FINDING OF NO SIGNIFICANT IMPACT

for

Environmental Assessment
Burnett Oil Company, Inc.
Oil and Gas Plan of Operations
Nobles Grade 3-D Seismic Survey
Big Cypress National Preserve, Florida

The selected alternative is Alternative 2 from the Environmental Assessment (EA), Seismic Survey Using Vibroseis Buggies, which represents the proposed action and the preferred alternative. The NPS will approve the Plan of Operations submitted by Burnett Oil Company, Incorporated, to conduct seismic exploration activities using Vibroseis buggies within a 110± square mile survey area in the north-central part of Big Cypress National Preserve. A detailed description of this alternative is included in the Finding of No Significant Impact (FONSI) and in the EA. All of the stipulations identified in the Minimization and Mitigation Measures described as part of the action alternatives on pages 28-33 of the EA (and included in the FONSI) will apply as conditions of approval. After careful and thorough consideration of the facts contained herein, the undersigned finds that the proposed Federal actions are consistent with existing national environmental policies and objectives as set forth in Section 101 (a) of the National Environmental Policy Act (NEPA), and that they will not significantly affect the quality of the human environment.

Recommended: Tammy Whittington Date: 5/6/16
Tammy Whittington
Superintendent, Big Cypress National Preserve

Approved: Stan Austin Date: 5/6/16
Stan Austin, Regional Director
Southeast Region, National Park Service

INTRODUCTION

The National Park Service (NPS) prepared the *Environmental Assessment for Proposed Oil and Gas Plan of Operations: Nobles Grade 3-D Seismic Survey within Big Cypress National Preserve* (EA) to evaluate a Plan of Operations (POP) for a three-dimensional seismic survey proposed by Burnett Oil Company, Incorporated (BOCI), to be conducted within Big Cypress National Preserve (Preserve) under the jurisdiction of the National Park Service (NPS). The project purpose is to consider BOCI's request to exercise its private oil and gas exploration rights while protecting Preserve resources. The proposed geophysical exploration is needed to determine whether and where potentially producing geological structures might be located so that the owners of those oil and gas interests may exercise their private property rights. The EA evaluated three alternatives: a no-action alternative and two action alternatives and analyzed the potential impacts that these alternatives could have on the natural and human environment. The EA was prepared in accordance with the National Environmental Policy Act and its implementing regulations (40 CFR 1500-1508.9); and with the NPS Director's Order (DO) #12: Conservation Planning, Environmental Impact Analysis, and Decision-Making (2011) and accompanying DO-12 Handbook (2001) and the most recent NPS NEPA Handbook (2015). During preparation of the EA, the NPS consulted with federal and state agencies, tribes, interested and affected parties, and the general public. The NPS developed enforceable mitigation measures that were included in the EA and are incorporated into the selected action. The required mitigation measures were developed as an additional assurance that the impacts of the selected action will be lessened and will not be significant. The mitigation measures and anticipated impacts are discussed below.

The EA was first made available for public comment from November 20, 2015, through January 4, 2016. After the first round of public comments, the NPS worked with BOCI to make changes to the proposed action in response to public comments received on the November 2015 EA. These changes necessitated preparation of a revised EA and draft Wetlands Statement of Findings (Appendix B in the revised EA). The revised EA was released for public comment March 25, 2016, through April 9, 2016. NPS responses to public comments received on the original EA are provided in Appendix D in the revised EA, and a summary of changes is at Appendix E in the revised EA.

NPS reviewed all public comments received on the revised EA. In response to these comments, minor changes were made to the revised EA that are described as an errata included as Appendix A of this document. Appendix B includes the NPS non-impairment determination for the project, and Appendix C includes NPS responses to public comments received on the revised EA. Appendix D includes the final Wetland Statement of Findings for the project. Hereinafter, references to the EA in this document

refer to the March 2016 revised EA. This finding of no significant impact (FONSI) incorporates the EA by reference, as noted below. Details for documents referenced in this FONSI can be found in the reference section of the EA.

SELECTED ACTION

The selected action is Alternative 2 from the EA – Seismic Survey Using Vibroseis Buggies. The NPS will approve the POP submitted by BOCI to conduct seismic exploration activities using Vibroseis buggies within a 110± square mile survey area in the north-central part of the Preserve. A detailed description of this alternative is included below. All of the Minimization and Mitigation Measures described as part of the action alternatives on pages 28-33 of the EA (and included below with one additional measure not included in the EA) will apply as conditions of approval. These are included in the FONSI as enforceable provisions described below.

BOCI will use the Vibroseis seismic exploratory method, a 3-D technology, 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. Vibroseis technology allows the acquisition of high-resolution seismic data without penetrating the ground and detonating a subsurface charge to produce a seismic signal. This minimizes the potential to disturb subsurface cultural and archeological resources or sensitive environmental features at or below the ground surface. This 3-D technology produces an acoustic seismic signal at the surface and will use small, portable seismic receivers (geophones) and recording devices to measure subtle vibrations in the ground from signals that have traveled downward and "bounced" off various subsurface layers back to the surface (Figure 2-1 in EA). The geophones, which have a single, small anchor spike, will be pushed into the ground by foot and connected to a recording device. No explosives will be used to create the vibrations or seismic acoustical signals. Instead, seismic signals will be created by vibrating a hydraulically lowered 8 x 4 foot, 7-inch thick steel plate attached to a special off-road vehicle (ORV), a Vibroseis buggy (Figure 2-2 in EA). This plate is placed against the ground, vibrated, raised, and then moved on to the next location in an approximate two-minute time span (Figure 2-3 in EA).

The vibration devices and the geophones which receive the return seismic signal from the subsurface geology will be oriented in a "source" and "receiver" line grid which will allow BOCI to map the subsurface geology in sufficient detail to meet the project need. The geophones will be placed along the line grid by workers who access the areas by foot. Once the seismic acquisition is completed, the geophones will be collected by hand and the locations where vibrating occurred and geophone receivers were placed on the ground will be returned to their pre-existing condition to the extent possible.

Vibroseis buggies will utilize “balloon” or “flotation”-type tires (Figure 2-4 in EA) to substantially reduce weight on the surface to 26 pounds per square inch (psi). These tires will also result in less potential impact to plant roots due to the lack of tread (or lugs). The Vibroseis buggies have a width of 12 feet but have an articulation feature which allows the buggies to make relatively small radius turns while in operations. With the articulation features, Vibroseis buggies can maneuver in tight spots, producing minimal surface impacts similar to those described in the NPS Operators Handbook for Nonfederal Oil and Gas Development in Units of the National Park System (2006b).

The seismic survey will generally employ a “one pass” design for point locations during data acquisition operations. The “one pass” survey design means that the equipment group (small group of three vehicles) will only traverse a given area once and that area will not be driven upon again in the majority of cases. However, certain areas may be crossed more than once if it will result in less environmental impacts to use the same crossing to avoid sensitive areas (e.g. endangered species nesting/denning areas, archeological sites). Based on the POP, the theoretical maximum distance travelled by the Vibroseis buggies will be 510+ miles. This distance will likely be reduced in practice due to avoidance of Important Resource Areas (IRAs) and other sensitive resources.

A staging area outside of the Preserve known as the Vulcan Mine site (Figure 2-5 in EA) will be utilized to accommodate crew assemblies, support equipment, material storage, Vibroseis and support equipment, receiver/Geospace Seismic Recorder (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. The Vulcan Mine site is a disturbed upland area and using this site will eliminate the need for staging areas within the Preserve. Personnel and equipment will be transported by vans and pickup trucks to and from Preserve access points on I-75 at mile marker (MM) 63 and MM 70.

Crews will travel between the access points and work sites by pickup truck, utility transport vehicle (UTV), or foot. Helicopter pickup and drop-off points will be required on both sides of I-75, as Federal Aviation Administration (FAA) regulations and safety guidelines prohibit helicopters from transporting materials and/or long line (sling) loads over interstate highways. The pickup and drop-off points will allow ground transfer of equipment from either side of I-75 via the existing traffic crossovers that service the Federal Department of Transportation (FDOT) MM 63 rest area and MM 70 recreational parking area. Use of the Vulcan Mine staging area will replace the five staging areas originally planned within the Preserve and will significantly reduce environmental impacts, personnel, and vehicular traffic, as well as eliminate the use of tractor trailers in the Preserve.

The initial survey design will entail vibration points (or source points) and receiver lines oriented generally east/west and north/south, respectively (Figure 2-6 in EA). The source lines will be approximately 1,155 feet apart with source point station spacing of 82.5-foot intervals. The receiver lines will be approximately 495 feet apart with receiver point spacing of 165± feet. Each receiver point will consist of three geophones placed by hand at each station, over an approximately one square-foot area. The operation will utilize geophone sets that are not connected to other geophone sets via a receiver line or cable, thus reducing deployment and pickup times.

The planning operations will involve the identification and mapping of infrastructure, cultural resources, and environmentally sensitive areas, including IRAs. BOCI will modify the survey design to utilize where practicable existing roads, trails, and other disturbed areas for relocation of vibration source points away from IRAs (Figure 2-7).

Mapping of the survey area will first be conducted utilizing high resolution Geographic Information Systems (GIS) mapping imagery, followed by field crews ground-truthing on foot concurrent with the survey operations. By employing these systems, it is anticipated that BOCI will reduce substantially the traditional survey staking of recorder and source points.

Sensitive areas (e.g., IRAs, other listed species areas/buffers, areas with soft soils, and/or dense trees, etc.) as identified by the NPS and field scouting crews (ecologist, archeologist, and seismic contractor) will be added to a work area map as "avoidance polygons," and the survey design will be adjusted accordingly around these areas and posted to a digital map available to field crews on field computer tablets and/or Global Positioning System (GPS) instruments.

Because sensitive environmental features that were not identified during the planning stage may be encountered in the field, when field operations begin, daily scouting and research of the proposed survey lines will be conducted in advance of on-the-ground operations to identify potential sensitive areas and routing alternatives immediately in front of the survey. Following survey activities, geophone receivers will be deployed beginning at one end of a survey area and moving toward the other end. Flexibility has been built into the POP to accommodate relocation around unanticipated sensitive areas. Receiver points will be relocated and source paths re-routed in the field to avoid impacts to these areas. Helicopters will be used to deliver equipment to otherwise inaccessible receiver locations without constructing new roadways or trails. Peak helicopter usage will occur during receiver deployment and recovery and Vibroseis operations. Helicopter operations will be conducted an average of 3-6 hours each day during the 18 weeks of program operations transporting equipment between the staging area outside of the park to the site.

After sufficient geophones have been deployed, Vibroseis operations (seismic acquisition activities) will begin. BOCI will utilize two groups of three Vibroseis buggies. Both groups of buggies will operate simultaneously over an approximate 2.5-square-mile area each day with stops of approximately two minutes at each vibration source point. The short vibrating periods and noise produced at any one source point within the daily operating area will die out (attenuate) with distance from the source.

Approximately 12 to 24 seconds of vibration will be conducted at each source point. Crews will be on call to immediately attend to any required restoration and reclamation activities at any source point needing such attention at the direction of the NPS (see Minimization and Mitigation Measures Nos. 22-24). Reclamation and cleanup entailing the activities listed above will be conducted concurrently with field operations and completed within 30 days following the last Vibroseis source pass, excepting inclement weather conditions.

Field activities can be accomplished in one dry season and will only occur under dry conditions. There is also a reasonable likelihood that the survey may require less than a full dry season to accomplish. The selected action incorporates the Minimization and Mitigation measures (listed below) and best management practices (from NPS Procedural Manual 77-1, Appendix 2, listed in the POP). Additional mitigation measures could be added to this list in the future at the discretion of the NPS, based upon NPS monitoring of the effectiveness of the mitigation measures.

The Minerals Management Plan (MMP) included in the 1992 General Management Plan (GMP) specified that the total Area of Influence (AOI, the percentage of the original Preserve affected by oil and gas activities) should not exceed 10%. The AOI for the selected alternative is 2.1%, which, combined with the 2.7% for existing oil and gas operations, results in a total of 4.8%.

MINIMIZATION AND MITIGATION MEASURES

BOCI has committed to implementing a variety of measures, standard operating procedures (SOPs) and best management practices (BMPs) as part of its proposed POP to prevent lasting impacts and minimize short-term impacts to the Preserve's resources during seismic survey activities. The following management strategies will be applied to further avoid or minimize potential impacts from implementation of the selected action. NPS approval of the POP will be conditioned upon BOCI agreeing to implement the following:

1. The survey will 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 will be conducted during dry season conditions, typically

November through mid-May, consistent with Preserve MMP geophysical operational Stipulation #8 and 2006 NPS Operators Handbook seasonal plant dormancy mitigation recommendations.

2. Operations will avoid all forms of new construction, such as new roads and fill pads.

3. Survey activities will be conducted during daylight hours.

4. 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 BOCI, will be collected and removed from the field daily and as the survey progresses.

5. Survey operations will utilize existing trails to the extent feasible. In addition, the NPS will be consulted to determine access to off-trail source points in environmentally sensitive areas.

6. NPS staff and inspectors will be heavily involved throughout field operations. The Project Manager or his designee will act as liaison and coordinate inspection logistics as needed to ensure the survey alternatives do not impact the ability of NPS staff to manage the Preserve. Inspection personnel will be provided radio and/or cellular telephone communications for use in the field, allowing for the continued coordination of Preserve management and minimizing the time constraints or abilities of Preserve staff.

7. 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 subsequent channelization.

8. Vibroseis buggies will be equipped with wide, smooth treaded balloon tires designed to spread the weight of the buggy over a wider “footprint” to reduce potential short-term impacts to soils, which will also minimize potential rutting. Balloon tires reduce the ground pressure and therefore the rutting depth.

9. Seismic survey activities will generally utilize a "one pass" design for Vibroseis equipment groups, which will greatly reduce potential short-term impacts. The "one pass" survey design means that the equipment group (which will include a UTV and three Vibroseis buggies) will seek to traverse a given area only once, and that area will not be driven upon repeatedly again in the majority of cases. However, certain areas may be crossed more than once if it will result in less

environmental impacts to use the same crossing to avoid a sensitive area.

10. Vibroseis source lines will be located on existing roads, trails and disturbances, where feasible. BOCI will coordinate with the NPS regarding the potential use of trails recovering from past recreational ORV use.

11. Machinery will be operated slowly and attentively to minimize potential impacts. The low speed and the use of the balloon tires on the Vibroseis buggies will also minimize potential turbidity if small amounts of standing water are traversed.

12. Heliportable geophone receiver equipment will be used to enable on-foot deployment and recovery, thus reducing the extent of impacts and time spent on the ground during the survey. Helicopters will adhere to vertical buffers established around colonies of nesting birds to avoid or reduce potential disturbances.

13. 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, personnel and equipment on the ground, which will in turn decrease potential impacts to water quality and hydrology.

14. Available GIS data and aerial imagery will be utilized to identify documented environmentally sensitive and cultural/archeological areas, so the source points, receiver points and their respective access pathways may be re-routed to minimize impacts to these areas.

15. Scouting and ground-truthing operations will be conducted by a wetland scientist and archeologist working concurrently with the survey operations to identify both documented and undocumented environmentally sensitive or cultural/archeological areas so the source points, receiver points and their respective access pathways may be re-routed to minimize impacts to these areas.

16. In the event that undocumented protected species nesting sites or cultural/archeological areas are discovered prior to or during program operations, observation reporting protocols will be initiated with the NPS and other agencies, when applicable, so that appropriate setbacks and program design modifications can be implemented pursuant to the advice and direction of agency personnel.

17. Low shrubs and herbaceous vegetation, topsoil, rootstock, and plant material will be left in place along source lines, receiver lines, and access routes to facilitate

natural re-vegetation. Also, marred or wounded standing trees will be treated with a commercially available, non-toxic pruning paint or wound coating.

18. Ruts, depressions, and vehicle tracks resulting from field operations will 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 will begin immediately upon completion of each task, and final clearance will be documented by and coordinated with NPS inspectors to the satisfaction of the Superintendent.

19. Where vegetative trimming is required, areas with native vegetation will be avoided if trimming areas with exotic vegetation can accomplish an acceptable positioning of vibration or receiver points.

20. Trimming native vegetation below the height or beyond the width of 36 inches or with a 4-inch or greater trunk diameter as measured at breast height will be avoided.

21. Use of motorized vehicles will be avoided in IRAs and other sensitive resource areas within the Preserve identified by the NPS, including areas near known locations of endangered species (e.g., red-cockaded woodpecker clusters), sensitive vegetation communities, and cultural resources.

22. All adverse impacts to wetlands resulting from any project actions, including rutting and compaction of soils and/or destruction of vegetation from vehicle use, will be identified by NPS staff. Field reclamation of impacts will begin immediately as the survey continues. Soils will be decompacted and returned to match the original grade. If the NPS determines that revegetation of the disturbed areas is necessary, then the area will be identified and BOCI will plant native species in a specific pattern, species composition, and density as defined by the NPS.

23. Restoration activity will occur during the dry season and may include the use of mechanical or hand equipment to loosen the soil and level soil ruts to existing natural grade of adjacent undisturbed areas. Revegetation will be allowed to occur via natural recruitment unless planting is required by the NPS. Signage will be installed near restored areas to keep visitors out.

24. Dedicated crews will be used to implement restoration and reclamation activities.

25. Survey equipment and vehicles will be cleaned prior to initially entering the Preserve to avoid the spread of nonnative plant species and potential wildlife diseases.

26. Potential contaminants will be very limited and localized to small areas through the application of the MMP's resource protective stipulations on the proposed operations. 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. Cleanup and restoration activities will be conducted in compliance with applicable MMP operation stipulations in the unlikely event that a spill will occur.

27. Educational training programs will be provided to survey crews to help them identify and avoid wildlife and environmentally sensitive areas (to the extent feasible) and identify and avoid cultural/archeological areas. In addition, the survey crews will be informed not to collect vegetation, wildlife, artifacts, etc., as well as inform them of wildlife protection measures and safety hazards.

28. BOCI will conduct meetings with state and federal wildlife management and research specialists to discuss ongoing research, potential issues, and survey protocols for protected species. BOCI will coordinate field operations with the state and federal wildlife management and research specialists to avoid potential impacts to protected species. Per guidance received from the agencies, species-specific buffers and protocols will be established around areas containing certain protected plants and wildlife to minimize potential disturbance to these species.

29. To avoid and minimize potential adverse impacts to protected wildlife, BOCI will conduct a GIS analysis of available protected species location information. These documented occurrences will be avoided with appropriate buffers, as described in 31-34 and 37-40 below. The species data will be the focus of the initial planning and design efforts for the project, which will continue to be the subject of ongoing identification and monitoring activities throughout all phases of survey field operations. In addition, particular attention will be paid toward wildlife IRAs, which will be avoided in accordance with applicable operational stipulations.

30. To avoid potential impacts to undocumented wildlife and IRAs, scouting and research of the survey lines will be conducted by a qualified ecologist concurrently with the survey operations. The ecologist will work with the access management, surveying crews, and agency personnel to identify protected species occurrences, dens/nests and/or cavities or other potentially sensitive

wildlife areas. Flexibility will be built into the operations plan to accommodate unanticipated wildlife encounters. Receiver points will be relocated and source paths will be re-routed in the field to avoid potential impacts to wildlife. Field personnel will also avoid directly disturbing wildlife.

31. The NPS and Florida Fish and Wildlife Conservation Commission (FWC) conduct extensive, ongoing research on red-cockaded woodpecker populations within the Preserve. The specific locations of documented red-cockaded woodpecker clusters and cavity trees will be shared with BOCI so that these areas could be avoided and appropriate setbacks could be maintained. The U.S. Fish and Wildlife Service (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. Therefore, a buffer of 61 meters (200 feet) in width will be maintained between red- cockaded woodpecker clusters and foot or ORV traffic. Special precautions will be taken around red-cockaded woodpecker clusters during the peak feeding activity periods of early morning (6 a.m. - 9 a.m.) and late afternoon (4 p.m. - sunset). Where practicable, activity near red-cockaded woodpecker clusters will be avoided entirely during those time windows.

32. In order to further reduce potential red- cockaded woodpecker disturbances, a 61-meter (200-foot) buffer will be established vertically and applied to helicopter activity above active cavities. Red-cockaded woodpeckers usually do not fly above canopy level, thus the potential for a helicopter collision with a bird will be negligible (Davis *et al.* 2010).

33. Potential red-cockaded woodpecker habitat areas will be scouted by an ecologist prior to the commencement of surveying activities. Previously undocumented areas containing red-cockaded woodpecker clusters will be avoided, and the 61-meter (200-foot) buffers will be maintained. Survey crews will be trained to identify red-cockaded woodpeckers, as well as to identify active and inactive red-cockaded woodpecker cavity trees. No identified red-cockaded woodpecker cavity trees will be cut, destroyed, or damaged as a result of seismic surveying activities.

34. Although no bald eagle nests are documented within the survey area, they could potentially occur. Potential bald eagle nesting areas will be scouted by an ecologist prior to the commencement of surveying activities. Previously undocumented bald eagle nests will be avoided, and the appropriate buffers will be established. The buffer zones will adhere to the USFWS and FWC

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.

35. The 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 could 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. Previously undocumented colonies could also be avoided with appropriate buffers. Survey crews will be trained to identify the different wading birds and nesting areas. No wading bird nest trees will be cut, destroyed, or damaged as a result of the seismic surveying activities.

36. The NPS Operators Handbook (NPS 2006b) calls for geophysical exploration to be conducted during a time that results 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 protection measures for vegetation, soils, and water quality, the selected alternative will reduce impacts to foraging habitats and foraging birds by avoiding surface water areas.

37. 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) state that unauthorized human entry closer than 300 feet of a nesting wood stork colony will likely be detrimental to the colony. Davis *et al.* (2010) recommended a similar minimum 328-foot (100-meter) buffer from active colonies. 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 vehicular traffic.

38. 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.

39. Prior to equipment entry, a qualified ecologist will scout the area for burrows which may indicate the presence of gopher tortoises, burrowing owls, or eastern indigo snakes. If a burrow is discovered by the ecologist, no field equipment will

be driven within 50 feet of the burrow.

40. Prior to equipment entry, a qualified ecologist will scout the area for potential Florida bonneted bat nesting and roosting sites. If bats or nesting/roosting sites are observed, 300-foot buffers will be established around the sites, and no entry of personnel or equipment will be permitted.

41. As part of the original Nobles Grade 3-D Geophysical Survey POP for the Big Cypress National Preserve and Addition Areas submitted to the NPS in June 2006, a professional archeology review was conducted by L. Ross Morrell and Wilburn Cockrell (Morrell and Cockrell 2006), both registered professional archeologists (RPA) familiar with south Florida. They conducted research and prepared a report of the cultural, historical and archeological resources in approximately 40 percent of the survey area. They also prepared an Avoidance Model for cultural resources in the area they investigated. BOCI will use this model to avoid disturbing areas likely to contain cultural resources.

42. In 2014, BOCI contracted with a professional cultural resource management firm, Archaeological Consultants, Inc. (ACI), to interface with the NPS, SEAC and the State Historic Preservation Officer (SHPO) for the purpose of developing a Cultural Resource Avoidance Model for the overall program area. This research will include a review of existing data, conducting detailed analyses of the overall program area utilizing GIS databases from Southeast Archaeological Center (SEAC) and the Florida Master Site File, 19th-century federal land records, Seminole War documents and maps, soil, vegetation, and water resource imagery. Delineation of known resources may also involve the identification of buffer zones if recommended by the NPS to minimize or avoid any disturbances to identified resources. ACI will also coordinate with appropriate Preserve personnel and others as requested by the NPS and SEAC.

43. In recognition of the inherently sensitive nature of archeological, historical, and cultural resources in the Preserve, a professional archeologist will oversee program activities. The archeologist will research available site conditions (i.e., soils, land use, etc.), as well as documented archeological sites, and develop site recognition and avoidance protocols in cooperation with SEAC after consultation with the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida. Archeology experts will also advise on the avoidance of potentially undocumented archeological sites. As requested by the Miccosukee and Seminole tribes and in compliance with federal and state regulations, the locations of all archeological, historical, and cultural sites will be kept confidential. The archeologist will also consult with tribal representatives on an ongoing basis to

ensure that any tribal activities in the survey area will not be affected.

44. In an effort to minimize negative visitor experience for those who may pass through backcountry or off of I-75 at the time of the survey, BOCI will work with the NPS in posting informational notices at trail heads, I-75 visitor/recreational access points and rest areas and on appropriate Internet sites. Activities will be scheduled to avoid peak visitor use dates, i.e. opening day of general gun season.

45. As compensation for any temporal loss of wetland function resulting from vehicle use documented by the NPS, an equivalent area of wetland restoration area will be conducted elsewhere in the Preserve as identified by the NPS to offset the specific functional loss identified by the NPS. BOCI will restore an area providing wetland functional benefit equivalent to the wetland functional loss documented by the NPS from the project. The soils will be decompacted and returned to match original grade as directed by the NPS. If the NPS determines that revegetation of the disturbed areas is necessary, then the area will be identified and BOCI will plant native species in a specific pattern, species composition, and density as defined by the NPS.

46. Prior to any Vibroseis field operations, BOCI will provide the NPS with GIS files of the proposed routes so that they can be reviewed. No Vibroseis operations will be undertaken without prior NPS approval of proposed routes.

47. BOCI will provide extensive monitoring during the project and post-survey monitoring of selected sites that are impacted by survey activities. The monitoring will be done by a professional independent monitor that will be directed by and report directly to the NPS. Post-survey monitoring will be conducted over a minimum of three years to determine recovery of specific environmental attributes (e.g., soil, vegetation, hydrology) and success of any remediation activities that are conducted during survey activities. If successful recovery is not identified during the period of post-project monitoring, BOCI will be required to return to those areas to conduct additional restoration activities as identified by the NPS.

FINDING OF NO SIGNIFICANT IMPACT

As described in the EA, the selected action has the potential for short-term adverse impacts on vegetation, habitat, soils, wetlands, protected species, wildlife, water quality, hydrology, subsurface geologic resources, air quality, cultural resources, archeological resources, soundscapes, visitor experience (including visual quality), and wilderness character; however, no potential for significant adverse impacts was identified through

the analysis of impacts or the results of agency and tribal consultation or review of public comment.

Short-term adverse vegetative and habitat impacts will result primarily from the movement of Vibroseis buggies along source lines. Potential short-term disturbances to vegetation could occur through the matting down of plants, scraping of trees, exposure of plant roots, or bending, breaking, and trimming of low shrubby and woody undergrowth. Vegetation impacts from the Vibroseis buggies will be similar to impacts from past recreational ORV use, which was generally characterized as long-term and adverse in the 1992 GMP/EIS (pages 263-268), the 2000 ORV Management Plan/EIS (pages 130-134), and the 2010 Addition GMP/EIS (pages 339-349). However, there are important differences that will lessen the adverse effects of this operation compared to recreational ORV use: 1) the impacts from recreational ORVs mostly result from multiple passes of vehicles over the same trails vs. a single pass of the Vibroseis buggies (Minimization and Mitigation Measures No. 9), 2) the Vibroseis buggies, although heavier than recreational ORVs, will distribute their ground pressure through wide balloon-type tires, thus minimizing rutting (Minimization and Mitigation Measures No. 8 and the 2000 ORV Plan/EIS at page 52, suggesting that wider, high-flotation tires may reduce impacts), 3) Vibroseis buggies will only operate during the dry season when soils and vegetation are more resilient to vehicular activity (Minimization and Mitigation Measures No. 1) vs. most of the year for recreational ORVs, and 4) immediate restoration of environmental damage will be required for Vibroseis buggies (Minimization and Mitigation Measure Nos. 18, 22-24) vs. none from recreational ORV use. In addition, Vibroseis buggies will use existing trails when possible, thus limiting impacts to previously disturbed soils (Minimization and Mitigation Measures No. 5). The minimization and mitigation measures will reduce any impacts to wetlands, habitat, soils, and vegetation non-significant levels. Field tests of the Vibroseis buggies both in and outside the Preserve have demonstrated minimal vegetation impacts and substantial recovery six months later (Appendix A in the EA). Duever *et al.* (1981 and 1986a) concluded that in most cases single passes of ORVs 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 selected action will involve a single pass of a group of three Vibroseis buggies through a given area. Potential short-term impacts to soils could occur through soil rutting and soil compaction. Seismic survey activities in wetlands are expected to produce greater impacts than those to upland areas. Equipment might get stuck at points during survey operations and might need to be extricated through assistance from other vehicles. This may result in localized soil disturbance, which will be remediated on site.

BOCI conducted a field demonstration in the survey area on April 24, 2015, to observe how a Vibroseis buggy would perform in wetlands typical of those expected to be

encountered during the survey. Although the test vehicle got stuck in a pre-existing man-made ditch and had to be extricated by other equipment, the wetland habitat traversed by the buggy was minimally impacted and showed signs of recovery six months later. If the field test had followed the same minimization and mitigation measures (e.g., No. 46) that will be in place for the selected action, Preserve staff would have rerouted the vehicle around the area such that it would not have followed the original route and subsequently gotten stuck. The minimization and mitigation measures have been designed to avoid such a recurrence.

Implementation of the minimization and mitigation measures cited above will ensure that this operation will result in the same or fewer impacts to vegetation, soils, and wetlands as observed by Duever *et al.* Based on years of NPS experience with ORV management in the Preserve, previous NEPA documents (the 1992 GMP/EIS, 2000 ORV Plan/EIS, and 2010 Addition GMP/EIS) and studies (1981 and 1986 Duever studies, 2001 WilsonMiller report), mitigation measures, and Vibroseis field tests, no or minimal long-term impacts to vegetation, soils, and wetlands are expected and none of these impacts will be significant.

There is some potential for the spread of nonnative invasive plant species through the operation of vehicles. Because of the short duration and limited scope of the project, the probability of introduction of exotic plant species is low. As a mitigation measure, survey equipment and vehicles will be cleaned prior to initially entering the Preserve to avoid the spread of nonnative plant species and potential wildlife diseases (Minimization and Mitigation Measures No. 25). Also, the majority of the equipment used for survey activities (i.e., Vibroseis buggies and utility transport vehicles) will remain within the survey area for the duration of the survey, reducing the likelihood of bringing in non-native seeds.

The Biological Assessment (BA), Appendix C in the EA, addresses the potential effects of the project on the threatened American alligator (*Alligator mississippiensis*)(due to similarity of appearance to the American crocodile), threatened eastern indigo snake (*Drymarchon corais couperi*), threatened Audubon's crested caracara (*Caracara cheriway),* endangered Everglade snail kite (*Rostrhamus sociabilis plumbeus*), endangered red-cockaded woodpecker (*Picoides borealis*), threatened wood stork (*Mycteria americana*), candidate gopher tortoise (*Gopherus polyphemus*), and endangered Florida bonneted bat (*Eumops floridanus*). The U.S. Fish and Wildlife Service (USFWS) concurred with the NPS determination that the project "may affect, but is not likely to affect these species." The BA also included the endangered Florida panther (*Puma concolor coryi*). The USFWS disagreed with the NPS determination of *may affect* and changed the determination to "may affect, not likely to adversely affect" the Florida panther. Two plant species, Florida prairie-clover (*Dalea carthagenensis floridana*) and Florida pineland crabgrass (*Digitaria pauciflora*), could be present in the

survey area. Both species are identified by USFWS as candidate species for federal listing. The probability of occurrence of these species is low, as supported by the USFWS determination of "may affect, but not likely to adversely affect" for these species (see pages 7 and 8 of Appendix C in the EA). In the event that these 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.

Short-term adverse impacts to protected wildlife and other wildlife resources specifically described in the EA (pages 85-90) are expected due to the seismic survey techniques and design, Modification Protocols, and technologies proposed. These adverse impacts will be evident in the species' avoidance of the area during survey activities. In addition, elements of the seismic survey may result in beneficial effects on protected wildlife species through extensive new data acquisition, collection, and sharing with agency personnel. The mitigation measures will reduce potential impacts to wildlife species in the Preserve. Because seismic survey activities will not occur in wet or submerged areas, fish and other aquatic species will not be impacted. Highly mobile birds and mammals are anticipated to avoid the small area where seismic surveying activities will occur during a given day. In addition, moving at slow speeds with attentive drivers, educational training for survey crews, scouting ecologists and agency coordination and oversight will provide additional protections for all wildlife species. Field personnel will avoid directly disturbing wildlife. For these reasons, there will be no significant impacts to wildlife or listed species.

Anticipated adverse impacts to water quality, hydrology, and subsurface geologic resources resulting from the selected action are expected to be localized and short-term, likely within one growing season. These impacts would be similar to impacts from recreational ORVs analyzed in the 1992 GMP/EIS, 2000 ORV Plan, and the 2010 Addition GMP/EIS, as discussed in the EA on page 90, however impacts would occur during dry conditions and therefore, will be limited. Surface water quality could be degraded from suspended sediment or 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. The occurrence of standing water is unlikely since activity will only occur in dry conditions and via routes approved by NPS. If the rare occurrence of a vehicle or heavy foot traffic occurs in standing water, 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, though short-term, could stress both plants and animals in these shallow water areas directly traversed by vehicles. This impact is not expected in dry conditions. If these impacts occur, water quality would return to the same or similar state and the character of the resource would not be degraded. 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 vehicles. All potential impacts to water quality, hydrology, and subsurface geologic resources are addressed by the plan design and/or mitigation measures (Minimization and Mitigation Measures Nos. 1, 7, 11, 18, 23, and 26) and would be avoided to a large extent by conducting work during the dry season. Because the occurrence of survey vehicles or employees traversing standing water would be low and since NPS will approve the routes used to avoid these areas entirely and because survey activities will occur in dry season conditions, no significant impacts to water quality, hydrology, and subsurface geologic will occur.

Anticipated adverse impacts to air quality resulting from the selected action are expected to be short-term. The selected action will consume fuel and generate a short-term, minor increase in air emissions over ambient conditions. Anticipated survey-generated air impacts include minor particulate emissions and products of combustion from the six Vibroseis buggies, use of one helicopter, and the various support vehicles and equipment operating in the field. The daily fuel consumption and corresponding fuel emissions estimate for any phase ranges from approximately 162 gallons of diesel per day during the initial few weeks of the survey to 1,047 gallons consumed each 24-hour period when all survey work segments will be active. Air quality impacts will cease with the conclusion of field operations. Survey operations will contribute a small amount of air emissions for a short period of time in the immediate vicinity of operating machinery in the form of internal combustion engine exhaust that may amount in aggregate to an increase of 1.04 percent to 6.7 percent above ambient air quality conditions (see sections 10.6.1 and 10.6.3 of the POP). These emissions will occur over one dry season. Fugitive dust is not anticipated to affect air quality due to the relatively limited amount of equipment movement at low speeds, existing soil conditions, and the high use of pedestrian field movement.

Anticipated adverse impacts to cultural/archeological resources resulting from the selected action are expected to be localized, and confined to the immediate areas that are surveyed. These impacts are attributed to the potential for survey vehicles to disturb undocumented resources; as provided for in Minimization and Mitigation Measures Nos. 41-43, documented sites will be avoided. Seismic vibrators produce a small-amplitude ground motion that will not lead to substantial subsurface displacement of material. Because the subsurface does not have a free boundary, little displacement of material will be possible, and almost no differential displacement will be possible that would lead to disturbance or damage to buried historical materials. Elements of the seismic survey may also have beneficial effects on cultural/archeological resources.

On February 29, 2016, the Preserve Superintendent, Deputy Superintendent, Chief of Resource Management, and the Environmental Specialist met with the Seminole Tribe of Florida Historic Preservation Officer (THPO), Deputy THPO, and Compliance, Legal,

and Tribal Council representatives. Specific concerns to the Seminole Tribe which were discussed at this meeting included the legal requirement for, and status of Preserve-specific oil and gas regulations; preservation of cultural resources within the project area; and the need for the NPS to keep confidential any and all information concerning the location, character, or ownership of historic properties or artifacts in the event they are inadvertently discovered during the archaeological survey or seismic activities. It was also suggested during the meeting that representatives from the NPS attend the next tribal community meeting to field questions on the BOCI seismic proposal and inform the reservation community how such an activity may affect tribal members. Despite several attempts to schedule the community meeting, at the time of this writing, that meeting has not been scheduled by the Seminole Tribe. Preserve staff also contacted the Miccosukee Tribe of Indians of Florida who requested consultation but the tribe has not responded.

If undocumented cultural/archeological resources are discovered, their locations will be GPS located, information will be gathered by the archeologists, and the results will be shared with appropriate agencies, tribes, and personnel. Thus, the determination of effect under Section 106 of the National Historic Preservation Act (NHPA) is "no adverse effect." The State Historic Preservation Officer concurred with this determination by letter dated April 22, 2016. Therefore, there will be no significant impacts to cultural or archeological resources.

Anticipated adverse impacts to soundscapes resulting from the selected action are expected to be short-term as described in the EA (pages 93-95). Survey-generated noise will originate from the Vibroseis buggies, UTVs and other vehicles, and signal generation activities at each source point. No ground-disturbing activities, drilling, or dynamite will be used to conduct the seismic survey. The Vibroseis buggies have two noise sources: diesel exhaust noise, and to a much lesser extent, vibrating pad noise. Additional noise from support helicopters will be generated as well. Peak helicopter usage will occur during data acquisition operations (more with receiver layout and retrieval and less with Vibroseis operations). Helicopter operations will be limited to an average of three to six hours each day during the 18 weeks of survey operations. As such, the proposed seismic survey will not impose any significant long-term effects on natural ambient soundscape. Visitor use and perception may be affected by noise generated from seismic survey and helicopter operations, while they are ongoing, although most visitors will not notice survey field operations or diminished soundscapes unless standing within approximately 1.5 km of a group of three Vibroseis buggies. For those visitors electing to experience the backcountry in the immediate vicinity of survey activities, BOCI will work with NPS to provide informational materials at the limited entry points and online. All operations will occur during daylight hours; therefore, the noise from plan operations will occur only during daylight hours.

Noise can also have important effects on wilderness character. Natural soundscapes and the absence of anthropogenic noise are crucial to preserving the undeveloped quality of wilderness as well as the quality of solitude or opportunities for primitive and unconfined recreation. Within the lands eligible or proposed for wilderness designation in the survey area, the noise generated by Vibroseis buggies, utility terrain vehicles (UTVs), helicopters, and other mechanized equipment will degrade the quality of solitude or primitive and unconfined recreation because areas currently remote from sights and sounds of human activity will be exposed to survey operations. In addition, the noise generated by motorized equipment, as well as the presence and use of this equipment in wilderness, will degrade the undeveloped quality of wilderness character. Overall, impacts from noise and the presence of motorized equipment in wilderness will be adverse, but short-term, and diffused over a large area. As discussed on page 95 of the EA, survey-generated noise would be intermittent during an 18-week period and limited to a small portion of the survey area (2½ square miles) on any given day. In operation the Vibroseis buggy will lower its plate, vibrate, raise the plate, and move on to the next source point in about two minutes, and the actual vibration takes only 12-24 seconds, so the time spent at any one location would likely be less than two minutes. Helicopter operations would be limited to an average of 3-6 hours each day during the 18 weeks of survey operations. As such, the proposed seismic survey would not impose any significant long-term effects on natural ambient soundscape. Upon conclusion of the survey, all noise impacts would immediately cease. Use of motorized equipment in wilderness will also degrade natural quality of wilderness character, and further the undeveloped quality, by producing visible soil ruts, matting vegetation, and causing damage to trees and shrubs from vehicle passage and trimming. However, these impacts will likewise be adverse and short term. Not only will the survey work be limited in time and area, but trial use of the Vibroseis buggies at the Preserve has shown that natural systems largely recover from their limited impacts within less than a year. To ensure that impacts on wilderness resources and character are avoided or minimized, a formal Minimum Requirements Analysis (MRA) will be completed to determine the specifics of implementing the selected alternative in areas eligible or proposed for wilderness designation. The MRA will be completed prior to initiating survey activities, when more specific information relating to proposed routes of the vehicles and helicopters is available. The analysis will include a thorough review of survey routes, as well as the techniques and types of equipment to be used in particular locations. For all of the above reasons, impacts to wilderness character will not be significant.

Anticipated impacts to visual quality and visitor use and perceptions resulting from the selected action are expected to be adverse and short-term. Because the Preserve lands are virtually flat throughout the survey area with areas of both dense vegetation and areas of sparse vegetation, the survey activities could potentially be viewed by Preserve

visitors. However, most visual expanses are less than a mile because the dense vegetation in certain areas hides much of oil and gas operations when viewed from the ground level. Impacts would result from the visibility of disrupted vegetation and/or soils after the survey has been accomplished, seeing vehicles and workers as they enter recreational parking areas, traverse locked fencing, and travel to work sites, and in the rare occurrence of visitors crossing the survey area on trails while survey activities are taking place.

The survey will utilize, where practicable, existing and previously disturbed roads, trails, and other areas. Although visitor use of these areas is infrequent because of the remote location of the majority of the survey, use of these areas could temporarily disrupt recreational uses by hikers, ORV users, and hunters as a result of temporary trail/area closures. Also, a visitor to the backcountry could encounter some operational elements in natural settings and view some short-term disruption of surface vegetation and/or soils. With the exception of travelers along I-75 and occasional hikers, ORV users, and hunters along trails, no survey operations will occur near areas frequented by Preserve visitors. While these interactions may be undesirable, they would be limited to the time of survey activities and would not result in a significant impact to visual quality and visitor use and perception. The survey activities will be conducted quickly with the Vibroseis buggies and with minimal vegetation clearing or soil disruption. Therefore, potential adverse impacts to the visual quality and visitor use and perception will be minimal and short-term (one day only in specific areas) during survey activities. Visual impacts from matted vegetation will last longer; however they are anticipated to largely recover within one growing season. BOCI will work with the NPS in posting informational notices at trail heads, I-75 visitor/recreational access points and rest areas and on appropriate internet sites (Mitigation Measure 44) to ensure that visitors are informed and able to avoid the area if they choose. Therefore, impacts to visitor use and experience will not be significant.

Other past, present, or reasonably foreseeable actions were analyzed for their potential to contribute to cumulative impacts in association with implementation of the selected action. The effects of the selected action will compose a very small component of any cumulative impacts, given the size and scope of the operation within the Preserve. Overall, the impacts of the selected action, combined with the cumulative beneficial and adverse impacts from other past, present, and reasonably foreseeable future actions, will not result in significant adverse cumulative impacts. In summary, the selected action will not have a significant effect on the human environment. There are no significant impacts on public health, public safety, threatened or endangered species, sites or districts listed in or eligible for listing in the National Register of Historic Places, or other unique characteristics of the region. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified.

Implementation of the NPS selected action will not violate any federal, state, or local environmental protection law. Based on the foregoing, it has been determined that an environmental impact statement is not required for this action and thus will not be prepared.

DECISION REACHED AND RATIONALE

The NPS has selected Alternative 2: *Seismic Survey Using Vibroseis Buggies*, the NPS Proposed Action and Preferred Alternative in the EA, for implementation as described in this Finding of No Significant Impact. The NPS will approve the request to conduct a three-dimensional seismic survey within Big Cypress National Preserve, subject to minimization and mitigation measures which will allow BOCI to exercise its private oil and gas exploration rights, while protecting Preserve resources.

The NPS has elected to approve BOCI's request to conduct a 3-D seismic survey because they have met the requirements in 36 CFR 9b for approval of a POP. BOCI has been able to demonstrate their pre-existing mineral exploration rights below the surface of the Preserve in the area proposed for operation and have established that they are using equipment that will provide high-resolution data without the need to penetrate the surface. The survey methods included in the selected action represent the technologically feasible methods of obtaining the data necessary to BOCI, that are least damaging to Preserve resources while assuring the protection of public health and safety. To further ensure that impacts are minimized and no significant impact will occur the NPS will require BOCI to implement Minimization and Mitigation measures (listed above), NPS personnel will be involved with directing mitigation and monitoring activities, and BOCI will provide extended monitoring of selected mitigation sites. Upon conclusion of the survey, some impacts, such as noise, will immediately cease. Other impacts, such as soil and vegetation damage, will be restored and will take longer to recover; however, recovery would be expected within one growing season and no more than three years. Where restoration activities occur, BOCI will provide post-survey monitoring on a schedule determined by the NPS and will be required to return to those areas to conduct additional restoration activities as identified by the NPS if restoration efforts are not successful. With activities occurring in dry conditions, with NPS approving all routes, and mitigation measures in place to ensure impacts are minimized, significant impacts will not occur.

Appendix A

Environmental Assessment Errata

Big Cypress National Preserve
Florida

This errata should be attached to the EA to form the complete record of the environmental impact analysis and conservation planning completed for the project. The combination of the EA and this errata, prepared in response to public comments on the EA, form the complete and final record of the Finding of No Significant Impact.

An EA was first made available for public comment from November 20, 2015, through January 4, 2016. Changes to the proposed action and public comments received on the November 2015 EA necessitated preparation of a revised EA and draft Wetlands Statement of Findings (Appendix B in the EA). The revised EA was released for public comment March 25, 2016, through April 9, 2016. NPS responses to public comments received on the November 2015 EA are provided in Appendix D of the March 2016 revised EA, and a summary of changes is included as Appendix E in the March 2016 revised EA. The comments received on the March 2016 revised EA were analyzed to determine whether any new issues, reasonable alternatives, potential for significant impacts, or mitigation measures were suggested. The public comments received did not identify new issues, alternatives, or mitigation measures, nor did they correct or add substantially to the facts presented in the environmental assessment. The comments received resulted in clarification of policy or procedures and did not provide substantive information to change the plan's purpose, goals, objectives, and environmental impact analysis.

Changes to the March 2016 EA are outlined below. The page numbers refer to the March 2016 EA that was reviewed by the public.

Editorial Changes

Revised EA

1. The EA refers to tiering to the GMP/EIS and ORV EIS in the following locations: P. 1, para. 3, P. 7, paras. 2, 6, 8, Appendix D, comments 4, 8.a, 12.a, 14, Appendix E, item 3. Rather than tiering, the NPS is incorporating relevant information in

those documents by reference because they considered oil and gas activities and use of ORVs and the impacts of both in the Preserve: 1)The 1992 *Big Cypress National Preserve General Management Plan (GMP)/Final Environmental Impact Statement (EIS)*, for the original Preserve (1992 GMP/EIS, NPS 1992), which included a Minerals Management Plan (MMP) governing oil and gas activities in the original Preserve; 2) The 2000 *Big Cypress National Preserve Recreational Off-Road Vehicle Management Plan/EIS* for the original Preserve (2000 ORV Plan/EIS, NPS 2000); and 3) The 2010 *Big Cypress National Preserve – Addition Final GMP/Wilderness Study/Off-Road Vehicle Management Plan/EIS* (2010 Addition GMP/EIS,), governing Preserve activities in the Addition. These documents contain relevant information related to existing conditions in the Preserve and the use of off-road vehicles in the Preserve.

2. An additional minimization and mitigation measure was developed by NPS after release of the EA. The additional measure should be #47 and reads as follows:

> BOCI will provide extensive monitoring during the project and post-survey monitoring of selected sites that are impacted by survey activities. The monitoring will be done by a professional independent monitor that will be directed by and report directly to the NPS. Post-survey monitoring will be conducted over a minimum of three years to determine recovery of specific environmental attributes (e.g., soil, vegetation, hydrology) and success of any remediation activities that are conducted during survey activities. If successful recovery is not identified during the period of post-project monitoring, BOCI will be required to return to those areas to conduct additional restoration activities as identified by the NPS.

Appendix D

1. Response to comment no. 6: 43 CFR 46.3 should be 43 CFR 46.30.
2. Response to comment no. 7: AOI calculations of 2.7% and 2.1% should be reversed, i.e., proposed action AOI is 2.1% and existing AOI is 2.7%.

Appendix B

National Park Service, Southeast Region
Non-Impairment Determination
Nobles Grade 3-D Seismic Survey
Big Cypress National Preserve

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of the Interior and the NPS to manage units "to conserve the scenery, natural and historic objects, and wild life in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wild life in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (54 U.S.C. 100101).

NPS Management Policies 2006, Section 1.4.4, explains the prohibition on impairment of park resources and values:

> "While Congress has given the Service the management discretion to allow impacts within parks, that discretion is limited by the statutory requirement (generally enforceable by the federal courts) that the Park Service must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. This, the cornerstone of the Organic Act, establishes the primary responsibility of the National Park Service. It ensures the Park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them."

The NPS has discretion to allow impacts on Park resources and values when necessary and appropriate to fulfill the purposes of a Park (NPS 2006 sec 1.4.3). However, the NPS cannot allow an adverse impact that will constitute impairment of the affected resources and values (NPS 2006 sec 1.4.3). An action constitutes impairment when its impacts “harm the integrity of Park resources or values, including the opportunities that otherwise will be present for the enjoyment of those resources or values” (NPS 2006 sec 1.4.5). To determine impairment, the NPS must evaluate the “particular resources and values that will 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 sec 1.4.5).

As stated in NPS *Management Policies 2006* (NPS 2006, section 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 affects 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 (GMP) or other relevant NPS planning documents as being of significance.

The Preserve's purpose and significance were considered during the impairment determination process for the selected action. Congress established Big Cypress National Preserve to:

> *"assure the preservation, conservation, and protection of the natural, scenic, hydrologic, floral and faunal, and recreational values of the Big Cypress Watershed in the State of Florida and to provide for the enhancement and public enjoyment thereof."*

Statements of a park's significance describe why a park is important within a global, national, regional, and ecosystem-wide context and are directly linked to the purpose of the park.

Big Cypress National Preserve is significant for the following reasons:

- The Preserve protects the Big Cypress Watershed—an area critical to the survival of the greater Everglades ecosystem.
- The Preserve contains the largest dwarf cypress forests in North America and the largest old-growth south Florida slash pine forest.
- The Preserve protects vital habitat for state and federal threatened and endangered plant and animal species, including the Florida panther, wood stork, and ghost orchid.
- The Preserve provides opportunities for the public to enjoy outdoor recreation activities in a vast natural area spanning more than 729,000 acres of south Florida. These opportunities are increasingly rare in a region containing rapidly growing cities with more than 6 million people.
- The Preserve contains evidence of approximately 15,000 years of human use and sustains resources that continue to hold importance to traditionally associated cultures including the Miccosukee and Seminole people.

Non-Impairment Determination for the Selected Action

The NPS prepared an Environmental Assessment (EA) to evaluate the Plan of Operations (POP) submitted by Burnett Oil Company, Incorporated (BOCI) for a three-dimensional seismic survey. The EA was first made available for public comment from November 20, 2015, through January 4, 2016. After the first round of public comments, the NPS worked with BOCI to make changes to the proposed action in response to public comments received on the November 2015 EA. These changes necessitated preparation of a revised EA. The revised EA was released for public comment March 25, 2016, through April 9, 2016. NPS reviewed all public comments received on the revised EA. In response to these comments, minor changes were made to the revised EA that are described as an errata included as Appendix A of the finding of no significant impact (FONSI). Hereinafter, references to the EA in this document refer to the March 2016 revised EA as amended by the errata.

The selected action, as described in the FONSI, is Alternative 2 from the EA – Seismic Survey Using Vibroseis Buggies. For the selected action, a determination of non-impairment is made for each of the impact topics carried forward for detailed analysis in the EA except for "visitor use and perceptions." Pursuant to the *Guidance for Non-Impairment Determinations and the NPS NEPA Process* (2010), impairment findings are not necessary for visitor experience, socieoeconomics, public health and safety, environmental justice, land use, or park operations because these impact topics are not generally considered to be park resources or values, and are therefore not subject to the written impairment determination requirement found in NPS Management Policies 2006. This document references the EA and documents referenced in the EA.

VEGETATION, HABITAT, SOILS, WETLANDS, AND PROTECTED PLANT SPECIES

Eleven major land cover types are found within the survey area, including approximately 32,211 acres of cypress forest, 18,855 acres of scrub cypress, 379 acres of disturbed area, 82 acres of hydric hammock, 2,936 acres of hydric pine flatwoods, 688 acres of marsh, 2,889 acres of mesic hammock, 8,415 acres of mesic pine flatwoods, 486 acres of swamp forest, 124 acres of water, and 3,389 acres of wet prairie. Of those, cypress strands, mixed-hardwood swamps, sloughs and cypress domes, marshes, hardwood hammocks, old-growth pinelands, and mangrove forests were identified as Important Resource Areas (IRAs) in the Preserve's Minerals Management Plan (MMP).

Temperate plants are abundant, but the majority of the species are tropical. Pinelands, cypress strands and domes, prairies, and marshes are the most prevalent vegetation types and are dominated by temperate species. Tropical species occur primarily in hardwood hammocks but are also found in pinelands, mixed hardwood swamps, and

cypress strands. Two plant species, Florida prairie-clover (*Dalea carthagenensis floridana*) and Florida pineland crabgrass (*Digitaria pauciflora*), could be present in the survey area. Both species are identified by the U.S. Fish and Wildlife Service (USFWS) as candidate species for federal listing; however, the probability of occurrence of these species is low.

Thirteen soil types occur within the area: 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; and Tucker Marl.

Based upon the NPS land cover categories outlined above, the majority of the survey area (58,647± acres or 83 percent) is comprised of wetland habitats (see EA, Table 3-3). These wetland habitats are spread throughout the survey area, both north and south of I-75. As described in the EA and Wetlands Statement of Findings, wetlands serve a number of biotic, hydrologic and biogeochemical functions and comprise areas that have cultural values. For instance, wetlands sustain complex trophic interactions. Wetland structure, including topography, soils, and vegetation, has helped evolve the many highly specialized biota. Mature forested cypress wetland areas provide important nesting and roosting habitat for both birds and mammals. Scrub cypress is dominated by pond cypress (*Taxodium ascendens*) that is adapted for areas with slow to stagnant water, low-nutrient availability, and occasional forest fires. Wet prairies and marshes provide important foraging opportunities for wading birds.

Adverse impacts would result primarily from the movement of Vibroseis buggies along source lines. Disturbances to vegetation could occur through the matting down of plants, scraping of trees, exposure of plant roots; or bending, breaking, and trimming of low shrubby and woody undergrowth. Adverse impacts to soils could occur through soil rutting and soil compaction. Seismic survey activities in wetlands would be expected to produce greater impacts than those to upland areas. Equipment might get stuck at points during survey operations and might need to be extricated through assistance from other vehicles, resulting in localized soil disturbance, which would need to be remediated on site.

In most cases the impacts to vegetation, habitat, soils, and wetlands would be short-term, meaning resources would return to conditions similar to those that currently exist within three years. As described in the EA (p. 83), impacts to vegetation and soils would be less than those caused by single passes of off-road vehicles (ORVs). Duever et al. (1981 and 1986a) concluded that in most cases single passes of ORVs 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.

It is expected that no or only a minimal amount of impacts would last for more than three years. In order to avoid and minimize impacts, survey activities will only take place during dry conditions and will use existing trails to the extent possible. In order to minimize impacts and ensure quick recovery from any impacts, a number of minimization and mitigation measures described in the EA and FONSI will be required. These minimization and mitigation measures include conducting the survey operations in dry season conditions only, when soils are not saturated and are more resilient to vehicular activity; restoring vehicle rutting immediately following vehicle passage; and the use of "balloon" tires, which lay over vegetation rather than uprooting it, preventing and minimizing soil disruption. As stated above, the probability of the Florida prairie-clover and Florida pineland crabgrass occurring in the survey area is low, as supported by the USFWS determination of "may affect, but not likely to adversely affect" for these species (see EA, pages 7 and 8 of Appendix C). In the event that these species are observed prior to or during survey operations, observation reporting protocols would be initiated with the appropriate agencies so that sufficient setbacks and survey design modifications could be implemented pursuant to the advice and direction of agency personnel.

Based on the impact analysis in the EA, the impacts described above would occur in only a small portion of the survey area (0.01% of the survey area), which comprises approximately 0.001% of the Preserve. Due to the low intensity, short-term nature of the impacts and the required minimization and mitigation measures, affected resources will return to a condition similar to those that currently exist within three years or less, in most cases. Vegetation (including protected plant species), habitat, soils, and wetlands, will remain in a condition that can be enjoyed by current and future generations, and the wetlands will continue to function at a high level both during and after survey activities. Therefore, there would be no impairment to these resources.

PROTECTED WILDLIFE AND OTHER WILDLIFE SPECIES

Eight federally listed and one federal candidate wildlife species are known to or could potentially occur within the survey area, including the American alligator (*Alligator mississippiensis*), eastern indigo snake (*Drymarchon corais couperi*), gopher tortoise (*Gopherus polyphemus*), Audubon's crested caracara (*Polyborus plancus audubonii*), wood stork (*Mycteria americana*), red-cockaded woodpecker (*Picoides borealis*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida panther (*Puma concolor coryi*), and Florida bonneted bat (*Eumops floridanus*). In addition, the American crocodile (*Crocodylus acutus*), West Indian manatee (*Trichechus manatus*), and Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) are known to occur in the Preserve, though not in the survey area. No critical habitat for these protected wildlife species exists within the survey area.

According to the Florida Fish and Wildlife Conservation Commission, USFWS, and NPS databases for documented occurrences of listed wildlife species, two federally listed species, the wood stork and Florida panther, occur within the survey area. The MMP for the Preserve designates the red-cockaded woodpecker and known Florida panther areas as IRAs. Cape Sable seaside sparrow habitat and active bald eagle (*Haliaeetus leucocephalus*) nesting sites are also identified as IRAs but have not been documented within the survey area. The survey area does not contain habitat suitable for the American crocodile or West Indian manatee. Other wildlife that could be affected includes the Florida black bear (*Ursus americanus floridanus*), Everglades mink (*Mustela vison evergladensis*), and Big Cypress fox squirrel (*Sciurus niger avicennia*).

Wildlife could display avoidance behaviors as a result of the seismic survey activities, similar to avoidance by Florida panthers of ORV activity (2000 ORV Management Plan/EIS page 139, 2010 Addition GMP/EIS page 350). Although such avoidance would not be expected to affect breeding, some species could be subjected to short-term stress during their breeding season (Davis *et al.* 2010). Although not anticipated, mortality/injury to wildlife could also occur. Implementation of the project could also have beneficial effects on protected wildlife species through new data acquisition, collection, and sharing with agency personnel. If additional nesting sites for red-cockaded woodpeckers or other potential sensitive areas to wildlife were discovered through the scouting efforts concurrent with the survey, these locations would be GPS located, biological information would be gathered, and the results would be shared with appropriate agencies and personnel. These data would provide the applicable agencies with new information that could be used to help them better manage, research, and understand protected wildlife in the area.

The USFWS concurred with the NPS determination that the project "may affect, but is not likely to affect" the threatened American alligator, threatened eastern indigo snake, threatened Audubon's crested caracara, endangered Everglade snail kite, endangered red-cockaded woodpecker, threatened wood stork, candidate gopher tortoise, and endangered Florida bonneted bat. The USFWS made the same "may affect, not likely to adversely affect" determination for the Florida panther. As stated in the USFWS concurrence letter, "The seismic survey, as proposed, will result in only temporary impacts to vegetation that provided habitat for fish and wildlife. The project, as proposed, will avoid impacts to wetlands to the greatest extent practicable, and permanent impacts to wetlands will not occur."

While adverse impacts to protected wildlife and other wildlife species could occur, the probability is low, many of the species listed above have not been found to actually occur in the survey area, and impacts would be to individuals, not at the population level. Impacts would be short-term, and in many cases would cease as soon as survey activities

end in the immediate area. As described in the EA and FONSI, a number of minimization and mitigation measures will be required in order to avoid and minimize impacts to wildlife. These measures include educational training programs for survey crews to help them identify and avoid wildlife and environmentally sensitive areas; conducting wildlife surveys and collecting data prior to using Vibroseis buggies; on-site scouting by an ecologist prior to beginning survey activities in order to avoid sensitive areas; and maintaining buffer areas appropriate for specific species when they are present in areas being surveyed.

Overall, impacts to protected wildlife and other wildlife species are expected to be low-intensity and short-term. The required minimization and mitigation measures will ensure that the majority of potential adverse impacts are avoided, and for those that do occur, affected resources will return to conditions similar to those that currently exist in no more than three years, and in most cases in a much shorter period. Protected wildlife and other wildlife species will remain in a condition that can be enjoyed by current and future generations. Therefore, there would be no impairment to these resources.

WATER QUALITY, HYDROLOGY, AND SUBSURFACE GEOLOGIC RESOURCES

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. The land surface of the survey area is generally flat and slopes to the south and southeast. During the dry season, there is typically standing water only in the deepest portions of the wetlands. The geologic conditions at and near the surface of 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.

Adverse impacts to water quality, hydrology, and subsurface geologic resources could potentially result from equipment and crew movement. Surface water quality could be degraded from suspending sediment or 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, though short-term, could stress both plants and animals in these shallow water areas directly traversed by program vehicles. Also, potential impacts to water quality as a result of survey activities could occur through fuel spills and/or minor leaking of fluids from the geophysical vehicles.

While adverse impacts could occur to water quality, hydrology, and subsurface geologic resources, in most cases those impacts would not be noticeable due to the small area that will be affected by survey activities. As stated in the EA, impacts to these resources are expected to be localized and short-term, similar to impacts from recreational ORVs analyzed in the 1992 GMP/EIS, 2000 ORV Plan, and the 2010 Addition GMP/EIS. Because survey activities will take place during the dry season, it is unlikely that fuel spills or minor leaks from vehicles would directly contaminate surface water. In cases where contamination occurs, it would not affect water quality in any meaningful way because contamination would be diluted by the vast amount of water that occurs under the surface and during the wet season. Furthermore, impacts to hydrology and subsurface geologic features are unlikely to occur because the cap rock has proven difficult to breach in past geophysical source placement operations, and therefore it is unlikely the cap rock would be breached by survey activities. As with other resources, there are required minimization and mitigation measures that will ensure impacts are kept to a minimum, such as requiring fuel spill containment systems and the use of "balloon" tires that reduce the surface pressure of vehicles.

Because potential impacts to water quality, hydrology, and subsurface resources are unlikely and would not result in meaningful impacts, and because any impacts would be of a low intensity, these resources are expected to remain in essentially the same condition that they are in now, both during and after survey activities. Any impacts that do occur would be short-term. Current and future generations will be able to experience these resources in conditions similar to or the same as exist today. Therefore there would be no impairment to water quality, hydrology, or subsurface geologic resources.

AIR QUALITY

The Preserve is located in an air quality attainment area and not subject to restrictions for development activities under state air quality regulation programs. The selected action would consume fuel and generate a small, short-term increase in air emissions over ambient conditions. These impacts would cease with the conclusion of field operations. Survey operations would affect only the immediate vicinity of operating machinery in the form of internal combustion engine exhaust that may amount in aggregate to an increase of 1.04 percent to 6.7 percent above ambient impact levels (see sections 10.6.1 and 10.6.3 of the POP). These emissions would occur over one dry season. Fugitive dust would not be anticipated to affect air quality due to the relatively limited amount of equipment movement at low speeds, existing soil conditions, and the high use of pedestrian field movement.

Impacts would be localized, short-term, and result in only a small increase in air emissions over ambient conditions while survey operations are ongoing. Air quality would remain essentially the same as it is currently, and any minor increase in

pollutants would cease as soon as survey operations end, thus returning the air quality to current conditions. Because air quality in the Preserve will remain in a condition that can be enjoyed by current and future generations, no impairment will occur to this resource.

CULTURAL / ARCHEOLOGICAL RESOURCES

Anticipated adverse impacts to cultural/archeological resources resulting from the selected action are expected to be localized and confined. These impacts are attributed to the potential for survey vehicles to disturb undocumented resources. In the unlikely event that undocumented and unanticipated cultural/archeological resources are driven over or a source vibration conducted directly upon artifacts at or near the surface, adverse impacts could occur.

In order to avoid adverse impacts to cultural and archaeological resources, BOCI will use a Cultural Resource Avoidance Model, and the NPS may identify mandatory buffer zones for known resources. Furthermore, a professional archeologist will oversee survey activities, researching available site conditions (i.e., soils, land use, etc.), as well as documented archeological sites and developing site recognition and avoidance protocols. Archeology experts will also advise on the avoidance of potentially undocumented archeological sites. While it is possible that undocumented resources could occur below the surface because the subsurface does not have a free boundary, little displacement of material would be possible from seismic vibrators; almost no differential displacement would be possible that would lead to disturbance or damage to buried historical materials.

Currently, there are over 400 recorded archeological sites in the Preserve. Due to the minimization and mitigation measures, those recorded sites will remain in the same conditions that exist today. Undocumented resources that may be discovered during survey activities would be documented and would remain in their current condition. In the unlikely event that undocumented and unanticipated cultural/archeological resources are damaged, that would represent an extremely small portion of the cultural/archeological resources in the Preserve, and even in that case current and future generations would be able to enjoy the Preserve's cultural and archeological resources in conditions similar to those that exist today. Therefore, cultural and archeological resources will not be impaired.

SOUNDSCAPES

Natural ambient is the sound level that exists in the Preserve in the absence of human-caused sound. As shown in Table 3-7 of the EA, natural ambient sound levels in the Preserve generally range between 37 dB(A) and 42 dB(A) in summer and 28 dB(A) to 29 dB(A) in winter. Current noise sources in the Preserve include human noise sources

(e.g., NPS management activities, recreational activities), hunting-related firearm use, ORVs, existing oil and gas development noise, aircraft noise, and highway noise (NPS 2010*a*). 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. Table 3-8 of the EA indicates the amount of time that human-caused sounds are audible as measured at several locations throughout the Preserve. The percentage of time that noise is audible ranges from 34% to 72% of the day. The percentage of time that no noise is audible ranges from 28% to 66% of the day.

For wildlife and many human activities, times of relative quiet with little or no human-caused noise are especially important. During those times, only natural sounds are audible, and wildlife and visitors can use the acoustic environment of the Preserve with little or no interference. For humans, this experience promotes a sense of solitude and provides numerous psychological and physiological benefits. It also provides excellent conditions for activities, such as birding, in which the detection of acoustic information is important. For wildlife, periods of little or no noise enhance inter- and intra-species communication, opportunities for predation and foraging and other ecological processes.

Adverse impacts to soundscapes resulting from the selected action will be short-term. Survey-generated noise will originate from the Vibroseis buggies, UTVs and other vehicles, and signal generation activities at each source point. Additional noise from support helicopters will be generated as well. Helicopter operations will be conducted an average of three to six hours each day during the 18 weeks of survey operations. Peak helicopter usage and resultant noise will occur during receiver deployment and recovery and Vibroseis operations. All survey activities will occur during daylight hours; therefore, the noise from plan operations will occur only during daylight hours.

Impacts to soundscapes could affect both visitors and wildlife while survey operations are ongoing. Noise would affect ambient acoustic conditions in an area of 6 to 9 km^2 surrounding each group of three Vibroseis buggies, and noise from helicopter operations could affect an area of 24 to 32 km^2 under the route. However, survey-generated noise would be intermittent during an 18-week period and limited to a small portion of the survey area (2½ square miles) on any given day. The primary wildlife response to soundscape impacts would be avoidance. The primary impact to visitors would be a diminished experience in the Preserve.

While adverse impacts to soundscapes will occur, survey operations will take place mostly in areas remote from visitors, thus limiting the impacts. Most visitors will not notice survey field operations or diminished soundscapes unless standing within approximately 1.5 km of a group of three Vibroseis buggies. For those visitors electing to experience the backcountry in the immediate vicinity of survey activities, BOCI will

work with NPS to provide informational materials at the limited entry points and online. Because soundscape impacts would occur over a relatively small area, those visitors who wish to experience natural sounds will be able to do so in other areas, which comprise the vast majority of the Preserve. Wildlife would only avoid certain areas while survey activities are taking place, as discussed under the "Protected Wildlife and Other Wildlife Species" heading. Impacts would cease in the immediate area when survey activities in that area cease, and would not occur at all in the Preserve once the survey operations are complete (approximately 18-weeks).

Given that noise created by the operation would be limited to daylight hours and would occur to only a small portion of the survey area, which comprises only a small area of the Preserve, current and future generations will be able to enjoy the Preserve's soundscape while survey activities are taking place. Furthermore, once the survey activities end, conditions will return to those that exist today. Therefore, there would be no impairment to soundscapes from implementation of the selected action.

Conclusion

By allowing the selected action to proceed with minimization and mitigation measures, the Preserve will meet its mission of preserving these resources and associated values unimpaired and retain its significance in assuring the preservation, conservation, and protection of the natural values of the Preserve while providing for the enhancement and public enjoyment of those resources. Many of the impacts will cease as soon as survey activities end. Other impacts would take longer to return to conditions similar to those that currently exist. Based on years of NPS experience with ORV management in the Preserve, previous NEPA documents with impact analyses, studies, mitigation measures, Vibroseis field tests, and previous heavy equipment use at Raccoon Point, no or minimal long-term impacts would be expected. All of the affected resources would remain available to be enjoyed by current and future generations.

In the best professional judgment of the NPS decision-maker, based upon the impact analysis in the EA, relevant studies, advice or insights offered by subject matter experts and others who have relevant knowledge or experience, and the results of civic engagement and public involvement activities, no impairment of Preserve resources or values will result from implementation of the selected action.

Appendix C

Selected Public Comments and National Park Service (NPS) Responses on the Nobles Grade 3-D Seismic Survey Revised Environmental Assessment (EA)

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
1.	The EA improperly segments a four phase exploration and must be an EIS for all phases of exploration	The NPS has analyzed the only phase of operation that has been proposed for immediate approval. Per 36 CFR 9.30(c), the operator has the flexibility to design plans of operations (POP) only for that phase of operations contemplated and 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. NPS can only consider the proposed action as described in the POP. The probability or extent of any future surveys is speculative, and any future proposals would be subject to their own National Environmental Policy Act (NEPA) analyses.
2.	There would be 1,000 miles of new disturbance. The draft Wetlands Statement Of Findings (WSOF) states there could be impacts to 510 miles; the EA states the trucks would drive 1681 miles.	The commenter incorrectly concludes that Vibroseis buggies will drive up to 1,681 miles. The WSOF (Appendix B) on p. 20 states that the maximum length of source lines is 510 miles and the total length of receiver lines is 1,171 miles for a total of 1,681 miles. The WSOF states, "Access to receiver lines will be accomplished in large part by crews working and travelling on foot and by helicopter." So, of the total 1,681 miles of source and receiver lines, Vibroseis vehicles will only travel a maximum of 510 miles. This figure is repeated numerous times in the EA and is the basis for analysis. Of the 510 miles, only an NPS-approved portion will be accessed due to lines located in IRAs and other sensitive areas (mitigation measure #46 on p. 33). Finally, it is incorrect to assume that merely driving a vehicle through wetlands creates a "trail." The April 2015 field demonstration indicated that soil and vegetation impacts were largely invisible several months later (Appendix A).
3.	NPS can and should reject the POP, and should regulate it under existing authorities.	The NPS must comply with the 36 CFR 9B regulations in processing the POP. The regulations state that the NPS Regional Director (RD) may approve, conditionally approve, or reject a POP (EA page 5). Because the impacts will not be significant and the mitigation measures will further prevent and minimize impacts, the RD is going to sign a Finding of No Significant Impact and approve the POP.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
4.	NPS failed to consider reasonable alternatives such as purchasing the mineral rights, using previous seismic data, no surface occupancy, reducing the proposed area, avoiding and minimizing actions in areas proposed for wilderness designation, full implementation of all existing BMPs, or a combination of the 2 action alternatives.	The suggested alternatives were considered but dismissed from further analysis, as explained in the responses to comments in Appendix D of the revised EA, #'s 20-23. The purchase of mineral rights was considered and dismissed because it does not meet the EA's purpose for taking action. The NPS notes that this alternative would be equivalent to the no action alternative in terms of analyzing impacts. The use of previous seismic data was dismissed as an alternative because existing data either do not cover the area of interest or were collected using 2-D technology. Burnett Oil Company, Incorporated (BOCI) used available 2-D seismic data in their area of interest in addition to gravity and magnetic surveys. Geological data was also acquired using well control information derived from geophysical logs. Data collected from these various resources are used for sub-surface mapping but none will provide the precision details offered by a 3-D seismic survey. BOCI proposed the use of 3-D seismic technology versus 2-D technology because 3-D technology allows for better data collection than traditional methods. 3-D seismic will provide very accurate imaging of rock layers 11,000-12,000 feet below the surface and will provide essential information to locate small, subtle structures and determine if they are suitable for drilling. Less invasive techniques including aeromagnetic and gravity surveys were considered, but are reconnaissance tools used to conceptualize large regions and are not suited for determining precise drilling locations, except in areas of salt domes. Such alternative techniques were considered but dismissed as not meeting the EA's purpose and need. Further reducing the survey area was considered and dismissed because the required data would not be obtained, and the alternative would thus not meet the EA's purpose and need. Impacts will be minimized with the implementation of the minimization and mitigation measures listed in the finding of no significant impact (FONSI), and included within the scope and methodology of the selected action. A combination of the two action alternatives was not considered further because the impact analysis of the combination of shothole plus vibroseis survey efforts would likely have more impacts than the existing, less environmentally damaging alternative considered.
5.	The EA does not address how the avoidance of IRAs will be enforced.	NPS staff and inspectors will be heavily involved in survey activities, including identifying IRAs. The identified IRAs will be avoided by BOCI (see mitigation measures listed in the 6, 21, 29, 30).

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
6.	Scientific reports evidence that there is substantial controversy over the impacts.	The NPS has reviewed the comment letters and associated attachments submitted during the comment period. While the NPS understands there is opposition on the part of some to the selected action, the NPS did not find any information in the comment letters or attachments that would give rise to a substantial controversy over the environmental impacts of the selected action. The NPS reviewed the two reports that were submitted, one from Quest Ecology and one from McVoy, and did not find that new information was provided that would demonstrate a controversy over impacts. It does not appear that the scientists who prepared the reports visited the site or are familiar with the site and history of the Preserve. Conclusions in the Quest report claim severe impacts without any basis provided in the report. The NPS disagrees with the conclusions, which exaggerate the potential for exotic plant introduction, erroneously asserts that dredge and fill permits will be required, and makes speculative predictions concerning impacts that have not been observed with years of off-road vehicle (ORV) use at the Preserve. The McVoy report fails to consider the successful NPS restorations following oil and gas activities and does not include information that would give rise to a substantial controversy over impacts.
7.	The proposed testing has highly uncertain impacts and unique and unknown risks	As stated in NPS Response to Comments in the Revised EA (Appendix D, Comment/Response 2e)," Vibroseis technology is not new and has been in existence since the 1950s. The 1992 General Management Plan (GMP) refers to it (GMP page 162).The impacts of the Vibroseis technology are well known based on use at sites all over the country, including wetland environments (2013 sinkhole survey in LA; 1986 I-75 survey within the Preserve boundary in FL). Because the impacts would resemble those of recreational ORVs and shothole exploratory vehicles, and these impacts have been analyzed in previous Preserve NEPA documents and are well understood, there is no high level of uncertainty concerning the predicted impacts, and the impacts can thus be reasonably predicted.
8.	There were over 65,000 comments on the EA which makes it highly controversial.	As stated in NPS Response to Comments in the Revised EA (Appendix D, Comment/Response 2d), for NEPA *controversial* refers to circumstances where a substantial dispute exists as to the environmental consequences of the proposed action and does not refer to the existence of opposition to a proposed action, the effect of which is relatively undisputed (43 CFR 46.30). While the NPS notes there is opposition to the proposed action, there is no substantial dispute concerning the effects of the proposed action.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
9.	The NPS must undertake a new GMP for the Preserve, and must not tier to the GMP/EIS.	The current GMP is still valid and there is no requirement to do a new one at this time. To alleviate concerns with tiering, the NPS has elected to incorporate the relevant analyses in the GMP/EIS into the EA, rather than tier to it.
10.	Why did NPS pull the references to the 1998 Calumet EA and why does NPS use the third monitoring report rather than the first?	The section titled "Laws, Regulations, and Policies" in the first EA was considerably shortened and retitled "Laws, Regulations, and Plans" in the revised EA. The Calumet EA, not being a law, regulation, or policy, did not fit this section and was removed along with other documents. The first WilsonMiller monitoring report was cited in the revised EA to support the contention that natural recovery of wetland vegetation disturbed by off-road oil and gas seismic survey vehicles can occur relatively quickly (see Appendix A in the EA). The first annual report more clearly stated the impact recovery than the third annual report; i.e., some areas were found to recover after only one year.
11.	How did the NPS calculate the AOI at 4.8%?	The Minerals Management Plan (MMP) included in the 1992 GMP specified that the total Area of Influence (AOI, the percentage of the original Preserve affected by oil and gas activities) should not exceed 10%. The AOI for this alternative is 2.1%, which, combined with the 2.7% for existing oil and gas operations, results in a total of 4.8%. More information on the background of this calculation can be found in the POP.
12.	The GMP states that all surveying vehicles will use existing roads and designated trails; the proposed action does not comply with this.	To the extent practicable, surveying under the selected action will use existing roads and trails. However, in some instances, the vibroseis buggies will need to travel off road of existing roads and trails in order to obtain the information BOCI requires. The environmental impacts of traveling off of existing roads and trails is evaluated in the EA, and a number of mitigation measures will be required in order to ensure impacts are minimized.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
13.	NPS cannot tier to the GMP for a new technology that wasn't evaluated in that EIS.	To alleviate concerns with tiering, the NPS has elected to incorporate the relevant analyses in the GMP/EIS into the EA, rather than tier to it. The Vibroseis technology is not a new technology, is well known, and has been used in other NPS units, as well as in highway right-of-ways within the Preserve. The 1992 GMP described Vibroseis as a means of generating energy waves as a survey technique (GMP page 162). The proposed action is not unprecedented; it is similar to recreational ORV activity which has occurred in the Preserve for many years and which has been thoroughly analyzed in previous NEPA documents. The predictability of impacts is based on use of Vibroseis at other sites as well as tests of the equipment in and near the Preserve. From BOCI: "There are several 2-D Vibroseis lines that Shell Oil acquired in the years 1985 – 1988. Shell used the highway right of ways to lay out and shoot using vibroseis as the source. The vibs are on natural soils in the right of way. The vibrator was mounted on a large bobbed tail truck that would be used to pull a semi-trailer. The tires they used put 47.7 psi on the ground versus the floatation tire 26 psi. The shell line names and mileage: 1) SHELL 86-117-913 80 miles on the Interstate 75 right of way, 2) SHELL 85-117-911 50 miles on the Tamiami Trail, 3) SHELL 86-377-157 60 miles Hendry/Collier counties, 4) SHELL 88-117-975 16 miles, Broward County"
14.	NPS should not allow this exploration under the current oil and gas regulations; it should consider this POP under the proposed oil and gas regulations.	While revisions to the 36 CFR 9b regulations have been proposed, they have not yet been finalized. The NPS is applying the regulations that are currently in effect, which contain time limits for evaluating a POP.
15.	The action could jeopardize areas proposed for wilderness designation	While there will be impacts to lands proposed and eligible for Wilderness designation, none of the impacts caused by non-conforming uses would result in the lands no longer being eligible for wilderness designation, due to the short term, low intensity nature of the impacts. Any non-conforming uses would be temporary. As stated in NPS Response to Comments in the Revised EA (Appendix D, Comment/Response 33), The Management Policies (6.3.5) allow motorized use in wilderness if the NPS determines that such use is the "minimum requirement," i.e., it (a) is necessary for administration of the area as wilderness, and (b) ensures that impacts on wilderness resources and character are minimized. The motorized use in Alternative 2 is the minimum requirement (page 98) because it is necessary to administer existing private rights in wilderness (Management Policies 6.4.6) and is of a type that will minimize impacts on wilderness resources, as compared to other exploration technologies. Prior to initiating survey activities, when more specific information relating to proposed routes of the vehicles and helicopters would be available, a formal Minimum Requirements Analysis will be completed using a thorough review of the techniques and types of equipment to be used in order to ensure that impacts on wilderness resources and character are minimized. No routes to be used by the Vibroseis vehicles would be improved, and all routes would have to be approved by the NPS prior to use.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
16.	The proposed action violates NPS management policies with regard to actions in Wilderness, including the use of motorized access off roads.	To meet wilderness requirements and also meet the requirements of NPS Management Policies while also honoring private mineral rights, the NPS is allowing the survey in wilderness based on the following: In accordance with Management Policies, Section 6.4.9, motorized use in wilderness is allowed only with an approved plan of operations on valid mineral claims and where there is no reasonable alternative. The NPS intends to conditionally approve the plan of operations, which also includes an established valid mineral claim to this area. Page 98 of the revised EA includes an initial minimum requirements determination that established that the work needs to take place in wilderness and identified Alternative 2 as the minimum requirement in wilderness. Furthermore, the applicant and the NPS will prepare a more detailed minimum requirements analysis (signed by the superintendent) when more specific information relating to proposed routes of the vehicles and helicopter use has been identified along with other details of operation from the applicant. Lastly, the revised EA and FONSI include a number of minimization and mitigation measures that represent stipulations on operations and reclamation that will ensure that long-term effects on the wilderness area are substantially unnoticeable.
17.	NPS has violated management policies by not seeking to acquire mineral rights located in wilderness.	While there is general direction in NPS Management policies to seek to extinguish private mineral rights in wilderness, there is no requirement to do so in any particular instance. The purchase of mineral rights was considered and dismissed because it does not meet the EA's purpose for taking action. The NPS notes that this alternative would be equivalent to the No Action alternative in terms of impacts.
18.	NPS failed to address cumulative impacts because it is only evaluating phase 1 of a 4-phase project; the EA refers to this as phase 1. The future phases are foreseeable because Burnett is proposing to do those next, within a four-year period.	The original POP had four phases but the NPS did not act on that proposal. The revised POP released to the public in June 2015 scaled down the scope of the survey to the 110-acre area referred to in the original POP as Phase I of a 4-phase survey. The consideration of four phases was withdrawn by BOCI and now the NPS only has the proposed action for consideration. The revised EA on p. 3 clearly states that BOCI is no longer seeking approval for Phases II, III, and IV that were identified in the original POP. This consideration of only the reduced survey area is reinforced on p. 27 and Appendix D comments 3, 6, and 12.a. It is not foreseeable whether Burnett will propose additional phases and at this time they do not have the right of access in any other location within the Preserve.
19.	There are additional projects that should be considered for cumulative impacts.	See Appendix D of the revised EA comment 6. Many projects listed by commenters are located one or more counties away from the survey area, and these projects would not affect the same resources as the proposed action and therefore would not be considered under cumulative impacts.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
20.	The fact that the vibroseis buggy got stuck during the demonstration demonstrates those vehicles do not perform well in wetland environments, contrary to NPS assertions.	As stated in NPS Response to Comments in the Revised EA (Appendix D, Comment/Response 11), the demonstration provided useful information; it was not designed or required to be a scientific study. It was conducted in habitat typical of the survey area to give the applicant and the NPS a sense of how the vehicles would perform and if the environmental impacts that result were as expected. The Vibroseis operating crew learned a great deal, and observations and photographs taken during the demonstration and several months later were useful in documenting potential impacts. The April 2015 demonstration is only one of the pieces of information that was used to assess environmental impacts. The stuck vehicle resulted from an attempt to cross a manmade ditch and not from normal passage through dry- season wetlands. Getting stuck would not be a regular occurrence under the proposed action because activities will only be allowed in dry conditions and routes will be approved by NPS prior to use, as opposed to recreational ORVs, which frequently get stuck and have to be pulled out and are not limited to dry conditions.
21.	It is not possible to avoid new construction, as the EA states, if there are no adequate existing roads or trails.	No new construction will take place. This issue was already responded to in the response to comments in the revised EA as follows (Appendix D comment 9.e). The EA repeatedly states that there would be no construction. If the implication is that driving a vehicle off trail constitutes construction, the NPS disagrees. The Vibroseis buggies would not create new trails; they would use mostly existing trails. A single pass of a vehicle would not constitute trail creation. Recreational ORVs are restricted to trails designated by the NPS through specific planning processes. Routes used by the Vibroseis buggies would not become designated trails unless they were under NPS consideration prior to BOCI's proposal. Any tracks created by Vibroseis vehicles that intersect designated ORV trails would be marked "closed," similar to current NPS practice.
22.	The EA should address how the trucks and personnel will get from the Vulcan mine sites to the staging areas and include an impact analysis for that.	The vehicles will be deployed at existing I-75 access points and use existing trails to the extent possible. Transport of personnel and equipment from the Vulcan Mine staging area to the Preserve is detailed on pp. 20-21 of the EA.
23.	There is no scientific or technical analysis to support the assertion that impacts to vegetation would be short-term. The NPS has acknowledged that survey lines from the 1970s are still visible.	Survey lines from the 1970s were prior to the Preserve's establishment, and ORVs were operating largely without restriction. In the comment responses in the revised EA Appendix D comment 8a, the NPS clarified that In the 1970s the state did not regulate seismic exploration, and environmental requirements were much less stringent than they are today. At that time, bulldozers were allowed to plow paths across the landscape to provide vehicular access to drill seismic shot holes and to place geophones on the ground to record seismic sound-wave data. These impacts were much more severe and long-lasting than impacts caused by today's Vibroseis buggies. The most recent seismic survey in the Preserve was conducted at Raccoon Point in 1999. The evidence of this past activity, in which shot-hole drilling methods were used in today's standard 3-D source and receiver line array, would be extremely challenging to find. Soil disturbance from heavy equipment employed during the 1999 Raccoon Point seismic survey has not proved to be permanent (see the 2000 Raccoon Point 3-D Seismic Survey First Annual Monitoring Report prepared by WilsonMiller, in which many of the disturbed sites were indistinguishable from adjacent undisturbed areas only one year after the survey).

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
24.	There is no support for the NPS assertion that impact to soils would be short-term. ORV data contradict this. .	As stated in NPS Response to Comments in the Revised EA Appendix D comment 9.a which states: "As discussed in the revised EA, Vibroseis buggies have similar but lesser impacts than recreational ORVs. Soil impacts would be temporary and minimal because: 1) Vibroseis buggies would use existing trails when possible, thus limiting impacts to previously disturbed soils; 2) any soil rutting would be immediately restored following vehicle passage; 3) Vibroseis buggies would only traverse a given area once, and thus impacts would not accumulate over time, as would be the case from repeated ORV passage; 4) photographs six months after the 4/24/15 field demonstration (Appendix A) confirm that impacts would not be permanent; 5) Soil disturbance from heavy equipment employed during the 1999 Raccoon Point seismic survey has not proved to be permanent (see the 2000 Raccoon Point 3-D Seismic Survey First Annual Monitoring Report prepared by WilsonMiller, in which many of the disturbed sites were indistinguishable from adjacent undisturbed areas only one year after the survey); and 6) the Vibroseis buggies are equipped with wide, balloon-type tires, spreading the ground pressure over a large area.
25.	The EA must address the impacts of multiple passes of the vibroseis buggies, the impacts of the buggies getting stuck, and the impacts of subsequent ORV use of the new trails that will be created.	The EA emphasizes that the survey would use a single-pass design and that multiple passes would be rare. The impacts of vehicles getting stuck have been analyzed in the revised EA on pp. 29 and 84 and discussed in the Response to Comments (Appendix D comments 9.e and 11). See above responses 2 and 22 regarding trail creation. The Vibroseis buggies would not create new trails; they would use mostly existing trails. A single pass of a vehicle would not constitute trail creation. Recreational ORVs are restricted to trails designated by the NPS through specific planning processes. Routes used by the Vibroseis buggies would not become designated trails unless they were under NPS consideration prior to BOCI's proposal. Any tracks created by Vibroseis vehicles that intersect designated ORV trails would be marked "closed," similar to current NPS practice.
26.	There will be dredging and filling, and therefore the NPS must consult with the Corps and get a permit. The EA must acknowledge and address these impacts.	No dredge and fill activities will occur. Simply driving an ORV through wetlands does not constitute dredging or filling. The Corps is aware of decades of ORV use in the Preserve and has never required permits.
27.	The EA should contain specific mitigation measures to address impacts to water quality that NPS acknowledges.	Any impacts would be mitigated by conducting the survey in dry conditions (page 28 #1), avoiding soft soils and standing water (page 28 #7), minimizing rutting through the use of balloon- type tires and one-pass design for field vehicles (pages 28-29 #8 and #9), operating equipment at slow speeds to minimize turbidity (page 29, #11), and restoring ruts and vehicle tracks (pages 29-30 #18 and #22-23). As is addressed in the impact analysis-running across standing water will be a rare occurrence as operation will take place in dry season conditions. See comment responses in the revised EA (Appendix D comment 12.c) and mitigation measures referred to in comment 12.a of the same document. The probability of leaks and spills would be limited by the short duration of the proposed action, as opposed to recreational ORVs, which operate all year. Unlike recreational ORVs, the routes travelled by the Vibroseis buggies would be inspected and any spills or leaks would be immediately remediated. The revised EA on pages 90-91 analyzes impacts to water quality and hydrology. These impacts would be localized and short-term, and there is no evidence that impacts would occur outside the Preserve or even the immediate area where vehicles would be operating. This is supported by the equivalent water resources analyses in the 2000 ORV Plan and the 2010 Addition GMP.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
28.	NPS and FWS should require surveys from Burnett prior to concluding Section 7 consultation and in advance of the commencement of the proposed action.	As stated in NPS Response to Comments in the Revised EA (Appendix D comment 13.a). Wildlife surveys are not necessary. Existing knowledge of the species present is evident from years of NPS management and outside research conducted in the Preserve. Such information was used to compile the list of federally threatened and endangered species that would be potentially affected, which FWS has reviewed (Appendix C in the revised EA). The revised EA states on page 21 that "daily scouting and research of the proposed survey lines would be conducted to identify potential sensitive areas and routing alternatives immediately in front of the survey." This scouting would be more accurate and useful and would provide more information than any previous wildlife surveys because it would be much closer in time and location to the seismic survey activity and would cover more area. A qualified ecologist would survey along each of the source lines, as well as in areas where the source lines would be proposed to be re-routed, prior to the Vibroseis buggies moving in. The acquisition of scouting information would be shared with other agencies and personnel and would contribute a beneficial impact (page 85).
29.	Operations could take place any time of year because they are limited to the dry season, April-Nov., but the EA says the dry season could occur earlier or later than that. It is unclear whether NPS or Burnett would determine when the dry season is, or when dry conditions exist. The time of year matters because it affects impacts to wildlife, water quality, etc.	BOCI will only be allowed to operate in dry season conditions. The revised EA clearly states that the survey would occur only during the dry season, typically November through mid-May. Mitigation measure #1 further restricts the survey to dry season *conditions,* so as not to allow the survey to occur during those months even if conditions are wetter than normal. Survey activities may extend one month earlier or later than the typical dry season if dry conditions prevail. No matter the month of survey activities the pre-survey scouting will occur which will identify the presence of any nesting species and identify any other potential concerns.
30.	The EA does not address habitat fragmentation and vehicle mortality with regard to endangered species (including the Florida panther).	Because survey impacts will be temporary, fragmentation will not occur, as would be the case for a permanent disturbance such as a road or housing development. The increase in traffic on roadways will be negligible, and many of the roads travelled (SR 29, I-75) are already fenced off to protect wildlife.
31.	The EA fails to consider alternatives or mitigation that would address noise impacts to visitors and wildlife and also fails to consider alternatives or mitigation that would minimize visual impacts.	The NPS did consider mitigation and minimization measures to address noise and visual impacts. As discussed in the revised EA, noise and visual impacts will be mitigated by the following: 1) The total area of operation associated with the Vibroseis buggies, UTVs, and other vehicles will be confined to an approximate area of 2½ square miles per day, and this noise will be intermittent. 2) No dynamite will be used. 3) Operations will occur only during daylight hours. 4) Survey operations will take place mostly in areas remote from visitors. Most visitors will not notice survey field operations and diminished soundscapes unless standing within approximately 1.5 km of a group of three Vibroseis buggies. For those visitors electing to experience the backcountry in the immediate vicinity of survey activities, BOCI will work with the NPS to provide informational materials at the limited entry points and online. 5) The dense vegetation in parts of the survey area will help to hide much of oil and gas operations when viewed from the ground level.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
32.	The impacts from noise would be significant (helicopters at 105 dBA 3 hours per day for 18 weeks).	The EA does not state that noise levels from helicopter operations would be 105 dBA for 3 hours a day. The revised EA states that, "Expected sound levels during these operations would range between 75.2 dBA and 91.3 dBA, with *short-term peaks (45-sec at 105 dB(A))* [emphasis added] during receiver bag drop-offs and pickups" (p. 95). As discussed in the FONSI, these short-term increases in dBA level do not constitute a significant impact and there will be no significant impacts on the natural ambient soundscape.
33.	The proposed restoration is insufficient and is incompatible with the state of Florida restoration guidelines and prior restoration plans at BICY.	As stated in NPS Response to Comments in the Revised EA, (Appendix D comment 17.f), the proposed restoration is consistent with South Florida Water Management District and US Army Corps of Engineers permits issued to the Preserve for past and ongoing wetlands restoration and mitigation projects. Every permit issued has allowed for natural recruitment with planting only required if there is evidence that recruitment is not proceeding satisfactorily. Natural recruitment is recommended by the 2000 ORV Management Plan and has been used successfully for restoration of ruts caused by years of repeated ORV passage, impacts of which are much more intense than what would be expected from a single pass of a Vibroseis buggy.
34.	The EA is unclear as to whether the 46 mitigation measures will be required, and whether their purpose is to avoid significance.	The 47 explicit mitigation measures are incorporated into the selected alternative. As stated in NPS Response to Comments in the Revised EA (Appendix D comments 17a and 17b), the proposed action was revised to require BOCI to agree to implement the mitigation measures as a condition of POP approval. The purpose of the mitigation measures is to "prevent lasting impacts and minimize short-term impacts to the Preserve's resources during seismic survey activities" (page 28 of the EA). The mitigation measures will also ensure that no significant adverse impacts occur.
35.	When producing a seismic signal the full weight of the 30-ton trucks will be lifted and supported on metal plates. The weight and vibration will cause impacts similar to a commercial soil compactor. This will result in thousands of 8'x4' compacted pads every 82 ft. along the paths the trucks drive.	This assumption is incorrect; the full weight of the trucks is not supported by the plates. The full weight of the machine (100%) will not rest on the vibrator plate during vibration sweeps. However, 60-70% of the machine's weight will be exerted on the plate. Exhibit 7 of the POP shows that peak force = 61,800 PSI, Plate = 3,876 sq. inches. 61,800 / 3,876 sq. inches = 15.94 psi. At 70 % of Peak force = 43,260 PSI / 3,876 = 11.16 PSI Peak force is a combination of vehicle weight plus the pressure that can be exerted on the vibrator plate by connecting hydraulic pistons.

	Comment	NPS Response (EA Page Numbers Refer to the Revised EA)
36.	The proposed action recommended by NPS in the revised EA involves an unprecedented off- road seismic survey over more than 110 square miles (70,454 acres) within the Preserve. Approximately 75% of the proposed action area is within the original Preserve, and 25% of the proposed action area is within the Addition lands portion of the Preserve.	As stated in NPS Response to Comments in the Revised EA (Appendix D of the EA), the Vibroseis technology is well known and has been used in other NPS units, as well as in highway right-of-ways within the Preserve. The 1992 GMP described Vibroseis as a means of generating energy waves as a survey technique (GMP page 162). Shothole seismic exploration, which results in greater environmental impacts due to drilling and use of explosive charges, has occurred many times in the Preserve (page 8 of the POP). Although the survey area encompasses 110 square miles, the maximum footprint of the buggies would be 510 miles x 12 feet, or 742 acres (1.16 square miles). The actual footprint would be significantly smaller, as the vehicles would not be able to access all sites due to resource sensitivity. The proposed action is not unprecedented; it is similar to recreational ORV activity which has occurred in the Preserve for many years and which has been thoroughly analyzed in previous NEPA documents. The predictability of impacts is based on use of Vibroseis at other sites as well as tests of the equipment in and near the Preserve

Appendix D

WETLAND STATEMENT OF FINDINGS

NOBLES GRADE 3-D SEISMIC SURVEY
BIG CYPRESS NATIONAL PRESERVE

April 2016

Recommended: _____ 4/14/16
Superintendent, Big Cypress National Preserve — Date

Concurred: _____ 4/14/16
Chief, Water Resources Division — Date

Approved: _____ 5/6/16
Regional Director, Southeast Region — Date

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INTRODUCTION

This document is the Wetland Statement of Findings (WSOF) for the proposed Nobles Grade 3-D Seismic Survey (NG3-D) proposed by Burnett Oil Company, Inc. (BOCI) in the Big Cypress National Preserve (Preserve). This WSOF summarizes the information contained in the revised Plan of Operations (POP) and the draft Environmental Assessment dated March 2016 and incorporates some of the detailed information found there.

PURPOSE AND NEED FOR ACTION

In accordance with National Park Service (NPS) regulations for non-federal oil and gas rights, BOCI, a private company, has submitted a POP to the NPS to conduct a three-dimensional (3-D) seismic survey within the Preserve. The proposed survey would encompass approximately 110 square miles (70,454± acres) located in the Preserve (Figure 1). The project purpose is for BOCI to conduct geophysical exploration that would provide sufficiently detailed information to determine whether and where possible oil and gas deposits may exist within the privately owned mineral estate beneath the surface of the Preserve.

ALTERNATIVES CONSIDERED

This matter proposal involves a 3-D seismic survey of subsurface geologic structure and conditions in the Preserve. A seismic survey involves sending subtle acoustical signals into the ground and then recording return signals so that one can identify subsurface conditions. The sending of these signals and the recording of the return signals requires activities on ground surface.

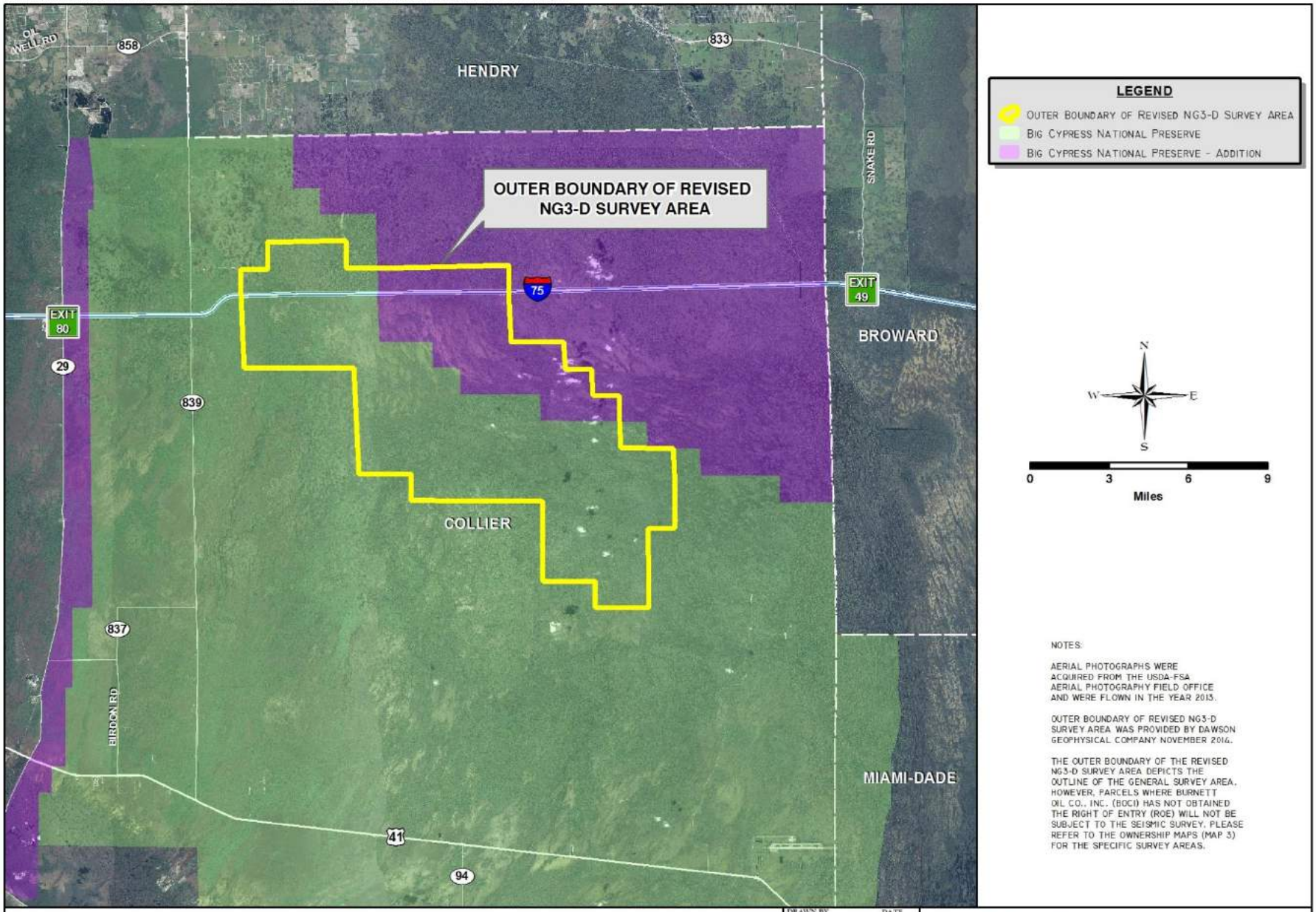
The seismic survey seeks to evaluate specific privately owned oil and gas resources located beneath the Preserve. The Preserve consists almost entirely of wetlands. Survey teams cannot avoid going into wetlands located above the privately owned oil and gas resources. Acoustical signals cannot be generated or received using existing technology without physically touching the ground within wetlands. Team members must traverse wetlands with their equipment in order to reach survey locations. Engaging in survey activities in wetlands cannot be avoided.

Three alternatives have been considered for this seismic survey.

Alternative 1: No Action

Under the No Action Alternative, BOCI would not pursue the proposed project. The No Action Alternative does not achieve the project purpose and need and is therefore not a reasonable alternative. This alternative would not provide an image of the subsurface and/or oil and gas resources underlying the project area, and subsurface oil and gas mineral owners would not be able to take full advantage of their rights to explore for minerals in the area.

Alternative 2: Seismic Survey Using Vibroseis Buggies (Proposed Action/Preferred Alternative)


J:\2013\13soc2197\GIS\2015\Wetland Statement of Findings\Figures\Figure 1 Aerial with Phase 1 Boundary 12-1-14.mxd - 11/10/2015 @ 3:41:27 PM
OIL WELL RD
858
833
HENDRY
SNAKE RD
OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
75
EXIT 80
EXIT 49
BROWARD
29
839
COLLIER
837
BIRDON RD
MIAMI-DADE
41
94
LEGEND
OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
BIG CYPRESS NATIONAL PRESERVE
BIG CYPRESS NATIONAL PRESERVE - ADDITION
N
W
E
S
0
3
6
9
Miles
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.
FIGURE 1. AERIAL WITH REVISED NOBLES GRADE 3-D SURVEY AREA
NOBLES GRADE 3-D
DRAWN BY F.L. DATE 12/10/13
REVIEWED BY K.C.P. DATE 12/10/13
REVISED F.L. DATE 9/9/15
PASSARELLA & ASSOCIATES INC
Consulting Ecologists

This alternative would conduct the seismic survey over an area of approximately 110 square miles of the Preserve using Vibroseis buggies to generate the acoustical signals. Vibroseis buggies are specialized off-road vehicles (ORVs) with vibrating metal plates. The buggies lower metal plates to ground where they are vibrated for a few seconds to generate seismic acoustical signals. Those signals are picked up and recorded using small, portable seismic receivers (geophones) and recording devices, which also are placed on the ground. The buggies and recording devices then move on to new locations, where the process is repeated. Equipment would be staged on a previously disturbed, upland area north of the Preserve. On any given day, approximately two and one-half square miles of the Preserve would be affected by Vibroseis operations. Equipment would be transported to survey locations on foot, using ORVs, and using helicopters. The survey would take one dry season to complete.

Alternative 3: Seismic Survey Using Explosive Charges

The third alternative is to conduct the seismic survey in the 110-square-mile survey area using explosive charges. Holes 200 to 300 feet deep would be drilled into the ground using large drills located on ORVs. Explosive charges ranging between 5.5 to 7.5 pounds would be placed into the holes and detonated to create the seismic signal. Those signals would be captured by geophones and recording devices. Due to the greater amount of labor associated with drilling the holes, this alternative would take approximately twice as long to cover the same survey area, or approximately two dry seasons. This alternative would have greater potential impact to wetland resources than the proposed action.

WETLANDS IN THE PROJECT AREA

Wetland Descriptions

Since most of the Preserve consists of wetlands, the majority of the survey area (greater than 58,740± acres or 83 percent), is comprised of wetland habitats. From discussions with the NPS and review of existing soil surveys, vegetation mapping, and aerial photographs, it was determined that a significant majority of the seismic survey area consisted of wetlands; therefore, for purposes of this report, the entirety of the seismic survey area was considered wetlands and was not formally delineated. Determination that a majority of the survey area is comprised of wetlands based on soil surveys, vegetation mapping, and aerial photographs was independently verified by Professional Wetland Scientist (PWS) Andrew Woodruff (PWS No. 2366). Since formal delineations were not performed, the extent of upland/wetland boundaries was not field verified or mapped.

Wetlands in the NG3-D survey area were delineated and classified by use of a vegetation classification system created for south Florida units of the national park system (Welch and Madden 1999) and subsequently revised by Preserve staff in 2000 by reclassifying the data into 12 vegetative community types. This classification of vegetative communities uses the information produced by Welch and Madden but combines many of the categories to depict areas of more general vegetative communities.

Survey area descriptions of vegetation, geology, soils, biotic components, hydrology, and water quality are described below.

Vegetation and Habitat

Virtually all naturally occurring wetlands in the NG3-D survey area are palustrine, as they are nontidal wetlands dominated by trees, shrubs, and persistent emergent vegetation. There are several human-constructed water bodies, a few of which may be considered riverine wetlands (artificially created and periodically or continuously containing moving water).

According to the NPS land cover data, 11 major land cover types are found within the NG3-D survey area, including approximately 32,211 acres of cypress forest, 18,855 acres of scrub cypress, 379 acres of disturbed area, 82 acres of hydric hammock, 2,936 acres of hydric pine flatwoods, 688 acres of marsh, 2,889 acres of mesic hammock, 8,415 acres of mesic pine flatwoods, 486 acres of swamp forest, 124 acres of water, and 3,389 acres of wet prairie. A map depicting the NPS designations of the wetland and assumed wetland land covers is provided as Exhibit A. Table 1 lists the NPS wetland and assumed wetland land cover types, cover type acreages, and vegetation community descriptions.

Table 1. NPS Land Cover Types and Acres

NPS Land Cover Category	Vegetation Communities	Survey Area Acreage
Cypress Forest	Cocoplum Swamp Forest Cypress Domes/Heads Cypress Strands Cypress-Mixed Hardwoods	32,211
Scrub Cypress	Cypress Savanna Dwarf Cypress	18,855
Disturbed	Brazilian Pepper Exotics Java Plum Major Canals (>30m Wide) Major Roads (>30m Wide) Melaleuca Spoil Areas	379
Hydric Hammock	Bay Hardwood Scrub; Bayhead Paurotis Palm	82
Hydric Pine Flatwoods	Cypress with Pine Cypress-Pines Pine Savanna Slash Pine with Cypress	2,936
Marsh	Broadleaf Emergents Cattail Marsh Non-Graminoid, Emergent Marsh Tall Sawgrass Pop Ash Willow	688
Mesic Hammock	Cabbage Palm Hardwood Scrub Oak Sabal Forest Palm Savanna Saw Palmetto Scrub Palm Savanna	2,889
Mesic Pine Flatwoods	Savanna Slash Pine Mixed with Palms Slash Pine with Hardwoods	8,415

Table 1. (Continued)

NPS Land Cover Category	Vegetation Communities	Survey Area Acreage
Swamp Forest	Mixed Hardwood Swamp Forest Mixed Hardwood Cypress and Pine Swamp Forest	486
Water	Water	124
Wet Prairie	Common Reed Cordgrass Graminoid Prairie Maidencane Maidencane/Spikerush Mixed Graminoids Muhly Grass Sawgrass Shrublands Spikerush	3,389

These wetland habitats and assumed wetland habitats are spread throughout the survey area, both north and south of Interstate 75 (I-75), and are similar to wetland habitats found throughout the larger Preserve and southwest Florida. North of I-75 is characterized extensive mesic pine flatwoods and cypress forests. Marshes and wet prairies are widely interspersed there as well. 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.

Temperate plants are abundant, but the majority of the species are tropical. Pinelands, cypress strands and domes, prairies, and marshes are the most prevalent vegetation types and are dominated by temperate species. Tropical species occur primarily in hardwood hammocks but are also found in pinelands, mixed-hardwood swamps, and cypress strands.

A description of each vegetation community, adapted from the 1992 and 2010 Preserve General Management Plan/Environmental Impact Statement documents, is included below.

Cypress Forest. Cypress domes occur throughout the survey areas. They are characterized by a monospecific overstory of cypress (*Taxodium distichum*), 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*. 1986*a*). Flooding is essential for maintaining cypress domes, and a 290-day hydroperiod is average for domes; average maximum water levels reach about 2 feet (Duever *et al*. 1986*b*). 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 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. All cypress strands have been logged, and many sites are now more characteristic of the mixed-hardwood swamps. 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 8 inches, with inundation lasting 120 days. Fuel buildup is slow on these sites, and fires occur only once every decade or two (Wade *et al*. 1980).

Disturbed. Areas affected by man's past activities occur throughout the survey area. Logging, canal and road construction, farming and grazing, recreation, oil extraction, ORV use, and facility construction have affected the Preserve's surface and to some extent its vegetation communities.

Thousands of nonnative plant species have been introduced to Florida for ornamental plantings, agriculture, and other human uses. Some 297 exotic plants are known to have been naturalized in south Florida (Duever *et al*. 1986*b*). Many of these are reported within the 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, melaleuca (*Melaleuca quinquenervia*), Brazilian pepper (*Schinus terebinthifolius*), 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 oaks such as 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 Preserve 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*. 1986*c*).

Marsh. Freshwater marshes occur throughout the survey area. They 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 (*Pontederia cordata*), arrowhead (*Sagittaria lancifolia*), maidencane (*Panicum hemitomon*), and sawgrass (*Cladium jamaicense*). Freshwater marshes are generally located at elevations between cypress strands and pinelands, primarily on the slopes of the undulating bedrock surface. 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 8 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 mostly outside the central portions of the survey areas. South Florida slash pine (*Pinus elliotii* var. *densa*) is the major overstory species, with a dense understory of cabbage palm (*Sabal palmetto*) and saw palmetto (*Serenoa repens*) 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.

Swamp Forest. The logging of overstory bald cypresses in some strands has resulted in domination by former sub-canopy hardwood species, such as red 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 *et al*. 1980). Mixed-hardwood swamps occupy peats, sands, and rock and have a 270-day or longer hydroperiod.

Water. The open water areas in the survey areas consist mainly of ponds, ditches, and large canal systems.

Wet Prairie. Prairies are treeless areas dominated by grasses and forbs (non-grass flowering herbaceous plants). Wet and dry prairies have been differentiated (Duever *et al*. 1986*a*). Wet prairies are characterized by muhly grass (*Muhlenbergia capillaris*), love grass (*Eragrostis* spp.), and sand cordgrass (*Spartina bakeri*). Dry prairies are characterized by broomsedges (*Andropogon* spp.), white-top sedge (*Rhynchospora colorata*), 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 prairies have hydroperiods of 70 days and are inundated to a maximum depth of 8 inches during the wet season; dry prairies have hydroperiods of 50 days and are inundated to a maximum of 2 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.

Nonnative/Invasive Plant Species. The Florida Exotic Pest Plant Council (EPPC) keeps an updated list of Category I and Category II nonnative plants in Florida, which represents about 11 percent of the more than 1,400 nonnative plant species that have been introduced into Florida and subsequently established outside of cultivation (EPPC 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 (EPPC 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 (EPPC 2011). Many of these plants are reported in the Preserve and within the 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.

Functions and Values

Functions and values shared by the wetlands located in the NG3-D survey boundary include:

Biotic Functions

The wetlands provide important habitat for mammals, birds, reptiles, amphibians, fishes, and invertebrates, and they sustain complex trophic interactions. Federally endangered or threatened species such as Florida panther (*Puma concolor coryi*) and wood stork (*Mycteria americana*) also use these wetlands at some point in their lives. Wetland structure, including topography, soils, and vegetation, has helped evolve the many highly specialized biota. Mature forested cypress wetland areas provide important nesting and roosting habitat for both birds and mammals. Scrub cypress is dominated by pond cypress (*Taxodium ascendens*) that is adapted for areas with slow to stagnant water, low-nutrient availability, and occasional forest fires. Wet prairies and marshes provide important foraging opportunities for wading birds.

Table 2 summarizes the federally listed wildlife species that have been documented or could potentially occur within the seismic survey area.

Table 2. Federally Listed Wildlife Species with Potential to Occur Within Wetlands in the NG3-D Survey Area

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

USFWS – U.S. Fish and Wildlife Service
E – Endangered
T – Threatened
T(S/A) – Threatened Due to Similarity of Appearance

Table 3 summarizes the state-listed wildlife species that have been documented or could potentially occur within wetlands in the NG3-D survey area.

Table 3. State-Listed Wildlife Species with Potential to Occur Within Wetlands in the NG3-D Survey Area

Common Name	Scientific Name	Designated Status
		State (FWC)
Mammals		
Everglades mink	*Mustela vison evergladensis*	ST
Big Cypress fox squirrel	*Sciurus niger avicennia*	ST
Birds		
Limpkin	*Aramus guarauna*	SSC
Little blue heron	*Egretta caerulea*	SSC
Snowy egret	*Egretta thula*	SSC
Tri-colored heron	*Egretta tricolor*	SSC
White ibis	*Eudocimus albus*	SSC
Florida sandhill crane	*Grus canadensis*	ST
Roseate spoonbill	*Platalea ajaja*	SSC

Table 3. (Continued)

Common Name	Scientific Name	Designated Status
		State (FWCC)
Mollusks		
Florida tree snail	*Liguus fasciatus*	SSC

FWC – Florida Fish and Wildlife Conservation Commission
SSC – Species of Special Concern
ST – State Threatened

Hydrologic and Biogeochemical Functions

The wetlands attenuate downstream flooding and recharge the shallow aquifers. Rainwater and water flowing into the NG3-D survey boundary is captured, stored, and slowly released, thereby reducing the impact of downstream flooding, deterring saltwater intrusion, and helping to sustain aquatic resources. The wetlands act as filters and sponges to clarify water by trapping sediment and sequestering and cycling nutrients such as nitrogen and phosphorus.

As stated in the 1992 GMP for the original Preserve and the 2010 GMP for the Addition, the water in the Preserve 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 the Preserve 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.

Wetlands in the NG3-D survey area are primarily precipitation driven, but water table aquifers play an important role in their function. The land surfaces are flat and slope to the south and southeast from elevations of approximately 15 to 10 feet over a distance of ten miles across (Figure 2). Wetlands are typically flooded with a shallow sheet of surface water starting shortly after the onset of the rainy season (usually in June) and ending in the winter dry season after surface waters recede to marsh and cypress dome areas. The period from November through mid-May is typically considered the dry season. Rainfall averages 54 inches per year with a range of 35 to 80 inches per year. Summer rains are usually short, intense, and frequent. Winter rains are a result of frontal systems and they last longer and have less intensity. Tropical systems, including hurricanes, occur June to November and can sometimes bring significant and torrential rainfall.

During the rainy season, shallow depressions fill with water. Because of the poor drainage, water stands on the land until it evaporates, infiltrates the soils and porous limestone to the underlying aquifer, or slowly drains off through sloughs or strands. Seasonally high water tables in the

surficial aquifers maintain the water levels necessary to support wetland communities. The area is inundated during the wet season by water ranging from a few inches to several feet in depth

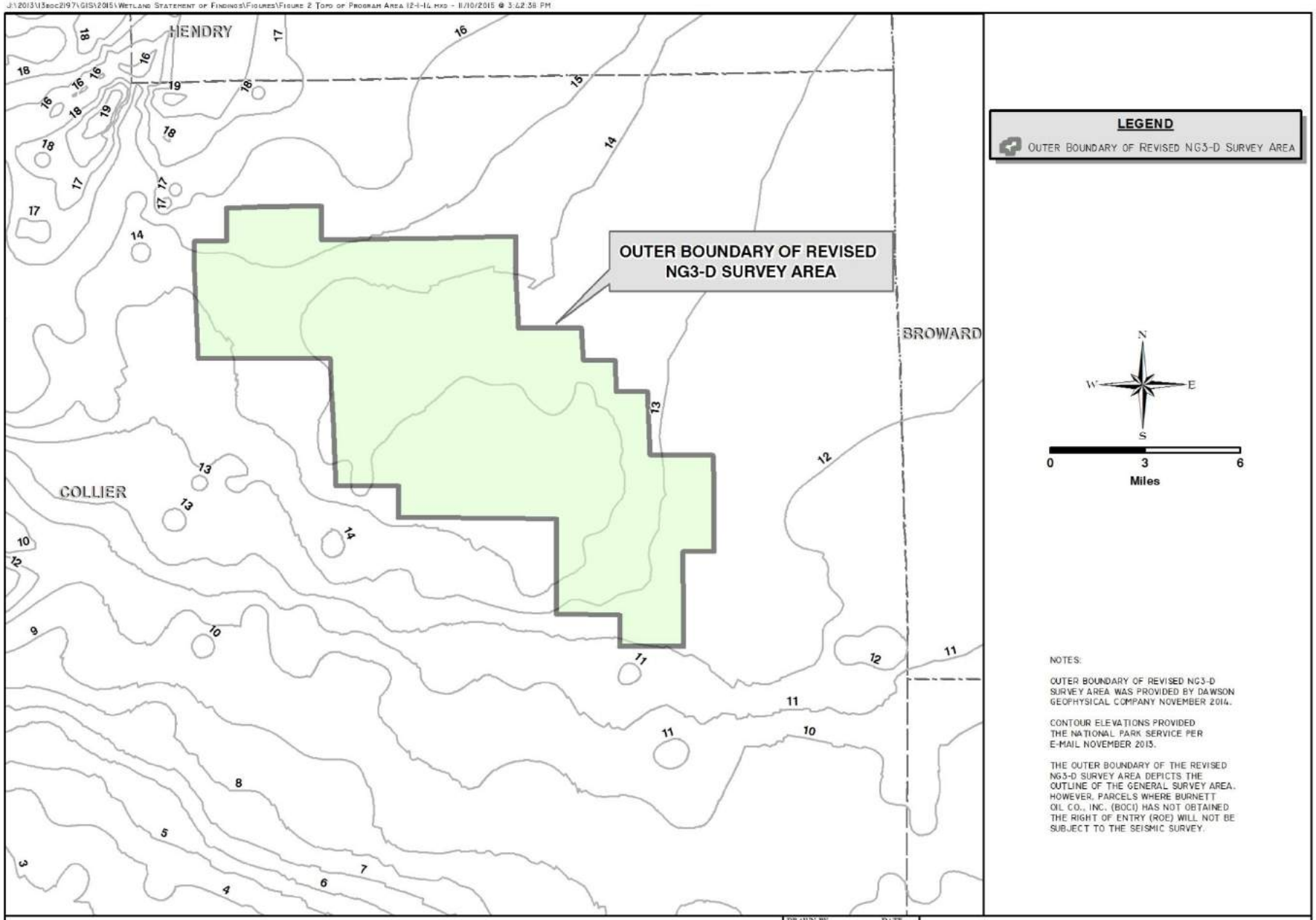


FIGURE 2. TOPOGRAPHY MAP
NOBLES GRADE 3-D

(Klein *et al*. 1970). In general, the water table across the site is 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. The water regimen of the area largely determines the patterns in which temperate and tropical vegetative communities and their related wildlife species occur. Ponding of water provides refugia for aquatic species and conduits for dispersal of species from one area to another.

Cultural Values

The wetlands provide value as areas utilized for fishing, birding, education, research, nature enjoyment, and wildlife photography. The wetlands have also long been utilized by American Indians and others for hunting, logging, and camping.

Geology

Surface Formations and Thickness

The geologic conditions at and near the surface in the survey area consist of a 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 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.

Soil Types and Engineering Properties

The most recent soil surveys produced by the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, were originally issued in 1998 and updated in 2005. However, this mapping does not delineate most of the soil types east of State Road (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 Exhibit B.

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 flotation 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.

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 (Exhibit B). Table 4 lists the soil types and the associated soil descriptions follow.

Table 4. 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 (*Aristida stricta*), switchgrass (*Panicum virgatum*), carpetgrass (*Axonopus* sp.), maidencane, 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 Collier 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 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 (*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 (*Myrica cerifera*), 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 find sand of find 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.

POTENTIAL WETLAND IMPACTS OF THE PREFERRED ALTERNATIVE

No fill will be brought in for road construction; therefore, no wetlands would be filled. There would be no permanent loss or degradation of wetland function. Temporary adverse impacts (in the form of rutting, soil compaction, and vegetation destruction) could result from the movement of survey crew and vehicles through the Preserve to conduct the survey.

The theoretical distance that vehicles could drive to access the unmodified length of source points and receiver lines is 1,681± miles. Not all source and receiver lines will be accessible for survey, and the majority of the 1,171± linear miles of receiver lines will be accessed on foot. There will be two sets of three vehicles driving through the wetlands to access the source points. Assuming the entirety of the source lines is accessible, there is a potential for rutting, soil compaction, and vegetation destruction for a total two-track distance of 510± miles.

Wetland Impact Avoidance and Minimization

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. This is the initial design of hypothetical lines on a map prior to modification required to avoid impacts to sensitive areas. 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. Each source point will be accessed by a group of three Vibroseis vehicles. Accessing the entirety of the unmodified source line layout will require driving a maximum 510 linear miles, assumed for this assessment as entirely through wetland habitat. 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 in line. Access to receiver lines will be accomplished in large part by crews working and travelling on

foot and by helicopter. The entirety of the unmodified receiver line layout will occupy a maximum 1,171 linear miles, assumed for this assessment as entirely through wetland habitat.

The initial design was 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 wetland resource impacts. Receiver lines were also modified to route along existing disturbances 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 implementing Modification Protocols for source and receiver points is shown in Figure 4. The modified line locations for the entire NG3-D seismic survey area are shown on Exhibits C and D. These modified lines will be further moved during field operations to incorporate real-time data to further avoid/minimize potential wetland resource impacts.

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 NPS and subsequent route adjustments to avoid sensitive resources. A professional wetland scientist hired by the applicant and approved by NPS staff, along with the survey crew and crew manager chiefs, will scout a given area daily prior to the seismic survey taking place. The professional wetland scientist will be from a private entity that will be professionally trained and have local experience with the flora, hydric soil conditions, and wetland habitat of the Preserve. Additional approved professional wetland scientists will be present with each survey crew. Additional aerial scouting will be conducted by a professional wetland scientist to identify potential species habitat that could be affected by the receiver line placement (i.e., red-cockaded woodpecker (*Picoides borealis*) habitat, wading bird rookeries, etc.). Additional groundtruthing will be conducted by the professional wetland scientist (if needed) in conjunction with the NPS to avoid protected species location along the receiver lines, if identified.

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'

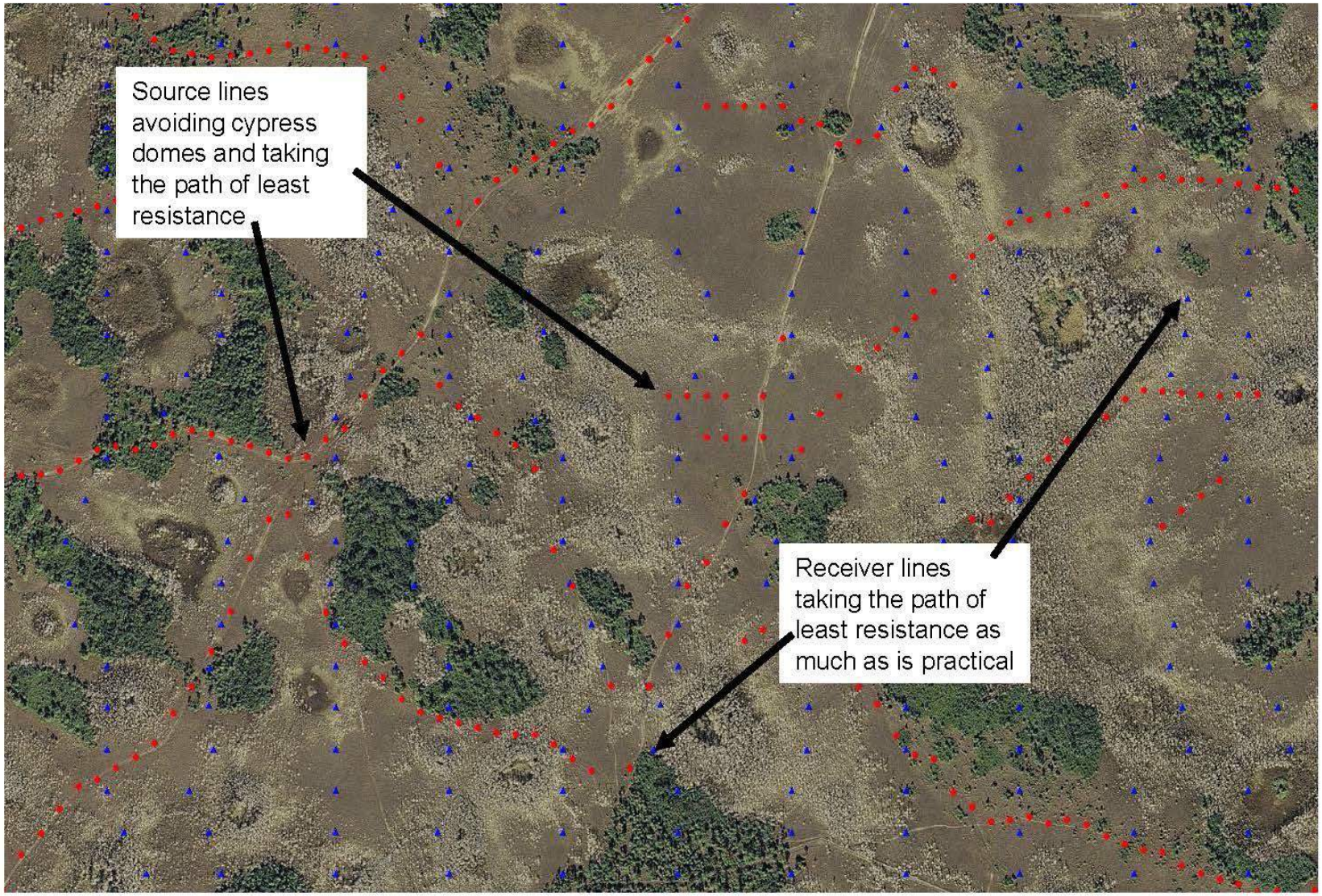


Figure 3. Modified Standard "Brick-Grid"

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. 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 NPS and Florida Department of Environmental Protection (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 a professional wetland scientist and archeologist (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 virtually all of the one pass lanes had restored in one year and completely disappeared after seven years of recovery.

Duever summarized in his 1986 study that vegetation which is impacted by a passing vehicle is frequently not killed and will re-sprout and continue to grow. 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 avoid operations in standing water or soils saturated at or just below the surface to 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.

The operation as proposed incorporates measures that would prevent or minimize impacts to fish and wildlife communities, as well as the natural environment that supports these communities. Offsets from waterways and known locations of threatened and endangered species will be applied, the crews would not be permitted to harass wildlife, and seismic operations in any given

area would only occur for a brief period of time before moving on to the next source point location. Suitable adjacent habitat is also widely available for displaced wildlife to utilize during project operations, and impacts to habitat values are expected to be short term.

Minimization of Potential Surface and Subsurface Geologic Impacts

Potential 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 would be expected to produce greater impacts in wetland areas where the soils are inundated or saturated than in wetland areas where the upper soil surface is dry.

Because the controlling factor in the capacity to severely disrupt soils is the moisture content of the soil (2000 Preserve ORV Management Plan), operations will be conducted during the dry period of the year (typically November through mid-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 NPS managers to avoid working in saturated soils or standing water.

The 2006 NPS Operators Handbook specifically recommends the use of vehicles with "low ground pressure" to reduce potential impacts. The Preserve's ORV GMP/EIS (NPS 2000*b*) 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 (flotation) 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 minimize the creation of ruts (as opposed to using standard tires) in the drier wetland areas.

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 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 NPS Operators 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.

Minimization of Potential Hydrologic Impacts

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. 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 (typically November through mid-May), so significant impacts to water quality, hydrology, and near-surface, subsurface geologic resources are not anticipated. BOCI will coordinate all field operations with 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.

Vibroseis buggies will be equipped with wide, smooth treaded balloon tires designed to spread the weight of the buggy over a wider "footprint" to reduce potential impacts to soils, which may also reduce the potential for soil compaction and rutting, which may in turn reduce the potential

impacts to water quality and hydrology. Vibroseis source lines will be located on existing roads, trails, and disturbances where feasible. The use of Vibroseis buggies and the use of existing disturbed areas will minimize potential 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. In the unlikely event that a spill occurs, clean-up and restoration activities will be conducted in compliance with applicable MMP operation stipulations.

Minimization of Potential Vegetation Impacts

Localized vegetative impacts could result primarily from the movement of Vibroseis buggies along source lines, driving equipment to establish receiver points, and daily mobilization. Potential disturbances to individual pieces of vegetation could occur through the matting down of plants, compaction of soils, scraping of trees, exposure of plant roots, bending or breaking of vegetation, and/or brush cutting and vegetation trimming. Consistent with Preserve GMP/EIS/MMP geophysical Stipulation #17, cut vegetation must be capable of returning to its natural condition after operations. 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 is addressed by mitigation measures.

The "one pass" design of survey operations will minimize 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. Duever *et al.* (1986*c*) state 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 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 Preserve 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 recover 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 NPS representatives.

In accordance with the Preserve's MMP, impacts to vegetation will be further minimized by avoiding vulnerable areas. The wide range of environmentally sensitive areas 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.

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 will 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 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 NPS Operators 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 NPS Regional Director and Superintendent, if needed.

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" in all locations 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. 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 through 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 recreational 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 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.

The Preferred Alternative incorporates a series of measures designed to minimize wetland impacts. Many of those mitigation measures are identified in the Preserve's General Management Plan as appropriate for oil and gas activities. The measures include the following:

- Avoiding disturbance to wetland areas with visible standing water or saturated soil conditions at or just below the soil surface. Program field operations would be conducted during the "dry season" (typically November through mid-May) consistent with Preserve MMP geophysical operational Stipulation #8 and 2006 NPS Operators Handbook seasonal plant dormancy mitigation recommendations, which would greatly reduce potential short-term impacts to vegetation, habitat, and soils; wetlands; some wildlife; water quality; hydrology; and sub-surface geologic resources.

- Avoiding all forms of new construction, such as new roads and fill pads.

- 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.

- Oversized "balloon" tires or tracks would be used to spread vehicle surface weight to avoid or minimize potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; water quality; hydrology; sub-surface geologic resources; visual quality; and visitor use and perception. Specifically, by laying over vegetation rather than uprooting it, this will prevent/minimize soil disruption, which in turn protects water quality, hydrology, sub-surface geologic resources, visual quality, and visitor use and perception.

- Seismic survey activities would generally utilize a "one pass" design for Vibroseis equipment groups, which would greatly reduce potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; cultural/archeological resources; visual quality; and visitor use and perception. However, certain areas maybe crossed more than once if it would result in less environmental impacts then an alternative route.

- Program operations would utilize existing trails to the extent feasible. In addition, the NPS would be consulted to determine access to off-trail source points in environmentally sensitive areas. These measures which would greatly reduce potential short-term disturbances to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; cultural/archeological resources; visual quality; and visitor use and perception.

- Where vegetative trimming is required, selectively avoiding areas with native vegetation if trimming areas with exotic vegetation could accomplish an acceptable positioning of vibration or receiver points.

- Avoiding trimming native vegetation below the height or beyond the width of 36 inches or with a 4 inch or greater trunk diameter as measured at breast height.

- Avoiding use of motorized vehicles in especially sensitive resource areas within the Preserve identified by the NPS, including areas near known locations of endangered species (e.g., red-cockaded woodpecker clusters), sensitive vegetation communities, and cultural resources.

- Scouting and groundtruthing operations would also be conducted by a wetland scientist and archeologist, working concurrently with the survey operations, to identify both documented and undocumented environmentally sensitive or cultural/archeological areas so the source points, receiver points and their respective access pathways may be re-routed to minimize impacts to these areas. In the event that undocumented protected

species nesting sites or cultural/archeological areas are discovered prior to or during program operations, observation reporting protocols would be initiated with NPS (and other agencies, when applicable) so that appropriate setbacks and program design modifications could be implemented pursuant to the advice and direction of agency personnel. This would avoid or minimize potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; cultural/archeological resources; visual quality; and visitor use and perception.

- Available GIS data and aerial imagery would be utilized to identify documented environmentally sensitive and cultural/archeological areas so the source points, receiver points and their respective access pathways may be re-routed to minimize impacts to these areas. This would minimize potential short-term impacts to vegetation, habitat, and soils; wetlands; protected wildlife; water quality; hydrology; sub-surface geologic resources; cultural/archeological resources; visual quality; and visitor use and perception.

- Heliportable geophone receiver equipment would be used to enable on-foot deployment and recovery, thus reducing the extent of impacts and time spent on the ground during the survey. As such, helicopter operations would reduce the extent of potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; water quality; hydrology; and sub-surface geologic resources by reducing the need for additional motorized equipment. It should be noted that helicopters would adhere to vertical buffers established around colonies of nesting wading birds to avoid or reduce potential disturbances.

- Low shrubs and herbaceous vegetation, topsoil, rootstock, and plant material would be left in place along source lines, receiver lines, and access routes to facilitate natural re-vegetation. 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. These measures would greatly reduce potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; visual quality; and visitor use and perception.

- Survey equipment and vehicles would be cleaned prior to initially entering the Preserve to avoid the spread of nonnative plant species and potential wildlife diseases. This would in turn reduce potential impacts to vegetation and habitat; wetlands; protected plants; protected wildlife; wildlife resources; visual quality; and visitor use and perception.

- Crews dedicated to implementing restoration and reclamation activities will be used. Ruts, depressions and vehicle tracks resulting from field operations will be restored to original contour conditions using shovels and rakes, to prevent the creation of any trails.

- Prevention mechanisms would be used to eliminate or reduce potential spills/leaks of

contaminants from survey equipment. These mechanisms would include implementation of Dawson Geophysical operational Health, Safety, Security, Environment (HSSE) Management System policies that address spill prevention and clean-up, fire protection, refueling and health and safety practices. This would reduce potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; visual quality; and visitor use and perception.

- Educational training programs would be provided to survey crews to help them identify and avoid wildlife and environmentally sensitive areas (to the extent feasible) and identify and avoid cultural/archeological areas. In addition, the survey crews would be informed not to collect vegetation, wildlife, artifacts, etc., as well as inform them of wildlife protection measures and safety hazards. This would result in increased protection to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; cultural/archeological resources; visual quality; visitor use and perception, and Preserve management and operations.

- Trash bags and receptacles would 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 would be collected and removed from the field daily and as the program progresses. This would reduce potential short-term impacts to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; visual quality; and visitor use and perception.

- BOCI would conduct meetings with state and federal wildlife management and research specialists to discuss ongoing research, potential issues, and survey protocols for protected species. BOCI would coordinate field operations with the state and federal wildlife management and research specialists to avoid potential impacts to protected species. Per guidance received from the agencies, species-specific buffers and protocols would be established around areas containing certain protected plants and wildlife to minimize potential disturbance to these species.

- Program activities would be conducted during daylight hours, minimizing potential disturbance to protected wildlife; and other wildlife resources.

- Machinery would be operated slowly and attentively to avoid potential impacts to vegetation, habitat, and soils; wetlands; protected plants; protected wildlife; wildlife resources; water quality; hydrology; sub-surface geologic resources; and cultural/archeological resources.

NPS staff and NPS inspectors would be heavily involved throughout field operations. The Project Manager or his designee would act as liaison and coordinate inspection logistics as needed to ensure the survey alternatives do not impact the ability of NPS staff to manage the Preserve. Inspection personnel would be provided radio and/or cellular telephone

communications for use in the field, allowing for the continued coordination of Preserve management, and minimizing the time constraints or abilities of Preserve staff. This would increase time and effort by Preserve management and operations staff, but would also ensure them that survey was being conducted as authorized and that no long-term impacts would occur.

Collectively, these measures will contribute to minimizing the loss of wetland functions and values. No wetlands will be filled. There will be no permanent loss of wetland functions or values. Any impacts will be temporary and localized.

MITIGATION PLAN

Impact Site Restoration

All adverse impacts to wetlands resulting from any project actions, including rutting and compaction of soils and/or destruction of vegetation from vehicle use, will be identified by NPS staff. The applicant will begin field reclamation of impacts immediately as the survey continues. Soils will be decompacted and graded to match the original grade. If the NPS staff determine that re-vegetation 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.

Compensatory Mitigation

As compensation for any temporal loss of wetland function resulting from vehicle use, 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.

Restoration activity would occur during the dry season and may include the use of mechanical or hand equipment to loosen the soil and level soil ruts to existing natural grade of adjacent undisturbed areas. Re-vegetation would be allowed to occur via natural recruitment unless planting is required by NPS staff. Signage would be installed near restored areas to keep users on authorized trail segments.

Compensatory Mitigation Success Criteria

For compensatory mitigation conducted in the Preserve, the mitigation will be considered successful if at the end of a five-year monitoring program the mitigation area contains no more than 5 percent cover by exotic invasive plants, and hydrophytic vegetation has become established at 50 percent of the cover of a similar type of nearby, naturally occurring wetlands. If the vegetation composition and cover does not meet these standards, then the applicant will remove non-native species and/or plant the areas with native species.

On-Site Monitoring

Monitoring Methodology

Monitoring will be conducted at the mitigation site by a qualified wetland scientist approved by NPS staff. The monitoring process will commence immediately after the restoration, which will be designated as time-zero, and at one-year intervals thereafter for five years.

The monitoring survey for the restoration sites will document the status of vegetation, presence of invasive plants, wildlife activity observations, general weather conditions, and site photographs. An "as-built" report, to include a description of baseline or preconstruction conditions, will be prepared immediately after construction (i.e., at time-zero monitoring) to document plant densities and describe the conditions of the restoration area. The annual monitoring reports will document the progress of the restoration efforts and monitor the success of natural species recruitment. All reports will be forwarded to NPS staff, and copies will be maintained at Preserve headquarters. Any issues that arise or corrective action that needs to be taken will also be included in the monitoring reports. Observations of vegetation will be made along fixed transects at the restoration site to ensure identical sampling procedures throughout the time-zero and the subsequent reporting cycles.

Wildlife Monitoring

During the monitoring program, observations of wildlife will be made in the restoration area via both visual means and inspection of physical evidence.

Photographic Documentation

Photograph stations will be identified in the restoration area. These locations will be used to document the physical condition of the restoration area during the five-year monitoring program.

Monitoring Reports

Monitoring reports will be prepared and submitted to Preserve staff to provide documentation of the wetland mitigation success and the general condition of the enhanced area. Monitoring reports will consist of the following information:

- Narrative description of the enhancement activities performed since the last report
- Explanation of maintenance work to be conducted over the next year
- List of wildlife species observed
- Results of vegetative monitoring
- Identification of non-native, invasive vegetation
- Photographs taken at photograph station locations
- General weather description
- Description of any remedial action recommendations (if necessary)

Long-Term Maintenance

Annual inspections of the mitigation restoration site will occur for the five years of the monitoring program. The inspections will be performed by a qualified wetland scientist. The mitigation site will be inspected and locations of exotic and/or nuisance species identified to be treated and removed. Notations will be made of any potential problems identified during the inspection. The site will be maintained continually to ensure exotics and nuisance species do not become the dominant vegetation in the mitigation areas. If necessary, BOCI will actively revegetate with native wetland species.

Work Schedule Plan

The work schedule in Table 5 outlines activities and dates for monitoring program execution.

Table 5. Wetland Mitigation Restoration and Monitoring Schedule

Task or Document	Anticipated Completion Date
Mitigation restoration work	Within 30 days of conclusion of NG3-D survey
Time-Zero Monitoring Report (i.e., as-built report)	Six months following mitigation restoration work
First Monitoring Report (after first year)	
Second Monitoring Report (after second year)	
Third Monitoring Report (after third year)	
Fourth Monitoring Report (after fourth year)	
Final Monitoring Report (after fifth year)	

CONCLUSION

The NPS finds that there is no practical alternative to work in wetlands in order to conduct a geophysical seismic survey in the Preserve. Wetland impacts will be avoided to the maximum practical extent, and minimization measures are proposed to avoid loss of wetland function and value. Compensatory mitigation is proposed for unavoidable wetland impacts. Given that the procedures and mitigation measures described in this document are implemented, the NPS finds that this project is in compliance with Director's Order 77-1 and Executive Order 11990, "Protection of Wetlands."

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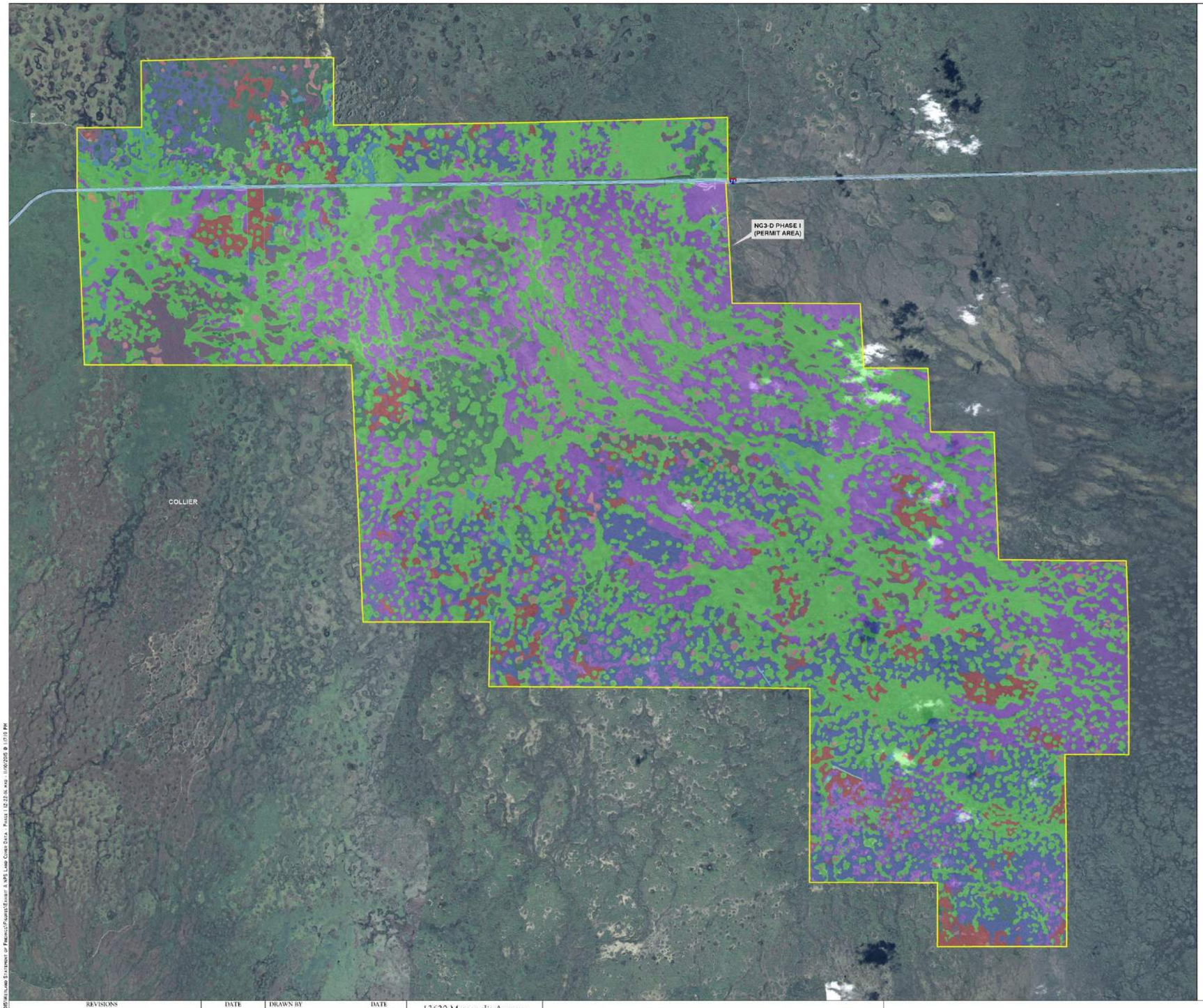
EXHIBIT A

NATIONAL PARK SERVICE LAND COVER DATA



LEGEND

- NOBLES GRADE 3-D PHASE I (PERMIT AREA)
- CYPRESS FOREST
- DISTURBED
- HYDRIC HAMMOCK
- HYDRIC PINE FLATWOODS
- MARSH
- MESIC HAMMOCK
- MESIC PINE FLATWOODS
- SCRUB CYPRESS
- SWAMP FOREST
- WATER
- WET PRAIRIE

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1 inch = 2,500 feet

VEGETATION DESCRIPTION	ACREAGE
Cypress Forest	32,211 Ac.±
Disturbed	379 Ac.±
Hydric Hammock	62 Ac.±
Hydric Pine Flatwood	2,936 Ac.±
Marsh	688 Ac.±
Mesic Hammock	2,880 Ac.±
Mesic Pine Flatwoods	8,415 Ac.±
Scrub Cypress	16,555 Ac.±
Swamp Forest	486 Ac.±
Water	124 Ac.±
Wet Prairie	3,389 Ac.±
TOTAL	70,454 Ac.±

NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

NOBLES GRADE 3-D PHASE I (PERMIT AREA) WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

THE NOBLES GRADE 3-D PHASE I (PERMIT AREA) DEPICTS THE OUTLINE OF THE GENERAL SURVEY AREA. HOWEVER, PARCELS WHERE BURNETT OIL CO., INC. (BOCO) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY.

VEGETATION LAND COVER DATA PROVIDED BY THE NATIONAL PARK SERVICE NOVEMBER 2013.

REVISIONS	DATE

DRAWN BY: F.L.	DATE: 12/12/13
DESIGNED BY: K.C.P.	DATE: 12/12/13
REVIEWED BY: K.C.P.	DATE: 12/12/13

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NOBLES GRADE 3-D

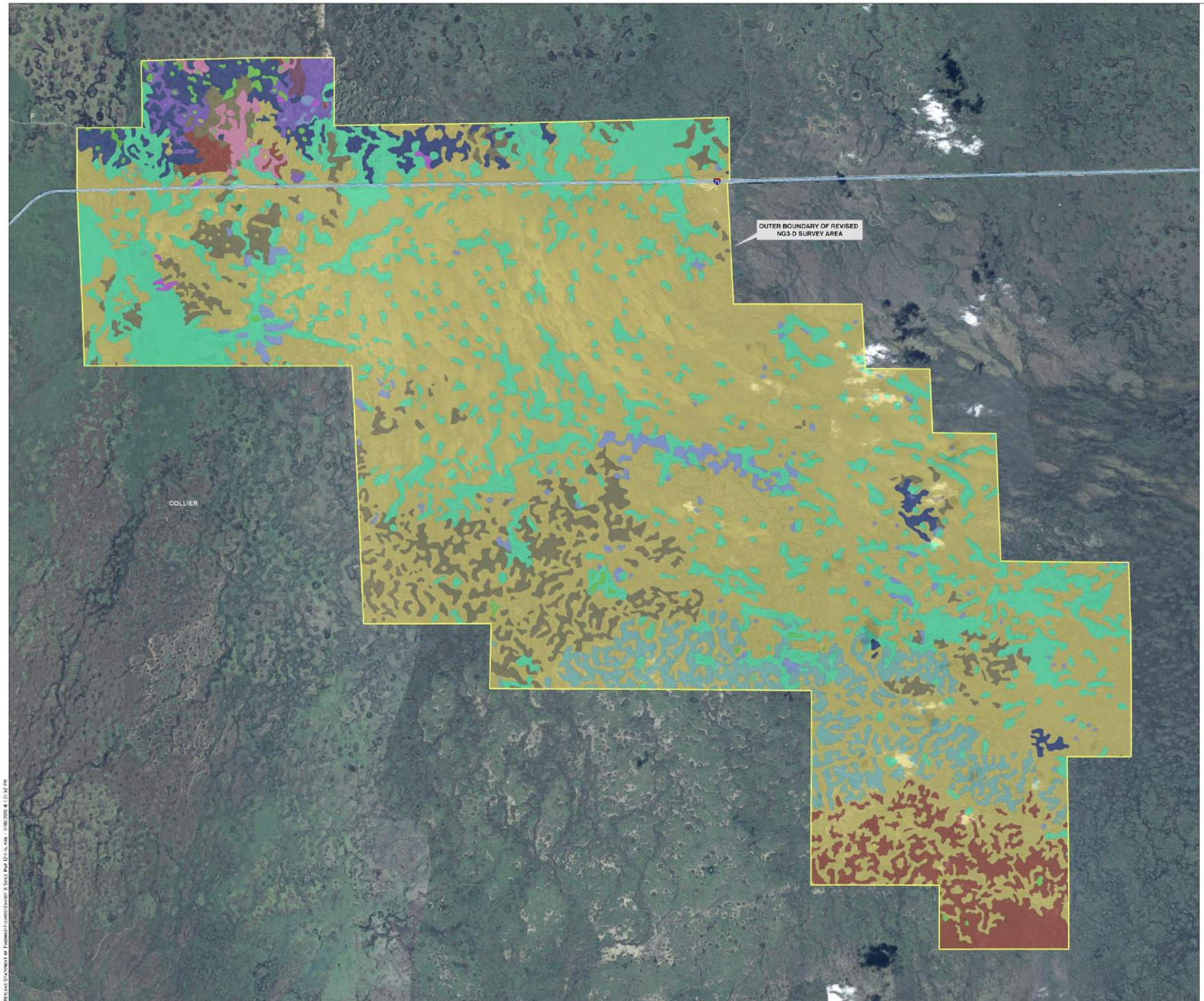
NATIONAL PARK SERVICE LAND COVER DATA

DRAWING No. 13BOC2197

SHEET No. EXHIBIT A

EXHIBIT B

SOILS MAP



LEGEND

- Outer Boundary of Revised NG3-D Survey Area

Collier Soils

- Boca-Jupiter 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

N

W E

S

1 inch = 2,600 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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COLLIER SOILS MAPPING WAS ACQUIRED FROM THE U.S. GEOLOGICAL SURVEY WEBSITE NOVEMBER 2013 AND ISSUED BY THE SOIL CONSERVATION SERVICE IN MARCH 1954.

REVISIONS	DATE

DRAWN BY	F.L.	DATE 12/10/13
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NOBLES GRADE 3-D

SOILS MAP

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SHEET No. EXHIBIT B

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EXHIBIT C

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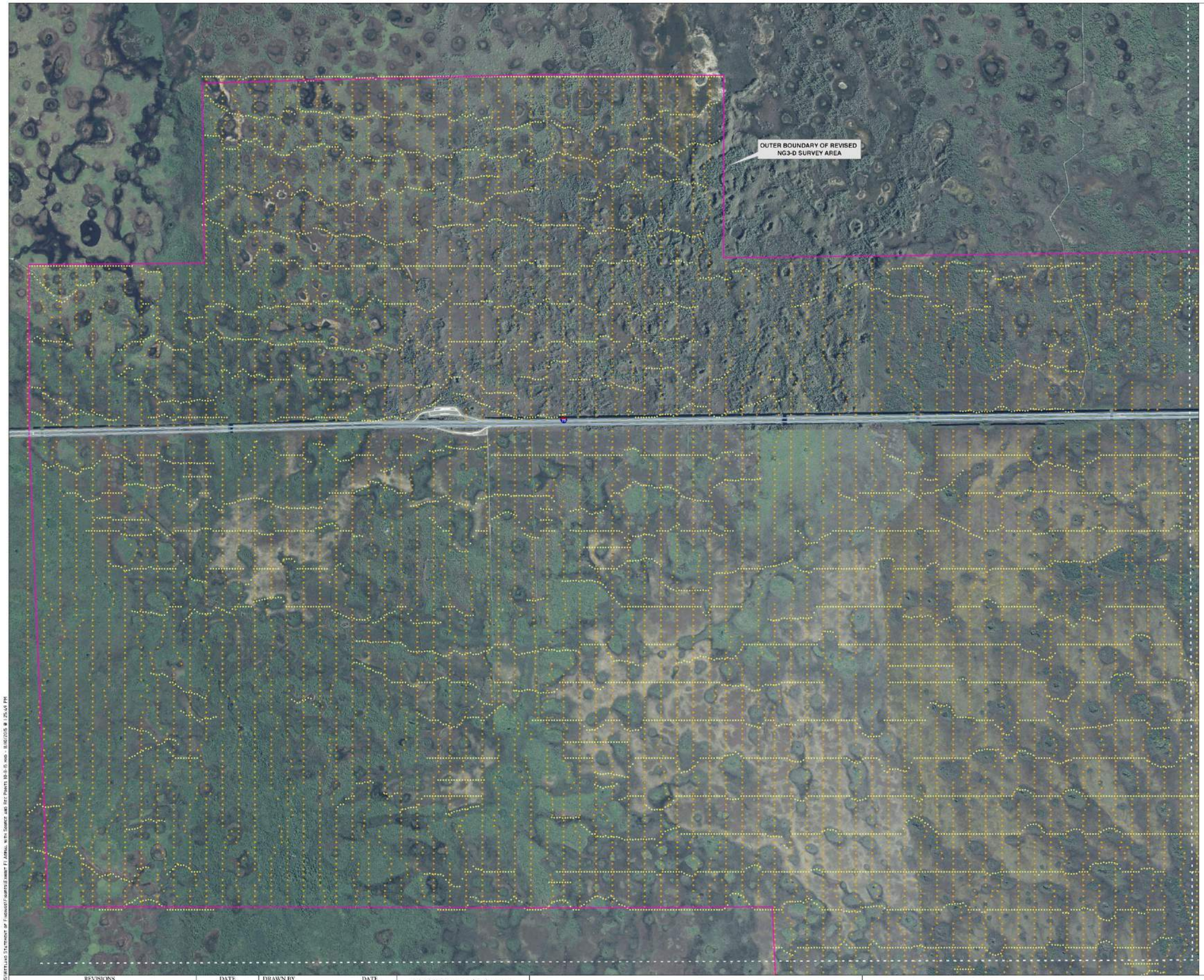

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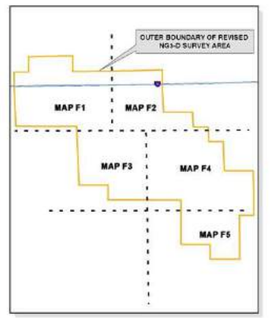
- RECEIVER POINTS
- SOURCE POINTS



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.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

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		DESIGNED BY	DATE
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		A.W.	10/8/15

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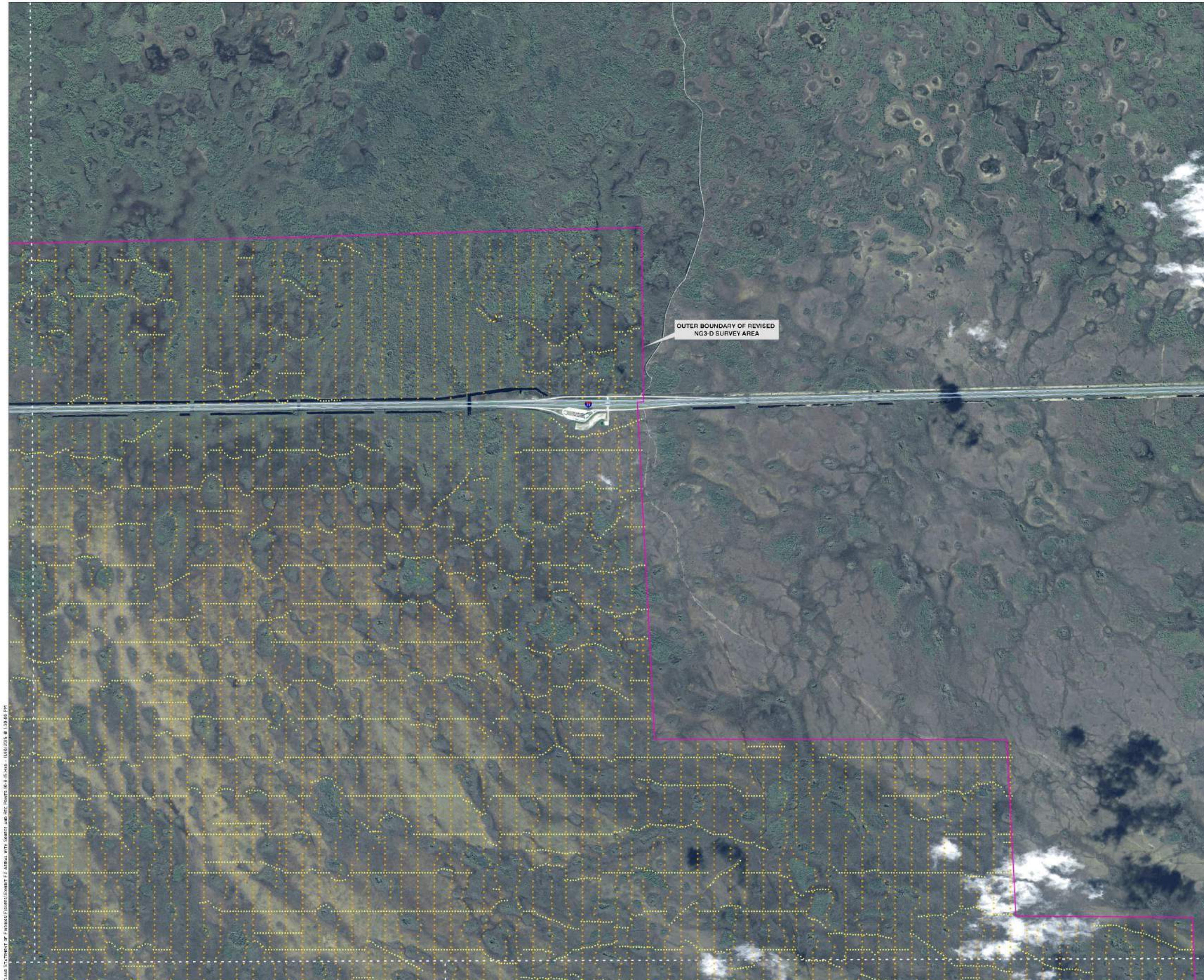
EXHIBIT C1

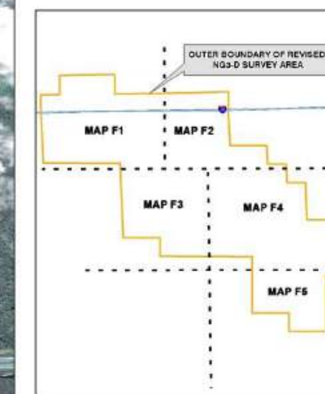


LEGEND

Outer Boundary of Revised NG3-D Survey Area

Receiver Points

Source Points



1 inch = 900 feet

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.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

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AERIAL WITH SOURCE AND RECEIVER POINTS

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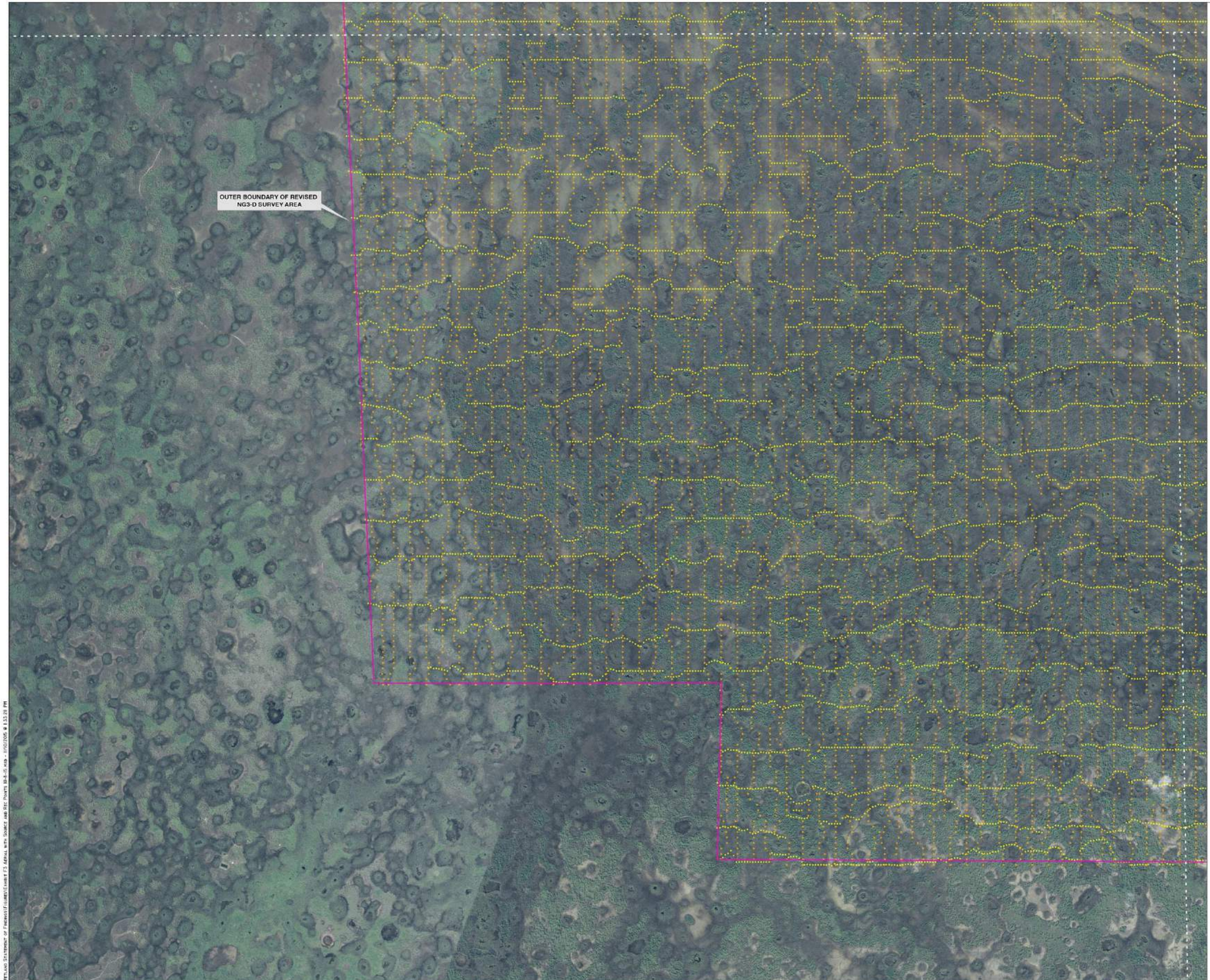
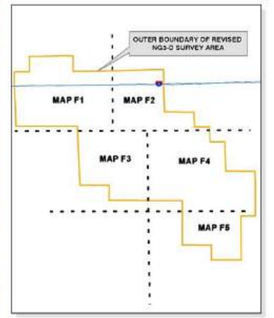


LEGEND

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- RECEIVER POINTS
- SOURCE POINTS



N

W E

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1 inch = 800 feet

NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

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REVISIONS	DATE

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AERIAL WITH SOURCE AND RECEIVER POINTS

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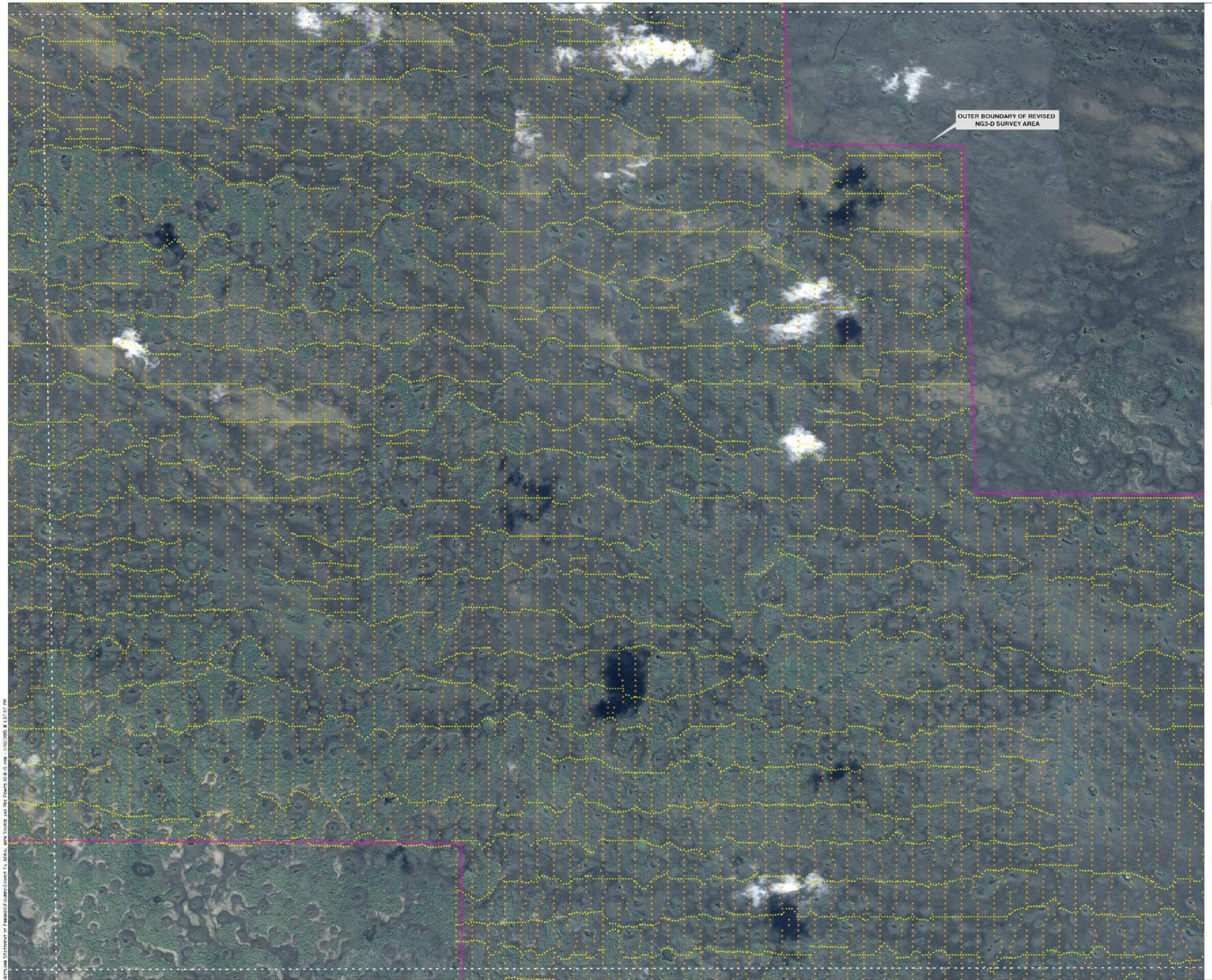

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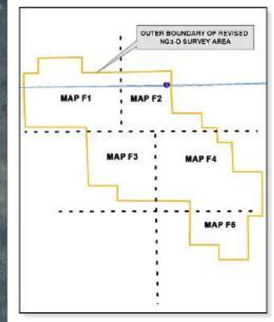
- RECEIVER POINTS
- SOURCE POINTS



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1 inch = 900 feet

NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

REVISIONS	DATE	DRAWN BY	DATE
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		DESIGNED BY	DATE
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AERIAL WITH SOURCE AND RECEIVER POINTS

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SHEET No.
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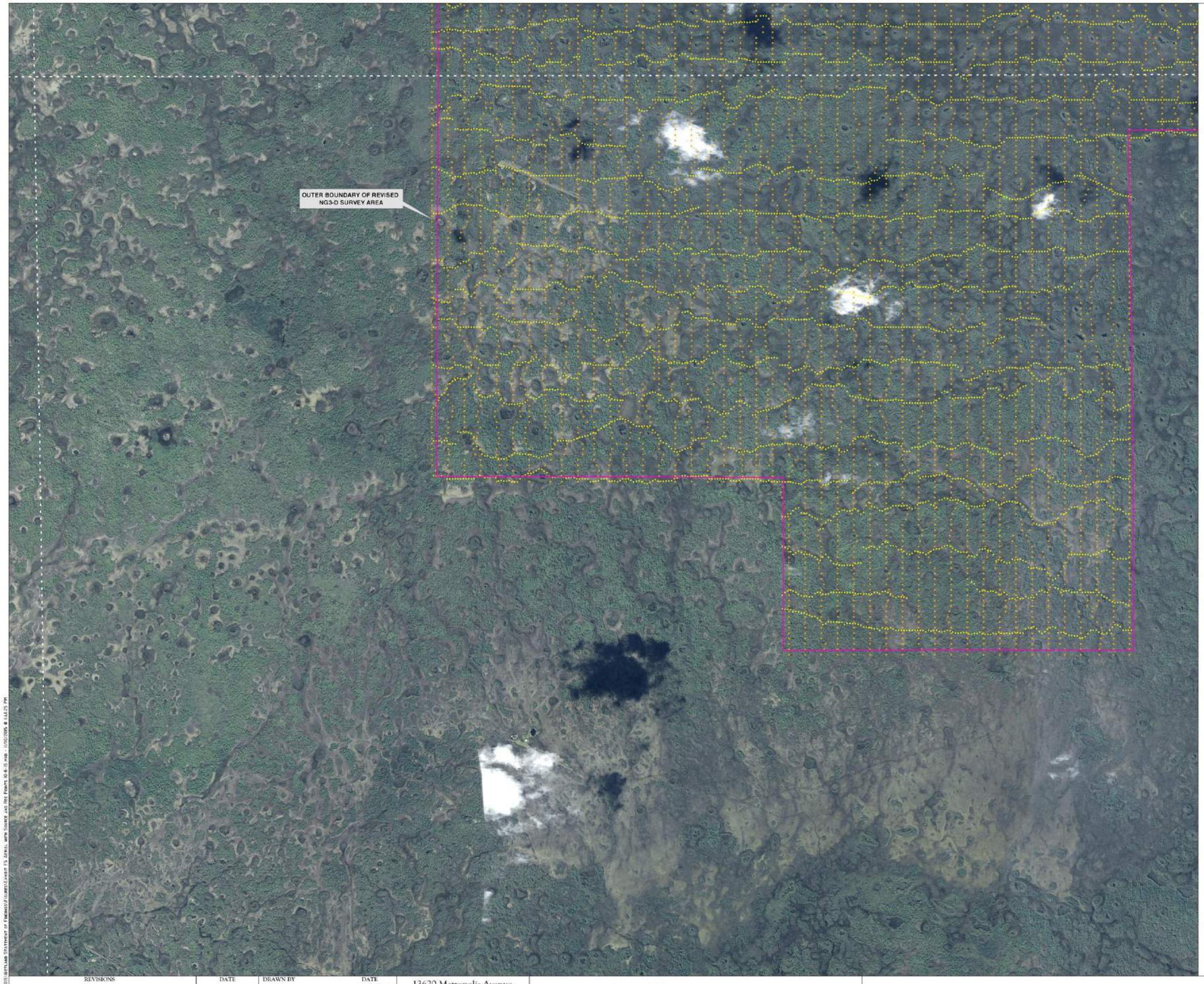

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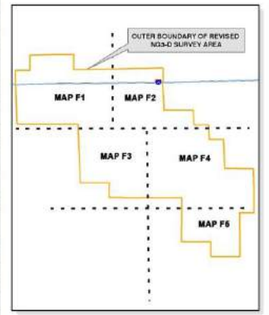
OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA

RECEIVER POINTS

SOURCE POINTS



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1 inch = 500 feet

NOTES:

AERIAL PHOTOGRAPHS WERE ACQUIRED FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE AND WERE FLOWN IN THE YEAR 2013.

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

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REVISIONS	DATE

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DESIGNED BY	A.W.	DATE	10/8/15
REVIEWED BY	A.W.	DATE	10/8/15

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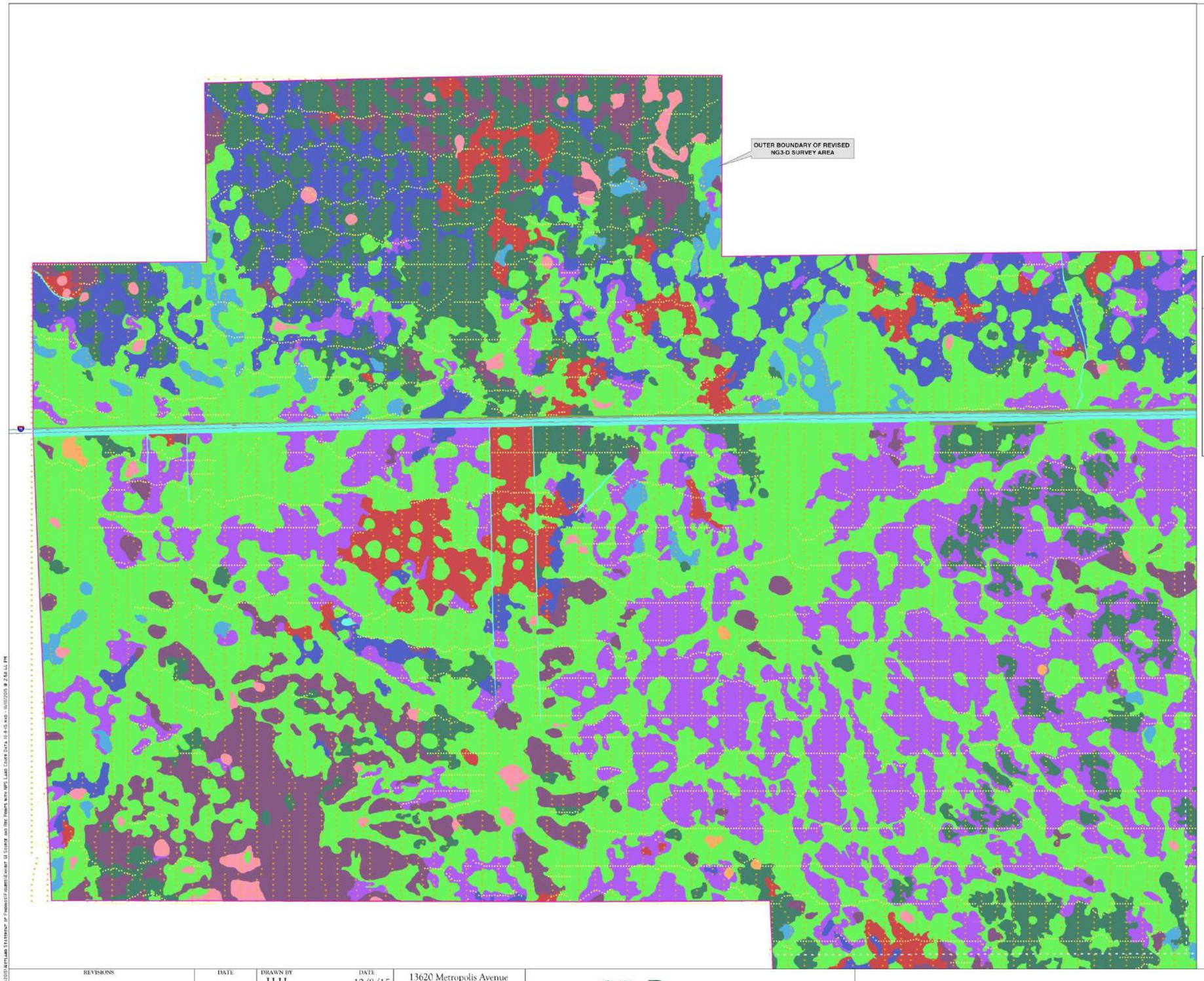
AERIAL WITH SOURCE AND RECEIVER POINTS

DRAWING No.
13BOC2197

SHEET No.
EXHIBIT C5

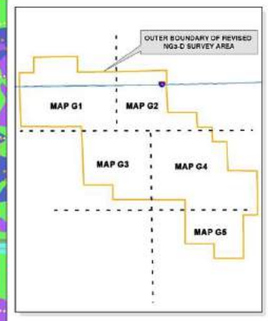
EXHIBIT D

SOURCE AND RECEIVER POINTS WITH NATIONAL PARK SERVICE LAND COVER DATA



LEGEND

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- RECEIVER POINTS
- SOURCE POINTS
- CYPRESS FOREST
- DISTURBED
- HYDRIC HAMMOCK
- HYDRIC PINE FLATWOOD
- MARSH
- MESIC HAMMOCK
- MESIC PINE FLATWOODS
- SCRUB CYPRESS
- SWAMP FOREST
- WATER
- WET PRAIRIE



N
W
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S

1 inch = 900 feet

NOTES:

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

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VEGETATION LAND COVER DATA PROVIDED BY THE NATIONAL PARK SERVICE NOVEMBER 2015.

REVISIONS	DATE

DRAWN BY	H.H.	DATE 10/8/15
DESIGNED BY	A.W.	DATE 10/8/15
REVIEWED BY	A.W.	DATE 10/8/15

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SOURCE AND RECEIVER POINTS WITH
NATIONAL PARK SERVICE LAND COVER DATA

DRAWING No. 13BOC2197

SHEET No. EXHIBIT D1

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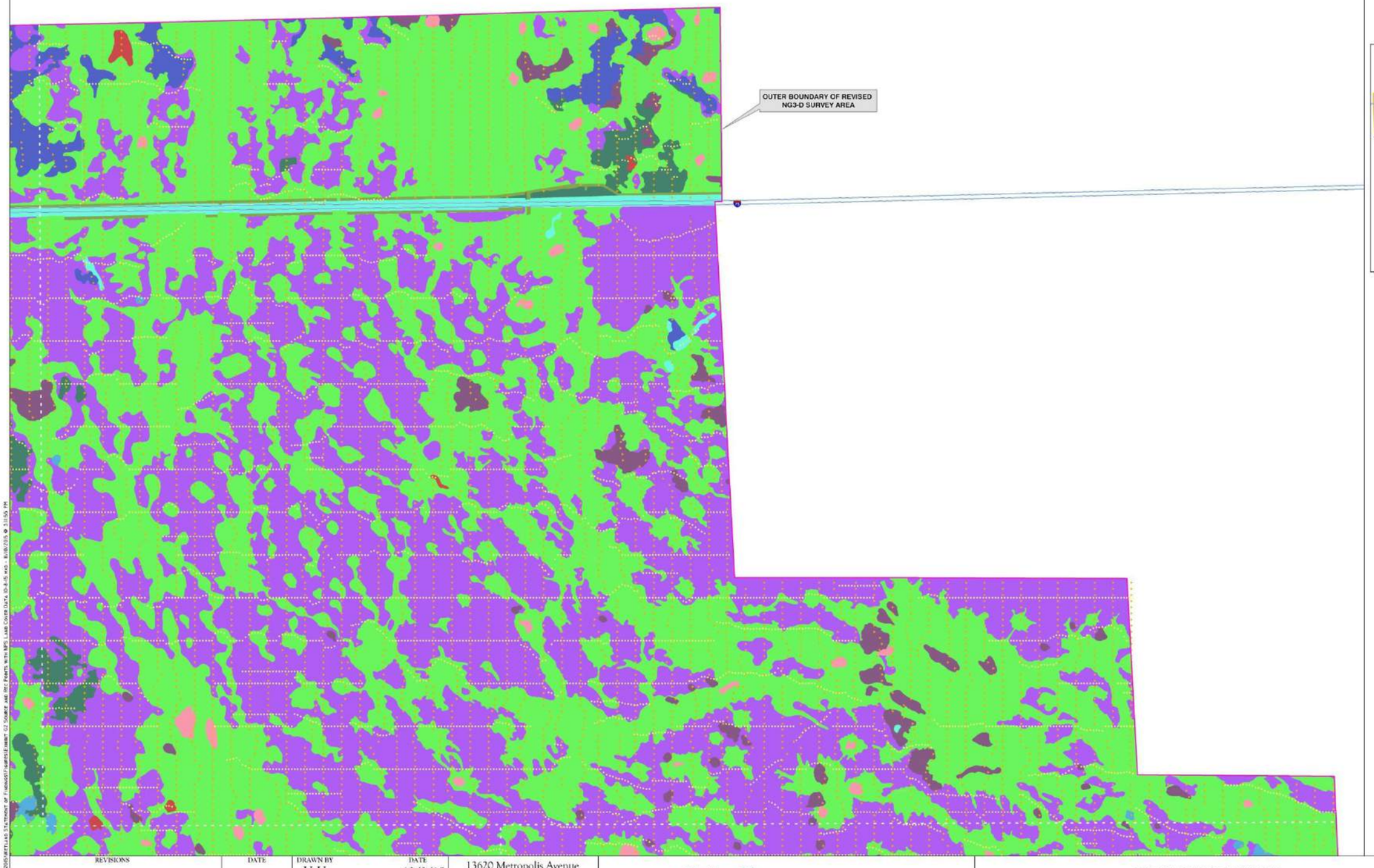
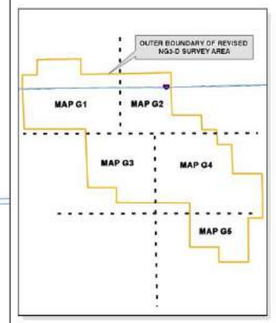


LEGEND

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- RECEIVER POINTS
- SOURCE POINTS
- CYPRESS FOREST
- DISTURBED
- HYDRIC HAMMOCK
- HYDRIC PINE FLATWOODS
- MARSH
- MESIC HAMMOCK
- MESIC PINE FLATWOODS
- SCRUB CYPRESS
- SWAMP FOREST
- WATER
- WET PRAIRIE



N

W E

S

1 inch = 900 feet

NOTES:

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2015.

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. (BOCO) HAS NOT OBTAINED THE RIGHT OF ENTRY (ROE) WILL NOT BE SUBJECT TO THE SEISMIC SURVEY.

SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2016.

VEGETATION LAND COVER DATA PROVIDED BY THE NATIONAL PARK SERVICE NOVEMBER 2013.

REVISIONS	DATE

DRAWN BY	H.H.	DATE	10/8/15
DESIGNED BY	A.W.	DATE	10/8/15
REVIEWED BY	A.W.	DATE	10/8/15

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NOBLES GRADE 3-D

SOURCE AND RECEIVER POINTS WITH NATIONAL PARK SERVICE LAND COVER DATA

DRAWING No. 13BOC2197

SHEET No. EXHIBIT D2

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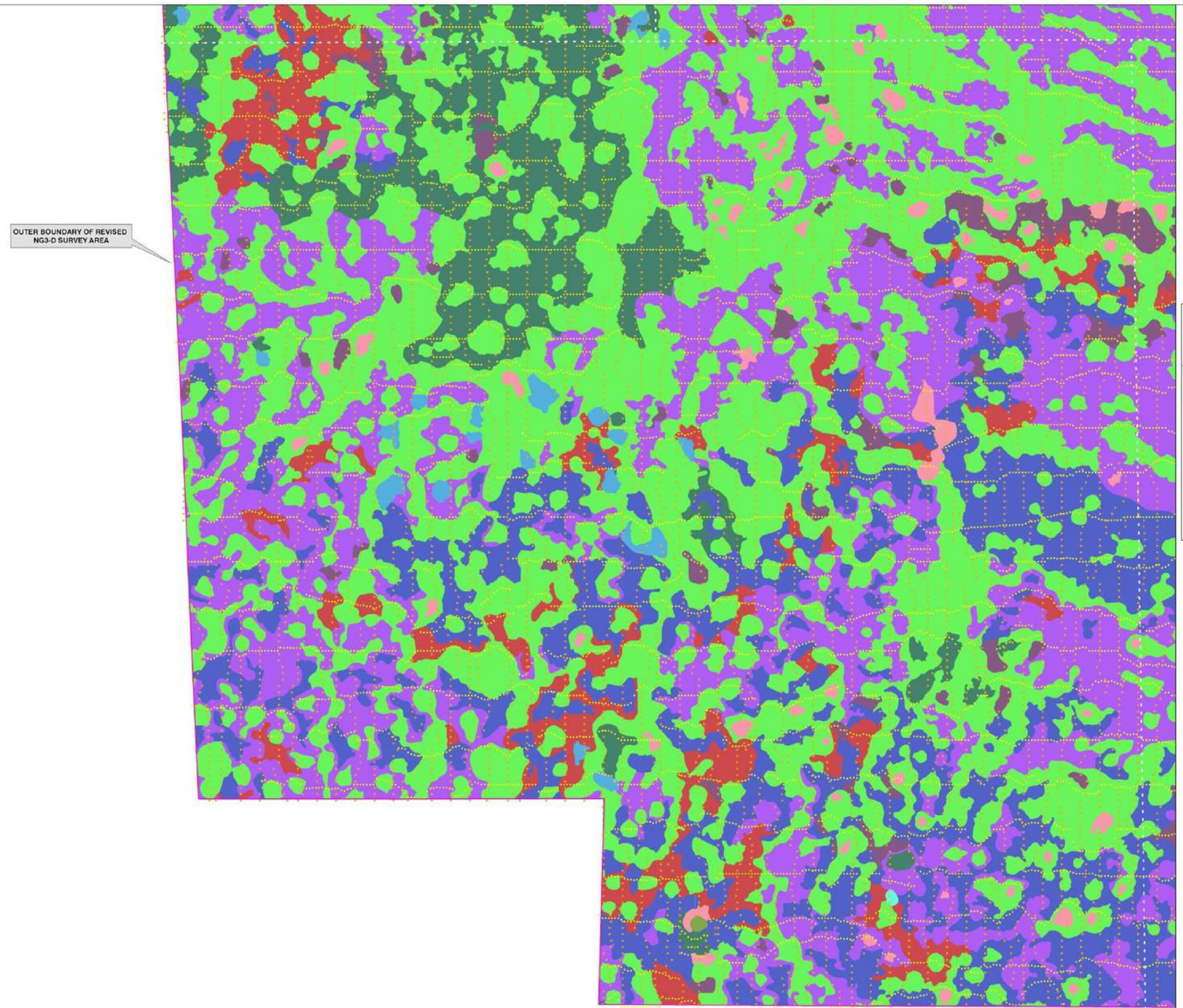
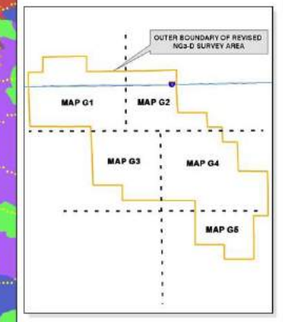


LEGEND

- Outer Boundary of Revised NG3-D Survey Area
- Receiver Points
- Source Points
- 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 = 800 feet

NOTES:

OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA WAS PROVIDED BY DAWSON GEOPHYSICAL COMPANY NOVEMBER 2014.

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SOURCE AND RECEIVER POINTS WITH
NATIONAL PARK SERVICE LAND COVER DATA

DRAWING No. 13BOC2197

SHEET No. EXHIBIT D3

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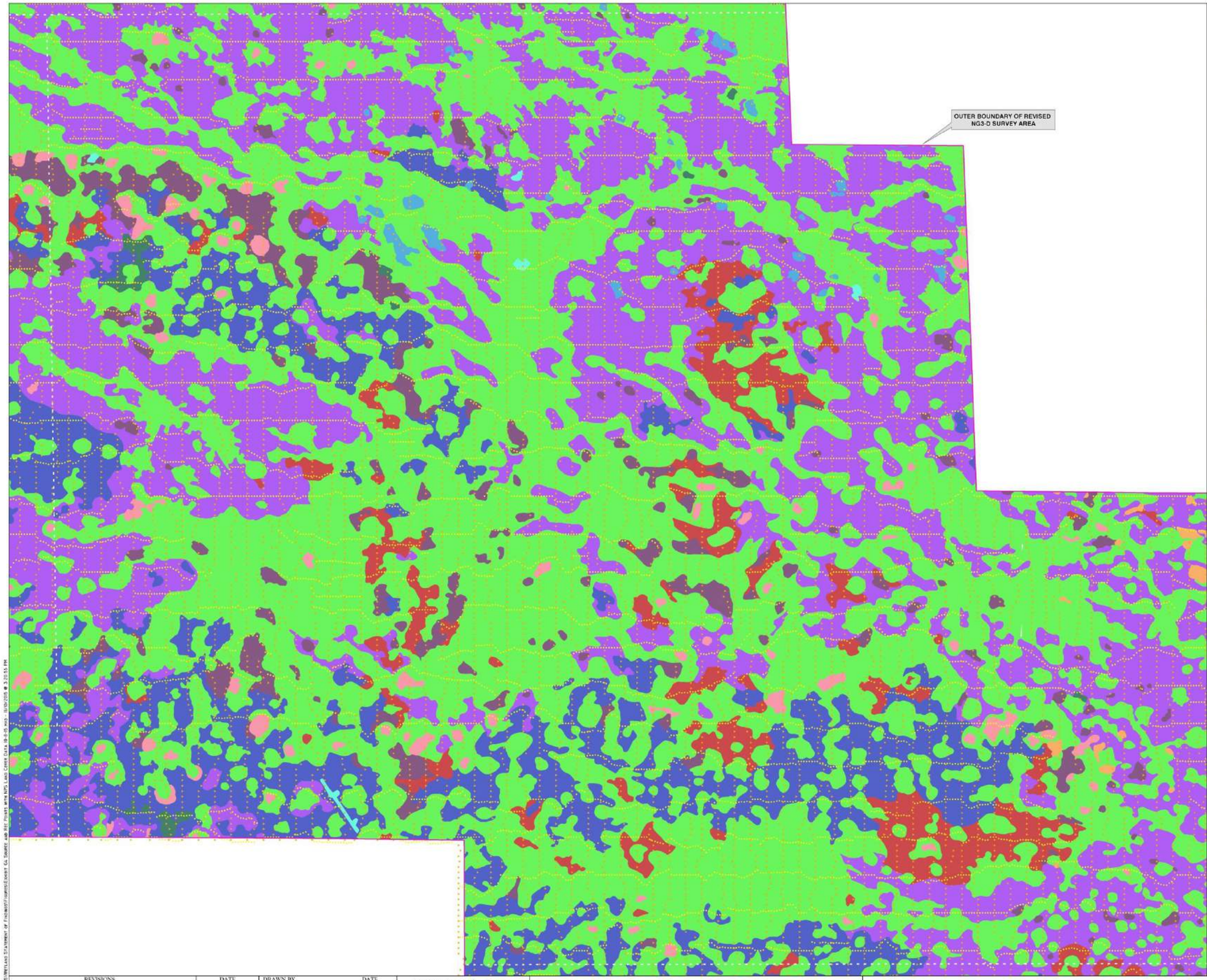
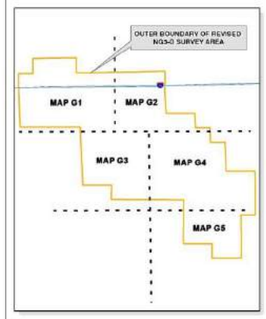


LEGEND

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- RECEIVER POINTS
- SOURCE POINTS
- CYPRESS FOREST
- DISTURBED
- HYDRIC HAMMOCK
- HYDRIC PINE FLATWOOD
- MARSH
- MESIC HAMMOCK
- MESIC PINE FLATWOOD
- SCRUB CYPRESS
- SWAMP FOREST
- WATER
- WET PRAIRIE



N
W E
S

1 inch = 900 feet

NOTES:

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.

VEGETATION LAND COVER DATA PROVIDED BY THE NATIONAL PARK SERVICE NOVEMBER 2013.

REVISIONS	DATE

DRAWN BY	H.H.
DATE	10/8/15
DESIGNED BY	A.W.
DATE	10/8/15
REVIEWED BY	A.W.
DATE	10/8/15

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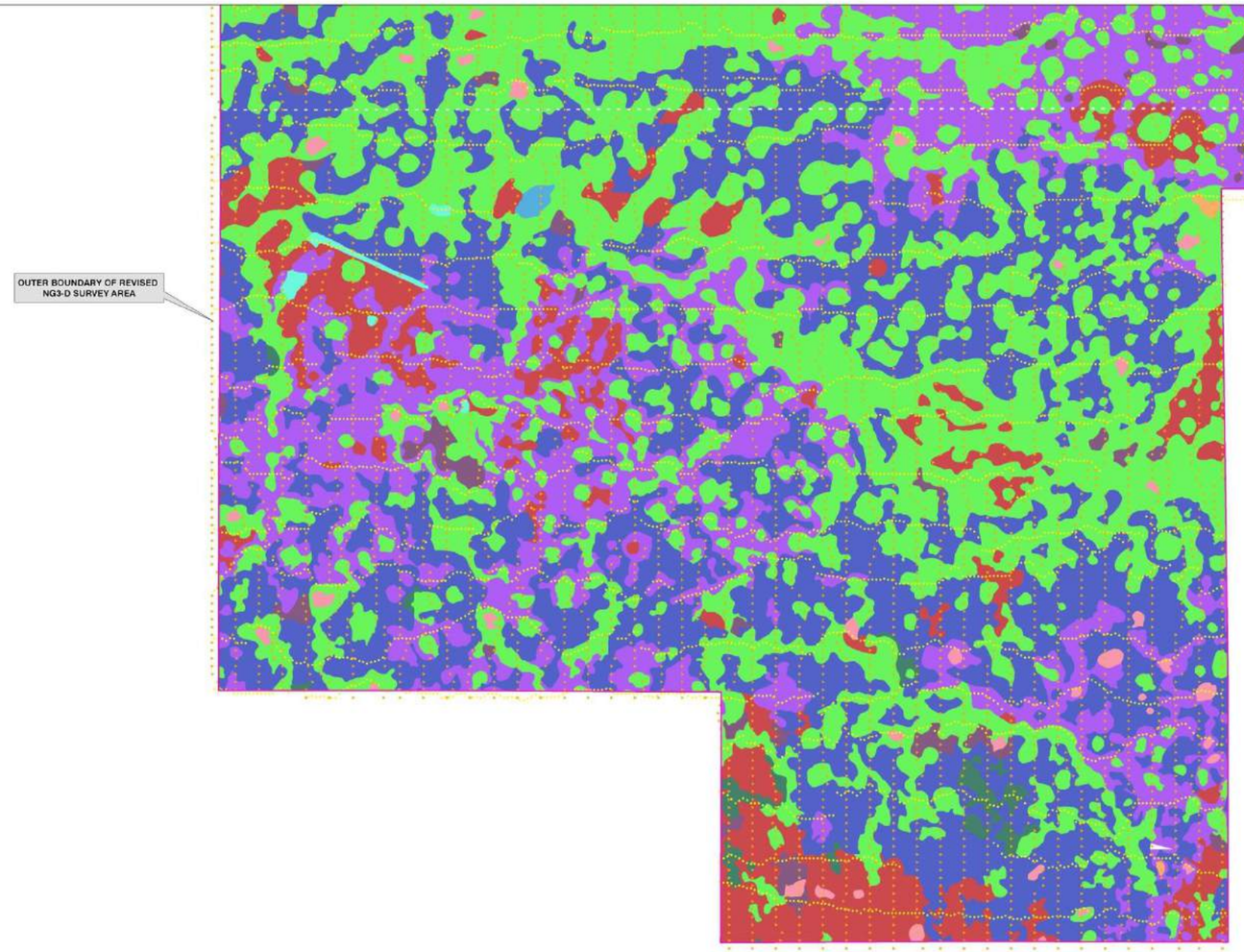
SOURCE AND RECEIVER POINTS WITH NATIONAL PARK SERVICE LAND COVER DATA

DRAWING No. 13BOC2197

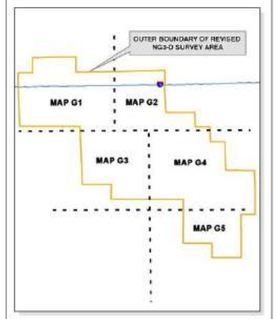
SHEET No. EXHIBIT D4

J:\2013\13BOC2197\GIS\JOB\WETLAND STATEMENT OF FINDING\FIGURES\Exhibit G4_SOURCE and REC Points with NPS Land Cover Data (8-8-8).mxd - 8/30/2016 @ 3:30:55 PM



LEGEND

- OUTER BOUNDARY OF REVISED NG3-D SURVEY AREA
- RECEIVER POINTS
- SOURCE POINTS
- 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 = 900 feet

NOTES:

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SOURCE AND RECEIVER POINTS WERE ACQUIRED FROM DAWSON GEOPHYSICAL AUGUST 2014.

VEGETATION LAND COVER DATA PROVIDED BY THE NATIONAL PARK SERVICE NOVEMBER 2013.

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		H.H.	10/8/15
		DESIGNED BY	DATE
		A.W.	10/8/15
		REVIEWED BY	DATE
		A.W.	10/8/15

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SOURCE AND RECEIVER POINTS WITH NATIONAL PARK SERVICE LAND COVER DATA

DRAWING No. 13BOC2197

SHEET No. EXHIBIT D5

J:\2013\13BOC2197\GIS\MXD\NEW LAND STATEMENT OF FINDINGS\FIGURES\EXHIBIT D5 SOURCE AND REC POINTS WITH NPS LAND COVER DATA 10-8-15.MXD - 11/07/2015 @ 3:28:28 PM