Nitrogen removal in constructed wetlands in Connecticut

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Source: CT DEEP
Objectives

- Evaluate the effectiveness of constructed wetlands in removing nitrogen from stormwater in the Long Island Sound Watershed.

- Identify the key factors that contribute to stormwater nitrogen removal efficiency in constructed wetlands.
Study Sites

Thornton

Lake Whitney

Davis
Study Sites

- Elderslie
- Lois
- Marion
Methods

• Water flow was determined using stage-discharge relationships:
  • Weirs
  • Pressure transducers for water level
Methods: Water Quality

- ISCO Autosampler 3700 at wetland inlet & outlet

- Manual composites
  - One flow-weighted sample per storm for influent & effluent

- Samples were analyzed to determine Event Mean Concentration (EMC) and N loads.
Sample Collection Period

Thornton

Precipitation (mm)

Mar Apr May Jun Jul Aug
Thornton: Effluent vs. Influent

![Graph showing comparison between TN Effluent Event Mean Concentration (mg/L) and TN Influent Event Mean Concentration (mg/L). The graph indicates a linear relationship with a trend line close to y = x, suggesting similar concentrations. The p-value is less than 0.05, indicating statistical significance.]
Sample Collection Period

Davis

n = 9

Precipitation (mm)

Mar  Apr  May  Jun  Jul  Aug
Davis: Removal Rates

unmeasured inflow (baseflow and stormflow) results in inflow<outflow
Davis: Effluent vs. Influent

A graph showing the comparison of TN Effluent Event Mean Concentration (mg/L) against TN Influent Event Mean Concentration (mg/L). The data points are scattered on the graph, and a line y = x is drawn to indicate the equality. The graph indicates no significant difference (NS) with n=10 samples.
Conclusions

• Thornton:
  • Significant biogeochemical N removal
  • Main mechanism for N removal is hydrologic

• Davis:
  • Hydrology issues
  • Biogeochemical removal not significant
Other sites

- Lois & Marion
  - Data from 9 to 11 storms
  - Hydrology issues
- Elderslie
  - Few storms, only one with outflow
  - Additional data collection
Future Work

- Assess explanatory variables
  - Residence times
  - Input N concentrations
  - Wetland-watershed area ratios
  - Soil organic matter content
  - Vegetation
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