

# Seasonal recovery of an Appalachian stream affected by acid mine drainage and municipal wastewater

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**Abstract:** Contamination of waterways by acid mine drainage (AMD) and municipal wastewater (MWW) still affects many communities both regionally and across the world. Despite the fact that these two common sources of rural water pollution frequently co-occur, their interaction and combined effects have not been thoroughly examined in the field. A monitoring-based field study was undertaken to evaluate the combined water quality impacts of AMD and MWW in Bradley Run, a second-order Appalachian stream near Gallitzin, PA, and investigate the resilience of the stream ecosystem. Clear differences in metal and nutrient concentrations and aquatic macroinvertebrate community composition were observed between sites upstream and downstream from the AMD and MWW inputs. This indicated that these pollutant sources significantly decreased water quality within the stream, particularly during low-flow conditions in the autumn when they comprised a significant source of water to the stream. However, substantial removal of aluminum and phosphate was observed, suggesting a rapid interaction between these key pollutants within the AMD and MWW, respectively. In addition, during high-flow conditions in the spring, higher water quality was observed along with recovery of the aquatic macroinvertebrate communities. This may indicate that small streams may be resilient and ready to recover if AMD and MWW pollutant inputs are simultaneously reduced since their combined effects may be less harmful than either one on its own.

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