Assessing effectiveness of a reactive amendment protective capping in reducing bioavailability of mercury and arsenic in Odonata and native wetland plant species

Heidi Gavel, EEV (Emily) Chapman, DM Lewis, Jenna Campbell, Liam Hill, Bradley Knockwood and Linda Campbell

Environmental Science, Saint Mary's University, Halifax, Nova Scotia, Canada

Contamination of Nova Scotia wetlands from legacy gold mine tailings is an understudied potential environmental risk factor for the province. Preliminary research suggests that the biodiversity and overall health of existing organisms in contaminated wetlands are impacted due to elevated levels of bioavailable mercury (Hg) and arsenic (As) from tailings. The addition of a reactive amendment and protective capping (RAPC) treatment to wetland environments could decrease bioavailability and mobility of contaminants allowing for wetland health recovery. A laboratory mesocosm test was conducted to examine the effectiveness of this risk management option for reducing bioavailability of Hg and As. Large intact cores of tailings and plants were collected from wetlands in the Montague and Waverley gold mining districts and treated with the RAPC. Plant species *Juncus balticus* (Baltic Rush) and *Equisetum fluviatile* (Water Horsetail) were collected with each core. *Pontederia cordata* (Pickerelweed) was also collected from an uncontaminated site and inserted into mesocosms following RAPC application to assess whether plant plugs can survive treatments and enhance natural recovery of wetlands. Five damselfly nymphs of the genus *Lestes* (Common Spreadwing) and three dragonfly nymphs from families Corduliidae (Emerald) and Libellulidae (Skimmer) were inserted into each mesocosm replicate. Regular monitoring of plant and animal health and growth took place throughout the experiment. After the growing season (approximately three months), plants and Odonata species will be analyzed for Hg and As concentrations. This study is currently ongoing with data collection in progress. General methodology and preliminary results available at the time of the conference will be presented. Thus far, RAPC appears to be a promising environmental risk management strategy for Hg and As contaminated wetlands.