Can Restored Marshes Support Similar Macroinvertebrate Communities to Natural References?

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Assessing a Marsh Creation Project

One of the goals of saltmarsh restoration projects is to build areas that can support similar communities to reference marshes. The Lake Hermitage Marsh Creation Project in Plaquemines Parish, Louisiana (*map below*), established two created marshes (*areas A and B*) in 2015. In 2018, our research team initiated several sampling efforts to determine if these newlycreated areas support similar plant, bacterial, and metazoan communities as nearby reference marsh (area C). The results described here focus on macroinvertebrate communities collected on the marsh platform in 2018.





Objectives

- 1) To compare the abundance and composition of macroinvertebrate groups in **created vs. reference** sites
- 2) To evaluate **abiotic** and **biotic factors** that may influence species abundance, composition, and distribution across these sites and distances from the marsh edge.



Representative types of marsh vegetation across different elevations. Original diagram by Brandon J. C. Fuller was downloaded from the Rhode Island Coastal Resource Management Council website. BJCF. Image modifications by PLD.

Hypotheses

- 1) Macroinvertebrate abundance and diversity will be less in newly-created marshes (less established habitat) relative to natural references.
- 2) Communities will transition from more aquatic to more terrestrial with distance from the marsh edge and increased elevation.

Samples were collected using nylon mesh bags filled with dried Spartina alterniflora and deployed at varying distances from the marsh edge (1, 10, 25, 50 and 100 m) for ~2 months in summer 2018. We used 5 replicate bags per distance as depicted in the diagram to the right.



Samples were sorted, identified, and counted under a dissecting scope. The samples represent forty taxonomic groups at varying levels of identification. Nematodes accounted for 80% of all samples and their abundances were consistent across sites. We do not include the nematodes in the data below to better depict the patterns of the remaining groups.



2,731 and 2,246 for LHA, B, and C, respectively.



Relative abundances of plant species vary across sites and distance from the edge, but no clear pattern emerges. The lowest diversity (dominated by *Spartina alterniflora*) can be seen at the marsh edge (1 meter) in LHA and LHB.

Summary and Next Steps

Macroinvertebrate biodiversity does not appear to be associated with marsh type (created vs. reference). Newly-created sites with relatively high vegetation biomass can sustain communities that resemble those observed at natural sites.

We are currently working on (1) developing taxonomy-based vs. trait-based community descriptors for this dataset, (2) comparing communities at lower salinity conditions due to a freshwater diversion near these sites, and (3) focusing on habitat connectivity across semi-terrestrial, benthic, and aquatic.

Integrations efforts across multiple habitats are being led by members of our research team: (1) Rabalais, (2) López-Duarte, (3) Martin, (4) Hooper-Bui

Macroinvertebrate and Plant Communities



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does not increase with increasing distance from the marsh edge at these sites.



There is a significant, positive association (r=0.697, p=0.006) between vegetation biomass and macroinvertebrate biodiversity. Note: there was no significant association between vegetation and macroinvertebrate diversity (r=-0.314, p=0.274).

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