATES INC.



**EXHIBIT G**  
**SOILS DESCRIPTIONS**



## SOIL DESCRIPTIONS

### 1 – Boca Sand

This poorly drained soil is on broad flatwoods, mainly near the edge of ponds and sloughs. Areas of this soil are irregular in shape and range from 5 to 400 acres. Slopes are less than 2 percent. Typically, this soil has a sand surface layer about 7 inches thick. It is very dark gray in the upper part and gray in the lower part. The subsurface layer to a depth of about 27 inches is light gray fine sand. The subsoil is dark grayish brown fine sand to a depth of about 28 inches and brown fine sandy loam to a depth of about 33 inches. It is underlain by limestone that is discontinuous and that has many fractures and solution basins. Under natural conditions, this Boca soil has a high water table within 10 inches of the surface for 2 to 4 months in most years. Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The organic matter content and natural fertility are low. The available water capacity is low in the surface layer, very low in the subsurface layer, and moderate in the subsoil.

### 23 – Hallandale Sand

This poorly drained soil is on flatwoods. Areas of this soil are irregular or elongated in shape and range from 5 to 50 acres. Slopes are less than 2 percent. Typically, this soil has a dark gray sand surface layer about 4 inches thick. The underlying material to a depth of about 16 inches is brown sand. It is underlain by hard, fractured limestone that has many solution basins. Under natural conditions, this Hallandale soil has a high water table within 10 inches of the surface for 6 months in most years. The root zone is restricted by the shallow depth to bedrock and the seasonal high water table. The available water capacity is low. Permeability is moderate or moderately rapid. The organic matter content and natural fertility are low.

### 26 – Holopaw Sand, Limestone Substratum

This poorly drained soil is on broad, low flats and in poorly defined drainage ways. Areas of this soil are irregular in shape and range from 5 to more than 500 acres. Slopes are less than 2 percent. Typically, this soil has a dark grayish brown sand surface layer about 6 inches thick. The subsurface layer to a depth of about 40 inches is sand. It is brown in the upper part, pale brown in the next part, and light gray in the lower part. The subsoil to a depth of about 45 inches is brown sand, and to a depth of about 60 inches, it is gray sandy loam that has calcium carbonates. The subsoil is underlain by fractured limestone. Under natural conditions, this Holopaw soil has a high water table within 10 inches of the surface for 2 to 6 months in most years. Permeability is rapid in the surface and subsurface layers and moderate or moderately slow in the subsoil. The available water capacity is low in the surface and subsurface layers and moderate or high in the subsoil. The organic matter content and natural fertility are low.

### 27 – Riviera Sand, Limestone Substratum

This poorly drained soil is in sloughs and on broad flatwoods. Areas of this soil are irregular in shape and range from about 5 to more than 500 acres. Slopes are less than 2 percent. Typically, this soil has a black sand surface layer about 5 inches thick. The subsurface layer to a depth of about 35 inches is light brownish gray sand. The subsoil to a depth of about 50 inches is olive gray sandy loam. It is underlain by fractured limestone. Under natural conditions, this Riviera soil has a high water table within 10 inches of the surface for 2 to 4 months during most years.



and at a depth of 10 to 30 inches for most of the remainder of the year. Following periods of prolonged, heavy rainfall, the water table in most areas rises above the surface for a week or more and sheet flow occurs. Permeability is rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is low in the surface and subsurface layers and moderate in the subsoil.

#### 44 – Jupiter Fine Sand

This poorly drained soil is in hammocks and on low flats that border sloughs and marshes. Areas of this soil are irregular in shape and range from 5 to 50 acres. Slopes are less than 1 percent. Typically, this soil has a fine sand surface layer about 6 inches thick. It is black in the upper part and very dark grayish brown in the lower part. This layer is underlain by fractured limestone that contains numerous crevices and solution basins. Under natural conditions, this Jupiter soil has a high water table within 10 inches of the surface for 2 to 4 months during most years and at a depth of 10 to 40 inches during dry periods. Permeability is rapid above the bedrock. The limestone has sufficient fractures and solution basins to permit water movement. The available water capacity is low or moderate. The organic matter content is moderate, and natural fertility is medium.

#### 57 – Chobee Fine Sandy Loam, Depressional

This very poorly drained soil is in marshes, swamps, and depressions. Areas of this soil are elongated or oval and range from 5 to 100 acres or more. The surface is concave, and slopes are less than 2 percent. Typically, this soil has a black fine sandy loam surface layer about 9 inches thick. The subsoil extends to a depth of about 68 inches. It is gray fine sandy loam in the upper part and light gray sandy clay loam in the lower part. The substratum to a depth of 80 inches is light gray fine sandy loam. This Chobee soil has a high water table within 10 inches of the surface for 3 to 6 months in most years and is ponded for about 6 months in most years. Permeability is moderately rapid in the surface layer, slow in the subsoil, and moderately slow in the substratum. The available water capacity is moderate. Natural fertility is medium.

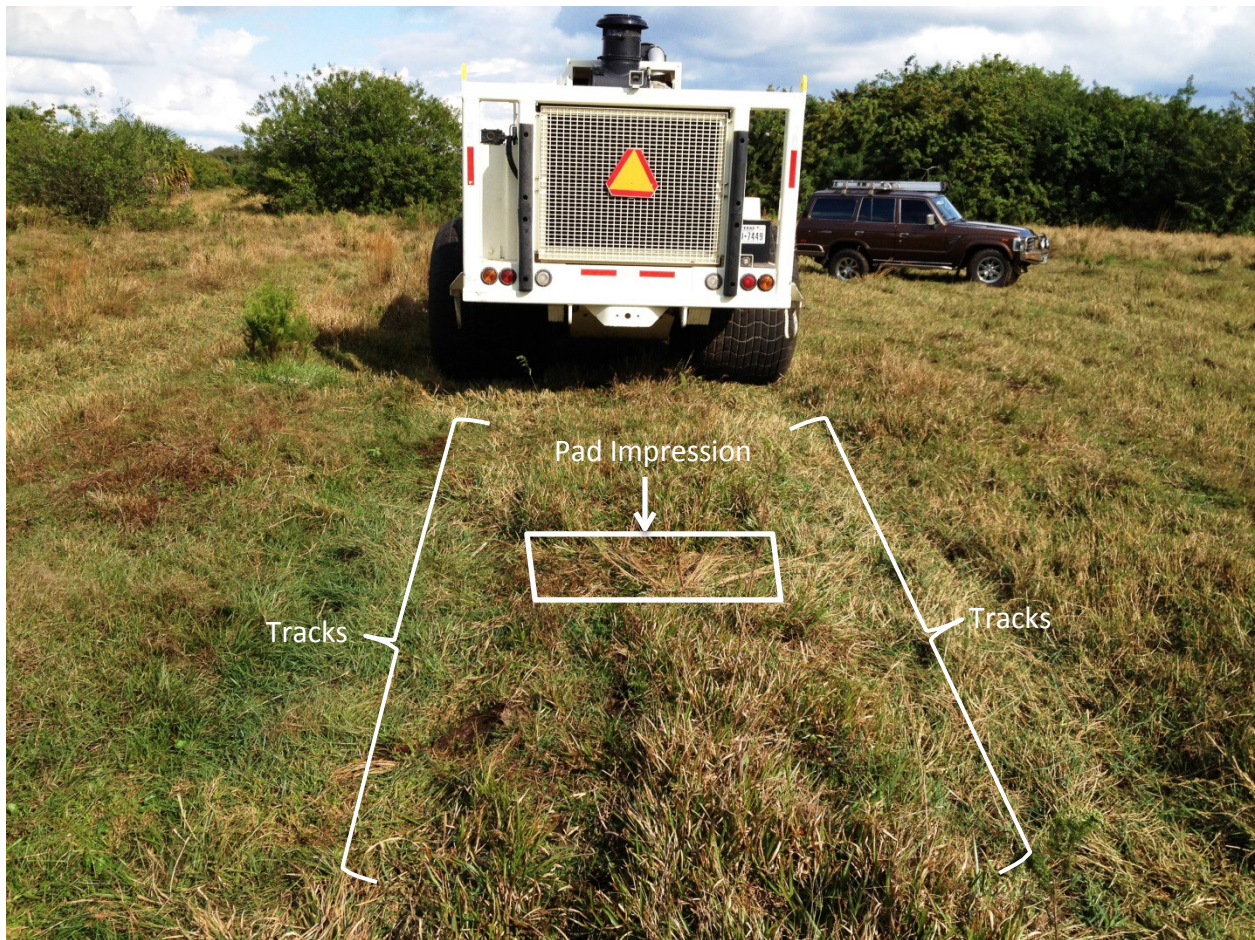


**EXHIBIT H**

**INITIAL FIELD TESTING PHOTOGRAPHS  
DECEMBER 6, 2013**

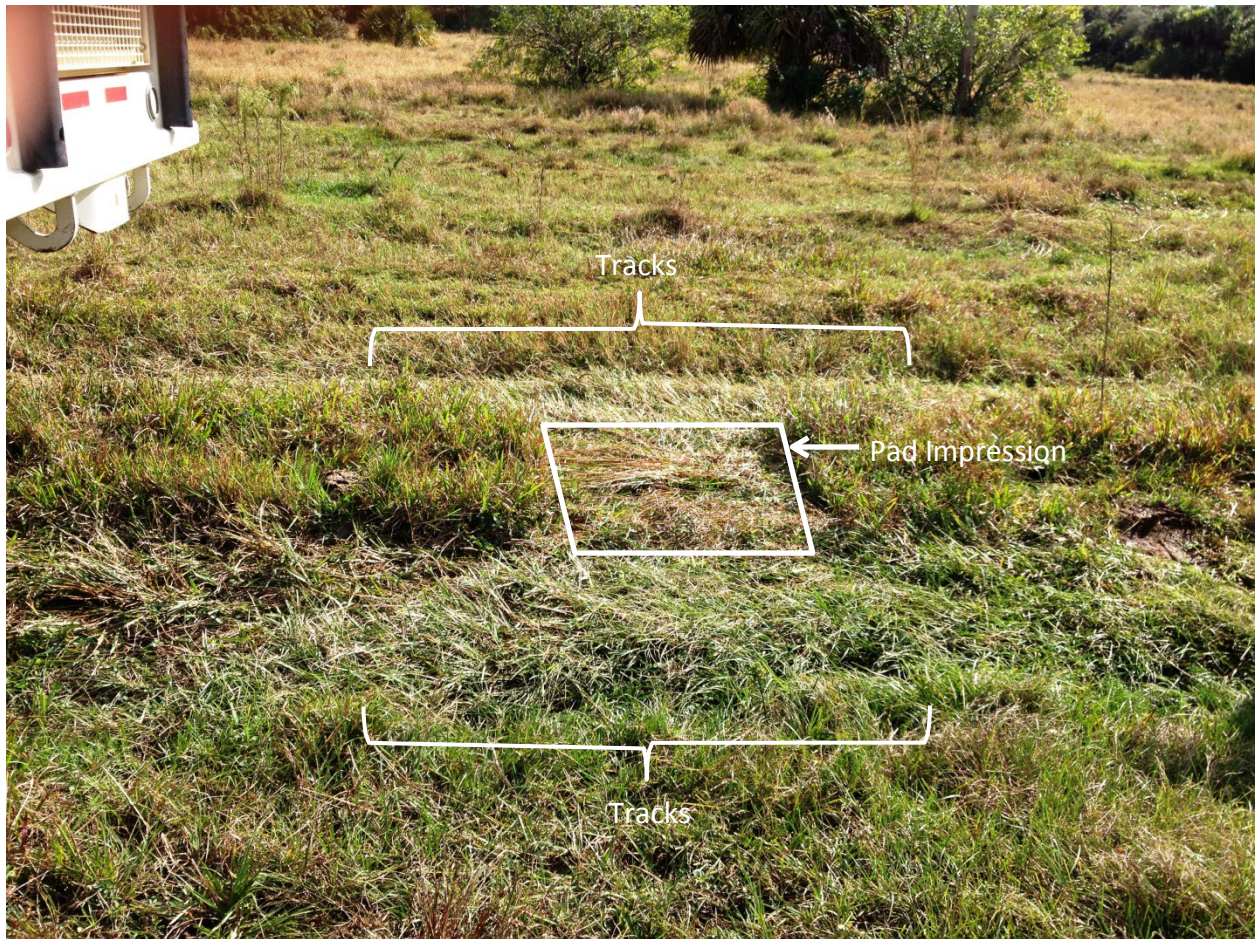


## EXHIBIT H



**Initial Field Test (Upland) - December 6, 2013:** Tire tracks and pad impression behind vibroseis buggy.





**Initial Field Test (Upland) - December 6, 2013:** Close up of tire tracks and pad impression.



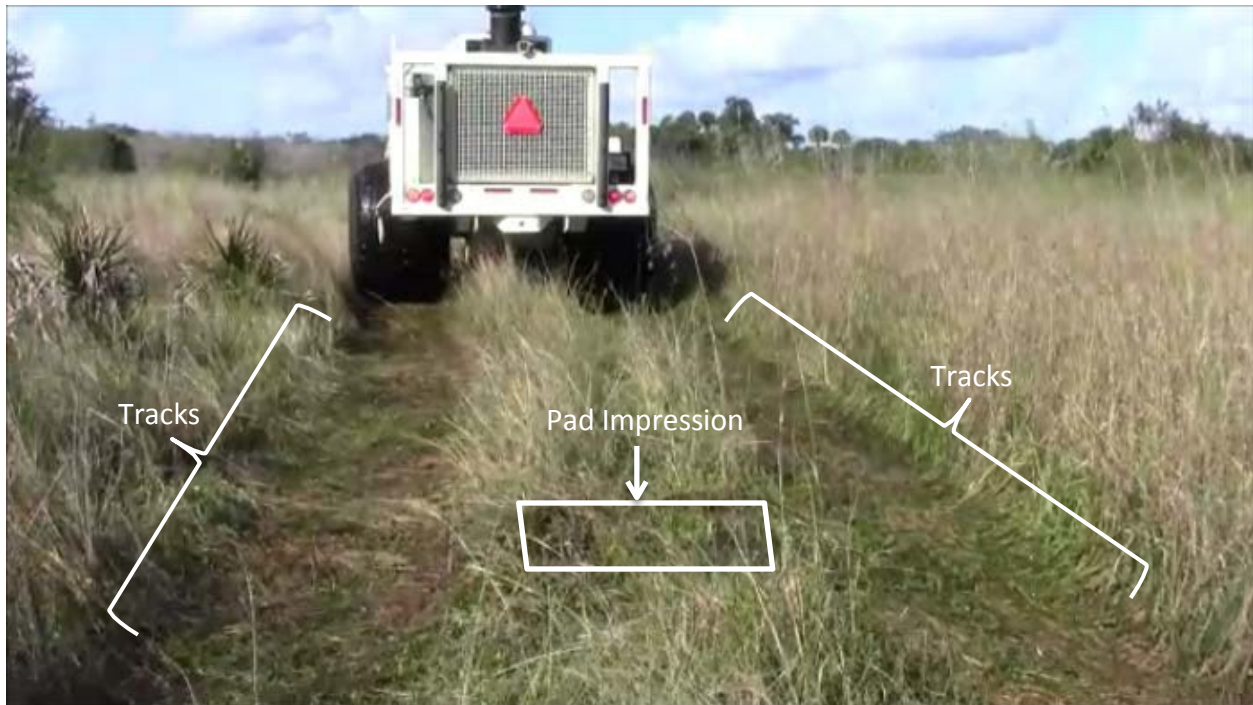


**Initial Field Test (Upland) - December 6, 2013:** Vibroseis buggy with vibrating pad lowered.



**Initial Field Test (Upland) - December 6, 2013:** Vibroseis buggy with vibrating pad retracted.





**Initial Field Test (Wetland) - December 6, 2013:** Tire tracks and pad impression behind vibroseis buggy.



**Initial Field Test (Wetland) - December 6, 2013:** Vibroseis buggy in wetland area (note saturation on tires).





**Initial Field Test (Equipment maneuverability) - December 6, 2013:** Vibroseis buggy maneuvering between two cabbage palm (*Sabal palmetto*) trees.



**Initial Field Test (Equipment maneuverability) - December 6, 2013:** Area vibroseis buggy successfully passed through without damaging trees.



**EXHIBIT I**

**FOLLOW-UP SITE REVIEW PHOTOGRAPHS  
JUNE 6, 2014**



## EXHIBIT I



**Follow-up site review (Upland) - June 6, 2014:** Indiscernible tracks and could not be verified in the field.





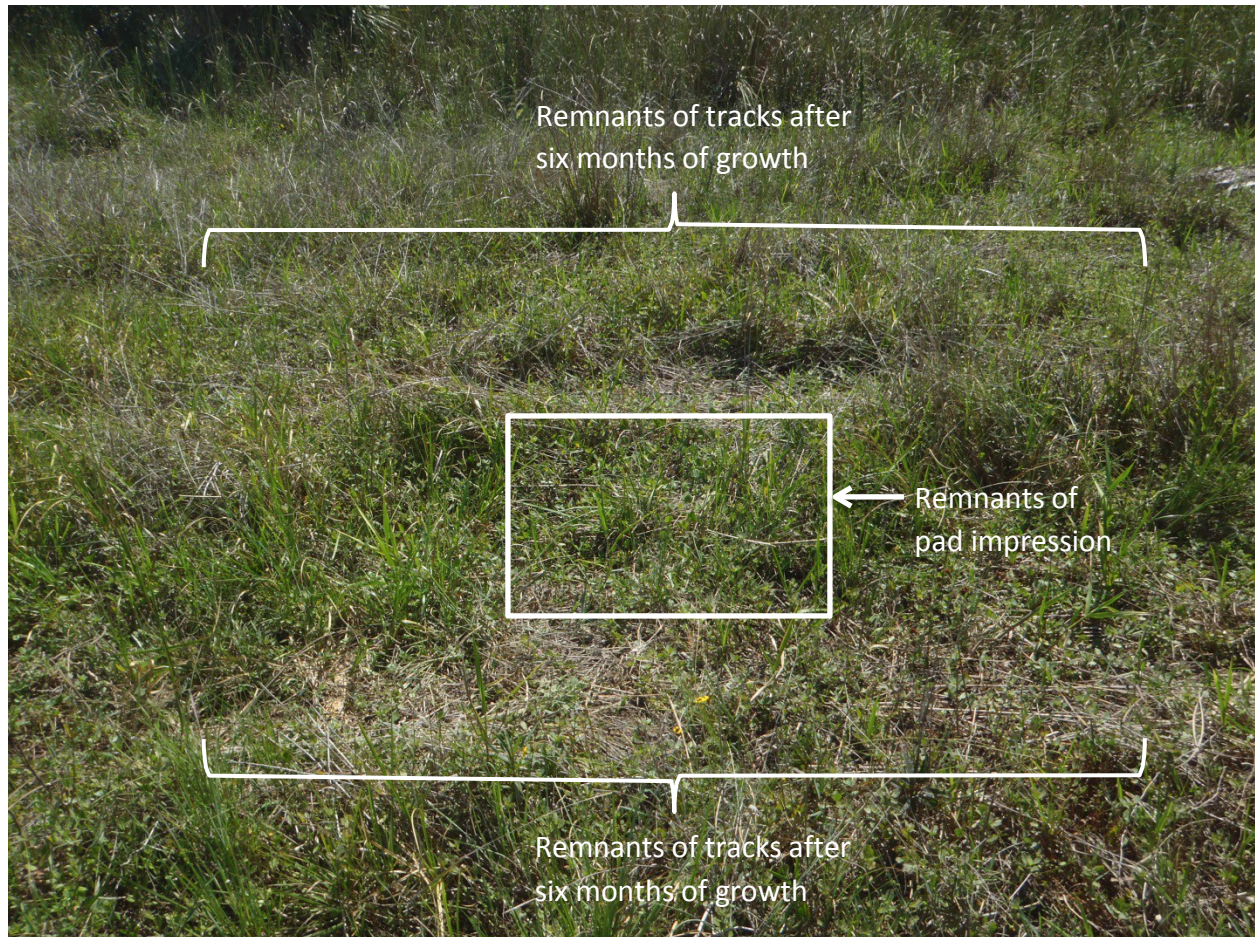
**Follow-up site review (Wetland) - June 6, 2014:** Remnants of tire tracks.





**Follow-up site review (Wetland) - June 6, 2014:** Close-up of tire tracks remnants.





**Follow-up site review (Wetland) - June 6, 2014:** Tire tracks made by vibroseis buggy and area where the vibrating pad made contact with the ground.





**Follow-up site review (Wetland) - June 6, 2014:** Close up of vegetation regrowth.



**EXHIBIT J**

**CD WITH FIELD TESTING VIDEO**



## **EXHIBIT 9**

### **COMPOSITE MAT SYSTEM**



# DURA-BASE<sup>®</sup>

## Composite Mat System

*Takes You Where You Want To Go*







**DURA-BASE®**, a product of Newpark Mats and Integrated Services, has been the leader in temporary road and jobsite technology for more than four decades.

The DURA-BASE Composite Mat System gives you the ability to access locations that are environmentally sensitive while providing minimal surface or soil disturbance.

When it comes to strength, durability and versatility, no other product equals the DURA-BASE Composite Mat System. We continue our commitment to providing you with temporary roads and work surfaces that are safe, strong and tailored to your specific needs.



**Tidal Flat Access**



**Road To Drill Site**



**Keep Equipment  
On Solid Surface**



**All-weather Work Surface**





**Support Heavy Structures  
In Wetlands**



**Staging In Muskeg**



**Protect Native Prairie**



**Access Frozen Tundra**

## ***One access solution that covers all the bases.***

When you have a jobsite that involves difficult terrain such as sand, muskeg, tundra, mud, tidal marsh, native prairie, permafrost, wetlands and other environmentally sensitive areas – you need an access solution that takes you where you want to go. That's where the DURA-BASE Composite Mat System comes through for you.

DURA-BASE is engineered to provide a safe, cost-effective surface for year-round, all-weather

performance. These rugged mats have been proven invaluable for use in industries including oil & gas construction, utilities, military operations and disaster relief support, just to name a few.

Specially formulated from high performance thermoplastic, DURA-BASE mats provide a strong, durable, uniform surface that is perfect for access to special environments, the stabilization of heavy equipment or simple ground protection.



**Heavy Lifting Platform For Cranes**



**Provides Safe Work Areas**





**Transmission Line Construction  
In Tidal Marsh**



**Power Line Access  
To Make Repairs**



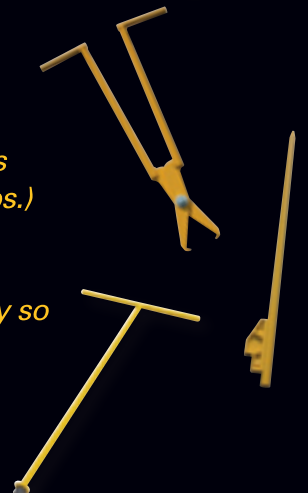
**Alaskan Utilities Project**



**Helps Stabilize Equipment**

## ***Specialized features help take you where you want to go.***

- ✓ *The tread pattern improves traction for load-bearing vehicles and heavy equipment.*
- ✓ *Twist-lock fasteners lock each DURA-BASE mat solidly into place with a single 90° turn.*
- ✓ *The overlapping lip system ensures a continuous barrier between ground and work surface, reducing the chance of slippage and movement.*
- ✓ *The mat system follows surface contours for terrain flexibility.*
- ✓ *Each mat measures 8' x 14' x 4.25" thick (2.44m x 4.27m x 10.8cm) and weighs approximately 990 lbs (449kg). (Small mats are also available – 8' x 7'6", 525 lbs.) Mats can support compressive loads up to 600 lbs. per square inch.*
- ✓ *Mats contain an additive that combines with plastic to increase the conductivity so a charge may rapidly dissipate, eliminating the potential for static buildup.*
- ✓ *Each mat is manufactured with a built-in RFID chip to help you track inventory.*



*\*All measurements and weights are nominal.*



# **DURA-BASE<sup>®</sup>**

## **Composite Mat System**

***Engineered with Consistent Strength Properties***

***Interlocks to Provide Even Weight Distribution***

***Conforms to Uneven Terrain***

***Rugged, Reusable and Recyclable***

***Protects the Environment***

***Versatile and Reliable***

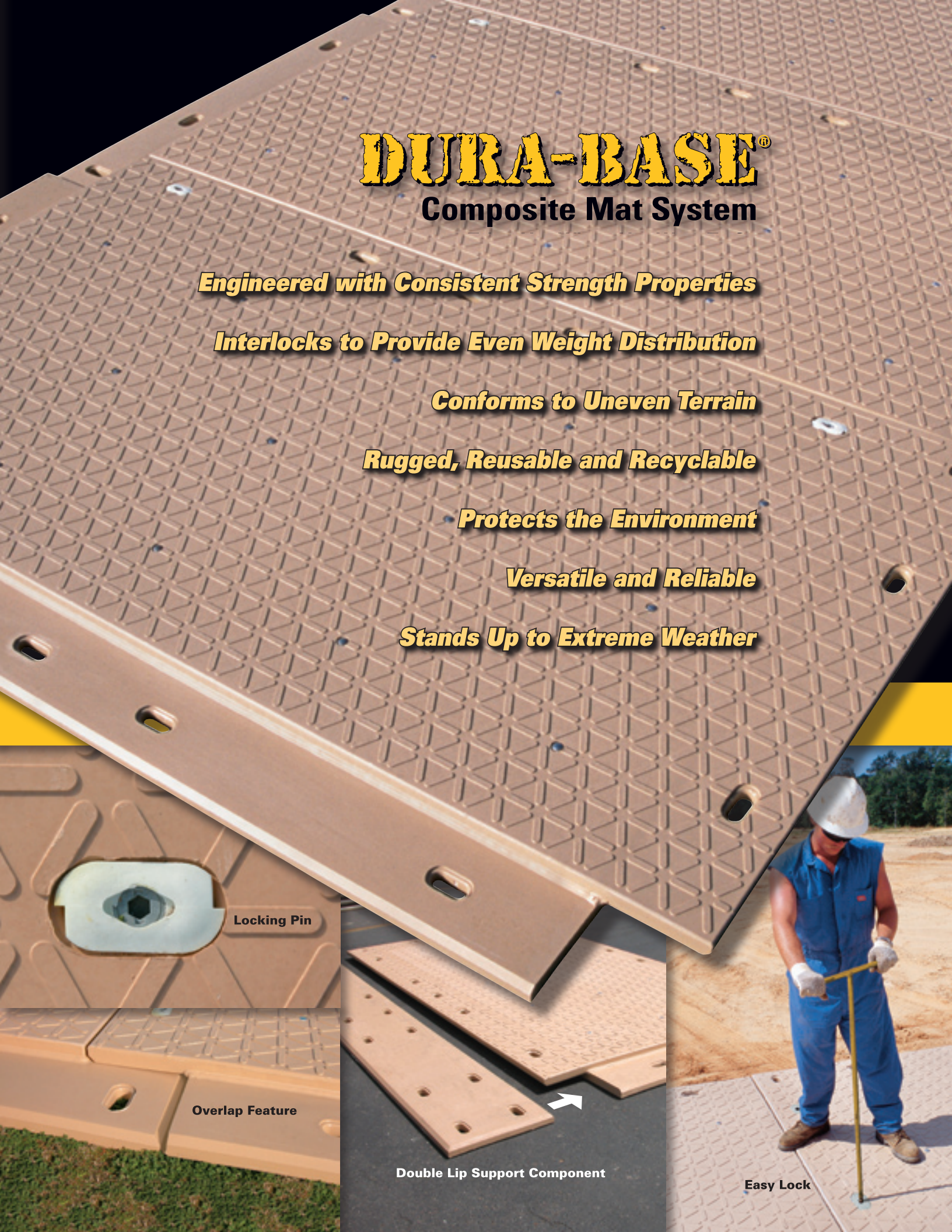
***Stands Up to Extreme Weather***

**Locking Pin**

**Overlap Feature**

**Double Lip Support Component**

**Easy Lock**







**700-Ton German Submarine  
Moved On DURA-BASE Mats**



**Tropical  
Access Road**



**Stable Surface For  
Excavator Next To Creek**

DURA-BASE significantly outperforms wood and other alternatives in both strength and longevity. They provide years of reusable performance and an endless shelf-life. In addition, they feature a built-in tread pattern that improves traction for load-bearing vehicles. And with an interlocking system that reduces the chance of drift and slippage, DURA-BASE also improves safety at job locations.

DURA-BASE mats can provide major cost savings. They help maintain productivity regardless of weather or terrain. Use DURA-BASE to enhance your ability to undertake difficult projects and deliver on-time results.

DURA-BASE is one access solution that covers all the bases.



**Disaster Relief**



**Temporary Road**



**Heavy Haul**



**Wetland Access**



**Preservation of Historic Spanish Fort**





**Movie Set Construction**



**Muskeg Access**



**Workers On  
Buoyant Mats**



**High Tide on Sakhalin Island**



**Military Support**



**Construction Site  
Concrete Pour**



**Chinook Landing Pad**



**Move approximately 3,822 sq ft of usable surface (42 mats)  
to your job site and save on transportation costs.**



# DURA-BASE<sup>®</sup>



Tropical Rain Forest Jobsite

## DURA-BASE<sup>®</sup> Composite Mat System

*Takes You Where You Want To Go*

**1-877-MAT-ROAD** [www.NewparkMats.com](http://www.NewparkMats.com)

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**CARENCRO:** 2900 Hwy 93 • Carencro, LA: 70520 • Office: (337) 896-8976 • Fax: (337) 896-1971

**HOUSTON:** 2700 Research Forest Dr., Ste. 100 • The Woodlands, TX 77381 • Office: (281) 362-6800 • Fax: (281) 362-6801

**INTERNATIONAL OFFICE:** Mexico



**NEWPARK**

A Product of **MATS & INTEGRATED SERVICES** The Leader In Temporary Road and Jobsite Technology For More Than Four Decades







# A TEMPORARY ROAD FOR SENSITIVE ENVIRONMENTS

*Eliminates Rutting.  
Provides Swift and Safe Access.  
Exceptionally Rugged.*

DURA-BASE® has been engineered to give safe access over sensitive terrain and to protect the landscape, plant and wildlife as well. As a Southern Louisiana product that works in wetlands and swamps nearly every day, you could say DURA-BASE® was "born on the bayou." Today our mats have proven safe for environments all over the world, from the jungles of Peru to the Alaskan tundra and many of the deserts, wetlands, forests and farms in between.

DURA-BASE® provides safe access over soft and shifting soils where no road exists or inadequate subgrades make it impossible to gain safe access. The mats are made from a durable thermoplastic insuring strength, uniformity and an extremely long service life. Once the mats are laid in place and locked together, they form a sturdy, continuous network that distributes the weight of passing vehicles or resting loads across an extensive surface.

The use of two crewmembers and a forked-equipment loader make installation and removal simple. In extreme environments, where equipment cannot touch the ground surface at all, the mats can be installed one in front of the other while driving over previously laid mats.

DURA-BASE® is designed with special safety features that help protect personnel, equipment and the environment from damage. Anti-static and UV-inhibitors extend the life and utility of the mats. The non-skid tread pattern enables tracked or wheeled vehicles to stop, turn and maneuver with ease. Twist-lock fasteners interconnect the mats to bring stability, convenience and versatility to the matted area with a variety of connection points for multiple mat configurations.



TEMPORARY ACCESS ROAD,  
AVERY ISLAND, LOUISIANA

FROZEN TUNDRA AND SPRING THAW, CANADA

TROPICAL RAINFOREST STAGING AREA, AMAZON

**Expert site evaluation and technical support is available.**

For rental or purchase information, call 1-877-MAT-ROAD or visit [www.NewparkMats.com](http://www.NewparkMats.com)

**FOR SITES REQUIRING LIGHT-WEIGHT ACTIVITIES, ASK US ABOUT BRAVO® MAT SYSTEM.**

*A Product of Newpark Mats & Integrated Services, The Leader In Temporary Road & Jobsite Technology For More Than Four Decades*

**DURA-BASE®**  
**Composite Mat System**

*Takes You Where You Want To Go*







# Performance Data Sheet

## DURA-BASE® Composite Mat System

In an effort to establish performance standards and to explore feasibility for new applications, Newpark Mats & Integrated Services (NMIS) has designed and conducted numerous tests with the DURA-BASE® Composite Mat System. The results viewed by NMIS as most significant are presented in abbreviated form in this document. Anyone having questions regarding the data presented, or issues not addressed here, may contact NMIS at 1-877-MAT-ROAD (1-877-628-7623).

### General Specifications

Overall Dimensions (Large Mat): 8' x 14' x 4 1/4" (2.44m x 4.27m x 10.8cm)  
Surface Dimensions (Large Mat): 7' x 13' (2.13m x 3.96m)  
Weight (Large Mat): 1050 lbs. (477 kg)

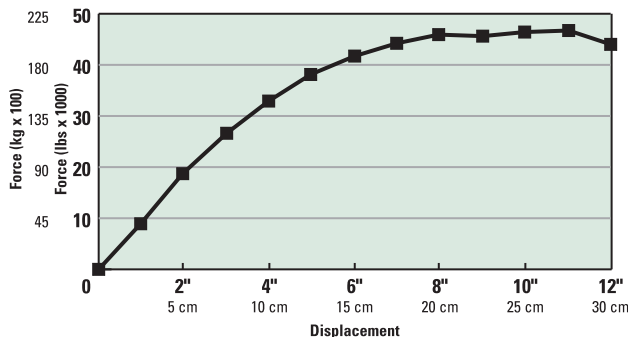
Overall Dimensions (Small Mat): 8' x 7'6" x 4 1/4" (2.44m x 2.29m x 10.8cm)  
Surface Dimensions (Small Mat): 7' x 6'6" (2.13m x 1.98m)  
Weight (Small Mat): 550 lbs. (250 kg)

Material (primary): High Density Polyethylene  
Coefficient of Friction (neoprene on wet mat): 0.6

*\*All measurements and weights are nominal.*

### Strength

Testing has demonstrated mat tolerance to extreme deflection while maintaining high load bearing capacity in pure bending [span = 4 feet (1.2m)]. Pure compressive load capacity is approximately 600 psi (40 kg/cm<sup>2</sup>). Compressive loads in excess of 1000 psi (70 kg/cm<sup>2</sup>) have been observed in laboratory tests.



**NMIS routinely utilizes the mats for unpermitted loads over subgrades of 2 CBR and above.**

### Traffic

Traffic tests on differing soil conditions have shown the mats to be suitable for an average expected life in excess of 15 years. Fatigue tests have shown no appreciable damage at 60,000 cycles [6 inch (15cm) deflection of 8 foot (2.5m) span].

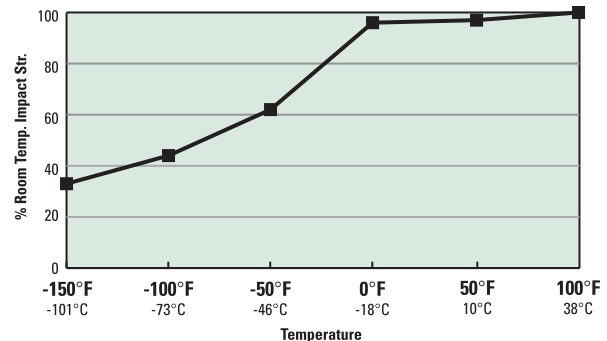
### Static Dissipation

Plastics, left untreated, exhibit poor electrical conductivity. This condition, when present in mat material, can lead to a buildup of static charge on the plastic or personnel and result in arcing (mild shock). The DURA-BASE® Composite Mats contain an additive that combines with the plastic and increases the conductivity so a charge may rapidly dissipate, virtually eliminating the potential for static buildup.

Tests have shown the mat surface conductivity to be approximately 10e8 Ohms. The upper limit for a dissipative material is 10e10 Ohms. Field tests have shown the dissipative properties of the composite mat to be equivalent to those of wooden mats.

### Temperature Effects

Izod impact tests were conducted to determine the effect of low temperature on material toughness. The results show a transition between -40°F and -4°F (-40°C and -20°C) where the material toughness begins to drop off. All specimens tested above -99°F (-72°C) exhibited signs of ductile failure. The graph presented here shows the impact results relative to room temperature. The impact strength at room temperature of 72°F (22°C) is 2,509 ft-lb/in (134 J/m). DURA-BASE® mats have been successfully employed in environments where -30°F (-34.4°C) temperatures were observed for an extended period of time.



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[www.NewparkMats.com](http://www.NewparkMats.com)











laboratory tests.

Traffic

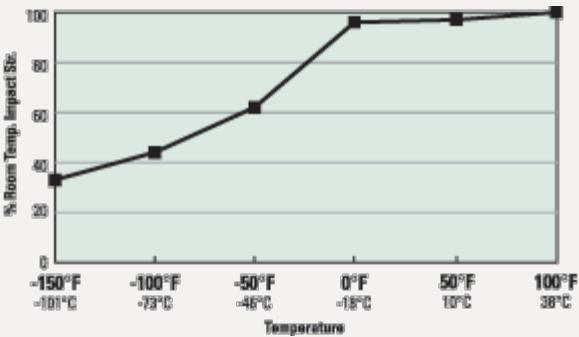
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NMIS routinely utilizes the mats for unpermitted loads over subgrades of 2 CBR and above.



**EXHIBIT 10**  
**RECORDING EQUIPMENT**



# Big Advances in Small Packages

## ***Geospace Seismic Recorder (GSR)™***



## Cable-Free/Radio-Free Autonomous Data Recording

- Scalability greater than 50,000 channels
- Delivers high resolution with a 24-bit delta-sigma ADC
- Built-in GPS receiver and disciplined clock
- Up to 30 days of continuous recording
- Compatible with explosive, vibratory and impulsive energy sources
- Accepts standard analog sensor inputs
- Has a built-in full resolution test generator
- Available as 1, 2, 3 or 4 channel versions
- Has an LED Status/Deployment State Indicator
- RFID for location/inventory assistance

**OYO GEOSPACE**

[www.oyogeospace.com/gsr.htm](http://www.oyogeospace.com/gsr.htm)



# Geospace Seismic Recorder (GSR)

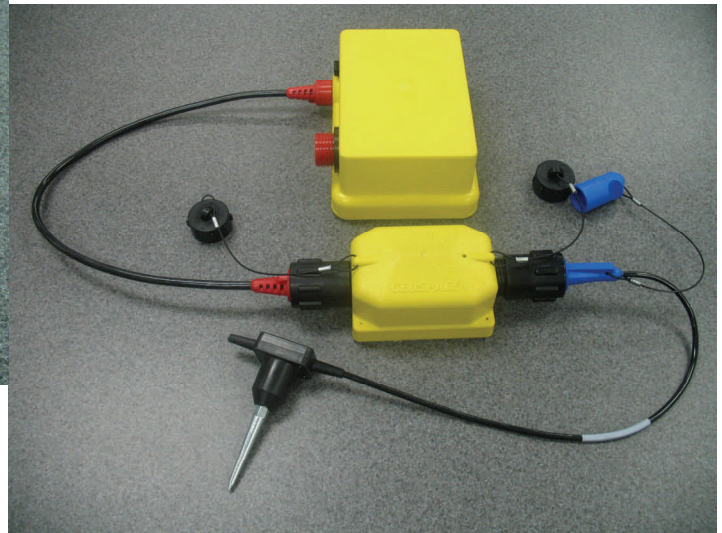
## Cable-Free/Radio-Free Autonomous Data Recording

The GSR is designed for cable-free/radio-free seismic data recording. The self-contained unit includes 1 to 4 channels of 24-bit digitization, an integrated/high sensitivity GPS receiver, built-in test signal generator, up to 4 GB per channel of non-volatile solid-state data storage, and a high-speed data port. The unit is housed in a sealed case, with input connector, extended life battery connector/data port connector.



*Above: GSR Data Recorder.*

*Below: GSR unit connected to geophone string and battery unit.*



*Above: GSR Battery Unit*

### GSR System Tests

The seismic channel performance and sensor tests can be performed by the GSR System. The user can choose a partial or complete set of tests that can be run in sequence. The user can also choose to display all of the results or only the failures. In the tests described below, the System Software automatically controls the Channel Input Switch Positions and Test Oscillator Settings during the tests. All tests can be run at all sample intervals and preamp gains of the GSR.

- Harmonic Distortion
- Gain Accuracy
- Impulse Response
- Common Mode Rejection
- Equivalent Input Noise
- Geophone Impedance and THD
- Instantaneous System Dynamic Range
- Crossfeed (multi-channel)

## OYO GEOSPACE

*All specifications subject to change without notice*

[www.oyogeospace.com/gsr.htm](http://www.oyogeospace.com/gsr.htm)



# Geospace Seismic Recorder (GSR)

## Features and Specifications

- 24-bit digital recorder
- Built-in GPS and disciplined clock
- Built-in full resolution test signal generator
- Solid-state flash memory
- Scalability greater than 50,000 channels
- Greater than 30 days of continuous recording
- Compatible with vibratory, explosive and impulsive energy sources.
- LED Status/Deployment State Indicator
- RFID for location & inventory assistance
- Accepts standard analog sensor input
- Available as 1,2,3, or 4 channel versions
- 24-bit delta-sigma ADC
- 3 Hz to 1600 Hz freq. response
- <1  $\mu$ sec. of UTC (GPS clock)
- Up to 4 GBytes per channel flash memory storage
- 12 Volt external battery
- Operating Temperature: -40° C to +85° C
- Humidity: 0 to 100%
- Selectable Gains:
  - X1, X2, X4, X8, X16, X32, X64
  - 0, 6, 12, 18, 24, 30, 36 dB
- Sample Intervals:
  - 4, 2, 1, .5, .25 milliseconds

Max input signal: 1.80 Vrms @ 0 dB Gain
Total Dynamic Range: 140 dB
System Dynamic Range @ 0dB Gain: <ul style="list-style-type: none"><li>126 dB @ 4 msec SI</li><li>124 dB @ 2 msec SI</li><li>120 dB @ 1 msec SI</li><li>117 dB @ .5 msec SI</li><li>102 dB @ .25 msec SI</li></ul>
Equivalent Input Noise @ 2 msec SI: <ul style="list-style-type: none"><li>1.13 <math>\mu</math>V @ Gain 0 dB</li><li>.58 <math>\mu</math>V @ Gain 6 dB</li><li>.33 <math>\mu</math>V @ Gain 12 dB</li><li>.22 <math>\mu</math>V @ Gain 18 dB</li><li>.19 <math>\mu</math>V @ Gain 24 dB</li><li>.18 <math>\mu</math>V @ Gain 30 dB</li><li>.17 <math>\mu</math>V @ Gain 36 dB</li></ul>
Input Impedance: <ul style="list-style-type: none"><li>20 kohms/0.06 <math>\mu</math>f Difference Mode</li><li>205 kohms Common Mode</li></ul>

System Dynamic Range @ 2 msec SI <ul style="list-style-type: none"><li>124 dB @ Gain 0 dB</li><li>123 dB @ Gain 6 dB</li><li>122 dB @ Gain 12 dB</li><li>120 dB @ Gain 18 dB</li><li>115 dB @ Gain 24 dB</li><li>110 dB @ Gain 30 dB</li><li>105 dB @ Gain 36 dB</li></ul>
Total Harmonic Distortion: 0.0005%
Common Mode Rejection: 0.001%
Gain Accuracy: 1%
Anti Alias Filter: <ul style="list-style-type: none"><li>Rejection @ Nyquist: 130 dB</li><li>Frequency @ -3 dB: 0.87 Nyquist</li><li>Linear or Minimum Phase</li></ul>
Time Standard: <1 ppm
Weight: 2 pounds
Max. Dimension: 3.5"Wx3.0"Hx6.67"L

**For more information:** [gshields@oyogeospace.com](mailto:gshields@oyogeospace.com) • Tel: 713.986.4444 • Fax: 713.986.4445

**OYO GEOSPACE**

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[www.oyogeospace.com/gsr.htm](http://www.oyogeospace.com/gsr.htm)



# Geospace Seismic Recorder (GSR)

## GeoRes-XTC GSR Data Management System

The GeoRes-XTC consists of two embedded software modules:

**GeoReaper** performs pre-deployment parameter programming, i.e. sample rate, pre-amp gain, record mode, testing, etc. and data collection via Ethernet connection to the Data Transfer Module (DTM) and a high speed PC. A full set of instrument tests can be performed and analyzed while the GSR is installed in the Data Transfer Module (DTM).

**GeoMerge** allows the system to read and import all three major components of SPS (R, S and X records). It will merge all GSR data into SEG-D or SEG-2 files according to SPS X records (Cross-Reference File, sorted in the same order as the Source 'S' File) and convert all latitude and longitude information into the same coordinates used in the SPS files. These data are then output to the field database (RAID memory) and/or hard media (tape, disk, etc.).

The GeoRes-XTC is compatible with third party generated SPS files.



GeoRes-XTC High Speed Computer



Data Transfer Module (DTM)

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**EXHIBIT 11**

**COORDINATION MEETINGS**



## **NG3-D SEISMIC SURVEY SUMMARY OF COORDINATION AND MEETINGS**

In early October 2013, Burnett Oil Co., Inc. (BOCI) and its representatives began preparing technical information for discussions with state, federal, and local regulatory agencies and other interested parties relative to conducting the Nobles Grade 3-D (NG3-D) Geophysical Seismic Survey proposed to be conducted within the Big Cypress National Preserve (BCNP) and Addition (BCNP-A) (collectively known as “the Preserve”). The purpose of the seismic survey is to identify new oil and gas filled geological structures within the portion of the well-known Sunniland Oil Trend that is beneath the surface of the Preserve. In an effort to make the regulatory agency community aware of its exploration plans and inform agency staff about vibroseis technology and strategies to minimize/avoid impacts to important resources of the preserve and receive agency feedback, BOCI and its representatives have coordinated and conducted meetings with various state, federal, and local regulatory agencies and other interested parties. A summary of the various coordination efforts and meetings with respective dates and locations is provided in chronological order as follows.

### **Florida Department of Environmental Protection (FDEP) Pre-Application Meeting with Oil and Gas Staff**

Date: October 29, 2013  
Location: Tallahassee, Florida

### **Interstate 75 Rest Area Construction Contractor Meeting**

Date: November 21, 2013  
Location: Collier County, Florida (I-75 Mile Marker 63 Rest Area)

### **U.S. Department of the Interior-National Park Service (USDOI-NPS) Pre-Application Meeting with Preserve Staff**

Date: November 22, 2013  
Location: Ochopee, Florida

### **FDEP Pre-Application Meeting with Environmental Resource Permit (ERP) Staff**

Date: December 3, 2013  
Location: Fort Myers, Florida

### **Florida Department of Transportation (FDOT) Coordination**

Date: December 4, 2013  
Location: Telephone Conference

### **Vibroseis Equipment Demonstration for Agencies and Non-Governmental Organizations**

Date: December 6, 2013  
Location: Immokalee, Florida



**USDOJ-NPS Technical Meeting with Preserve Staff**

Date: December 12, 2013  
Location: Ochopee, Florida

**FDOT Pre-Application Meeting**

Date: January 16, 2014  
Location: Bartow, Florida

**Division of State Lands Pre-Application Meeting**

Date: January 17, 2014  
Location: Tallahassee, Florida

**FDOT On-Site Field Meeting**

Date: January 24, 2014  
Location: Collier County, Florida (I-75 Mile Marker 70 Recreational Parking Area)

**Initial Coordination with Miccosukee Tribal Staff**

Date: January 27, 2014  
Location: Telephone Conference

**Initial Coordination with Seminole Tribal Representatives**

Date: January 27, 2014  
Location: Telephone Conference

**U.S. Army Corps of Engineers Pre-Application Meeting**

Date: January 30, 2014  
Location: Fort Myers, Florida

**USDOJ-NPS Technical Meeting with Preserve Staff to Review Plan of Operations**

Date: January 31, 2014  
Location: Ochopee, Florida

**FDEP ERP Helicopter Flyover**

Date: February 5, 2014  
Location: Ochopee, Florida

**FDEP ERP On-Site Field Meeting**

Date: February 6, 2014  
Location: Ochopee, Florida

**FDEP ERP Meeting to Review Permit Application**

Date: February 10, 2014  
Location: Fort Myers, Florida



**Florida Fish and Wildlife Conservation Commission Meeting**

Date: February 14, 2014  
Location: Fort Myers, Florida

**U.S. Fish Wildlife Service (USFWS) Meeting**

Date: March 5, 2014  
Location: Vero Beach, Florida

**USDOJ-NPS Coordination with Legal Staff to Discuss Right to Operate**

Date: April 11, 2014  
Location: Telephone Conference

**USDOJ-NPS Coordination Follow-Up with Legal Staff to Discuss Right to Operate**

Date: April 25, 2014  
Location: Telephone Conference

**USDOJ-NPS, Southeast Archaeological Center, and DHR Coordination**

Date: May 29, 2014  
Location: Telephone Conference

**USDOJ-NPS Southeast Archaeological Center Meeting to Obtain Data**

Date: June 18, 2014  
Location: Tallahassee, Florida

**USDOJ-NPS Coordination to Discuss Submittal of Draft Environmental Assessment with Preserve Staff**

Date: June 26, 2014  
Location: Telephone Conference

**USDOJ-NPS Southeast Archaeological Center Coordination**

Date: July 9, 2014  
Location: Telephone Conference

**USDOJ Field Solicitor's Office Coordination**

Date: July 11, 2014  
Location: Telephone Conference

**USDOJ-NPS Southeast Archaeological Center Meeting**

Date: July 15, 2014  
Location: Tallahassee, Florida

**USDOJ Field Solicitor's Office Coordination**

Date: July 23, 2014  
Location: Telephone Conference



**Joint USDOI-NPS and USFWS Meeting to Review Plan of Operations**

Date: August 12, 2014

Location: Ochopee, Florida



**EXHIBIT 12**

**BURNETT OIL CO., INC.  
RESPONSE TO 2006 USDOJ-NPS RECOMMENDED  
MITIGATION MEASURES**



**Actions Taken by the Operator to Conform To  
2006 NPS Operators Handbook  
Required Operating Stipulations and  
Recommended Mitigation Measures**

Burnett Oil Co., Inc. (BOCI), also known as the “Applicant,” has proposed to conduct the Nobles Grade 3-D (NG3-D) seismic survey project. The following document has been prepared to address Chapter 3 of the U.S. Department of the Interior – National Park Service (USDOI-NPS) 2006 Operators Handbook (Handbook) for the NG3-D seismic survey. The project is proposed to be conducted within the Big Cypress National Preserve (BCNP) and BCNP Addition (BCNP-A) (collectively known as “the Preserve”).

Chapter 3 of the 2006 NPS Handbook provides interpretation of Code of Federal Regulations (CFR) 9B regulations and recommended guidelines for conducting geophysical exploration operations on private mineral interests located beneath federally-owned or controlled surface lands managed by USDOI-NPS. Table 3.2 of the Handbook focuses on NPS 36 CFR 9B regulations but also includes operating stipulations required under other federal laws and regulations. Table 3.3 of the Handbook presents mitigation measures for geophysical operations recommended by NPS to ensure compliance with NPS’s approval standard to utilize “...technically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit...” as addressed in 36 CFR § 6.37(a) (1). Many of the suggested stipulations and mitigation measures are already set forth in the BCNP’s Mineral Management Plan (MMP), included as part of the promulgated 1992 General Management Plan/Environmental Impact Statement (GMP/EIS).

The relevant required operating stipulations and recommended mitigation measures found in Tables 3.2 and 3.3, respectively, of the 2006 NPS Handbook are provided below in italics. The Applicant’s proposed action(s) to be taken are presented in the responses that follow.

**Required operating stipulations:** *In order to use the surface or subsurface water from the park, the operator must demonstrate in the plan of operations that his/her water rights are superior to any claim of the U.S. to use the water, and where the use is subordinate to that of the U.S., that use of the water will not damage park resources.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, no water is needed and this suggested mitigation measure is not applicable.

**Required operating stipulations:** *Prepare an Emergency Response Plan to ensure safe operating procedures in the event of a reportable quantity spill; damage to wells, pipelines or other*



*structures; fire; explosions; medical evacuation; or other emergencies such as strong winds, heavy rainfall, swift currents and flooding.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey during the BCNP's "dry season" (December through May). As such, heavy rainfall, flooding, and high wind conditions generally associated with summertime weather or hurricanes are not expected. Section 5 of the Applicant's Plan of Operations (POP) describes measures to prevent fuel spillage in the field. POP Section 6 sets out the Applicant's various Spill Control and Emergency Preparedness Plans which include fire response. The POP's Exhibit 5 also addresses the Applicant's response to the BCNP's MMP operating stipulations for geophysical operations which include similar contingency plan requirements.

**Required operating stipulations:** *Prior to beginning operations, in consultation with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (if applicable), and NPS, identify all threatened, endangered, and sensitive species that may be present in the project area. Based on the species and the proposed operations, operators may be required to conduct biological surveys in the project area.*

**Action(s) taken in response:** Protected species are known to occur, or have the potential to occur within the Preserve, including some Important Resources Areas (IRAs) identified in the BCNP MMP. The BCNP's 1992 GMP/EIS and the Addition area's 2010 GMP/EIS fully addressed this subject and included (in the Records of Decision) consultation with the USFWS. The 1992 MMP requires that oil and gas POPs also address this subject. The Applicant's POP contains extensive background environmental information (Section 10) that addresses protected species and IRAs within the NG3-D seismic survey area. This section also describes the potential effects of the proposed operations on such species together with avoidance and mitigation measures to be utilized, including survey program modification. The NPS has initiated formal consultation with the USFWS for the NG3-D seismic survey project.

**Required operating stipulations:** *Conduct a pre-operational analysis to adequately describe the natural, social and economic environments that would be affected by the operations (including air quality, geology, topography, soils, surface and subsurface hydrology, vegetation, wetlands, fish and wildlife, threatened and endangered species, cultural resources, and all water and oil and gas wells) within a 2-mile radius of proposed operations.*

**Action(s) taken in response:** Section 10 of the Applicant's POP addresses these items in both the BCNP and Addition areas pursuant to the stipulations set out in the 1992 BCNP GMP and its MMP.



**Required operating stipulations:** *Conduct cultural resource surveys to document the location and significance of any cultural resource (including various components of archaeological, ethnographic, historic architectural, and historical landscape resources) that may be affected by operations.*

**Action(s) taken in response:** Section 10 of the Applicant's POP addresses these items in both the BCNP and Addition areas pursuant to the stipulations set out in the 1992 BCNP GMP and its MMP.

**Required operating stipulations:** *For geophysical operations using underground explosives, conduct a risk assessment of proposed operating methods (depth, size, pattern, and array of explosives) with respect to site conditions (landscape features and physical properties of soils, including depth and thickness of aquitards or water-retardant layers).*

**Action(s) taken in response:** The Applicant has prepared a POP utilizing the vibroseis methodology of creating seismic signals. No explosives are involved with this technology. As discussed in the Applicant's POP (Section 10), vibroseis technology is anticipated to produce a minimum of disturbance to surface and subsurface resources.

**Required operating stipulations:** *Discharge explosives at safe distances from pipelines, telephone lines, railroad tracks, roads, power lines, water wells, oil and gas wells, oil and gas production facilities, buildings, etc. Use accepted industry minimum safe offset distances, unless otherwise specified.*

**Action(s) taken in response:** The Applicant has prepared a POP utilizing the vibroseis methodology of creating seismic signals. No explosives are involved with this technology. As such, this stipulation does not apply to the Applicant's proposed operation.

**Required operating stipulations:** *Surface operations shall at no time be conducted within 500 feet of the banks of perennial, intermittent or ephemeral watercourses; or within 500 feet of the high pool shoreline of any natural or manmade impoundments...unless specifically authorized by an approved plan of operations. If necessary, the operators must specifically request exemptions from this standard in the plan of operations and demonstrate that the exemptions are necessary for acceptable data quality, can be conducted with insignificant affects on park waters or manmade infrastructure, and result in overall resource impact reduction.*

**Action(s) taken in response:** As discussed earlier, the Applicant has proposed a POP that is in compliance with the BCNP's 1992 GMP and MMP. The 1992 programmatic EIS recognizes the BCNP as wetlands that become dry for most of the December through May "dry season."



**Required operating stipulations:** *Protect all survey monuments, witness corners, reference monuments, and bearing trees against all destruction, obliteration, or damage from operations. Operator shall be responsible for the reestablishment, restoration, or referencing of any monuments, corners, or bearing trees which are destroyed, obliterated, or damaged by such operations.*

**Action(s) taken in response:** The Applicant understands and will comply.

**Required operating stipulations:** *Possession of firearms by persons conducting oil and gas operations is prohibited in NPS units.*

**Action(s) taken in response:** The Applicant understands and will comply.

**Required operating stipulations:** *The operator shall take technologically feasible precautions to prevent accidents and fires.*

**Action(s) taken in response:** The Applicant understands (as set out in Section 6 of the POP) and will comply.

**Required operating stipulations:** *Operators shall not injure, alter, destroy, or collect any object, structure, or site of historical, archaeological, or cultural value without written authorization from the NPS.*

**Action(s) taken in response:** The Applicant understands (as set out in Section 10 of the POP) and will comply.

**Required operating stipulations:** *Ensure that a qualified 3rd party monitor is present during appropriate operational phase(s). Once operations have commenced, the operator shall immediately bring to the attention of the superintendent any cultural or scientific resource, or species of special concern encountered that might be altered, harmed, or destroyed by the operation and shall leave such discovery intact until told to proceed by the superintendent. The superintendent will evaluate the discoveries brought to his/her attention, and will determine within ten (10) days what action will be taken with respect to such discoveries.*

**Action(s) taken in response:** The Applicant understands and will comply (as set out in Sections 5 and 10 of the POP).

**Required operating stipulations:** *Include stop work provisions in the event of a cultural or scientific discovery in operator's contracts.*



**Action(s) taken in response:** As set out in the Applicant's POP Sections 5 and 10, archaeologist personnel will be on-site, equipped with the latest coordinates of known archaeological and cultural resource sites and an archaeological avoidance model that predicts areas of resource probability. The archaeologist will coordinate with seismic crews for the locating of receiver lines, vibrating source lines, and routing of equipment to avoid any cultural sites and areas of resource probability. Discoveries of unknown sites will be marked and reported.

**Required operating stipulations:** *Use of park roads must be in accordance with procedures outlined in an approved plan of operations.*

**Action(s) taken in response:** The Applicant's POP complies with the operating stipulations set out in the BCNP's 1992 GMP and MMP. Use of roads, former well access and pad sites, and existing and previously disturbed areas (active and former trails) are detailed in the POP.

**Required operating stipulations:** *Do not locate staging areas within the 100-year floodplain. If there is no practicable alternative to siting the staging area in the floodplain, design operations to minimize harm to the floodplain.*

**Action(s) taken in response:** The Applicant considers the Preserve areas subject to seasonal flooding as wetlands. As such, there is no other viable alternative other than locating staging areas close to Interstate 75 (I-75) to minimize Preserve occupancy. Access sites will be through existing I-75 rest and recreational parking area infrastructures utilizing existing ingress and egress. Access gates will be locked.

**Required operating stipulations:** *Develop an adequate flood warning system which monitors one or more physical parameters (e.g., rainfall, runoff, streamflow) and provides warning of an impending flood to the operator, operator's contractors and subcontractors, visitors, and park personnel with adequate time to permit evacuation; and use signs, high-water indicators, and other information indicating that a site is floodprone and suggesting appropriate actions in the event of flooding.*

**Action(s) taken in response:** In compliance with BCNP's 1992 GMP and MMP, the Applicant proposes to conduct geophysical operations during the "dry season" (December through May). No flooding is anticipated to be present or occur in areas where operations will take place.

**Required operating stipulations:** *Wetlands (both Cowardin classification system and jurisdictional wetlands) must be delineated where proposed operations would directly or indirectly adversely impact wetlands. Wetland delineations shall be approved by the U.S. Army*



*Corps of Engineers and the Water Resources Division of NPS and incorporated in the Statement of Findings and Plan of Operations.*

**Action(s) taken in response:** The Applicant considers the Preserve as “wetlands.” However, Executive Order 11990 is inapplicable and no Wetland Statement of Findings (WSOF) will be required for the project (see Section 11.7 for WSOF justification).

**Required operating stipulations:** *Plan work to avoid known cultural resources. If work cannot avoid known cultural resources, assess, and mitigate effects on National Register eligible or listed properties in consultation with State Historic Preservations Office and Advisory Council on Historic Preservation.*

**Action(s) taken in response:** The Applicant understands and will comply (see Section 10 of the POP).

**Required operating stipulations:** *An incidental take of a federally listed species must be immediately reported to the NPS and USFWS; all other protected species would be reported to the NPS.*

**Action(s) taken in response:** The Applicant understands and will comply.

**Recommended mitigation measure:** *Hold daily safety and environmental meetings with crews to reinforce crew and public safety, environmental concerns, and operating procedures.*

**Action(s) taken in response:** The Applicant intends to conduct such meetings and discussions to be held prior to commencement of operations and daily thereafter (see Section 5.10.11 of the POP). Daily coordination meetings will also be held with NPS personnel and observers.

**Recommended mitigation measure:** *Minimize conflicts with visitors by avoiding designated visitor use areas. If operations are needed in or around designated visitor use areas for successful completion of the project, then schedule work during low visitor use times and/or implement strategies to minimize the sights, sounds, and duration of operations in and around designated visitor use areas.*

**Action(s) taken in response:** I-75 bisects the northern portions of the Preserve, as well as the NG3-D seismic survey program area. The great majority of travelers on I-75 are not visitors to the Preserve, but rather they are just passing through the area. For those individuals who exit the freeway, most are stopping at the Collier County rest area as part of their journey elsewhere; visiting the Preserve is not their purpose and they do not leave the vicinity of the rest area facilities.



Because I-75 is a limited-access federal highway, and by way of an agreement between the Collier mineral interest owners and the Florida Department of Transportation (FDOT), access to privately-owned minerals and seismic exploration activities within seismic program areas will necessarily be from I-75 to the following four staging areas using the following existing facilities and selected access routes: the newly constructed recreational parking areas at Mile Marker 63 South and North (MM-63S and MM-63N) located adjacent to the newly constructed MM-63 rest and emergency response areas; and the existing recreational parking areas on the north and south sides of I-75 at MM-70N and MM-70S. Although screened by the rest area facilities and I-75 overpass, motorists traveling on I-75, and stopped at the MM-63 rest/recreational parking areas or MM-70N and MM-70S recreational parking areas, may be able to see personnel periodically accessing the BCNP backcountry though locked, large gates and intermittent helicopter operations in the vicinity during daylight hours. Noise will be lost to a significant extent amid the ongoing noise impacts associated with I-75 traffic and the parking area facilities. Helicopter operations occurring at MM-63North are expected to be nearly invisible from the MM-63 rest area due to its distance (1,650± feet) from the staging areas and the heavy screening by thick vegetative cover but may be more visible from the recreational parking areas.

Operations at these four staging areas will utilize the existing service roads to the recreational parking areas and access the staging area through new locked gates. FDOT prefers to avoid (as much as possible) building temporary access directly off of I-75 for geophysical oil and gas operations. Use of service roads to and from existing facilities will help accomplish that goal. Recreational parking areas are not utilized as much as rest areas; but when used, visitors are expected to be screened from observing operations by heavy vegetation.

A very limited portion of the Florida Trail, immediately adjacent to I-75, will be utilized to access staging sites and conduct operations (approximately 0.5 mile for MM-63N and 0.4 mile for the main staging area MM-63S). It is the intent of the Applicant to minimize, as much as feasible, direct conflicts with visitor use of Florida Trail during operations. With the cooperation of NPS, the Applicant will post appropriate notifications at multiple locations and online, monitor Florida Trail use (including periodic checks by helicopter) and ensure, with additional personnel (if needed), a visitor/hiker use or passage free of conflicts with operations. More information regarding visitor and BCNP user conflicts and the Applicant's proposed plans to minimize such conflicts are addressed in the Applicant's POP in Sections 5.11 and 10.9 and Exhibit 5, MMP Compliance, Stipulation #7.

**Recommended mitigation measure:** *Use minimum number of vehicles, boats, or aircraft necessary to provide efficient and safe access for personnel and equipment.*

**Action(s) taken in response:** The Applicant's selection of vibroseis technology and equipment assisted by helicopter operations does result in the lowest number of vehicles necessary to



provide for efficient and safe seismic survey operations. In fact, there may be less equipment necessary for the Applicant's proposed operations than with other forms of seismic acquisition seeking the same quality of survey acquisition. The "one-pass" survey plan will also minimize the number of vehicle-days that vehicle and aircraft are present in any given location within the Preserve.

**Recommended mitigation measure:** *Reduce vehicle speeds on access roads to minimize dust. Consider spraying roads and access routes with freshwater to reduce dust.*

**Action(s) taken in response:** The vibroseis buggies to be used in the field will be traveling at slow speeds so dust should not be an issue. If needed, the operator will spray water at helicopter landing areas to minimize dust from rotor wash.

**Recommended mitigation measure:** *Use properly designed, maintained and operated equipment to reduce emissions such as proper engine fuel mixtures, regularly serviced exhaust systems, and proper engine tuning.*

**Action(s) taken in response:** The Applicant intends to contract with Dawson Geophysical Company to conduct vibroseis seismic survey operations. Dawson has an excellent reputation for using and maintaining the highest quality equipment shown throughout Section 5.0.

**Recommended mitigation measure:** *Use designated access routes, designated roads, and natural routes (e.g., waterways) whenever possible during operations and during travel to and from the project area.*

**Action(s) taken in response:** The Applicant intends to utilize as much as feasible, with NPS approval, existing roads, trails, and other disturbed areas as part of its environmental mitigation/avoidance strategy in conducting the proposed seismic survey operations. See Section 5.10 of the POP.

**Recommended mitigation measure:** *Locate primary staging areas outside of the park. Confine refueling, lubrication, and maintenance of vehicles and equipment to areas outside the park where feasible.*

**Action(s) taken in response:** The Preserve covers a vast area, which makes the use of staging areas outside of the Preserve impractical. This would result in more vehicle trips in the Preserve (as vehicles travel between distant staging areas and areas of operation), shorter operating hours, and a longer period of time when surveying equipment are located within the Preserve (due to less efficient operations). The BCNP 1974 and Addition's 1988 congressional acts provide that the private mineral owner can continue to pursue exploring for, developing, and producing oil



and gas subject to appropriate environmental protections. Staging areas for proposed operations are necessarily located inside the Preserve, and within the NG3-D seismic survey areas, for efficient and effective seismic exploration operations.

**Recommended mitigation measure:** *Where feasible, use global positioning systems (GPS) technology to minimize the amount of vegetation removal when surveying source and receiver lines.*

**Action(s) taken in response:** The Applicant intends to fully utilize the latest GPS technology in its proposed seismic exploration operations as described extensively in Section 5 of the POP.

**Recommended mitigation measure:** *In areas where vegetative cover precludes the use of traditional GPS survey equipment, use of non-satellite kinematic and inertial survey control systems to survey source and receiver lines to eliminate the need to trim or remove vegetation.*

**Action(s) taken in response:** The Applicant intends to fully utilize such systems with limited staking to supplement GPS surveying and on the ground navigation as described in Section 5 of the POP in order to avoid vegetation trimming as much as feasible.

**Recommended mitigation measure:** *Conduct operations during dormant (plant dormancy) seasons.*

**Action(s) taken in response:** As addressed throughout the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. This period is also the dormancy period for cypress vegetation. This is consistent with the MMP developed for the original BCNP in 1992 as part of an EIS process.

**Recommended mitigation measure:** *Cut vegetation by hand, supplementing as necessary with chain saws or other motorized cutting equipment.*

**Action(s) taken in response:** The Applicant intends to comply. Vegetation trimming and/or brush cutting will be conducted pursuant to MMP Stipulations #16 and #17 (see POP Exhibit 5, MMP Compliance).

**Recommended mitigation measure:** *Selectively cut vegetation along source and receiver lines, offsets, and designated access routes as necessary to accommodate safe passage of personnel and equipment.*

**Action(s) taken in response:** The Applicant intends to fully comply (see POP Exhibit 5, MMP Compliance).



**Recommended mitigation measure:** *Leave small vegetation in place (low shrubs and herbaceous vegetation), consistent with safe passage of personnel and equipment.*

**Action(s) taken in response:** The Applicant intends to fully comply (see POP Exhibit 5, MMP Compliance).

**Recommended mitigation measure:** *Leave topsoil, rootstock, and seeds on lines and designated access routes to encourage natural re-vegetation.*

**Action(s) taken in response:** With its use of vibroseis technology, the Applicant's does not anticipate producing the type of impacts that would require such restoration activities. However, the Applicant will comply with such measures, if required.

**Recommended mitigation measure:** *Clear vegetation in accordance with the park's current vegetation management plans or policies.*

**Action(s) taken in response:** The Applicant intends to comply with the MMP's Important Resource Stipulation, as well as Stipulations #16 and #17 (see POP Exhibit 5, MMP Compliance).

**Recommended mitigation measure:** *Secure flagging, other markers, cables, or other equipment without cutting or slicing vegetation.*

**Action(s) taken in response:** As discussed in the POP, the Applicant intends to utilize GPS and high resolution imagery to modify and reposition (as necessary) initial pre-plotted receivers and vibration points. Surveyors, receiver layout crews, and vibroseis buggies will have navigations systems to direct equipment to pre-determined GPS points thus reducing the need for surveying and staking with the limited exception of trail marking and route indicators to facilitate operations. Survey operations will still be required for hazard identification and ground trothing prior to acquisition crew activities.

**Recommended mitigation measure:** *Do not permanently mark any tree in the park.*

**Action(s) taken in response:** Should there be a need to mark trees for facilitating operations, the Applicant will utilize colored flagging or ribbons, which will be recovered following completion of operations.

**Recommended mitigation measure:** *Use means of access other than land vehicles when soils are saturated to minimize compaction, displacement, and rutting of clayey soils.*



**Action(s) taken in response:** It is the Applicant's intent to avoid operating in wet or saturated soil conditions.

**Recommended mitigation measure:** *Conduct operations during dry seasons when soils are less susceptible to compaction, displacement, and rutting.*

**Action(s) taken in response:** As addressed throughout the POP, the Applicant intends to conduct proposed seismic survey operations during the "dry season," from December through May.

**Recommended mitigation measure:** *Use vehicles with low ground pressure to minimize surface impacts. In lieu of using large mechanized drilling equipment, use lightweight, walk behind tracked drills or hand augers as appropriate in the park.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Vibroseis buggies equipped with a hydraulically-lowered vibrating steel plate will be used to create seismic signals. These vehicles will be equipped with "balloon" or "flotation" tires to reduce ground pressures to around 26 pounds per square inch (psi), or 11 psi less than the equivalent of a pickup truck. These tires are expected to "push" over vegetation rather than uproot vegetation and reduce soil compaction and the likelihood of rutting.

**Recommended mitigation measure:** *Use sonic drilling technology to reduce shothole cuttings.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Plan efficient refueling of vehicles and equipment to minimize travel and chances for spills.*

**Action(s) taken in response:** The Applicant intends to comply. The Applicant has addressed these measures in its POP that meet the intent of this mitigation suggestion (see Section 5 of the POP).

**Recommended mitigation measure:** *Refuel or lubricate equipment over secondary containment such as drip pans, drip basins, or impenetrable polyvinyl covered by absorbent materials.*

**Action(s) taken in response:** The Applicant has addressed these measures in its POP that comply with the intent of this mitigation suggestion (see Sections 5 and 6 of the POP).



**Recommended mitigation measure:** *Periodically check for leaks under all operating vehicles and equipment; contain and remove contaminated soil for proper disposal.*

**Action(s) taken in response:** The Applicant has addressed these measures in its POP that comply with the intent of this mitigation suggestion (see Sections 5 and 6 of the POP).

**Recommended mitigation measure:** *Replace all cuttings in shotholes/boreholes, including proper tamping of cuttings during shothole plugging. Avoid backfilling shotholes too quickly to avoid bridging. Spread any remaining cuttings on the surface into a thin layer at each hole. Note: Plugging materials may be required for shotholes less than 20 feet deep.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Use high velocity seismic energy source charges and electric detonation systems that allow smaller energy sources with better signal strength and a high degree of safety.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Use existing stream crossings whenever practicable.*

**Action(s) taken in response:** As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. As such, the Applicant does not expect to encounter “streams” in the seismic survey area. However, the Applicant would follow this recommendation, if required.

**Recommended mitigation measure:** *Minimize stream crossings, if necessary to conduct operations, cross at right angles to the stream.*

**Action(s) taken in response:** As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. As such, the Applicant does not expect to encounter “streams” or “stream crossings” in the seismic survey area. However, the Applicant would follow this recommendation, if required.



**Recommended mitigation measure:** *Ensure that approaches to stream crossings do not alter natural drainage into the stream. Temporary runoff diversion and/or erosion control structures may be appropriate to minimize erosion and vegetation loss.*

**Action(s) taken in response:** As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. As such, the Applicant does not expect to encounter “streams” or “stream crossings” in the seismic survey area. It is the intent of the Applicant to avoid wet areas as much as possible. However, the Applicant would follow this recommendation, if required.

**Recommended mitigation measure:** *Whenever practical, cross streams or watercourses where the water is shallow and the streambed or bottom is firm.*

**Action(s) taken in response:** As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. As such, the Applicant does not expect to encounter “streams” or “stream crossings” in the seismic survey area. It is the intent of the Applicant to avoid wet areas as much as possible. However, the Applicant would follow this recommendation, if required.

**Recommended mitigation measure:** *Minimize width of survey lines and designated access routes, particularly at water crossings to minimize input of sediment and vegetation in watercourses.*

**Action(s) taken in response:** As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. As such, the Applicant does not expect to encounter “streams” or “stream crossings” in the seismic survey area. It is the intent of the Applicant to avoid wet areas as much as possible. However, the Applicant would follow this recommendation, if required.

**Recommended mitigation measure:** *Avoid blocking or filling any natural drainage path.*

**Action(s) taken in response:** The Applicant intends to comply. As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” which from December through May. Further, the Applicant’s proposed operations do not intend to disturb the surface, or block or fill natural drainage paths.

**Recommended mitigation measure:** *When traveling in water, use slow vehicle and boat speeds to minimize resource damage.*



**Action(s) taken in response:** As addressed in the POP, the Applicant intends to conduct proposed seismic survey operations during the “dry season,” from December through May. It is the intent of the Applicant to avoid wet areas as much as possible. As such, the Applicant does not plan to operate in standing water it may encounter in the seismic survey area. However, the Applicant would follow this recommendation, if required.

**Recommended mitigation measure:** *When using boats, ensure adequate water depth to minimize bank erosion and effects on aquatic life.*

**Action(s) taken in response:** No boats are to be used in the Applicant’s operations proposed in its POP.

**Recommended mitigation measure:** *Secure portable fuel tanks to the boat for safety and to prevent loss.*

**Action(s) taken in response:** No boats are to be used in the Applicant’s operations proposed in its POP.

**Recommended mitigation measure:** *Use loading poles or tamping poles to ensure charges are placed and seated at the proper depth, and shotholes are properly plugged with cuttings and/or other authorized materials. Use plugging materials that meet International Association of Geophysical Contractors (IAGC) standards.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Use plugging materials in tubes or casing which will expand appropriately. Recommended tube diameter is 75 percent of shothole diameter.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Plugs should set at least 24 hours before detonation of charges.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.



**Recommended mitigation measure:** *If a flowing shothole occurs (groundwater under artesian conditions), attempt to plug it immediately. If the flow is too great, use expansive plugging material inflatable plug above the aquifer and backfill with expansive plugging material to the surface.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Clean vehicles and equipment prior to entering the project area to avoid introducing foreign plant materials.*

**Action(s) taken in response:** The Applicant intends to comply.

**Recommended mitigation measure:** *For vehicles, clear the undercarriage of brush to prevent fires when driving over dry areas. Use spark arresters and spark suppression accessories on equipment.*

**Action(s) taken in response:** The Applicant intends to comply (see Section 6 and Exhibit 5, MMP Compliance, Stipulations #6 and #7 of the POP).

**Recommended mitigation measure:** *Avoid threatened, endangered, and sensitive species and their habitats during project design.*

**Action(s) taken in response:** The Applicant has followed this recommendation in the development of the POP. In its POP, the Applicant discusses at length its environmental mitigation/avoidance strategies including 3-D design modification to accomplish the goals of the suggested mitigation measure (see Sections 5 and 10 of the POP).

**Recommended mitigation measure:** *Use USFWS “Conservation Guidance for Plant and Animal Candidate Species” to plan and conduct operations that will minimize disturbances to these species.*

**Action(s) taken in response:** The Applicant has provided an extensive report on threatened and endangered flora and fauna existing in the NG3-D seismic survey areas based, in large part, on NPS, USFWS, and FWCC documented data. The Applicant intends to utilize appropriate buffer areas and set-backs for those species deemed to be protected (see Sections 1, 5.10, and 10 and Exhibit 5, MMP Compliance, Important Resource Area Protections Stipulation of the POP).



**Recommended mitigation measure:** *Provide field personnel with training in identification and habits of wildlife in the project area.*

**Action(s) taken in response:** The Applicant intends to provide ecological personnel in the field and the necessary threatened and endangered species training to field personnel prior to commencement of operations (see Section 5 of the POP).

**Recommended mitigation measure:** *If using helicopters, locate helipads as far apart as practical in existing clearings.*

**Action(s) taken in response:** As discussed in its POP, the Applicant intends to utilize five staging areas throughout the survey program area to facilitate operations. With the exception of staging areas located on the north side of I-75 made necessary because of restricted access to and across an interstate highway, the remaining staging area locations are widely separated from each other, consistent with this recommended mitigation measure.

**Recommended mitigation measure:** *Consistent with safety, minimize the number of helicopter flyways.*

**Action(s) taken in response:** The Applicant, in consultation with NPS and incorporating best practices, will determine appropriate flyways for safe and efficient operations.

**Recommended mitigation measure:** *Use GPS field asset tagging technology for real-time monitoring and helicopter support operations to minimize flight time and reduce the need for field staging areas.*

**Action(s) taken in response:** As discussed in its POP, the Applicant intends to utilize such practices (see Section 5 of the POP).

**Recommended mitigation measure:** *Use long sling lines, consistent with safety, to minimize the effects of down draft from the rotor.*

**Action(s) taken in response:** As discussed in its POP, the Applicant intends to utilize such practices (see Section 5 of the POP).

**Recommended mitigation measure:** *Avoid or bypass wildlife areas marked on the project map and/or in the field to minimize disruption to wildlife, especially in areas of active denning, nesting, spawning, migration, and feeding. Where interaction with wildlife is unavoidable, minimize the sights, sounds, and duration of operations to the maximum extent feasible.*



**Action(s) taken in response:** The POP is designed to follow this recommendation. The Applicant has provided an extensive environmental report on threatened and endangered flora and fauna existing in the NG3-D seismic survey areas based, in large part, on NPS, USFWS, and FWCC documented data. The Applicant intends to utilize appropriate buffer areas and set-backs for those species deemed to be protected (see Sections 1, 5.10, and 10 and Exhibit 5, MMP Compliance, Important Resource Area Protections Stipulation of the POP).

**Recommended mitigation measure:** *Report any sighting of threatened, endangered, or sensitive species or paleontological resources to the NPS.*

**Action(s) taken in response:** The Applicant intends to comply.

**Recommended mitigation measure:** *Inform visitors and area residents and users while planning and conducting an operation. For example, post warning and informational signs, notices in visitor centers, notices in local newspapers and publications, etc.*

**Action(s) taken in response:** The Applicant intends to comply (see Sections 5 and 10 of the POP).

**Recommended mitigation measure:** *Conduct operations during low visitor use periods.*

**Action(s) taken in response:** The BCNP MMP stipulates that exploration activities take place during the “dry season” period. However, the Applicant intends to incorporate measures to minimize conflicts between visitors and its proposed operations as described in Sections 5 and 10 of the POP.

**Recommended mitigation measure:** *Adequately sign project area, especially at visible intersections and locations, indicating type of operation and other information and appropriate actions.*

**Action(s) taken in response:** The Applicant intends to comply (see Section 5 and Exhibit 5, MMP Compliance, Stipulation #31 of the POP).

**Recommended mitigation measure:** *Immediately following completion of operations, remove survey stakes, flagging, trash, and other debris or waste from the project area.*

**Action(s) taken in response:** The Applicant intends to comply (see Section 5 and Exhibit 5, MMP Compliance, Stipulation #35 of the POP).



**Recommended mitigation measure:** *Do not burn vegetation, survey stakes, flagging, refuse, or other debris or waste incidental to maintenance or operation.*

**Action(s) taken in response:** The Applicant intends to comply (see Section 5 and Exhibit 5, MMP Compliance, Stipulation #35 of the POP).

**Recommended mitigation measure:** *Provide trash bags and trash receptacles for cans, bottles, paper, and other trash generated daily by crews.*

**Action(s) taken in response:** The Applicant intends to comply (see Section 5 and Exhibit 5, MMP Compliance, Stipulation #35 of the POP).

**Recommended mitigation measure:** *Bury and/or secure cap wire from undetonated or live charges to reduce risk to human health and safety.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *Take appropriate measures to ensure all charges are fired. Disable misfired charges by breaking or cutting the cap wire as deep below ground as practical.*

**Action(s) taken in response:** The Applicant is conducting a seismic survey where vibroseis technology (ground vibrations) is replacing drilled, buried, and detonated dynamite charges to produce seismic signals. Therefore, this suggested mitigation measure is not applicable.

**Recommended mitigation measure:** *When working in dry vegetation, prohibit smoking, or only allow smoking at designated times and locations.*

**Action(s) taken in response:** The Applicant intends to comply (see Sections 5 and 6 and Exhibit 5, MMP Compliance, Stipulations #6 and #7 of the POP).

**Recommended mitigation measure:** *Ensure fire-fighting equipment and personnel are available while operating in dry vegetation. Consider both fire danger and fire danger rating during planning and conduct of operations.*

**Action(s) taken in response:** The Applicant intends to comply (see Sections 5 and 6 and Exhibit 5, MMP Compliance, Stipulations #6 and #7 of the POP).



**Recommended mitigation measure:** *Use seed, mulch, or other authorized materials or structures to mitigate the potential for erosion. Use certified weed-free mulch, native seed, or sterile cover crops that are not sources of undesirable nonnative plant species.*

**Action(s) taken in response:** The Applicant intends to comply if such erosion protection is required.



**EXHIBIT 13**

**FDEP-OGS *DE MINIMIS* INTER-AGENCY AGREEMENT**



Memorandum

Florida Department of  
**Environmental Protection**

**TO:** Phil Coram, Chief, Bureau of Submerged Lands and Environmental Resources  
Doug Frye, Bureau of Submerged Lands

**FROM:** Don Hargrove, Oil & Gas Section, FGS *DHL*

**DATE:** August 26, 1997

**SUBJECT:** Letter Sent to Interested Parties Regarding *de minimis* Exemption Procedures for Oil & Gas Geophysical Permits

Enclosed is a copy of the letter which sent to interested parties (distribution list attached) regarding the *de minimis* exemption procedures for Oil & Gas Geophysical Permits.

Again let me thank you for all of your efforts. I know this will be beneficial to everyone involved.





## Department of Environmental Protection

Florida Geological Survey • Division of Technical Services  
Gunter Building • 903 W. Tennessee Street • Tallahassee, FL 32304-7700  
Lawton Chiles Governor Phone: (904) 487-2219 • Fax: (904) 488-8086

Virginia B. Wetherell  
Secretary

August 20, 1997

Mr. Wallace Hibbard, Superintendent  
Big Cypress National Preserve  
HCR 61 Box 110  
Ochopee, FL 33943

Dear Mr. Hibbard:

In order to be more responsive to the geophysical exploration applicant's needs the Department of Environmental Protection has implemented a new oil and gas geophysical permitting procedure.

Phil Coram and Doug Frye of the Bureau of Submerged Lands and Environmental Resources together with Walt Schmidt, David Curry and myself of the Florida Geological Survey, have entered into an agreement whereby the Survey will be the sole permitter for geophysical applicants qualifying for a *de minimis* exemption. Enclosed is a copy of the *De Minimis Exemption Qualification for Oil and Gas Geophysical Permits*, which explains the process in detail. This "one-stop permitting" will reduce the duplication of time and effort both by the applicant and the Department and will allow the applicant to submit only one fee and provide only one surety bond.

Please read the enclosed copy of the procedures and if you have any questions call me at the number listed above.

Sincerely,

Don L. Hargrove, Engineer  
Oil and Gas Section

DLH/cs

Enclosure



## De Minimis Exemption Qualification for Oil and Gas Geophysical Permits

The process described below will be used to issue Oil and Gas Exploration Geophysical permits (OGEGP) under Section 377.2424, F.S., that also require a corresponding authorization under Part IV of Chapter 373, F.S. (hereinafter called environmental resource permits (ERP)/wetland resource (WR) permits<sup>1</sup>). This process is intended to reduce paperwork for the applicants and staff, as well as streamlining the review process, eliminating the need for applicants to submit a separate ERP/WR application for activities that qualify for a "*de minimis*" exemption under Subsection 373.406(6), F.S. This process envisions that the applicant submits an application for an OGEGP without a separate application for an ERP/WR permit. If the applicant makes a separate ERP/WR permit application to a Department (DEP) district office, the following procedures are not applicable, and each office is responsible for processing the corresponding ERP/WR and OGEGP applications.<sup>2</sup>

### Process

1. Within 5 days of receipt of an OGEGP application, the Florida Geological Survey (FGS) staff will forward a copy to the DEP district ERP/WR staff (concurrently with soliciting comments from other reviewers) for the "*de minimis*" determination.
2. If the DEP district ERP/WR staff note any items that may be required to determine whether the application qualifies for a "*de minimis*" exemption or proprietary authorization, such information shall be forwarded to the FGS Oil and Gas Section within 14 days of receipt of the copy of the application from the FGS.
3. DEP district ERP/WR staff determine whether the application qualifies for a "*de minimis*" exemption. If it so qualifies, the DEP district ERP/WR staff shall forward to the FGS a copy of the draft "*de minimis*" exemption determination letter and any conditions or modifications that are recommended to be included in the OGEGP permit within 21 days of receipt of the application by ERP/WR staff. The Division of State Lands will handle any required sovereign submerged lands authorization for these activities, so the ERP/WR staff do not have to be involved.<sup>3</sup>

<sup>1</sup> Note: wetland resource permits are applicable only within the NFWFMD and for certain activities throughout the rest of the state that are "grandfathered" from the ERP program under subsections 373.414(9) - (14), F.S.

<sup>2</sup> In such cases, a copy of the district office completeness summary for the ERP/wetland resource permit application, or determination of qualification for an exemption, shall be copied to the FGS.

<sup>3</sup> This authorization is in the form of a use agreement, with the fee calculated based on the length of the survey line.



*"De minimis"* Exemption for Geophysical Activities

July 16, 1997

Page 2

4. If the ERP/WR staff determine that the activity does not qualify for a *"de minimis"* exemption under Subsection 373.406(6), F.S., the ERP/WR staff will notify the FGS by phone, followed by a written confirmation. This written confirmation is due within twenty-one (21) days of receipt of the application by the ERP/WR staff. The FGS will notify the applicant of the need for a ERP/WR permit, and direct them to the appropriate DEP district office.
5. The FGS will copy the applicable DEP district office on:
  - a. All RAI's sent to the applicant;
  - b. Any notification to the applicant that they need an ERP, and
  - c. All final agency actions taken on the *"de minimis"* exemption determination, including issuance or denial of the OGEGP permit.



Mr. Gerard Berry  
Collier Resources Company  
2640 Golden Gate Parkway, Suite 106  
Naples, FL 33942-3200

Mr. Peter Spooner, Vice President  
Universal Seismic Associates  
16420 Park Ten Place, Suite 300  
Houston, TX 77084

Mr. Doug Shelby, Executive Director  
Florida Petroleum Council  
First Florida Tower, Suite 800  
215 South Monroe Street  
Tallahassee, FL 32301

Mr. Wallace Hibbard, Superintendent  
Big Cypress National Preserve  
HCR 61 Box 110  
Ochopee, FL 33943

Mr. Tom Sylte, President  
Florida Independent Petroleum Producers Association, Inc.  
P. O. Box 230  
Pensacola, FL 32591

Carolyn Raepple  
P.O. Box 6526  
Tallahassee, FL 32314

Oil & Gas Field Offices - Ft. Myers & Jay

Phil Coram  
Doug Frye  
Bureau of Submerged Lands and Environmental Resources



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## **EXHIBIT 14**

### **AREA OF INFLUENCE (AOI) ANALYSIS**



## AREA OF INFLUENCE (AOI) ANALYSIS

Appendix B, Table B-4 of the 1992 Big Cypress National Preserve (BCNP) General Management Plan/Environmental Impact Statement/Mineral Management Plan (GMP/EIS/MMP) states:

*“Only 10 percent of the preserve may be under the influence of oil and gas exploration and development activities at any given time.”*

The United States Department of the Interior – National Park Service (USDOI-NPS) postulates in the 1992 GMP/EIS/MMP that there is some level of indirect “influence” that propagates beyond the actual footprint (direct impact) of active and inactive oil and gas operations. The area affected by an oil and gas activity beyond the direct impact footprint is designated by NPS as the “area of influence” or “AOI.”

This AOI analysis estimates the effect of planned NG3-D program operations on the resource values of the BCNP and the BCNP Addition (BCNP-A) utilizing the AOI concept put forth by the USDOI-NPS in the 1992 BCNP GMP/EIS/MMP, Appendix B.

### Background

In the 1992 BCNP GMP/EIS/MMP, the USDOI-NPS instituted a ten percent (10%) overall AOI limit for current and future oil and gas operations within the BCNP (the BCNP-A had not yet been conveyed to the USDOI in 1992 when the GMP was published). An AOI is comprised of an oil and gas activity’s temporary footprint enlarged by an AOI radius assigned by the USDOI-NPS to yield the areal extent of that activity’s “influence” on the BCNP. In Appendix B, Table B-4, the USDOI-NPS assigns an “AOI Radius” to a variety of oil and gas activities. These activity radii are shown in the following table excerpted from the 1992 GMP/EIS/MMP (Table E14-1).



Activity	Primary Criteria	Area of Influence Radius
Inactive or Abandoned Roads & Pads	Hydrology Vegetation & Soils	300 feet
Geophysical Operations without Helicopters	Noise Wildlife	0.5 mile
Geophysical Operations with Helicopters	Noise Wildlife	0.75 mile
Completed Geophysical Survey lines	Vegetation & Soils	Direct Impact
Reclaimed Geophysical Survey Lines	Vegetation & Soils	0
Construction (roads, pads, & pipelines)	Noise Water Quality Vegetation & Soils Wildlife	0.5 mile
Drilling Operations (roads & pads)	Noise Visual Quality Water Quality Vegetation & Soils Wildlife	0.5 mile
Production Roads without Adjacent Flowlines	Noise Wildlife	0.25 mile
Production Roads with Adjacent Flowlines	Noise Water Quality Vegetation & Soils Wildlife	0.5 mile
Production Pads	Noise Water Quality Air Quality & Odor Vegetation & Soils Wildlife	0.5 mile
Production Pipelines	Water Quality Vegetation and Soils	0.5 mile
Removal of Roads, Pads, & Pipelines	Noise Water Quality Vegetation and Soils Wildlife	0.5 mile
Recontoured & Replanted Roads, Pads, & Pipelines	Hydrology Vegetation and Soils	Direct Impact
Reclaimed Roads, Pads, & Pipelines	Vegetation and Soils	0

**Table E14-1. Table B-4 from 1992 GMP/EIS/MMP, Appendix B**



The Ten Percent AOI Stipulation on oil and gas activity represents the USDOJ-NPS's attempt to quantify an answer to the question: "How much is too much?" The 1992 GMP/EIS/MMP estimated that 1,113± acres in direct impacts had resulted in 19,654± acres of the BCNP's 576,442± acres being influenced or affected by current and past oil and gas activities. When compared to the original Preserve's total area, this estimate amounted to a 1992 oil and gas AOI of 3.4 percent - leaving 6.6 percent room for new activities.

### AOI Estimates for Peak or Maximum NG3-D Seismic Survey Activity

The various operational activities comprising the NG3-D seismic survey program are discussed in Section 4 of the Plan of Operations and shown in the table below.

**Table E14-2. Estimated Timetable and Personnel**

Activity Segments	Personnel	Total Number	Weeks Active	Where
Staging Area Access Prep	<ul style="list-style-type: none"> <li>• FDOT Crews with Supervisor (2)</li> </ul>	10	Before Operations Start	I-75 FDOT ROW
Staging Area Prep	<ul style="list-style-type: none"> <li>• Project Manager</li> <li>• Preparation Crews (2)</li> </ul>	1 6	1-18 1-4	FDOT and BCNP
Mob and Surveying	<ul style="list-style-type: none"> <li>• Crew Chief</li> <li>• Survey Crews (5)</li> <li>• Brush Cutters</li> </ul>	1 10 3	1-10 1-10 1-10	BCNP and BCNP-A
Data Acquisition and Receiver Layout/Pickup	<ul style="list-style-type: none"> <li>• Supervision</li> <li>• Layout Crews (4)</li> <li>• Line View/Troubleshoot Crews (6)</li> <li>• Pickup Crews (4)</li> <li>• Equipment Maintenance</li> <li>• Survey Crew (1)</li> <li>• Staging Area Helpers</li> <li>• Helicopter Crew (1) <ul style="list-style-type: none"> <li>○ Pilot</li> <li>○ Coordinator</li> <li>○ Ops. Advisor</li> </ul> </li> </ul>	3 16 12 16 1 2 6 3	5-18 5-18 5-18 5-18 5-18 1-18 5-18 5-18 5-18 5-18	BCNP and BCNP-A
Data Acquisition – Vibroseis Operations	<ul style="list-style-type: none"> <li>• Crews (7)</li> <li>• Scout Crews (2)</li> <li>• Equipment Maintenance</li> <li>• Transportation Driver</li> <li>• Recording Crews (2)</li> </ul>	7 2 1 1 2	5-18 5-18 5-18 5-18 5-18	BCNP and BCNP-A
Clean-up	<ul style="list-style-type: none"> <li>• Crews (2 to 3)</li> </ul>	No Additional	1-18	BCNP and BCNP-A
Inspections	<ul style="list-style-type: none"> <li>• NPS</li> <li>• State</li> </ul>	1 1	1-18 1-18	BCNP and BCNP-A
Reclamation	<ul style="list-style-type: none"> <li>• TBD</li> </ul>	TBD	As Needed During 1-18	BCNP and BCNP-A



The approach used by the Applicant to test compliance with the Ten Percent AOI Stipulation is that of estimating the AOI during the period of peak or maximum activity which is anticipated to occur during weeks eight through ten when work segments are engaged in the field (Table E14-2). The AOI compliance calculation incorporates (i) the appropriate radii from Table E14-1 for each NG3-D seismic survey activity segment to determine an estimate of peak AOI acreage (Table E14-3); (ii) an estimate of overall AOI by adding the peak NG3-D AOI to the 1992 oil and gas AOI estimated acreage adjusted for current conditions; and (iii) a comparison of the resulting percentages of affected original BCNP and BCNP-A combinations to the ten percent limit (Table E14-4).

NG3-D seismic survey work segments can be thought of as “bubbles” of activities with each work segment in the timeline table imposing a discrete and temporary disturbance on the surface that extends outward and is contained within a circular area. Moving from east to west over the 3-D program area, these activities begin in the morning, end at dusk, and repeat the next day until the survey is completed. These activity bubbles are either “static” or “non-static.” Examples of static influences would be staging areas and certain support equipment located in the field such as the acquisition trailer. Static influences represent a baseline of the NG3-D seismic survey’s AOI. Non-Static influences or AOIs, which are additive to the baseline AOI, would be seismic survey activities that move around during the work day such as receiver line deployment and pick up crews, helicopter receiver equipment deployment and pickup, and vibroseis buggy movement during the seismic acquisition work segments.

AOI calculations for these activities are the greatest if each activity is spread out in the 110 square-mile seismic survey program area at distances greater than the assigned AOI radius for each activity. In reality, however, and given the large radii distances assigned to each activity, certain activity “disturbance bubbles” may overlap with each other at various times during the survey or be subsumed within pre-existing BCNP disturbances such as Interstate 75 (I-75) traffic and rest and recreational parking areas or other user activities thus resulting in a lower net incremental AOI calculation than would otherwise occur.

AOI estimates for NG3-D activity segments are shown in the table below:

**Table E14-3. Estimated Maximum or Peak Workday AOI during NG3-D Operations**

Work Segment	Number	Temporary Direct Impact	AOI Radius (Miles)	Total AOI (Acres)
Staging Areas	5	2-4 acres each	0.5	2,525
Surveying	5 Crews	3 ft. radius/member	0.5	2,510
Receiver Layout & Retrieval				
• LO/Retrieve	8 Crews	3 ft. radius/member	0.5	4,106
• Troubleshoot	6 Crews	3 ft. radius/member	0.5	3,012
• Helicopter	1 Helo	300 ft. radius	0.75	1,131
Data Acquisition	2 Groups of 3 Vibes w/Scouts	300 ft. radius/group	0.5	1,004



**Table E14-3. (Continued)**

Work Segment	Number	Temporary Direct Impact	AOI Radius (Miles)	Total AOI (Acres)
Cleanup	3 Crews	3 ft. radius/member	0.5	1,500
<b>Total</b>				<b>15,788</b>

The above NG3-D AOI estimates include the following assumptions or observations:

- NG3-D baseline AOI acreage estimate originates from the presence of five staging areas (four located adjacent to I-75) and totals 2,525± acres;
- There is no AOI differentiation made between staging area and their activity levels although most (four of five) staging areas will be used far less and at lower activity levels than the main staging area, MM-63S, that is located near the MM-63 Rest Area;
- There are no reductions to staging area AOIs although four of five staging areas are proximate to I-75 and within its noise envelope. It could be argued that most of the staging area AOI amount is subsumed within the existing I-75 existing AOI;
- Direct impact from crew activity does assume members of each crew are essentially together within an AOI bubble;
- Direct impacts radii are relatively small and subsumed within NPS-assigned AOI radius amount;
- There is no AOI differentiation between on-foot activities (receive layout and pickup/receiver checks/cleanup activities) and mechanized operations (vibroseis); and
- NG3-D work segments activities are calculated with no overlap reductions.

Estimated results for the NG3-D seismic survey AOI calculations are shown in the table below:

**Table E14-4. Estimated AOI Results for NG3-D Seismic Survey Activities**

	BCNP		BCNP and BCNP-A	
	AOI Acres	Percent of BCNP	AOI Acres	Percent of BCNP and BCNP-A
Existing Oil and Gas Activity	15,809	2.7	21,073	2.9
NG3-D Seismic Survey	15,788	2.7	15,788	2.2
<b>Total</b>	<b>31,597</b>	<b>5.4</b>	<b>36,861</b>	<b>5.1</b>

The above table assumes the following:

- 576,442± acres in the BCNP and 147,000± acres in the BCNP-A (723,442± total acres)



- The estimated May 1, 1991 AOI acreage (referenced in the 1992 BCNP-GMP/EIS) of 19,654± acres has been reduced by 3,845± AOI acres to a current estimate of 15,809± AOI acres as a result of reclaiming 87± acres of direct impacts in the Bear Island Field;
- BCNP-A has one-third the current oil and gas AOI acreage (5,264± acres) as BCNP for a total BCNP-A AOI of 21,073± acres; and
- Assumes no further reduction in 1992 BCNP AOI although it is likely that more oil and gas infrastructure has been reclaimed (either naturally or by operators) over and above the estimated 87± acres in Bear Island Oil Field.



**EXHIBIT 15**

**USACOE NO PERMIT REQUIRED E-MAIL CONFIRMATION DATED  
JANUARY 30, 2014**



**From:** [Kenneth Passarella](#)  
**To:** [Melissa Kruse](#); [Alicia Dixon](#)  
**Subject:** FW: Nobles Grade 3-D Seismic Survey Project (PAI#13BOC2197)  
**Date:** Thursday, January 30, 2014 2:19:26 PM  
**Attachments:** [Corps Pre-App Worksheet0120.docx](#)

---

-----Original Message-----

From: McElwain, Tunis W SAJ [<mailto:Tunis.W.McElwain@usace.army.mil>]  
Sent: Thursday, January 30, 2014 1:37 PM  
To: Kenneth Passarella  
Cc: Alicia Dixon  
Subject: FW: Nobles Grade 3-D Seismic Survey Project (PAI#13BOC2197)

Ken,

Based on the information presented in the meeting today, this project will not require a Corps permit because no fill nor mechanical clearing would occur in Waters of the United States.

Thanks,

Tunis W. McElwain  
Chief, Fort Myers Section  
Regulatory Division  
Jacksonville District

Office: 239-334-1975, ext 30  
Fax: 239-334-0797

Let us know how we're doing! Complete this brief survey: [http://corpsmapu.usace.army.mil/cm\\_apex/f?p=regulatory\\_survey](http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey)

-----Original Message-----

From: Melissa Kruse [<mailto:melissak@passarella.net>]  
Sent: Monday, January 20, 2014 8:57 AM  
To: McElwain, Tunis W SAJ  
Subject: [EXTERNAL] RE: Nobles Grade 3-D Seismic Survey Project (PAI#13BOC2197)

Good morning Tunis,

Attached is the requested pre-application worksheet. As noted on the worksheet the client's attorney would like to participate; therefore the COE attorney will need to as well.

-----Original Message-----

From: McElwain, Tunis W SAJ [<mailto:Tunis.W.McElwain@usace.army.mil>]  
Sent: Monday, January 13, 2014 3:26 PM  
To: Melissa Kruse  
Subject: RE: Nobles Grade 3-D Seismic Survey Project (PAI#13BOC2197)

Melissa,



Please complete the attached form and send it back to me. It will help me determine how to prepare for the meeting and if additional Corps staff need to be present.

Thanks,

Tunis

-----Original Message-----

From: Melissa Kruse [<mailto:melissak@passarella.net>]

Sent: Monday, January 13, 2014 3:22 PM

To: McElwain, Tunis W SAJ

Subject: [EXTERNAL] RE: Nobles Grade 3-D Seismic Survey Project (PAI#13BOC2197)

Good afternoon Tunis,

I just wanted to follow-up on the meeting request below. If you could forward me some available dates/times it would be greatly appreciated. Thanks!

From: Melissa Kruse

Sent: Tuesday, January 07, 2014 9:34 AM

To: Tunis McElwain ([tunis.w.mcelwain@usace.army.mil](mailto:tunis.w.mcelwain@usace.army.mil))

Subject: Nobles Grade 3-D Seismic Survey Project (PAI#13BOC2197)

Tunis,

I've been asked to set up a meeting with you to discuss the Nobles Grade 3-D Seismic Survey project. We will be submitting a FDEP ERP next week (week of the 13th) and would like to meet sometime that week to discuss further. If you could provide me with some available dates and times it would be greatly appreciated. Thanks!

Regards,

Melissa Kruse

Executive Administrator

Passarella & Associates, Inc.

Offices in Florida and South Carolina

13620 Metropolis Avenue, Suite 200

Fort Myers, Florida 33912

Phone (239) 274-0067 Fax (239) 274-0069



[www.passarella.net](http://www.passarella.net)

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## PREAPPLICATION WORKSHEET

Applicant: **Burnett Oil Co., Inc.**

Project Name: **Nobles Grade 3-D Seismic Survey**

Project Location(S/T/R and parcel ID/s): **The program area includes all or portions of Township 49 South, Ranges 30, 31, 32, 33, and 34 East; Township 50 South, Ranges 30, 31, 32, 33, and 34 East; and Township 51 South, Ranges 31, 32, 33, and 34 East; and Township 52 South, Ranges 32, 33, and 34 East.**

Project Type (Mine/Residential/Commercial/Mixed/Marina/Dredge): **Seismic Survey**

Project Size: **The proposed seismic survey will temporarily traverse through an area of approximately 366± square miles (234,500± acres) of surface land.**

Estimated Project Impacts: **The Applicant plans to avoid any discharge of dredged or fill material into wetlands as part of the seismic survey.**

Potential ESA Concerns (if Known): **None**

Formal or Preliminary Jurisdictional Determination Requested: **N/A**

Previous DA Permits/JD Determinations provide#/Dates): **N/A**

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### Meeting Attendee Name:

### Capacity/Affiliation:

**Frank Stillwell**

**Burnett Oil Co., Inc.**

**Rob Hilliard**

**Burnett Oil Co., Inc.**

**Neal McAliley**

**White and Case, LLP (Attorney)**

**Ken Passarella**

**Passarella & Associates, Inc.**

**Alicia Dixon**

**Passarella & Associates, Inc.**

**Bob Duncan**

**Duncan Oil & Gas Consulting, LLC**

**Dave Wisniewski**

**Dawson Geophysical Company**

### Important Note:

The Corps does not routinely find that the applicant requires representation by an attorney at the pre-application meeting but must be informed if the applicant intends to have legal counsel present during the meeting.



If the applicant will be represented by official legal counsel you must provide the name (and firm) of the attorney to be present. The Corps may need to make arrangements for legal representation by Corps legal counsel if the applicant's counsel will be present in an advisory capacity. Supplemental arrangements may cause delay in scheduling your requested meeting due to limited availability of Corps OC staff. If adequate arrangements have not been made for Corps counsel and the applicant's attorney is present the meeting may be rescheduled.



**EXHIBIT 16**

**FDEP-OGS LETTER DATED FEBRUARY 2, 2006**





Jeb Bush  
Governor

# Department of Environmental Protection

Florida Geological Survey  
Division of Resource Assessment & Management  
Geological Investigations Section  
Gunter Building • 903 W. Tennessee Street • Tallahassee, FL 32304-7700  
Phone: (850) 488-4191 • Fax: (850) 488-8086



Collen Castille  
Secretary

3 February 2006

Thomas A. Herbert, Ph.D., P.G.  
Vice President  
Lampl Herbert Consultants  
P.O. Box 10129  
Tallahassee FL 32302

Re: Collier Resources Company Seismic Exploration in Big Cypress

Dear Dr. Herbert:

The Big Cypress area of southern Florida contains no significant occurrences of fossils in naturally occurring exposures. In the subsurface, fossil mollusk faunas are common in the Plio-Pleistocene sediments and are normally exposed only by mining activities. Fossil vertebrates are occasionally found in association with the Plio-Pleistocene shell-bearing sediments.

If you have any further questions, please contact me.

Sincerely,

*Thomas M. Scott, Ph.D., P.G.*  
*Assistant State Geologist*  
*Florida Geological Survey*  
[thomas.scott@dep.state.fl.us](mailto:thomas.scott@dep.state.fl.us)  
URL: [dep.state.fl.us/geology/](http://dep.state.fl.us/geology/)

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