

ORAL PRESENTATION

DIATOM DENSITIES IN FRESHWATER STREAMS EXPOSED TO HEAVY METALS AROUND THE ELIZABETH MINE, VERMONT, USA

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Freshwater microbenthic algae provide a multi-species dimension to the ‘canary in the coal mine’ concept of biological assessment. Diatoms are sensitive to high concentrations of heavy metals. A survey of diatom communities collected from fourteen sites distributed across six small to moderately-sized rivers near the Elizabeth Mine, Orange County, Vermont, revealed a range of individualistic responses by the nine abundant taxa to metal concentrations above and below the USEPA’s probable effect concentrations (PEC). Metal concentrations above the PEC are expected to frequently cause adverse effects. Some taxa, like *Achnanthydium rivulare*, were relatively indifferent to high metal concentrations. *Eunotia implicata*, although not often abundant, had its high densities when many metals were above the PECs, but not when copper was above its PEC. At the other end of the spectrum, *Achnanthydium pyrenaicum* had its highest abundances when metal concentrations were low. Between these extremes was an association of four diatoms with high abundances when cadmium, copper, nickel, and zinc were near the PECs, but only when lead concentrations were low. Two taxa had more individualistic responses. *Achnanthydium minutissimum*, which was relatively indifferent to aluminum, copper, and iron, had low abundances when lead, nickel, zinc, and cadmium were above the PEC. *Cocconeis placentula*, which had its highest densities at moderate to high concentrations of cadmium, lead, nickel, and zinc, did so only when copper and iron concentrations were low. Changes in density, of course, could be due to a variety of direct and indirect effects of metal stress. These observations provide evidence that diatom communities provide a multi-species early indicator for assessing the extent of metal stress in freshwater stream environments.