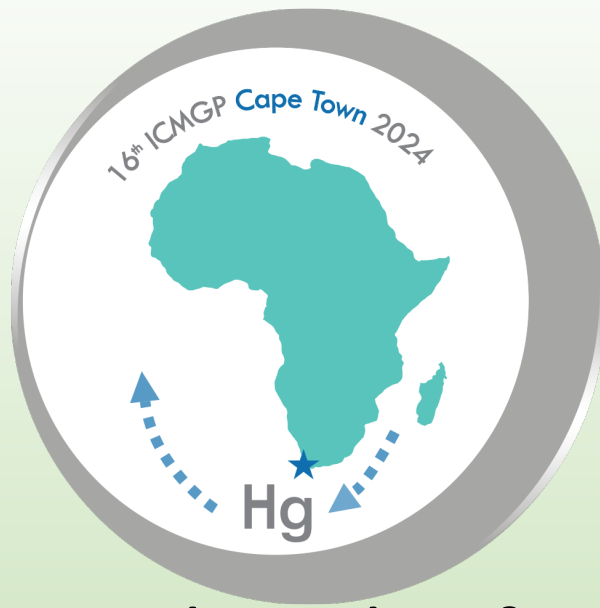




Title: Identifying the role of native versus non-native wetland vegetation to influence methylmercury production.

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Introduction:

Wetland ecosystems have long been associated with enhanced mercury (Hg) methylation

- anoxic conditions
- abundant organic carbon
- elevated nutrients



Introduction:

Wetlands can contain a large range of plant species

Many wetlands are dominated by reed canarygrass—an invasive species distributed widely across the US

Reed canarygrass:

- fast growing
- outcompetes/shades native vegetation
- high biomass production & decomposition rates
- leads to higher soil organic carbon levels

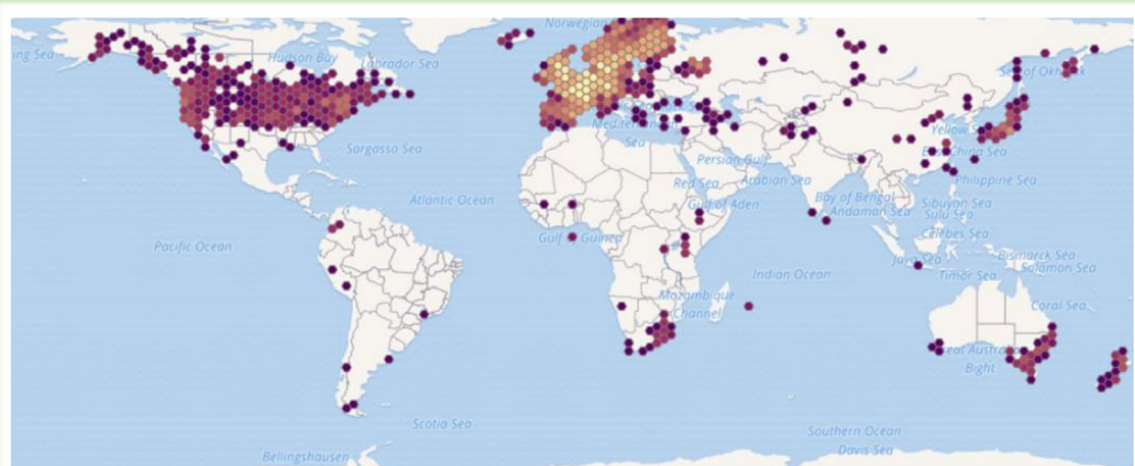


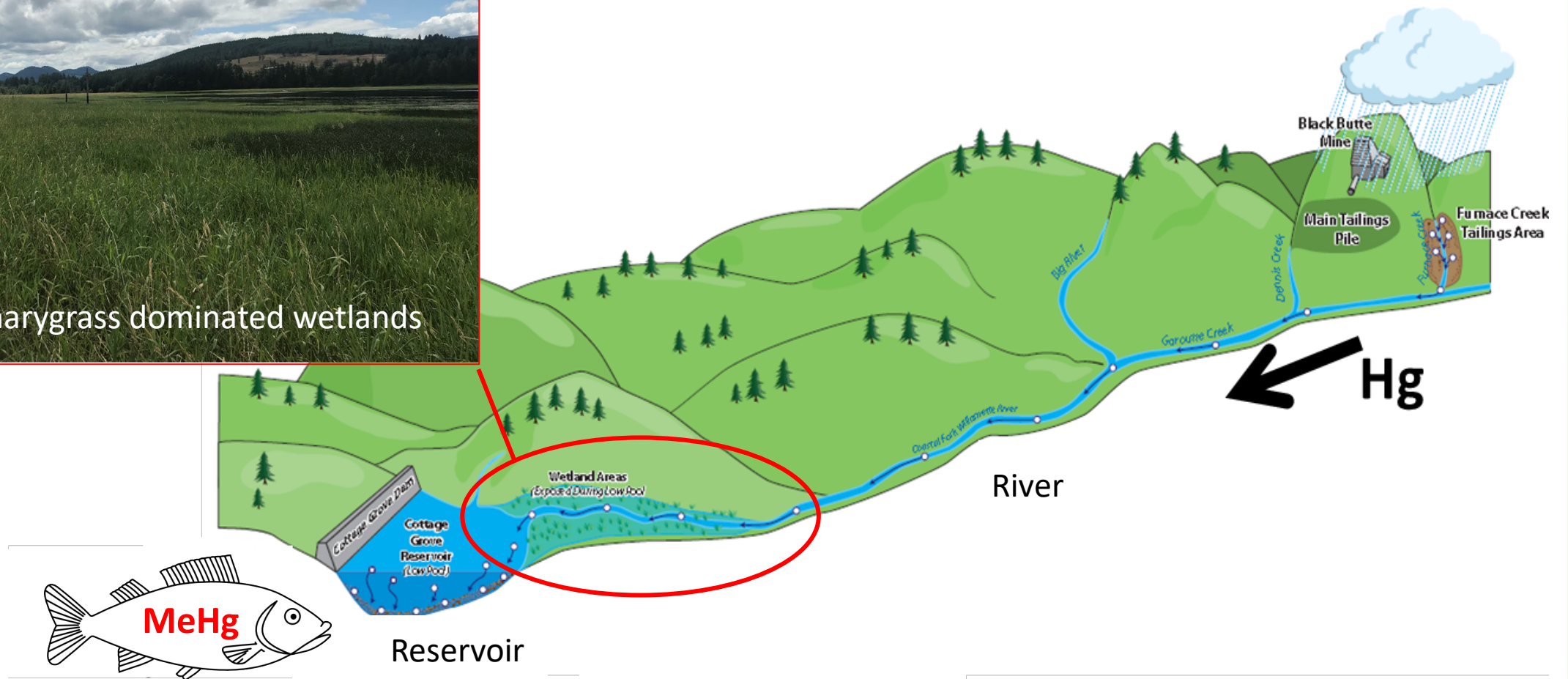
Figure 1. Known global distribution of *Phalaris arundinacea*. Map from GBIF Secretariat (2018).

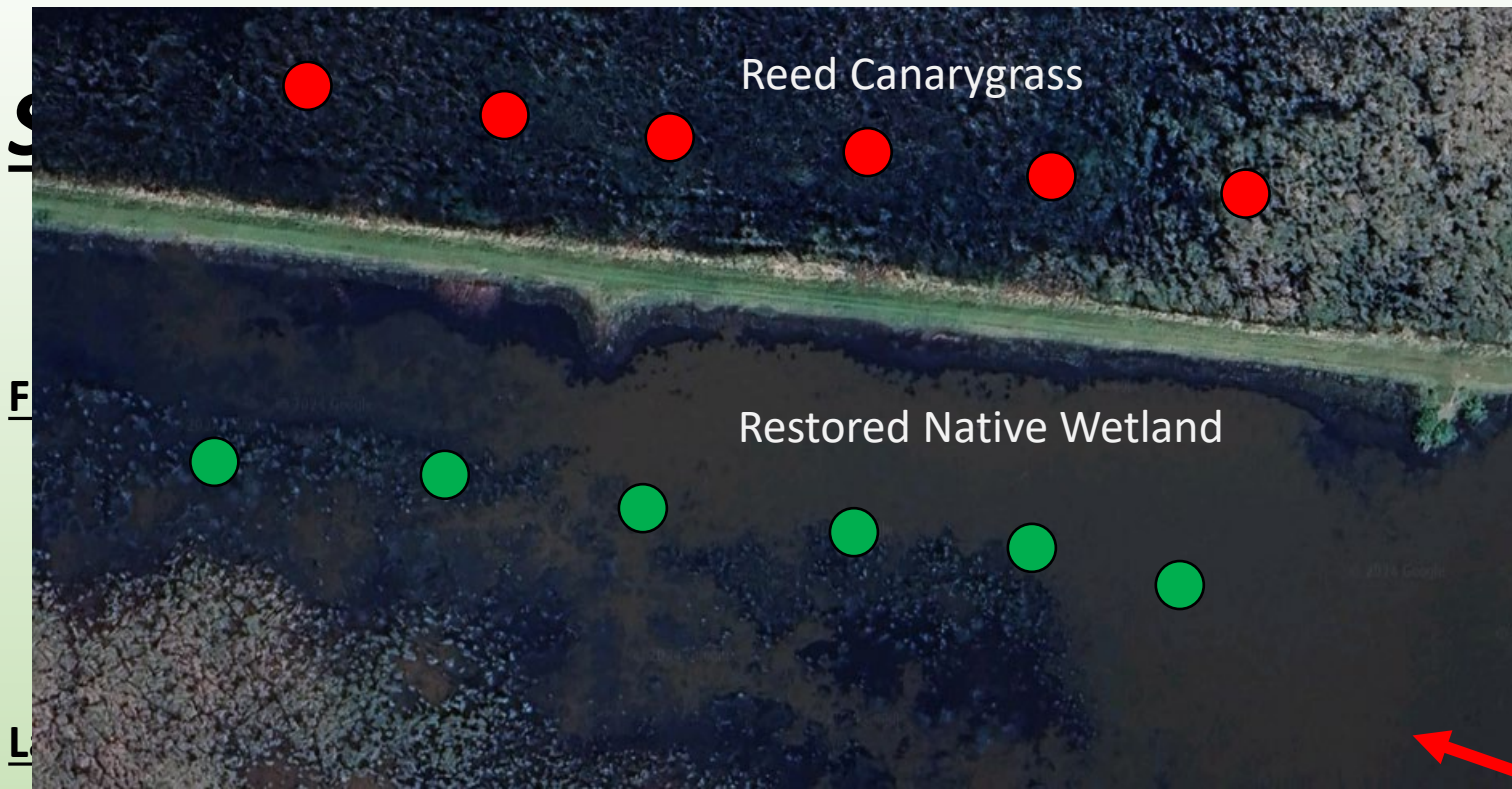
Introduction:

Reed canarygrass removal programs are utilized by several land management agencies/organizations to improve habitat conditions



Study Question: How does reed canarygrass removal and restoration to native wetland vegetation impact Hg methylation?





Methods:

18 Mesocosms with 5 different wetland plant communities + unvegetated controls

The native vegetation :

- 1) Baltic rush (*Juncus balticus*): native rhizomatous rush, nitrogen-fixer
- 2) Sitka willow (*Salix sitchensis*): native large woody shrub, nitrogen-fixer
- 3) Daggerleaf rush (*Juncus ensifolius*): native short-statured rhizomatous rush
- 4) Soft rush (*Juncus effusus*): native rush with large aerenchyma
- 5) Reed canarygrass (*Phalarus arundinacea*): invasive species in North America
- 6) Unvegetated control



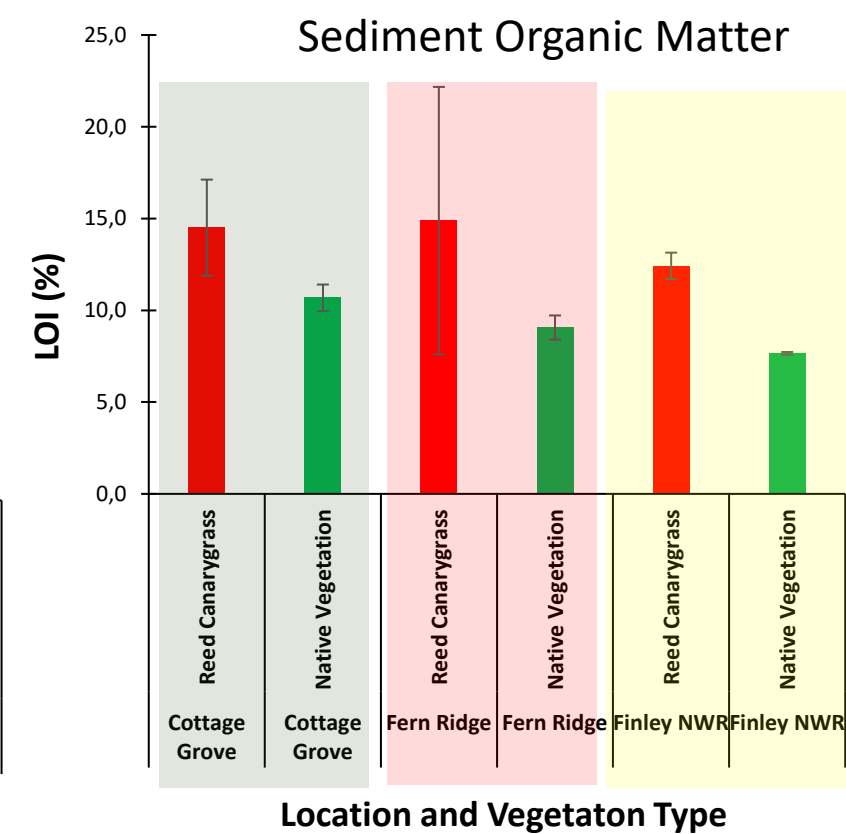
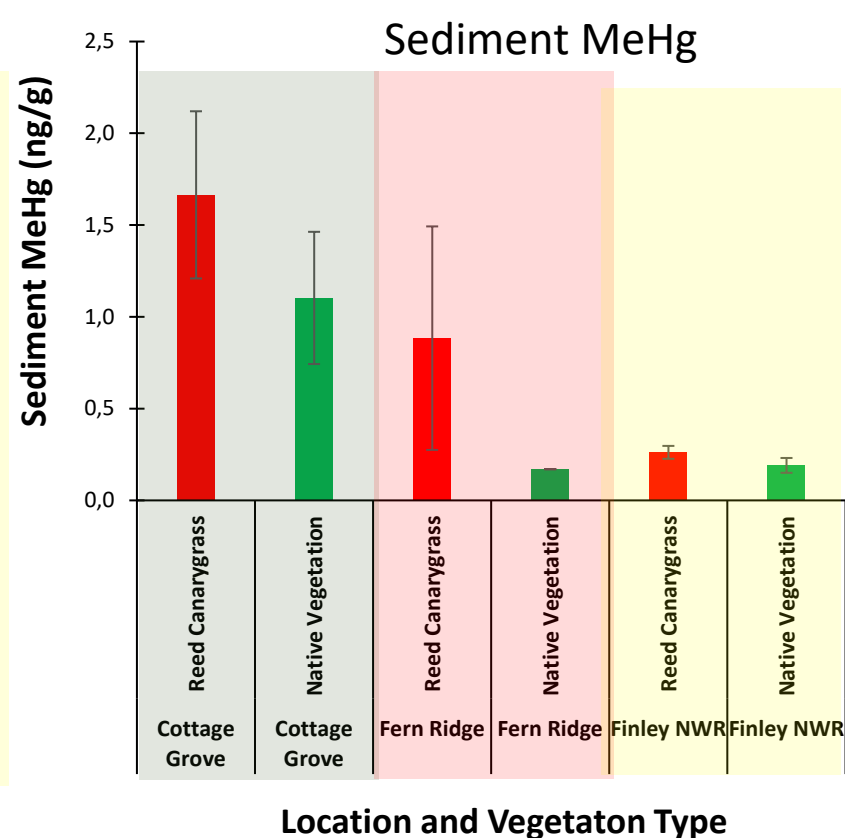
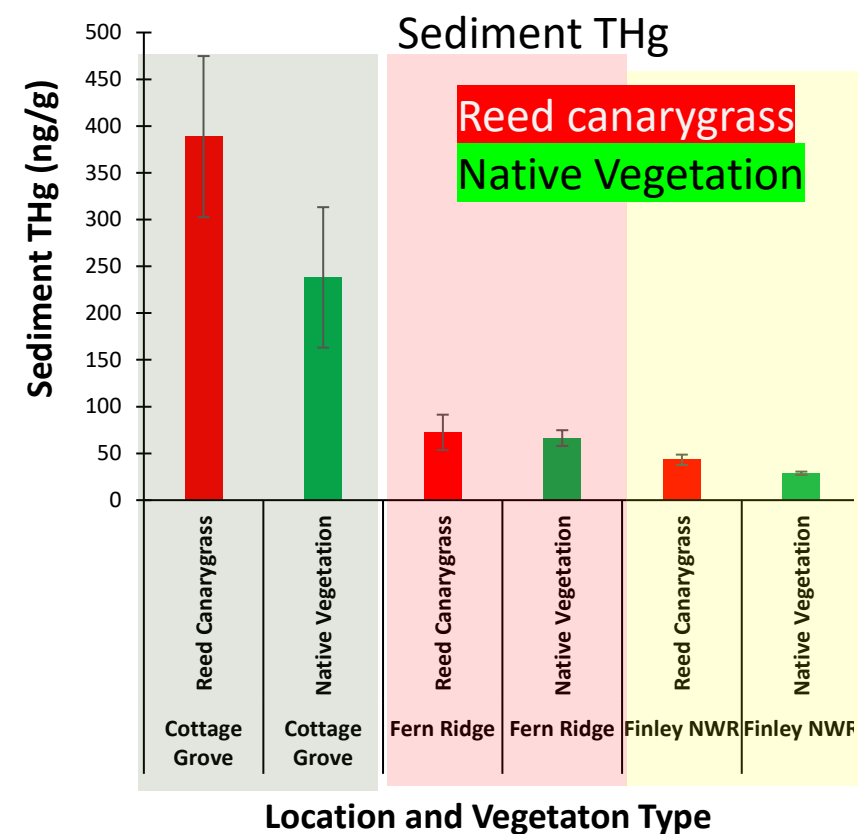
Methods:



Methods:



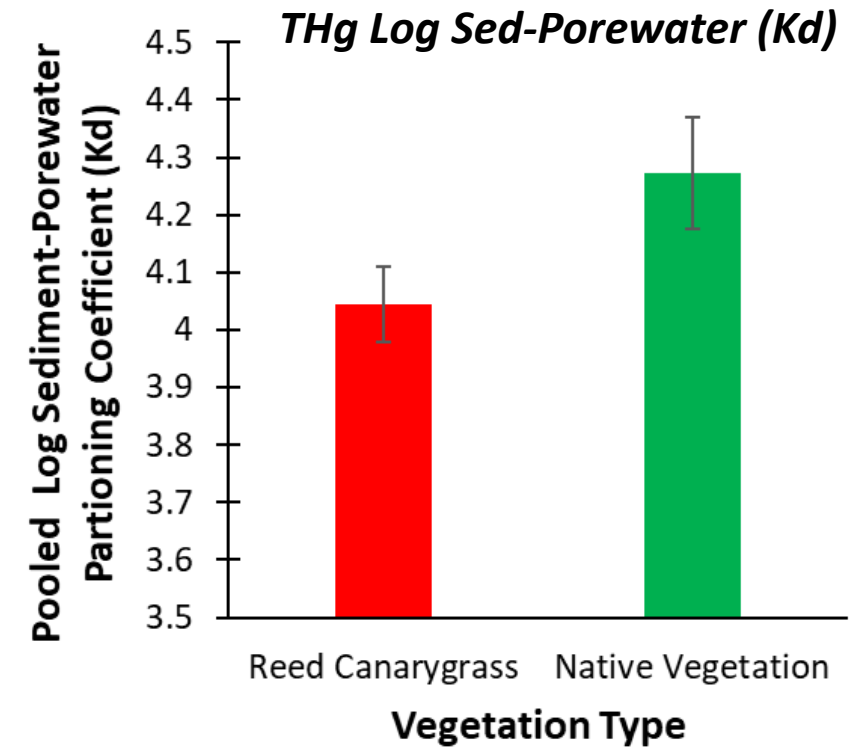
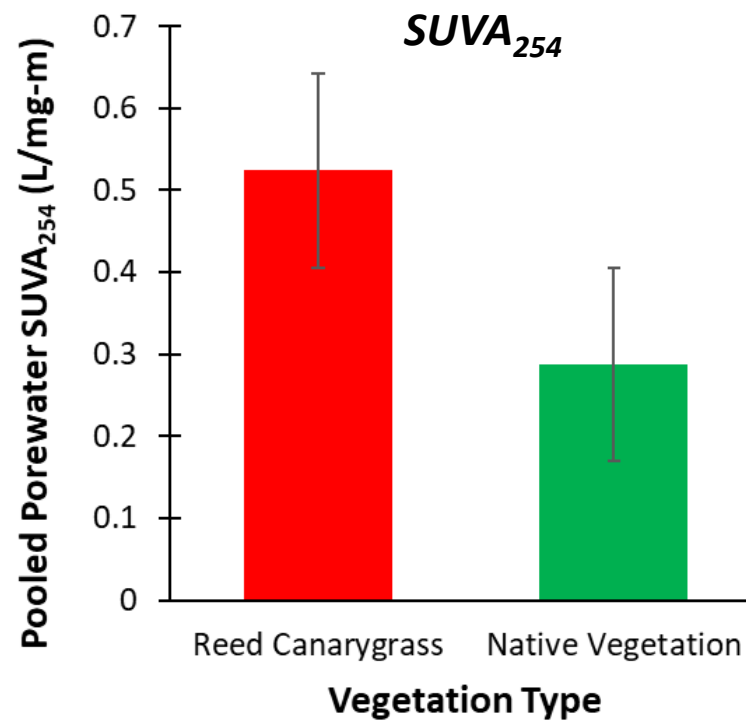
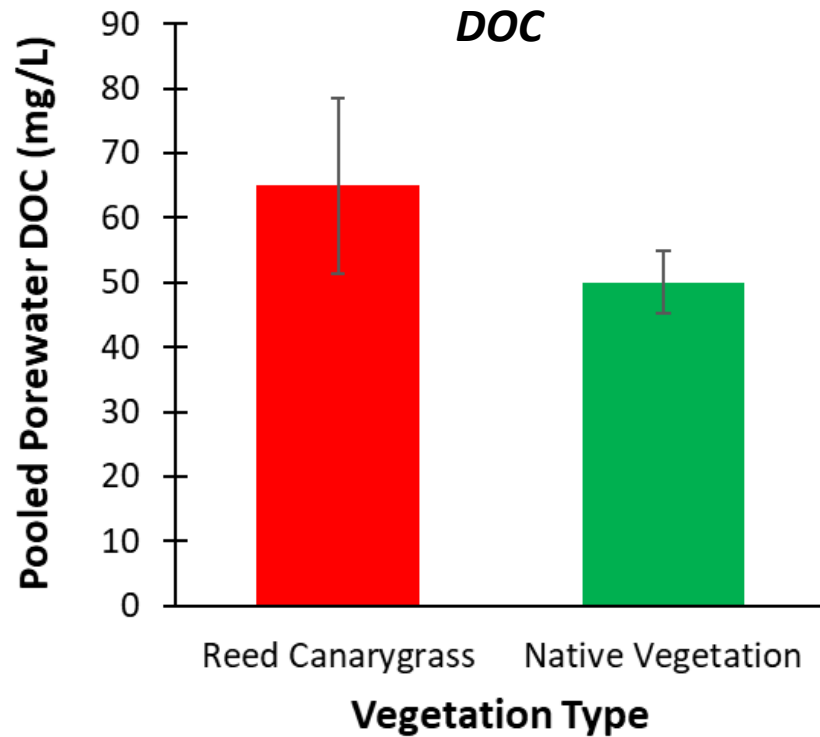
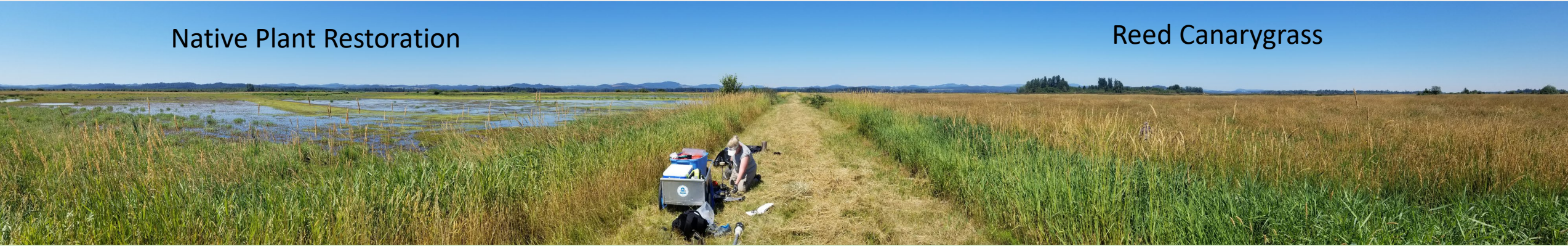
Results: Field Study



Results: Field Study

Native Plant Restoration

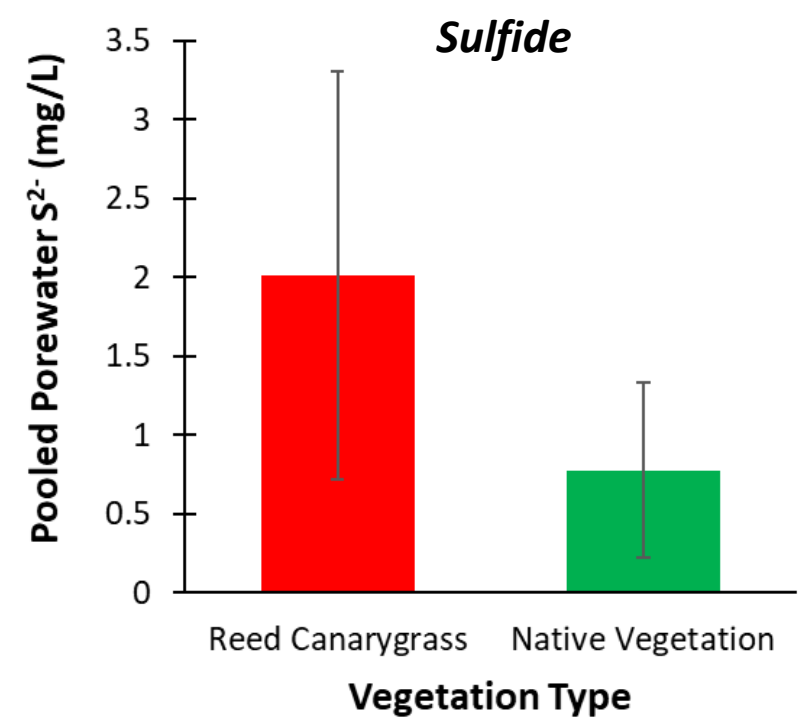
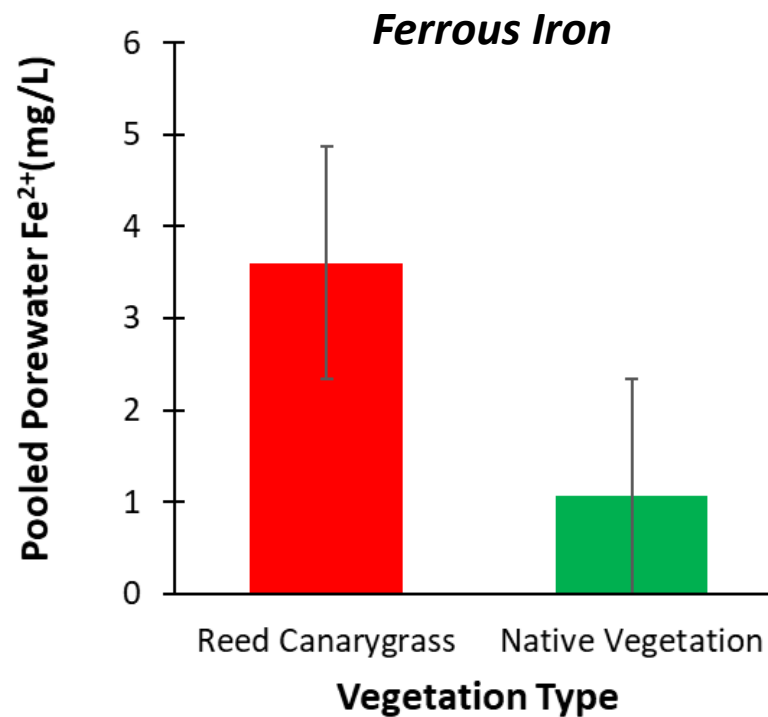
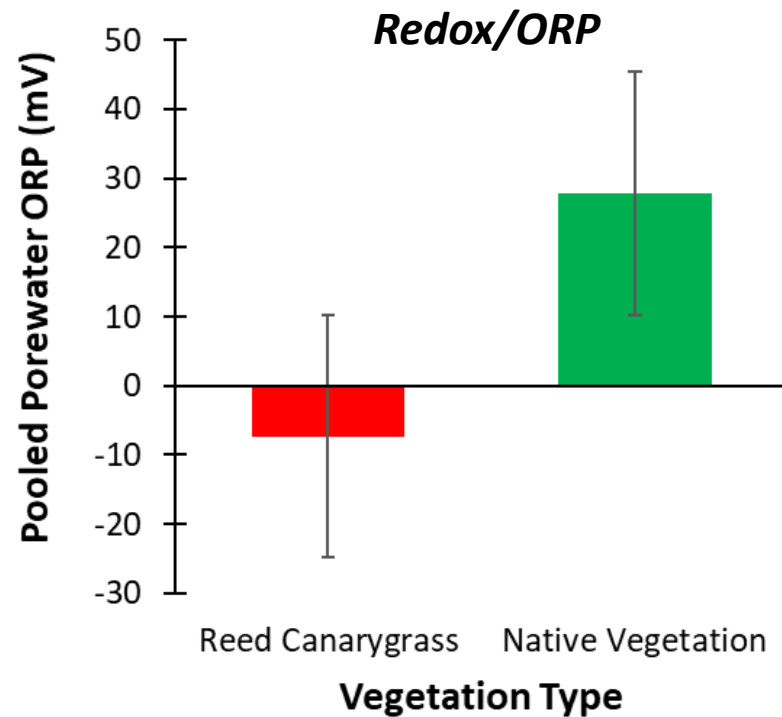
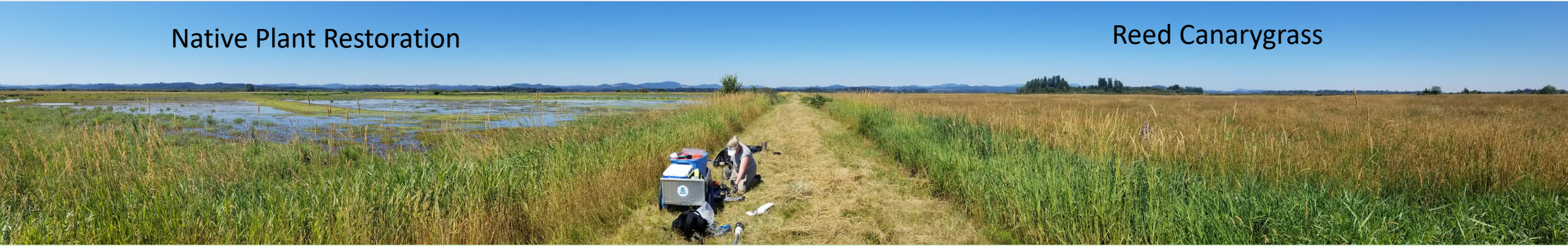
Reed Canarygrass



Results: Field Study

Native Plant Restoration

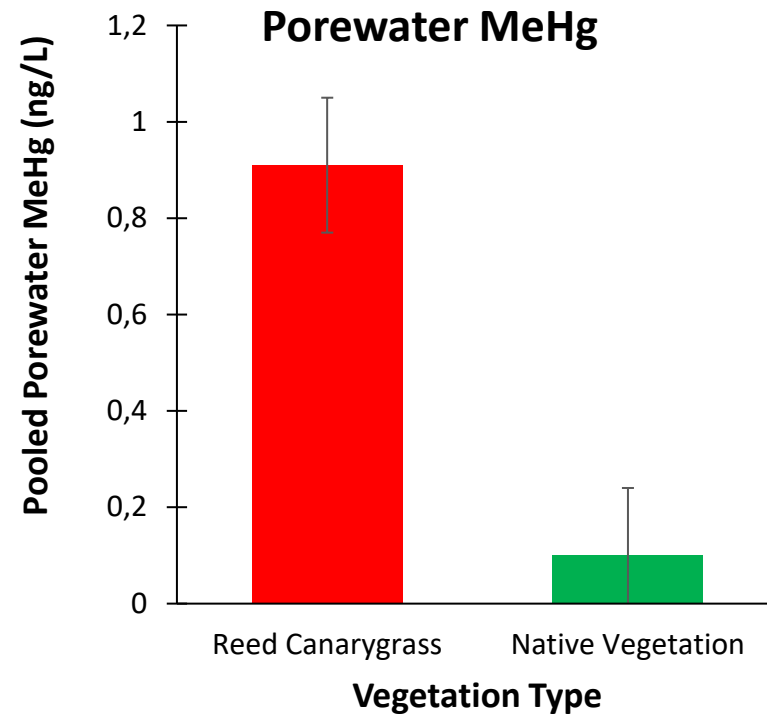
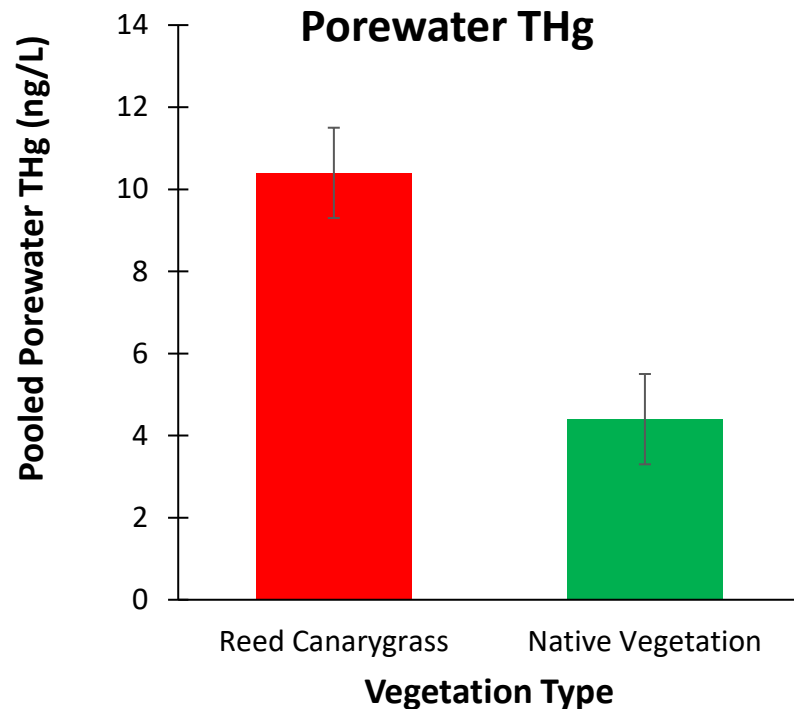
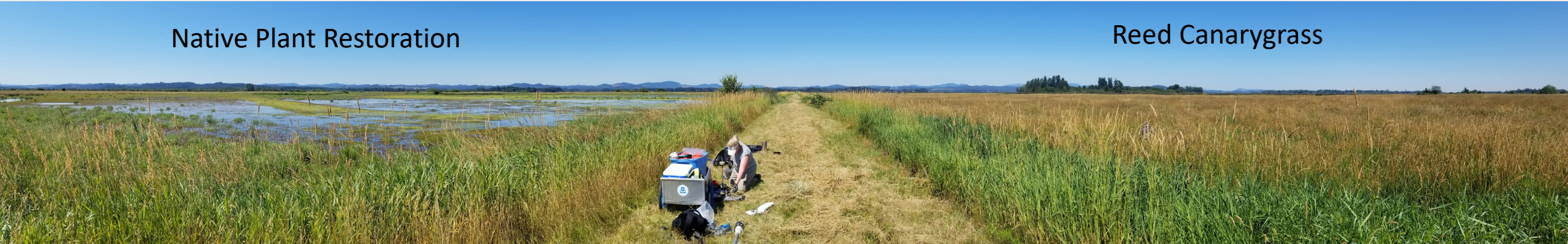
Reed Canarygrass



Results: Field Study

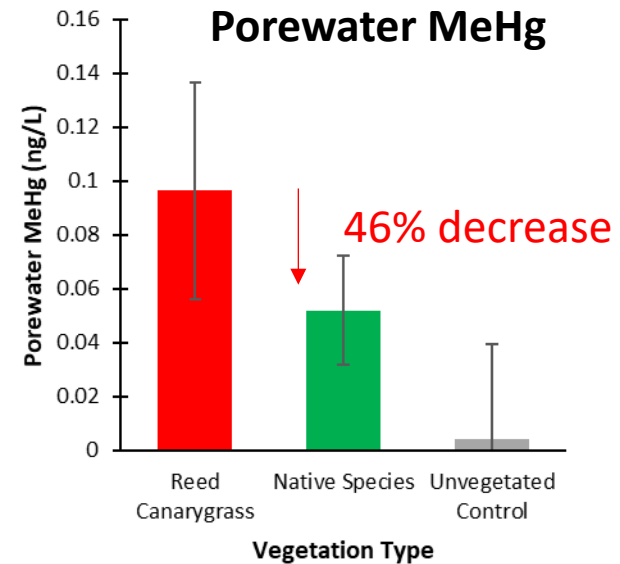
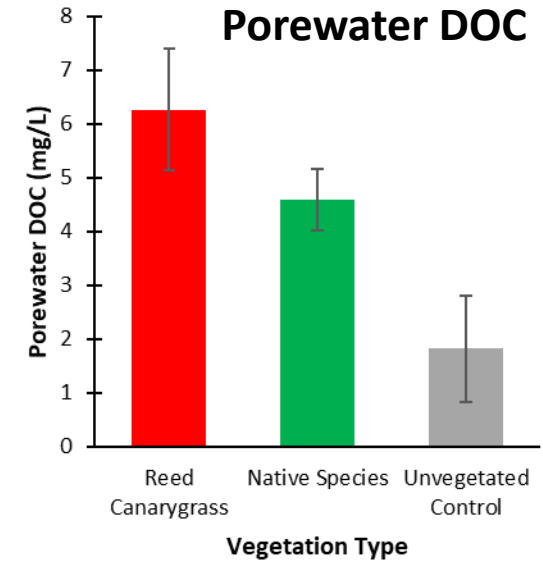
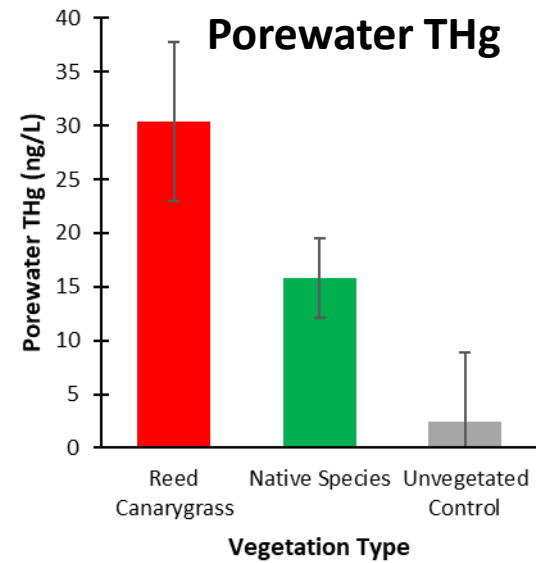
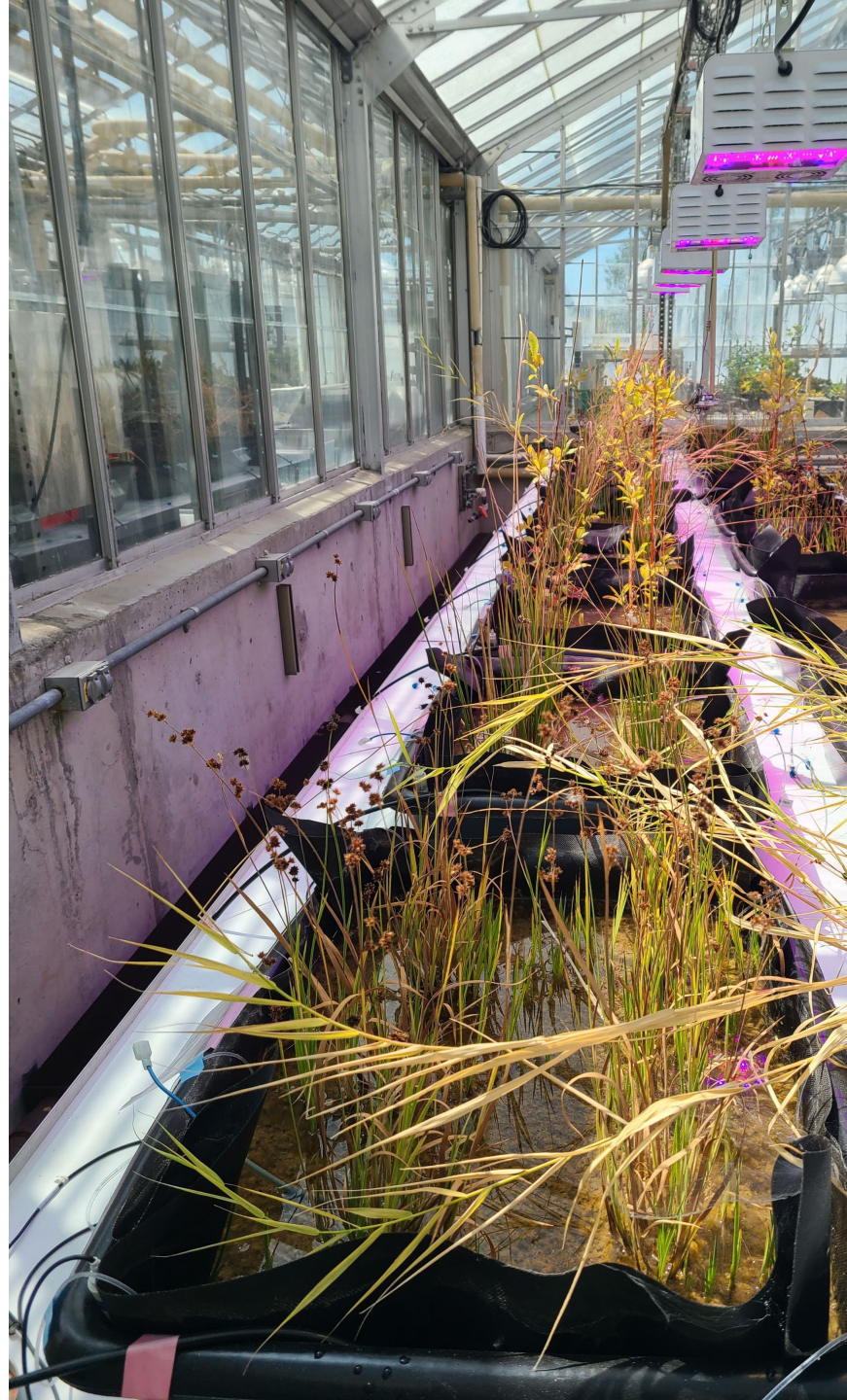
Native Plant Restoration

Reed Canarygrass



On average, MeHg concentrations in porewater were 89% lower in wetlands with native species compared to ones with reed canarygrass

Results: Mesocosm Study



Conclusions

- MeHg and THg concentrations tend to be higher in the wetlands dominated by reed canarygrass compared to native species.
- The lower THg K_d values for the reed canarygrass wetlands also suggests that more inorganic Hg would be dissolved in the porewater where methylation is occurring.
- The higher amount of organic matter and more reducing conditions suggest that the reed canarygrass wetlands have conditions that are more favorable to microbial populations involved in Hg methylation.
- These results suggest that switching from reed canarygrass to native species could result in a significant decrease in solid phase and sediment porewater MeHg concentrations

Questions

