

In a Degraded Stream, Increased Salt Concentration is Correlated with Decreased EPT Diversity

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Abstract

Many streams in the Northern Panhandle of West Virginia are biologically impaired due to historical and concurrent anthropogenic activities, including mining, agriculture, and urbanization. These activities alter water chemistry which affects the benthic macroinvertebrate communities. While taxa like Ephemeroptera, Plecoptera, and Trichoptera (EPT taxa) are sensitive to water pollution, other taxa like tipulids, beetles, and chironomid midges are more pollution tolerant. However, responses to specific chemical pollutants are taxa specific and even some EPT are relatively pollution tolerant. We investigated how increases in chloride (Cl) and specific conductance (SPC) affected the macroinvertebrate community in a stream already heavily impacted by mining, urbanization and agriculture. Five upstream sampling sites were placed in a degraded stream above the outfall of an active coal mine, while five additional sites were placed downstream of the discharge. Water chemistry was measured in each site, and macroinvertebrates were collected with kick nets, leaf packs and a visual collection of unique habitats following the Stream Monitoring Information Exchange (SMIE) protocol. We found that temperature, SPC, and Cl were significantly higher downstream of the mine outfall with SPC and Cl more than doubling. SMIE water quality scores and whole community Shannon-Wiener Diversity Index scores were not significantly different between upstream and downstream sites but EPT diversity was significantly higher upstream of the mine. This data helps determine taxa specific responses to changes in water chemistry, specifically SPC and Cl, and highlights how streams already afflicted with poor water quality can lose additional taxa when the concentrations of salts increases.