

HYDROLOGY OF THE OKEFENOKEE SWAMP

What is Hydrology?

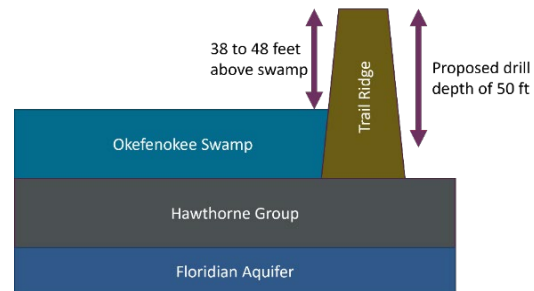
Hydrology is the study of the distribution and movement of water. Water occurs in many places on Earth, in rivers, swamps, the ground, or the atmosphere, and is always moving between these locations. For example, water in the atmosphere falls as rain, flowing into rivers or filtering into aquifers, and water in rivers eventually makes its way to the ocean.

Understanding water systems is important because they are complicated, and small changes can have a big impact on the overall hydrology of an area. Over the years there have been various proposals to mine Trail Ridge, a ridge of land on the eastern boundary of the Okefenokee swamp. The science shows that [mining Trail Ridge will permanently change its composition and consequently the hydrology in and around the swamp](#). Many negative effects are associated with these changes, including an increased risk of drought and wildfires, and the release of heavy metals into downstream waterways.

Hydrology of the Okefenokee and Trail Ridge

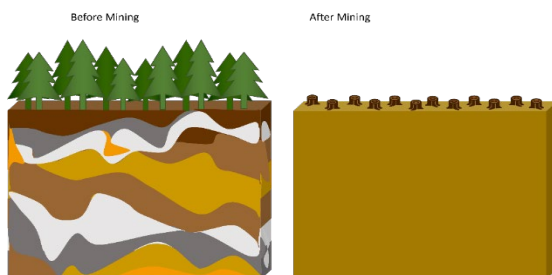
[About seventy to eighty percent of the Okefenokee's water supply comes from rain falling on the swamp](#). Most of the rest comes from groundwater inputs, particularly from Trail Ridge, the site of the proposed Twin Pines mine. Trail Ridge acts as an earthen dam, holding water in the swamp and directing groundwater towards it. Trail Ridge is essential for the Okefenokee's health.

Because the swamp is mostly rain-fed, it is very sensitive to drought. Only a small amount of water is stored in the swamp at any given time. [The average water depth is only two feet deep](#). During years with little rain, the swamp depends on groundwater inputs to maintain water levels.



Water exits the swamp through the Suwanee and the St. Marys rivers. Water also evaporates or leaks through the ground into the Floridian aquifer.

Impact of Mining Trail Ridge on the Water System



The proposed Twin Pines mine will extract heavy mineral sands from Trail Ridge. [To mine, Twin Pines proposes to move a large, open pit across the ridge. All the soil will be removed, heavy minerals extracted, and the soil replaced.](#)

This soil replacement method poses a permanent threat to the hydrology and formation of Trail Ridge. Currently, the soil along Trail Ridge naturally has distinct layers of sand, clay, and organic material, but in the mining and replacement process, these soils will be mixed. Mixed soil is more porous, and lets more water through, permanently reducing Trail Ridge's ability to act as a dam for the Okefenokee.

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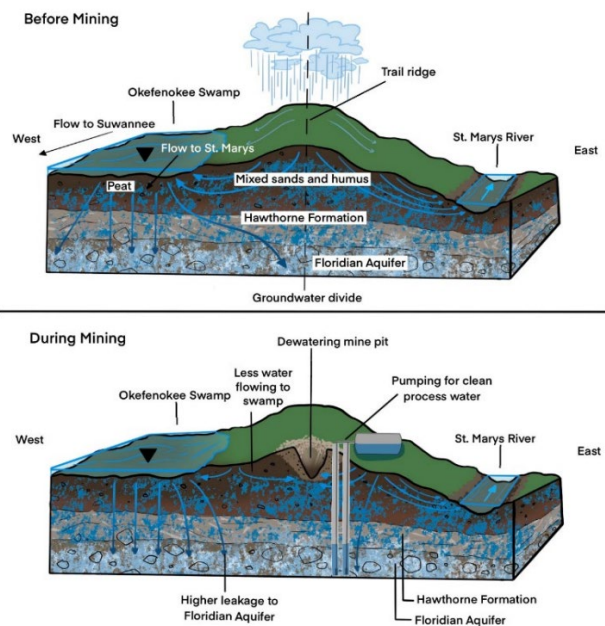
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The mining strategy also poses two temporary threats to the hydrology in and around the Okefenokee, compromising the ability for the swamp to remain full. One, like a hole dug in the sand at the beach, groundwater will flow into the mining pit. It will need to be continuously pumped to remove water. [About half the water pumped out of the pit would have otherwise flowed into the Okefenokee.](#)

Two, the mine will also draw water from the Floridan aquifer in the mining process. [The extra water withdrawn from the aquifer will increase the rate at which water leaks into the aquifer from the Okefenokee.](#)

A final concern is wastewater at the mine, which will be evaporated using mechanical evaporator devices. Wastewaters have a high concentration of dissolved salt. [If salt is evaporated into the atmosphere, the result will be salt rain over the swamp, threatening the integrity of its freshwater ecosystem.](#)



Effects of a Changed Hydrology

With lower water levels and less groundwater available to the swamp, drought conditions will become more frequent and severe. This causes an increase in severe fire risk. Large wildfires have already broken out in the swamp during drought conditions. [For example, six thousand people had to evacuate their homes during a fire in 2007. Increased fire risk threatens the swamp's ecosystem, human lives, and nearby timber farms. Firefighting can cost the state millions.](#)

[When the water level in the Okefenokee is low, boating becomes impossible outside of the main channels.](#) The water trails must be closed, and boat tours canceled. Drought conditions negatively impact the Okefenokee's ecotourism, which boosts the economy of the surrounding areas.

Wetlands are natural carbon sinks and water filters, but when water levels fall, [stored carbon is released back into the atmosphere and stored heavy metals into the water.](#) These heavy metals can cause fish kills, be absorbed into nearby drinking wells, and be indirectly eaten by humans when they eat fish.

About Science for Georgia

Science for Georgia is a 501c3 dedicated to bridging the gap between scientists and the public through training, outreach opportunities, and direct contact with the public, policymakers, and the press. Science for Georgia highlights how science can impact people's lives and advocates for the responsible use of science in public policy.

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