

## Steel Slag Leach Bed Longevity Analysis

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The Raccoon Creek watershed, located in southeastern Ohio, utilizes a mixture of source control, passive, and active treatment projects to remediate acid mine drainage (AMD) polluted waters within the 684 square mile watershed. Fifteen steel slag leach beds (SSLBs) are utilized as a passive treatment strategy throughout the watershed. The oldest steel slag leach beds were installed in 2004 and the most recent in 2011. Each bed is designed differently to account for individual site variation, however each consists of a liner, PVC piping, and steel slag bed material. Newer project designs allow for discharge rates to be manually adjusted by valves which control the quantity of water entering the bed. With the ability to regulate the amount of water flowing through the bed comes the opportunity to fine tune the level of treatment to meet project goals without over treating and prematurely exhausting the alkalinity in the beds. The objective of this work was to estimate the useful lifespan of the slag and evaluate treatment targets by determining target alkalinity loads for SSLB discharges based on the acid loads of the AMD receiving tributaries targeted for treatment. Current and past alkalinity loads from each SSLB were used to estimate the alkalinity generating potential of each bed related to the flow rate through the bed. The acid load of the receiving tributary being treated was calculated based on multiple years of long term monitoring data. This information was applied to the treatment goal of each bed to determine a target operational flow rate. The capability to better estimate the useful lifespan of a SSLB will enable agencies to better estimate long term project maintenance costs and enable those individuals maintaining systems to choose appropriate flow rates to meet treatment goals without prematurely exhausting the alkalinity of the bed.