2. Secondary impacts

The application also largely ignores secondary impacts of the proposed mine. Again, like NEPA, the 404(b)(1) Guidelines obligate the Corps to evaluate the secondary, or indirect, effects of a proposed discharge of dredged or fill material on the environment.[85] Under the Guidelines, "Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material."[86] The analysis of secondary impacts is critical: as the Guidelines recognize, "[w]hen disruptions in flow and circulation patterns occur, apparently minor loss of wetland acreage may result in major losses through secondary impacts."[87]

It is likely that the proposed mine will cause changes to the hydrology on the site and potentially in areas off of the site. Twin Pines and the Corps must consider the impact the proposed mine would have on groundwater levels in and around the mine, the direction of ground water flow to and from the mine, and water quality both under the footprint of the mine as well as for any waters flowing off the site.

Such hydrologic changes in an area can have profound changes on ecosystem diversity and resilience. As Mark Hutson, a geologist who specializes in hydrology issues as they relate to mining, said in his expert report, "The proposed project must be carefully studied to identify, evaluate and eliminate as many foreseeable impacts as possible prior to permitting such a potentially damaging project on the doorstep of a Wetland of International Importance."[88]

So far Twin Pines' identification and evaluation of potential changes in on-site and off-site hydrology has been unsophisticated, incomplete, and, in some cases, reckless. Given the location of the proposed mine, the scale of secondary impacts could be enormous. As Hutson pointed out, there is a real risk that the mine could irreversibly harm the Okefenokee Swamp by altering the direction of groundwater flow beneath the swamp.[89] Another expert in hydrology, Dr. Richard Rheinhardt, agrees. He states in his expert report that the mining would destroy existing layers of "low-permeability strata" that are currently acting to keep groundwater from flowing through trail ridge to the St. Marys River. Once these layers are ground up, combined with sand, and returned to the mining pits, there may be nothing to prevent groundwater from the Okefenokee Swamp from flowing eastward towards the St. Marys River. This leakage could lower the water table in the swamp and possibly drain it over time.[90]

[85] 40 C.F.R. § 230.11.
[86] *Id.*
[87] *Id.* § 230.41
[88] Hutson Report at 1.
[89] Hutson Report at 1; USFWS Letter at 3.
[90] Rheinhardt Report at 5.