

# Constructed Stormwater Wetlands in Semiarid Climates: Nutrient Dynamics and the Socio-Political Drivers of Implementation

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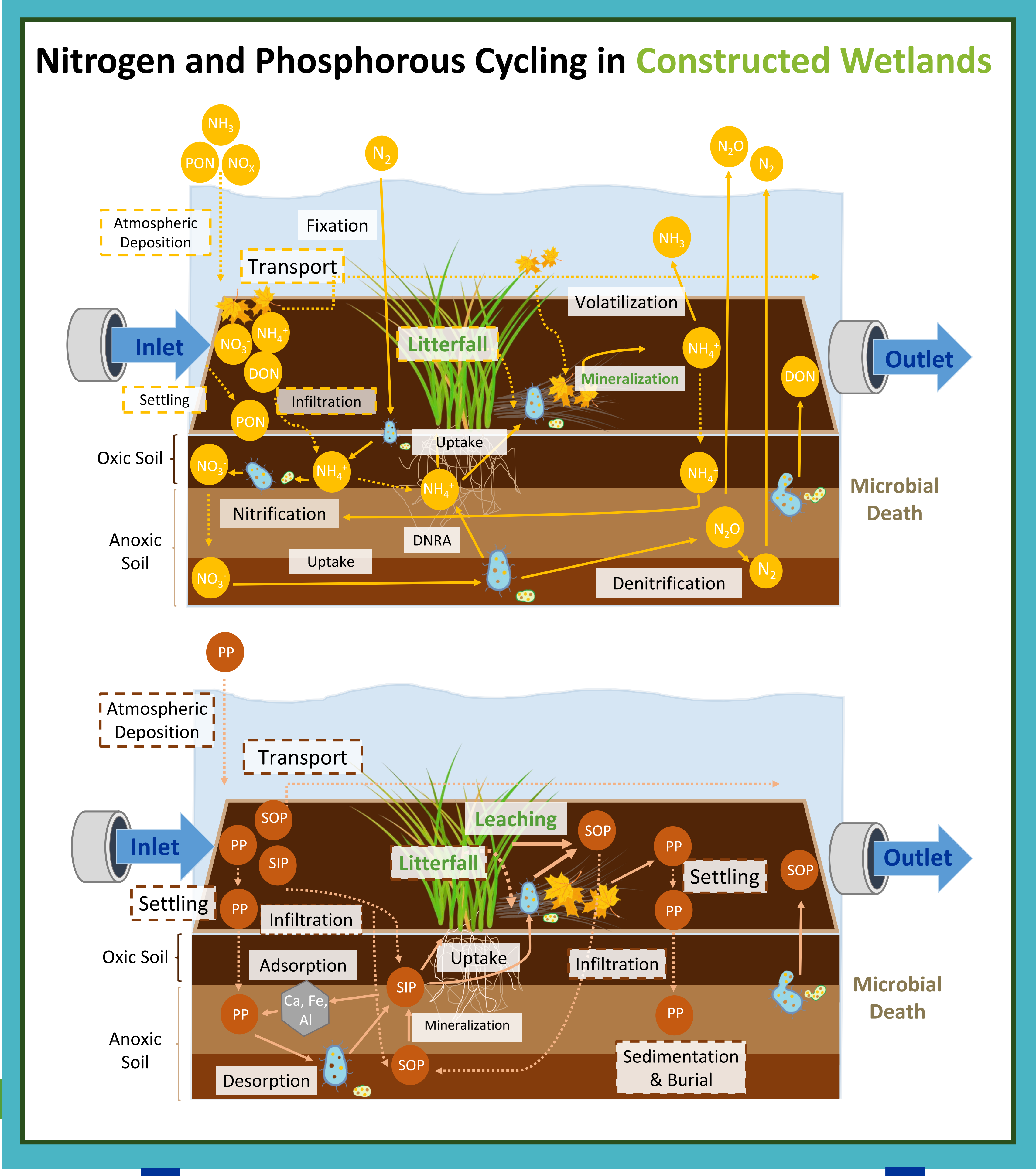
- **Constructed stormwater wetlands (CSWs)** are stormwater management infrastructure **designed to reduce pollutant loads** entering downstream aquatic systems by **mimicking natural wetland processes**.
- **Most research** on their effectiveness has been done in **temperate climates**.

### Background: Study Sites

**Sacajawea Park Wetland**

**First Ave Wetland**

Semiarid, snowmelt-driven climates, like Pocatello, Idaho, may not support wetland vegetation & microbial communities in systems that depend on storm flows. This may limit macronutrient removal in these systems.



### Question

How do management goals, stormwater infrastructure type & infrastructure placement change across climate regions?

### Methods

Stormwater Manager Survey (~750 stormwater managers across the U.S.)

Management Challenges, Communication & Information, Infrastructure, CSWs

### Potential Results

More "good" sites for CSW placement = more CSWs used

### Questions

How does vegetation composition and abundance vary between sites? Is leaching and decomposition of wetland vegetation a significant source of macronutrients?

### Methods

Vegetation harvest for nutrient content estimates and leaching mesocosm experiment. Point-Intercept phototelemetry.

FA Vegetation (*Acer platanoides*), SJ Vegetation, Control

### Results

Legend: Bare, Grasses, Trees, Sedges, Reeds, Forbs

NO<sub>3</sub> (mg)/Gram of Vegetation vs. Inundation Time (hours)

### Questions

How effectively do CSWs uptake and store sediment and nutrients? How does uptake and storage change with variations in discharge?

### Methods

HOBO Water Level loggers + ISCO Automated Samplers

Nutrient and Sediment Flux: **UPSTREAM – DOWNSTREAM = UPTAKE and STORAGE**

### First Flush, Rain on Snow

### Inundation Period, Snowmelt

### Questions

Does rewetting of dried sediments cause a pulse of nutrients? How quickly can the soil microbial community recover?

### Methods

Soil core rewetting. Changes in water nutrient content over 7 days of inundation

### Results

Interesting differences between sites for SRP and NO<sub>3</sub><sup>-</sup>. Substantial variation in soils within sites – hotspots?

### Acknowledgements

I would first like to thank the MILES program for funding and the opportunity to conduct this research. I would also like to thank my advisor, Rebecca Hale, and committee members Colden Baxter and Morey Burnham. Finally, thank you to the many ISU professors, fellow graduate students, and MURI students who have helped with various aspects of this project.