

MEMORANDUM



QUEST
ecology

TO: Natural Resources Defense Council

FROM: Mary James, PWS, Senior Ecologist

SUBJECT: Comments on Turrell, Hall and Associates, Inc.'s 2019
Reclamation Monitoring Report – August 30th, 2019
Burnett Oil Company's Nobles Grade 3-D Seismic Oil and Gas Exploration
in the Big Cypress National Preserve

DATE: January 3, 2020

Quest Ecology Inc. (Quest) completed a desktop review of the 2019 Reclamation Monitoring Report (dated 8/30/19) prepared by Turrell, Hall and Associates, Inc (THA). The stated purpose of the THA report is to document Time-Zero reclamation conditions along approximately 91.1 miles of 'pathways' (seismic lines) created by Burnett Oil Company Inc.'s (BOCI) Nobles Grade 3-D Seismic Oil and Natural Gas Exploration within Big Cypress National Preserve (BCNP) in 2017 and 2018.

Our preliminary comments are summarized below according to corresponding sections of the report and may be supplemented at a later date.

2.0 SAMPLING METHODOLOGY

2.1 Monitoring Station Selection

a. The number of monitoring stations within each designated reclamation area is not proportional to the length of impacts reported for each reclamation area (See table on "Monitoring Station Tracking" Exhibit of THA report). If completion of reclamation, achievement of success criteria, potential release of Burnett Oil Company from further monitoring, and/or mitigation requirements are to be assessed on an area-by-area basis, the number of monitoring stations should be proportional to the length of impacted pathways in each reclamation area. Currently, 3 of the 21 reclamation areas (1, 2, and 13) have approximately one monitoring station established per 1 mile of impacts. The remaining 18 reclamation areas are either under-sampled or over-sampled.

b. The number and size of vegetation monitoring quadrats is insufficient to yield statistically significant results. THA collected disturbed vegetation data from a single 1 m² (~10.8 ft²) quadrat, which is used to purportedly represent approximately 1 mile of disturbed pathway (63,360 ft², based on a minimum pathway width of 12 feet). Therefore, each of THA's central/disturbed quadrats represents a maximum of ~0.02% of the associated impact area. In a 3/28/19 letter to the National Park Service, Acting Superintendent Laura Perdices, Big Cypress National Preserve, NRDC relayed Quest's recommendations that one monitoring station consisting of one impacted plot and one adjacent, undisturbed plot should be established for every 0.5 mile of impact, and that the disturbed vegetation monitoring plots should include the full width of the disturbed

pathway. Based on this recommended design, each impact plot would have captured approximately 5.5% of the associated impact area, which would yield a statistically significant comparison between impacted and adjacent plots.

c. This section states that monitoring stations will be surveyed twice per year (once at the beginning of the dry season and once at the end of the dry season) for a period of at least three years. Presumably, twice per year monitoring is intended to capture seasonal variations in hydrology and the appearance of ephemeral vegetation taxa. However, THA's Time-Zero monitoring data was collected during a single monitoring event, near the end of the dry season, when vegetative cover is presumably at or near the annual minimum. It is not clear how data to be collected twice per year during subsequent monitoring events will be combined and compared to this Time-Zero data collected during a single monitoring event. Also, it is not explicitly stated what criteria will be used to determine whether three years of monitoring will be sufficient, or if that decision will be based on individual reclamation areas or monitoring stations, or Burnett Oil Company's seismic survey area in its entirety.

2.3 Sampling Locations

This section does not state that monitoring station locations were recorded with GPS. GPS location and reporting of the latitude and longitude coordinates for each monitoring station should be a fundamental component of this Time-Zero and all subsequent monitoring reports.

2.5 Vegetation Sampling

a. The placement of the disturbed vegetation quadrat within the center of the pathway is extremely biased, and one of the most concerning aspects of this monitoring design. Based on our observations and prior reports, the center of the pathway, or seismic line, is the least-disturbed portion of the pathway because it was located between the vibroseis vehicle tires during the seismic surveys, and, therefore, was not subjected to the most severe soil rutting and compaction, and mortality of vegetation that occurred. Due to this differential in the severity of impacts, Quest recommended that the boundaries and size of the impact plot contain the full width of the impacted pathway, (including ruts, the central ridge between the tire tracks created by the vibroseis vehicles, and any ridges or disturbed soils on the outside of each rut caused by soil displacement or reclamation activities). This recommendation was relayed in NRDC's 3/28/19 letter to the National Park Service.

b. At each monitoring station, disturbed vegetative cover was assessed within a single 1 m² quadrat, while "adjacent", supposedly undisturbed vegetative cover was assessed at two, 1 m² quadrats. The THA report does not explain how data from a single disturbed quadrat will be compared to two undisturbed quadrats. In NRDC's 3/28/19 letter to the National Park Service, a simple paired plot design – one impact plot and one un-impacted plot – was recommended for each monitoring station. The establishment of two "adjacent" quadrats at each monitoring station by THA, suggests that the data from the impacted quadrat could be compared to either of the un-impacted quadrats. Disturbed and undisturbed plots should be equally represented at each monitoring station.

c. The vegetation sampling methods do not provide references for nomenclature used to identify taxa or discuss which system of wetland indicator status (federal vs. state) will be used to calculate percent cover of Facultative Wet (FACW) or Obligate (OBL) vegetation. Based on the results presented (discussed in Section 3.2 below), a combination of taxonomic and wetland indicator sources was apparently used. These details and discrepancies should be resolved in this and future monitoring reports.

d. One paragraph in this section describes how data regarding cypress tree density and size was collected at each monitoring station, yet there is no discussion of how this data will be used or analyzed to assess restoration progress. Quest agrees that cypress density and basal area are extremely important variables to document and track to determine restoration success, but, at present, there are no explicit restoration goals or criteria established for cypress.

e. One paragraph in this section states that “center plot sampling will be compared each year to those undisturbed plots to determine if impacted vegetation has regenerated to at least 50% of what exists naturally within the monitoring station.” The origin of this 50% vegetation coverage threshold or how it will be calculated is unknown, but half of ‘what exists naturally’ is not consistent with the overall reclamation goal stated in the first paragraph of the THA report, Section 2.8 of the THA report, or Specific Condition 21 of Burnett Oil Company’s Oil & Gas Geophysical Permit issued by the Florida Department of Environmental Protection (FDEP), which reads as follows: “The goal of long-term maintenance and monitoring of site reclamation areas is to return survey areas to conditions consistent with presurvey conditions...”

2.6 Contour Measuring

a. The stated method for comparing undisturbed elevation contours to reclaimed contours is biased and inconsistent with Burnett Oil Company’s FDEP Environmental Resource Permit (ERP) and Oil and Gas Geophysical Permit. THA calculated elevation differences between disturbed and undisturbed ground elevations based on the lowest adjacent undisturbed elevation. THA states that “[i]f restored pathway elevations fall below 7.62 centimeters (3 inches) of the lowest adjacent undisturbed elevation, then the reclamation in that location may be deemed unsuccessful.” (See Section 2.6 of the THA 2019 Reclamation Monitoring Report dated 8/30/19). This requirement presumably comes from Specific Condition 12 of the ERP, which states *“rutting shall be defined as indentations in the soil that are visibly identifiable or greater than 3 inches deep as measured from the average elevation of the adjacent un-impacted wetlands”* (hereinafter, “3-inch contour condition”). However, the Oil and Gas Geophysical permit makes no reference to a 3-inch contour condition, but, rather, per Specific Conditions 13a and 13b, *“original contour conditions”* to *“match the topographic elevations in adjacent undisturbed wetlands”* are to be restored. It is clear that considerable liberties with interpretation of FDEP permit language have been taken in this report. FDEP input is needed to clarify discrepancies in this and other purported ‘reclamation goals’.

Another confounding issue with the elevation comparisons in the THA report is due to where THA drew the dividing lines between ‘cut pathways’ and ‘adjacent grades.’ According to THA methods, a biologist “noted where along the tape measure edges of pathway began and ended.”

However, no specifics are provided as to how this determination was made, and, based on most of the profile drawings included in the results section, these dividing lines do not depict the actual boundary between disturbed and undisturbed topography. This concern is further discussed in the results in Section 3.1.

2.8 Reclamation Goals

a. This section states that *“Permitted reclamation goals require the area achieves at least 80% of the total coverage of Obligate and Facultative Wetland non-nuisance and non-exotic vegetation based on presurvey conditions.”* Questions regarding the methods used to quantify this stated goal have already been mentioned above, including: (1) which ‘adjacent’ quadrat will be used for comparison?; (2) how will bi-annual monitoring data be combined for comparison to a one-time, Time-Zero monitoring event?; (3) will all stations within a reclamation zone be required to meet this criterion before release or mitigation assessment?; and (4) what source(s) will be used to determine wetland indicator status and/or resolve related taxonomic inconsistencies?

Additional concerns about the inadequacy of the reclamation goal to ensure that all seismic survey areas are returned to *“conditions consistent with presurvey conditions”* were raised in NRDC’s 3/28/19 letter to the National Park Service, which included a discussion on the importance of similarity in groundcover composition and species richness between impacted and un-impacted areas as important measures of success of the reclamation, in addition to overall vegetation abundance and cypress density and size. Fundamental plant community attributes between impacted and adjacent sites are not being addressed by the current low standard of 80% native wetland vegetation cover and other purported reclamation goals.

b. It is not clear in the following statement which Burnett Oil Company permits are being referenced: *“Permitted reclamation goals require the area achieves at least 80% of the total coverage of Obligate and Facultative Wetland non-nuisance and non-exotic vegetation based on presurvey conditions.”* If FDEP permits are the intended reference, it is important to note that the Burnett Oil Company’s ERP does not include any specific “reclamation goals” or success criteria because it was issued based on the assurance that no damages beyond a temporary “layover of vegetation” were expected (See Specific Condition 6). Unexpected impacts, such as soil ruts and vehicle tracks which are *“visibly identifiable or greater than 3 inches, shall be restored to original contours.”* Specific Condition 21 of the Oil and Gas Geophysical permit does contain some language regarding long-term maintenance goals for percent cover of desirable wetland vegetation and nuisance/exotics, but no 3-inch contour condition is mentioned, as it is in the ERP. On the contrary, Specific Condition 13 of the Oil and Gas Geophysical permit requires restoration of *“areas with ruts, depressions, and vehicle tracks...to original contour conditions.”*

c. This section also states that *“Exotic/nuisance plant species may not exceed 5% total coverage of the restored pathways for a period of 2 consecutive years in accordance with provisions of the POP.”* This section should clearly identify what source(s) will be used to assess the nativity of plant taxa and which species are to be considered nuisance species. The methods section of the report should also specify how the 5% threshold will be calculated and applied. Most importantly, this 5% threshold is an extremely low standard to set for an area that currently has

very limited populations of nuisance/exotics, as verified by this Time-Zero report and prior Quest reports.

3.0 SAMPLING RESULTS

3.1 Profile Drawings

Most of the profile drawings provided for each monitoring stations are not representative of the topography that Quest has observed along reclaimed pathways and adjacent habitats, or that has been documented by others (Duever, 1986). In Quest's June 2019 Inspection Report, we documented elevation differences of 3 inches or more at 14 of the 19 (74%) sampling stations inspected along ~3.7 miles of reclaimed Seismic Survey Line B. However, according to THA results, only 4 of the total 102 monitoring stations (i.e., 4%) along 91 miles of survey tracks are not meeting the 3-inch contour condition stated in the ERP. Ironically, this condition is not being met at these 4 stations [21453 (Area 1); 16322 (Area 3); 1130 (Area 19); 2288 (Area 19)] due to the confounding effects of old roads and off-road vehicle (ORV) trails according to THA, so it appears that THA asserts that reclamation at these monitoring stations is successful, despite their non-compliance with ERP Specific Condition 12.

Perhaps one of the main reasons that THA asserts that many of the stations are purportedly meeting the 3-inch contour condition stated in the ERP is that the dividing lines shown on THA profile drawings do not appear to accurately depict the boundary between disturbed and undisturbed topography. Many of the 'adjacent grade' profiles depict steep slopes over short distances that are extremely atypical for undisturbed habitats within Big Cypress, where elevation gradients are normally on the order of ~5 to 10 inches per mile (Duever, 1986). For example, the first profile provided for Station 19927 (Area 1), depicts a ~8.3-inch change in elevation over 7.5 feet for the 'adjacent grade' on the left side of the graph. Also concerning is that the left-side adjacent grade is extremely dissimilar to the right-side adjacent grade, and the right-side adjacent grade only extends laterally for ~3 feet, although the methods (Section 2.6) stated that adjacent grades were measured for at least 1.4 meters (~5 feet) on each side of the pathway. These issues are frequently encountered in the profile drawings. Some other examples include Stations 17293, 19370, and 21412 in Area 2, and Stations 20900 and 21611 in Area 3. Non-problematic profiles that appear to represent successfully reclaimed pathways are infrequently encountered in the report, but #16519 in Area 4 is one such example.

It is unclear what sampling errors may have produced these unrealistic topographic grades, but it appears that the cross-sections may not have extended far enough on each side of the disturbed pathway to accurately capture adjacent, undisturbed grades. It also appears that THA's dividing lines drawn between the 'cut pathway' and 'adjacent grade' contours were not placed appropriately to accurately represent the boundary between the impacted and un-impacted areas. The presence of groundcover vegetation and/or tautness of the string from which elevations were measured may have also been confounding factors.

3.2 Vegetation Results

a) All of the cypress in this report are mis-identified as *Taxodium distichum* (baldcypress). Current taxonomic authorities agree that *Taxodium ascendens* (pondcypress) is the dominant tree species in Big Cypress National Preserve.

b) *Muhlenbergia capillaris* is listed as a dominant species in many of the vegetation data tables, and assigned an indicator status of OBL, which is consistent with FDEP nomenclature and wetland indicator status provided in Rule 62-340.450, Florida Administrative Code. However, the National Wetland Plant List (NWPL) classifies *Muhlenbergia capillaris* as Facultative (FAC). The *Atlas of Florida Plants* recognizes three varieties of *Muhlenbergia capillaris* (var. *capillaris*, var. *filipes*, and var. *trichopodes*, the latter of which is restricted to the Florida Panhandle)) and notes that var. *filipes* is synonymous with *Muhlenbergia sericea*. The predominant *Muhlenbergia* of Big Cypress marl prairies is *M. capillaris* var. *filipes*/*Muhlenbergia sericea*, neither of which are included in Rule 62-340.450, Florida Administrative Code. NWPL classifies *M. sericea* as FACW. Quest recommends that nomenclature and wetland indicator status in the THA report be supported by appropriate references and rationale that are consistently followed for all taxa and subsequent reports.

c) *Schizachyrium rhizomatum* is frequently listed in the THA data tables, and assigned a wetland indicator status of FACW, which is consistent with NWPL. However, no *Schizachyrium* species are included in Rule 62-340.450, Florida Administrative Code, and the FDEP's *Florida Wetlands Delineation Manual* classifies all *Schizachyrium spp.* as Facultative (FAC). The *Atlas of Florida Plants* notes that *S. rhizomatum* appears to be confluent with *S. stoloniferum*; however, this species is not recognized by NWPL. Quest recommends that nomenclature and wetland indicator status in the THA report be supported by appropriate references and rationale that are consistently followed for all taxa and subsequent reports.

d) *Dichantherium commutatum* is frequently listed in THA data tables, and assigned an indicator status of OBL. However, this species nor its former synonym (*Panicum commutatum*) are listed in Rule 62-340.450, Florida Administrative Code, and NWPL assigns *Dichantherium commutatum* an indicator status of FAC. The *Florida Wetlands Delineation Manual* recognizes this taxon by its former name (*Panicum commutatum*), and assigns it an indicator status of FAC. Based on the convergence between FDEP and NWPL indicator status, it appears the indicator status for this taxon should be changed to FAC throughout this and future reports.

e) *Dichantherium erectifolium* occasionally appears in THA data tables and is assigned an indicator status of FAC at monitoring station #20216. However, this species is listed as OBL by NWPL, which is consistent with the indicator status assigned to its former synonym (*Panicum erectifolium*) in the *Florida Wetlands Delineation Manual*. Based on the convergence between FDEP and NWPL indicator status, it appears the indicator status for this taxon should be changed to OBL throughout this and future reports.

f) *Dichantherium ensifolium* occasionally appears in THA data tables, and is assigned an indicator status of OBL, which is consistent with the indicator status assigned to its former name (*Panicum ensifolium*) in the *Florida Wetlands Delineation Manual*. However, this taxon is not recognized by NWPL, and three varieties (var. *ensifolium*, var. *breve*, and var. *unciphyllum*) are recognized by

the Atlas of Florida Plants. Quest recommends that nomenclature and wetland indicator status in the THA report be supported by appropriate references and rationale that are consistently followed for all taxa and subsequent reports.

g) Several vine species are listed in the vegetation tables and assigned the following wetland indicator statuses that are consistent with NWPL: *Cassytha filiformis* (FAC), *Smilax auriculata* (FACU), *Ipomoea sagittata* (FACW), and *Lygodium microphyllum* (FACW). However, none of these species are assigned an indicator status by FDEP or in Rule 62-340.450, Florida Administrative Code, because vines, by rule, are ignored for the purposes of wetland delineation. Quest recommends that nomenclature and wetland indicator status in the THA report be supported by appropriate references and rationale that are consistently followed for all taxa and subsequent reports.

h) Two 'nuisance/exotic' species are recorded in the THA data tables. *Panicum repens* is listed for Station #21412 (Area 2) as a FACW species with 1% cover, and *Lygodium microphyllum* is listed for Station #21406 (Area 3) as a FACW species with 1% cover. The percent cover of both of these species are included is the sum of the FACW and OBL vegetation percent cover, even though both are designated as Category I Invasive exotics by the Florida Exotic Pest Plant Council's most recent list (FLEPPC, 2019). Pursuant to Specific Condition 21 of Burnett Oil Company's Oil and Gas Geophysical Permit, FLEPPC invasive species should not be included in the percent cover of desirable wetland vegetation.

3.3 Exhibits

The following edits to the Exhibits portion of the report are recommended:

a) A smaller dot should be used to indicate monitoring station locations. At present, each 10 m² station is represented by a dot that is ~200 feet in diameter.

b) Many of the dots used to indicate monitoring station locations are clearly not on the impacted pathway, in spite of the large size of the dots (e.g. in Zone 7, #13948). The location of each monitoring station should be accurately depicted and supported by latitude-longitude coordinates in this and future monitoring reports.

c) Related to Item (b) above, the 533,926 feet of impacted pathways indicated in the Exhibit tables should be shown as thin colored lines on the 'Monitoring Station Tracking – West' and 'Monitoring Station Tracking – East' exhibit figures and legend for comparison to actual impacts visible on aerials.

d) Some station locations are not visible on the Exhibits (e.g., 1326 in Zone 16; 4040 in Zone 17), and some station number labels are not visible (1 station in Zone 1) or not clear (SE corner of Zone 11, center of Zone 15). A review of the Exhibits maps is recommended to ensure that all monitoring stations are clearly depicted.

e) Despite the purported low incidence of nuisance/exotic species documented by the THA

report, a separate exhibit showing the locations of each nuisance/exotic population encountered is recommended, even if the population consisted of a single individual that was hand-pulled.

4.0 CONCLUSIONS

The THA report concludes that ground contours have been successfully reclaimed, the removal of cypress in the pathways had minimal impact on the canopy coverage as a whole, nuisance/exotic populations are currently minimal, and groundcover vegetation is expected to rebound over time. It is not surprising that this Time-Zero report concludes with such optimism given the extremely low bar set by the poorly-defined 'reclamation goals,' the problematic profiles described in Section 2.8, and the siting of the disturbed vegetation quadrats in the least-disturbed portion of the pathways. Quest has advocated for the establishment of more meaningful success criteria and robust monitoring methods in prior reports and letters to the National Park Service and FDEP, which have not been implemented to date, despite the failure of the National Park Service's Minimization and Mitigation Measures outlined in the Finding of No Significant Impact, and FDEP permit conditions, to minimize or mitigate the extensive damage caused by Burnett Oil Company's seismic activities in this national park unit. Based on our observations and findings stated in this memorandum and prior reports, it is reasonable to assume that long-term soil, hydrologic, and vegetation damage will persist as a result of Burnett Oil Company's seismic survey activities and unsuccessful reclamation attempts to date.

References

Duever, M.J., J.E. Carlson, J.F. Meeder, L.C. Duever, L.H. Gunderson, L.A. Riopelle, T.R. Alexander, R.L. Myers, and D.P. Spangler. 1986b. *The Big Cypress National Preserve*. Research Report No. 8 of the National Audubon Society. New York, New York. 468 p.

Gilbert, K.M., J.D. Tobe, R.W. Cantrell, M.E. Sweeley, and J.R. Cooper. *The Florida Wetlands Delineation Manual*. 210 p.

National Wetland Plant List: http://wetland-plants.usace.army.mil/nwpl_static/v33/species/species.html?DET=001100#

Wunderlin, R. P., B. F. Hansen, A. R. Franck, and F. B. Essig. 2018. *Atlas of Florida Plants* (<http://florida.plantatlas.usf.edu/>). [S. M. Landry and K. N. Campbell (application development), USF Water Institute.] Institute for Systematic Botany, University of South Florida, Tampa.