

Temperature Effects on Selenium Cycling in Simulated Constructed Wetland Microcosms¹

Michael P. Nattrass*, Jesse I. Morrison, and Brian S. Baldwin²

Abstract: Constructed wetland phytoremediation is a passive treatment option for improving water quality of stormwater runoff impacted runoff. Phytoremediation removes contaminants through three primary elimination pathways: rhizofiltration, phytoaccumulation, and phytovolatilization. This research will be conducted to determine the Se mass balance in constructed wetlands planted with cattail and duckweed and evaluate the effect of temperature on aqueous selenium cycling. Phytovolatilization chambers fixed with activated charcoal traps for collecting volatile organic Se were placed in static growth chambers at 15, 20, and 25° C under a 12-hr. photoperiod. Chambers were planted with cattail, duckweed, or unplanted and treated with 25 µg Se L⁻¹ as either sodium selenite (Na₂SeO₃) or sodium selenate (Na₂SeO₄). After seven days, total Se concentration was determined in soil, plant, water, and activated charcoal traps by ICP-MS.

-
1. Oral paper presented at the 2019 National Meeting of the American Society of Mining and Reclamation, Big Sky, MT. Welcome Back to Montana: The Land of Reclamation Pioneers, June 3–7, 2019. Published by ASMR, 1305 Weathervane Dr., Champaign, IL 61821.
 2. Michael Nattrass (* presenter), Student; Jesse I. Morrison, Associate research professor ; Brian S. Baldwin, Professor, Plant and Soil Sciences, Mississippi State University, Mississippi State University, MS 39762.