TECHNICAL REVIEW OF WETLANDS, WILDLIFE, VEGETATION AND HABITAT ASPECTS OF THE PROPOSED BURNETT OIL COMPANY NOBLES GRADE 3-D SEISMIC SURVEY,

BIG CYPRESS NATIONAL PRESERVE

Submitted to:

NATURAL RESOURCES
DEFENSE COUNCIL
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TECHNICAL REVIEW OF WETLANDS, WILDLIFE, VEGETATION AND HABITAT ASPECTS OF THE PROPOSED BURNETT OIL COMPANY NOBLES GRADE 3-D SEISMIC SURVEY, BIG CYPRESS NATIONAL PRESERVE

1.0 Existing Conditions

In April 2016 Quest Ecology Inc. (Quest) conducted a review of the following data sources for the seismic survey area within Big Cypress National Preserve (BCNP): US Fish and Wildlife Service (FWS), Florida Fish and Wildlife Conservation Commission (FWC), Everglades Digital Library, and US Geologic Survey.

According to the FWS National Wetland Inventory, the seismic survey area consists of 36,151 acres of Freshwater Forested/Shrub Wetland (52% of the total survey area), 22,943 acres of Freshwater emergent wetland (33% of the total survey area), 18 acres of freshwater ponds and 81 acres of riverine wetlands (Figure 2). According to the 2008 South Florida Water Management District’s land use database, the survey area consists of both wetlands and uplands (Table 1). The USGS quadrangles map show topography ranging from 0 to 15 feet above sea level (Figure 3). The USDA Natural Resources Conservation Service soils data was not available for the area, however, it can be inferred that hydric soils are present based on the fact that ~85% of the survey area is wetland.

Many listed species have been documented in BCNP. Florida panther mortality and telemetry records are found within and surrounding the seismic survey area, and the project location falls within the FWS’s defined Florida panther habitat zone (Figure 4). FWC’s database documents the following state and/or federally listed species in or within the near vicinity of the survey area: southeastern American kestrel, crested caracara, little blue heron, red-cockaded woodpecker, least tern, sandhill crane, tricolored heron, bald eagle, and white ibis (Figures 5 & 6). The Everglades Digital Library states the Cape Sable seaside sparrow, American alligator, eastern indigo snake, and the Arctic peregrine falcon can also be found in BCNP. According to the FWS 2016 active wood stork colony database, nine colonies have Core Foraging Areas (CFA, 18.6 miles) overlapping this project location (Figure 7). Additionally, the project location falls within the following FWS consultation areas: crested caracara (Caracara cheriway), Florida panther (Puma concolor coryi), Everglades snail kite (Rostrhamus sociabilis plumbeus), and red-cockaded woodpecker (Leuconotopicus borealis).

Many non-listed species are documented in the area as well. Florida black bear roadkill, telemetry, and nuisance reports are located within and surrounding the proposed survey area and the project location falls within FWC’s defined Florida black bear range (Figure 8). FWC’s database documents the following non-listed species in or within the near vicinity of the survey area: anhinga, great blue heron, red-eyed vireo, short-tailed hawk, snowy egret, swallow-tailed kite, tufted titmouse, and white-tailed deer (Figure 6). In addition, USGS documented 64 fish species within Big Cypress National Preserve, none of which
are listed species. Of note, per the Revised EA (page 14), actions associated with alternatives would not affect estuarine and fisheries resources because of work in the dry season, however impacts to fisheries was not analyzed in detail in the EA.

Table 1
SFWMD Land Uses

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<th>FLUCFCS Description</th>
<th>Acres</th>
<th>% of Survey Area</th>
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2.0 Vegetation Community Impacts

In order to clearly document the impacts associated with the seismic survey, a baseline vegetation survey should be conducted along the proposed survey routes, or at the very least within several representative areas of each habitat type to be potentially impacted. Recommended methods would include quantitative data collection along transects across proposed survey routes, as well as “control” transects in similar habitats where surveys are not proposed. The baseline vegetation survey should document the vegetative species cover and diversity for comparison with post-survey conditions. A post-survey monitoring program should be implemented following completion of the seismic survey to assess the survey impacts by comparing the post-survey information to the pre-survey information, and to compare with data from the control transects where no impacts occurred. This will serve to track the progress of and need for any required restoration activities to offset resource impacts. Restoration goals may also follow the conditions of control transects which will reflect seasonal vegetation changes for non-impact areas.

Although the survey activities are described by the National Park Service as temporary and short-term due to utilization of a “one-pass” approach, as depicted in Exhibit C1, some transects appear to be located within isolated areas inside of forested wetlands. Vehicles accessing these isolated areas will impact additional forested wetlands during ingress and egress. In addition, some proposed transects dead end into forested swamps. In these cases multiple “passes” of the Vibroseis equipment will be required as vehicles must turn around to exit. Several transects shown on Exhibits C3, C4, C5, D1, D2, D3 indicate multiple and significant areas of track lines through forested wetlands. Additional monitoring and restoration planning should be provided in these areas of obvious additional impact.

The revised EA includes a new section regarding the environmental consequences of the alternatives considered on vegetation, habitat, soils, wetlands, and protected plant species. Comments on the preferred alternative (Alternative #2) are presented below in the order of which they appear in the revised EA text, beginning on page 82.

NPS maintains that the impacts of the Vibroseis trucks on vegetation and habitats would be minimal, short-term, and similar to those caused by recreational ORVs that utilize BCNP (Duever 1981 and 1986). This preliminary assumption is fundamentally flawed in two respects: 1) Vibroseis vehicles weigh ~20 times more and exert ~3 times the ground pressure of the heaviest ORV tested by Duever; 2) Duever found that very few of the heavy impact lanes had recovered seven years after the impacts had ceased. Heavy impacts were classified as those that resulted in moderate to severe soil disturbance.

Duever also noted that degree of impact was strongly correlated with soil moisture, and that water level was the single most important environmental factor affecting severity of initial vehicle impacts. When
water is above ground or near the soil surface at the time of impact, the degree of impact and time required for recovery are greatly increased. He found that small cypress and marl marsh habitats (both which have extremely wet, soft soils) were the most sensitive to vehicular disturbance.

Approximately 83% of the habitats proposed to be traversed by approximately 510 miles of seismic survey routes are categorized as wetland. By definition, wetlands have standing water at or near the surface, even during the dry season (Nov-May) when the survey is proposed to occur. “Small cypress,” one of the habitat types most sensitive to vehicle disturbance according to Duever, accounts for ~26.8% of the survey area. Although marl marsh is not one of the vegetation types identified in the revised EA, other deep water habitats such as Cypress, Marsh, and Swamp Forest account for ~47% of the proposed survey area. Wet prairies account for almost 5% of the proposed survey area. The few vegetation types that typically have drier, more mineral-based soils that are not as prone to soil disturbance, such as hydric-mesic hammock and pine flatwoods communities account for only 20% of the proposed survey area.

Despite NPS’ claims in the revised EA that the effects of the survey on vegetation would be minimal and short-term, it is important to note that the on-site Vibroseis demonstration conducted in late April 2015, normally one of the driest months of the year, resulted in the Vibroseis vehicle becoming stuck. Appendix A of the revised EA only consists of four (4) photos of this event. The revised EA contains minimal details on the extent of the immediate impacts to soil and vegetation from the demonstration, much less quantifies the long-term effects of this demonstration replicated over 510 miles of seismic survey transects. NPS states in the revised EA that, despite the Vibroseis truck becoming stuck, “much of the area traversed by the buggy was minimally impacted and showed signs of recovery six months later.” A much more in-depth analysis of the immediate impacts and long-term results from this field demonstration is warranted, as it is reasonable to expect this to be a regular occurrence during the duration of the seismic survey given the prevailing soil and hydrology characteristics of BCNP.

Other studies on long-term vegetation impacts associated with on-shore seismic survey vehicles in the Alaskan tundra support many of the same conclusions reached by Duever, despite obvious differences in climate, soils, and vegetation type. Jorgenson et al (2010) found that trails “with medium to high levels of initial disturbance recovered slowly,” and “severe impacts to tundra vegetation persisted for two decades after disturbance.” Kemper & MacDonald (2009) reported significant differences in plant community composition between seismic lines and reference tundra 20 – 30 years after the initial impacts. They attributed these differences to either (1) successional redevelopment following changes in soil conditions and nutrient availability arising from the disturbance, and/or (2) disturbance-initiated succession towards a community reflecting current climatic conditions.
The revised EA lists four Minimization strategies that would be employed, each of which is founded on flawed assumptions. The first minimization measure suggests that the “single-pass” of the two Vibroseis teams (each consisting of three 61,700 lb. vehicles) across 510 miles of mostly road-less terrain will create less of an impact than the impacts created by traditional recreational ORVs repeatedly travelling established routes. As aforementioned, the sheer weight of the Vibroseis trucks and dominantly wet, soft soils of BCNP will undoubtedly result in severe soil disturbance, leading to long-term changes in vegetation composition and greatly increasing the risk of new populations of invasive vegetation becoming established along the 510 miles of proposed survey route. Confinement of the survey activities to existing roads already used by recreational ORVs would greatly lessen the impact of the proposed alternative. However, aerial views of the proposed survey area reveal that this area is largely a road-less, undisturbed area so the opportunity for survey crews to use existing roads during the seismic survey is extremely limited.

The second minimization measure identified in the revised EA is the use of large balloon tires to better distribute the weight of the Vibroseis trucks. Elsewhere, the revised EA states that these tires will exert 26 lbs/in² of force on the ground. While this style of tire is anticipated to create less impact than a tracked vehicle or narrow tire, it still will exert more than three times the ground pressure than the heaviest swamp buggy tested by Duever. Duever’s swamp buggies created the most severe damage in the “small cypress” communities, which account for almost 27% of the proposed survey area. Effects in other soft-soil communities that account for an additional 47% of the survey area are also expected to be severe and long-term given the weight of these vehicles, and the frequency with which they will need to be extricated by other heavy equipment.

The third minimization measure cited in the revised EA is that the seismic survey will be conducted in the dry season (November – May). While it is true that water levels will generally be lower and that soil impacts would be potentially reduced, it is expected that there would still be substantial, severe, and long-term cumulative impacts across a majority of the proposed survey area given that 83% of the survey area is classified as wetland, and would still hold water at or near the surface throughout the year.

The final minimization measure cited in the revised EA is that damages caused by Vibroseis equipment would be immediately restored, thereby reducing any impacts to wetlands, habitat, soils, and vegetation to minimal levels. The presumption that these sites could be adequately restored on the scale that they are expected to occur has not been demonstrated by the applicant. Rapid restoration of complex soil characteristics and re-establishment of appropriate vegetative cover in sufficient time to preclude establishment of invasive exotic species is not a “proven technology” by any means. The remoteness of the area for ongoing inspections and proper management will also compromise the long-term success of the promised “immediate restoration.” We suggest that the applicant be required to demonstrate its
ability to restore each community type proposed for impact prior to issuing any authorization to proceed with the project.

Page 84 of the revised EA acknowledges that there would be some potential for the spread of non-native invasive plant species through the operation of vehicles within the proposed survey area, but maintains that the probability is low and that impacts could be mitigated by 1) cleaning of vehicles before entering the preserve, and 2) leaving most vehicles onsite for the duration of the project. The risk of contributing to the spread of invasive plants is grossly understated by the revised EA, and the efficacy of cleaning vehicles before they enter the preserve is greatly exaggerated. According to the Institute for Regional Conservation’s (IRC) floristic database, (based on a 2005 comprehensive floristic survey of BCNP), a total of 268 non-native species are present on the BCNP, of which 33 species are classified as Category 1 and 40 classified as Category 2 invasives by the Florida Exotic Pest Plant Council (FLEPPC). FLEPPC defines Category I invasives as species that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. Category II invasive exotics are defined as species that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species.

Treatment of exotic vegetation in BCNP has been ongoing since at least 1984. In 2014 alone, the Department of Interior spent nearly $3.7 million on invasive species prevention, eradication, containment, and management across south Florida. The National Park Service’s South Florida/Caribbean Inventory and Monitoring Network emphasized that roads and trails serve as “corridors of invasiveness” and describe their ongoing battle with invasive vegetation at BCNP in their 2013 Resource Brief. In a 2013 survey they conducted on 654 acres in the southern portion of the preserve, a total of 65 invasive species were detected, seven of which are new records for the park. A total of 311 infestations were found, occupying a total of approximately 6.3 acres.

The degree of soil disturbance anticipated to occur by even a single pass of three Vibroseis trucks is severe given the weight of these vehicles and the fact that ~83% of the habitats traversed are wetlands. Based on 510 miles of proposed source survey routes and the 12-foot average width of a Vibroseis vehicle, a minimum total of ~742 acres of soils and vegetation would potentially be disturbed by the seismic survey. It is well known that intact native plant communities provide the most reliable defense to invasion by exotics, and distance from roads and other disturbances are inversely correlated with the degree of infestation by exotic vegetation. The intensity of the proposed survey, shown on Exhibit C of the revised EA, would significantly expose the proposed routes of travel to invasion by new populations of exotic species and spread of exotic plant populations that already exist on the property. Once new populations are established, the potential for those populations to expand, and the difficulty and expense necessary to manage exotic species on BCNP will increase exponentially.
The ability to thoroughly cleanse large vehicles from unwanted plant propagules prior to entering BCNP deserves closer scrutiny if it is to be considered a mitigating activity for creating this extensive network of new disturbance. Although some more visible plant parts, such as a Brazilian pepper (*Schinus terebinthifolius*) seed or a rhizome of torpedograss (*Panicum repens*) may be readily visible and easily removed from a vehicle’s undercarriage, many invasive plant propagules are incredibly difficult to detect on a vehicle due to their small size and the many potential sites of attachment or lodging available on a vehicle. For example, the tiny spores from Japanese or Old World climbing ferns (*Lygodium japonicum, L. microphyllum*), both significant pest plants at BCNP, cannot be effectively removed from vehicles with any degree of certainty. Even if they could be effectively removed by washing, their ability to disperse considerable distances by wind and potentially colonize the soils exposed along the 510 mile survey route cannot be mitigated.

Page 84 of the revised EA recognizes the potential for severe soil disturbance and subsequent colonization by exotic plant species, but suggests that these impacts can be immediately mitigated. Again, the applicant’s ability to succeed at immediate restoration of the impacts caused by the Vibroseis trucks and any support vehicles to resist exotic species invasion to the same degree as an adjacent undisturbed area has not been sufficiently demonstrated. Such assurances should be provided prior to authorization of this extensive network of disturbance.

Photographs were reviewed in the revised EA from *APPENDIX A: VIBROSEIS FIELD DEMONSTRATION PHOTOS April 24, 2015 and October 10, 2015* to assess soil and vegetation impacts. Within *Photo Set 1*, vehicle tracks are still highly visible six months later through the wet prairie habitat. Within *Photo Set 2*, recognizing the difference between the photo from the end of the dry season photo (April) and the end of the wet season photo (October), vegetation is lacking in the tracks in October where it had been present prior to traversal in May. The ruts left by the truck appear to support less hydrophytic vegetation and possibly contain deeper areas of ponded water due to soil compaction. The photos indicate what would be expected; that soil compaction and rutting will create both localized and large areas of ponding and vegetation composition changes. The photos do not show and the revised EA text does not describe the disturbance caused by extricating the Vibroseis truck, nor do they provide an indication of how representative the demonstration site is of the proposed survey route. A much more detailed analysis of before and after conditions of this demonstration exercise is warranted given the preliminary results that are visible in the photos.

**Listed Plant Species**

Page 84 of the revised EA states that two plant species that are Candidates for federal listing are known to occur on BCNP, and infers that their probability of occurrence within the survey area is low. The species listed include Florida prairie-clover (*Dalea carthagenensis* var. *floridana*), a leguminous shrub
known from only nine (9) populations, seven (7) of which are located on conservation lands, according to USFWS’s Listing Assessment and Species Priority Form published in 2013. The Florida prairie-clover has been documented from a variety of habitats, including pine rockland habitats, edges of rockland hammocks, coastal uplands, and marl prairies. The other candidate species mentioned is Florida pineland crabgrass (*Digitaria pauciflora*), known from only two locations: BCNP and Long Pine Key in the Everglades National Park. Florida pineland crabgrass is typically found near the ecotone between pine rocklands and marl prairies in association with other grasses, shrubs, and palms. A natural historic fire regime is regarded as an important requirement to maintain the habitat preferences of these two species.

The revised EA fails to mention a third species that is a candidate for federal listing and is also documented from BCNP according to the Institute for Regional Conservation’s (IRC’s) floristic database for Big Cypress Preserve. The third candidate species is Everglades bully (*Sideroxylon reclinatum* ssp. *austrorfluoridense*), also a fire-dependent shrub, known from 11 conservation and private sites in South Florida. The Everglades bully has been documented from pinelands, pineland/prairie ecotones, and prairies at BCNP. The revised EA completely fails to mention the 69 species of plants state classified as Endangered and the 35 species of plants classified as Threatened that have also been documented from BCNP by the IRC’s floristic inventory (Table 2). These state-listed species are protected on public lands by Chapter 5B-40, Florida Administrative Code (“F.A.C.”). Although the revised EA states that any observations of federal candidate species will be reported if observed and recommendations for setbacks followed, the proposed protocol fails to provide sufficient protection for these 107 rare plant species that are known from BCNP and have a high potential to occur within the proposed survey area.

In order to assure protection of these rare species, a listed plant survey is recommended well in advance of the proposed seismic survey to determine known locations of listed species so that routes to minimize impacts to them may be planned in advance.

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<td>Linum carteri var. smallii</td>
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<td>Microgramma heterophylla</td>
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| State-Listed Plants Documented from Big Cypress National Preserve 1  
<table>
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<th>(Ch. 5B-40, Florida Administrative Code)</th>
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<td>Vanilla phaeantha</td>
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<td>Varronia bullata subsp. humilis</td>
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</tbody>
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*Also designated as a Candidate for Federal Listing*

3.0 Wildlife and Habitat

The revised EA documents protected species potentially occurring and potentially affected by the proposed plan of operations (“POP”), however, it is our opinion that the methods for determining potentially present and potentially affected species and habitats are inadequate.

Throughout the revised EA, reference is made to the plan for wildlife “scouting” in front of Vibroseis trucks concurrently with POP activities. Specific survey methods and timeframes are not addressed, and it is unclear what the definition of “scouting” is and what this would include and entail. Formal, quantitative surveys to document baseline conditions according to accepted methods has not been proposed, but is essential to identifying potentially affected plant and wildlife resources, potential impacts to these, methods for avoiding and minimizing impacts, and plans for mitigating impacts.

According to proposed Mitigation Measures 29 and 30 in the revised EA (Page 30), “…BOCI would conduct a GIS analysis of available protected species location information” and “To avoid potential impacts to undocumented wildlife and IRAs, scouting and research of the survey lines would be conducted by a qualified ecologist concurrently with the survey operations.” A GIS analysis alone with no field surveys or ground-truthing will not provide the required accuracy to identify and avoid impacts to species that may be nesting, roosting, or denning on or near the proposed survey routes. Our recommendation is to conduct comprehensive field surveys well in advance of the POP by highly trained wildlife ecologists to document as many occurrences and locations of dens, burrows, nests, colonies, cavities, etc. as possible so the proposed routes may be modified accordingly to reduce impacts. In addition, the qualifications and experience of the “qualified ecologist” must be confirmed, and should include experience in the identification of all potentially affected species and their signs, including state and federally listed plant species.

We recommend, at a minimum, that baseline species surveys follow standard FWC and/or USFWS survey protocols for each species. To inventory for species lacking specific survey guidelines, the FWC has recommended the methodology from USDA Forest Service Multiple Species Inventory Guide. This guide provides a Multiple Species Inventory and Monitoring (MSIM) protocol to serve as a consistent and efficient method for obtaining basic presence/absence data and associated habitat condition data for a large number of individual species at sites that represent a probabilistic sample. Although designed for National Forest Lands, this process or similar methods should be employed in order to adequately assess the presence/absence and potential impacts to the full suite of protected and non-listed species that rely on BCNP habitats.

The revised EA (Page 31) states that “Educational training programs would be provided to survey crews to help them identify and avoid wildlife and environmentally sensitive areas (to the extent feasible)”.

"TECHNICAL REVIEW OF WETLANDS, WILDLIFE, VEGETATION AND HABITAT ASPECTS OF THE PROPOSED BURNETT OIL COMPANY NOBLES GRADE 3-D SEISMIC SURVEY, BIG CYPRESS NATIONAL PRESERVE
April 2016"
The content of the training programs should be made available for review and approval to ensure comprehensive coverage of all species and their signs that may be encountered. Regarding avoidance of sensitive areas “to the extent feasible,” this should be further defined. This could imply that the avoidance of a nest cavity is not “feasible” for example.

Habitat Management

Habitat management and the control of nuisance and exotic species are a constant and expensive issue facing land managers throughout Florida. Vegetation and soil disturbance will increase opportunities for nuisance and exotic (N/E) vegetation to recruit and spread to these areas and has the potential to significantly add to the costs and scope of required management. We do not agree with the statement in the revised EA (Page 84), that “Because of the short duration and limited scope of the project, the probability of introduction of exotic plant species is low”. Based on our experience, it is unlikely that all vehicles could or would be cleaned sufficiently to preclude all manner of non-native nuisance seed sources. Upon entering the preserve these vehicles would then have the additional capacity to further spread existing N/E plants located on existing trails and disturbed areas as the range of these machines is far reaching and generally inclusive of every habitat type. Furthermore, the N/E seed dispersal effects of the scouts and the shovel and rake bearing restoration crews should not be discounted. In order to effectively minimize the spread of N/E seeds and vegetative material, a detailed inspection and maintenance program would need to be employed to ensure daily cleaning of each vehicle, tool, and piece of equipment. A rigorous contingency plan for eradicating any inadvertently introduced N/E species needs to be prepared and implemented as needed, based on results of a thorough post-survey monitoring program.

Treatment of exotic vegetation in BCNP has been ongoing since at least 1984. In 2014 alone, the Department of Interior spent nearly $3.7 million on invasive species prevention, eradication, containment, and management across south Florida. The National Park Service’s South Florida/Caribbean Network Inventory and Monitoring Network emphasized that roads and trails serve as “corridors of invasiveness” and describe their ongoing battle with invasive vegetation at BCNP in their 2013 Resource Brief. In a 2013 survey they conducted on 654 acres in the southern portion of the preserve, a total of 65 invasive species were detected, seven of which are new records for the park. A total of 311 infestations were found, occupying a total of approximately 6.3 acres.
The effect of the POP on other important habitat management activities, such as prescribed burning, has not been addressed. It can be assumed that the presence of the seismic survey equipment and crew will impact the ability to conduct prescribed burns, and in some cases will completely preclude the ability to conduct burns. Removing this ability for the November – May duration of the POP could affect burn cycles and habitat quality in this area of fire dependent vegetation communities, particularly during the “dry season” window when prescribed burns are typically conducted. Appropriate burn weather windows can be narrow, and removing the ability to burn over an entire season can negative impact the quality and condition of BCNP habitats.

Additional comments pertaining to specific species or groups are provided below.

**Gopher Tortoise and Eastern Indigo Snake**

The revised EA states (page 89) that “no field equipment would be driven within 50 feet of any burrow discovered during scouting by the ecologist”. What are the proposed methods and timing for conducting pre-construction surveys? It is recommended that FWC survey guidelines be followed, and conducted by an FWC certified Gopher Tortoise Agent well in advance of commencement of the seismic survey. All observed burrows should be mapped and categorized by age and activity status. It is not clear whether the proposed 50 feet buffer is sufficient to avoid impacts. Wilson (2011) studied the effects of using vibroseis trucks for seismic exploration on pygmy rabbits (*Brachylagus idahoensis*) in Utah. Effects to burrows, including decreased entrance height and collapse, were detected up to 25 meters (82 feet) from the survey line. Based on the Wilson findings, it is likely that burrows of fossorial species within Big Cypress may be similarly impacted, and specific surveys to identify and avoid all burrows should be employed. Wilson recommends a 50 meter (164 foot) buffer around pygmy rabbit burrows; three times that proposed for gopher tortoise burrows, which are known to provide refugia for a large number of associate species, including the eastern indigo snake.

The eastern indigo snake has been documented in the Preserve, and lack of gopher tortoise burrows does not necessarily indicate minimal presence of these federally protected species, as implied in the EA (page 89). Per USFWS Multi-Species Recovery Plan, in wetter habitats that lack gopher tortoises, eastern indigo snakes may take shelter in hollowed root channels, hollow logs, or the burrows of rodents, armadillo (*Dasypus novemcinctus*), or land crabs (*Cardisoma guanhumi*) (Lawler 1977, Moler 1985b, Layne and Steiner 1996). It can be extrapolated from the Wilson study that these forms of shelter may be likely to be similarly affected by the seismic vibrations. Because the eastern indigo and all other snakes lack an outer ear structure and a tympanum and "hear" sound as vibrations from their environment through vibrations of their skeletal system, the vibrations from testing could have unknown and lasting effects on their behavior and physiology. This could be construed as "harassment", “harm” or even take of Indigo snakes per the Endangered Species Act (“ESA”).
In addition to the seismic impacts, tortoise, armadillo, and similar refuges are highly vulnerable to the direct impacts of crushing and collapsing under the weight of trucks and other heavy equipment. Pre-construction surveys and mapping of burrows would assist to plan trail routes such that known burrow locations could be completely avoided. The Multi-Species Recovery Plan recommends that large expanses of unaltered habitat be protected for the benefit of this species; and it is unknown whether seismic surveys, which come with unknown consequences for reptiles, may allow for the level of protection required.

According to the revised EA (Page 89) “If a protected reptile is observed during the seismic survey, the survey would temporarily cease to allow sufficient time for the reptile to move away from the activity before resuming activities”. It is anticipated that non-listed snakes and other reptiles will be similarly affected by the POP, however this statement implies that non-listed species will not be afforded the same protections as the indigo snake. A wide variety of non-listed species are important food sources for other protected species, and each contributes to overall biodiversity of the preserve. It is recommended that all wildlife encountered be afforded the same protections and impact avoidance.

**AVIAN SPECIES**

A very large number of avian species are known to use BCNP habitats for a variety of important life cycle activities, including nesting, foraging and roosting activities. The Big Cypress Bird Checklist ([https://www.nps.gov/bicy/planyourvisit/upload/Bird-checklist_FINAL_2015.pdf](https://www.nps.gov/bicy/planyourvisit/upload/Bird-checklist_FINAL_2015.pdf)) consists of 275 bird species. Seven of these species are federally listed and 22 are state listed. All of the non-exotic species on this list are federally-protected by the Migratory Bird Treaty Act (MBTA). This act makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.

The revised EA does not mention the protections afforded most BCNP bird species through the MBTA. Many of the proposed activities associated with the POP have potential to impact nesting, roosting and foraging birds. Helicopter operations described in the revised EA (Page 21) are proposed to be conducted an average of 3-6 hours each day during the 18 weeks of program operations. Much of this timeframe coincides with the breeding season of a large number of avian species. It is likely that some degree of disturbance to nesting and roosting species would result from the noise and air disturbance/drafts from the helicopters operating at this frequency during nesting season.

The impact of seismic testing on snags and cavity trees is unclear, and could result in harm to cavity nesting species such as wood peckers, flycatchers, bluebirds, and the state-listed southeastern American
kestrel, the nesting seasons for which coincide with the POP timeframe. Potential impacts from vibrations or vehicle damage to snags is not mentioned in the revised EA, nor is there a plan for identifying or avoiding cavity trees that may be utilized as nest areas for these species. It is our experience that work crews often regard these as “dead trees” to be immediately removed or pushed aside versus avoided. Such damage to cavity trees could result in a take of active nests and the removal of important forage and nest cavities for a wide variety of species protected by the MBTA.

In addition, according to The Avian Conservation Implementation Plan (Plan) - Big Cypress National Preserve, compiled by J. Keith Watson and U.S. Fish and Wildlife Service In cooperation with BICY Resource Management Staff, National Park Service And Bird Conservation Partners (January 2005), the greatest impact to birds at BICY is the use of ORV’s. The Plan recommends the Preserve assess the impacts that ORVs have on the bird populations, especially birds that nest on the ground or in the herb/shrub layer of the forests. The cumulative effects of additional impacts from the loud, gas and oil burning trucks weighing 61,700 pounds, cannot be discounted, and no matter how slow moving, this activity will invariably disturbed roosting wading birds.

Several ongoing avian studies are likely to be impacted by the seismic testing activities, however, has not been addressed in the revised EA and needs to be examined. These studies, many being conducted at tax payer expense can be very important to the continued management and success of avian species and their habitats. According to the above Plan, the avian monitoring projects being conducted at Big Cypress Preserve include the following:

- Cape Sable Seaside Sparrow population monitoring (Population A) conducted by Everglades National Park personnel
- Red-cockaded Woodpecker nest monitoring on 45 clusters of woodpeckers
- Red-cockaded Woodpecker nestling banding
- Wood Stork colony monitoring by helicopter
- Snail Kite Monitoring
- Bald Eagle nest surveys conducted by State of Florida
- Waterbird colony monitoring conducted by Everglades National Park and State of Florida
- Osprey nest monitoring conducted by State of Florida
- Brown-headed Nuthatch and Eastern Bluebird monitoring following translocations
- Three mini-Breeding Bird Survey routes conducted during May
- Regular Breeding Bird Survey route conducted by US Fish and Wildlife Service

BCNP is clearly crucial for avian conservation. Ground nesting birds would be at increased risk by the proposed survey methodology and additional research is recommended to assess all avian impacts. Breeding season surveys should be conducted by qualified ecologists and all nesting areas, including cavity trees, should be identified and mapped so these areas can be avoided by the Vibroseis trucks.
WADING BIRD SPECIES

Database search results indicate five wading bird rookeries have been documented within the proposed Survey area, and nine wood stork rookeries are located within 18.6 miles, the Core Foraging Area for wood storks in this region (See Figure 7 of this document). The proposed seismic survey timeframe (approximately November – mid-May) coincides with the nesting seasons of wood storks and other protected wading bird species, when reliable food sources are most critical to successful reproduction. However, studies have linked seismic surveys to an overall decreased arthropod abundance (Kevan et al. 1995), which could result in decrease food availability for many wading birds, including protected species such as limpkin, little blue heron, tricolored heron, wood stork, sandhill crane and snowy egret. Additional studies have linked seismic testing to delayed egg development in snow crabs (Christian et al. 2003), altered eating habits in lobster (Payne et al. 2008), decreased nest initiation in sage grouse (Lyon and Anderson 2003) and reduced bird abundance along seismic lines (Ashenhurst and Hannon 2007). Such findings cannot be ignored when evaluating the potential impacts to important breeding and foraging habitats as are provided within the preserve.

Ground-nesting wading birds including sandhill crane and limpkin may be even more susceptible to the seismic vibrations, and certainly are more vulnerable to direct impacts from being crushed by vehicles. It is extremely important to conduct thorough surveys of suitable nesting habitat for sandhill cranes to ensure nest locations can be completely avoided.

It is clear that the effects of the POP are varied and potentially wide-ranging. Activities associated with the POP could affect reproductive success in a variety of bird species by disturbing or destructing nesting habitat and reducing the food source for feeding young. Again, comprehensive wildlife surveys prior to implementation of the POP are recommended to avoid take.

WOOD STORK

The revised EA does acknowledge that “Habitats within the 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 prairie. The presence of the wood stork is anticipated within the survey area.” (Page 63). However, the issue of impacts to Suitable Foraging Habitat (SFH) for wood stork is not addressed.

Per the May 18, 2010, letter and Wood Stork Effect Determination Key from the USFWS, the project “may affect” wood storks due to greater than 0.5 acres of impacts to Suitable Foraging Habitat (SFH) with no mitigation. Per USFWS, Suitable foraging habitat (SFH) includes wetlands that typically have shallow-open water areas that are relatively calm and have permanent or seasonal water depths
between 5 to 38 cm (2 to 15 inches). Other shallow non-wetland water bodies are also SFH. SFH supports and concentrates, or is capable of supporting and concentrating small fish, frogs, and other aquatic prey. Examples of SFH include, but are not limited to freshwater marshes, small ponds, shallow, seasonally flooded roadside or agricultural ditches, seasonally flooded pastures, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs.

For this Key, the Service requires an analysis of foraging prey base losses and enhancements from the proposed action as shown in the examples in Enclosure 3 for projects with greater than 2.02 hectares (5 acres) of wetland impacts. For projects with less than 2.02 hectares (5 acres) of wetland impacts, an individual foraging prey base analysis is not necessary although type for type wetland compensation is still a requirement of the Key. For projects with greater than 20.2 hectares (50 acres) of wetland impacts, written concurrence of “not likely to adversely affect” (NLAA) from the Service is necessary. (https://www.fws.gov/verobeach/BirdsPDFs/20100518LetterServicetoCorpsFLProgrammaticStorkRevise d1.pdf).

The above Wood Stork Effect Determination Key does not appear to have been applied to the POP, although it is clear that vast areas qualifying as SFH for the species occur throughout the footprint. Based on this key, concurrence from the USFWS is required, as is mitigation for the loss of SFH.

**FLORIDA BLACK BEAR AND FLORIDA PANTHER**

The Florida panther and Florida black bear are well documented to use habitats throughout the proposed survey area (See attached Figures 4 and 8). Studies have been conducted that indicate increased stress levels in mammal species subject to seismic surveys, as well as avoidance and displacement behaviors. This could be harmful during breeding seasons when it can be particularly important to remain close to prey sources and within home ranges. McLellan and Shackleton 1989 identified grizzly bear (*Ursus arctos*) habitat displacement in response to seismic exploration in British Columbia. During a seismic activity, one bear was found to have traveled 10 km (6.2 miles) to a habitat rarely used by grizzly bears during that season. The bear remained there for 6 days before returning to the seismic line. Such displacement can result in movements into unfamiliar or dangerous areas, such as roads. Black bear road kills have been documented within the proposed survey area and the nearby vicinity. Similarly, panthers retreating from or avoiding the seismic activity could force them away from dens, onto roads, and possibly into the territories of other panthers, and in general subjecting them to undue stress. Many species have been shown to avoid areas affected by seismic surveys (Stone and Tasker 2006; Richardson et al. 1995; Goold 1996). Seismic surveys have also been linked to increased stress hormone levels in belugas and bottlenose dolphins (Romano et al. 2004), bradycardia (slowed heart rate) in seals (Thompson et al. 1998) and reduce/ceased feeding in porpoises (Pirotta et al. 2014). These findings indicate there’s a possibility that seismic surveys may cause stress to a number of
protected mammal species in Big Cypress, including the Florida panther, Big Cypress fox squirrel, and the Everglades mink.

Specific methods for surveying and identifying locations of dens and nests must be prepared and implemented, particularly for the Florida panther. Contingency plans for actions to be taken if dens or abandoned litters are discovered must also addressed. For the Big Cypress fox squirrel, nest surveys should be performed prior to POP implementation to identify and map locations. All nest locations should be avoided, and the POP should be amended to include routes that will provide adequate buffers from dens and nests.

**Florida Bonneted Bat and Other Bat Species**

The proposed survey area is located within the USFWS Consultation Area and partially within the USFWS Focal Area for the Florida bonneted bat (*Eumops floridanus*). Four (4) other bat species are also likely to be found in the area: the Evening bat (*Nycticeius humeralis*), Northern yellow-bat (*Lasiurus intermedius*), Seminole bat (*Lasiurus seminolus*) and Brazilian free-tailed bat (*Tadarida brasiliensis*). Only the bonneted bat is federally listed, but the remaining bat species are protected by state law under the Florida Administrative Code in rules 68A-9.010 and 68A-4.001. Therefore, the possible impact of the seismic testing should be evaluated for all bat species, and disturbance to roost sites and maternity colonies should be avoided as much as possible to prevent incidental take.

Due to its low number, very limited geographic distribution and the lack of knowledge available, USFWS considers the Florida bonneted bat to be one of the most critically endangered species in North America. The species was proposed for listing on the Endangered Species Act (ESA) in 2012 and the listing was accepted in 2013. In the past, Florida bonneted bats have been observed roosting in a cavity of a long-leaf pine (*Pinus palustris*) (Belwood 1981), in palm fronds and crevices on limestone outcrops. Today, the species is known to roost in man-made structures and artificial roosts such as bat houses, but only one natural active roost is currently known. In 2014, a colony of bonneted bats was found in an old Red-cockaded woodpecker cavity at Avon Park Air Force Range.

Because little is known about the roosting preferences of the species, the most reliable and efficient way to detect the presence of the Florida bonneted bat is via acoustic detection. The species has a distinctive echolocation call, which reduces the risk of misidentification with other bat species (Marks and Marks 2012). Before conducting any seismic testing, methodical acoustic surveys should be performed along the proposed source lines to detect the presence of Florida bonneted bats. If the species call is recorded, potential roosts sites such as tree crevices, cavities and snags presenting large pieces of loose bark should be thoroughly examined by a qualified ecologist with specific experience identifying bat
species. Informal scouting for potential Florida bonneted bat cavities as described in the revised EA (page 89) will not yield reliable results for presence of roosts and may result in impacts to this species.

The endangered Indiana bat (*Myotis sodalis*) is protected by guidelines and regulations establishing buffer zones that could similarly benefit the Florida Bonneted bat. If tree clearing or other disturbing activities are scheduled within 1) 5 miles of an Indiana bat female (reproductive or non-reproductive) or juvenile capture record without an identified maternity roost tree; 2) 2.5 miles of an Indiana bat maternity roost or male bachelor colony record; or 3) 5 miles of a priority 3 or 4 Indiana bat hibernaculum or 4) 10 miles of a priority 1 or 2 Indiana bat hibernaculum, a Protection and Enhancement Plan (PEP) Guidelines must be followed. The PEP recommends a 100 ft buffer around caves during mining activities to avoid disturbance to roosting bats, and a 50ft buffer around wetlands and along stream edges (total of 100ft from both banks) to preserve foraging habitat (USFWS 2009).

We recommend that if acoustic surveys confirm the presence of Florida bonneted bat and a roost is found, any activity should immediately stop within a 300 feet buffer around the roost. USFWS must also be contacted and the roost documented by qualified biologists.

The official bat breeding season in Florida is from April 15th through August 15th. Seismic testing in suitable bat habitat should be avoided during this period. If little is known about the breeding ecology of the bonneted bats, reproduction has been documented both in the summer and in the winter (Timm and Genoways 2004) indicating that the Florida bonneted bat may have two breeding seasons per year. This highlights the need for rigorous survey to detect a possible colony, regardless of the time of year at which seismic testing will be conducted.

**Bald Eagles, Osprey, Swallow-tailed Kite**

According to FNAI and FWC databases, several species of raptors protected by the MBTA and the BGEPA (eagles) are known to rely on habitats within or nearby BCNP for breeding, roosting and feeding. These include bald eagle, swallow-tailed kite, and osprey. Nesting season for these species coincides with the proposed seismic testing period, and comprehensive surveys and nest monitoring should be conducted prior to any activity to identify and avoid nest sites. FWC bald eagle monitoring guidelines should be followed, and buffers of 660’ from active bald eagle nest sites should be maintained if located within the POP footprint. Florida Natural Areas Inventory (FNAI) lists BCNP as an important nesting area for the swallow-tailed kite, a declining species that relies heavily on the preservation of large heterogeneous forested habitats. To avoid impacts to nesting swallow-tailed kites, surveys should be conducted to identify and map nest trees so these may be avoided by vehicles and helicopters.
4.0 Federal Permitting Considerations

4.1 Federal Jurisdiction

The NPS asserts that Section 404 permitting is not required for the proposed seismic survey because “no discharges or filling is contemplated” (revised EA page 10). However, according to Section 404 of the Clean Water Act: The term fill material means material placed in waters of the United States where the material has the effect of ... Changing the bottom elevation of any portion of a water of the United States (https://federalregister.gov/a/02-11547). Soil compaction on over 500 miles of trails through the BCNP would change the bottom elevation of these wetlands.

In addition 52,570 acres of the proposed seismic survey area is forested wetlands. Vibroseis trucks accessing through forested wetlands would be very destructive to these systems. Miles of trails through forested wetlands is likely to result in land clearing activities that could be considered a discharge of dredged or fill material under 33 C.F.R Part 323: Discharge of dredged material: (2)(i) The Corps and EPA regard the use of mechanized earth-moving equipment to conduct landclearing, ditching, channelization, in-stream mining or other earth-moving activity in waters of the United States as resulting in a discharge of dredged material unless project-specific evidence shows that the activity results in only incidental fallback. The NPS fails to demonstrate that the impacts from required clearing activity will result in only incidental fallback.

In summary, the proposed work is clearly regulated under Section 404 of the Clean Water Act due to:

1) Soil compaction will likely change the bottom elevation of hundreds of acres of wetland thus meeting the regulatory definition of fill; and

2) Hundreds of miles of trails through forested wetlands will likely result in extensive areas of land clearing thus meeting the regulatory definition of discharge of dredged material.

4.2 Federal Permitting Authority

The USACOE regulates seismic exploratory operations in wetlands under Nationwide Permit #6 which states: Survey activities, such as core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching, soil surveys, sampling, sample plots or transects for wetland delineations, and historic resources surveys. However, in order to qualify for the NW permit, 25 general conditions must be met or the project must be reviewed under an Individual Permit (IP) with a public comment period. It is our opinion the proposed testing does not qualify for the NW 6 due to failure to meet seven (7) of these general permit conditions, which are discussed below.
General Permit Condition 2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity’s primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

The revised EA states in Appendix B on page 25 of the Wetland Statement of Findings, the following regarding how aquatic life movements will be affected: Temporary and localized 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 or 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.

Based on the above Statement of Findings, the proposed activity appears likely to adversely affect Aquatic Life Movement.

General Permit Condition 4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

As discussed above, a very large number of avian species are known to use BCNP habitats for a variety of important life cycle activities, including nesting, foraging and roosting activities. The Big Cypress Bird Checklist (https://www.nps.gov/bicy/planyourvisit/upload/Bird-checklist_FINAL_2015.pdf) consists of 275 bird species. Seven of these species are federally listed and 22 are state listed. All of the non-exotic species on this list are federally-protected by the Migratory Bird Treaty Act (MBTA). This act makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations.

The revised EA does not mention the protections afforded most BCNP bird species through the MBTA. Many of the proposed activities associated with the POP have potential to impact nesting, roosting and foraging birds. Helicopter operations described in the revised EA (Page 21), for example, are proposed to be conducted an average of 3-6 hours each day during the 18 weeks of program operations. Much of this timeframe coincides with the breeding season of a large number of avian species. It is likely that
some degree of disturbance to nesting and roosting species would result from the noise and air disturbance/drafts from the helicopters operating at this frequency during nesting season.

The impact of seismic testing on snags and cavity trees is unclear, and could result in harm to cavity nesting species such as woodpeckers, flycatchers, bluebirds, and the state-listed southeastern American kestrel, the nesting seasons for which coincide with the POP timeframe. Potential impacts from vibrations or vehicle damage to snags is not mentioned in the revised EA, nor is there a plan for identifying or avoiding cavity trees that may be utilized as nest areas for these species. It is our experience that work crews often regard these as “dead trees” to be immediately removed or pushed aside versus avoided. Such damage to cavity trees could result in a take of active nests and the removal of important forage and nest cavities for a wide variety of species protected by the MBTA.

**General Condition 11. Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

No matting is proposed in the revised EA.

The revised EA states on page 29: **Ruts, depressions, and vehicle tracks resulting from field operations would be restored to original contour conditions concurrent with daily operations using shovels and rakes to prevent the creation of new trails.** **Field clean-up activities would begin immediately upon completion of each task, and final clearance would be documented by and coordinated with NPS inspectors to the satisfaction of the Superintendent.**

It is impracticable to assume field personnel with shovels and rakes will walk behind the vehicles restoring by hand over 500 miles of ruts, depressions, and compacted soils resulting from the passage of the 61,700 pound Vibroseis equipment. **A comprehensive restoration plan for addressing the repair of ruts and vegetation damage is recommended.**

**General Condition 18. Endangered Species.** The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. **The word “harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.**

As stated above many listed species have been documented in BCNP. Section 3.0 above discusses the federally listed species that can be potentially harmed by the proposed action. These include but are not limited to the wood stork due to loss of Suitable Foraging Habitat and direct effects from helicopters.
disrupting nesting behaviors; and the Florida panther which can show avoidance and displacement behaviors that could lead to additional road mortality and abandoned dens and/or litters.

General Condition 19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any “take” permits required under the U.S. Fish and Wildlife Service’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such “take” permits are required for a particular activity.

As discussed under General Condition # 4 and Section 3 above regarding Migratory Birds, it appears that there is a high potential for incidental take of migratory birds due to various activities associated with the proposed surveys and equipment use.

General Condition 23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal: (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site). (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

In order to utilize the Nationwide Permit 6, the applicant must first show that all adverse impacts have been avoided and minimized to the greatest extent possible before consideration of compensatory mitigation. Clearly wetland impacts are neither avoided nor minimized, based on the large amount of wetlands to be affected by the POP.
Per the 2010 Oil and Gas Impacts in the Big Cypress Ecosystem: An analysis of impacts associated with proposed activities in the Nobles Grade Area, soils should be completely dry, with water levels well below the surface, before exploration commences as this would minimize impacts to wetlands.

Page 28 of the revised EA states under Minimization and Mitigation Measures that the survey would be conducted to avoid disturbance to wetland areas with visible standing water or saturated soil conditions at or just below the soil surface. Survey field operations would be conducted during dry season conditions, typically November through mid-May. Page 23 of the revised EA also states the use of ORVs associated with the seismic survey is anticipated to result in significantly less impacts than ongoing recreational ORV use within the BNCP, 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 or saturated soil conditions at or near the surface of the soil are encountered, the survey equipment would avoid these areas. Driving equipment would also cease when site conditions become wet enough that the survey cannot be conducted due to the presence of standing water or saturated soils.

On page 37 of the revised EA it is noted that cypress forests per Duever et al. 1986 average a 290-day hydroperiod with average maximum water levels reaching about 2 feet. Cypress forests constitute the vast majority of the habitat types in the seismic study area. On page 69 of the revised EA it is stated that groundwater is at or near the surface of the survey area at all times of the year. The depth to groundwater from seven observation wells in or near the survey area as described by USGS confirms the water table to be at or near the surface. Therefore, the premise that the wetlands will be unsaturated at the surface during the dry season and that subsequent wetland impacts incurred by the 61,700 pound trucks will therefore be minimized, appears unsubstantiated and unrealistic.

Furthermore, once field operations begin and saturated soils and standing water are invariably encountered, the Vibroseis trucks will have to turn around and re-route, thus failing to accomplish their stated “one pass” methodology designed to minimize wetland impacts.

Also, regarding the “one pass” methodology to minimize wetland impacts, Page 23 of Draft Wetlands Statement of Findings (SOF) states 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 virtually all of the one pass lanes had restored in one year and completely disappeared after seven years of recovery. The 1981 Duever study looked at 5 types of swamp buggies, a three wheel all-terrain cycle (ATC), an airboat and a track vehicle. Swamp buggies and track vehicles showed the least recovery during the first year. The heaviest vehicle studied was 1400 kg per axle (2800 kg total= 6,172 pounds). The Vibroseis trucks weigh 61,700 pounds. The
significantly greater weight of the Vibroseis trucks combined with the necessity for multiple passes to avoid saturated soils and forested wetlands will likely result in significant wetland impacts that do not diminish in one year. As such, all trails created by the Vibroseis trucks should be monitored for adverse impacts to soils and vegetation for 7 years. The need for additional remediation should be dependent on the published findings.

Although it appears wetland impacts have not been avoided and minimized to the greatest extent possible, compensatory mitigation has been proposed on page 32 of the SOF for temporal loss of wetland function: An equivalent area of wetland restoration will be conducted elsewhere in the Preserve as identified by NPS staff. Specifically, the NPS staff will quantify the amount of impact area from damage caused by vehicle use as linear feet of two-track impact. To compensate for the temporal loss of wetland functions, the applicant will restore an equivalent length of two-track impacted areas (damaged by ORVs) inside or outside of the project area and within the Preserve. The soils will be decompacted and graded to match original grade. If the NPS staff determine that revegetation of the disturbed areas is necessary, then the area will be identified and the applicant will plant native species in a specific pattern, species composition, and density as defined by the NPS staff.

This seems to state that approximately 742 acres of wetlands (510 miles x 12 feet) within the Big Cypress Preserve will be restored through grading, soil decompaction and possible revegetation. If less than 742 acres of restoration is proposed, what will be the methodology to determine the proposed amount of mitigation?

Additionally, if the Army Corps of Engineers fails to regulate the proposed activity under Nationwide 6 or an Individual Permit, the applicant will need to submit a Preconstruction Notification to utilize Nationwide 27- Aquatic Habitat Restoration, Establishment and Enhancement Activities for the proposed compensatory mitigation.

In summary, the proposed mitigation does not avoid and minimize wetland impacts to the greatest extent possible. The proposed compensatory mitigation involving mechanized earth moving (re-grading) would be a regulated activity under Section 404 of the Clean Water Act and could be authorized by Nationwide Permit # 27 or an Individual permit through the Army Corps of Engineers.

**General Permit Condition 25. Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.
Appendix B page 25 of the Wetland Statement of Findings states temporary and localized 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 or 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. Additionally page 90 of the revised EA states: Anticipated adverse impacts to water quality, hydrology, and subsurface geologic resources resulting from the proposed action are expected to be adverse, localized, and short-term, similar to impacts from recreational ORVs. In summary, it appears that the proposed action would have a more than minimal degradation of water quality.

All of the above information was provided in the context and support of Federal 404 jurisdiction and permitting requirements to utilize the Nationwide 6. Because it does not appear likely that the project can meet the General Conditions to utilize NW 6, it is our opinion that the Army Corps of Engineers should review the project as an Individual permit application with a public notice comment period. Nationwide 27 with a PCN could also be utilized to authorize the proposed compensatory mitigation in Waters of the US. However, per Page 99 of the revised EA, AGENCIES AND PERSONS CONSULTED, the US Army Corps of Engineers was not provided with an opportunity to review and comment on the POP and revised EA.
Literature Cited


http://science.nature.nps.gov/im/units/sfcn/monitor/invasive/inv_plants.cfm#corridors


Kemper, J.T. and MacDonald, E.S.  2009.  Directional Change in Upland Tundra Plant Communities 20-30 Years after Seismic Exploration in the Canadian Low-Arctic. Journal of Vegetation Science, Vol. 20, No. 3, pp. 557-567


Thompson D, Sjoberg M, Bryant ME, Lovell P, Bjorge A. Behavioural and physiological responses of harbour (Phoca vitulina) and grey (Halichoerus grypus) seals to seismic surveys. Report to European Commission of BROMMAD project. 1998; No. MAS2 C7940098.


Figure 1
Project Location
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida
Figure 2
National Wetland Inventory
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida
Figure 3
Topography
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida

Legend
Survey Boundary
Feet Above Sea Level

Source: USGS 1:24,000 (7.5 minute) quadrangles
This project location falls within the US Fish and Wildlife Services’ defined Florida panther habitat zone.

Figure 4
Florida Panther Occurrence Records
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida
Figure 5
Bird Occurrence Records
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida
This project location falls within the following USFWS consultation area:
Crested Caracara (*Caracara cheriway*)
Florida Panther (*Puma concolor coryi*)
Everglade Snail Kite (*Rostrhamus sociabilis plumbeus*)
Red-cockaded woodpecker (*Leuconotopicus borealis*)

**Legend**
- Survey Boundary
- American Kestrel
- Anhinga
- Crested Caracara
- Great Blue Heron
- Least Tern
- Little Blue Heron
- Red-cockaded Woodpecker
- Red-eyed Vireo
- Sandhill Crane
- Short-tailed Hawk
- Snowy Egret
- Swallow-tailed Kite
- Tricolored Heron
- Tuffed Titmouse
- White Ibis
- White-tailed Deer
- Wood Stork

**Figure 6**
Wildlife Observations
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida

Source: Florida Fish and Wildlife Conservation Commission
Figure 7
Wood Stork Colony and Core Foraging Areas
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida
This project locations fall within the Florida Fish and Wildlife Conservation Commission’s defined Florida black bear range.

Legend
- Survey Boundary
- Black Bear Roadkill
- Black Bear Nuisance Reports
- Black Bear Telemetry

Figure 8
Florida Black Bear Occurrence Records
Nobles Grade 3-D Seismic Survey
by Burnett Oil Co., Inc.
Big Cypress National Preserve, Florida

Source: Florida Fish and Wildlife Conservation Commission
ATTACHMENT 1
## Birds of Big Cypress National Preserve

**Date: _______________**  
**Time: ________**  
**Location:  _____________________________**  
**Weather:  ______________________________**  
**Observer(s): _____________________________**

### Birds of the Swamp...

Bird watching is one of the Preserve’s principal attractions. Vegetation types such as cypress strands, hardwood hammocks, old-growth pinelands, sawgrass prairies, and mangrove forests support a wonderful array of bird diversity. This is illustrated by the 207 species of birds observed within the Preserve boundaries.

The Big Cypress bird checklist has two primary functions: 1) to inform visitors of the presence and abundance of bird species in the Preserve and 2) to assist the wildlife team in updating the list through visitor observations. Therefore, if you see any unusual birds (those listed as rare or not listed at all), please advise Preserve staff at the visitor center and fill out a wildlife observation card, or write to: Big Cypress National Preserve — Attention: Wildlife Biologist 33100 Tamiami Trail East Ochopee, FL 34141

**Recommended Birding Sites**

Within the Preserve Loop Road, Kirby Storter Trail, Turner River Road, Wagonwheel Road, Birdon Road, and the Florida National Scenic Trail are ideal birding areas. See the Big Cypress National Preserve brochure for locations.

**Birding Ethics**

- Be careful not to disturb nesting birds. Eggs or chicks left unattended are vulnerable to extreme temperatures or predators.
- Avoid disrupting the natural behavior of birds. Although an isolated disturbance may not be harmful to an individual’s survival, cumulative incidents from other visitors may be detrimental.
- Be extremely cautious and courteous when roadside birding; be sure to pull entirely off the road when observing wildlife and to always be aware of other motorists.

### Breeding Status

Each species was indexed according to its presence and frequency in the Preserve:  
- **F** — Fairly common (often present in the proper habitat and season)  
- **U** — Uncommon (occasionally present in proper habitat)  
- **R** — Rare (seldom present in suitable habitat; few records)

### Index

**Poster (December-February)**  
**1 Feb. (September-October)**  
**5 Feb. (April-May)**

### Birding Ethics

- **Never feed** wildlife.
- **View** wildlife with respect.
- **All wild**life is wild and unpredictable. Stay a safe distance from any wild animal — 15 feet is recommended.
- **All plants and animals within national park areas are protected; it is illegal to collect any wildlife without special permits.**

### How You Behave Can Save Do Not Feed or Harass Wildlife

**EXPERIENCE YOUR AMERICA!**

- **National Park Service**  
- **U.S. Department of the Interior**  
- **Big Cypress National Preserve**  
- **Florida**  

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**Great Florida Birding Trail...**

The Great Florida Birding Trail is a collection of 445 sites throughout Florida selected for their excellent birdwatching or bird education opportunities. This 2,000-mile self-guided highway trail is designed to conserve and enhance Florida’s bird habitat by promoting birdwatching activities, conservation education and economic opportunity.

Look for signs along roadways with this symbol that identify the trail. Learn more at: www.floridabirdingtrail.com

### Watching wildlife the responsible way...**

The thrill of watching a wild animal in its native surroundings is spectacular and awe inspiring. While visiting Big Cypress National Preserve, or any other natural area, remember:

- Never feed wildlife.
- View wildlife with respect.
- All wildlife is wild and unpredictable. Stay a safe distance from any wild animal — 15 feet is recommended.
- All plants and animals within national park areas are protected; it is illegal to collect any wildlife without special permits.