POSTER PRESENTATION

Stability and persistence of macroinvertebrate communities in relation to yearly variation in precipitation, flow and acid mine drainage intensity

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ABSTRACT

Many streams in southeast Ohio bear the legacy of acid mine drainage (AMD) from underground mines, seeps, or runoff from surface mines and gob (coal waste) piles. We analyzed a 7 year dataset of chemical, hydrological and biological data (N=35+ sites) to assess the inter-annual stability and persistence of macroinvertebrate communities relative to a) level of biological impairment b) AMD contaminant intensity c) annual rainfall patterns and hydrological discharge. Over the 7 year study period, several wet and drought years were identified. Acid and metal concentrations typically increased at lower stream discharge levels, which correlated with drier seasons/years. Contrary to our expectation, macroinvertebrate biotic index scores did not decline significantly before, during or after a severe drought year (2007). However, year to year biological variability (CV of MAIS scores) correlated with inter annual variability in pH, acidity and the Stream Variability Index (SVI). Sites that were heavily impaired by AMD exhibited more inter annual variability (significantly higher coefficients of variation) in macroinvertebrate biotic index scores than unimpaired sites. Bray Curtis measures of inter-annual similarity were used to assess the stability of macroinvertebrate communities from year to year. These values ranged from 0.20 - 0.60, typical of other studies of similar-sized streams, and there was a significant decline in the stability of macroinvertebrate communities along the AMD impairment gradient. This suggests higher rates of turnover or local extirpation of species at heavily to moderately impaired sites, which could affect long-term ecological recovery.