Seasonal Trends in Water Quality in a Treated Acid Mine Drainage Impaired Stream[1]

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Abstract: While mine water treatment has been broadly successful in improving water quality in mining impaired watersheds in Ohio, the biological communities suggest that there are factors limiting recovery. To investigate the long term water quality, we collected three seasons of semi-continuous water quality monitoring data 2.3 miles and 8 miles downstream of a lime doser in a heavily studied watershed, Hewett Fork, Raccoon Creek, Ohio. There is a long dataset of grab samples and fish and macroinvertebrate data and a USGS gage station just downstream of the confluence of Hewett Fork and Raccoon Creek that can be used to compare with continuous monitoring data. Downstream of the doser, biological recovery begins after about 2.3 miles and reaches state benchmarks 8 miles downstream. At the upstream end of the recovery zone, large fluctuations in water quality occur throughout the year. Specific conductivity tends to be lower in the early spring when snowmelt and early-season rainfall events dilute the acid mine drainage and the regional water table remains high, potentially cutting off reactive material from oxygen. It increases throughout the summer with the highest values during flushing events in the fall. pH tends to be circum-neutral during base flow with either alkaline or acidic flushing events causing increases or decreases in pH. At the downstream end of the recovery zone where biology meets targets, these storm-related fluctuations in water quality are much smaller, although the mean values are not much better than those further upstream. This shows not only the value of seasonal sampling and storm sampling, but also of continuous monitoring downstream of treatment systems.

Additional Key Words: continuous monitoring, doser, active treatment, stream recovery.

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3. Work reported here was conducted near 39°20'49.1"N 82°15'15.9"W.