PRELIMINARY EVALUATION OF POTENTIAL EFFECTS OF SEISMIC SURVEYING FOR OIL AND GAS IN AND NEAR THE BIG CYPRESS NATIONAL PRESERVE ON THE FLORIDA PANTHER

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I. Executive Summary

Endangered Florida panther habitat is currently under threat by oil exploration and other development in and near the Florida Everglades. The Burnett Oil Company, Inc. has begun its first phase of oil exploration within 110-square miles of the Big Cypress National Preserve (hereinafter, "Big Cypress" or "Preserve") using 33-ton "vibroseis" vehicles to generate seismic signals to map oil and gas beneath the surface. This seismic exploration is negatively affecting "primary zone" habitats, which are habitats essential for the survival of the endangered Florida panther. Impacts primarily resulted from vibroseis vehicles and other vehicles driving off-road through wetlands, damaging mature cypress trees and other vegetation, causing extensive soil rutting and compaction, leading to changes to localized hydrology. Seismic survey crews also cut down cypress trees in the paths of the vibroseis vehicles. Seismic survey activities are impacting the habitat quality for panthers by fragmenting and degrading natural plant compositions, in turn making the impacted areas less suitable for habitation. Panther dens are not being adequately mapped within the seismic survey area and any dens which have been identified do not have adequate protection based on the recommended amount of buffer area between seismic survey activities and dens. Additionally, the potential for the dispersal of and impacts to the panther's prey species may reduce the amount of food available to panthers. Avoidance of the seismic survey area in Big Cypress by panthers may result in more frequent crossings of roads, putting panthers at increased risk for death or injury by vehicular collision. Impacts to panther habitat caused by the oil exploration have not been restored or mitigated as of the date of this report.

Furthermore, federal and state agencies have not analyzed the cumulative effects of other development projects taking place in nearby panther habitat along with the impacts caused by the ongoing oil exploration in Big Cypress. These cumulative impacts include another seismic survey proposed for private and state lands containing panther habitat located immediately to the north of Big Cypress, including parts of the Dinner Island Ranch Wildlife Management Area. The impacts of development activities taking place in and near Big Cypress have not been analyzed, and, thus, the full nature and extent of the impacts of the oil exploration and surrounding development on Florida panthers and their habitats is unknown and should be evaluated.

II. Background

The U.S. Fish and Wildlife Service (USFWS) originally listed the Florida panther (*Puma concolor coryi*) as an endangered species in 1967 and remains one of the most endangered mammals in the eastern United States, with an estimated population of 120 to 230 individuals.[1] Florida panthers have faced an uphill battle after their numbers declined to as few as 20 to 30 individuals in the 1970s and early 1980s.[2] USFWS published the first version of the Florida Panther Recovery Plan in 1981 and has since revised it three times, the last time in 2008.[3] This plan sets forth goals to maintain, restore, and expand the panther population and its habitat, and expand the breeding population in South Florida.[4] Yet there are numerous threats to its survival, including vehicular collisions, inbreeding, increased competition for food and territory, and habitat loss due to mining, agriculture, residential development, and oil and gas activities, including in Big Cypress.[5] The Florida Panther Recovery Plan states that the federal government should only consider reclassifying this species to a "threatened" status if two viable populations of at least 240 adults and sub-adults are sustained for at least 12 years, and should only consider "delisting" if three viable populations of at least 240 adults and sub-adults are sustained for at least 12 years, along with other factors related to habitat and corridor connections.[6] The current population estimate of 120 to 230 Florida panthers is not enough to even constitute one viable population.

The Florida Panther Habitat Preservation Plan identifies about 926,000 acres of habitat considered essential to maintaining a minimum viable population of panthers in South Florida. About 582,000 of these acres are located within Big Cypress, representing approximately 63 percent of the designated essential habitat.[7] *See* Figure 1 for a map of Florida Fish and Wildlife Conservation Commission (FWC) panther occurrence data points in and around Big Cypress. The Burnett Oil Company, Inc. has targeted panther habitat in the Preserve for new oil exploration. While some oil development has taken place in discrete portions of the Preserve, developers have targeted new areas

[1] Florida Fish and Wildlife Conservation Commission, Determining the Size of the Florida Panther Population (2017), http://myfwc.com/media/4156723/DeterminingPantherPopulation2017.pdf.
[2] *Id.* at 1.
[3] U.S. Fish and Wildlife Service, *Florida Panther Recovery Plan*, Third Revision at I (2008), https://www.fws.gov/uploadedFiles/Panther%20Recovery%20Plan.pdf.
[4] *Id.* at ix.
[5] *Id.* at viii.
[6] *Id.* at x.
[7] U.S. Fish and Wildlife Service, *Florida Panther Habitat Preservation Plan: South Florida Population* (1993), http://www.mountainlion.org/us/fl/FL-A-USFWS-Logan-et-al-1993-Florida-Panther-Habitat-Preservation-Plan-South-Florida-Population.pdf.

for exploration. The first phase of four planned phases of exploration began in 2017 using 33-ton vibroseis vehicles to generate seismic signals to map the oil and gas beneath the surface. The vibroseis vehicles are accompanied by other off-road vehicles, helicopters and survey crews.[8] These vehicles drive off-road through wetlands in the Preserve, damaging mature cypress trees and other vegetation, causing extensive soil rutting and compaction, and changes in hydrology.[9,10] *See* Appendix A for photographs of this damage. These impacts will be difficult, if not impossible, to restore. Impacts are likely to affect Florida panther movements, as panthers will likely avoid the impacted areas.

III. Habitat Fragmentation and Degradation within the Preserve

Seismic survey activities in Big Cypress are impacting the habitat quality for Florida panthers and other wildlife by fragmenting and degrading natural plant compositions in cypress swamps. Paths created by seismic surveys fragment forests, resulting in decreasing the size and increasing the number of forest patches.[11] Florida panthers prefer to live in contiguous areas of undeveloped land, especially forested cover types such as cypress swamps, which are one of the most preferred land cover types of panthers.[12] Plant community compositions are altered along seismic survey lines,[13] and off-road vehicles can be dispersers of invasive plant species.[14] Introduction of invasive plants can result in monocultures that outcompete native plants and decrease overall diversity, resulting in less desirable forage and cover for panthers and prey. There is also a slow recovery period (40+ years) of vegetation regrowth after seismic surveys, leading to long-term fragmentation and changes in movement patterns

[8] Burnett Oil Co., Inc. *et al*., *Nobles Grade 3-D Seismic Survey, Big Cypress National Preserve and Big Cypress National Preserve Addition Plan of Operations* (Dec. 2014), http://parkplanning.nps.gov/document.cfm?parkID=352&projectID=53498&documentID=66527.
[9] National Park Service, *Revised Environmental Assessment for a Proposed Oil and Gas Plan of Operation: Nobles Grade 3-D Seismic Survey within Big Cypress National Preserve proposed by Burnett Oil Company, Inc*. (2016) (hereinafter, "Revised EA"), https://parkplanning.nps.gov/document.cfm?parkID=352&projectID=53498&documentID=71803.
[10] Quest Ecology. Seismic Survey Inspection Report Big Cypress National Preserve (May 2018), https://assets.nrdc.org/sites/default/files/seismic-survey-inspection-big-cypress-20180531.pdf?_ga=2.64474735.1368414805.1534966676-1336211018.1533580820.
[11] Pattison, Colin A., *et al.* "The landscape impact of linear seismic clearings for oil and gas development in boreal forest." Northwest Science 90.3 (2016): 340-354.
[12] Kautz, R., et al. 2006. How much is enough? Landscape-scale conservation for the Florida panther. Biological Conservation 130:118–133.
[13] Kemper, J. Todd, and S. Ellen Macdonald. "Directional change in upland tundra plant communities 20-30 years after seismic exploration in the Canadian low-arctic." Journal of Vegetation Science 20.3 (2009): 557-567.
[14] Von Der Lippe, M. and Kowarik, I. 2007, Long-Distance Dispersal of Plants by Vehicles as a Driver of Plant Invasions. Conservation Biology, 21: 986-996. doi:10.1111/j.1523-1739.2007.00722.x.

and prey locating techniques in large mammals.[15]

Observations made following seismic survey activities in Big Cypress in 2017 revealed that cypress trees were cut down to make way for the vibroseis vehicles. The vehicles themselves damaged cypress trees and ran over and flattened cypress trees and other vegetation. Additionally, the large weight of the vibroseis vehicles rutted and compacted soils, leading to altered hydrology and plant compositions.[16] *See* Appendix A. Yet the USFWS assumed in its concurrence letter for Burnett Oil Company's seismic survey that "…[t]he project will result in limited impacts to vegetation during the establishment of transect line and buggy access paths, and it will not result in permanent habitat loss for the panther."[17] However, observations made after the seismic survey activities commenced have shown that the impacts to vegetation were not "limited" and it is likely that cypress forests in the Preserve will suffer long-term fragmentation by the seismic survey lines created, in turn making the habitat less optimal for Florida panthers and their prey species.

IV. Avoidance, Vehicular Mortalities, and Destruction of Nearby Habitat

In the revised environmental assessment for the Phase I seismic survey in Big Cypress, the National Park Service (NPS) assumed that Florida panthers would display avoidance behaviors when in the vicinity of seismic survey activities, arguing that since panthers are nocturnal and survey activities occur during the day, seismic operations would not disturb them.[18] However, the NPS failed to provide any scientific or technical analysis determining the distances at which Florida panthers could hear the noise caused by vibroseis vehicles and other off-road vehicles and helicopters, or feel the seismic vibrations generated by the vibroseis vehicles.

Avoidance of the seismic survey area may result in panthers crossing roads more frequently, putting them at increased risk for death or injury by vehicular collision. Vehicular collisions are a leading cause of panther deaths, with 24 vehicle-caused mortalities since the beginning of 2018 as of

[15] Dabros, A., *et al*. "Seismic lines in the boreal and arctic ecosystems of North America: environmental impacts, challenges, and opportunities." Environmental Reviews, 26.2 (2018): 214-229.
[16] Quest Ecology, Seismic Survey Inspection Report Big Cypress National Preserve (May 2018), https://assets.nrdc.org/sites/default/files/seismic-survey-inspection-big-cypress-20180531.pdf?_ga=2.64474735.1368414805.1534966676-1336211018.1533580820.
[17] Revised EA, *supra* note 9 at Appendix C (Letter of U.S. Fish and Wildlife Service to Big Cypress National Preserve re: Burnett Oil Co. Inc., Nobles Grade 3-D Seismic Survey (Feb. 25, 2015).
[18] *Id*. at 85.

October 10, 2018.[19] While the NPS asserted that access points to the seismic survey area would be secured to prevent panthers from breaching Interstate 75 (I-75) wildlife fencing,[20] it failed to provide an analysis of the increased motor vehicle and off-road vehicle traffic induced by the oil exploration on roads and trails both within and located adjacent to the Preserve. The NPS also failed to propose or analyze any additional measures that could be taken in order to prevent panthers from crossing roads other than I-75, which are located adjacent to or within the Preserve, such as US-41 (Tamiami Trail), State Road 29 (an especially deadly road for panthers), and internal roads in the Preserve, which panthers are likely to cross to avoid disturbance related to the seismic survey activities.

Additionally, the NPS has not adequately considered the cumulative effects of other development projects in nearby panther habitat on panthers and their habitats, which will no longer be available for use by panthers for retreat and solitude. Currently, at least ten major development projects are being proposed or are being constructed in nearby panther habitat, including the Florida Power and Light Hendry Clean Energy Center, the widening of State Road 82, State Road 29 and Snake Road, the Immokalee Sand Mine, and five large residential communities (Rural Lands West, WildBlue, Corkscrew Farms, Babcock Ranch, and Corkscrew Crossing). Further, the Eastern Collier County Multiple Species Habitat Conservation Plan proposes to allow 45,000 acres of mining and urban development within the Collier County Rural Land Stewardship Area.[21]

Adjacent to the Preserve, Tocala, LLC, has applied to the state to explore for oil on private lands and on parts of the state-managed Dinner Island Ranch Wildlife Management Area. Tocala, LLC proposes to use explosives to generate seismic signals.[22] This proposed seismic survey is located only 3.7 miles north of the seismic survey area in Big Cypress in known panther habitat. Nonetheless, the NPS failed to evaluate the cumulative impacts of both of these seismic surveys on the Florida panther in its environmental analysis of Burnett Oil Company's seismic activities, stating "[t]he Tocala survey is miles from the Preserve, is on privately owned ranchland, has no effects on Preserve resources, and

[19] Florida Fish and Wildlife Conservation Commission. Panther Pulse (2018), http://myfwc.com/wildlifehabitats/managed/panther/pulse/ (last visited October 15, 2018).
[20] Revised EA, *supra* note 9 at 88.
[21] U.S. Fish and Wildlife Service. Eastern Collier Multiple Species Habitat Conservation Plan (2016), http://easterncollierhcpeis.com/.
[22] Tocala, LLC, Florida Department of Environmental Protection Application for Permit to Perform Geophysical Exploration Permit No. G-174-17 (2017), which can be viewed at: https://floridadep.gov/water/oil-gas/content/current-applications.

thus should not be included in the cumulative impacts analysis."[23] However, the panthers documented in the seismic survey area proposed by Tocala, LLC, are from the same population, and it is likely that this additional seismic survey will further disrupt panther movements and degrade its habitat.

V. Denning

In the revised environmental assessment for the first phase of oil exploration in Big Cypress, the NPS acknowledges that the seismic survey could have an effect on Florida panther behavior and denning but claim mortality or injury would be highly unlikely to occur.[24] The NPS fails to analyze whether juvenile panther mortality would occur due to den abandonment. Instead, it asserts that female panthers have not been observed to abandon dens after visits from researchers,[25] but make no mention of whether this theory also applies to large scale disturbances involving the operations of vibroseis vehicles and other off-road vehicles, and helicopters, in the vicinity of dens. Notably, panther kittens have spotted coats for camouflage,[26] so they would be difficult to see during seismic survey operations. The NPS acknowledges that the seismic survey activities overlap with the panther's denning period in late spring,[27] but fail to evaluate any alternative to conducting seismic survey activities within this timeframe. During the denning period the home range of mother panthers is restricted greatly by their need to protect and to nurse their kittens.[28] However, NPS failed to analyze the impacts associated with mothers abandoning their dens in response to seismic survey activities.

The NPS claims in the revised environmental assessment for the first phase of oil exploration in Big Cypress that, "since the survey activities would not take place within impenetrable vegetation, Florida panther dens would not be expected to be directly impacted."[29] Based on the analyses of the damage caused by the Burnett Oil Company's seismic survey activities conducted thus far, seismic survey crews cut down vegetation within the chosen paths of the vibroseis vehicles. Thus, panther dens could be destroyed or driven over by off-road vehicles if they are not identified in advance of seismic

[23] Revised EA, *supra* note 9 at Selected Comments and NPS Responses on the Nobles Grade 3-D Seismic Survey EA, Comment Number 6.
[24] *Id.* at 87.
[25] *Id.*
[26] U.S. Fish and Wildlife Service. Florida Panther (Puma concolor coryi). (2018). https://www.fws.gov/refuge/florida_panther/wah/panther.html.
[27] Revised EA, *supra* note 9 at 87.
[28] S. Maehr, David & Darrell Land, E & C. Roof, Jayde & Mccown, J. (1989). Early Maternal Behavior in the Florida Panther (Felis concolor coryi). American Midland Naturalist. 122. 34. 10.2307/2425680.
[29] Revised EA, *supra* note 9 at 87.

survey activities within chosen seismic survey lines. The NPS goes on to state that "meetings would be held with NPS and FWC panther experts to determine potential denning areas within the vicinity of the survey area during the survey operations. BOCI [Burnett Oil Company] or designated representatives would contact NPS and FWC biologists regarding the monitoring of radio-instrumented panthers in and around the survey area. If monitoring suggests panthers are denning in or near the survey routes, appropriate actions would be taken as recommended by NPS and FWC staff."[30] However, not all panthers in the Preserve wear radio collars, thus, it is likely that seismic survey crews will not know the locations of all panther dens, specifically those of uncollared panthers, in or near the Phase I seismic survey area in advance of conducting seismic survey-related activities. Further, NPS only requires a panther den buffer between dens and seismic survey activities of approximately 100-200 meters.[31] However, another study recommended that a buffer of approximately 1 kilometer should be established for known panther dens in order to decrease the likelihood of den or litter abandonment.[32] It is unclear why NPS did not require the Burnett Oil Company to implement the more protective buffer.

VI. Effects on Panther Prey Species

The NPS failed to evaluate how seismic surveys affect panther prey species, and in turn food availability for Florida panthers. A study on the effects of seismic surveys on pygmy rabbits in Utah found that burrow entrances collapsed if they were directly hit by the tire or shaker pad of a vibroseis truck, and burrow entrance heights were reduced due to sloughing.[33] Similarly, rabbits and other mammals, including burrowing mammals such as the armadillo, are known prey items of Florida panthers and could be adversely affected by vibroseis vehicles. Other panther prey species, like the white-tailed deer, may also be affected by the human presence and loud activities associated with seismic survey vehicles and regular helicopter operations.[34] Damaging burrows and scaring off prey species will reduce the amount of food available to the panthers, making areas impacted by seismic survey activities less suitable for panther habitation.

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[30] *Id.*
[31] *Id.*
[32] Stephen E. Davis III, et al., "Oil and Gas Impacts in the Big Cypress Ecosystem: An Analysis of Impacts Associated with Proposed Activities in the Nobles Grade Area" (2010) at 157, https://www.evergladesfoundation.org/wp-content/uploads/sites/2/2017/12/Report-Oil-Gas-Impacts-Reduced.pdf.
[33] Wilson, Tammy L. "Effects of seismic exploration on pygmy rabbits." Natural Resources and Environmental Issues 17 (2011): 55.
[34] Stankowich, T. Ungulate flight responses to human disturbance: a review and meta-analysis. (2008) Biol. Conserv. 141, 2159–2173.

VII. Panther Focus Area and Panther Habitat Units (PHUs)

Section 9 of the Endangered Species Act (ESA) prohibits activities that "take" or negatively impact panthers. For example, impacts to panthers or their habitat that affect their essential behaviors and abilities to hunt, breed, or find shelter are prohibited absent a permit authorizing such take. The USFWS developed the Panther Habitat Assessment Method to measure the ecological value of panther habitat within the Panther Focus Area and uses it to determine how much compensation is required for habitat loss in this area. The Panther Focus Area consists of land important to the Florida panther, including the primary, secondary and dispersal zones. These zones are used as indicators of the level and type of panther usage in a particular location. Big Cypress is located in the panther's primary zone, which is defined as "all lands essential for the survival of the Florida panther in the wild."[35] *See* Figure 2 for a map of USFWS Florida Panther Focus Areas.

USFWS uses Panther Habitat Units (PHUs) to quantify the functional value of specific areas within the Panther Focus Area. When panther habitat in the Panther Focus Area is destroyed, habitat elsewhere in the Panther Focus Area must be permanently protected as mitigation to compensate for the loss of habitat. This habitat must have an equal PHU value as the habitat that was destroyed.[36] PHUs can be secured by permanently protecting lands containing panther habitat and performing land management and restoration activities. PHUs can also be purchased from Habitat Conservation Banks, which are privately owned and protect, restore, and manage strategically important Florida panther habitat in perpetuity.[37] There are currently three Habitat Conservation Banks with PHUs for purchase: Florida Panther Conservation Bank I, Florida Panther Conservation Bank II, and Panther Passage Conservation Bank.

In Quest Ecology's May 2018 Seismic Survey Inspection Report for Phase I seismic activities in Big Cypress, it was estimated that at least 225,896 linear feet (42.8 miles) of seismic survey lines were created in the Preserve by the Burnett Oil Company, as of May 27, 2017. It is important to note that this impact assessment is conservative, and the impacts have increased since 2017 because the Burnett Oil Company resumed seismic exploration in Big Cypress in 2018. The oil company has also

[35] Florida Fish and Wildlife Conservation Commission. Panther Habitat Zones (2018), http://geodata.myfwc.com/datasets/panther-habitat-zones-florida.
[36] U.S. Fish and Wildlife Service. Panther Habitat Assessment Methodology (2012), https://www.fws.gov/verobeach/MammalsPDFs/20120924_Panther%20Habitat%20Assessment%20Method_Appendix.pdf.
[37] University of Florida. Government Efforts to Protect Habitat for the Florida Panther on Private Lands (2016), http://edis.ifas.ufl.edu/uw413.

expressed interest in continuing seismic exploration of Phase I during the upcoming 2018-2019 dry season. Therefore, the full nature and extent of the impacts on panther habitat in Big Cypress is unknown.

Based on conservative estimates of the damage caused by the 2017 seismic survey activities, using the typical minimum seismic survey line widths of 12 and 15 feet measured by Quest Ecology in the Preserve, the minimum area impacted from the Burnett Oil Company's seismic survey lines as of May 2017 is at least 62.2 acres. This minimum impact acreage is not all-inclusive because it does not account for areas where seismic survey lines were greater than 15 feet wide. Seismic survey lines greater than 15 feet wide were occasionally observed in Big Cypress and appeared to occur as a result of vibroseis vehicles getting stuck in soft wetland soils and turning around. Most of these impacts occurred in previously roadless areas through high quality wet prairie and dwarf cypress strand wetland communities. *See* Appendix A.

Quest Ecology calculated the number of PHUs needed to compensate for the estimated 62.2 acres of primary zone panther habitat impacted by the Burnett Oil Company's seismic activities in the Preserve as of May 27, 2017. This estimate is conservative, as the number of PHUs required to compensate for the loss of panther habitat will be higher since additional seismic surveying impacts occurred in Big Cypress in 2018 and are likely to continue into 2019. PHUs are calculated based on habitat suitability values, which are used as a numerical indicator of a habitat's importance to panthers. These values range between 0 and 10, with higher habitat suitability values indicating higher likelihood of use by panthers. To calculate the PHUs within the impact areas *before* the seismic survey activities began, the 62.2 acres of seismic survey impacts was multiplied by 9.2 (the habitat suitability value for cypress swamp), which resulted in 572.2 PHUs. To calculate the PHUs within the impact areas *after* the seismic activities began, the 62.2 acres of seismic survey impacts was multiplied by 3 (the habitat suitability value for disturbed lands), which resulted in 186.6 PHUs. To calculate the loss of PHUs due to seismic survey activities, the post-survey PHUs (186.6) was subtracted from the pre-survey PHUs (572.2), resulting in a loss of 385.6 PHUs. Next, this value (385.6 PHUs) was multiplied by the USFWS defined base ratio (2.5), which accounts for the amount of primary zone equivalent habitat that must be protected to offset the ongoing loss of panther habitat in the Preserve from seismic activities, which resulted in 964 PHUs. This means that the Burnett Oil Company must provide compensation for at least 964 PHUs to compensate for impacts to primary zone panther habitat from its 2017 seismic survey activities. This compensation can be fulfilled by purchasing PHUs from a Habitat Conservation

Bank or generating the required PHUs by permanently conserving lands containing Florida panther habitat.

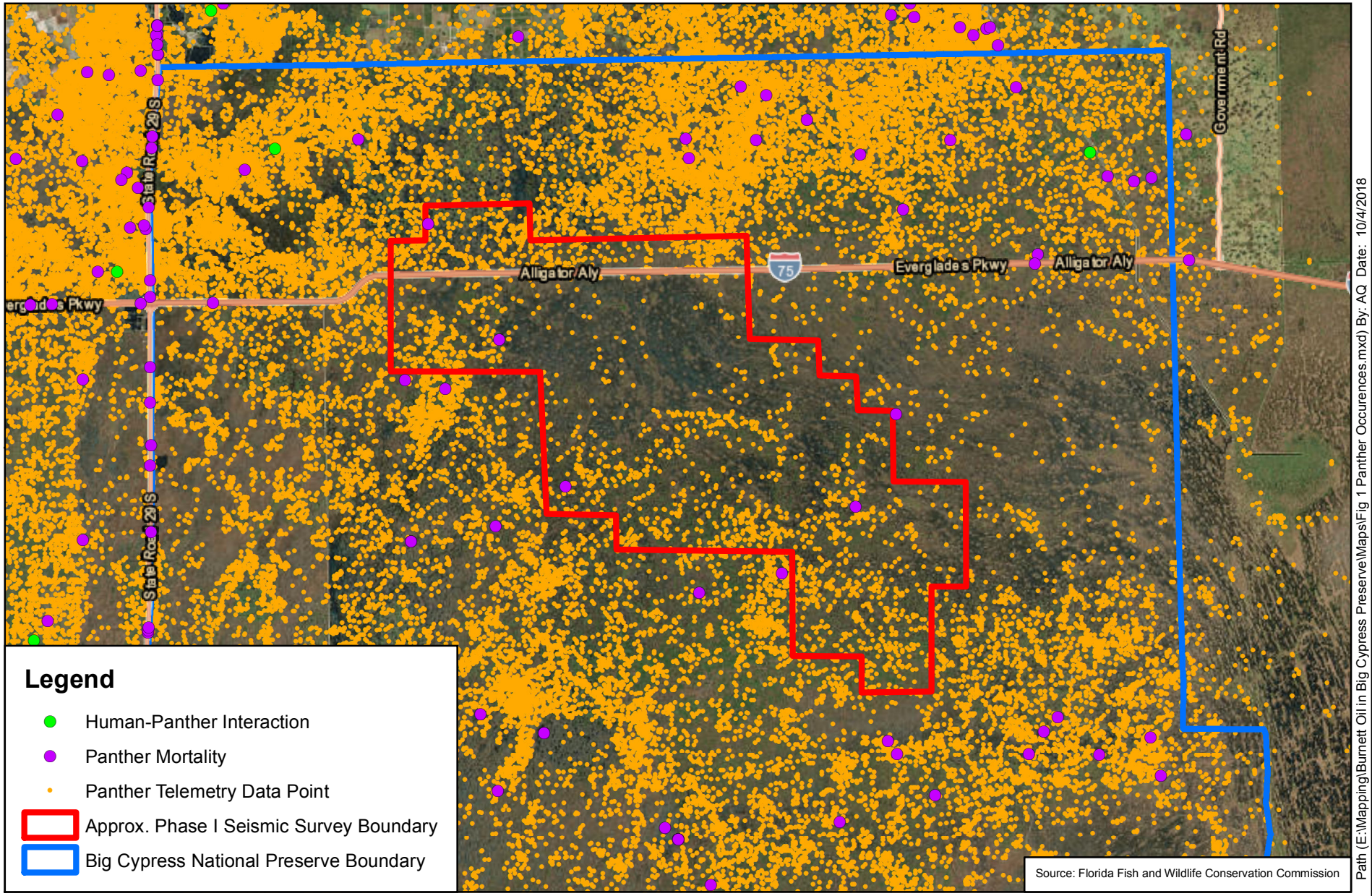
In the event compensation is proposed in the Florida panther's secondary zone habitat instead of primary zone habitat, a "Landscape Compensation Multiplier" must be applied. Since lands in the primary zone are more important to panthers than the secondary zone, more land must be protected in the secondary zone to compensate for impacts to panther habitat in the primary zone. In this case, 964 PHUs is multiplied by a landscape compensation multiplier of 1.45 to get 1,397.8 PHUs. As described above, the Burnett Oil Company must permanently preserve adequate panther habitat to generate the needed PHUs or purchase PHUs from a Habitat Conservation Bank to compensate for losses to panther habitat in Big Cypress. To date, Quest Ecology has not been provided with any proposed PHU assessments to compensate for or mitigate the impacts to Florida panther habitat caused by Phase I of the Burnett Oil Company's oil exploration in Big Cypress.

VIII. Conclusion

The Phase I seismic survey impacts in the Preserve documented in this report and Quest Ecology's May 2018 report reveal that the Burnett Oil Company destroyed primary zone Florida panther habitat. Further, the NPS and USFWS underestimated the nature and extent of anticipated impacts to panthers and their habitat from the Burnett Oil Company's Phase I seismic survey activities and failed to consider the cumulative impacts of these seismic survey activities together with the impacts of another nearby seismic survey proposal and surrounding development of panther habitat. Further, the Burnett Oil Company failed to restore the impacts to panther habitat in Big Cypress, and to date, has not provided compensation or mitigation for this damage by providing compensatory PHUs.

The Burnett Oil Company must fully restore the damage it caused to panther habitat in the Preserve and demonstrate its ability to achieve defined restoration success criteria for affected panther habitat. Additionally, NPS and USFWS must reinitiate consultation on Phase I of the oil exploration and compel the Burnett Oil Company to provide compensation or mitigation for the loss in primary zone panther habitat, which could include the purchase of PHUs from a Habitat Conservation Bank or generating the required PHUs by permanently conserving lands containing Florida panther habitat. Finally, the NPS should not allow any additional seismic activities and undertake a supplemental review of the effectiveness and adequacy of the Minimization and Mitigation Measures to protect

Florida panthers and other Preserve resources from seismic survey activities to prevent further damage to panther habitat in the Preserve.



Path (E:\Mapping\Burnett Oil in Big Cypress Preserve\Maps\Fig 1 Panther Occurences.mxd) By: AQ Date: 10/4/2018

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Figure 1 - Florida Panther Occurrence Records
Nobles Grade 3-D Seismic Survey (Burnett Oil Co., Inc.)
Natural Resources Defense Council
Big Cypress National Preserve, Florida

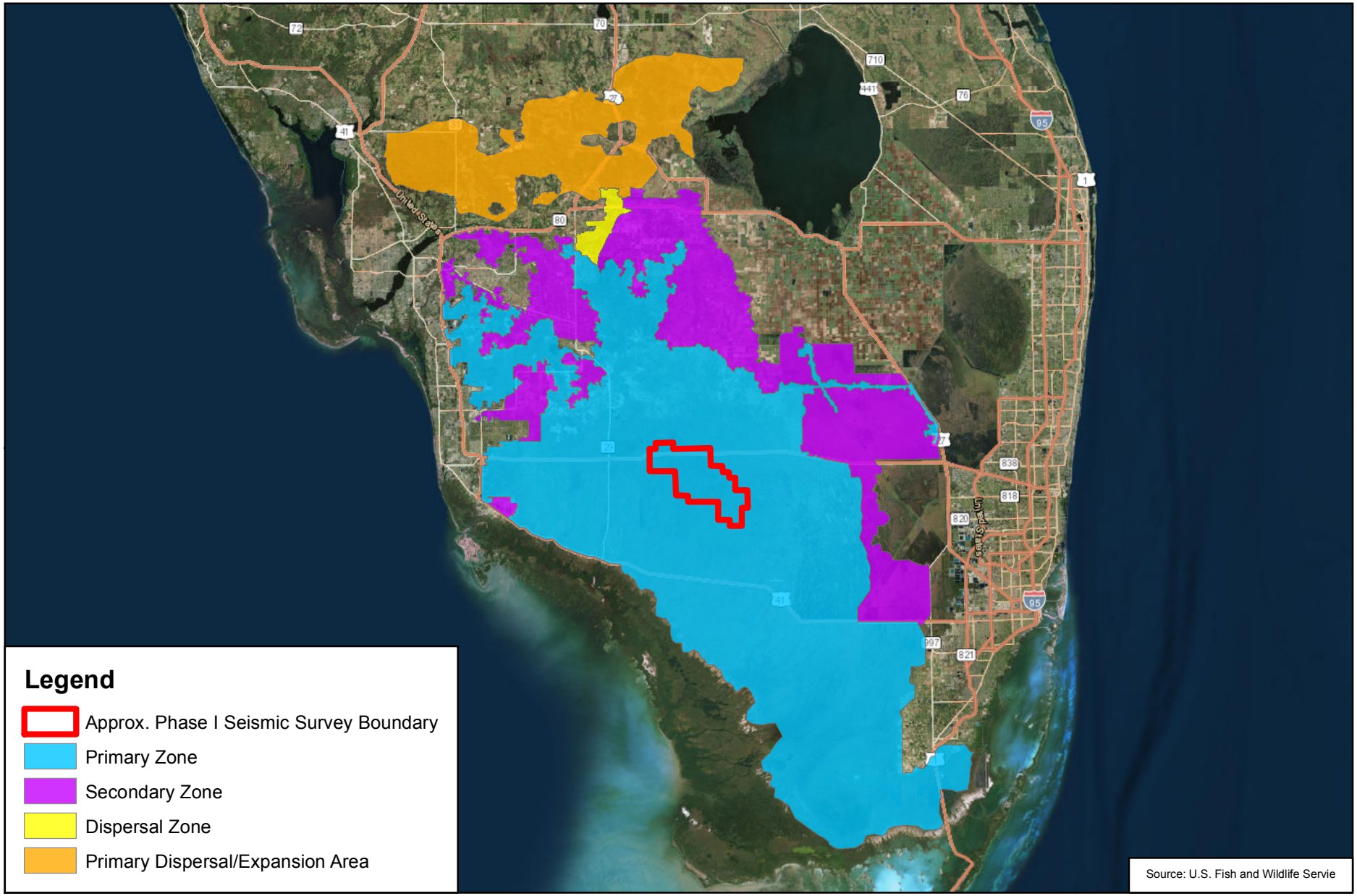

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Figure 2 - Florida Panther Focus Areas
Nobles Grade 3-D Seismic Survey (Burnett Oil Co., Inc.)
Natural Resources Defense Council
Big Cypress National Preserve, Florida

Photo 1: Five vibroseis vehicles staged in a cypress strand wetland.

Photo 2: Cypress tree cut down to make way for vibroseis trucks and rutting from tires.

Photo Credit: Inspection Team, April 26, 2018

Photo 3: Dwarf cypress measuring 4.3 inches dbh and estimated to be 150-200 years old which was cut down along a survey path.

Photo 4: Dwarf cypress stump measuring 40 inches (3.3 feet) in diameter, estimated to be > 330 years old, which was removed from a survey path.

Photo Credit: Inspection Team, April 26, 2018