

Evaluation and Redesign of Wetland/ALD Passive System in North Fork of the Blackwater River, WV

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The North Fork of the Blackwater River near Thomas, West Virginia is impacted by acid mine water flowing from the M29 portal out of the Coketon Mine Pool. A portion of the flow was diverted in 1993 into a passive treatment system constructed in conjunction with the Douglass Highwall reclamation project. The system consists of a series of wetland cells followed by an anoxic limestone drain (ALD) that is covered with a constructed wetland. The ALD component of the system contains about 12,000 tons of limestone aggregate. The system discharged net alkaline water with low metals after its installation. However, in 1995 the performance declined substantially. Sampling since 2011 shows little difference between the influent and effluent chemistry of the system.

In 2018 Friends of Blackwater requested proposals to rehabilitate the passive treatment system. A team consisting of Langan Engineering and Environmental Services and Hedin Environmental was selected to develop the rehabilitation plans. The development of the redesign has included review of water chemistry and investigation of the condition of the limestone aggregate. The mine water chemistry has moderated considerably since 1993 and current concentrations are approximately 75% lower than in 1993. The recent concentration averages are 100 milligram per liter (mg/L) acidity, 11 mg/L Al, 2 mg/L Fe, and 3 mg/L Mn. The condition of the limestone aggregate was investigated in 2019 by excavating a series of pits into the ALD. Most of the limestone was clean, suggesting that the failure of the passive system was due to plugged flow paths, not armoring of the stone. With minor processing, it appears feasible to reuse the aggregate.

A passive treatment plan has been developed that includes drainable limestone beds, arranged in parallel, that discharge to a settling/polishing pond. The design stays within the existing system footprint and does not permanently impact the adjacent bike trail or historic coke ovens.

The presentation will describe the original treatment system, present sampling data generated over the last 25 years, show the results of the limestone investigation, and present the current passive treatment redesign concept.