

Influence of water chemistry and sediment transport on biological recovery downstream of lime dosers

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Lime doser treatment for acid mine drainage (AMD) is often used in areas with insufficient space for passive treatment systems and in rural areas where more complex treatment systems would be impractical. In the coal bearing region of Ohio, four lime dosers are currently in use treating AMD in four watersheds: Monday Creek, Sunday Creek, Raccoon Creek and Leading Creek. The dosers were installed between 2004 and 2012 and have varied results. In Raccoon Creek, previous studies support the theory that stream geomorphology and natural alkalinity sources in the watershed support recovery of fish and macroinvertebrate communities. In this study, we assess field parameters (pH, total dissolved solids, conductivity, temperature and Eh), velocity and settleable solids monthly for 8-11 miles downstream of each doser (distance depending on watershed) for twelve months. A full chemical analysis and flow rate measurement were performed at least twice annually since installation of each doser. The installation of each doser has led to biological improvement in the downstream reaches; however, the improvement has not been consistent between the watersheds. In Raccoon Creek and Monday Creek, biological, acidity, pH and metal targets are both met 7 miles downstream of the doser.. In Sunday Creek, acidity, pH and metal targets are met 3.5 miles downstream of the doser, while biological targets are not met until 7 miles downstream of the doser. In Leading Creek, while the pH goal is met 1.5 miles downstream of the doser, the acidity, metal and biological targets are not met. pH values downstream of dosers in Raccoon and Monday Creeks currently average between 5.5 to 8.0 and that for Sunday and Leading range from 6 to 6.5. Preliminary data suggests that reduction in sediment load, precipitation of dissolved metals and additional alkalinity loads downstream of the doser treatment lead to better biological improvement.