The Effect of Nitrogen Over-Enrichment on some Plant-Soil Relationships and Microbial Processes in New England Salt Marshes. (S10-wigand163511-Oral)

Authors:

- C.Wigand* - *NHEERL-USEPA, Narragansett, RI*
- R.McKinney - *NHEERL-USEPA Narragansett, RI*
- J.Davis - *University of Rhode Island*
- B.Nowicki - *University of Rhode Island*
- P.Groffman - *Institute of Ecosystem Studies, NY*

Abstract:

Salt marshes of similar geomorphology and hydrology with varying watershed nitrogen loads were examined for differences in plant structure, soil characteristics, and denitrification. We observed landward encroachment of the low marsh Spartina alterniflora, and the displacement of the high marsh dominant S. patens in the marshes receiving the greatest nitrogen loads. Differences in the root morphology of the Spartina species appears to have consequences on soil characteristics and microbial processes. S. alterniflora has a tap root system, in contrast, S. patens has a shallow turf-matrix with mycorrhizal roots. Along with the changes in the plant species composition, there were noticeable differences in the soil characteristics including the bulk density, percent organic matter, percent sand, and the hardness of the soil. S. patens root ergosterol was inversely related with both soil percent organic matter and the concentration of dissolved phosphate in discharge streams. Denitrification enzyme activity in the high marshes along the gradient appeared to be significantly related to the estimated nitrogen loadings in a dry but not in a wet year. At the most impacted sites, nitrogen fixation sometimes exceeded denitrification.

Corresponding Author Information:

Cathleen Wigand
NHEERL-USEPA, Narragansett, RI
27 Tarzwell Drive
phone: 401-782-3090
fax: 401-782-3030
e-mail: wigand.cathleen@epamail.epa.gov

Narragansett, RI 02882

Presentation Information:

Presentation Date: Monday, November 11, 2002

Presentation Time: 3:30 pm

Keywords:

nitrogen over-enrichment, plant-soil relationships, wetlands, microbial processes