

Green Infrastructure for Storm Water Management

The UIC Science Team

Co-PIs: Miquel Gonzalez Meler, Emily Minor, Moira Zellner

Research Technicians: Lisa Cotner & Dean Massey

Our Goals

1. Assess & compare the effectiveness of various kinds of green infrastructure
2. Use modeling to understand the role of spatial scale and pattern on effectiveness

GOAL 1

- Assess & compare the effectiveness of various kinds of green infrastructure
 - Review of scientific literature

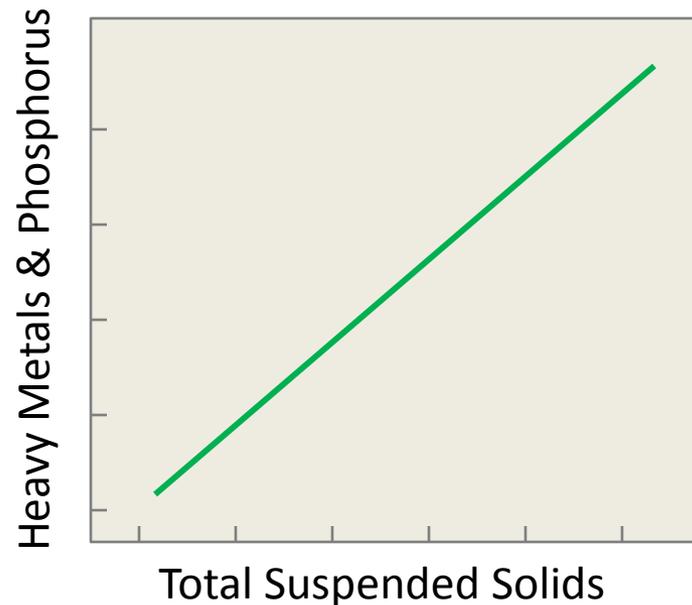
Literature Review

Kinds of green infrastructure:

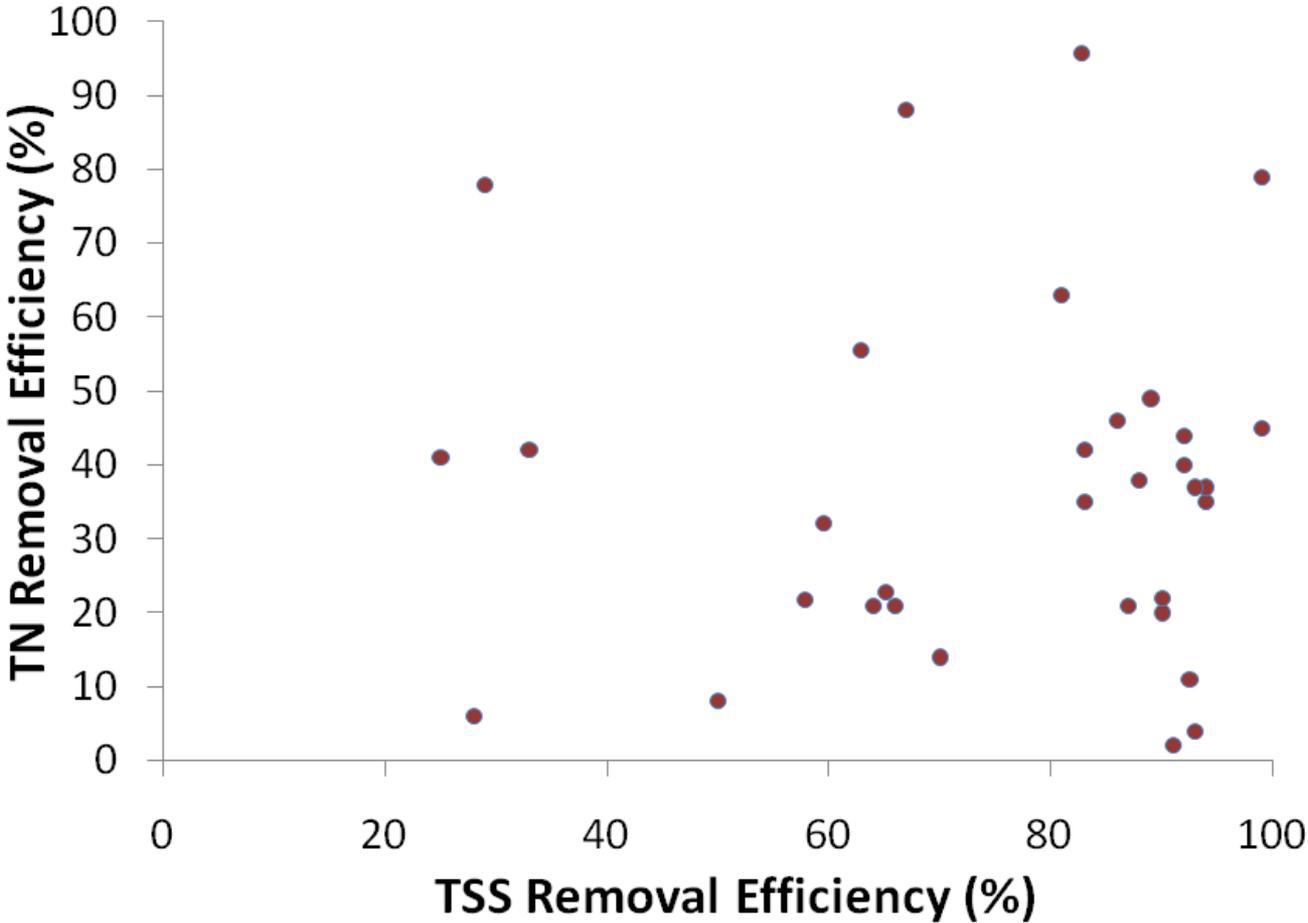
- **Infiltration** Vegetated systems; e.g., swales, rain gardens
- **Buffer** Vegetated strip along a stream
- **Detention** Water is detained to reduce peak flow
- **Permeable Pavement** Allows water to infiltrate into soil
- **Filtration** Filters pollutants out of storm water
- **Green Roof** Designed to reduce runoff
- **Constructed Wetland** Helps reduce runoff volume and pollution

Variables of Interest

- Volume
- Quality
 - How to measure?
 - TSS?



Total Suspended Solids vs. Total Nitrogen

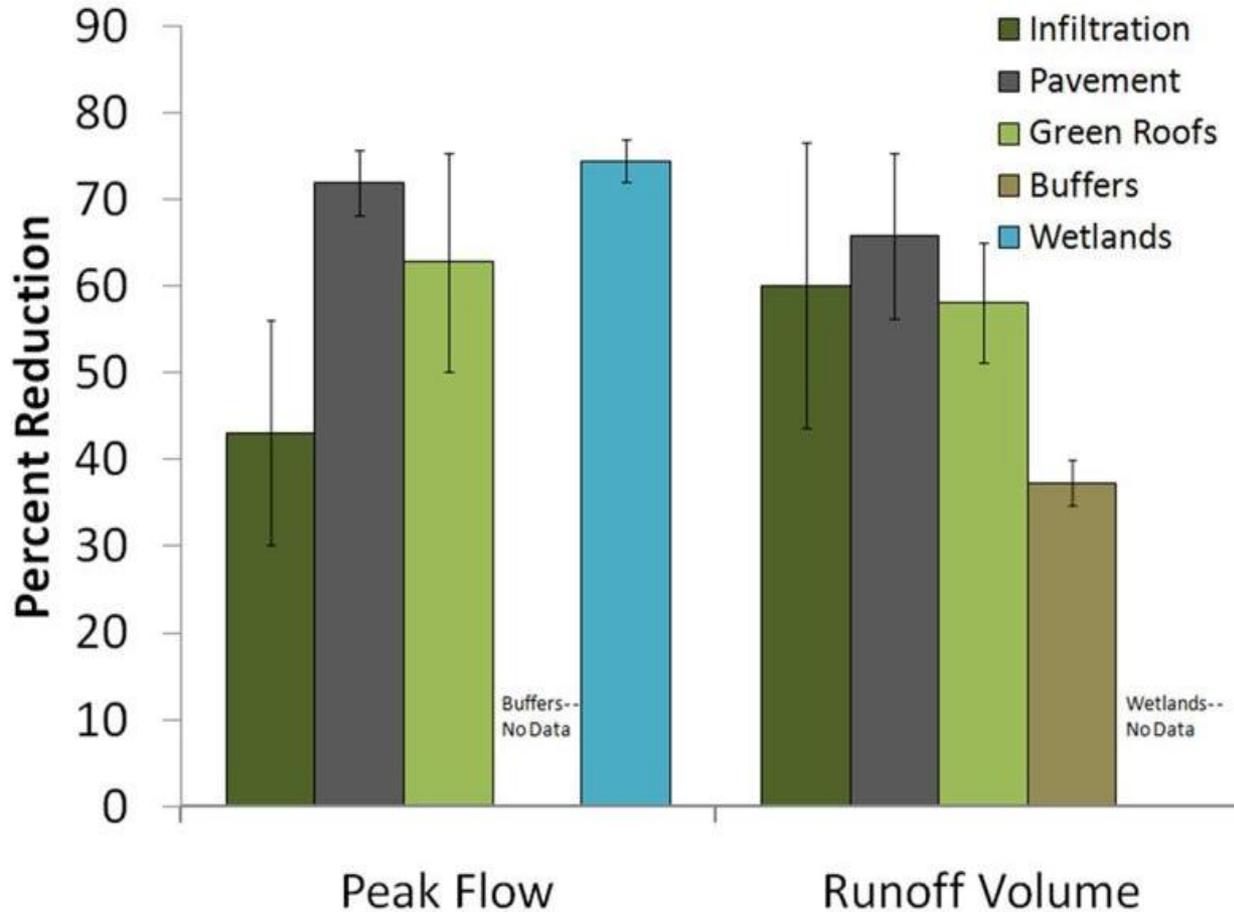


Preliminary Results

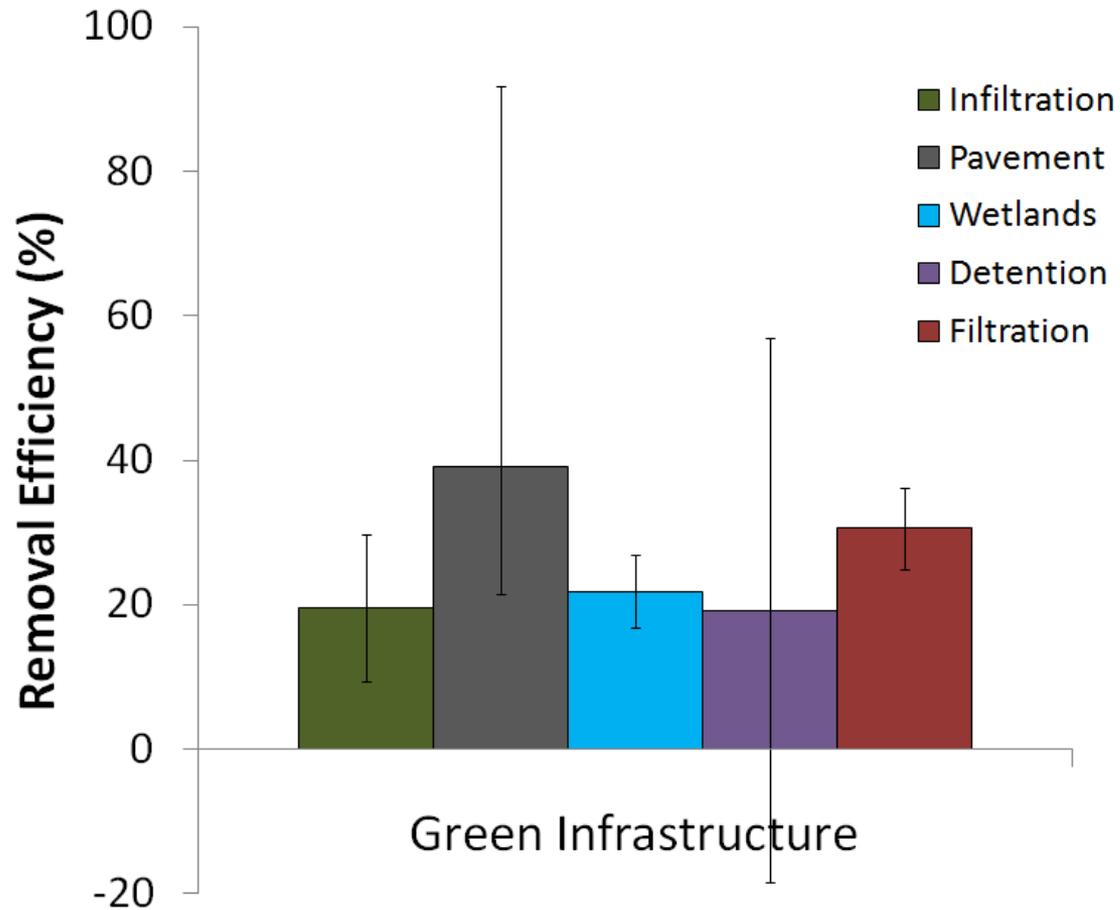
Effectiveness of green infrastructure for:

- Volume reduction
- TN reduction
- TSS reduction

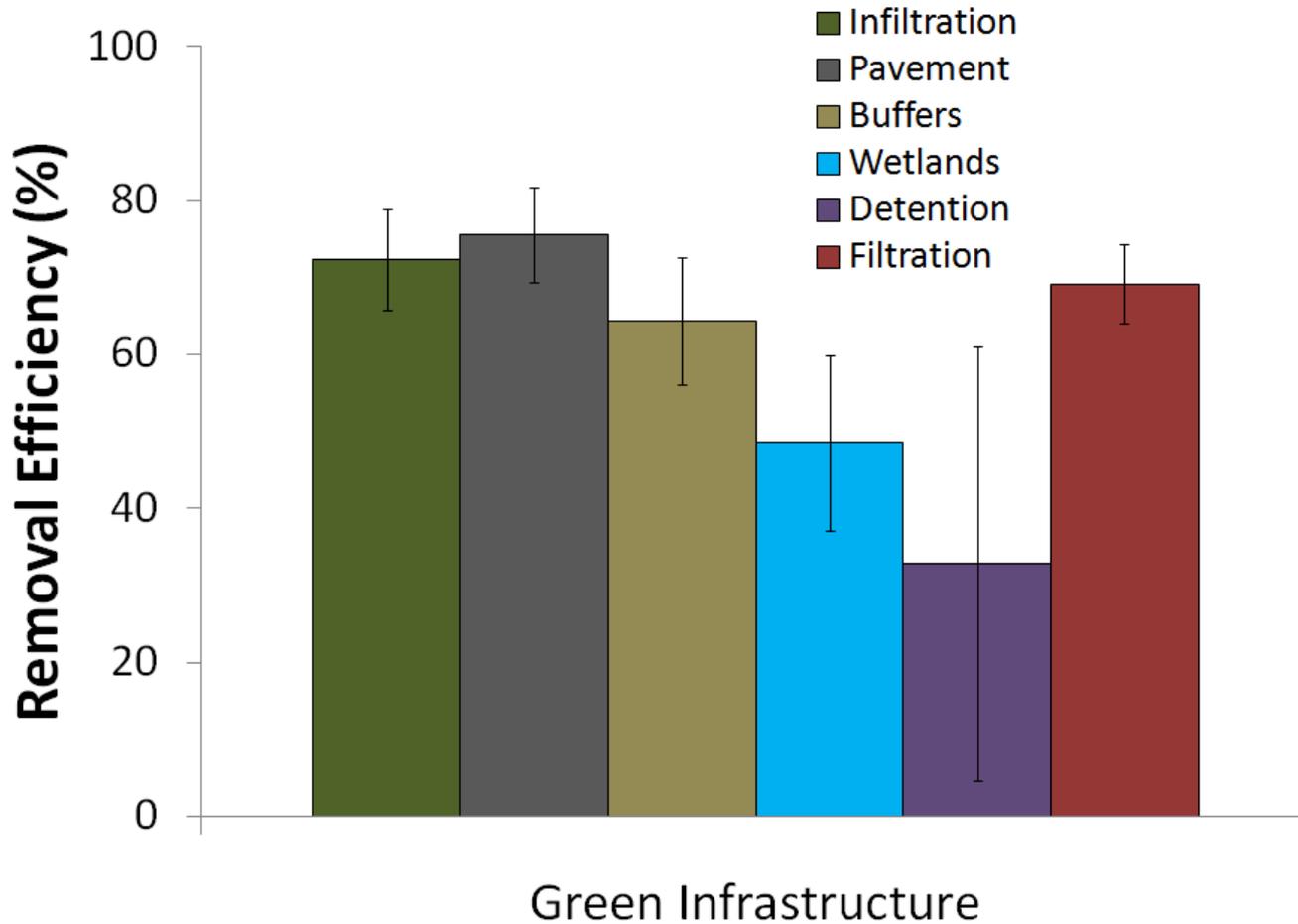
Preliminary Results - Volume



Preliminary Results – Total Nitrogen



Preliminary Results – Total Suspended Solids



Possible Sources of Variability

- Scale
 - Proper scaling of infrastructure
- Maintenance of infrastructure
- Variability in local conditions
 - Influent pollution
 - Soil permeability
 - Rain events

GOAL 2

- Use modeling to understand the role of spatial scale and pattern on effectiveness

Desirable Model Features

- Spatially explicit
 - How do layout and configuration matter over a regional scale?
- Ease of inputting data
 - Maps
 - Data from literature review
- Tracks the variables we are interested in
 - Volume
 - TSS
 - TN
- Flexibility to customize

Some Existing Models

- **SWMM**: Storm Water Management Model
- **P8**: Program for Predicting Polluting Particle Passage through Pits, Puddles, & Ponds
- **L-THIA**: Long-Term Hydrologic Impact Assessment
- **HSPF**: Hydrologic Simulation Program Fortran
- **MUSIC**: Model for Urban Stormwater Improvement Conceptualization
- **AGNPS**: Annualized Agricultural Non Point Source
- **RECARGA**: bioretention model used by Wisconsin DNR
- **SUSTAIN**: System for Urban Stormwater Treatment and Analysis INtegration

THANKS!

Contact information:

Emily Minor
eminor@uic.edu