CONNECTICUT CONFERENCE OF NATURAL RESOURCES 2018 PRESENTER:

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TITLE: Road salt induced cation exchange in upland and wetland soil

TYPE OF SUBMISSION: Poster Display

THEME: Water Resources

ABSTRACT:

Widespread applications of deicing salts (primarily as sodium chloride) create well-documented increases in soil salinity. Sodium from road salts may also exchange with other non-sodium cations in soils (magnesium, calcium, and potassium). We conducted a soil core experiment to quantify non-sodium cation loss rates from wetland versus upland soils. Soil cores (10 cm deep) were collected from a forested upland (n = 15 cores) and a wetland (n = 15 cores) with no prior exposure to road salts. To simulate road salt exposure, we added sodium chloride solutions at varying concentrations (freshwater, 3, and 6 ppt) three times a week for five weeks to the top of each soil core. Leachate from each core was collected six times throughout the experiment and analyzed for cation concentrations. Our initial results suggest both salinity treatments had higher cation concentrations in leachate relative to the freshwater control for both soil types. Concentrations of non-sodium base cations peaked between five and 12 days after the start of the experiment, and the effect of road salts on base cation exchange increased with increasing salinity. We also found that wetland soils had higher cation leachate concentrations than upland soils. Our results suggest that both upland and wetland soils readily lose cations when exposed to sodium chloride concentrations typically observed in the field, and wetlands may be more susceptible to road-salt induced cation exchange. Future work includes a field survey of cation concentrations in wetland soils that experience a range of road salt pollution.