

“Protecting Water Quality Using Natural Treatment Systems: Applications of Large-Scale Sand Filters and Constructed Wetlands for Improving Mine Water Quality”

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Bio:

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Abstract:

Mining may affect water quality through generation of excess stormwater, discharge of process water, and seepage to groundwater. Because water volumes requiring treatment are typically on the order of several million gallons per day (mgd), treatment must be effective during high flows. Conversely, costs and post-mining reclamation needs argue for relatively compact treatment systems.

One such treatment approach gaining greater application in the Florida phosphate mining region is the passive sand filter. A more sustainable alternative to conventional treatment, sand filters rely on naturally occurring biological, chemical, and physical processes to achieve treatment. Constructed from sand tailings and building from investigations by the Florida Institute of Phosphate Research, sand filters provide effective removal of biological and inorganic suspended solids, including particulate forms of nutrients.

Full-scale sand filters have been constructed in the phosphate mining region in central Florida, and another is being planned. This landscape-scale solution provides effective treatment under high hydraulic loading. Planning large-scale sand filters requires analysis of site hydrology, including calculation of watershed runoff volume and timing and hydraulic analysis of distribution, conveyance, filtration and collection. An overview of this approach and the potential for wider industrial and municipal application will be provided in this presentation.