



United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345



March 17, 2023

In Reply Refer To:
FWS/R4/ES/DCN 078450

Mr. Richard E. Dunn, Director
Georgia Environmental Protection Division
2 Martin Luther King Jr. Drive, SE
14th Floor East Tower – Suite 1456
Atlanta, Georgia 30334-4713

Dear Director Dunn:

The U.S. Fish and Wildlife Service (FWS) has reviewed information on the Georgia Department of Natural Resources-Environmental Protection Division (GA-EPD) website and associated information concerning the draft Mining Land Use Plan (MLUP) submitted by Twin Pines Minerals, LLC (TPM) involving a proposed mining project in Charlton County, Georgia. The applicant proposes to mine heavy mineral sands from Trail Ridge, a geomorphic feature that impounds the Okefenokee swamp along its east side for approximately 30 miles. FWS is concerned that the mining operations are likely to negatively impact the Okefenokee National Wildlife Refuge (ONWR), a unique natural feature with national cultural and biological significance, resulting in decreased habitat quality for federally listed and at-risk species that rely on the wetland ecosystem and the possibility of permanently altering the hydrology and fire regimes.

The FWS is the primary federal agency responsible for the conservation, protection, and enhancement of the Nation's fish and wildlife populations and their habitats. The ONWR provides habitat and protection for numerous plants, 48 species of mammals, 200 birds, 33 fish, 101 species of reptiles and amphibians, and an undetermined number of invertebrates. These include multiple federal trust and state at-risk species (enclosed). In accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e) and the Endangered Species Act of 1973 (16 U.S.C. 1531-1544) and consistent with our review of the MLUP, the FWS is concerned that the proposed mining project and associated reclamation activities may pose risks to the ecosystems and habitats unique to ONWR due to changes to the hydrology of the area. These changes in hydrology may result in increased wildfire occurrence by drying vegetation of the ONWR and the Okefenokee swamp, thereby threatening and/or decreasing habitat quality for federally listed and at-risk species found there, such as the endangered red-cockaded woodpecker and the proposed threatened Suwannee alligator snapping turtle and other plants and wildlife.

The FWS received an independent technical review conducted by the hydrology experts from the National Park Service's (NPS) South Florida Natural Resources Center pertaining to the TPM proposed mining project. This review (enclosed), which was finalized in February 2023,

concludes that the modeling used to predict the magnitude, extent and types of impacts from the proposed mining process and reclamation was not adequate to accurately predict the impacts to the Okefenokee wetland ecosystem including the ONWR. FWS requests that the complete enclosed NPS technical review be considered as part of its comments on the proposed MLUP. In their assessment NPS evaluated information from the GA-EPD website including the draft MLUP submitted by TPM and the updated modeling conducted in 2022 by Dr. Sorab Panday and GSI Environmental. The analyses revealed several critical shortcomings in the modeling used for accurate prediction of impacts to the ONWR, including but not limited to:

- The area modeled did not include the complete watershed that connects the mining site to the ONWR downstream. The model used fixed-head boundary conditions that were too close to the regions of interest, which can bias the model results. The model boundary conditions were established in such a way that it eliminated the ability to predict the impacts on ONWR particularly in extreme dry and wet periods.
- The modeling did not capture the seasonal and interannual variability in the system and instead used only average conditions. Modeling of dry periods is especially critical to ensure damage to the refuge will not be caused when small changes in water flows can have the largest effects on ONWR. The choice to use a steady-state model that approximates average conditions instead of a transient model that captures the seasonal and interannual variability in the system is a critical shortfall.
- Interpretation of model results relative to impacts on ONWR was not possible because the model combined data from multiple watersheds, including those not influenced by the mine. Thereby diluting the magnitude of changes in the specific watershed where the mine is proposed to be located. The model results were further biased by the inclusion of data from within an artificial prescribed model boundary.
- The modeling did not quantify the combined impacts of the mining processes (dewatering, pumping, and mixing of soils), but instead modeled each process separately. Dewatering of the mine pit has a significant impact on the water budget along Trail Ridge, removing an average of 16% of the water budget. Inappropriate modeling assumptions eliminated the ability to accurately predict the dewatering impacts on ONWR.
- Areal extent of the model domain omits the most direct flow path between mine and ONWR.
- Combined inappropriate modeling assumptions compromise its predictive capability with respect to the impacts on ONWR:
 - Assumptions for hydrogeologic properties in modeling of mining area are not appropriate based on available datasets.
 - All simulations were performed assuming steady-state conditions using average values. Such simulations do not take into account seasonal and interannual response to freshwater recharge and therefore do not simulate the dry season and periods correctly. Flows in dry periods are critical for swamp's ecological health and frequency of wildfire.
 - Modeling did not simulate effects in the dry season when water levels are lower, and there is less precipitation.

- There is a seasonal variability in observed groundwater head along the boundary of the modeled area. A constant head boundary and a specified head "drain" boundary conditions in the model do not take into account this variability.
- Methodology of simulating surface water flow using the "Drain Package" needs more justification before conclusions can be considered valid. The MODFLOW model is primarily a groundwater model, yet more than 90% of the water modeled is on the surface.
- Modeling and analysis did not consider re-mining of bentonite layer in dragline overlap areas, which could cause bentonite to be mixed throughout the soil column with all the tailings placed back in the mine pit.
- Quantification of impacts to ONWR incorrectly included the boundaries, which would obfuscate any actual impacts of the mine.
- Use of the Theis solution to predict drawdown of the Upper Floridan due to pumping is too simplistic to accurately predict effects on ONWR.

The ONWR includes navigable waters, lakes, rivers, and streams that are considered Waters of the United States (WOTUS). Based on the new information provided by the NPS critical review outlined above, FWS believes there is a direct connection between impacts from the proposed mining project and the Waters of the United States (WOTUS) located within the ONWR and areas adjacent to the Okefenokee swamp, therefore a Clean Water Act (CWA) permit may be required from the U.S. Army Corps of Engineers (USACE).

In *Cty. of Maui v. Haw. Wildlife Fund*, 140 S. Ct. 1462(2020), the Supreme Court held that a CWA permit is required where the addition of pollutants through groundwater is the "functional equivalent" of a direct discharge into navigable waters. The critical shortcomings of the modeling identified in the report are so significant that the USACE could not have made an appropriate determination on whether the proposed mining project's impacts would be the functional equivalent of a direct discharge to WOTUS. Therefore, FWS requests GA-EPD defer action on the pending draft MLUP until the USACE determines whether a CWA permit is needed based on this new information.

The soil profile of Trail Ridge is comprised of distinct layers which influence the capacity of water to move through it. Specifically, some of these soils have low hydraulic conductivity and therefore Trail Ridge forms a geomorphological "dam" on the east side of the Okefenokee swamp that contributes to maintaining its water level and hydrologic budget. As part of the reclamation plan, the project proposes to add a bentonite clay layer to the excavated mining spoils that will be placed back in the site to approximate the low permeability of the existing soils in Trail Ridge. The top of the clay layer would be at the approximate top of the humate-cemented consolidated black sand and sand tailings would be placed above this. FWS is concerned that the sediment porosities reported by TPM appear to be based on the testing of bentonite-contaminated samples, which would skew the determination of the appropriate hydraulic conductivity needed to mimic existing conditions to a degree that has not been evaluated. Consequently, changes that may occur to the elevation of the water table in the wetlands south and east of Okefenokee swamp remain unknown to date. Based on the experimental nature of mimicking the low hydraulic conductivity of the soils of the existing site,

FWS is concerned that the ONWR may be negatively affected by changes to the existing soils in Trail Ridge from the proposed mining activities.

Additionally lowered water tables within the Okefenokee swamp would elevate wildland fire frequency and intensity due to increased exposure of typically wetted areas and result in degradation of carbon-rich peat soils. This would in turn reduce the capacity of the swamp, a major carbon storage area in Georgia, to retain and capture carbon and assist in controlling greenhouse gasses and climate change. Increased wildland fire activity could also threaten the millions of dollars of commercial timberland that immediately surround the Okefenokee swamp. In 2017, the 152,515-acre West Mims Fire cost taxpayers an estimated \$45.5 million to suppress and destroyed over \$58 million in private timberland, the majority of which is in close to the proposed mine site.

The applicant proposes the use of an evaporator system to handle excess process water. FWS recommends that the possible effects of this part of the mining process requires additional analysis by the GA-EPD since the effects of this process may have long term and permanent consequences on both the proposed mine site and areas downwind of it, including the ONWR. Effects may include impacts to air quality, water quality, and vegetation due to salt transport via air or water.

Lastly, FWS requests that GA-EPD revisit the selection of the U.S. Geological Survey (USGS) streamflow gage used to analyze the effects of the water withdrawals by the proposed mining operations. We consider the use of USGS gage number 02228500 at Moniac to be much more appropriate than gage number 02231000 at Macclenny, which includes many more hydrologic inputs besides the Okefenokee swamp and therefore dilutes the potential effects of water withdrawals for mining on the swamp.

In summary, FWS believes the proposed mining operation, including reclamation and dewatering techniques, poses a risk of permanent and irreversible impacts to the ONWR, its associated habitats, and the species that depend on them. We appreciate the opportunity to comment on the MLUP and to thoroughly evaluate the proposed activities that have the potential to result in adverse impacts to one of our nation's most significant natural areas.

Sincerely,



Mike Oetker
Acting Regional Director

Enclosure (1)

List of Federal Trust and State At-Risk Species Within the Okefenokee National Wildlife Refuge

Enclosure (2)

Independent Technical Review of the Twin Pines Permit Application Hydrologic Modeling

Federal Trust Species

American Alligator (T, Similarity of Appearance)
Bald Eagle (N)
Ciliate-leaf Tickseed (P)
Eastern Diamondback Rattlesnake (P)
Eastern Indigo Snake (T)
Florida Pine Snake (P)
Florida Sandhill Crane (N)
Frosted Flatwoods Salamander (T)
Gopher Frog (P)
Hairy Rattleweed (E)
Hartwrightia (P)
Red-cockaded woodpecker (E)
Spotted Turtle (P)
Suwanee Alligator Snapping Turtle
(Proposed T)
Wood Stork (T)

E – Endangered
T – Threatened
C – Candidate
P – Petitioned, Under Review
N – Not Listed Under ESA
AR – At-Risk

State At-Risk

Blackbanded Sunfish
Crestless Plume Orchid
Dwarf Witch Alder
Florida Wild Privet
Fly Catcher/Golden Trumpet
Gopher Tortoise
Greenfly Orchid
Hooded Pitcherplant
Okefenokee Giant Pitcherplant
Parrot Pitcherplant

Pond Spice
Purple Honeycomb Head
Rafinesque's Big-eared Bat
Round-tailed Muskrat
Sandhill Rosemary
Silver Buckthorn
Southeastern Pocket Gopher
Southern Hog-nosed Snake
Striped Newt
Swallow-tailed Kite
Velvet Sedge
Yellow Flytrap