

April 9, 2024

Via Electronic Mail

Director Jeff Cown
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Environmental Protection Division
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Suite 1456, East Tower
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Re: Comments Opposing Draft Permits for Twin Pines Mine

Dear Director Cown:

Together, the following 54 organizations, collectively representing more than fifteen million members and supporters, ask you to protect the Okefenokee Swamp and the St. Marys River by denying Twin Pines Minerals' (TPM) application to strip mine for heavy mineral sands at the doorstep of the Okefenokee National Wildlife Refuge.



The pristine waters of the Okefenokee are under threat from TPM's proposed strip mine. (© Gregory Miller)

Altamaha Riverkeeper	Georgia Wildlife Federation
Amphibian Foundation	Glynn Environmental Coalition
Birds Georgia	Great Old Broads for Wilderness
Black Warrior Riverkeeper	League of Conservation Voters
Camden County Audubon Society	National Audubon Society
Center for a Sustainable Coast	National Parks Conservation Association
Center for Biological Diversity	National Wildlife Federation
Chattahoochee Riverkeeper	National Wildlife Refuge Association
Concerned Citizens of Cook County	Oconee River Land Trust
Conserve Nassau	Ogeechee Riverkeeper
Coosa River Basin Initiative	One Hundred Miles
Defenders of Wildlife	Satilla Riverkeeper
Dogwood Alliance	Savannah Riverkeeper
Emory Ecological Society	Science for Georgia
Endangered Species Coalition	Sierra Club
Environment Georgia	Sierra Club, Florida Chapter
Environmental Protection Information Center (EPIC)	Southern Environmental Law Center
Friends of Okefenokee National Wildlife Refuge	SouthWings
GASP	Sowing Seeds Outside the Walls
Georgia Canoeing Association	St. Marys Riverkeeper
Georgia Conservancy	Standing Trees
Georgia Conservation Voters	The New School
Georgia Forest Watch	The Wilderness Society
Georgia Interfaith Power and Light	Third Act Georgia
Georgia River Network	Trust for Public Land
Georgia WAND	Veterans for Clean Water
	Wild Cumberland
	Wilderness Watch

At 438,000 acres, the Okefenokee Swamp is one of the most wild, pristine, and ecologically intact places in America. Its vast labyrinth of cypress forests, pine islands, and blackwater channels shelter more than one thousand animal and plant species. In addition to providing refuge to wildlife, the Okefenokee offers an escape to hundreds of thousands of people who fish, hunt, paddle, birdwatch, and camp in its wilderness each year. As the U.S. Fish and Wildlife Service put it, “The Okefenokee is like no other place on earth.”

TPM’s proposed strip mine endangers this world-class resource. Not only is the proposed mine dangerous in its own right, it would effectively open Trail Ridge to mining for decades to come, jeopardizing the long-term viability of the swamp. EPD, as the state agency charged with protecting and restoring Georgia’s environment, has both a statutory and moral obligation to say no. The stakes are too high, and the risks are too great.

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I. BACKGROUND

A. The Okefenokee Swamp is a national treasure.

The Okefenokee Swamp is one of the largest and most well-preserved freshwater ecosystems in the world.¹ Unlike most other globally significant wetlands, the Okefenokee is the source of rivers, rather than their recipient, allowing it to escape upstream disturbances that threaten other globally important wetlands like the Everglades or the Great Dismal Swamp.

For nearly a century, federal and state leaders have celebrated and protected the Okefenokee Swamp. In 1937, President Roosevelt designated the Okefenokee Swamp as a National Wildlife Refuge, and it remains the largest refuge in the eastern United States. It is also a National Wilderness Area and a National Natural Landmark, a designation reserved for “the best examples of biological and geological features” in the country.² On an international scale, the Okefenokee National Wildlife Refuge is designated as a “Wetland of International Importance” under the Ramsar Convention and is a candidate for designation as a UNESCO World Heritage Site.³



Standing up to four feet tall with a wingspan of five feet, the federally threatened wood stork is one of more than 230 bird species that take shelter in the Okefenokee. (© Gregory Miller)

¹ The attachments to this letter are available at <https://bit.ly/3vV4GQF>.

² Nat'l Park Serv., *National Natural Landmarks Program*, <http://bit.ly/3YHWo74> (last visited Mar. 18, 2024).

³ *Okefenokee National Wildlife Refuge World Heritage Bid*, <https://bit.ly/49k8wk2> (last visited Mar. 28, 2024).

From a biodiversity perspective, the Okefenokee is a critical link in important wildlife corridors that connect park and conservation lands around the Southeast.⁴ The swamp and its surrounding ecosystems are home to approximately 620 species of plants, 233 species of birds, 39 species of fish, 37 amphibians, 64 reptiles, and 50 mammals, several of which are threatened or endangered, including the red-cockaded woodpecker, the wood stork, and the eastern indigo snake.⁵

In addition to its environmental value, the Okefenokee National Wildlife Refuge is economically important to local residents and the state. With more than 700,000 annual visits, the Refuge's visitation numbers are on par with those of iconic national parks like Redwood and Denali. These visits are critically important to Georgia and nearby communities. Visits to the Refuge contribute \$64.7 million in economic activity annually to local communities and support more than 750 jobs in the surrounding area, according to the U.S. Fish and Wildlife Service.⁶

The cultural and historical resources associated with the Okefenokee Swamp are equally important, with Native American roots reaching back thousands of years. The Muscogee (Creek) Nation, for example, has worked with the U.S. Fish and Wildlife Service to designate its ancestral homelands within the Okefenokee Swamp—once regarded as “the most blissful spot on earth” by the Nation⁷—as a Traditional Cultural Property on the National Register of Historic Places.

B. Mining the section of Trail Ridge next to the Okefenokee poses an existential threat to the Swamp.

The Okefenokee sits in a saucer-shaped depression that was once part of the ocean floor. To its east, the swamp is bordered by Trail Ridge, an elevated terrace created more than one million years ago as an ancient barrier island complex when the Atlantic Ocean was approximately forty miles further inland than it is today.

Today, the swamp is a vast peat bog that holds the largest remaining undisturbed peat deposit on the North American Coastal Plain, which stretches from Massachusetts to Mexico.⁸ With peat layers up to 15 feet deep in some areas, the swamp stores the equivalent of more than 95 million tons of carbon dioxide in its peat alone.⁹

⁴ Ga. Dep't of Nat. Res., *State Wildlife Action Plan* (Sept. 2015), <https://bit.ly/40biuAe>.

⁵ U.S. Fish & Wildlife Serv., *Okefenokee National Wildlife Refuge Amphibians, Fish, Mammals and Reptiles List* (July 2009), <https://bit.ly/3TUdhML>.

⁶ U.S. Fish & Wildlife Serv., Div. of Econ., *The Economic Contributions of Recreational Visitation at Okefenokee National Wildlife Refuge 2–3* (May 2019) (attached to March 2023 comments as Ex. 03).

⁷ U.S. Fish & Wildlife Serv., *Muscogee Nation Visits “Most Blissful Spot on Earth”* (July 14, 2022), <http://bit.ly/3yvdsme>.

⁸ U.S. Fish & Wildlife Serv., *Okefenokee Swamp's Peatlands: A Hidden Resource* (2022), <https://bit.ly/3VPIobE>.

⁹ *Id.*

Like many ancient sand deposits in the coastal plain, Trail Ridge contains the primary ores of titanium dioxide (ilmenite and rutile) and zircon. As a result, the ridge has at times been a target of the mining industry. In the 1990s, the chemical giant E.I. du Pont de Nemours & Company announced plans to mine a portion of Trail Ridge along the refuge boundary—a proposal that, like TPM’s, faced near-universal opposition. Then-Secretary of the Interior Bruce Babbitt called for DuPont to withdraw its proposal, noting, “It is apparent on the face of it that this refuge and this mining project are not compatible.”¹⁰ His rationale was simple: “Titanium is a common mineral, but the Okefenokee is a very uncommon swamp.”¹¹

Georgia’s then-Commissioner of Natural Resources Lonice Barrett agreed, calling the Okefenokee “sacred ground” and noting that the mining threat was “the most significant environmental issue” he had encountered in his nearly thirty years in state government.¹² The Georgia Board of Natural Resources voiced similar concerns, adopting a resolution expressing “its strong recommendation that full and comprehensive environmental impact statements be completed to fully assess all applicable natural, environmental, historical, cultural and recreational impacts of the proposed action prior to any state or federal permits being considered.”¹³

Eventually, the public outcry and government opposition led DuPont to abandon the project and donate a portion of the property for permanent protection. Following the DuPont saga, mining companies avoided the portion of Trail Ridge that directly influences the Okefenokee, focusing instead on other heavy mineral sand deposits in the region—until now.

In 2018, TPM announced plans to strip-mine thousands of acres of land next to the Okefenokee National Wildlife Refuge. The pending application covers a 582-acre mining footprint that will make up phase one of a larger, 8,000-acre mine.

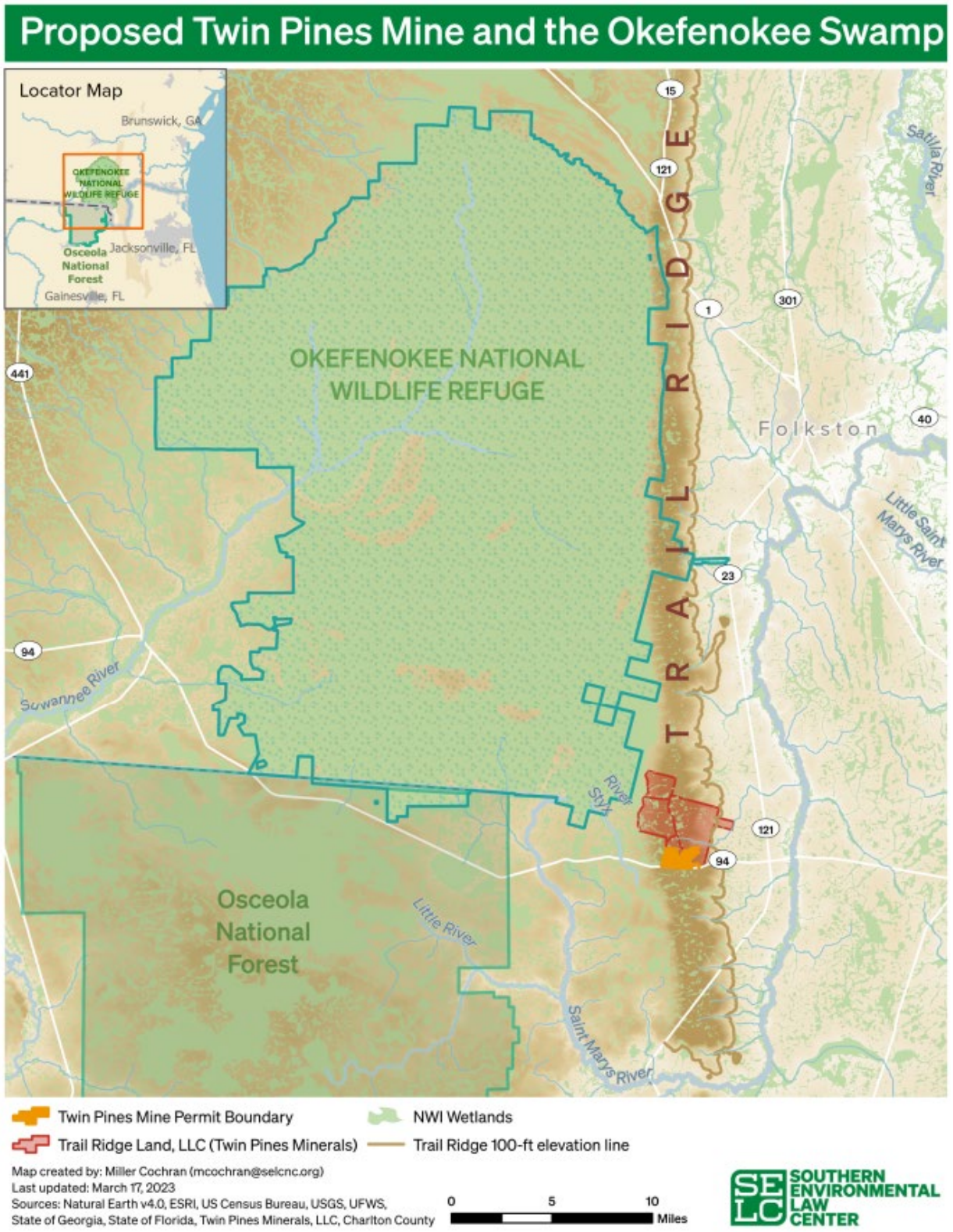
During the mining process, TPM plans to dig 50-foot-deep trenches in Trail Ridge to excavate the sandy soil for wet processing, during which the lower density sand would be separated from the heavier minerals using machines called spiral concentrators. Once the minerals are removed, TPM intends to return the homogenized lower density sands to the mining pits along with a three-foot layer of what TPM calls “soil amendments.” After replacing the topsoil, the company would move on to the next section in the grid, eventually excavating thousands of acres bordering the swamp. This process, though billed as “harmless” and “environmentally benign” by TPM, poses substantial risks to local and regional hydrology.

¹⁰ John H. Cushman Jr., *Official Attacks Plan for Mining Project*, N.Y. Times (Apr. 4, 1997), <http://bit.ly/3J572yZ>.

¹¹ Donald P. Baker, *DuPont Asked to Drop Mine Plan*, Wash. Post (Apr. 4, 1997), <http://bit.ly/40fKov1>.

¹² *Id.*

¹³ Ga. Bd. of Nat. Res., *Resolution Regarding DuPont Mining Project Adjacent to the Okefenokee Swamp* (April 23, 1997) (attached to March 2023 comments as Ex. 4).



The proposed demonstration site includes a 582-acre mining footprint that makes up phase one of the larger, 8,000-acre mine. (© SELC)

C. No permit application in Georgia history has drawn as much opposition as this one.

Since TPM proposed the mining project in 2018, public opposition has been overwhelming and unwavering, with more than a quarter million individual comments at the state and federal level as of April 8, 2024. People across the state have written letters and called their legislators in unprecedented numbers, with polls showing that more than 70% of Georgia voters, including 74% of Republican voters and 75% of South Georgia voters, agree that mining next to the Okefenokee Swamp is a bad idea.¹⁴ Public figures from Leonardo DiCaprio to Newt Gingrich have spoken out against the mine. As the Atlanta Journal Constitution put it, “[o]ur community [is] fiercely divided about, well, just about everything. Everything but this.”¹⁵

In February 2023, more than one thousand people registered for the two public hearings EPD conducted. Hundreds more registered for the public hearing last month, where individuals from across Georgia spoke out to share their stories and concerns.



Rev. Antwon Nixon, born and raised in Folkston, leads local advocates for the long-term protection of the swamp. (© Rena Ann Peck, Georgia River Network)

For example, Josh Howard, a fifth-generation Charlton County resident and president of Friends of the Okefenokee National Wildlife Refuge, explained, “For many of us the

¹⁴ Mason-Dixon Polling & Strategy, Okefenokee Polling (Sept. 2020) (attached to March 2023 Comments as Ex 1).

¹⁵ Andrew Morse, *On this, we agree: Protect the Okefenokee*, Atlanta Journal Constitution (Mar. 26, 2024).

Okefenokee is part of our identity. We may have different temperaments, talents, and convictions, but we are all Swampers and identify with it. We don't want to risk it.”¹⁶

Ellis Wynn, the son of a Georgia Game Warden who has been to the Okefenokee “more times than [he] can count,” explained, “It would be like putting a mine next to Yellowstone. I can't really put into words how much I oppose it.”¹⁷

Sheila Carter, a former Okefenokee guide whose family has worked as guides for several generations, implored EPD, “Please don't let them mine what God has put for us here to enjoy, and generations beyond us.”¹⁸

In addition to hundreds of thousands of individual comments, more than 85 scientists from across the country, many of whom have direct experience studying the Okefenokee Swamp, signed an open letter opposing the mine.¹⁹ As did more than one hundred Georgia faith leaders, noting, “Our faith inspires us to boldly proclaim our opposition to this project as we advocate for just policies and practices that allow for all of Creation to thrive.”²⁰

Local, state, and federal officials from both political parties, along with state and federal agency employees, have also called for the protection of the Okefenokee. The following letters of opposition from government officials are attached to these comments:

- *Letter from Secretary Haaland Opposing Mine* (attached as Ex. 1): A letter from Secretary of the Interior Deb Haaland urging the State of Georgia not to move ahead with approval for the proposed mine in order to ensure that the swamp and refuge are protected.
- *Letter from State and Federal Officials Opposing Mine* (attached as Ex. 2): A letter of opposition from former Secretary of the Interior Bruce Babbitt, who oversaw the Dupont mining proposal; former U.S. Fish and Wildlife Service directors from five administrations; Lonice Barrett, the Commissioner of the Georgia Department of Natural Resources under the Miller, Barnes, and Perdue administrations; and several other former state and federal officials.
- *Letter from U.S. Senator Jon Ossoff Opposing Mine* (attached as Ex. 3): A letter from Senator Ossoff urging EPD to reject TPM's permit application because “the risk of severe damage to [the Okefenokee] ecosystem is unacceptable.”

¹⁶ Ga. Env't. Prot. Div., Public Hearing on Draft Surface Mining Land Use Plan (Feb. 21 and 23, 2023) [hereinafter “EPD 2023 Public Hearing”] (statement of Josh Howard).

¹⁷ *Id.* (statement of Ellis Wynn).

¹⁸ *Id.* (statement of Sheila Carter).

¹⁹ Open Letter from Amy Sharma *et al.* to the Georgia Community (Sept. 16, 2022) (attached to March 2023 comments as Ex. 11).

²⁰ Letter from Codi Norred *et al.* to Gov'r Brian Kemp (Oct. 2021) (attached to March 2023 comments as Ex. 12).

- *Proclamation by Governor Brian P. Kemp Declaring Okefenokee Swamp Day* (attached as Ex. 4): A 2022 proclamation by Governor Kemp recognizing that “the Okefenokee Swamp hosts more than 650,000 visits by Americans and international tourists to Georgia on an annual basis, generating upwards of \$64.7 million annually for the economies of Ware, Clinch, and Charlton Counties and creating some 750-swamp tourism-related jobs.”
- *Letters from current and former legislators, both Republican and Democrat*, from around the State including Representative Taylor (R-Thomasville); Representative Stephens (R-Savannah); Representative Dempsey (R-Rome); Representative Evans (D-Atlanta); Representative Hawkins (R-Gainesville); Senator Jackson (D-Stone Mountain); then-Senator Jordan (D); Senator Kirkpatrick (R-Marietta); Representative Knight (R-Griffin); then-Senator Ligon (R); Representative Lim (D-Norcross); then-Senator McNeill (R); Representative Oliver (D-Decatur); Senator Parent (D-Atlanta); Representative Powell (R-Hartwell); Representative Roberts (D-Atlanta); Representative Schofield (D-Atlanta); Representative Tankersley (R-Brooklet); Senator Williams (R-Milledgeville); and Representative Williams (D-Marietta) (collectively attached as Ex. 5).
- *Letters from Mayors of Woodbine, Georgia; Kingsland, Georgia; Fernandina Beach, Florida; St. Marys, Georgia; and the Camden County Joint Development Authority* (collectively attached as Ex. 6)

In addition, at least nineteen local governments have passed resolutions calling for the protection of the Okefenokee:

- *Resolution of the City of Homeland Requesting Protection for Okefenokee Swamp and the Surrounding Natural Resources and Drinking Water Supplies* (attached as Ex. 7): A resolution by the City of Homeland, a city in Charlton County located approximately five miles from the eastern border of the Okefenokee Swamp and just a few miles from the proposed mining site.
- *Resolution of the Ware County Board of Commissioners Requesting Protection for Okefenokee Swamp* (attached as Ex. 8): A resolution from Ware County, which is home to a substantial portion of the Okefenokee Swamp and National Wildlife Refuge and which derives significant economic benefits from refuge-related ecotourism.
- *Joint Resolution of the City of Waycross and Ware County Requesting Protection for the Okefenokee Swamp* (attached as Ex. 9): A resolution from the City of Waycross, the county seat of Ware County. Waycross is home to the Okefenokee Swamp Park and one of the primary entrances to the National Wildlife Refuge. The city derives significant economic benefits from refuge-related ecotourism.
- *Resolution of the Clinch County Board of Commissioners for the Okefenokee Swamp and Against the Twin Pines Minerals Strip Mine* (attached as Ex. 10): A resolution from

Clinch County, which, like Ware County, is home to a portion of the Okefenokee Swamp and National Wildlife Refuge and derives significant economic benefits from the Refuge.

- *Resolution of the Echols County Board of Commissioners for the Okefenokee Swamp and Against the Twin Pines Minerals Strip Mine* (attached as Ex. 11): A resolution from Echols County, located immediately west of the Okefenokee Swamp and National Wildlife Refuge.
- *Resolution of the Wayne County Board of Commissioners Supporting the Protection of the Okefenokee Swamp as a Natural Resources of International Importance and as an Economic Driver for Southeastern Georgia* (attached as Ex. 12): A resolution from Wayne County, located approximately forty miles northeast of the Okefenokee Swamp and National Wildlife Refuge.
- *Resolution of the City of Jesup Supporting the Protection of the Okefenokee Swamp as a Natural Resources of International Importance and as an Economic Driver for Southeastern Georgia* (attached as Ex. 13): A resolution from the City of Jesup, located approximately forty-five miles northeast of the Okefenokee Swamp and National Wildlife Refuge, calling on the state to “take every reasonable step to ... protect the Okefenokee Swamp from future mining activities.”
- *Resolution of the City of Nashville in Opposition of Strip Mining in the Okefenokee Swamp or Adjacent Lands* (attached as Ex. 14): A resolution from the City of Nashville, located approximately forty-five miles northeast of the Okefenokee Swamp and National Wildlife Refuge, opposing TPM’s proposed mine, as well as any other strip mine permit applications within ten miles of the Okefenokee.
- *Resolution of the Atkinson County Board of Commissioners for the Okefenokee Swamp and Against the Twin Pines Minerals Strip Mine* (attached as Ex. 15): A resolution from Echols County, located less than fifty miles northwest of the Okefenokee Swamp and National Wildlife Refuge.
- *Resolution of the Berrien County Board of Commissioners for the Okefenokee Swamp and Against the Twin Pines Minerals Strip Mine* (attached as Ex. 16): A resolution from Berrien County, located approximately sixty miles northwest of the Okefenokee Swamp and National Wildlife Refuge.
- *Resolution of the Hamilton County Board of Commissioners for the Okefenokee Swamp and Environmental Conservation* (attached as Ex. 17): A resolution from Hamilton County, Florida, located immediately southwest of the Okefenokee Swamp and National Wildlife Refuge, advocating for the preservation and protection of the Okefenokee and its surrounding watersheds, and calling on the Florida Department of Environmental Protection to engage in the EPD permitting process to ensure thorough consideration of downstream impacts.

- *Resolution of the City of Savannah Urging Protection of the Okefenokee Swamp* (attached as Ex. 18): A resolution from Savannah, a city of nearly 150,000, calling on EPD to deny TPM's permit application.
- *Resolution of the City of Brunswick Supporting the Protection of the Okefenokee Swamp as a Natural Resource of International Importance and as an Economic Driver for Southeastern Georgia* (attached as Ex. 19): A resolution from the City of Brunswick, a city of nearly 15,000 people located in Glynn County northeast of the Okefenokee Swamp.
- *Resolutions of the City of St. Marys Requesting Protection for Okefenokee Swamp and Supporting the Protection of the Okefenokee Swamp as a Natural Resource of International Importance and as an Economic Driver for Southeastern Georgia* (attached as Exs. 20 and 21): Resolutions from St. Marys, a city of nearly 20,000 people located on the St. Marys River east of the swamp. The headwaters of the St. Marys River are located in the Okefenokee Swamp, and the water quality of the river is directly threatened by the proposed TPM mining project.
- *Resolution of the City of Kingsland Requesting Protection for Okefenokee Swamp* (attached as Ex. 22): A resolution from the City of Kingsland, a city of 17,000 people located in neighboring Camden County. It is located just north of the St. Marys River.
- *Resolution of the City of Valdosta in Opposition of Strip Mining in the Okefenokee Swamp* (attached as Ex. 23): A resolution from the City of Valdosta, a city of 56,000 people located approximately 45 miles from the western border of the Okefenokee Swamp. It is the most populous city in the Suwannee River basin.
- *Resolution of the Board of Commissioners of DeKalb County Requesting Protection for the Okefenokee Swamp* (attached as Ex. 24): A resolution from DeKalb County, home to nearly 800,000 Georgians, calling for the protection of the Okefenokee and supporting the resolutions of Clinch, Echols, and Ware Counties and the City of Waycross in their respective requests for protection.
- *Resolution of the City of Brookhaven*: (attached as Ex. 25): A resolution from Brookhaven, a city of more than 55,000, calling on EPD to deny TPM's permit application.
- *Resolution of the City of Albany Urging the Protection of the Okefenokee Swamp* (attached as Ex. 26): A resolution from Albany, a city of nearly 70,000, calling on EPD to deny TPM's permit application.

Hundreds of news articles, opinion pieces, and letters to the editor have been published since mid-2019, including pieces in the New York Times, Washington Post, AP, and other national and international publications.²¹ Just last month, the Atlanta Journal-Constitution published a front-page editorial by its president and publisher, on behalf of the Editorial Board, calling on the state to protect the swamp.²²

Filmmakers have produced two award-winning documentaries about the threats to the Okefenokee, *Sacred Waters: Okefenokee in Peril* and *Okefenokee Destiny*.²³ Students across the state have engaged in outreach and advocacy efforts—including an educational video produced by a 3rd grade class at the Museum School, a series of short videos by students at The New School, an advocacy film by UGA students, several documentary-style interviews conducted by an Atlanta high school class, and an economic analysis of potential World Heritage status by a high school class in Newnan. The New School in Atlanta developed a public service curriculum around the current threat to the Okefenokee, organizing a two-day camping trip in the refuge with more than one hundred students, teachers, and administrators; writing letters to the editor; holding a concert to raise funds to support advocacy efforts; and lobbying at the Georgia State Capitol in support of efforts to protect the Okefenokee.

Put simply, the amount, duration, and strength of opposition to TPM’s proposal exceeds that of any other proposed project in state history—and does so by a long stretch.

D. Even a perfectly operated mine would create an unacceptable risk to the Okefenokee; that risk multiplies exponentially with TPM at the helm.

TPM dismisses this unprecedented level of opposition with promises of good corporate stewardship and environmental protection. But its promises are as unsupported by history as they are by science.

TPM and its leadership have a long track record of noncompliance and environmental harm. TPM also operates (or has operated) facilities in Starke, Florida and Ione, California, both of which have committed serious and substantial violations of state environmental regulations. TPM’s owners, Raymon Bean and Steve Ingle, and its environmental manager, Mark Fowler, are also associated with several companies that have poor environmental track records.²⁴ Mr. Bean owns all or part of GreenFuels, LLC and its subsidiaries, Georgia Renewable Power, GRP Madison, GRP Franklin, GRP North Carolina, and North Carolina Renewable Power. Mr. Ingle served as Vice President of GreenFuels and Georgia Renewable Power. Mr. Fowler served as the

²¹ For a list of articles, op-eds, and letters to the editor, see Okefenokee Protection Alliance, *News*, <https://protectokefenokee.org/news> (last visited Mar. 19, 2024).

²² Andrew Morse, *Governor and Speaker must preserve singular wonder of Okefenokee*, Atlanta J.-Const. (Mar. 10, 2024), <https://bit.ly/3TEupVy>.

²³ To view the documentaries, see Okefenokee Protection Alliance, *Documentaries*, <https://protectokefenokee.org/documentary> (last visited Mar. 19, 2024).

²⁴ Corporate documents showing common ownership are collectively attached as Ex. 27.

environmental manager of GreenFuels. As shown below, each of these companies has an unacceptable list of environmental violations.²⁵

1. At its tailings processing plant in Starke, Florida, TPM repeatedly and indiscriminately violated permit conditions.

From around 2017 to 2020, TPM operated a mineral sands processing facility on Trail Ridge in Starke, Florida, where it purchased sand from the Chemours Trail Ridge mine for processing. During its three years of operation, the TPM Starke facility routinely violated its permit conditions.

- **February 2018:** The Florida Department of Environmental Protection (FL DEP) cited TPM for operating the facility for more than a year and a half without first obtaining a proper permit. FL DEP also cited TPM for failing to meet silt fence requirements and for depositing process water and tailing fill into wetlands without permission.²⁶
- **November 2018:** TPM exceeded emissions standards for particulate matter on three of the facility's four pollution control devices during its annual compliance test.²⁷
- **January 2019:** FL DEP sent a warning letter to TPM regarding its particulate matter exceedances.²⁸
- **March 2019:** FL DEP fined TPM \$6,300 for particulate matter exceedances.²⁹
- **December 2019:** TPM again exceeded emissions standards for particulate matter during its annual compliance test.³⁰
- **February 2020:** FL DEP sent a warning letter to TPM regarding its particulate matter exceedances.³¹
- **April 2020:** FL DEP fined TPM \$3,000 for particulate matter exceedances.³²
- **August 2020:** All emissions units were shut down, according to facility closure notices.

²⁵ The notices of violation, inspection reports, and letters cited in this section are collectively attached as Ex. 28.

²⁶ Consent Order, *Florida Dep't of Env't Prot. v. Chemours*, OCG File No. 18-1240 (Feb. 7, 2019).

²⁷ Letter from Florida Dep't of Env't Prot. to Twin Pines Minerals, LLC (Jan. 25, 2019).

²⁸ Letter from Florida Dep't of Env't Prot. to Twin Pines Minerals, LLC (Jan. 25, 2019).

²⁹ Consent Order, *Florida Dep't of Env't Prot. v. Chemours*, OCG File No. 19-0196 (March 12, 2019).

³⁰ Letter from Florida Dep't of Env't Prot. to Twin Pines Minerals, LLC (Feb. 19, 2020).

³¹ Letter from Florida Dep't of Env't Prot. to Twin Pines Minerals, LLC (Feb. 19, 2020).

³² Consent Order, *Florida Dep't of Env't Prot. v. Chemours*, OCG File No. 20-0201 (Apr. 6, 2020).

2. At its new facility in Ione, California, TPM apparently operated an “unpermitted heavy mineral mining and processing operation.”

According to California Water Quality Control Board records, TPM is currently operating an “unpermitted heavy mineral mining and processing operation” in Ione, California.

- **September 2023:** The California Water Quality Control Board reported that “[a] new unpermitted heavy mineral mining and processing operation was operating at [a US Mine facility in Ione, CA] in violation of the California Water Code ... and California Code of Regulations.”³³ “According to US Mine staff, this operation is run by Twin Pines Minerals, LLC.”³⁴
- At the same inspection, the California Water Quality Control Board noted that the discharges from TPM’s unpermitted heavy mineral separation activities are being conveyed to a US Mine discharge pond that is near capacity, leading to a discharge to another site in violation of US Mine’s Facility Order.³⁵



According to the California Water Quality Control Board, TPM is operating “a new unpermitted heavy mineral mining and processing operation,” shown above, in violation of California law. (© Central Valley Regional Water Quality Control Board)

3. During the permitting process for the proposed mine in Charlton County, Georgia, TPM has already violated state and local laws.

Although TPM has not begun mining operations in Charlton County, it has already violated state and local regulations during pre-mining operations:

- **2018 – 2020:** TPM requested a permit from the Corps and EPD for land it didn’t own or control, despite representing under penalty of perjury that it did. The landowner, TIAA Timberlands, made repeated requests to TPM to remove the parcel from the

³³ Cal. Central Valley Regional Water Quality Control Board, Inspection Report (Sept. 8, 2023).

³⁴ *Id.*

³⁵ *Id.*

application, all of which went ignored. TIAA eventually contacted the Corps directly: “To date, this request has been ignored by Twin Pines; consequently, we are formally notifying you on behalf of TIAA Timberlands of such material inaccuracies and asking your assistance with respect to the removal of any and all references to TIAA Timberlands or TIAA Timberlands Property from the Mining Application.”³⁶

- **2019:** TPM conducted land-disturbing activities on the proposed mine site, including bulldozing and grading land within the proposed permit boundary for draglines, equipment, and facilities, before obtaining land disturbance permits from Charlton County.³⁷



TPM broke ground on staging areas before obtaining required permits. (© Joseph Kelly, Georgia River Network)

- **January 2024:** EPD issued an enforcement order and fined TPM \$20,000 for drilling boreholes on 107 days without providing a performance bond or letter of credit, and for drilling boreholes on 24 days while not under the direction of a professional engineer or a professional geologist registered in the state of Georgia.³⁸

³⁶ Letter from Jeff Nuss, Greenwood Res., Inc. (on behalf of TIAA Timberlands I, LLC) to Holly Ross, U.S. Army Corps of Eng'rs (Sept. 15, 2020), <http://bit.ly/3ZB7EDN>.

³⁷ Letter from Veronica Crow, EPD Nonpoint Source Program Manager, to Hon. James Everett, Chair of Charlton County Board of Commissioners and Hampton Raulerson, Charlton Cnty. Adm'r (June 21, 2021) *in* Georgia Dep't of Community Affairs, *Development of Regional Impact #3410 Forms*.

³⁸ Ga. Env't Protection Div., Enforcement Order EPD-WP-9469 (Jan. 23, 2024) (on file with EPD).

4. At GRP Madison (a GreenFuels subsidiary), TPM principals drew considerable fire for repeated environmental violations.

Georgia Renewable Power (GRP) began operating a biomass facility in Madison County, Georgia, in mid-2019. The facility routinely violated permit conditions and was subject to numerous enforcement orders, citizen complaints, and lawsuits.

- **December 2019:** EPD issued a Notice of Violation based on ongoing fugitive emissions complaints.³⁹
- **December 2019:** The U.S. District Court for the Middle District of Georgia entered a consent decree and judgment ordering GRP Madison to pay \$312,500, \$312,500, and \$225,000 to three civil plaintiffs for discharging wastewater onto plaintiffs' properties and \$4,000 in civil penalties to the federal government, for a total payment of \$854,000.⁴⁰
- **June 1, 2020:** EPD issued an enforcement order and fined GRP Madison \$7,500 for failing to maintain and operate the facility "in a manner consistent with good air pollution control practices for minimizing fugitive emissions."⁴¹
- **June 18, 2020:** EPD issued an enforcement order and fined GRP Madison \$16,800 for discharging wastewater without a permit; failing to provide accurate information in its NPDES permit application; discharging contaminated compressor oil; and having an insufficiently sized stormwater pond.⁴²
- **August 2020:** EPD issued an enforcement order against GRP Madison for burning material in the commingled fuel pile in a manner that presented a risk of fire and contamination in runoff.⁴³
- **2021-2023:** EPA records show unresolved Clean Air Act permit violations in all of the last twelve reporting quarters.⁴⁴
- **EPD citizen complaints:** Complaint ID nos. 87465, 90772, 90773, 91263, 91306, 91400, 91636, 91639, 91650, 91651, 91687, 91715, 91869, 92129, 92242, 92869, 92876, 92967, 93396, 93670, 94013, 94130, 94308, 94404, 94798, 94864, 94981, 95100, 95101, 95467, 95920, 96034, 98549, 150297, 105296, and 102670.

³⁹ Ga. Dep't of Env't Prot., Notice of Violation re: GRP Madison Renewable Energy Facility (Dec. 23, 2019) (on file with EPD).

⁴⁰ Consent Decree and Judgment, *Michael v. GRP Madison LLC*, 3:19-cv-000190-CDL (M.D. Ga. Dec. 5, 2019).

⁴¹ Ga. Env't Protection Div., Enforcement Order EPD-AQC-7032 (June 1, 2020) (on file with EPD).

⁴² Ga. Env't Protection Div., Enforcement Order EPD-WP-8932 (June 18, 2020) (on file with EPD).

⁴³ Ga. Env't Prot. Div., Enforcement Order EPD-AQC-7041 (Aug. 7, 2020) (on file with EPD).

⁴⁴ U.S. Env't Prot. Agency, Detailed Facility Report for GRP Madison, LLC, <https://bit.ly/43ADpzy> (last visited Jan. 21, 2024).

5. At GRP Franklin (a GreenFuels subsidiary), TPM principals violated air, water, and noise pollution laws, causing a significant fish kill after releasing contaminated water into a nearby creek.

GRP Franklin began operating a biomass facility in Franklin County, Georgia, in mid-2019. Like GRP Madison, the Franklin facility routinely violated permit conditions and was subject to numerous enforcement orders, citizen complaints, and lawsuits.

- **October 2019:** GRP released more than one million gallons of contaminated fire-suppression water into Indian Creek, resulting in a fish kill of approximately 2,159 fish in 4.6 miles of the creek.⁴⁵
- **November 2019:** EPD observed multiple stormwater violations during a site visit.⁴⁶
- **December 2019:** EPD issued a Notice of Violation for various permit violations.⁴⁷
- **December 2019:** The Franklin County Board of Commissioners unanimously found “that an emergency condition exists where the dangerous noise levels and chemical emissions produced by the operation of the Georgia Renewable Power Plant located in Franklin County, Georgia, constitute[d] a nuisance as defined in Section 18-6 of Chapter 18 of the Franklin County Code of Ordinances.”⁴⁸
- **June 2020:** EPD issued an enforcement order and fined GRP Franklin \$5,604 for exceeding particulate matter emissions standards.⁴⁹
- **September 2020:** EPD issued an enforcement order and fined GRP Franklin \$48,107 for violations related to the October 2019 fish kill, as well as other emissions exceedances and reporting violations.⁵⁰
- **January 2021:** EPD issued a Notice of Violation for various permit violations.⁵¹
- **2021:** 48 Franklin County residents filed nuisance lawsuits against GRP Franklin. The first case is scheduled for trial in May 2024.⁵²

⁴⁵ Ga. Env’t Prot. Div., Enforcement Order EPD-WP-8973 (Sept. 8, 2020) (on file with EPD).

⁴⁶ *See id.*

⁴⁷ U.S. Env’t Prot. Agency, Detailed Facility Report for GRP Franklin Renewable Energy Facility, <https://bit.ly/3PHbY15> (last visited Jan. 21, 2024).

⁴⁸ MJ Kneiser, *Franklin BOC Takes Emergency Action Against Biofuel Plant for Violating County Nuisance Act, Calls Violations “Dangerous,”* 92.1 WLHR (Dec. 12, 2019), <https://bit.ly/4aBv4xX>.

⁴⁹ Ga. Env’t Prot. Div., Enforcement Order EPD-AQC-7031 (June 1, 2020) (on file with EPD).

⁵⁰ Enforcement Order EPD-WP-8973, *supra* n. 45.

⁵¹ Detailed Facility Report for GRP Franklin Renewable Energy Facility, *supra* n. 47.

⁵² *Millen et al. v. Georgia Renewable Power, LLC*, 3:21-cv-42 (M.D. Ga. 2021).

- **2021-2023:** EPA records show Clean Water Act permit violations in eight out of the last twelve quarters, with “Significant/Category 1 noncompliance” during two quarters of 2023.⁵³
- **August 2023:** EPD issued a Notice of Noncompliance.⁵⁴
- **EPD citizen complaints:** 90853, 91376, 91886, 93151, 94331, and 95458.

6. At North Carolina Renewable Power (a GRP and GreenFuels subsidiary), Mr. Ingle and other GRP principals had a long track record of environmental noncompliance.

North Carolina Renewable Power (NCRP), a GRP and GreenFuels subsidiary, operated a biomass facility in Lumberton, NC between 2015 and 2020. Like other GreenFuels companies, NCRP has a track record of permit violations, most of which occurred under Mr. Ingle’s leadership.

- **May 2015:** Three months after NCRP received a permit to operate under new ownership, the N.C. Department of Environment and Natural Resources issued a Notice of Deviation for failure to meeting reporting requirements.⁵⁵
- **December 2015:** NCRP exceeded emission limits for particulate matter 2.5 and sulfuric acid mist.⁵⁶
- **April 2016:** NCRP’s semi-annual report from 2015 showed 25 exceedances of sulfur dioxide and 43 for nitrogen oxides. The facility’s continuous emissions monitoring system failed to operate as required.⁵⁷
- **June 2016:** Based on December 2015, January 2016, and March 2016 submittals, the North Carolina Department of Environmental Quality (NC DEQ) issued Notices of Violation to NCRP for exceeding particulate matter 2.5 emission limits, exceeding monthly sulfur dioxide and nitrogen oxide emission limits, deficient operation and management practices, and failure to complete source testing. The facility was placed on a quarterly rather than semi-annual reporting basis.⁵⁸

⁵³ Detailed Facility Report for GRP Franklin Renewable Energy Facility, *supra* n. 47.

⁵⁴ *Id.*

⁵⁵ Letter from N.C. Dep’t of Env’t. & Nat. Res. to Steven Ingle, N.C. Renewable Power (May 15, 2015).

⁵⁶ N.C. Dep’t. of Env’t Quality, Stack Test Observation Report (Jan. 6, 2016).

⁵⁷ Letter from N.C. Dep’t. of Env’t Quality to Steven Ingle, N.C. Renewable Power (Apr. 15, 2016).

⁵⁸ Letter from N.C. Dep’t. of Env’t Quality to Steven Ingle, N.C. Renewable Power (June 29, 2016).

- **August 2016:** NC DEQ fined NCRP \$9,000 in a special consent order, which noted that the facility's continuous emissions monitoring system was down 43% of the time in 2015.⁵⁹
- **September 2016:** NC DEQ issued a Notice of Deficiency to NCRP for record-keeping issues.⁶⁰
- **September 2016:** NCRP exceeded allowable carbon monoxide levels even after the plant underwent repairs meant to address the issue.⁶¹
- **November 2016:** NC DEQ issued another Notice of Violation based on the prior month's carbon monoxide exceedances.⁶²
- **January 2017:** NC DEQ fined NCRP more than \$15,000 in a second consent order.⁶³
- **February 2017:** An equipment failure caused a fire in the facility's "baghouse," which burned for more than four hours and caused an unknown amount of emissions.⁶⁴
- **March 2017:** NC DEQ issued two Notices of Violation to NCRP, one for nitrogen oxide exceedances and the other for exceedingly high monitoring downtimes.⁶⁵
- **June 2017:** NC DEQ issued seven Notices of Violation to NCRP for air quality violations, record-keeping deficiencies, and maintenance violations.⁶⁶
- **July 2017:** NC DEQ fined NCRP \$11,555 for various permit violations.⁶⁷
- **November 2018:** NC DEQ issued a Notice of Violation to NCRP for nitrogen oxide exceedances.⁶⁸
- **February 2019:** NC DEQ fined NCRP \$8,596 for various permit violations.⁶⁹

⁵⁹ N.C. Env't Mgmt. Comm., Special Order by Consent, SOC 2016-001 (June 30, 2016).

⁶⁰ Letter from N.C. Dep't. of Env't Quality to Steven Ingle, N.C. Renewable Power (Sept. 12, 2016).

⁶¹ Letter from Steven Ingle, N.C. Renewable Power to N.C. Dep't. of Env't Quality (Oct. 28, 2016).

⁶² Letter from N.C. Dep't. of Env't Quality to Steven Ingle, N.C. Renewable Power (Nov. 16, 2016).

⁶³ N.C. Env't Mgmt. Comm., Special Order by Consent, SOC 2017-001 (Jan. 25, 2017).

⁶⁴ Letter from N.C. Dep't. of Env't Quality to Steven Ingle, N.C. Renewable Power (March 31, 2017).

⁶⁵ Letter from N.C. Dep't. of Env't Quality to Steven Ingle, N.C. Renewable Power (March 13, 2017).

⁶⁶ Letter from N.C. Dep't. of Env't Quality to Steven Ingle, N.C. Renewable Power (June 15, 2017); Letter from N.C. Dep't. of Env't Quality to Steven Ingle, N.C. Renewable Power (June 30, 2017).

⁶⁷ N.C. Dep't. of Env't Quality, Civil Penalty Assessment (July 25, 2017).

⁶⁸ Letter from N.C. Dep't. of Env't Quality to Carey Davis, N.C. Renewable Power (Nov. 27, 2018).

⁶⁹ N.C. Dep't. of Env't Quality, Civil Penalty Assessment (Feb. 28, 2019).

- **April 2020:** NC DEQ issued a Notice of Violation to NCRP for excessive monitoring downtime.⁷⁰
- **September 2020:** NC DEQ fined NCRP \$3,449 for various permit violations.⁷¹
- **November 2020:** NCRP reported that it shut down the plant on November 1 and that it would perform upgrades upon receiving a new major source air pollution permit.
- **December 2020:** NC DEQ issued a Notice of Violation to NCRP for emissions exceedances that occurred between January and June 2020, including 18 violations of nitrogen oxide limits.⁷²
- **April 2021:** NC DEQ fined NCRP \$10,407 for various permit violations, bringing the total amount of compliance fines to more than \$100,000.⁷³
- **May 2022:** NC DEQ issued a new air quality permit reclassifying the facility as a PSD major source and requiring the facility to implement Best Available Control Technology on its boilers and other emissions sources. The facility was still not operational.
- **January 2023:** Although the facility had not been operational since November 2020, NC DEQ issued a Notice of Violation for failure to submit its acid rain permit renewal.⁷⁴
- **February 2023:** Although the facility had not been operational since November 2020, NC DEQ issued a Notice of Deficiency for reporting issues.⁷⁵
- **February 2023:** NCRP notified NC DEQ that it was shutting down, having not operated since November 2020, and requested rescission of its air pollution permit.

7. Whether TPM and its leadership’s track record is attributable to neglect or incompetence, EPD should not trust TPM to mine next to the Okefenokee.

TPM’s President Steven Ingle dismisses these concerns by saying, “There’s no way we would do anything to harm the swamp which would expose us to regulatory actions and place our investment at risk.”⁷⁶ History shows otherwise. TPM and its leadership appear to view

⁷⁰ Letter from N.C. Dep’t. of Env’t Quality to Carey Davis, N.C. Renewable Power (Apr. 16, 2020).

⁷¹ N.C. Dep’t. of Env’t Quality, Civil Penalty Assessment (Sept. 18, 2020).

⁷² Letter from N.C. Dep’t. of Env’t Quality to Carey Davis, N.C. Renewable Power (Dec. 9, 2020).

⁷³ Letter from N.C. Dep’t. of Env’t Quality to Steven Ingle, N.C. Renewable Power (Apr. 26, 2021).

⁷⁴ Letter from N.C. Dep’t. of Env’t Quality to Carey Davis, N.C. Renewable Power (Jan. 12, 2023).

⁷⁵ Letter from N.C. Dep’t. of Env’t Quality to Carey Davis, N.C. Renewable Power (Feb. 22, 2023).

⁷⁶ Russ Bynam, *Bill to halt mining near Okefenokee gets hearing but no vote*, Associated Press (Mar. 14, 2023), <http://bit.ly/408fDb4>.

environmental noncompliance fines as a cost of doing business, not a deterrent against violations—a practice that seems likely to continue. As one Madison County resident put it:

They said they would be good neighbors, and they lied.... [T]he plant repeatedly and illegally discharged and disposed of wastewater, they dumped stormwater, they disposed their ash on our neighbors, and generated so much noise, odor, fugitive dust, and air pollution that they ruined the quality of life in our community.... It got so bad, that I had to sell my home.... If you grant them a permit, Twin Pines will destroy the Okefenokee, just like its sister company destroyed my community. Please, please do not let that happen.⁷⁷

Ultimately, whether TPM and its leadership's track record is attributable to an intentional disregard for environmental regulations or simply incompetence, neither EPD nor the public should trust TPM or its leadership with a world-class resource like the Okefenokee Swamp. Even a perfectly operated mine would create an unacceptable risk to the Okefenokee; that risk multiplies exponentially with TPM at the helm.

II. TECHNICAL COMMENTS

A. TPM's proposed mine poses substantial risks to the Okefenokee Swamp.

1. The proposed mine would lower water levels in the Okefenokee Swamp by removing approximately 560,000 gallons of water per day from the Okefenokee water budget.

Independent experts anticipate that the proposed mine will remove approximately 560,000 gallons of water per day from the Okefenokee Swamp water budget—that is, the accounting of water stored within and exchanged among the Okefenokee Swamp watershed—thereby decreasing water levels in both the swamp and the St. Marys River.

To keep the mining pit dry, TPM plans to continuously pump approximately 1.128 million gallons per day (MGD) of seepage water from the surficial, or uppermost, aquifer.⁷⁸ According to Dr. Rhett Jackson, the Interim Dean of Academic Affairs and the John Porter Stevens Distinguished Professor of Water Resources at the Warnell School of Forestry and Natural Resources at the University of Georgia, approximately half of this seepage water will come from the west, as cones of depression of groundwater levels around pumped wells are typically symmetrical.

⁷⁷ EPD 2023 Public Hearing, *supra* n. 16 (statement of Gina Ward).

⁷⁸ Dr. C. Rhett Jackson, *Re-Analysis of hydrologic effects of TPM's proposed Trail Ridge mine on the Okefenokee Swamp based on new Water Management Plan and Groundwater Memo released November 2022* at 1 (Nov. 22, 2022) (attached as Ex. 29).

The proposed mine straddles a groundwater divide, with groundwater on the west side flowing to the Okefenokee Swamp. By continuously pumping .87 cubic feet per second (cfs) (half of 1.74 cfs) that would otherwise flow to the Okefenokee, the proposed mine will remove that amount (approximately 560,000 gallons per day) from the swamp. The other half would be removed directly from the St. Marys water budget.

The Okefenokee is mostly rain-fed (70-80%) and thus “very sensitive to drought.”⁷⁹ As a result, the removal of 560,000 gallons per day of input is likely to triple the duration and severity of drought in the southeastern portion of the swamp and the Upper St Marys River.⁸⁰

TPM is also seeking a permit to withdraw up to 1.44 million gallons per day from the Floridan Aquifer for process water.⁸¹ According to Dr. Jackson, this would reduce pressures in the Floridan Aquifer, slightly increasing leakage from the swamp to the aquifer. The increased leakage from the swamp will compound the drought-producing impacts of seepage water pumping, together potentially quadrupling the frequency of severe drought conditions in the southeastern portion of the swamp.⁸²



A side-by-side comparison of the Okefenokee Swamp in April 2021 and March 2011 (during a D3 drought the month before the Honey Prairie Fire began) shows the difference between the Okefenokee in normal conditions versus drought conditions, which could be exacerbated by the proposed mine. (© Google Earth)

⁷⁹ *Id.* at 3.

⁸⁰ *Id.*

⁸¹ *Id.* at 2.

⁸² *Id.*

These risks are substantial and alarming. Georgia is already the most drought-prone state in the eastern half of the United States, spending 30-40% of the time during the last 20 years in at least moderate drought.⁸³ During that time, Charlton, Clinch, and Ware counties have experienced more than 100 weeks in “extreme” (or “D3”) drought,⁸⁴ defined as “major crop/pasture losses, extreme fire danger, and widespread water shortages or restrictions.”⁸⁵

These drought occurrences are only expected to increase in the coming decades due to a combination of high temperatures, which increase evaporation rates and decrease soil moisture during dry spells, and increased water demand, which affects aquifer recharge rates. Indeed, the percentage of the southeast region experiencing moderate to severe drought has already increased over the past three decades. Since the mid-1970s, the area of moderate to severe spring and summer drought has increased by 12 percent and 14 percent, respectively. Fall precipitation tended to increase in most of the southeast, but the extent of region-wide drought still increased by nine percent.⁸⁶

2. The proposed mine would destroy the distinct geological layers of Trail Ridge, making it difficult to reestablish wetlands and potentially reducing long-term flows to the Okefenokee Swamp.

Experts are also concerned that mixing and combining the distinct geological layers that make up Trail Ridge will increase the bulk hydraulic conductivity of the system, causing Trail Ridge to transmit water faster after mining. This increase in hydraulic conductivity will likely lower the water table on Trail Ridge, making it difficult to reestablish wetlands on the site after mining.⁸⁷ In addition, the homogenization of soils may cause reduced flows from Trail Ridge to the Okefenokee.⁸⁸ Although this impact is hard to predict without detailed 3D modeling and a better understanding of the hydraulic characteristics of the replaced sands, according to Dr. Jackson, if the replaced sands are better connected to the steeper groundwater system to the east, the groundwater divide will move west of its original position, causing reduced flows from Trail Ridge to the swamp and increased flows from Trail Ridge to St. Marys.⁸⁹

⁸³ Nat'l Oceanic & Atmospheric Ass'n Nat'l Integrated Drought Info. Sys., *How Drought Prone is Your State? A Look at the Top States and Counties in Drought Over the Last Two Decades* (Apr. 19, 2019), <https://bit.ly/3IYJ5tM>.

⁸⁴ Tableau Public, *Percent of Weeks in Extreme Drought (D3) or Greater [2000–present]*, <https://tabsoft.co/3PDFmVW> (last visited Mar. 28, 2024).

⁸⁵ Nat'l Weather Serv., *Drought Information*, <https://bit.ly/4acy4kj> (last visited Mar. 28, 2024).

⁸⁶ Global Change Research Program, *Global Climate Change Impacts in the United States* 111 (Karl, T.R., J.M. Melillo, and T.C. Peterson, eds., 2009).

⁸⁷ C. Rhett Jackson, *Hydrologic Connections Between Trail Ridge and the Okefenokee Swamp and the Potential Effects of Mineral Sands Mining on the Okefenokee and St. Marys River* 5 (Aug. 29, 2022).

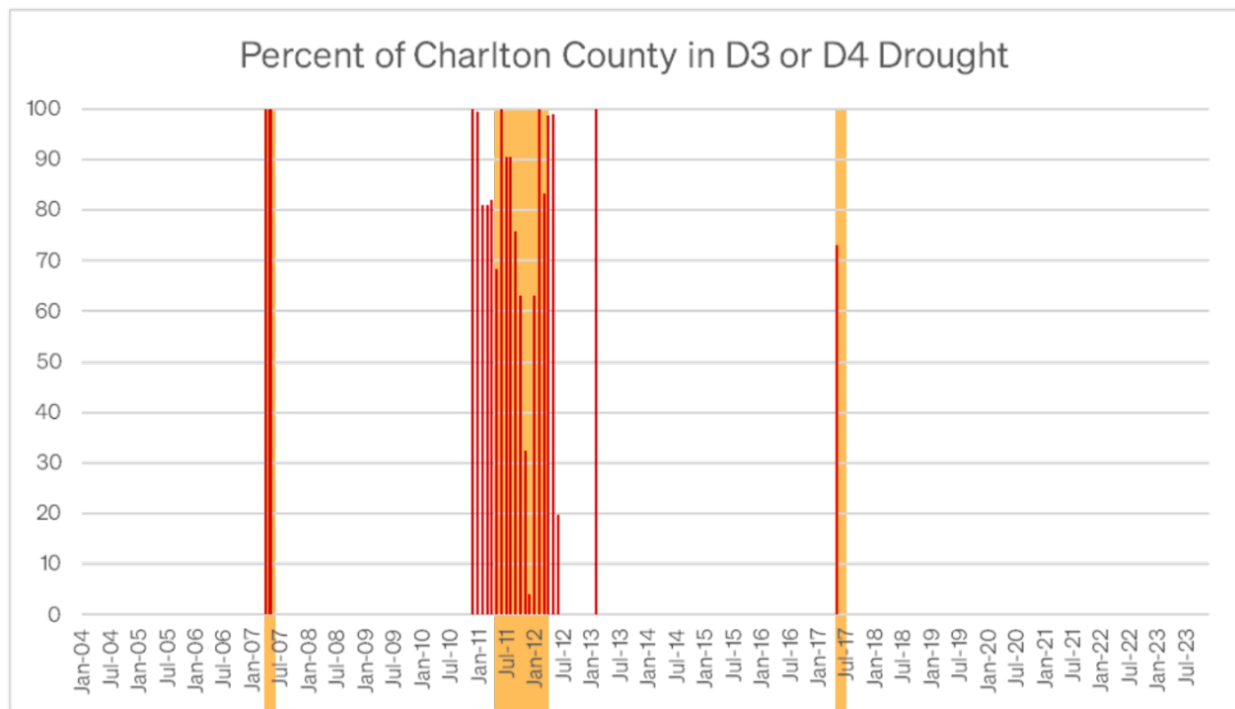
⁸⁸ *Id.* at 1.

⁸⁹ *Id.*

3. The proposed mine would increase wildfire risk in the vicinity of the swamp by exposing peat and increasing the duration and severity of drought in the Okefenokee Swamp.

Decreased water levels and more frequent drought in the Okefenokee directly correspond with increased wildfire risks. Decreased water levels can expose upper layers of peat—the precursor to coal—making them more susceptible to fires, and a longer, more intense burning. In addition, drought can dry out other fuels for wildfire, like vegetation and trees, making them more flammable and increasing the risk of widespread fire. In turn, wildfires can also prolong droughts by reducing the moisture in soils and damaging vegetation.

During the past twenty years, Charlton County has seen “extreme” or D3 drought in 2007, 2010–2012, 2013, and 2017. These periods largely correspond with the three major wildfires in the Refuge during that time.



The Okefenokee’s three major wildfires during the past two decades (denoted in orange) correspond with significant drought (denoted by red bars), including the Bugaboo Scrub Fire (April–June 2007), the Honey Prairie Fire (April 2011–April 2012), and the West Mims Fire (April–July 2017).⁹⁰

⁹⁰ For drought data, see National Integrated Drought Information System, *Historical Conditions for Charlton County*, <https://bit.ly/4aBQJGk> (last accessed Apr. 4, 2024).

In April 2007, the Bugaboo Scrub fire burned more than 564,000 acres both within and outside refuge boundaries, with a total economic cost of about \$130 million, including \$65 million in lost timber and \$44 million in firefighting costs.⁹¹ More than 6,000 people were forced to evacuate their homes, and schools, state roads, and interstates in the area closed.



In 2007, the Bugaboo Scrub Fire burned more than 564,000 acres during a period of extreme drought. (© FEMA)

In 2011, the Honey Prairie Fire burned more than 300,000 acres. As the longest lasting fire in the Refuge's 75-year history, the Honey Prairie Fire burned for nearly a year, with smoke plumes reaching into neighboring communities and beyond.⁹²

Most recently, in April 2017, the West Mims Fire burned more than 150,000 acres in three counties, including more than 30,000 acres of industrial property and timberlands, causing an estimated timber loss of nearly \$40 million.⁹³ Over the span of three months, the fire led to the mandatory evacuation of St. George and much of southern Charlton County,⁹⁴ with smoke traveling to St. Simons Island, Jekyll Island, Jacksonville, and beyond.

⁹¹ Mary Cardwell, *Okefenokee Swamp fire: Why swamps burn*, Atlanta J.-Const. (May 19, 2017), <https://bit.ly/4ab5W0R>.

⁹² Mary Landers, *Okefenokee fire finally out*, Savannah Morning News (Apr. 17, 2012), <https://bit.ly/3IYbKz0>.

⁹³ Ga. Forestry Comm'n, *Wildfire Assessment for the West Mims Fire* (2017), <https://bit.ly/49hShE9>.

⁹⁴ Nat'l Weather Serv., *West Mims Fire 2017* (last visited Mar. 28, 2024), <https://bit.ly/4ctVVxD>.



In 2017, smoke from the West Mims fire reached all the way to Georgia's coast and beyond. (© NASA)



The West Mims fire burned more than 30,000 acres of industrial property and timberlands, including the ones seen here. (© Michael Lusk)

The Charlton County Hazard Mitigation Plan, which includes the Cities of Folkston and Homeland, estimates that approximately 77% of homes in Charlton County are susceptible to wildfire based on their location relative to natural fuel sources, as are 70% of commercial, industrial, agricultural, religious, non-profit, government, education, and utility properties. Even homes and businesses in lower-risk areas are subject to smoke hazards, including increased emergency room visits for asthma, COPD, pneumonia, acute bronchitis, and heart failure. Peat fire smoke also poses a significant risk to travelers on nearby roads like I-95. Last October, a combination of wildfire smoke and fog (known as “super fog”) caused a 158-vehicle pileup on I-55 in Louisiana. In 2012, super fog from a marsh fire in Paynes Prairie Preserve State Park in north Florida caused a 21-vehicle crash on I-75. According to experts, the phenomenon is most common near marshy areas or peat fires in the southern United States.⁹⁵

Increasing the risk of a fast-spreading wildfire in a county with an already-high hazard rating is short-sighted and irresponsible.

4. The proposed mine would likely contaminate ground and surface water in the vicinity of the mine by liberating heavy metals, radionuclides, and other contaminants that are currently bound up in Trail Ridge soils.

The proposed mine is also likely to contaminate nearby ground and surface water. Mining operations similar to TPM’s have released a variety of metals and radionuclides into local waters, yet the hydrogeology discussions included with the permit application materials do not include any information, evaluation, or prediction of impacts of the mining process on either groundwater or surface water quality. TPM has not shared any fate and transport analysis of contaminants that could be released during the mining with EPD and the public. SELC first raised this issue with TPM in May 2019, again raised the issue in written comments to TPM’s consultant, TTL, Inc. in September 2019, and again raised the issue in written comments to the U.S. Army Corps of Engineers and EPD in 2019, 2020, and 2023.

Despite these ongoing requests, TPM has never included contaminant fate and transport in any of the modeling done in support of the proposed mine. Prediction of potential impacts to the quality of groundwater and surface water in and around the proposed mine site, including to the Okefenokee Swamp, is a critical question TPM has repeatedly ignored.

Instead, TPM states in its response to comments that tests of the soil at the mine site found that heavy metals are “not readily leachable” and therefore disposal of post-mining soils back into the mining pits will have “no significant impact on groundwater quality.” TPM relies on this claim to assert that no fate and transport modeling is necessary to evaluate when peak concentrations of heavy metals and other contaminants from the mining site will reach groundwater monitors. But TPM’s approach is flawed and risks failing to evaluate, predict, and

⁹⁵ Mark Schleifstein, *Superfog conditions that contributed to massive I-55 pileup could last for days in New Orleans and Slidell areas, weather service says* (Oct. 23, 2023), <https://bit.ly/4afOXux>.

mitigate contamination of groundwater with heavy metals and other toxics from the mining site. The tests performed only detect leaching of heavy metals over a very short period. The test used by TPM's consultants, Synthetic Precipitation Leaching Procedure (SPLP), is used to analyze leachate from a soil sample. According to the EPA's 2003 guidance on leaching tests, SPLP assumes that both kinetic and local equilibrium has been reached.⁹⁶

The post-mining soil material or mine "tailings" will be left exposed to groundwater and precipitation for weeks, months, or even years. Many of the heavy metals present in these soils take a longer time to dissolve and migrate than the tests that were used would detect. There are better, more reliable, more useful testing methods available that can and should be run on TPM site soils, and which should be used to predict contaminant leaching and to inform fate and transport modeling. EPA encourages the use of the Leaching Environmental Assessment Framework (LEAF), a leach testing and modeling approach that is designed to "provide an estimate of the release of constituents of potential concern from a wide range of solid materials."⁹⁷

This testing framework is the kind of standard technology that should be used to assess the potential impacts of large mining operations like TPM. Without properly sensitive and comprehensive testing of potential leaching of heavy metals and other hazardous pollutants from the TPM site, neither TPM nor EPD can properly design and implement a groundwater monitoring regime that will detect the migration of hazardous pollutants through the post-mining disposed soils and nearby groundwater.

5. The proposed mine will have far reaching effects on wildlife, including threatened and endangered species and migratory birds.

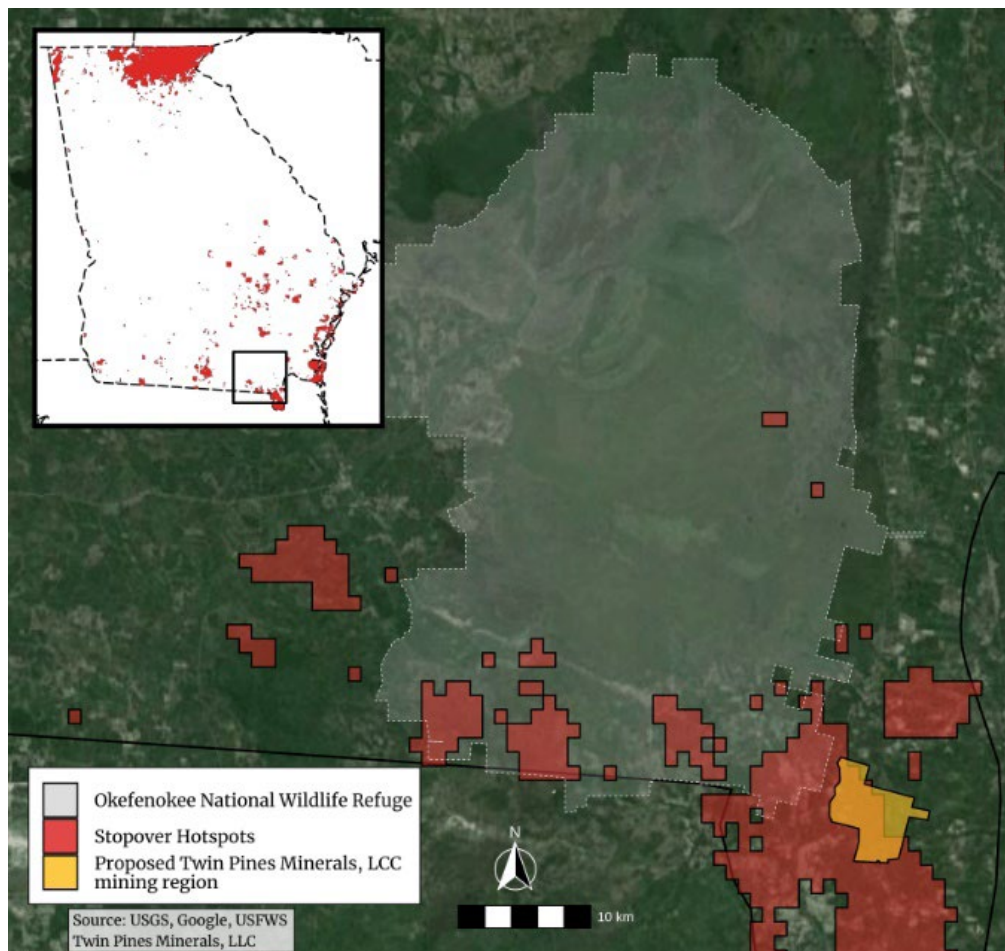
The Okefenokee Swamp and St. Marys River provide unique and important habitat to wildlife, including several threatened or endangered species. Despite TPM's assertions otherwise, it is likely that the proposed mine's hydrological impacts, when coupled with the conversion of Trail Ridge habitat, would impact several species that are found within the larger Okefenokee ecosystem as well as downstream in the St. Marys River. Federally protected sturgeon are particularly vulnerable to harm from hydrological impacts. Indirect impacts from the proposed mine, such as increased truck traffic and increased lighting, also pose a significant risk, particularly to Florida panthers, black bears, and migratory birds, as described in Appendix B.

⁹⁶ See EPA, *A Guide to the Use of Leaching Tests in Solid Waste Management Decision Making* (March 2003) (attached as Ex. 30).

⁹⁷ EPA, *Leaching Environmental Assessment Framework How-To Guide* (May 2019)(attached as Ex. 31).

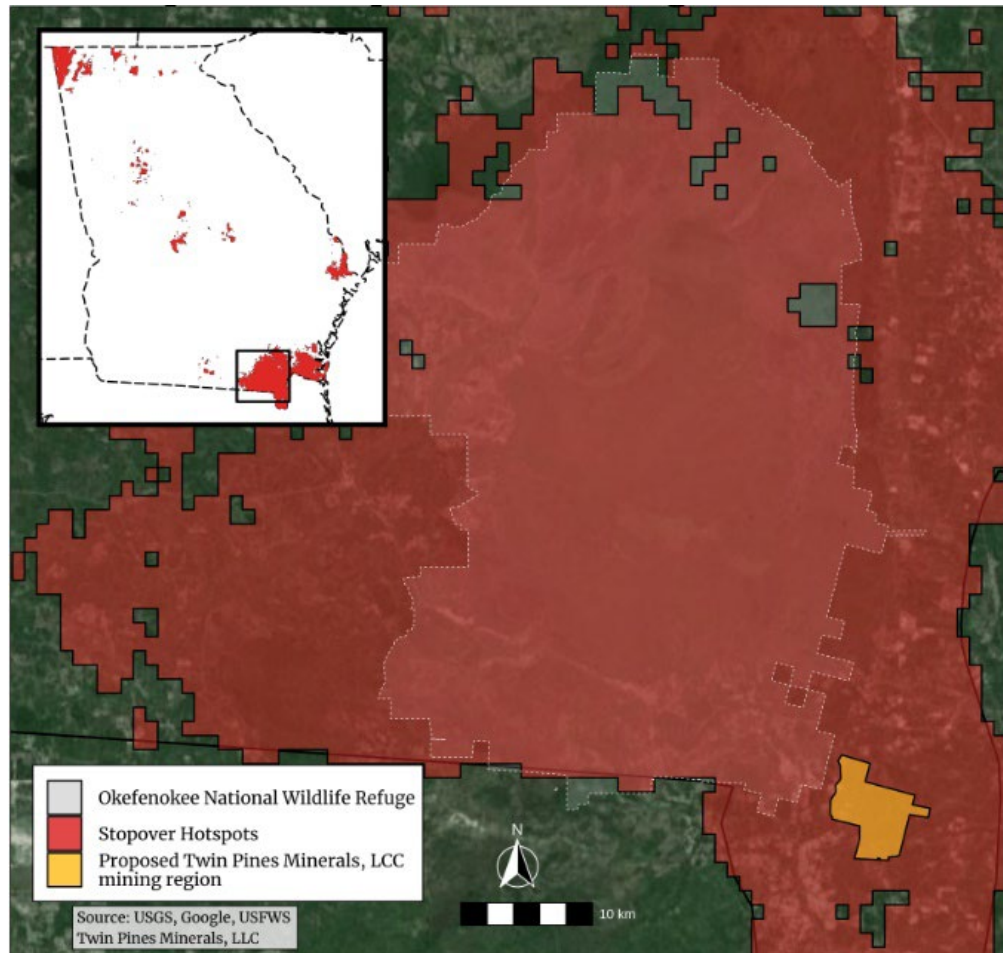
a. The proposed mine would destroy important stopover habitat for migratory birds.

Along with other partners and researchers, the Cornell Lab of Ornithology and Colorado State University have used radar and satellite imagery to develop BirdCast, a bird migration forecasting tool.⁹⁸ In addition to providing multi-day forecasts of bird migration patterns over the continental US, BirdCast also provides real-time data on the population density and direction of migratory birds flying over the country. An analysis of BirdCast data from 2000 to 2020 reveals that the Okefenokee Swamp and surrounding environment is a critically important stopover area for vast and diverse populations of migratory birds, both during spring and fall migrations. Particularly notable, portions of Trail Ridge which include and surround the proposed mining site are hotspots for migration stopovers. These areas provide migratory birds with needed shelter and key food sources as they travel to and from breeding and wintering grounds.



Analysis of spring stopover hotspots for bird migration using BirdCast migration tools (© Birds Georgia)

⁹⁸ BirdCast Migration Tools, Cornell Lab and Colorado State University (last visited Mar. 29, 2024), <https://birdcast.info/>.



Analysis of fall stopover hotspots for bird migration using BirdCast migration tools (© Birds Georgia)

The proposed mine would disrupt these critical stopover areas in a variety of ways, including by destroying vegetation and soil structure, removing groundwater, generating light and noise, exacerbating wildfires, and releasing toxic contaminants. All of these disruptions are likely to negatively impact migratory birds and their habitat in and around the mining site, as well as the broader Okefenokee ecosystem.

b. The proposed mine threatens shortnose and Atlantic sturgeon in the St. Marys River.

The St. Marys River is designated critical habitat for shortnose and Atlantic sturgeon, both of which are federally listed endangered species. Both species are sensitive to changes in water quantity and quality, including water flow, water level, temperature, dissolved oxygen content, salinity, sedimentation, and the presence of toxic contaminants.⁹⁹ The proposed mine

⁹⁹ NMFS, 5-Year Review: Summary and Evaluation, South Atlantic Distinct Population Segment of Atlantic Sturgeon 17 (Aug. 18, 2023).

could have an impact on any or all of these variables in the St. Marys River, thereby disrupting vital behaviors, including spawning, feeding, and sheltering.

Atlantic sturgeon are an ancient species of anadromous fish historically found in the Atlantic Ocean and rivers and bays of the Atlantic coast from Canada to Florida. Shortnose sturgeon are amphidromous fish historically found in coastal rivers along the same range, but unlike Atlantic sturgeon typically spend relatively little time in the ocean.

Beginning in the late 19th century and continuing throughout the 20th century, habitat destruction and overfishing led to steep declines in the species' population throughout their range.¹⁰⁰ Shortnose sturgeon were listed in 1967 under the precursor to the Endangered Species Act and continue to be protected as endangered throughout their range. In 2012, Atlantic sturgeon were listed under the Endangered Species Act as five distinct population segments (DPS). One of these, the South Atlantic DPS, occupies rivers and estuaries from South Carolina to northern Florida, including the St. Marys River.¹⁰¹ The National Marine Fisheries Service (NMFS) has classified the South Atlantic DPS as recovery priority 1C, meaning it is a species for which extinction is almost certain in the immediate future because of rapid population decline or habitat destruction, and because of conflicts with construction, development, or economic activity.¹⁰²

The shortnose and Atlantic sturgeon populations in the St. Marys River are vitally important and uniquely vulnerable. For many years, both shortnose and Atlantic sturgeon were considered extirpated from St. Marys River,¹⁰³ but both species were recently rediscovered in the river. Shortnose sturgeon trends are largely unknown, but from 2014 to 2016, researchers from the University of Georgia captured genetically distinct resident juvenile Atlantic sturgeon in the St. Marys. The presence of year-old juveniles was strong evidence that Atlantic sturgeon native to the river had returned and successfully spawned.¹⁰⁴

These sturgeon are believed to be the southern-most spawning population of Atlantic sturgeon remaining. The most recent estimates from the U.S. Fish and Wildlife Service indicate that the St. Marys supports a native population of only about 14 individual fish.¹⁰⁵ NMFS warned in 2022 that St. Marys sturgeon were at risk of inbreeding and loss of evolutionary potential.¹⁰⁶

¹⁰⁰ Final Listing Determination for Two Distinct Population Segments of Atlantic Sturgeon, 77 Fed. Reg. 5914 (Feb. 6, 2012), <https://bit.ly/3vLyKyb>.

¹⁰¹ Critical Habitat for the Endangered Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon, 80 Fed. Reg. 36078 (June 3, 2016), <https://bit.ly/49tMStQ>.

¹⁰² NMFS, Recovering Threatened and Endangered Species, FY 2019–2020 Report to Congress 13 (2022).

¹⁰³ NMFS, 5-Year Review: Summary and Evaluation, South Atlantic Distinct Population Segment of Atlantic Sturgeon 27 (Aug. 18, 2023).

¹⁰⁴ *Id.* at 7.

¹⁰⁵ *Id.* at 13.

¹⁰⁶ *Id.* at 14.

In addition to being the southern-most riverine habitat for Atlantic sturgeon, the St. Marys is also among the shortest, warmest, most acidic, and flattest rivers in which South Atlantic sturgeon spawn. In other rivers, Atlantic sturgeon spawn dozens or even hundreds of miles upstream, well upriver of brackish estuaries and below the fall line or major cataracts. Spawning sturgeon lay their eggs in well-oxygenated water along hard-bottom substrates like gravelly shoals or rocky banks.¹⁰⁷

The St. Marys is somewhat distinct in that the river is tidally-influenced all the way to Folkston, GA and has relatively few shoals and hard-bottom substrates. These unique physical characteristics and the scarcity of sturgeon in the St. Marys have made finding spawning sites difficult. Researchers believe that limestone outcroppings existing anywhere from Folkston to the confluence of the North and Middle Prongs of the river could serve as crucial spawning sites. Eggs, larvae, and juvenile sturgeon require particular riverine and estuarine environments to shelter, feed, and develop. Because of the unique physical characteristics of the St. Marys, there may only be a few, small suitable areas for sturgeon to persist.¹⁰⁸

The St. Marys Riverkeeper and NMFS sent letters to EPD warning that the proposed mine could harm protected shortnose and Atlantic sturgeon.¹⁰⁹ In response to those comments, EPD recognized that the proposed mine might have consequences for sturgeon in the St. Marys River, and that further analysis and risk assessment was needed. In a November 2023 memorandum summarizing the hydrologic analyses of the mine, EPD staff acknowledged that the impacts of the mine on the sturgeon could not be assessed without the results of a bathymetry survey and the development of an open channel hydraulic model.¹¹⁰ EPD staff further committed to providing a supplemental memorandum summarizing the results of that assessment. EPD Water Protection Branch planned to conduct a bathymetry survey and water sampling along the St. Marys River in the Spring of 2024.¹¹¹

Inexplicably, before that planned study had advanced, EPD drafted another memorandum in January 2024 abandoning its earlier conclusions and asserting that the proposed mine would have no impact on the water levels of the St. Marys River, and that no further assessment was needed to study potential impacts to sturgeon.¹¹² This memorandum provided no information, analysis, or discussion of potential impacts from the mine with respect to water flow, water

¹⁰⁷ NMFS, 5-Year Review: Summary and Evaluation, South Atlantic Distinct Population Segment of Atlantic Sturgeon 7 (Aug. 18, 2023).

¹⁰⁸ Letter from Nicholas Alexander Farmer, Nat'l Marine Fisheries Serv. to Ms. Jamie Lancaster and Dr. Wei Zeng, Ga. Dep't of Nat. Res. Env't Prot. Div. (May 19, 2023) (attached as Ex. 32).

¹⁰⁹ *Id.*

¹¹⁰ EPD, Memorandum on Summary of hydrologic analyses on Twin Pines Mineral's Charlton County Project at 11 (November 16, 2023), <https://bit.ly/4aqyFyZ>.

¹¹¹ *Id.*

¹¹² EPD, Memorandum on Additional assessment of potential impacts from Twin Pines Mineral's Charlton County operations on the St. Mary's River at 3 (January 18, 2024), <https://epd.georgia.gov/document/document/tp-memo-st-marys-river/download>.

temperature, dissolved oxygen levels, salinity, sedimentation, turbidity, or toxic contamination of the St. Marys River and consequential impacts to sturgeon. EPD made this departure from its earlier assessment based solely on its evaluation of water elevation data gathered at a single point on the river: the Macclenny gauge since 2000.¹¹³

EPD's decision to abandon its initial plans to thoroughly evaluate the potential adverse impacts of the proposed mine on the sturgeon before making a permit decision is unsupportable for several reasons. First, there are several studies, both planned and ongoing, which will produce critically important information needed to assess the impacts of the proposed mine on the St. Marys River and resident sturgeon. Before EPD makes any permit decisions, it must see that these studies are completed.

As of March 2024, EPD's Water Protection Branch was performing a bathymetry and water sampling survey along the entire river.¹¹⁴ Additionally, the U.S. Fish and Wildlife Service performed a field study in January 2024 to identify potential sturgeon spawning sites.¹¹⁵ The agency plans to follow-up on those surveys in the coming months and produce reports on possible sturgeon spawning patterns in the St. Marys. Researchers at the University of Georgia are also planning to conduct sampling and genetic studies in the St. Marys River to estimate sturgeon populations and identify key habitats and behavioral patterns.¹¹⁶

Each of these studies will provide information necessary to understand sturgeon populations in the St. Marys and potential impacts from the proposed mine. EPD may not allow the proposed mine to move forward without a well-informed understanding that the mine will not harm protected sturgeon or their habitat.

Second, EPD has not yet performed any analysis to understand whether the proposed mine will impact the temperature or dissolved oxygen content (DO) of the St. Marys River. Generally, these two variables are linked. Colder water is capable of carrying greater dissolved oxygen content.¹¹⁷ Relative to most fish species, sturgeon require higher levels of DO in order to survive in warmer water.¹¹⁸ As noted by NMFS and a robust body of research, sturgeon are especially sensitive to water temperature and DO content.¹¹⁹ When a river is too warm, stagnant, or devoid of DO, adult sturgeon may be unable or unlikely to migrate upstream to spawning

¹¹³ *Id.* It should be noted that EPD drafted this memorandum less than one month after receiving a letter on the same topic drafted by TPM's attorney. Letter from Lewis Jones to Jeff Cown, Ga. Env't Prot. Div. (Dec. 20, 2023).

¹¹⁴ St. Marys River Sturgeon Study Committee, Agenda (Nov. 30, 2023); St. Marys River Sturgeon Study Committee, Agenda (Sept. 28, 2023).

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ USGS, *Dissolved Oxygen and Water* (last visited Mar. 29, 2024), <https://on.doi.gov/3xrTBqS>.

¹¹⁸ Final Listing Determination for Two Distinct Population Segments of Atlantic Sturgeon, *supra* n. 100.

¹¹⁹ *Id.*

sites.¹²⁰ Eggs, larvae and juveniles may be unable to survive or develop in warm, oxygen-deprived waters, as well.¹²¹

As a relatively shallow blackwater river in southeastern Georgia, the St. Marys often reaches high temperatures that are stressful or dangerous for sturgeon.¹²² Many stretches and tributaries of the St. Marys River have been and are currently listed as impaired for dissolved oxygen levels, meaning those levels fall below 4.0 mg/l.¹²³ Sturgeon require a minimum DO content of 4.3 mg/l to survive, though juvenile sturgeon require even higher DO content to grow and develop.¹²⁴ Therefore, even small changes to temperature or DO content in the St. Marys can make river conditions harmful to sturgeon.

EPD has not provided any information or analysis of the potential impact of the proposed mine on the water temperature or DO content of the St. Marys River and the consequences for resident and migrating sturgeon.

Third, EPD has inappropriately limited its analysis of impacts from the proposed mine by only considering potential changes to water elevation. In the January 2024 memorandum, EPD only considers river water elevation data from the USGS Macclenny gauge¹²⁵ and only over an inadequate time period. Though the proposed mine may have a relatively minor impact on water *elevation* as measured from that gauge, the impacts to total water *flow* will be significant especially during times of drought.

Examination of the Macclenny data demonstrates that the proposed mine's removal of 560,000 gallons per day (or .87 cubic feet per second (cfs)) of water from the St. Marys River would be a measurable and substantial reduction in the overall discharge of the river at that gauge, especially during dry periods.¹²⁶ EPD only examines dry spells at the Macclenny gauge dating back to 2000, but USGS records show common, severe, and prolonged drought conditions at the Macclenny gauge dating back to the 1920s.¹²⁷

There are more than 600 daily discharge measurements at or below 20 cfs.¹²⁸ Under those circumstances, removing .87 cfs from the river would amount to at least a 4% reduction in the total flow of the river. While such a reduction might not have a major impact on water elevation, it could have substantial consequences for sturgeon, by reducing flow, increasing temperature, and decreasing DO content.

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² *Id.*; USFWS, *Sturgeon Sampling Season on the St. Marys River* (Jul. 21, 2023), <https://bit.ly/3PRihzg>.

¹²³ EPD, *Draft 2024 Integrated 305(b)/303(d) Rivers/Streams* (Feb. 7, 2024), <https://bit.ly/4anNsdD>.

¹²⁴ *Critical Habitat for the Endangered Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon*, 80 Fed. Reg. 36078 (June 3, 2016), <https://bit.ly/49tMStQ>.

¹²⁵ Mem. on additional assessment of potential impacts from Twin Pines, *supra* n. 112.

¹²⁶ USGS, *Discharge Data for St. Marys River Near Macclenny, FL-02231000*, <https://on.doi.gov/4cKXrLU>.

¹²⁷ *Id.*

¹²⁸ *Id.*

Fourth, EPD's January 2024 analysis inappropriately disregards data from the USGS Moniac gauge, claiming that frequent periods of "zero flow" render that dataset unreliable for measuring water level.¹²⁹ However, the Moniac gauge has ample available measurements of daily water flow that EPD can consider. Frequent "zero flow" measurements at Moniac provide an important piece of information. The St. Marys River is prone to running very low or completely dry in its upstream reaches.¹³⁰ The stretch of river around Moniac is also the closest part of the river to the proposed mine site and could be the most sensitive to impacts from the mine, particularly removal of water.

In fact, based on decades of records from Moniac, and EPD's own analytical framework, removing .87 cfs of water from that stretch of the St. Marys would more than triple the number of days when the river has "zero flow," from under 3% to nearly 10% of the time.¹³¹ Less extreme, but no less important, the St. Marys at Moniac flows at or below .87 cfs about one quarter of the time.¹³² During those very frequent periods of relatively low water, removing .87 cfs would shrink the flow of the river by at least 10%, if not much more. These reductions in flow could have significant effects on the ability of sturgeon to migrate, spawn, shelter, and feed in upstream reaches of the river. These flow reductions would also have important knock-on effects on the temperature and DO content of the river, imposing further harms on sturgeon. Understanding these impacts at the stretch of the river around the Moniac gauge is crucial. Sturgeon critical habitat extends further upstream than the Macclenny gauge, so water flow and quality data from Moniac is needed to estimate conditions and mining impacts on further upstream habitats, including potential spawning sites.

Finally, EPD has not provided any analysis of a range of other variables and potential impacts from the proposed mine on the St. Marys River and its resident sturgeon. Removing groundwater, disrupting and replacing soils, and processing minerals could lead to erosion and sedimentation, changes in pH, introduction of toxic contaminants, changes in salinity and increased saltwater intrusion, seismic disruptions, light and noise pollution, and other impacts. EPD has not examined how the proposed project could impact the St. Marys sturgeon with respect to any of these variables.

The sturgeon of the St. Marys River are a uniquely rare and vulnerable population within a species that is already under threat of extinction in Georgia, the southeast, and throughout its range. While the St. Marys may seem like a challenging environment for sturgeon to live, St. Marys sturgeon know no other home. It is exceptionally rare that Atlantic sturgeon spawn in a different river from where they were born. The young sturgeon recently found in the river, if they survive, will live their adult lives in Atlantic Ocean and return to the St. Marys to spawn. If the

¹²⁹ Mem. on Additional assessment of potential impacts from Twin Pines, *supra* n. 112.

¹³⁰ USGS, Discharge Data for North Prong St. Marys River at Moniac, GA-02228500, <https://waterdata.usgs.gov/monitoring-location/02228500/#parameterCode=00065&period=P7D&showMedian=false>

¹³¹ *Id.*

¹³² *Id.*

St. Marys River that they come home to has been altered, warmed, dried out, or polluted, they will be unable to reproduce, and sturgeon will be permanently extirpated from the St. Marys River. EPD has the responsibility to ensure that its actions do not enable or cause any harm to sturgeon. In order to meet that responsibility, EPD must consider the information produced by the U.S. Fish and Wildlife Service, EPD WPB, and other researchers to create an open channel hydraulic model and to consider the full range of variables and impacts from the proposed mine on the St. Marys River and its sturgeon.

c. The proposed mine would harm other federally protected species.

The federally threatened eastern indigo snake is known to occur on Trail Ridge in the vicinity of the mining site. Although TPM suggests that no indigo snakes were detected on the site during a survey, individual indigo snakes have extensive territories (greater than 1,000 acres) and can move as much as five miles from known locations.¹³³ Indeed, TPM's own biological survey acknowledges that "a lack of indigo snake observations during focused surveys doesn't demonstrate that the species is never present or transient on the Twin Pines site."¹³⁴ Indeed, as noted by the U.S. Fish and Wildlife Service, "Because of the large acreage utilized and the ability to diurnally and seasonally adapt their use of the habitat within each area, individual snakes are difficult to detect or capture in any given area on any given day."¹³⁵

There is a real and significant risk that mining will harm federally protected eastern indigo snakes. In addition to the direct impacts of excavating hundreds of acres, mining will likely indirectly harm eastern indigo snakes by impacting gopher tortoise burrows, which eastern indigo snakes use to avoid exposure during cold winter months and to avoid heat in warm summer months.¹³⁶ Although TPM suggest it will avoid construction "within burrow areas," it is not clear what parameters it intends to apply. Moreover, even if mining were to avoid existing burrows on the mine site, the homogenized soils present after mining may not be structurally capable of sustaining burrows.¹³⁷

The mine also poses risks to the federally threatened red-cockaded woodpeckers (RCW). Based on recent surveys, there are at least 15 active clusters near the southeastern refuge boundary.¹³⁸ Some RCWs may use the project site for foraging, and the full project could eliminate what habitat remains for dispersing individuals. For the Okefenokee clusters, this is of concern, since the population is already small, isolated, and suffering from a lack of

¹³³ Letter from Donald W. Imm, U.S. Fish & Wildlife Serv., to Col. Daniel Hibner, U.S. Army Corps of Eng'rs (May 28, 2020) (attached to March 2023 comments as Ex. 30).

¹³⁴ Dirk J. Stephenson, *2018–2019 Survey for Protected Amphibians/Reptiles on the Twin Pines Site, Charlton County, GA* (2019).

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.*

connectivity—three factors that are known to heighten the risk of extinction for the red-cockaded woodpecker.¹³⁹

In addition to obvious habitat fragmentation concerns, the disturbances caused by light, noise and air pollution may further affect the Okefenokee population. The proposed mine will require the installation of heavy machinery, the erection of semi-permanent facilities, road construction, and night-time lighting near the Refuge. These activities may affect the nesting and foraging patterns of those found along the Trail Ridge boundary.

B. TPM and EPD’s analyses of impacts and proposed monitoring and reclamation plans are flawed and incomplete.

TPM predictably asserts that its model and other data show the proposed mine will not impact the Okefenokee Swamp. But at least four independent Ph.D. hydrologists, with more than a century of combined professional experience, disagree, stating that TPM’s model is too flawed to accurately predict whether the proposed mine will harm the Okefenokee Swamp. None have a financial stake in the project, and none have been hired or compensated in any way by conservation organizations.¹⁴⁰

In addition, Mark Hutson, a professional geologist retained by SELC with more than forty years of professional experience, concurs that the model is flawed and that the proposed monitoring plan is wholly inadequate.¹⁴¹

Another eleven research hydrologists from universities around the Southeast—including University of Georgia, Georgia State University, University of Virginia, Virginia Tech University, Duke University, University of North Carolina at Chapel Hill, University of Florida, Auburn University, and Mississippi State University—studied the application and submitted a letter to EPD advising the agency that TPM’s analysis relied on an inappropriate USGS gage to assess the impacts of its consumptive groundwater withdrawals on the Okefenokee Swamp.¹⁴²

An additional 87 scientists, many of whom have direct experience researching the Okefenokee Swamp, signed a comment letter concluding that “a majority of the established research supports the claims that mining close to the swamp has a high likelihood of causing permanent damage to the swamp and surrounding area.”¹⁴³ The signers include academic professors from a dozen Georgia colleges and universities, as well as fifteen others, including

¹³⁹ Karin Schiegg, et al. *Inbreeding in red-cockaded woodpeckers: Effects of natal dispersal distance and territory location*. 131 *BIOLOGICAL CONSERVATION* 544–552 (2006), <https://bit.ly/3Ub9pY4>.

¹⁴⁰ Sue Braumiller, U.S. FISH AND WILDLIFE SERV., Technical Comments (July 17, 2020).

¹⁴¹ Letter Report from Mark A. Hutson to Peter Slag (April 5, 2024) (attached as Ex. 33); *see also* Letter Report from Mark A. Hutson to William Sapp (March 18, 2023).

¹⁴² Letter from C. Rhett Jackson *et al.* to GEORGIA ENV’T PROT. DIV. (Feb. 20, 2023) (attached to March 2023 SELC Comments as Ex. 31).

¹⁴³ Open Letter from Amy Sharma *et al.* to the Georgia Community (Sept. 16, 2022) (attached to March 2023 comments as Ex. 11).

Duke University, University of Virginia, University of North Carolina, University of Florida, University of South Carolina, and University of Alabama.

Most recently, thirteen former EPD officials, with a combined 294 years of public service to the state, concluded, “Mining of Trail Ridge *will* negatively impact the fragile dynamics of the Okefenokee ecosystem. The structure and integrity of Trail Ridge will be compromised, which will directly impact the Okefenokee.”¹⁴⁴

There is simply no credible basis for EPD to ignore legitimate critiques of the proposed mining plan from more than one hundred independent scientists. The objection of so many highly regarded scientists who have carefully studied analyzed the proposed mining plan should at a minimum prompt technical review by a panel of independent outside experts.

Below, we highlight some of the concerns raised by these scientists about the flaws in TPM’s analysis and proposed mining, monitoring, and reclamation plans.

1. TPM’s model is insufficient to accurately predict impacts to the Okefenokee.

TPM’s model is riddled with flaws and insufficient to accurately predict impacts to the Okefenokee. Dr. Kiren Bahm and Dr. Rajendra Paudel of the National Park Service (NPS) identified the following flaws, none of which were adequately addressed by Dr. Zeng’s memorandum or EPD’s response to comments:

- TPM uses an oversimplified pumping model (the Theis Equation) to predict the drawdown at the Okefenokee National Wildlife Refuge caused by pumping from the Upper Floridan Aquifer. The equation does not capture real field conditions and cannot accurately predict the effects of pumping on the Okefenokee National Wildlife Refuge. EPD did not appear to address this concern in its response to comments.
- TPM did not properly verify its model to ensure reliability. In its response to comments, EPD acknowledged that TPM calibrated its model against field measurements, but it did not address NPS’s comment that TPM had not separately validated that calibration on an independent set of data.
- The hydraulic conductivity values in the model were estimated based on observation sites too far from the Okefenokee National Wildlife Refuge. Because hydraulic conductivity is one of the key parameters in the model, it is critical to use sufficient observation data to accurately model impacts. In its response to comments, EPD notes that TPM drilled 387 boreholes, but does not address NPS’s actual criticism: that none of these boreholes were within one mile of the Refuge and that very few were within two miles of the Refuge.

¹⁴⁴ Letter from Kristen Ritter Rivera to Jeffrey W. Cown, Env’t Protection Div. (Mar. 25, 2024) (attached as Ex. 34).

Given the significant variation in hydrogeology in the region, boreholes further from the site may not accurately capture conditions within and near the Refuge.

- The model domain is not large enough to accurately assess impacts on the Refuge because it omits the direct flow path connection between the proposed mine and the Refuge. In its response to comments, EPD summarily dismisses this concern, noting only that leaving these features out did not affect the model. It also summarily dismisses NPS's concern that averaging results from multiple watersheds, including those not influenced by the mine, dilutes the predictive capacity of the model. EPD should better explain why it believes a larger model domain is unnecessary.
- The drain elevations in TPM's models were set to streambed or wetland elevation, but EPD's models show that many of the drain cells are 0.5 feet below the land surface elevation. In its response to comments, EPD directs the public to Dr. Zeng's memorandum, but that memorandum does not appear to respond to NPS's question about drain cell elevations.
- TPM used a steady-state model instead of a transient model. A transient model is necessary to capture the seasonal and interannual variability in the system. EPD states that a steady state model is appropriate because, in a transient model used by EPD, groundwater heads were similar in January and July 2020. NPS debunked this justification, however, noting that Dr. Kennedy's transient model only showed groundwater stage on two days and did not show any temporal variability within stage, despite observed data at groundwater wells showing up to four feet of variability. EPD did not respond to this criticism in Dr. Zeng's memorandum or its response to comments.
- As a steady-state model, TPM's model relies on inappropriate assumptions. Among other concerns with the chosen model, it does not mimic the system's natural variability, the recharge rates are not spatially and temporally variable, the fixed-head boundaries are not appropriate, the no-flow boundary is not appropriate, and the use of the Drain Package is not appropriate.
- TPM does not properly quantify the effects on the Refuge from mine dewatering. Among other shortcomings, the model design does not show any surface water exchange across the Refuge boundary, and TPM did not attempt to quantify the change in water flow in any of the streams or channels feeding the Refuge. When properly assessed, NPS estimates that dewatering will extract an average of 16% of the total recharge received over the entire model domain. EPD does not sufficiently address this concern in its response to comments.
- TPM did not assess the impacts of redredging the bentonite layer during overlap passes. Not only could redistributed bentonite alter the hydraulic conductivity of the sand layers above and below, it also calls into question the accuracy of the proposed amendment ratio. EPD does not sufficiently address this concern in its response to comments.

Dr. Jackson agrees that the modeling is flawed. In his most recent report, he observes: “This modeling effort as described does not meet the basic standards or tenets of hydrologic modeling, nor does it pass any credible tests of modeling. With the information provided, it is impossible to judge the validity of its predictions.”¹⁴⁵ In addition to the concerns raised by the NPS hydrologists, Dr. Jackson identifies the following flaws:

- The swamp should be modeled as “soil water” instead of “open water.” According to Dr. Jackson, “because of the moisture holding behavior of soils and organic matter, a withdrawal of 1 inch of water from the system would translate into 4 or 5 inches of water table drawdown.”¹⁴⁶ This distinction makes TPM’s modeling inaccurate.
- The model description does not indicate whether its model includes swamp evapotranspiration. Because evapotranspiration is the major swamp outflow, an accurate model must take this into account.
- It does not appear that TPM or EPD has sufficiently checked model predictions against the water level time series in the swamp observed by the U.S. Fish and Wildlife Service, nor demonstrated that their model reproduces either flows or water levels at the USGS Moniac gage.
- It is unclear what time period was used for modeling and why that time period was chosen.

EPD does not appear to sufficiently address any of these concerns in its response to comments.

In addition, Kristen Ritter Rivera, former co-chair of the Georgia State Board of Professional Geologists, along with twelve former EPD geologists, engineers, and others, questioned the validity of the data that formed the basis for the groundwater flow model. According to the former EPD employees, “TPM’s failure to properly supervise eighty-six (86) boreholes, or over 22% of its initial exploratory drilling program, raises serious questions as to the integrity of that data.”¹⁴⁷ They also point out that, as recognized by EPD, “[a] substantial number of the core samples used in determining hydraulic conductivities seemed to have been contaminated,” a concern that TPM dismissed without adequate explanation. Given the importance of the field work data, the former EPD employees recommend that “[t]he proper remedy should be to require TPM to conduct additional exploratory drilling in full compliance

¹⁴⁵ Dr. Rhett C. Jackson, Continued problems with the assessment of the hydrologic effects of the proposed TPM LLC mineral sands mine and a recommendation for an independent expert panel at 5 (March 27, 2024) (attached as Ex. 35).

¹⁴⁶ *Id.* at 5.

¹⁴⁷ Letter from Kristen Ritter Rivera, *supra* n. 144 at 2.

with the supervision requirements.”¹⁴⁸ After all, if we cannot trust the input, EPD should not trust the output, especially when it comes to impacts on a resource like the Okefenokee.

2. The analysis of the EcoVAP evaporator systems does not consider a sufficiently broad range of climate, weather, and operating conditions to ensure that the storage ponds will not overflow.

A key element of the proposed mine is a system of EcoVAP evaporators installed on process water storage ponds. These evaporators are designed to increase the amount of water that can be evaporated from the storage ponds into the atmosphere.¹⁴⁹ TPM estimates that more 1.128 MGD will seep into the mining pit and need to be transferred into storage ponds. The operation also plans to periodically pump up to 1.44 million gallons of water per day from the Floridan Aquifer into the storage ponds. Additionally, water from precipitation, stormwater runoff, and stockpile runoff will also be collected in the storage ponds.¹⁵⁰ Because the proposed operation is not permitted to discharge any wastewater, the evaporators must be able to remove as much water as flows into the storage ponds.

TPM provided a storage pond management simulation that maximizes the amount of water evaporated during warm, dry, and windy periods, while filling extra capacity in the storage ponds during wetter, colder, and calmer conditions. In that simulation, the operation also maintains enough freeboard storage capacity to absorb a once-in-1,000-year, 60-day rain event without overflowing.¹⁵¹ However, while the simulation considers the amount of water produced by a catastrophic rain event, the simulation fails to consider an appropriately broad range of climatic conditions that might accompany such an event. Instead, the background precipitation rate was estimated using only a single year (2022) of precipitation totals from Jacksonville, Florida.¹⁵² It is not clear that Jacksonville is an appropriate comparison to the proposed project site. In any event, however, a brief examination of Jacksonville’s annual precipitation totals reveals that annual rainfall totals have often been higher than the annual total in 2022, and in some cases much higher (over 70 inches in 2017, compared to just 55 inches in 2022).¹⁵³

The primary variables affecting the rate of evaporation from the system—temperature, humidity, and wind speed—are analyzed using monthly averages in St. George, GA.¹⁵⁴ Using only these average values severely limits the range of conditions under which this system’s performance can be tested. For example, the simulation does not appear to have considered how well the system will work when humidity spikes above 80% or 90%. Similarly, this analysis

¹⁴⁸ *Id.*

¹⁴⁹ Revised MLUP, App. U2 at 2.

¹⁵⁰ *Id.* at 4.

¹⁵¹ *Id.* at 6-7.

¹⁵² *Id.* at 4.

¹⁵³ NOAA Online Weather Data, *Monthly Total Precipitation for Jacksonville Area, FL*, <https://bit.ly/3U7MwVc> (last visited Mar. 28, 2024).

¹⁵⁴ Revised MLUP, App. U2, *supra* n. 149 at 3.

offers no insight into how much water can be evaporated when wind speeds fall below 4 mph for prolonged periods. Further still, the analysis does not consider the effect of freezing temperatures, nor of temperatures exceeding 100 degrees. The analysis also cites several projects from California, Wyoming, Utah, Montana, Texas, and New Mexico as examples of EcoVAP systems being successfully used to evaporate process water.¹⁵⁵ Notably, each of these locations has climate and weather conditions that differ substantially from typical conditions in southeast Georgia. How can TPM and EPD be sure that the storage ponds and evaporator system will be able to absorb a catastrophic rain event during an especially wet year, during a period of low wind speed, low temperature, and high humidity, conditions which may not be average, but are entirely foreseeable in southeast Georgia?

3. TPM does not adequately address concerns about bentonite application.

TPM's application proposes an unproven method to mimic the lost functions of the region's humate-cemented black sands: adding a three-foot layer of bentonite-mixed sand across the entire site. Among the issues associated with the bentonite plan—beyond the fact that there are no other mining operations using bentonite at this scale and in such a manner—is the practical matter of how it would be reliably and consistently applied by sidecasting it into the open pit. Inconsistent application could undermine the purpose of the bentonite layer. Further there does not appear to be adequate consideration that TPM's plans to mine overlapping cuts across the site will result in the repeated excavation of the bentonite layer, its homogenization in the separation plants, and eventual replacement in the pit.

TPM itself warns that using bentonite could adversely impact the groundwater system, including “artificially rais[ing] the water table above the land surface leading to ponding or increased surface water runoff, reducing downward flow to deeper parts of the surficial aquifer, [and] reducing groundwater discharge to the west [towards to the Okefenokee] and to the east of Trail Ridge.”¹⁵⁶ Given the significant risks of bentonite application, TPM should have conducted more detailed mapping of the humate-cemented sands under this mine footprint in advance of this comment period and modeled those actual site conditions, rather than proposing to “map” the soil types during active mining and asking to discontinue or modify the soil amendment plan on the fly.¹⁵⁷

TPM and EPD also ignore concerns about potential ecological impacts of bentonite application. Because bentonite wetland reclamation is often associated with stunted recruitment of aquatic vegetation, greater consideration should be given to active plant propagation beyond

¹⁵⁵ *Id.* at 2.

¹⁵⁶ Proposed MLUP, Sheet 9.

¹⁵⁷ Similarly, the plans should explicitly note that soil data from existing and installed piezometers will also be considered in determining the extent of the humate-cemented, consolidated black sands. *E.g.*, Revised MLUP, App. D at Figs. 3, B, and C.

the simple replanting of longleaf pine.¹⁵⁸ Reliance upon the existing seedbank, when coupled with the compaction of the affected soils, may deter swift recolonization of both vegetation and wildlife on the affected property. Though bentonite is sometimes used in the restoration of wholly isolated wetlands, it is unclear whether TPM will be able to replicate the temporal and spatial diversity of the complex wetland system found within the project area.

The risk of bentonite failure also poses concerns for aquatic wildlife. Bentonite is known to clog the gills of aquatic organisms.¹⁵⁹ When coupled with increased temperatures and reduced dissolved oxygen levels, the impacts are lethal.¹⁶⁰ This is a particular concern for threatened and endangered species occurring within the affected watershed. For instance, the Atlantic sturgeon, as previously discussed, is a federally endangered species with only a few dozen documented individuals in the St. Marys and is “precariously close to extirpation.”¹⁶¹ Should bentonite find its way into the river system, it could have a deleterious effect on individuals utilizing the upper reaches of the St. Marys River.

Despite these significant concerns, which were raised more than a year ago, the proposed mining land use plan still lacks significant information necessary to meaningfully evaluate and comment on the risks of bentonite application. For example:

- Where will TPM source bentonite for soil amendment? Does EPD have quality or sourcing considerations for bentonite soil amendment? What are those quality or sourcing considerations?
- How likely is it that the bentonite used will contain toxic contaminants? What toxic contaminants are typically found in bentonite?
- Will EPD require TPM to test bentonite for toxic contaminants before placing it into the soil structure? Why or why not?
- Will EPD require TPM to mix bentonite with other soil replacements using a particular method or protocol? Why or why not? If so, what protocol will be used?
- How will EPD ensure that the soil amendment placed into the mining pits will be consistently or appropriately mixed?

¹⁵⁸ Mark C. McKinstry and Stanley H. Anderson, *Improving aquatic plant growth using propagules and topsoil in created bentonite wetlands of Wyoming*, 21 *Ecological Engineering* 175-189 (2003), <https://doi.org/10.1016/j.ecoleng.2003.12.002>.

¹⁵⁹ Joseph M. O’Connor, *Evaluation of Turbidity and Turbidity-Related Effects on the Biota of the San Francisco Bay-Delta Estuary* at n. 100 (Apr. 3, 1991) (citing Peddicord et al. (1975)).

¹⁶⁰ *Id.*

¹⁶¹ Adam G. Fox, et al., *Occurrence of Atlantic Sturgeon in the St. Marys River, Georgia*, 10 *MARINE AND COASTAL FISHERIES* 606, 615 (2018).

- Are there other examples of bentonite being used as a soil amendment for large-scale mining reclamation?
- Will EPD require bench scale studies from the affected strata to ensure bentonite soil amendment is appropriate and effective? Why or why not?
- Will EPD require post-closure maintenance and monitoring of bentonite amendment soil structure?
- How might the use of bentonite as drilling mud to extract soil samples used to test hydraulic conductivity and the effect of mineral processing have affected the results of those tests? How would different or inaccurate test results affect the soil amendment plan and other reclamation efforts?

4. TPM's reclamation plan is insufficient.

TPM's reclamation plan is insufficient to mitigate and repair the damage caused by mining to soil structures, hydrodynamics, and ecosystems on and surrounding the demonstration site. The natural soil types and structures currently on the site took hundreds or, in some cases, thousands of years to develop and support a unique and richly biodiverse ecosystem.¹⁶² In an attached report, Bruce Pruitt, Ph.D., P.H., SPWS, details the specialized soil types and structures that pervade the mining site.¹⁶³ These soils play a leading role in the storage and conveyance of precipitation and groundwater on Trail Ridge, to the Okefenokee Swamp, and into surrounding streams and rivers.¹⁶⁴ Dr. Pruitt's report warns that mining excavation and removal of groundwater would result in substantially altered hillslope hydrologic processes and changes to baseflow augmentation to the swamp, the St. Marys River, and smaller nearby streams.¹⁶⁵ The consequences of these changes include negative impacts to oxygen and nutrient dynamics in nearby waters and reduced and altered habitat, which would in turn impact insect drift and fish migration.¹⁶⁶

TPM's plan to place post-process mining soil materials back into the mining pit, along with an artificial layer of bentonite, is an unproven method of reclamation that is highly unlikely to succeed. As Dr. Pruitt states in his report:

Mixing bentonite with mine tailings (spoil) is essentially creating an artificial soil that will not have the same function, structure, and biogeochemical processes as the native soils for hundreds of years, if at all. Creating an artificial spodic horizon, that exhibits the same properties as the spodosols as described in this report, would be new to the science

¹⁶² Letter Report from Bruce Pruitt to Bill Sapp, at 10 (April 6, 2024) (attached as Ex. 36).

¹⁶³ *Id.* at 7-9.

¹⁶⁴ *Id.* at 9-10.

¹⁶⁵ *Id.* at #.

¹⁶⁶ *Id.* at 11.

of soil restoration, has not been proven, and its success is highly improbable.

In addition, restoration of pre-mined topography and associated geomorphic positions which support hillslope hydrologic processes will be challenging because of soil swelling and restoration of pre-mined hydrodynamics. The possibility of recreating the current mosaic of ecosystem types, associated species diversity and irregular edges (ecotone) on Trail Ridge is highly unlikely.¹⁶⁷

TPM's reclamation plan is entirely dependent on creating a new soil structure using a method that has no precedent, no proof, and very little evidence to support its deployment. Rather than restore the natural processes and ecosystems on the site, the reclamation plan as conceptualized now threatens to permanently degrade the integrity of the existing soil and replace it with a new structure that poses unknown risks and offers little basis for reestablishing ecosystems and biodiversity. Dr. Pruitt concludes that the mine poses substantial risk of permanent damage to the site and surrounding landscape and points out that Twin Pines has made no attempt to ameliorate this risk by, for example, empowering a Technical Advisory Group to design surveys, studies, and models that account for the unique dynamics and features of the site and full range of impacts that would likely result from the mine.¹⁶⁸

5. TPM's water quality monitoring plan is insufficient.

TPM's proposed water quality monitoring plan is also insufficient. As described above, disturbing the natural soils that compose Trail Ridge will likely release contaminants presently bound up in the soils to groundwater and impact water quality in groundwater and surface streams, both in the Okefenokee Swamp and in areas east of Trail Ridge. In the attached reports, Mark Hutson, P.G., details concerns about the proposed monitoring plan—chief among them, that “the currently proposed monitoring system appears designed to minimize the possibility of detecting environmental impacts rather than providing high quality data upon which to base future decisions.”¹⁶⁹ For example:

- TPM has not evaluated how long it will take for peak contaminant concentrations to migrate to monitoring well locations. Similarly, TPM has not identified the basis for the length of its proposed post-mining monitoring period.
- The list of analytical parameters is insufficient and appears to be based on parameters detected in undisturbed baseline monitoring. Monitoring only those parameters detected prior to mining is not the purpose of collecting samples and the list should ensure that any contaminants released by mining activities are detected.

¹⁶⁷ *Id.* at 3-4.

¹⁶⁸ *Id.* at 2, 4.

¹⁶⁹ 2023 Hutson Report, *supra* n. 141, at 4; 2024 Hutson Report, *supra* n. 141.

- There are no monitoring wells proposed downgradient of the water management ponds that could detect any leakage or discharge.
- There are no surface water monitoring locations near the boundary of the mine area. Placing surface water monitoring points along the study boundary will render the system less effective at detecting changes.
- There are no surface water monitoring locations on the streams that flow from the mine site to the Okefenokee Swamp, preventing detection of surface-water contamination to the swamp.

The proposed monitoring plan also lacks important detail about assessment procedures. For example, on Sheet 11, TPM says data will be used to assess water quality but does not identify how that assessment will be done. Similarly, TPM says that water level and chemistry data will be analyzed for trends and compared to applicable standards but fails to describe how that data will be evaluated and against what specific standards it will be compared. The plan should identify the specific statistical testing to be used as well as identified concentrations for each parameter above, which mining operations will be suspended. TPM has been aware of many of these concerns for years and has refused to provide adequate responses.

6. TPM's groundwater level monitoring plan is insufficient.

TPM's groundwater level monitoring plan is likewise inadequate. Indeed, the Performance Criteria for the Reclamation Plan do not even require restoration of groundwater levels as a requirement for final reclamation.

TPM's monitoring plan should require prompt submittal of all relevant data to EPD for EPD to make the determinations as to whether mining is having an impact on water levels. The plan should also identify effective remedial actions if problems do develop. Instead, the Draft Plan leaves critical analysis to be conducted solely by TPM, with no deadlines, and without clear standards.

TPM's proposal says that water level data will be "downloaded monthly," but notes that "may be adjusted." It does not specify how frequently or when the data will be evaluated, nor does it specify under what conditions the frequency of data collection will be "adjusted." TPM never commits to submitting the data to EPD unless TPM itself determines that the water levels are not approximately normal, i.e. within "2.7 feet above or below normal."¹⁷⁰ Even if the water levels are not within that range, under its plan TPM can still claim all is well if TPM determines that water levels in other areas are "fluctuat[ing] uniformly."

¹⁷⁰ Revised MLUP, Sheet 11 § 2.4.

In Appendix R, TPM says its rain gauges “mimic each other” and “fluctuate in a similar relationship to one another.” TPM provides no explanation of what deviation from this mimicry would trigger a change in operations. This is too vague and too discretionary for such a critical aspect of the proposed mine. For instance, could TPM claim that because water levels in a rain gauge at the north end of its 8,000-acre mine site dropped 6 inches, a drop in water levels of 6 feet at the mine site is fluctuating uniformly? No mining company should enjoy such discretionary standards, especially when the stakes are so high.

TPM goes on to state that even if it identifies that water levels are not returning to approximately normal levels and that the other areas are not mimicking each other, “no further action will be required” if TPM finds the condition “can be attributed to [any] factors unrelated to the mining activity.” Again, TPM should not be the entity making this determination.¹⁷¹

Even in the event TPM is required to notify EPD under the monitoring plan, it has thirty days after making that determination to do so. And TPM then only commits to “conduct further investigations” on an indeterminate timeline and eventually propose a contingency plan with “feasible engineered solutions.” EPD should require that mining stop immediately if there is a potential problem or impact to water levels from the mining operation.

7. The proposed “demonstration” mine does not meet its purported purpose, as it would do nothing to demonstrate that mining on the remaining 8,000 acres would not endanger the Okefenokee National Wildlife Refuge or St. Marys River.

A project of this scale is hardly a demonstration project as much as the first phase of mining. The investment of time and money required to develop and operate a four-to-six-year mining operation on this scale is significant and would be very difficult from an economic perspective to abandon if at the end of six years of mining, data showed adverse environmental impacts. Moreover, the proposed demonstration footprint is not representative of the remainder of the 8,000-acre mining site, as it sits farther from the Okefenokee and at a higher elevation than much of the remaining mine site, leading U.S. Army Corps hydrologists to conclude that the demonstration mine is “[un]likely to provide useful information regarding the potential impacts of mining within the remainder” of the site.

If the proposed mine were really intended to serve as a demonstration of concept, there would be robust water elevation and water quality monitoring systems already in place and generating baseline data from the proposed site prior to, during, and following completion of mining operations. There would be a significant planned pause to allow hydrologic systems to recover and water chemistry to reach equilibrium. Data developed during the mining and post-mining recovery period would be compared to a baseline by TPM and EPD to identify impacts to

¹⁷¹ Rather, the framework proposed by TPM is inappropriately backwards here. The presumption should be that mining is the cause, and the burden should shift to proving that it is not.

waste quantity and/or quality. The recovery period would be sufficiently long to assure that surface reclamation techniques were successful, and that impacts to surface water and groundwater quantity and quality had been detected and evaluated prior to permitting further mine development. Here, however, TPM has already stated publicly that they intend to begin mining future tracts before the results of the first phase are even analyzed,¹⁷² making it abundantly clear that TPM does not intend for the proposed mine to demonstrate anything.

8. The proposed mine is likely to have interstate impacts.

As described above, multiple scientists, including Dr. Jackson, have predicted impacts to the St. Marys River and the southeast quadrant of the Okefenokee Swamp, both of which extend into Florida. The draft permits also allow TPM to pump up to 1.44 MGD from the Floridan aquifer, the main drinking water source for most Floridians. Given the threat of significant interstate impacts to water quality, water quantity, wildlife, and ecotourism, EPD should consult with the Florida Department of Environmental Protection before issuing any permits for the proposed mine.

Not only is consultation important because the state will shoulder significant burdens from mining, but Florida is also well positioned to provide valuable expertise. Floridians are all too familiar with the cost of fixing a broken ecosystem. The restoration of the Florida Everglades through the Comprehensive Everglades Restoration Plan has already cost taxpayers more than \$5 billion, with a total estimated cost of \$23.2 billion to complete.¹⁷³ Florida DEP is also well versed in the impacts of titanium mining on Trail Ridge. The Chemours Maxville Mine in Clay County, Florida, has caused significantly elevated levels of Radium 226+ 228 and gross alpha (a signal of overall radioactivity in water) in groundwater monitoring wells on an ongoing basis since 2001¹⁷⁴—a risk that TPM has summarily dismissed here.

III. LEGAL COMMENTS

A. TPM must apply for and receive a groundwater withdrawal permit to pump seepage water from the mine pit into the water management pond.

As described above, TPM estimates that 1.128 MGD of groundwater will seep from the surficial aquifer into the mine pit, which the company plans to pump into a water management pond to evaporate. Because it intends to pump more than 100,000 gallons per day of groundwater from the mine pit, TPM must apply for and receive an additional groundwater withdrawal permit for withdrawals from the surficial aquifer. The existing groundwater

¹⁷² Georgia House of Representatives, Nat. Res. and Env't Subcomm. Hearing on HB 1338 (Feb. 21, 2024) (statement of Ari Gordin).

¹⁷³ Congressional Research Serv., *Recent Developments in Everglades Restoration* (updated Dec. 27, 2023), <https://bit.ly/3vKhgSY>.

¹⁷⁴ Consent Order, *Florida Dep't of Env't Prot. v. the Chemours Company TT, LLC*, OCG File No. 16-1402 (June 30, 2023).

withdrawal permit application for 1.44 MGD from the Floridan aquifer does not cover seepage water withdrawals from the surficial aquifer.

The Groundwater Use Act requires a person to obtain a permit to “withdraw, obtain, or utilize ground waters in excess of 100,000 gallons per day for any purpose.”¹⁷⁵ “Ground water” is defined as “water of underground streams, channels, artisan basins, reservoirs, lakes, and other water under the surface of the earth, whether public or private, natural or artificial, which is contained within, flows through, or borders upon this state or any portion thereof.”¹⁷⁶ Water seeping directly into the mine pit from the surficial aquifer plainly meets this definition and is therefore subject to the permitting requirement.

Nothing in the Georgia Code exempts mine pit dewatering from groundwater withdrawal permit requirements. To the contrary, the groundwater use regulations expressly address dewatering. Although dewatering “to a depth of not more than thirty feet...for the purpose of construction of trenches for sewer or water pipes, or excavation for foundations, or utility construction...for a period of not more than sixty days” is exempt from obtaining a groundwater use permit, the Groundwater Use Act expressly provides that any withdrawal in excess of 100,000 gallons per day for dewatering for any other purpose must obtain a groundwater withdrawal permit.¹⁷⁷

B. EPD may not grant a permit that infringes on the federal government’s reserved water rights.

EPD may not grant a permit that infringes on the United States’ federal reserved water rights. The federal reserved water rights doctrine provides that when the federal government sets aside lands for a particular purpose, like a National Wildlife Refuge or a National Wilderness Area, it also reserves enough water to support that particular purpose.¹⁷⁸ Importantly, federal water rights, unlike state rights, cannot be abandoned or lost by nonuse; nor are they subject to the state’s system of prioritizing or comparing competing uses. Instead, they are senior federal property rights that the state has a legal obligation to recognize and accept. As Professor Ryan Rowberry described it, they are a powerful “exception to the rule that states possess exclusive control over their waters.”¹⁷⁹

¹⁷⁵ O.C.G.A. § 12-5-96.

¹⁷⁶ O.C.G.A. § 12-5-92.

¹⁷⁷ Ga. Comp. R. & Regs. § 391-3-2-.09.

¹⁷⁸ *Sturgeon v. Frost*, 139 S. Ct. 1066, 1079 (2019) (“When the federal government withdraws its land from the public domain and reserves it for a federal purpose, the Government, by implication, reserves appurtenant water then unappropriated to the extent needed to accomplish the purpose of the reservation.”) (citation and quotations omitted).

¹⁷⁹ Ryan Rowberry, *Drinking from the Same Cup: Federal Reserved Water Rights and National Parks in the Eastern United States*, 29 Ga. St. U.L. Rev. 987, 993 (Summer 2013).

Because the doctrine is rooted in the Property Clause of the U.S. Constitution, reserved water rights are not cabined or confined to navigable waters. If the purpose of a reservation requires water, the federal government’s reservation of land “implicitly reserves the right to use needed water from various sources—such as groundwater, rivers, streams, lakes, and springs—that arise on, border, cross, underlie, or are encompassed within the reservation.”¹⁸⁰

Under the federal reserved water rights doctrine, when the federal government established the Okefenokee National Wildlife Refuge in 1937,¹⁸¹ it impliedly reserved water rights for the amount of water necessary to support a “refuge and breeding ground for migratory birds and other wildlife.”¹⁸² Congress reserved additional water rights for the federal government in 1974 when it set aside substantial portions of the Okefenokee as a national wilderness area under the Wilderness Act of 1964 for the purpose of leaving the area “unimpaired for future use and enjoyment as wilderness.”¹⁸³

Here, the proposed mine’s water use will likely impact the purposes for which the Refuge and Wilderness Area were established, thereby infringing on the federal government’s reserved water rights. As described above, to keep the mining pit dry, TPM plans to continuously pump 1.128 million gallons per day (1.74 cfs) of seepage from the surficial aquifer. According to Dr. Rhett Jackson, this pumping will “continuously rob the swamp of .87 cfs of input,” or just over 560,000 gallons per day, tripling the duration and severity of drought in the southeastern portion of the swamp.¹⁸⁴

¹⁸⁰ *Arizona*, 143 S.Ct. at 1811; *accord Cappaert*, 426 U.S. at 138, 142 (“The doctrine . . . encompass[es] water rights in navigable and nonnavigable streams” and groundwater).

¹⁸¹ Executive Order 7593, 2 Fed. Reg. 739 (Mar. 30, 1937).

¹⁸² Courts generally regard it as settled law that the creation of a national wildlife refuge impliedly reserves an amount of water necessary to fulfil the primary purposes of the refuge. *See, e.g., Arizona v. California*, 373 U.S. at 601; *Arizona v. California*, 547 U.S. 150 (2006) (approving settlement allocating reserved water rights to two National Wildlife Refuges “in annual quantities reasonably necessary to fulfil the purposes of the Refuge”); *John v. United States*, 720 F.3d 1214, 1239 & n. 97 (9th Cir. 2013) (affirming implied reservation of water “necessary to accomplish the purposes for which the land was reserved” in sixteen Alaskan National Wildlife Refuges (citation and quotations omitted)); *Alaska v. Babbitt*, 72 F.3d 698, 703 & n. 10 (9th Cir. 1995), *aff’d en banc*, 247 F.3d 1032 (Mem) (9th Cir. 2001) (in reserving “vast parcels of land in Alaska” for “national parks, forests and wildlife preserves,” the United States “implicitly reserved appurtenant waters, including appurtenant navigable waters, to the extent needed to accomplish the purposes of the reservations.”); *see also Pac. Coast Fed’n of Fishermen’s Assocs. v. U.S. Bureau of Reclamation*, 138 F. Supp. 2d 1228, 1231 (N.D. Cal. 2001) (“Two national wildlife refuges, the Lower Klamath and Tule Lake National Wildlife Refuges . . . have federal reserved water rights to the amount of water, unreserved at the time of creation of the refuges, necessary to fulfill the primary purpose of the refuges.”). Although the National Wildlife Refuge System Improvement Act says that it does not “create a reserved water right, express or implied, in the United States for any purpose,” it also provides that the Act does not “affect any water right in existence on October 9, 1997,” which would include the implied water rights associated with the creation of the Okefenokee National Wildlife Refuge in 1937.

¹⁸³ 16 U.S.C.A. § 1131; *see also Sierra Club v. Block*, 622 F. Supp. 842, 850 (D. Colo. 1985) (finding that Wilderness designation reserved enough water to preserve the area in its “original untouched natural state.”).

¹⁸⁴ Letter from C. Rhett Jackson et al. to Georgia Env’t Prot. Div. (Feb. 20, 2023) (attached to March 2023 as Ex. 31).

The mine would also withdraw significant amounts of water (up to 1.44 MGD) from the Floridan Aquifer for process water.¹⁸⁵ This would reduce pressures in the Floridan Aquifer, slightly increasing leakage from the swamp to the aquifer and worsening the drought effects of pumping the surficial aquifer.

According to Dr. Jackson, “[i]ncreasing the frequency, duration, and severity of drought in the swamp will increase the fire risk, reduce the number of boating days in the southeastern portion of the swamp, and alter the swamp ecosystem in multiple ways.”¹⁸⁶ This is particularly concerning given that “over the last 100 years large wildfires often form and spread in the swamp margins during droughts,” and because “the water level in the swamp can become too low for even canoes and kayaks during drought.”¹⁸⁷

Although more data is likely necessary to quantify the amount of water needed to fulfill the primary purposes of the Okefenokee National Wildlife Refuge and Wilderness Area, it is very likely that the proposed mine would violate the federal government’s reserved water rights. EPD may not move forward without an agreement between the State of Georgia and the federal government about its water needs.

C. EPD may not grant a permit that causes the unauthorized take of endangered Atlantic and shortnose sturgeon, threatened eastern indigo snakes, or other federally protected species.

EPD will be liable under Section 9 of the Endangered Species Act (ESA) if it permits a mine that causes the unauthorized take of endangered or threatened species. Section 9 of the ESA broadly prohibits “any person” from “taking” a federally listed species or from causing a take to be committed.¹⁸⁸ The word “take” has a broad meaning and includes, among other actions, to “harm” or “harass.”¹⁸⁹ Harm can be caused by “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.”¹⁹⁰ Similarly, “harass” means “an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns.”¹⁹¹ The ESA’s definitions of

¹⁸⁵ *Id.* at 3.

¹⁸⁶ *Id.* at 3.

¹⁸⁷ *Id.* at 11.

¹⁸⁸ 16 U.S.C. § 1532(13) (defining person to include, *inter alia*, state departments); *id.* § 1538(a)(1), (g) (prohibiting take).

¹⁸⁹ 16 U.S.C. § 1532(19); *see also Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 515 U.S. 687, 704–05 (1995).

¹⁹⁰ 50 C.F.R. § 17.3 (2006); *see, e.g., Palila v. Haw. Dep’t of Land & Nat. Res.*, 852 F.2d 1106, 1108 (9th Cir. 1988) (concluding agency caused species take under meaning of “harm” by introducing grazing sheep that destroyed specific wood land upon which endangered species depended for habitat); *Sweet Home*, 515 U.S. at 704 (finding broad definition of “harm” permissible under ESA).

¹⁹¹ 50 C.F.R. § 17.3 (2006). These behavioral patterns “include, but are not limited to, breeding, feeding, or sheltering.” *Id.*

“harm” and “harass” illustrate the Act’s broad recognition that species take need not result from direct or intentional action in order to create ESA liability. The critical question is whether the result of that act or omission meaningfully stymies an individual’s flourishing.¹⁹²

State agencies can be liable for Section 9 violations when they authorize the activities of others that result in take.¹⁹³ Liability occurs even where another party’s direct action ultimately causes take of the species in question when that action only occurs with the agency’s express authorization. The agency may be liable for the incidental take resulting from third-party actions where the agency’s permits were a necessary precondition to the third party taking that action.

The only avenues to avoid liability for a prohibited take under Section 9 are to go through federal interagency consultation or to obtain an incidental take permit (ITP). Under Section 10 of the ESA, federal wildlife agencies may issue an ITP under a narrow set of circumstances.¹⁹⁴ ITPs may only be issued when a taking is incidental to a certain activity and where the ITP applicant has submitted a conservation plan that includes analysis of possible alternative actions and steps that can be taken to mitigate impacts to the listed species.¹⁹⁵ Given the substantial likelihood that permitting the proposed mining project will lead to prohibited take of endangered or threatened species, TPM should pursue an ITP for the proposed mine.

1. The proposed mine may result in the take of federally endangered shortnose and Atlantic sturgeon.

For aquatic species, a take may result from decisions and actions which alter water flow, temperature, or dissolved oxygen levels and thereby affect habitat. The U.S. Fish and Wildlife Service and NMFS—the agencies charged with implementing the ESA—specifically list “removing water or otherwise altering streamflow” among the types of activities that can result in unlawful take.¹⁹⁶

As the permitting authority, EPD is responsible for any incidental take of listed species resulting from TPM’s actions under the permit. EPD therefore retains liability for take which occurs due to water quality changes—including changes in flow—even if take occurs

¹⁹² See *Palila v. Haw. Dep’t of Land & Nat. Res.*, 639 F.2d 495, 497–98 (9th Cir. 1981)(concluding habitat degradation constituted take).

¹⁹³ *Strahan v. Coxe*, 127 F.3d 155, 163 (1st Cir. 1997)(“[A] governmental third party pursuant to whose authority an actor directly exacts a taking of an endangered species may be deemed to have violated the provisions of the ESA.”); see also *Defenders of Wildlife v. EPA*, 882 F.2d 1294, 1300–01 (8th Cir. 1989)(holding EPA responsible for species take via registration of harmful pesticide strychnine); see also *Sierra Club v. Yeutter*, 926 F.2d 429,438–39 (5th Cir. 1991) (concluding Forest Service’s logging activity permitting scheme caused take of endangered woodpeckers).

¹⁹⁴ 16 U.S.C. § 1539(a)(1)(B).

¹⁹⁵ 16 U.S.C. § 1539(a)(2).

¹⁹⁶ Endangered and Threatened Wildlife and Plants; Definition of “Harm” Final Rule, 64 Fed. Reg. 60,727, 60,730 (Nov. 8, 1999).

incidentally while TPM otherwise complies with its permit.¹⁹⁷ Although the ESA does not require EPD to assume an affirmative obligation to protect listed species in its permitting scheme, it does hold the agency liable when that scheme authorizes permittees to engage in activities that result in the incidental take of listed species.¹⁹⁸

As discussed above, two species of sturgeon inhabit the St. Marys River: the shortnose sturgeon and the South Atlantic Distinct Population Segment of Atlantic sturgeon.¹⁹⁹ Both are federally protected under the ESA.²⁰⁰ The St. Marys populations of Atlantic and shortnose sturgeon, which until recently were considered extirpated, are particularly vulnerable to disturbance given their depressed numbers.²⁰¹

The National Marine Fisheries Service has raised concerns about the potential impact of the proposed mine on St. Marys sturgeon populations, particularly the spawning population of Atlantic sturgeon:

Water depth, water temperature, dissolved oxygen concentrations, and river discharge are all important factors to sturgeon spawning/recruitment and survival. Water withdrawals associated with mining operations may indirectly reduce the overall water levels in the St. Marys River. Lower water levels may reduce the amount of suitable spawning habitat available for sturgeon by making waters too shallow for individuals to migrate to/from spawning habitats. Even if adults are able to lay their eggs, low water levels may also increase the predation risk of eggs/larvae by birds or other terrestrial animals. Shallower water also heats more quickly. Because water temperatures and dissolved oxygen concentrations are inversely proportional, increased water temperatures will lower dissolved oxygen concentrations in the river. Both individually and synergistically, increased water temperatures and lower dissolved oxygen concentrations may injure or kill eggs and larvae or may discourage adults from attempting to spawn altogether.

River discharge and water temperature appear to [be] important spawning cues for sturgeon. Emerging information suggests river discharge may be tied to the overall success of sturgeon recruitment for a given spawning year. Any action that reduces the river's discharge may cause detrimental delays or cessations of spawning runs. Reductions in river discharge may also reduce the overall success

¹⁹⁷ See *Animal Welfare Inst. v. Martin*, 588 F. Supp.2d 70, 99–100 (D. Me. 2008); *Animal Prot. Inst. v. Holsten*, 541 F. Supp. 2d 1073, 1079 (D. Minn. 2008).

¹⁹⁸ See *Animal Welfare Inst.*, 588 F. Supp. 2d at 99 (“The question, then, is not whether the state has an obligation to undertake an affirmative act, but whether, when it undertakes an affirmative act by authorizing [an activity], it is violating the ESA.”); *United States v. Town of Plymouth*, 6 F. Supp. 2d 81, 91 (D. Mass. 1998) (enjoining off-road vehicle activities because “without an injunction, the town officials will not act to protect [threatened] plovers”).

¹⁹⁹ Letter from Nicholas Alexander Farmer, *supra* n. 103.

²⁰⁰ *Id.*

²⁰¹ *Id.*

of spawning that does occur. This is particularly concerning given how small and vulnerable the St. Marys' population of Atlantic sturgeon appears to be. Additionally, reductions in river discharge may shift the location of the freshwater/saltwater interface further upriver. Changing the location of this interface could affect important riverine sturgeon foraging habitat.

Any impacts to water depth, water temperature, and dissolved oxygen concentrations could also affect Atlantic sturgeon critical habitat. A critical habitat designation is significant because effects to the physical features themselves are addressed during federal interagency consultation. Sturgeon do not need to be present for impacts to designated critical habitat to be evaluated. Thus, any of the potential impacts from mining operations described previously that affect those features needs to be considered.

Although EPD is not obliged to prevent natural droughts or periods of low flow in the St. Marys River, the agency is responsible for ensuring that it does not authorize TPM to exacerbate low flow conditions and thereby cause or contribute to the take of endangered and threatened species. If EPD allows TPM to cause reductions in flow and changes to water temperature and dissolved oxygen—as predicted by multiple hydrologists—that contribute to take, the agency will be liable under Section 9 of the ESA.

2. The proposed mine may lead to the take of federally threatened eastern indigo snakes.

As described above, there is also a real and significant risk that mining will contribute to the take of federally threatened eastern indigo snakes. The U.S. Fish and Wildlife Service has recognized that “it is possible that the proposed project may result in loss of habitat, individuals, and natural corridors that are utilized by this species.”²⁰² In addition to direct impacts of excavating hundreds of acres, mining will likely indirectly harm eastern indigo snakes by impacting gopher tortoise burrows, which eastern indigo snakes use to avoid exposure during cold winter months and to avoid heat in warm summer months.²⁰³ Not only could mining impact existing gopher tortoise burrows on the mine site, the homogenized soils present after mining may not be structurally capable of sustaining burrows.²⁰⁴

²⁰² Letter from Donald Imm, U.S. Fish & Wildlife Serv., to Col. Daniel Hibner, U.S. Army Corps of Eng'rs 4 (Feb. 20, 2019)

²⁰³ *Id.*

²⁰⁴ *Id.*

D. EPD may not grant a Surface Mining Act permit because TPM has not shown (1) that the proposed mine is consistent with land use in the area and the public interest; (2) that the proposed mine will not harm the environment or contiguous natural resources; (3) that the proposed mine is based on sound engineering and conservation principles; or (4) that the proposed reclamation plan is sufficient.

The Surface Mining Act and its regulations place the burden squarely on TPM to show (1) that the proposed mine is consistent with land use in the area and the public interest²⁰⁵; (2) that the proposed mine will not harm the environment or contiguous natural resources;²⁰⁶ (3) that the proposed mine is based on sound engineering and conservation principles;²⁰⁷ and (4) that the proposed reclamation plan is sufficient.²⁰⁸ If TPM cannot affirmatively prove each of these factors, EPD may not grant a permit. As shown below, TPM has not met this burden.

1. The proposed mine is not consistent with “land use in the area of the mine” or the public interest.

EPD should deny TPM’s application for a surface mining permit because the proposed mine is not consistent with land use in the area.²⁰⁹ As Secretary Babbitt said in the 1990s, “It is apparent on the face of it that this refuge and this mining project are not compatible.”²¹⁰

What was plainly apparent then is even more so now. The State need not take our word for it. The U.S. Fish and Wildlife Service has repeatedly voiced its opposition.²¹¹ Secretary of Interior Deb Haaland urged the state to deny the permit. “The proposed mining activity in this area poses an unacceptable risk to the long-term hydrology and future of the swamp ecosystem

²⁰⁵ Ga. Comp. R. & Regs. § 391-3-3-.05(5) (“It is the operator’s responsibility to provide a properly prepared, acceptable and sufficient Mining Land Use Plan that will provide for the protection of the environment in the development and operation of the stie and reclamation of mined lands.”). EPD has the power and duty to “examine and pass upon” permit applications and surface mining land use plans, O.C.G.A. § 12-4-73(a)(2)–(3), and EPD may only issue permits “on evidence satisfactory to the director of compliance” with the Surface Mining Act and regulations. *Id.* § 12-4-75(1).

²⁰⁶ Ga. Comp. R. & Regs. § 391-3-3-.05(2) and 391-3-3-.09.

²⁰⁷ Ga. Comp. R. & Regs. § 391-3-3-.05.

²⁰⁸ Ga. Comp. R. & Regs. § 391-3-3-.05(2).

²⁰⁹ Ga. Comp. R. & Regs. § 391-3-3-.05.

²¹⁰ Cushman, *supra* n. 10.

²¹¹ *See, e.g.*, Letter from Donald W. Imm, U.S. Fish & Wildlife Serv., to Col. Daniel Hibner, U.S. Army Corps of Eng’rs (Feb. 20, 2019) (attached to March 2023 comments as Ex. 36); Letter from Catherine Phillips and David Viker, U.S. Fish & Wildlife Serv., to Col. Daniel Hibner, U.S. Army Corps of Eng’rs (Oct. 8, 2019) (attached to March 2023 comments as Ex. 37); Letter from Donald W. Imm to Col. Daniel Hibner (May 28, 2020) (attached to March 2023 comments as Ex. 30); Georgia House of Representatives, Nat. Res. and Env’t Comm. Hearing (March 14, 2023)[hereinafter “HB 71 Hearing”] (statement of Michael Lusk); Letter from Leopoldo Miranda-Castro, Regional Dir., U.S. Fish & Wildlife Serv., to Brigadier Gen. Jason E. Kelly, Commander, S. Atl. Div., U.S. Army Corps of Eng’rs (Dec. 21, 2021) (attached to March 2023 comments as Ex. 38); Letter from Shannon A. Estenoz, Assistant Sec’y for Fish & Wildlife & Parks, U.S. Dep’t of the Interior, to Michael L. Conner, Assistant Sec’y of the Army (Civil Works) (Mar. 7, 2022) (attached to March 2023 comments as Ex. 39).

and these cultural values,” she wrote.²¹² “I strongly recommend that the State of Georgia not move ahead with approval for this proposed mine in order to ensure that the swamp and refuge are appropriately protected.”²¹³



The proposed mine is not an appropriate neighbor for a national treasure like the Okefenokee. (© Gregory Miller)

Former Department of the Interior officials are no less opposed. In addition to Secretary Babbitt, U.S. Fish and Wildlife Service Directors from the Nixon, Ford, Carter, Bush, and Clinton administrations have voiced their opposition to the project.²¹⁴ We are aware of no other project anywhere in the country that has generated this level of opposition from the U.S. Department of the Interior.

Local citizens and municipalities are likewise concerned about how the project will affect land use in the area. As described above, a September 2022 poll showed that 75% of South Georgia voters oppose the proposal to mine next to the Okefenokee Swamp.²¹⁵ More than a dozen South Georgia cities and counties have passed resolutions calling for the protection of the

²¹² Letter from Sec’y Deborah Haaland, U.S. Dep’t of Interior, to Gov’r Brian Kemp (Nov. 22, 2022).

²¹³ *Id.*

²¹⁴ Letter from Bruce Babbitt, Former Sec’y of the U.S. Dep’t of the Interior, *et al.* (attached to March 2023 comments as Ex. 9).

²¹⁵ Okefenokee National Wildlife Refuge Mining Poll, *supra* n. 14.

Okefenokee, including Homeland, Waycross, Jesup, Nashville, Brunswick, St. Marys, Savannah, Kingsland, Valdosta, Albany, Ware County, Clinch County, Echols County, Wayne County, Atkinson County, and Berrien County, as well as Hamilton County, Florida.

In response to these overwhelming concerns that mining is not consistent with land use in the area, TPM provides only a November 2020 letter of support from a Charlton County Administrator. For a number of reasons, that letter fails to satisfy TPM's burden.

First, the November 2020 letter is not dated within 30 days of the receipt of TPM's application, as required by the EPD's guidance for Surface Mining Act land use plans.²¹⁶ Instead, TPM's application is dated November 28, 2022—more than two years after the County issued the November 2020 letter.

Second, the November 2020 letter does not address the proposed mine's incompatibility with the County's Comprehensive Plan. Instead, the letter simply states that "Charlton County currently has no zoning regulations that would prohibit the proposed mining operations." While true, this is because Charlton County has no zoning regulations *at all*—not because the mine is consistent with the County's zoning regulations. The County does have a Comprehensive Plan, however, developed jointly with Folkston and Homeland after public notice and engagement with local citizens. As laid out below, the Comprehensive Plan directs the county to "encourage and request that any proposed development be compatible with the underlying Character Areas." In this case, the applicable character areas emphasize that any development should protect rural, agricultural, and forestry uses and "preserve a rural quality of life." The proposed mine, with its accompanying dust, light, noise, and ecosystem destruction, is conspicuously incompatible with the character areas within which it would be located—a fact entirely ignored in the November 2020 letter and in TPM's application.

Third, the November 2020 letter does not—and cannot—speak to the proposed mine's consistency with the neighboring Okefenokee National Wildlife Refuge and Wilderness Area. The U.S. Fish and Wildlife Service, not the County, is best equipped to make that determination and has repeatedly concluded that mining is not consistent with the purpose of the Refuge.

Fourth, the August 2019 resolution attached to the November 2020 letter was passed under the assumption that the U.S. Army Corps of Engineers would conduct a thorough NEPA review and not permit an operation that would threaten the Okefenokee National Wildlife Refuge, and, in any event, does not purport to address whether the proposed mine is consistent with land use in the area. Instead, it expresses support for the proposed mine based on the alleged economic benefits—a separate question than that before EPD under the Surface Mining Act standards.

²¹⁶ Georgia Env't Prot. Div., *Guidance for Mining Land Use Plan 1* (Sept. 9, 2020), <http://bit.ly/3ZWbuHE>.

Fifth, the August 2019 resolution states that the Commission’s support for the mine is “subject to [the mine’s] approval by any other authority having jurisdiction.” As Charlton County Commissioner Jesse Crews put it, “we [the County Commission] passed a resolution that told Twin Pines, ‘seek your permits from EPD, if you can get them, fine, if you can’t get them, we’ll see ya.’ See, that’s it, that was it. All we did.”²¹⁷ TPM, however, attempts to use this resolution, which supports the mine only if EPD determines it is safe and appropriate, to argue to EPD that the mine is safe and appropriate. EPD should not fall for this circular reasoning.

Sixth, the November 2020 letter and the August 2019 resolution do not reflect the views of most local municipalities and citizens. For example, Josh Howard, President of the Friends of the Okefenokee National Wildlife Refuge and a fifth-generation resident of Charlton County testified to the Georgia House Natural Resources and Environment Committee that “there are many folks in Charlton County, residents that are opposed to mining on Trail Ridge” and that the August 2019 resolution “does not represent the views of many of the residents of our county.” He continued, “Only a few that stand to benefit personally and financially from the mine strongly support it. Those voices do not speak for the rest of us.”²¹⁸ Indeed, the City of Homeland, located approximately five miles from the eastern border of the Okefenokee Swamp and just a few miles from the proposed mining site, unanimously passed a resolution opposing the mine—a fact that EPD entirely ignores in its assessment of land use.

In addition to the hydrological and other concerns addressed above, the paragraphs below highlight specific concerns about how the mine is inconsistent with nearby land uses and the public interest.

a. The proposed mine is inconsistent with the Joint Comprehensive Plan for Charlton County and the cities of Folkston and Homeland.

The Comprehensive Plan for Charlton County and the cities of Folkston and Homeland recognizes the importance of the Okefenokee Swamp to the region’s economy and quality of life. The Plan, developed jointly after public notice and comment from local citizens, emphasizes the community’s desire to preserve its “sense of place” by “protecting scenic and natural features that are important to defining the community’s character.”²¹⁹ The plan also highlights the local community’s desire to protect its world-renowned resource for economic reasons. For example, the Plan states a goal for Charlton County “to become a regional center for ecotourism”²²⁰ by “target[ing] tourism opportunities presented by the Okefenokee Wildlife Refuge....”²²¹

²¹⁷ Georgia House of Representatives, Nat. Res. and Env’t Comm. Hearing on HB 71 (March 14, 2023) (statement of Jesse Crews).

²¹⁸ *Id.*

²¹⁹ *Joint Comprehensive Plan Update for Charlton County and the Cities of Folkston and Homeland* 24 (Oct. 15, 2020), <https://bit.ly/3YT4Gtb>.

²²⁰ *Id.* at 12.

²²¹ *Id.* at 26.



In addition to its ecological importance, the Okefenokee National Wildlife Refuge is economically important to communities like Folkston, the “Gateway to the Okefenokee.” (© Gregory Miller).

The Plan sets out a handful of “Community Goals” to guide land use policy decisions. Two of those goals address the importance of the Okefenokee and the need to protect it:

- Goal 1: Improve the greater Charlton County economy by diversifying and establishing an economic and cultural climate that will allow the County to become a regional center for ecotourism and other coastal area-oriented businesses.
- Goal 3: Protect, appropriately use, or conserve the natural resources of the County, notably the Okefenokee National Wildlife Refuge and Rivers, to maximize their functions and values in a sustainable manner for perpetuity.

The plan also identifies “a lack of coordination and cooperation between State and Federal agencies to market the Okefenokee National Wildlife Refuge” as a challenge.²²² It is disappointing that, despite this clearly identified need for State and Federal assistance to support a local ecotourism industry based around the Okefenokee National Wildlife Refuge, the State is now considering issuing a permit that would put the local ecotourism economy at risk.

²²² *Id.* at 16.

In addition to setting broad “Community Goals,” the Comprehensive Plan identifies specific “Character Areas” to guide future land use decisions. These character areas are particularly important where, as here, the local government has not yet adopted a zoning ordinance.

The proposed mine site straddles the “Mixed Use Transitional” and “Mixed-Use Preferred Development” character areas. The “Mixed Use Transitional” character area is designed to protect rural, agricultural, and forestry land uses and encourages the use of conservation easements to protect environmentally sensitive areas.²²³ The Plan recommends that all proposed uses within this zone should be “compatible with the natural and cultural uses surrounding them.”²²⁴

The “Mixed Use Preferred Development” character area allows for mixed use development but advises the use of land development standards that would “steer development and economic growth where Charlton County would like to see it and to limit any potential negative environmental impacts.”²²⁵ The stated goal in this area is to “provide for compatible development, market the County as a bedroom community to Jacksonville, and preserve a rural quality of life in the midst of the County’s close proximity to a major metropolitan area.”²²⁶

It goes without saying that a heavy industrial strip mine is incompatible with rural, agricultural and forestry land uses and certainly inconsistent with a bedroom community with a rural quality of life.²²⁷

b. The proposed mine is inconsistent with the State Wildlife Action Plan.

The proposed mine is also inconsistent with the State Wildlife Action Plan (SWAP), a comprehensive wildlife conservation strategy developed by the Georgia Department of Natural Resources to conserve Georgia’s animals, plants, and natural habitats. The current SWAP identifies the Okefenokee Swamp as a high priority conservation area, both in its own right and based on its landscape connectivity to the St. Marys, Suwannee, and Satilla Rivers.²²⁸

EPD should give extreme deference to state prioritizations like this one, especially those coming from the Georgia Department of Natural Resources. To spend taxpayer money on identifying high priority conservation areas only to have those same priorities ignored and undermined by EPD in issuing permits is inexcusable.

²²³ *Id.* at 56–57.

²²⁴ *Id.*

²²⁵ *Id.* at 57–58.

²²⁶ *Id.*

²²⁷ *Id.*

²²⁸ Georgia Dep’t of Nat. Res., *State Wildlife Action Plan* (Sept. 2015), available at <https://bit.ly/40biuAe>.

c. The proposed mine is not consistent with the Suwannee Satilla Regional Water Plan.

The Suwannee Satilla Regional Water Plan is issued by the Suwannee Satilla Council, composed of decisionmakers from 18 counties in the region. The Plan identifies key water quality and quantity issues in the watersheds of the Satilla, Suwannee, and St. Marys Rivers. One of those issues is low dissolved oxygen levels, and consequent low assimilative capacity, in the St. Marys River. The proposed mine will remove groundwater flow to the St. Marys River, potentially resulting in even lower assimilative capacity and exacerbated problems with depressed dissolved oxygen in the St. Marys. The proposed mine could also generate accelerated runoff dynamics and produce sedimentation and contaminant pollution in the St. Marys and its tributaries. These effects of the proposed mine could interfere with water use priorities in the region, as identified in the Plan, including fishing, recreation, and agricultural uses. As such, the proposed mine is not consistent with the Plan, an important policy document generated by local decision makers to protect local water resources.

d. The proposed mine is incompatible with ecotourism associated with the Okefenokee National Wildlife Refuge.

The Okefenokee National Wildlife Refuge is an important economic engine for Charlton, Clinch, and Ware Counties in Georgia, as well as Baker County, Florida. Of the hundreds of national wildlife refuges throughout the nation, the Okefenokee ranks fourth in terms of economic output.²²⁹ According to a May 2019 Report by the U.S. Fish and Wildlife Service, the Refuge had more than 720,000 recreation visits in 2016, with approximately 65 percent of those visits by non-residents.²³⁰

As shown in the charts below, spending from those visits supported economic activity in the four-county region surrounding the Refuge, including Charlton County. According to the U.S. Fish and Wildlife Service, recreational spending in the local communities was associated with approximately 753 jobs, \$17.2 million in annual employment income, \$5.4 million in annual tax revenue, and \$64.7 million in annual economic output.²³¹

²²⁹ *Id.* at 12.

²³⁰ Economic Contributions of Recreational Visitation at Okefenokee National Wildlife Refuge, *supra* n. 6 at 2–3.

²³¹ *Id.*

Activity	Residents	Non-Residents	Total
Non-Consumptive	\$4,702,100	\$59,786,000	\$64,488,100
Hunting	\$4,600	\$0	\$4,600
Fishing	\$210,600	\$0	\$210,600
Total Expenditures	\$4,917,200	\$59,786,000	\$64,703,200

*Visitor Recreation Expenditures Associated with the Okefenokee National Wildlife Refuge (2016)*²³²

Activity	Residents	Non-Residents	Total
Non-Consumptive			
Pedestrian	35,554	82,958	118,512
Auto Tour	91,019	136,529	227,548
Boat Trail/Launch	4,367	13,102	17,469
Bicycle	782	261	1,043
Photography	3,627	10,881	14,508
Interpretation	37,534	87,578	125,112
Other Recreation	24,066	24,066	48,132
Visitor Center	49,922	116,485	166,407
Hunting			
Big Game	155	-	155
Small Game	-	-	-
Migratory Birds	-	-	-
Fishing	4,623	-	4623
Total Visitation	251,649	471,860	723,509

*2016 Recreation Visits to the Okefenokee National Wildlife Refuge*²³³

Economic Contribution	Residents	Non-Residents	Total
Economic Output	\$4,917,200	\$59,786,000	\$64,703,200
Jobs	57	697	753
Jobs Income	\$1,307,000	\$15,853,900	\$17,160,900
State and Local Tax Revenue	\$383,100	\$5,065,700	\$5,448,800

*Local Economic Contributions Associated with Recreation Visit to the Okefenokee NWR (2016)*²³⁴

These numbers are anticipated to significantly increase, especially by nonresidents, as ecotourism in the region grows. For example, the Okefenokee National Wildlife Refuge holds promise to become the first U.S. National Wildlife Refuge to receive UNESCO World Heritage Site Status—a non-regulatory designation reserved only for international sites of outstanding universal value and exceptional natural beauty. Only a handful of sites in the United States, like the Grand Canyon, Great Smoky Mountains, Yellowstone, Everglades, and Yosemite, have been awarded UNESCO status. Should the Refuge be designated, the Okefenokee would earn its

²³² *Id.*

²³³ *Id.*

²³⁴ *Id.*

rightful place beside these iconic natural wonders, further catalyzing the sustainable tourism and recreation economy in the area.

According to an impact study prepared by the Conservation Fund on behalf of Okefenokee Swamp Park, the pending World Heritage Site designation would result in an up to 100% increase in visitation, leading to an additional 800,000 annual visits that would generate roughly 750 additional long-term jobs and \$60 million in additional annual economic output. The report also considered the development of three new infrastructure projects and one new visitor center at separate entrance sites to the swamp, including a state-of-the-art nature center in Waycross, a cultural history and community center in Folkston, and a dark sky observatory in Fargo. The report estimates that together, development of these projects would generate 362 new jobs during construction, an additional \$46 million in economic output, and a total tax revenue of approximately \$4.6 million. Ongoing operation is expected to sustain at least 47 new jobs and generate over \$430,000 in annual tax revenue.²³⁵

By comparison, a recent economic study of the benefits of mining near the Okefenokee Swamp showed that, although mining would produce an initial, temporary net growth of employment and income, the positive impacts are significantly outweighed in the long run by the adverse effects of mining on recreation employment and income—a finding that is consistent with other case studies of tradeoffs between environmental amenity-based and resource extraction-based regional economic growth, as well as recent work on boom-bust cycles in resource intensive economies.²³⁶

In addition to providing direct economic benefits, the Okefenokee Swamp provides a number of ecological goods and services to the local community, including:

(1) maintenance and conservation of environmental resources, services, and ecological processes; (2) protection of natural resources such as fish, wildlife, and plants; (3) protection of cultural and historical sites and objects; (4) provision of educational and research opportunities; and (5) outdoor and wildlife-related recreation.²³⁷

An assessment by the University of Georgia, prepared for the U.S. Fish and Wildlife Service, estimates the gross economic value from wetlands in the Refuge to be approximately \$125,000,000 per year:

²³⁵ The Conservation Fund, *Projected Economic Impact of UNESCO World Heritage Site Designation: The Okefenokee National Wildlife Refuge* (Feb. 2024) (attached as Ex. 37).

²³⁶ Jacob Bradt, *Modeling Tradeoffs between Recreation and Extraction Based Regional Development: An Integrated Assessment of Mining near the Okefenokee Swamp* (HARVARD KENNEDY SCH. OF GOV'T, Submitted for Publ'n, 2021)(attached as Ex. 38).

²³⁷ Economic Contributions of Recreational Visitation at Okefenokee National Wildlife Refuge, *supra* n. 6 at 1.

Ecosystem Service	Gross Economic Value Per Year
Storm Protection	\$27,000,000
Water Quality	\$45,000,000
Commercial Fishing Habitat	\$0
Carbon Storage	\$53,000,000
4 service aggregate	\$125,000,000

*Gross Economic Values from Okefenokee Refuge Wetlands per Year.*²³⁸

According to the authors, the estimated values are conservative, in part because the study “only consider[s] benefits to local populations whereas National Wildlife Refuges provide[] benefits to the nation as a whole.” In addition, “because of lack of data, [the] results also leave out other ecosystem services such as biodiversity protection, aesthetic values, and cultural values (plus potentially many more).”²³⁹

e. Light pollution from the proposed mine could impair the visitor experience in the Okefenokee National Wildlife Refuge.

The Okefenokee Swamp enjoys natural nighttime darkness to a degree almost unparalleled in the eastern United States. Stephen C. Foster State Park, located on the western side of the Okefenokee Swamp, is a Gold-tier International Dark Sky Park, the first and only place in the state of Georgia to receive accreditation as part of the International Dark Sky Places Program.²⁴⁰

In addition to attracting visitors, the Okefenokee’s dark skies are important to the survival of its ecosystems. As one scientist noted, “[t]hrough it may not be as immediately toxic as a chemical spill, light pollution is now among the most chronic environmental perturbations on Earth.”²⁴¹ He went on to explain that “[r]esearchers have already identified harmful impacts on a shocking array of non-urban species, including bats, insects, plants, fish, turtles, marine invertebrates including corals, and even primates.”²⁴²

In response to these concerns, TPM provided a lighting analysis concluding that skyglow impacts may be minimized if TPM develops a detailed lighting plan following guidelines for dark skies friendly lighting design, including using specific bulbs and fixtures for any lighting, but it does not provide an actual lighting plan consistent with these standards.

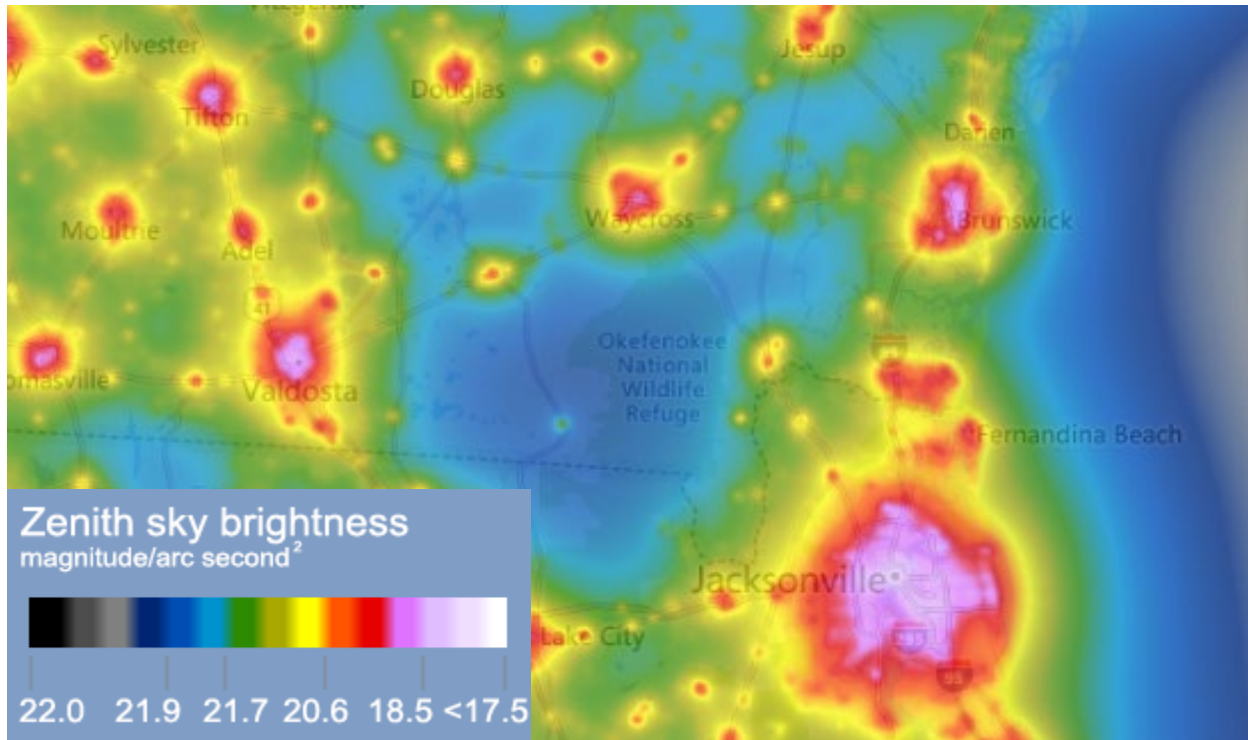
²³⁸ Douglas Patton et al., *National Wildlife Refuge Wetland Ecosystem Service Valuation Model, Phase 1 Report* at iii (April 2012) (attached to March 2023 comments as Ex. 40).

²³⁹ *Id.* at 47.

²⁴⁰ International Dark Sky Association, *Stephen C. Foster State Park (U.S.)*, <http://bit.ly/3FwUAHf> (last visited Mar. 19, 2023).

²⁴¹ Nadia Drake, *Our Nights are Getting Brighter, and Earth is Paying the Price*, NAT’L GEOGRAPHIC (Apr. 3, 2019), <http://bit.ly/3mEXfZ0>.

²⁴² *Id.*



The Okefenokee is home to some of the darkest skies east of the Mississippi River. (©lightpollutionmap.info)



The Okefenokee Swamp is home to some of the darkest skies in the Eastern United States. (© Jay Blanton)

f. Sound from truck traffic and mining operations may impact the nearby community.

The machinery at the proposed mine is likely to generate a substantial amount of noise throughout the day and night. Most of the excavation work would be done by a dragline, which TPM describes as a “large crane-like earthmoving machine” that is equipped with a “large capacity bucket” so that it can move “large quantities of material” efficiently. The noise from the dragline would be coupled with the sound from other pieces of smaller excavation equipment such as bulldozers, backhoes, and dump trucks. Once the titanium ore is excavated by these machines, TPM would feed it into a pre-concentration plant, followed by a wet concentration plant and mineral separation plant, both of which are likely to generate substantial noise.

TPM attaches an acoustical analysis showing the anticipated sound level at the border of the Refuge. The analysis is based on standard construction equipment, not the specific mining and separation equipment used by TPM. Moreover, it does not address the impacts on other community sites, nor does it address the acoustic impact of transporting materials onto and off of the site by truck or train. Indeed, in a document not submitted to EPD, TPM suggested it anticipates up to thirty trucks each day.²⁴³

g. The proposed mine threatens cultural resources in the area.

The proposed mine is also inconsistent with the abundant cultural and historical resources in the area. The Okefenokee has a rich cultural history, with evidence of Native American occupation dating back to 2500 BCE. Multiple Tribes have expressed concerns about the impact of the proposed mine on their ancestral homelands.

For example, Principal Chief of the Muscogee (Creek) Nation David W. Hill declared Trail Ridge from Hoboken, Georgia to the St. Marys River a “Sacred Site,” including all wetlands that form the watershed for the Okefenokee Swamp and St. Marys River.²⁴⁴

Marian McCormick, Principal Chief of the Lower Muscogee Creek Tribe, expressed concerns about the impact of the proposed mine on ancestral grave sites. “Lowering the water levels will expose cultural items and graves of our ancestors. With the long history of the Muscogee and the natives that came before us, there is no way that there will be no burials in this area that will be exposed,” she explained.²⁴⁵ “We are connected to the Okefenokee Swamp by the bones of our ancestors. There is no honor in mining this area. We ask that the EPD deny this application.”²⁴⁶

²⁴³ GEORGIA DEP’T OF COMMUNITY AFFAIRS, *Development of Regional Impact #3410 Forms*, *supra* n. 37.

²⁴⁴ Letter from Principal Chief David W. Hill, Muscogee (Creek) Nation, to Col. Joseph R. Geary, U.S. Army Corps of Engineers (Oct. 27, 2022) (attached to March 2023 comments as Ex. 41).

²⁴⁵ EPD 2023 Public Hearing, *supra* n. 16 (statement of Marian McCormick).

²⁴⁶ *Id.*

2. The mining land use plan does not ensure the protection of contiguous natural and other resources.

EPD should deny TPM’s application for a surface mining permit because the proposed mining land use plan does not ensure “the protection of contiguous natural and other resources.”²⁴⁷ As explained in the technical comments above, the proposed mine threatens to (1) lower water levels in the Okefenokee Swamp by removing approximately 560,000 gallons of water per day from the water budget; (2) increase the bulk hydraulic conductivity on Trail Ridge and potentially reduce long-term flows to the Okefenokee; (3) increase wildfire risk in the vicinity of the swamp by exposing peat and increasing the duration and severity of drought in the swamp; (4) contaminate ground and surface water in the swamp by liberating heavy metals, radionuclides and other contaminants that are currently stored in Trail Ridge soils; and (5) harm wildlife, including shortnose and Atlantic sturgeon, by eliminating or degrading habitat.



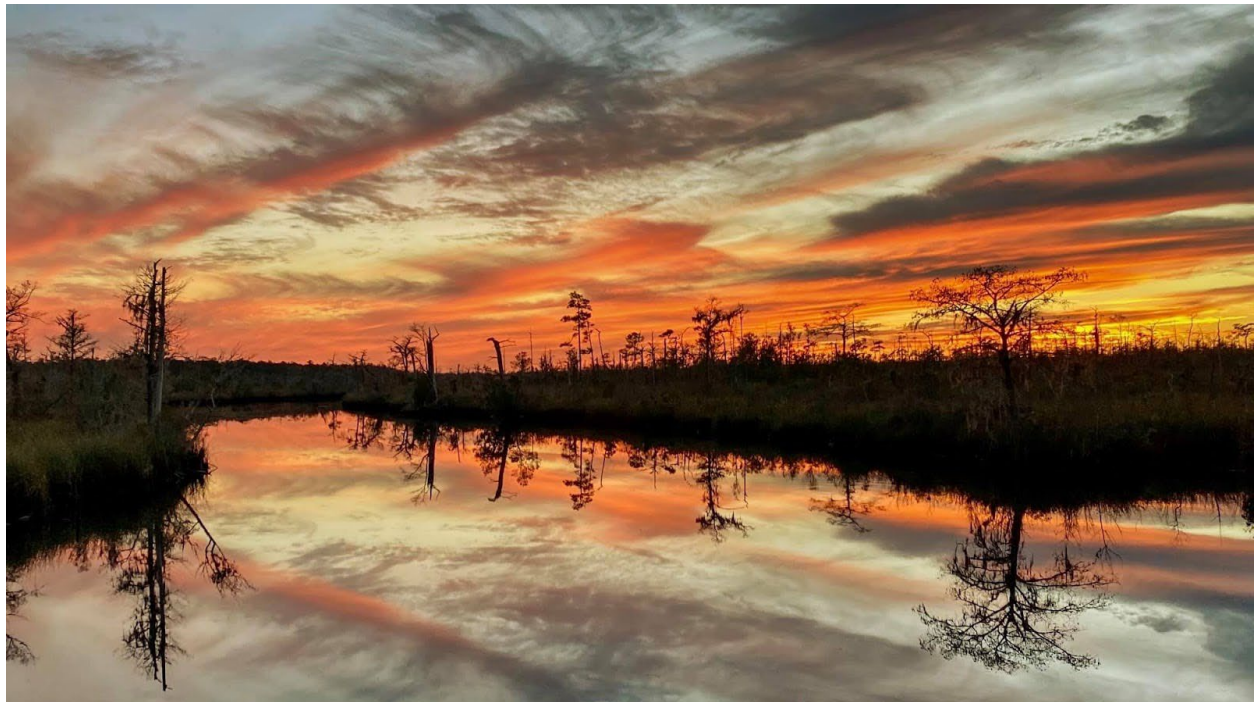
The Okefenokee Swamp is one of the largest and most well-preserved freshwater ecosystems in the world. (© Gregory Miller)

Although it has garnered the most attention, the Okefenokee Swamp is not the only important natural resource at stake. The swamp forms the headwaters of two of the South’s healthiest river systems: the St. Marys and the Suwannee. The St. Marys is a blackwater river that has been designated as one of “America’s most endangered rivers” by American Rivers

²⁴⁷ Ga. Comp. R. & Regs. § 391-3-3-.05(2) and 391-3-3-.09.

because of TPM’s mining application. It surfaces as a tiny stream known as River Styx and flows from the western edge of Trail Ridge and into the southeastern Okefenokee Swamp. From there it travels 125 river-miles before delivering its tea-colored water into the Atlantic Ocean near St. Marys, Georgia, and Fernandina Beach, Florida.

The Suwannee River flows more than 240 miles from South Georgia through North Florida and into the Gulf of Mexico. In recognition of its exceptional water quality and the significance of its natural communities, the State of Florida has designated it an Outstanding Florida Water.



The proposed mine also threatens downstream rivers like the Suwannee, one of the South’s healthiest river systems.
(© Georgia River Network)

As the headwaters to these two major rivers, the Okefenokee’s health and vitality are essential to supplying downstream ecosystems with clean water. In addition, as described above, by disturbing and homogenizing the soils on Trail Ridge, the mining process is likely to release the toxic contaminants stored in those soils, including radionuclides and heavy metals, into nearby surface waters like the St. Marys River—a concern that TPM has repeatedly failed to address.

In addition, the wetlands within the proposed mine site—even if they are now labeled non-jurisdictional under the Clean Water Act—are important in their own right. Although less celebrated than the Okefenokee or the St. Marys, more than three hundred acres of wetlands sit atop the proposed mine site, serving important ecosystem functions like water filtration, flood control, and habitat. Although TPM dismisses impacts to these wetlands as “minor,” it would

likely take decades for habitat to return and perhaps longer for biogeochemical cycling to return to pre-mining conditions, if this were to occur at all.

In addition, it is likely that the proposed mine's hydrological impacts, when coupled with the conversion of Trail Ridge habitat, will impact multiple species that are found within the larger Okefenokee ecosystem as well as downstream in the St. Marys River. As described in the attached Appendix, the Okefenokee Swamp and its surrounding ecosystems are home to approximately 620 species of plants, 233 species of birds, 39 species of fish, 37 amphibians, 64 reptiles, and 50 mammals, many of which are threatened or endangered, including the red-cockaded woodpecker, the wood stork, and the eastern indigo snake. The proposed mining land use plan does not adequately consider the harm to or mitigation of this habitat and species.²⁴⁸

3. The mining land use plan is not based on sound engineering and conservation principles.

EPD should deny TPM's application for a surface mining permit because the proposed mining land use plan is not based on "sound engineering and conservation principles."²⁴⁹ The technical concerns addressed above compel denial of the permit under Ga. Comp. R. & Regs. § 391-3-3-.05.

4. The mining land use plan does not provide sufficient detail concerning the reclamation plan.

As addressed in the technical comments above, TPM's reclamation plan is wholly insufficient. The "Performance Criteria for Reclamation" amounts to filling in the mine pit and possibly decommissioning the ponds. Under these criteria, TPM could meet its "objectives" and be released from reclamation responsibilities even if significant adverse effects occur. Rather than provide enforceable benchmarks and requirements, the reclamation procedures indicate only that groundwater levels are "expected to return naturally" and that natural plant communities are "expected to develop" from the topsoil.

TPM also fails to adequately address wetlands reclamation issues. In its *Provisions Check List for Protection of the Environment and Resources of the State*, TPM falsely claims that impacts to wetlands will be "minor," despite its plan to excavate more than 332 acres of wetlands, like the one shown below, to an average depth of 50 feet. It is unclear how or if TPM plans mitigate these losses, since the plans at best refer only to "restoration"—a significant misnomer, since even effective wetland restoration efforts cannot recover original levels of ecosystem function for many decades.

²⁴⁸ Appendix B, attached hereto, provides a brief summary of endangered, threatened, and other vulnerable species that may be harmed by the proposed mining operations.

²⁴⁹ Ga. Comp. R. & Regs. § 391-3-3-.05(2).



This photograph, taken in August 2018, depicts part of the more than 332 acres of wetlands just south of the proposed Pre-Concentration and Wet Concentration Plants that would be excavated in year 2.²⁵⁰

For example, TPM does not anticipate planting any vegetation except trees on the reclaimed wetlands based on its assumption that the seedbank in the topsoil will reestablish plant communities. TPM intends to remove the topsoil two weeks before mining and stockpile it near the excavation, but it is not clear from the proposal that TPM will treat the topsoil in a sufficiently careful manner, making any future wetland creation nearly impossible. First, the soil used to create a wetland must be wetland soil, meaning that TPM must separate the wetland soil that it removes from the upland soil that it removes. Second, the wetland soil redeposited on the tailings must be at a sufficient depth to support wetland functions. Third, stockpiling the topsoil for any extended time will make it more difficult for plant seeds to survive. It does not appear that TPM has considered any of these concerns.

In addition, water levels are critical for the existence of wetlands, and a 2.7-foot change in water levels from mining could entirely prevent the re-establishment of wetlands. Again, there are over 332 acres of wetlands in the footprint of this first phase of TPM's mine, and a drop in water levels could also negatively impact wetlands outside the mine footprint. There is a very real risk that the homogenized sands may be too permeable to ever support wetlands and streams. Even if the bentonite layer functions as intended, TPM still considers post-mining groundwater

²⁵⁰ See *Waters of the United States Delineation Report: Approximately 1,034-Acre Keystone Tract, St. George, Charlton County, Georgia*, App'x B at 5 (Sept. 28, 2018).

levels “restored” if they are 2.7 feet lower than they were before mining, regardless of the impacts to future wetland establishment.

Moreover, even if the pits that were previously wetlands are returned to preconstruction contours, the physical, biological, and chemical functions of those wetlands would not return for a very long time. It would likely take decades for habitat to return and perhaps longer for biogeochemical cycling to return to pre-mining conditions, especially if topsoil is not sorted by hydrogeomorphic (HGM) type when stockpiled.²⁵¹

Despite these concerns, the proposed reclamation plan deems wetland reclamation “successful where tree vegetation maintains a survivability rate of 50 percent,”²⁵² but trees alone are an insufficient marker of wetland restoration.

TPM should address the above concerns and also describe the following as part of any reclamation plan:

- How TPM intends to stockpile topsoil in a manner that will not adversely affect organic matter content, soil microbes, soil fungi (esp. root mycorrhiza), and seed banks of native plant species;
- Which ecosystems (or HGM subclasses) TPM would use to establish intermediate and final targets for their proposed created habitats and ecosystems;
- What mix of native species and herbaceous shrubs would TPM plant and what is the basis for planting those species;
- What TPM’s plan is for preventing invasive species (e.g., cogongrass) from overtaking reclaimed land; and
- How and when TPM will measure success (beyond tree vegetation).

We anticipate that many of these questions require additional studies and monitoring. As prepared, TPM’s reclamation plan is wholly insufficient to satisfy the requirements of the Surface Mining Act.²⁵³

E. EPD may not grant the groundwater withdrawal permit for withdrawals from the Floridan aquifer.

EPD should deny TPM’s application for a groundwater withdrawal permit from the Floridan aquifer because (1) TPM has not provided “sufficient documented evidence ... to

²⁵¹ Richard Rheinhardt, *Review of USACE Clean Water Act Permit Application by Twin Pines Minerals* (Sept. 2019) (attached to March 2023 comments as Ex. 32).

²⁵² Revised MLUP, Sheet 9.

²⁵³ Ga. Comp. R. & Regs. § 391-3-3-.05(2).

evaluate the effects of the described water use upon the water resources of the area;”²⁵⁴ (2) TPM did not consider “the best geologic and hydrologic information available on the aquifer or ground water system of the area;”²⁵⁵ and (3) granting the permit is likely to have “unreasonably adverse effects upon other water uses in the area, including public use.”²⁵⁶

As explained in the technical comments above, TPM’s model is too flawed to accurately predict how the proposed groundwater withdrawal from the Floridan aquifer will affect water resources in the area, including the Okefenokee Swamp and the St. Marys River, or other water uses in the area, including agricultural use and public use. In addition to the concerns noted in the technical comments, the best geologic data available on the aquifer shows that a hydraulic connection exists between the Okefenokee Swamp and the Upper Floridan Aquifer through the Hawthorn Group—a fact that TPM summarily dismisses. EPD should therefore deny TPM’s permit to withdraw groundwater from the Floridan aquifer.

In addition, EPD may not grant the permit as drafted, which would allow TPM to withdraw 1.44 MGD of groundwater from the Floridan aquifer for the next ten years, because TPM’s application does not even attempt to assess the impacts of ten years of cumulative groundwater withdrawals. At most, the applicant purports to assess (albeit poorly) groundwater impacts at year four. It should go without saying that EPD may not grant a ten-year groundwater use permit based on an assessment of impacts at year four.

F. EPD may not grant an air permit because TPM’s application is lacking significant information necessary to meaningfully evaluate and comment on the application.

TPM’s air permit application is lacking significant information necessary to meaningfully evaluate and comment on the application. For example:

- Do the “potential emissions” calculations take into consideration the proposed controls? If yes, proposed controls should not be included in the calculation of potential emissions.
- It is unclear whether the emitting units have been characterized correctly. Are there emitting units that TPM has characterized as fugitive (and excluded in the potential to emit and determination of source/PSD) that should be included as controlled emissions (for example, conveyers)?
- The application does not include any stationary source emissions from the mining operations as part of the “source.” Are there any such emissions?

²⁵⁴ Ga. Comp. R. & Regs. 391-3-2-.04(2).

²⁵⁵ Ga. Comp. R. & Regs. 391-3-2-.05(1).

²⁵⁶ Ga. Comp. R. & Regs. 391-3-2-.05(3).

- Why did TPM choose to use AP-42 emissions factors to estimate emissions? These factors are known to have a high level of uncertainty.
- Please provide a justification for why TPM claims that no emissions are expected during wet processing.
- Why did TPM fail to include all emitting units?
- Where will TPM get its power? Diagrams identify several “substations,” but it is unclear whether these are for transfer of power from an offsite location or if power will be generated onsite. If power is generated onsite, TPM must consider emissions from those activities.
- The application lacks specifics about control of fugitive emissions. For example, TPM claims that “fugitive dust emissions from hauling roads will be controlled by wet suppression, as needed”; that one of the truck loading areas will have an “enclosed chute for bulk tank trailers” and that TPM will use “best management practices” for dust and PM fugitive emissions for HMC Feed Hopper Nos. 1 and 2 and the HMC Re-Slurrying Hopper. Please explain what these practices are.
- The application fails to explain how it will control fugitive emissions of particulates from stockpiles where mineral products will dry for a few days outside of the wet concentrator plant; emissions from loading the mineral products onto trucks and transporting to either the dry plant for MSP from the wet concentrator plant; piles of raw materials from mining operations; loading of product; transfer of raw materials from mining operations to plants via conveyors; and loading of product to rail or barge. Please describe which controls, if any, will be used for these areas.
- Are combustion emissions from the three indirect-fired dryers at the Mineral Separation Plant, which are vented outside via a stack and uncontrolled, part of the emission estimate? The application indicates that propane is the fuel and that the dryers range in capacity from 1.02 to 5.32 MMBtu/hr.

G. EPD should consider cumulative impacts.

TPM eventually plans to mine at least 8,000 acres—a fact that it has acknowledged publicly on repeated occasions. Its application, however, considers the impacts from mining only the first tract.

TPM’s application is a classic example of “piecemealing,” or dividing a project into two or more phases and evaluating each piece in a separate environmental document, rather than evaluating the entire project in a single review. The dangers of piecemealing are obvious: the practice deliberately obscures the real scale of damage caused by a project.

Although details about future phases may not yet be known, the basic contours are clear. Indeed, TPM has already purchased the land. There is no real dispute that the project, when complete, will have a significantly larger scope and impact than the first phase alone. Indeed, according to TPM, the entire purpose of the “demonstration” mine is to show how mining 8,000 acres would impact the Okefenokee and surrounding ecosystems. TPM cannot simultaneously argue that the purpose of the mine is to measure the long-term impact of mining 8,000 acres on Trail Ridge and also tell EPD it should not consider the cumulative impact of mining 8,000 acres on Trail Ridge.

In short, common sense and principles of good stewardship dictate that EPD should consider the cumulative impacts of the entire project, as well as other reasonably foreseeable mining projects on Trail Ridge—especially when one of our nation’s most valuable natural resources is at stake.

IV. CONCLUSION

In 1919, the U.S. Biological Survey declared the Okefenokee to have “no counterpart anywhere in the world.” “Its complete exploitation for commercial purposes, with the accompanying destruction of primeval conditions,” warned the agency, “would be a severe loss to science and to the Nation, just as its preservation in its original state would be a cause for rejoicing and lasting benefit to the whole country.” These words remain as true today as a century ago.



The state should not risk the integrity of one of our greatest natural resources on a strip mine. (© Gregory Miller)

Director Jeff Cown

April 9, 2024

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At its core, the question before EPD is simple: With the future of the Okefenokee at stake, should EPD trust an Alabama-based company with a documented track record of environmental harm and a strong financial interest in mining, over more than two dozen independent scientists, including three nationally respected federal government hydrologists, the Interim Dean of Academic Affairs at the University of Georgia Warnell School of Natural Resources, the Dean Emeritus of the Nicholas School of the Environment at Duke University, the former co-chair of the Georgia State Board of Professional Geologists, and a dozen former EPD geologists, engineers, and unit managers, all of whom have separately concluded that TPM has not met its burden to show that mining would not harm the Okefenokee? This should not be a close call. In the words of former Secretary of the Interior Bruce Babbitt: “The idea of compromising the integrity of this wildlife refuge for the color of toothpaste is inconceivable.”

On behalf of our 54 organizations, and generations of future Georgians, we implore EPD to protect the Okefenokee Swamp. EPD has both the authority and justification to deny TPM’s permit application. All it needs is the courage to use it.

Thank you for the opportunity to comment. If you have any questions or if we can provide any additional information, please feel free to contact us at 404-521-9900 or bsapp@selcga.org.

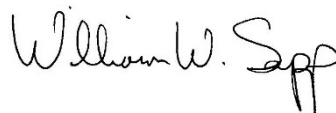
Sincerely,



Megan Hinkle Huynh
Senior Attorney
Southern Environmental Law Center



Peter Slag
Associate Attorney
Southern Environmental Law Center



William W. Sapp
Senior Attorney
Southern Environmental Law Center

Appendix A: Application Questions

Wildlife impacts

- How will EPD monitor the impact of the proposed mine on migratory birds seeking stopover habitat in the Okefenokee Swamp and on Trail Ridge?
- How will EPD ensure that the mining site is restored to conditions that offer sufficient food and shelter to migratory birds that have historically used these areas during migrations?
- Will EPD, in its TPM permitting decision, consider the water sampling data and bathymetric survey data produced by EPD WPB in 2024 to assess the impacts of the proposed mine on the St. Marys and resident sturgeon? Why or why not?
- Will EPD, in its TPM permitting decision, consider the side sonar scan data and field survey “ground-truthing” data collected by the U.S. Fish and Wildlife Service in 2024 to identify sturgeon and spawning sites in the St. Marys River? Why or why not?
- Will EPD, in its TPM permitting decision, consider the genetic sampling data collected by University of Georgia researchers in 2024-2025 to identify sturgeon populations and characteristics in the St. Marys River? Why or why not?
- Will EPD construct an open-channel hydraulic model and water quality models based on data collected in 2024 by EPD WPB and use those models to assess the impacts of the proposed mine on the St. Marys River and resident sturgeon?
- Why did EPD choose to use only water elevation data and not water flow data to assess the impacts of the proposed mine on the St. Marys River? Why did EPD choose to use data only from the MacClenny gauge and not other gauges, such as the Moniac gauge, to assess impacts to water elevation and flow from the proposed mine?
- Why did EPD choose not to consider the frequency and occurrence of zero flow events at the Moniac gauge when assessing potential impacts of the proposed mine on the St. Marys River?
- Why did EPD choose a connection value of 40% in assessing the connection between the surficial aquifer and the St. Marys River?
- Why did EPD compare the connectedness of the Floridan Aquifer in Florida and Georgia to the connectedness of the St. Marys River to the surficial aquifer on Trail Ridge? Is this an appropriate comparison? Why or why not? Is it possible that the surficial aquifer is more connected to the St. Marys River than the Floridan Aquifer is to most surface waters?

- What are the important differences in connectedness to adjacent surface waters between a surficial aquifer present on a ridge with a hydraulic head and a deep subsurface aquifer separated from surface waters by an aquitard layer?
- Is the connectedness of the immediately adjacent surficial aquifer to the St. Marys River similar to the connectedness of the Floridan Aquifer to the St. Marys River? Why or why not? Why did EPD conflate these analyses in its January 2024 memorandum?
- Will EPD develop and execute a plan to monitor impacts of the proposed mine on the St. Marys River and resident sturgeon?
- How could reductions in the amount of groundwater flowing into the St. Marys impact the dissolved oxygen levels in the river?
- How could reductions in the amount of groundwater flowing into the St. Marys impact the water temperature of the river?
- How could increased water temperatures in the St. Marys River impact dissolved oxygen levels in the river? At Moniac? At MacClenny? In portions of the river listed as impaired for dissolved oxygen? In portions of the river listed as critical habitat for sturgeon? Near sites identified as possible spawning locations?
- Will reducing the amount of groundwater flow into the St. Marys River increase the frequency and intensity of zero-flow days on the river?
- Will reducing the amount of groundwater flow into the St. Marys lead to negative flow, wherein the river reverses flow direction or loses water to groundwater seepage?
- How will zero flow or negative flow events impact the water temperature, dissolved oxygen, flow rate and water elevation of the St. Marys River? At Moniac? At MacClenny? In portions of the river listed as impaired for dissolved oxygen? In portions of the river listed as critical habitat for sturgeon? Near sites identified as possible spawning locations?
- Has EPD considered the impacts of the proposed mine on pH, sedimentation, salinity, turbidity, and toxic contamination in the St. Marys River and associated impacts to resident sturgeon?
- Will EPD plan and execute a plan to monitor potential impacts from the proposed mine on pH, sedimentation, salinity, turbidity, and toxic contamination in the St. Marys River and associated impacts to resident sturgeon?
- Does EPD have a plan to collect more data and information about the St. Marys River and the sturgeon and other wildlife that reside in the river?

- Will EPD place more water monitors and gauges on the St. Marys River to improve data collection?
- How will EPD respond to information or data collected that shows impacts from the proposed mine on the St. Marys River and resident sturgeon?
- Does EPD have a plan to determine whether or not sturgeon in the St. Marys River have been harmed by the proposed mine? Does EPD have a plan to monitor the well-being of sturgeon in the St. Marys River throughout designated critical habitat, including during spawning, feeding, and sheltering and at all life stages including adult, juvenile, larval and eggs?
- Once the landscape has been restored following mining, how much time is needed before gopher tortoises will resume burrowing?
- How sustainable are newly created gopher tortoise burrows in post-restoration project areas?
- The U.S. Fish and Wildlife Service concluded in February 2019 that the proposed project may result in loss of eastern indigo snake “habitat, individuals, and natural corridors.” It further noted that Trail Ridge is part of a recovery unit for the eastern indigo snake and stated that “[e]liminating a significant area of habitat from a recovery unit may eliminate the value of the entire unit, and delay species recovery.” EPD and TPM have not yet responded to this concern. What measures are required by the permit to ensure against habitat loss or take?

Soil leach tests

- How might homogenizing the replaced mined sand spoils affect the mobility and release of radionuclides, (primarily uranium-238 and thorium-232) into groundwater?
- Has EPD required TPM to provide soil leach tests that can simulate or detect potential contaminant leaching over a period of multiple years?
- Will EPD require TPM to use LEAF leach testing? Why or why not?
- What types of contaminants, toxics, changes, and issues will LEAF testing be able to identify that SPLP testing may not identify?

Slope stability

- Has TPM conducted a slope stability analysis?
- How do geological, groundwater, climate, and fire conditions affect the stability of the slope and the walls of the mine?

- Does TPM have a plan to address potential slope failure, particularly given the sensitive natural resources and infrastructure (i.e. roads and railways) in the vicinity of the project site? If TPM has not conducted a geotechnical analysis of slope stability, EPD should require that one be performed.

Eco-VAP system and water management

- Will EPD consider whether it is appropriate to simulate the storage pond and evaporator system using monthly averages from St. George, GA for temperature, wind speed, and humidity?
- Will EPD consider the performance of the storage pond and evaporator system under a broader range of climatic and weather conditions, including low or freezing temperatures, very low wind speed, high humidity, high annual rainfall totals?
- How will the evaporator system be impacted by relatively high wind speeds?
- Can relatively high wind speeds drive water droplets containing salts and other dissolved solids from the evaporator systems and into nearby environments, communities, and bodies of water?
- Have EcoVAP systems been tested or used in Georgia? In the Southeast? In other hot and humid environments? Have they been used in continuous operations over several years? How have these evaporators performed in such locations and over such time periods?
- How will minerals and organic materials contained in process water impact the function and efficiency of the evaporators?
- How will solid materials that accumulate in the process water ponds be returned to the mining pit? Will these materials be mixed with soil amendments and other waste solids? How will these materials impact the soil structure of replaced and amended soils?
- Will solids accumulated in the storage water ponds be tested for contaminants, pH, salinity, and other relevant characteristics before being returned to the mining pit?
- How will mining operations and water storage proceed if storage water ponds lack enough excess capacity to absorb a one-in-1,000-year rain event? Will EPD require operations to stop or slow down if the process water ponds do not have sufficient excess capacity?
- How often does EPD anticipate the wastewater management ponds will overflow?

Bentonite application

- Where will TPM source bentonite for soil amendment? Does EPD have quality or sourcing considerations for bentonite soil amendment? What are those quality or sourcing considerations?
- How likely is it that the bentonite used will contain toxic contaminants? What toxic contaminants are typically found in bentonite?
- Will EPD require TPM to test bentonite for toxic contaminants before placing it into the soil structure? Why or why not?
- Will EPD require TPM to mix bentonite with other soil replacements using a particular method or protocol? If so, what protocol will be used? Why or why not?
- How will EPD ensure that the soil amendment placed into the mining pits will be consistently or appropriately mixed?
- Are there other examples of bentonite being used as a soil amendment for mining reclamation?
- Will EPD require bench scale studies from the affected strata to ensure bentonite soil amendment is appropriate and effective? Why or why not?
- Will EPD require post-closure maintenance and monitoring of the bentonite amendment soil structure?
- Studies show that bentonite in large concentrations can adversely affect plant growth and sustainability. How will a 10% bentonite amendment affect plant growth and sustainability on the mining site?
- Studies show that bentonite can cause soil cracking during periods of drought adversely affecting soil structure and fertility. How will a 10% bentonite amendment affect plant soil structure and fertility on the mining site?
- Did TPM use data from bentonite-contaminated samples to construct estimates and models for conductivity?
- How might bentonite-contaminated samples affect the conductivity estimates for processed mine tailings and post-mining reclamation conditions?
- Are TPM's estimates for bentonite application as a soil amendment based on the use of bentonite-contaminated soil samples to estimate conductivity?

- Would the use of inappropriate or inaccurate conductivity data create problems for generating and implementing an effective soil amendment plan based on accurate conductivity data? Did such problems affect TPM's soil amendment plan?

Monitoring and reclamation

- The monitoring plan calls for unvented pressure transducers. Is water depth corrected to barometric pressure?
- The typical shallow piezometer detail (Sheet 13) depicts a cement/bentonite seal at 15 feet from the bottom of the casing. Groundwater measured within the 10-foot screened casing is not representative of shallow water levels within the vadose zone and the wetting front above the spodic horizon. Has EPD considered and addressed this deficiency?
- TPM states that "If groundwater levels are below normal...., the proposed solution may be to increase the percentage of bentonite added to the low-permeability layer going forward... inject additional bentonite slurry within a discrete subsurface soil amendment layer (i.e., 7 to 10 feet below land surface" (Sheet 11, Section 2.5). Is it best to add bentonite to a "low-permeability layer" to create an aquitard or even an aquiclude, or is it best to add bentonite to a high-permeability layer?
- Injecting bentonite "7 to 10 feet below land surface" does not restore the functionality of the spodic horizon which is generally within three feet of the ground surface. How does TPM intend to restore the functionality of the spodic horizon?
- How does TPM intend to stockpile topsoil in a manner that will not adversely affect organic matter content, soil microbes, soil fungi (esp. root mycorrhiza), and seed banks of native plant species?
- How does TPM intend to create perched wetlands in unconsolidated sands when the bentonite layer is 7 to feet below land surface?
- What ecosystems (or HGM subclasses) would TPM use to establish intermediate and final targets for their created ecosystems?
- What mix of native species and herbaceous shrubs would TPM plant and what is the basis for planting those species?
- What is TPM's plan for preventing invasive species (e.g., cogongrass) from overtaking reclaimed land and their adaptive management approach if they do?
- How would mining and subsequent homogenization of soils affect hydrology in the short-term?

Air emissions

- Do the “potential emissions” calculations take into consideration the proposed controls? If yes, proposed controls should not be included in the calculation of potential emissions.
- It is unclear whether the emitting units have been characterized correctly. Are there emitting units that TPM has characterized as fugitive (and excluded in the potential to emit and determination of source/PSD) that should be included as controlled emissions (for example, conveyers)?
- The application does not include any stationary source emissions from the mining operations as part of the “source.” Are there any such emissions?
- Why did TPM choose to use AP-42 emissions factors to estimate emissions? These factors are known to have a high level of uncertainty.
- Please provide a justification for why TPM claims that no emissions are expected during wet processing.
- Why did TPM fail to include all emitting units?
- The application lacks specifics about control of fugitive emissions. For example, TPM claims that “fugitive dust emissions from hauling roads will be controlled by wet suppression, as needed”; that one of the truck loading areas will have an “enclosed chute for bulk tank trailers” and that TPM will use “best management practices” for dust and PM fugitive emissions for HMC Feed Hopper Nos. 1 and 2 and the HMC Re-Slurrying Hopper. Please explain what these practices are and how they will control fugitive emissions.
- The application fails to explain how it will control fugitive emissions from particulates from stockpiles where mineral products will dry for a few days outside of the wet concentrator plant; emissions from loading the mineral products onto trucks and transporting to either the dry plant for MSP from the wet concentrator plant; piles of raw materials from mining operations; loading of product; transfer of raw materials from mining operations to plants via conveyors; and loading of product to rail or barge. Please describe controls, if any used for these areas.
- Are combustion emissions from the three indirect-fired dryers at the Mineral Separation Plant, which are vented outside via a stack and uncontrolled, part of the emission estimate? The application indicates that propane is the fuel and that they range in capacity from 1.02 to 5.32 MMBtu/hr.

Groundwater recharge data

- On what data source did TPM and EPD rely for groundwater recharge estimates used to inform hydrological modeling?

- Does that data source include any warnings or disclaimers against using data for local groundwater recharge estimates?
- How would inaccurate or inappropriate groundwater recharge data impact the accuracy and usefulness of the hydrological modeling that relies on that data?
- If that data is not appropriate or useful for incorporation into a local hydrological model, will EPD require updated modeling with appropriate and useful data?

Modeling

- Why did TPM apply a no-flow boundary condition on the bottom of the model despite having no data on the conductivity of the confining layer?
- Why did TPM apply boundary conditions that preclude the model from predicting a drop in wetland water levels, and in so doing preclude proper analysis of drought conditions?
- Why did TPM model the swamp as a level pool reservoir rather than a wet organic soil with high evapotranspiration rates?
- Did TPM model evapotranspiration when assessing impacts on swamp water level behavior?
- Has EPD done 3D modeling to determine how the hydraulic characteristics of the replaced sands will impact the position of the groundwater divide on Trail Ridge?

Draft groundwater withdrawal permit

- What impacts will be caused by ten years of cumulative groundwater withdrawals of 1.44 MGD from the Floridan aquifer?

Miscellaneous

- Where will TPM get its power? Diagrams identify several “substations,” but it is unclear whether these are for the transfer of power from an offsite location or if power will be generated onsite.
- How much additional truck traffic will the proposed mine and processing facility create? In one document, TPM suggests it anticipates up to 30 trucks a day. Is this number still accurate?
- Are the local roads built to sustain that amount of truck traffic? Many rural roads are not built to accommodate heavy loads or resources and equipment, causing potholes, cracking, rutting, and pavement issues.

- How much dust will the mining operations and processing facilities create? Can titanium dioxide dust be hazardous?
- Is there a risk of groundwater contamination from reagents like chloride added during the secondary processing of mineral-sand deposits?
- What are the anticipated impacts of mining the 8,000+ acres owned or leased by TPM over the next 30 years?
- How will the Okefenokee Swamp and St. Marys River be impacted by the cumulative effects of the proposed mine and other ongoing or future mining activities in the area?
- TPM has routinely violated environmental regulations at its operations in Florida, California, and Charlton County. Given the company's track record, has EPD considered the impacts of potential permit violations on the Okefenokee Swamp, St. Marys River, and other surrounding ecosystems? In other words, what will happen if the mine is not perfectly operated?

Appendix B: Species Impacts

The Okefenokee Swamp and its surrounding ecosystems are home to approximately 620 species of plants, 233 species of birds, 39 species of fish, 37 amphibians, 64 reptiles, and 50 mammals,²⁵⁷ many of which are threatened or endangered, including the red-cockaded woodpecker, the wood stork, and the eastern indigo snake. The project area and the neighboring Okefenokee Swamp provide a unique and important habitat to these species.²⁵⁸ Despite TPM's assertions otherwise, it is likely that hydrological impacts, when coupled with the conversion of Trail Ridge habitat, will impact several species that are found within the larger Refuge ecosystem as well as downstream in the St. Marys and Suwannee Rivers. This appendix provides a brief summary of endangered, threatened, and other vulnerable species that may be harmed by the proposed mining operations.

1. Atlantic and Shortnose Sturgeon

Both the shortnose (ESA Endangered) and Atlantic sturgeon (ESA Endangered) are present in the St. Marys River, the headwaters of which are formed by the Okefenokee Swamp. Sturgeon use freshwater rivers such as the St. Marys to spawn and as juvenile habitat. Although Atlantic sturgeon travel to deeper marine waters for part of their lifetimes, shortnose sturgeon spend most of their time in their natal estuary. Both species are vulnerable to bycatch, poor water quality (which impairs spawning success), dredging, and water withdrawals. The shortnose sturgeon is listed as Endangered throughout its entire range and all five U.S. Atlantic sturgeon distinct population segments (DPS) are listed as Endangered or Threatened under the Endangered Species Act (ESA).

Though shortnose and Atlantic sturgeon have suffered vast historical losses, researchers recently rediscovered both within the St. Marys River. Shortnose sturgeon trends are largely unknown, but the St. Marys (Critical Habitat for the Atlantic sturgeon) supports a year-round population of Atlantic sturgeon and serves as seasonally important habitat for migrating individuals.²⁵⁹ From 2013–2016, a total of 25 individuals were captured (20 unique).²⁶⁰ In 2014, the discovery of age-one river resident juveniles represented the “first documented evidence of successful Atlantic sturgeon reproduction within the St. Marys river.”²⁶¹ However, in light of poor recruitment levels—the juveniles were likely produced from a single spawning event in 2013—the population remains “precariously close to extirpation.”²⁶² The surviving sturgeon are thus acutely vulnerable to point source pollution; fluctuations in temperature; changes in

²⁵⁷ U.S. FISH & WILDLIFE SERV., *Okefenokee National Wildlife Refuge: Amphibians, Fish, Mammals, and Reptiles List* (July 2009), <https://bit.ly/3TUdhML>.

²⁵⁸ See, e.g., U.S. FISH & WILDLIFE SERV., *Species Status Assessment (SSA) Report for the Eastern Indigo Snake (Drymarchon couperi)* Version 1.1 at 157 (Jul. 8, 2019), <https://bit.ly/3VIdS5A>.

²⁵⁹ Adam G. Fox, et al. *Occurrence of Atlantic Sturgeon in the St. Marys River, Georgia*. 10 MARINE AND COASTAL FISHERIES 606-618 (2018).

²⁶⁰ *Id.* at 610.

²⁶¹ *Id.* at 613–614.

²⁶² *Id.* at 615.

dissolved oxygen levels; and increased sediment loads—all of which may result from the proposed mine.

Given the scale of the proposed project, increased sediment discharges into the St. Marys River basin are inevitable and threaten to potentially degrade the spawning habitat that remains. Indeed, Atlantic sturgeon depend upon “well-oxygenated water, clean substrates for egg adhesion, crevices that serve as shelter for post-hatch larvae, and macroinvertebrates for food.”²⁶³

The National Marine Fisheries Service (NMFS) has already made clear in a 2014 Biological Opinion that “the loss of a small number of [shortnose sturgeon] . . . can have an appreciable effect on the numbers, reproduction and distribution of the species . . . [especially when] there are very few individuals in a population, the individuals occur in a very limited geographic range, or the species has extremely low levels of genetic diversity.”²⁶⁴ The Atlantic and shortnose sturgeon of the St. Marys River likely satisfy these criteria. With potentially as few as three dozen remaining Atlantic sturgeon (and maybe even fewer shortnose individuals), the loss of even a single individual may cause the collapse of the river’s population; diminish the genetic diversity of the South Atlantic DPS; and hasten the regional population’s continued decline.

2. Red-Cockaded Woodpecker

The red-cockaded woodpecker (RCW) (ESA Endangered) is among the coastal plain’s most charismatic, visible, and imperiled species. Though RCWs were once found throughout the greater Southeast, from New Jersey to Florida and west to Texas, historical logging operations resulted in the loss of nearly 90 million acres of longleaf pine. Because the species uniquely depends upon mature pine forest—trees that are at least 60–80 years old—as few as 7,800 active clusters exist today across the species’ range, down from a historical, pre-European settlement estimate of 1–1.6 million family groups.²⁶⁵ The species remains listed as Endangered under the ESA.

The larger 8,000-acre project is adjacent to the Refuge, where several active RCW clusters are known to reside. Currently, the Refuge is home to 97 clusters, 46 of which are active.²⁶⁶ These “are most likely the remains of a much larger population that once depended on the pine stands surrounding the refuge,” such as that within the proposed project site.²⁶⁷

²⁶³ ATL. STATES MARINE FISHERIES COMMISSION, *Atlantic Sturgeon Acipenser oxyrinchus Life History and Habitat Needs* (Jan. 2018), <https://asmfc.org/files/Habitat/SpeciesFactsheets/AtlanticSturgeon.pdf>.

²⁶⁴ NATIONAL MARINE FISHERIES SERV., NE. REGIONAL OFFICE. *Endangered Species Act Section 7 Consultation Biological Opinion Tappan Zee Bridge Replacement NE-2017-14375* (Apr. 2, 2014).

²⁶⁵ U.S. FISH AND WILDLIFE SERV., *Draft Species Status Assessment Report for the Red-Cockaded Woodpecker (Picoides borealis)* Version 1.1 at 1, 5 (2018).

²⁶⁶ U.S. FISH AND WILDLIFE SERV., *Okefenokee National Wildlife Refuge Red-Cockaded Woodpeckers Report* (March 2022), <https://bit.ly/3VPIobE>.

²⁶⁷ *Id.* at 1.

Based on recent surveys, there are at least 15 active clusters near the southeastern-eastern refuge boundary.²⁶⁸ Some RCWs may use the project site for foraging, and the full project could eliminate what habitat remains for dispersing individuals. For the Okefenokee clusters, this is of concern, since the population is already small, isolated and suffering from a lack of connectivity—three factors that are known to heighten the risk of extinction for the red-cockaded woodpecker.²⁶⁹

In addition to obvious habitat fragmentation concerns, the disturbances caused by light, noise and air pollution may further affect the Okefenokee population. The proposed mine will require the installation of heavy machinery, the erection of semi-permanent facilities, road construction, and night-time lighting near the Refuge. These activities may affect the nesting and foraging patterns of those found along the Trail Ridge boundary.

3. Hairy Rattleweed

Found within a 125-square-mile area in South Georgia, the hairy rattleweed (ESA Endangered) is a perennial legume that is entirely covered in hairs. The species is primarily restricted to open, sandy areas and prefers higher and drier sites. The hairy rattleweed is found within the Refuge and is considered Endangered throughout its entire range. The rattleweed is negatively impacted by clear cutting, soil compaction resulting from heavy machinery, and inconsistent fire regimes. Should the hydrological regime change within the Refuge, however, fire intensity and frequency could increase, potentially exposing the species to unnatural burns. Florida hartwrightia (ESA candidate); floodplain tickseed (ESA candidate); and white fringeless orchid (ESA Threatened) are also sensitive to soil disturbances and could be similarly affected by mining operations and an altered hydrological cycle.

4. Florida Panther

As one of the two apex predators that historically roamed the Southeast, the Florida panther was heavily persecuted for centuries. By the time the ESA was enacted, the species had been lost throughout virtually its entire range and only a handful of individuals clung to existence in South Florida (the last Georgian panther was killed in the Okefenokee Swamp in 1925). Thanks to tireless conservation efforts, those individuals were saved, and the population has since grown to an estimated 120–230 adults and subadults. In a major conservation milestone, females with kittens were also recently documented north of the Caloosahatchee River, which has long been a major barrier to panther dispersal and range expansion.

Despite this progress, however, the species (ESA Endangered) is still threatened by habitat loss and fragmentation, roadway mortality, and long-term challenges posed by a lack of genetic diversity and human acceptance. For the panther to even be considered for reclassification under the ESA, the species must overcome pervasive habitat fragmentation and

²⁶⁸ *Id.*

²⁶⁹ Karin Schiegg, et al. *Inbreeding in red-cockaded woodpeckers: Effects of natal dispersal distance and territory location*. 131 *BIOLOGICAL CONSERVATION* 544–552 (2006), <https://bit.ly/3xiYiTF>.

establish a second core population north of Interstate 4, with gene exchange between subpopulations. Because natural recolonization may prove unattainable, researchers have examined several potential reintroduction sites, and concluded that, of the nine areas that were identified, Okefenokee National Wildlife Refuge, Ozark National Forest, and Felsenthal National Wildlife Refuge regions had the highest combination of effective habitat area and expert opinion scores.²⁷⁰ The Florida Game and Freshwater Fish Commission (now Florida Fish and Wildlife Conservation Commission) moreover conducted a Florida Panther Reintroduction Feasibility Study and concluded that reintroduction of the Florida panther within the greater Okefenokee ecosystem is biologically feasible.²⁷¹

Although Florida panthers have not yet established a presence in the greater Okefenokee ecosystem, they have been found as far north as Troup County, Georgia,²⁷² significantly north of the Okefenokee. Were mining to commence along the Refuge boundary, Trail Ridge's upland habitat—the preferred hunting grounds for Florida panther—would be diminished and with it, the effective habitat area and the overall ability of the larger ecosystem to support a viable population.

5. Eastern Indigo Snake

Reaching lengths of over eight feet, the eastern indigo (ESA Threatened) is North America's longest snake, with males weighing up to ten pounds. The species is generally colored an iridescent bluish-black and enjoyed a historical range that once encompassed parts of Mississippi, Alabama, Georgia, and Florida. Though the eastern indigo utilizes a variety of habitats, including longleaf pine sandhills, flatwoods, and coastal dunes, the species requires hundreds to thousands of acres for home range territories, moves over longer distances than any other North American snake, and is particularly vulnerable to habitat fragmentation and loss.

Since its listing in 1978, extant populations have grown increasingly disjunct, particularly those in the Florida panhandle, where gopher tortoise losses have accelerated.²⁷³ The overall resiliency of the eastern indigo population is predicted to be low to very low in the future without targeted conservation efforts.²⁷⁴

Though much of Trail Ridge along the Okefenokee is subject to timber operations, the land offers indigo snakes a matrix of habitat types, including upland and lowland features, and is considered part of the species' recovery unit and a Conservation Focus Area. In recent years,

²⁷⁰ Cindy Thatcher, et al. *A Habitat Assessment for Florida Panther Population Expansion into Central Florida*. 90(4) J. OF MAMMALOGY 918-925 (2009), <https://doi.org/10.1644/08-MAMM-A-219.1>.

²⁷¹ Robert C. Belden & James W. McCown. *Florida panther reintroduction feasibility study, Final Report Study Number 7507*. BUREAU WILDLIFE RESEARCH FL. GAME AND FRESH WATER FISH COMMISSION. 70 (1996), <https://ecos.fws.gov/ServCat/DownloadFile/27146>.

²⁷² Terry Dickson, *Georgia man who killed Florida panther gets two years probation, banned from hunting*, Florida Times Union (Aug. 25, 2011), <https://bit.ly/3vwEY56>.

²⁷³ Kevin Enge, et al. *The historical and current distribution of the eastern indigo snake (Drymarchon couperi)*. 8(2) HERPETOLOGICAL CONSERVATION AND BIOLOGY 288-307 (2013).

²⁷⁴ *Species Status Assessment (SSA) Report for the Eastern Indigo Snake (Drymarchon couperi)*, *supra* n. 258.

mining for limestone, phosphate and titanium has increased in Georgia and Florida. Because these mines disproportionately occur in wildlife-rich areas, their effects on indigo snakes have been documented. The U.S. Fish and Wildlife Service has already noted that habitat modification, mining debris and equipment, and the discharge of hazardous materials “adversely impact” indigo snakes.²⁷⁵

In this case, mining operations will likely result in both direct mortality and the fragmentation of existing populations: the proposed mine would operate all day and night for upwards of thirty years; require increased vehicular access, which, even in the absence of habitat alterations, can cause indigo populations to crash by 95 percent;²⁷⁶ result in the loss of the vegetation and cover that indigo snakes depend upon; and ultimately impair north-south movement between Trail Ridge populations separated by the mine’s 8,000-acre footprint.

The Service reaffirmed the likelihood of these impacts by noting that, without “meaningful avoidance and minimization measures ... the proposed Project may result in loss of habitat, individuals, and natural corridors that are utilized by this species.”²⁷⁷

6. Frosted Flatwoods Salamander

The frosted flatwoods salamander (ESA Threatened) depends upon small, isolated and ephemeral ponds. Undocumented in the applicant’s surveys, Trail Ridge historically supported the species. Even if there are no salamanders on site, the degradation of wetlands could permanently preclude its potential recolonization. It could also result in the loss of breeding habitat for other extant amphibian populations that require similar habitat conditions.

7. Wood Stork

The large, long-legged wood stork (ESA Threatened) is the only stork native to North America. As tactile feeders, wood storks wade in water with their beaks open and partially submerged. When a prey item is touched, the wood stork snaps its mandible shut and throws back its head to swallow the prey whole. This feeding technique allows storks to forage at all hours. Feeding success is largely dependent upon prey abundance and availability. Historically, water levels in the Southeast fluctuated with the seasons. Wet seasons would provide increased prey and dry seasons would concentrate that prey in easily accessible locations for wood storks. Because much of the Southeast has been diked, canalized, and drained, however, the natural cycle that wood storks depend upon has been altered and their historical populations severely diminished. The species is now listed as Threatened under the ESA.

²⁷⁵ *Id.* at 41.

²⁷⁶ J. Steve Godley and Paul E. Moler. *Population declines of eastern indigo snakes (Drymarchon couperi) over three decades in the Gulf Hammock Wildlife Management Area, Florida, USA*. 8(2) HERPETOLOGICAL CONSERVATION AND BIOLOGY 359-365 (2013), <https://bit.ly/4aMYSrt>.

²⁷⁷ Letter from Donald Imm, U.S. Fish & Wildlife Serv., to Col. Daniel Hibner, U.S. Army Corps of Eng’rs 4 (Feb. 20, 2019)

Because the Okefenokee remains functionally whole and largely intact, wood storks utilize the Refuge for foraging and nesting purposes. Unfortunately, the proposed mine potentially stands to alter the hydrological regime upon which the species relies. The Service “expect[s] impacts to ground water characteristics including water table elevation, and rate and direction of flow as the soil profile is permanently homogenized” within the refuge.²⁷⁸ Should these impacts be realized, they “may not be able to be reversed,” and could potentially have a major impact upon the ability of wood storks to locate prey.²⁷⁹ It is well established that “storks are especially sensitive to any manipulation of a wetland site that results in either reduced amounts or changes in the timing of food availability.”²⁸⁰ A drop in the water table, furthermore, would not only affect prey availability, but it could prove fatal to breeding storks, which avoid predation by creating nests in flooded environments.²⁸¹

The Service has also noted that, in addition to drainage and wetland alteration issues, one of the greatest threats facing the wood stork are the behavioral changes caused by human disturbance.²⁸² The effects of 30 years of lighting, noise disturbances and human encroachment near the Refuge boundary may well affect the foraging and nesting habits of wood storks within the Okefenokee. Mine-related runoff, sedimentation, and potential chemical accidents may also cause a decline in the number and availability of native fishes (stork prey) and have a deleterious impact upon the aquatic vegetation upon which those fishes depend.

8. Gulf Sturgeon

Historically, the Gulf sturgeon subspecies (ESA Threatened) occurred in most major Gulf rivers, from the Mississippi to Tampa Bay, Florida. Listed as Threatened under the ESA, major threats to the Gulf sturgeon include dams, loss of habitat, poor water quality and industrial runoff.

A significant number of Gulf sturgeon occur in the Suwannee river (182 river miles of Critical Habitat), the headwaters of which are formed by the Okefenokee Swamp. The Suwannee supports the most viable population of Gulf sturgeon remaining, with potentially upwards of 10,000 individuals. Gulf sturgeon are known to utilize much of the Suwannee River for spawning and nursery purposes and have been documented as far as 137 river miles upstream.²⁸³ Like its counterparts, the Gulf sturgeon is sensitive to changes in water quality, dissolved oxygen levels, and temperature fluctuations.

The Suwannee River basin is pocketed by nearly 200 springs, all of which are fed by the Floridan aquifer. These springs partially influence water flow and temperature within the river

²⁷⁸ *Id.* at 3.

²⁷⁹ *Id.* at 2.

²⁸⁰ John C. Ogden. *Habitat Management Guidelines for the Wood Stork in the Southeast Region*. U.S. FISH AND WILDLIFE SERVICE EVERGLADES NATIONAL PARK at 4, <https://bit.ly/3TRaVx7>.

²⁸¹ *Id.* at 5.

²⁸² *Id.*

²⁸³ U.S. FISH & WILDLIFE SERV. SE. REGION, ET AL. *Gulf Sturgeon Recovery/Management Plan* at 14, 170 (1995), <https://bit.ly/3xpmrlh>.

and offer the Gulf sturgeon important cool water habitat. Unfortunately, decreased groundwater levels, caused by pumping, can reduce the spring flow that Gulf sturgeon rely upon in the summer months.²⁸⁴

TPM intends to pump significant amounts of groundwater from the Floridan aquifer for thirty years. Though pumping is likely to occur closer to the St. Marys River than the Suwannee, the potential impacts of TPM's water withdrawals on the Gulf sturgeon have not been examined. It is also unclear how an altered hydrological regime within the Refuge would affect spawning Gulf sturgeon.

9. Gopher Tortoise

Like many coastal plain species, the gopher tortoise was once common throughout upland habitats in the South. The species has lost 80 percent of its historical range and continues to suffer from habitat destruction caused by commercial and industrial development, urbanization, and agriculture. The gopher tortoise is state-listed in Georgia and Florida. Should it experience continued declines, hundreds of other species, including the eastern indigo snake will feel the impacts. In Georgia, for example, indigo snakes depend upon tortoise burrows for warmth during the winter months.²⁸⁵

According to the applicant, the project site is home to approximately 30 adult tortoises, 25 subadults and several juveniles. Were mining to commence, tortoises that are found would be relocated on the property and fenced in to try to prevent attempted recolonization. In the long-term, however, continued mining would greatly reduce the ability of the property to support the species. Gopher tortoises require large parcels of undeveloped and unfragmented land, as well as soils that have not been permanently homogenized or compacted by heavy machinery. In this case, the cumulative impacts of mining—roadbuilding, logging, compaction of burrows, fragmentation of suitable habitat—is likely to result in the complete extirpation of the species from the entire 8,000-acres. This would affect not just the indigo snake, but other commensal species, such as the gopher frog.

10. Gopher Frog

The gopher frog is an ESA candidate species and is state-listed in Georgia. Surveys indicated that gopher frogs were documented on the Adirondack, Loncala, and Keystone tracts. Gopher frogs depend upon wetlands and gopher tortoise burrows for various life stages, both of which will be impacted by the proposed mine. Like gopher tortoise, it is unlikely that gopher frog will be found on site after mining operations conclude.

²⁸⁴ *Id.* at 27.

²⁸⁵ Dirk J. Stevenson, et al. *Survey and monitoring of the eastern indigo snake in Georgia*. 2 SOUTHEASTERN NATURALIST, 393-408 (2003); Enge et al., *supra* n. 273.

11. Florida Pine Snake and Southern Hognose Snake

The applicant's surveys confirmed the presence of the Florida pine snake on the Project Site. Because the species has lost 97 percent of its historical range, it is state-listed as threatened in Florida. Efforts are underway to restore habitat for the Florida pine snake, which requires high, dry, and easy-to-tunnel land. Because mining could result in the permanent compaction of the soils upon which the species depends, Florida pine snakes are likely to be extirpated from the site. The habitat of the Southern hognose snake was also documented on the site. Like the Florida pine snake, the species depends upon well-drained soils and requires underground habitat, which is likely to be compacted and disturbed by mining operations.

12. Bachman's Sparrow

The Georgia state-listed Bachman's sparrow has been documented on the site. The Bachman's sparrow has experienced significant range contractions, as a result of habitat conversion and commercial development. The species depends upon open, mature pinelands, regenerating clear cuts, and utility rights-of-way. Mining disturbances are likely to result in the localized disappearance of Bachman's sparrows from the site and affect the behavioral patterns of the larger population found within the Refuge.

13. Bald Eagle

Bald eagles are known to utilize Okefenokee National Wildlife Refuge. Because Trail Ridge is an inseparable component of the larger refuge ecosystem, any mining disturbances stand to potentially affect the nesting and hunting success of the bald eagles that depend upon the waters of the swamp.

14. Florida Black Bear

Florida black bears are known to occur on the site, as well as within the Refuge. Though the species is not federally listed, the Florida black bear continues to suffer from a lack of connectivity and meaningful gene flow between populations.²⁸⁶ The proposed mine threatens to further impair connectivity and, at least for the duration of mining, will likely result in the localized disappearance of the species from the larger tract. How this will affect the long-term genetic viability of the larger population is unaddressed by TPM. TPM's proposal also conflicts with the Georgia DNR Strategic Management Plan for Black Bears in Georgia's stated objectives of increasing habitat availability and connectivity between populations of black bears and allowing and supporting geographic expansion of the bear population into suitable, but unoccupied bear habitat.²⁸⁷

²⁸⁶ Jeremy D. Dixon, et al. *Genetic consequences of habitat fragmentation and loss: the case of the Florida black bear* (*Ursus americanus floridanus*). 8 CONSERVATION GENETICS 455 (2007).

²⁸⁷ Ga. Dep't of Natural Res., Wildlife Res. Div., *Strategic Management Plan for Black Bears in Georgia (2019–2028)* (Jan. 2019).