Stream Reclamation—We've got to be crazy about quality
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The definition of insanity is continuing to do the same thing and expect a different outcome.

Phosphate strip mining has the same result today that it did thirty years ago, the complete disruption of the natural system. Through the years, government controls and regulations over some mining practices, including "reclaiming" the land, have changed. But, based on studies conducted by the Florida Institute for Phosphate Research and the Florida Department of Environmental Protection, phosphate mining has the same effect it always did, and reclamation practices have failed—especially for streams. If stream reclamation continues as it always has, we don't need to expect a different outcome. We can predict what will happen to the streams in the Peace River Basin as strip mining heads south. Water quality will deteriorate along with habitat and wildlife.

At risk are the most basic natural systems. Frequently, we can see the differences between natural streams and those "reclaimed." To understand the consequences of those differences, we conducted chemical analysis on water samples and toxicity tests for the small critters that live at the bottom of streams.

As part of the technical team evaluating the proposed permit to strip mine and reclaim the Ona site, it was my job to evaluate and compare the water quality in reclaimed streams with the natural streams found at Ona.

In the worst cases, stream channels are entirely removed by strip mining. Removing a natural water channel can't help but affect the remaining waterways. Most directly, mining harms water quality. Natural systems, while resilient, cannot withstand total disruption where soils, vegetation, water flow and living things are displaced and dispersed.

That's why mining companies are required to "mitigate" the damage they do. They are required by law to restore type for type, function for function, the various natural systems destroyed or impacted by their strip mining.

In order to get Environmental Resource Permit (ERP) mining companies have to ensure that:

- They will not impact a stream so badly that it cannot be mitigated (restored)
- There will be no adverse impacts to the abundance and diversity of fish, wildlife and listed (protected) species and their habitats.
- The conservation of fish and wildlife and their habitats will not be adversely affected. Neither will fishing or recreational values or marine productivity…the relative value of these functions cannot be affected.
- Water quality must be maintained and protected and there can be no unacceptable cumulative impacts.

Based on review of research available and our own field studies, we can share three general findings:

- The vegetation at reclaimed streams is neither as diverse nor abundant as a natural stream
- The soils in and around reclaimed streams are severely disrupted
- The hydrology of reclaimed streams (the volume and flow of water) is impaired

These three issues help us understand why the water quality in reclaimed streams is so poor.

In a natural system, rain falls. That rain seeps into the ground at different rates depending on the soil and vegetation. When the ground is wet enough, the rainfall runs off the land through varied vegetation into small creeks and streams that wind their way through woods and fields and more vegetation. As the rainfall seeps into the ground or runs through soils and vegetation, its chemical properties change. Sometimes the water runs fast and at other times it meanders through a system, but the relationship between water and soil, vegetation and water quality is based on the interplay of these various factors. When the system is out of balance—not enough vegetation or no variation in water flow—for example, water quality is affected.

Here's what's been found in streams recreated after strip mining in the Alafia River Basin:

- Iron and manganese concentrations are higher
- Large populations of the iron bacteria are present in some systems and University of South Florida professors concluded that it may have a toxic effect on benthic creatures—those smallest critters that live at the bottom of the water and the food chain.
- There's less deciduous tree cover at reclaimed streams
- There's more organic matter in the bottom of reclaimed streams and it's significantly higher than natural streams
- Because water flow isn't sufficient in the reclaimed streams they cannot be "flushed" of organic matter. Large quantities of that can cause low dissolved oxygen in the water—reducing habitat and water quality.
- When we conducted toxicity tests, we found that the reproduction of test organisms was clearly affect over time.

The higher pH of reclaimed streams coupled with the higher concentrations of phosphorus, nitrogen, sediment and turbidity leads us to one conclusion. Reclaimed streams are impaired water bodies. Adding more of them to the natural system is the definition of insanity.

The existing reclaimed streams do not provide functions similar to natural systems. If strip mining and reclamation is to continue as it has, what we can expect is an increase in downstream loadings of nutrients and other pollutants. Downstream we have Horse Creek, the Peace River and Charlotte Harbor.

Call me crazy, but it seems now is the time for us to change the way that things are done. We cannot accept the past as the standard for our future. It just doesn't work.