

Upper Barataria (BA-207) Marsh Creation Project: Direct Nekton Habitat Use Monitoring

Emelia Marshall¹, Erin Kiskaddon¹, Tim Carruthers¹, David Reeves², Ian Zink², Melissa Carle², Donna Rogers², Rissa Inselman³

¹The Water Institute of the Gulf, Baton Rouge, LA
²NOAA Fisheries Office of Habitat Conservation Restoration Center Deepwater Horizon Program
³Nicholl's State University, Thibodaux, LA

Correspondence: emmarshall@thewaterinstitute.org

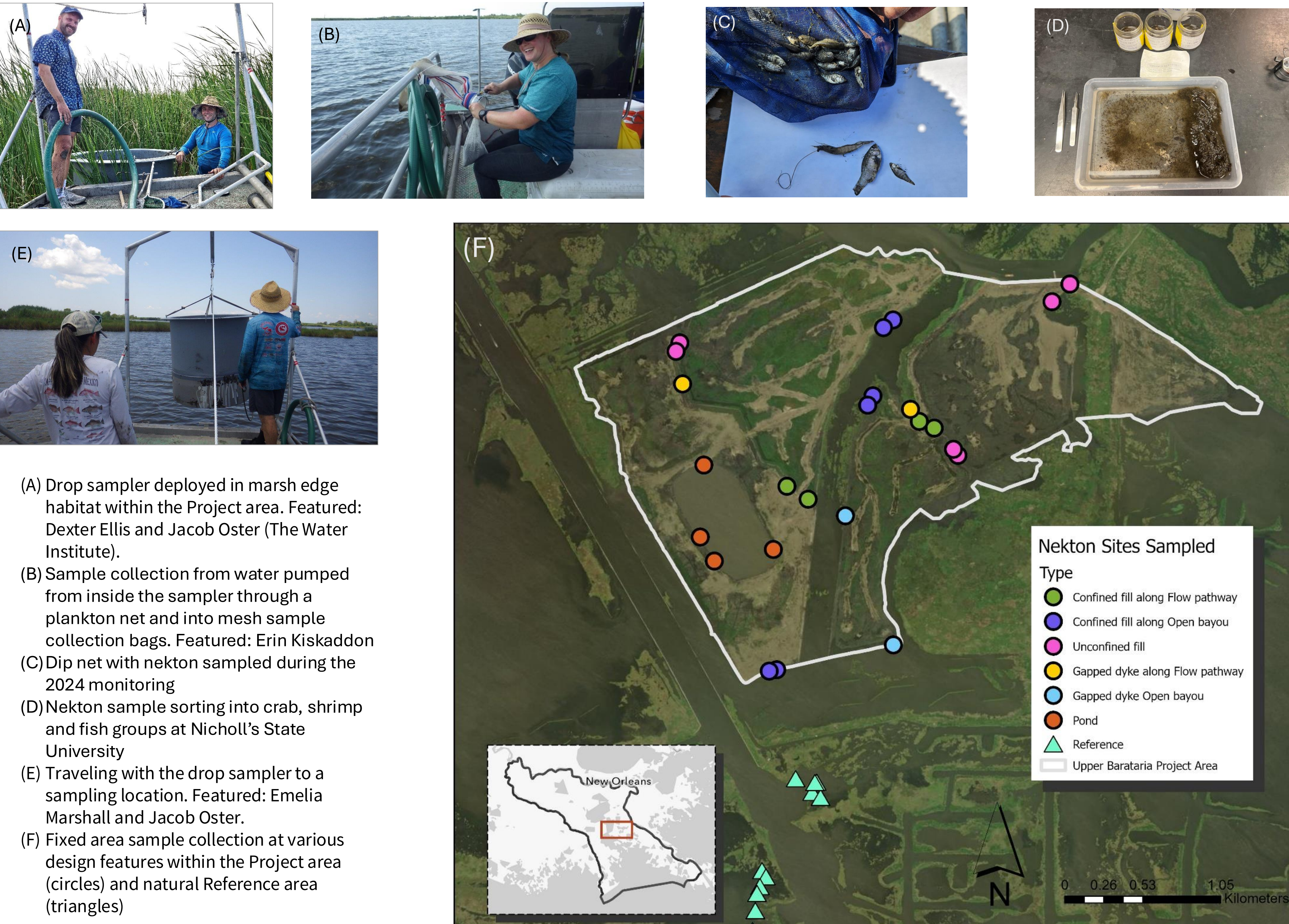


Why this matters

Restored marshes are intended to provide suitable habitat for aquatic species and restore fisheries productivity over time. However, benefits of restoration on nekton are not well understood. The monitoring data from the Project will directly inform adaptive management and help improve future restoration design for projects that intend to optimize nekton benefits. Data will also be used alongside other monitoring projects to inform nekton restoration targets for coastal Louisiana.

Introduction

- The Large-Scale Marsh Creation – Upper Barataria Component Project (“the Project”) aims to restore interspersed and ecologically connected coastal habitats.
- The project was funded and approved by the Deepwater Horizon (DWH) LA Trustee Implementation Group (TIG) and implemented by NOAA in 2023.
- Broadly, the objectives of the Project included (1) create ~1,200 acres of intermediate and brackish tidal marsh, (2) restore hydrologic and biologic connectivity to Barataria Basin, and (3) increase vegetation and nekton productivity in the project area.
- Monitoring spans a 20-year lifespan and will track changes in habitat coverage by type, elevation, biological connectivity, vegetation and sediment characteristics, assemblages of fishes and invertebrates (nekton), and resource availability as it related to secondary production.
- Targeted design features and construction approaches were implemented to increase biologic connectivity and productivity in the Project area (Figure G)



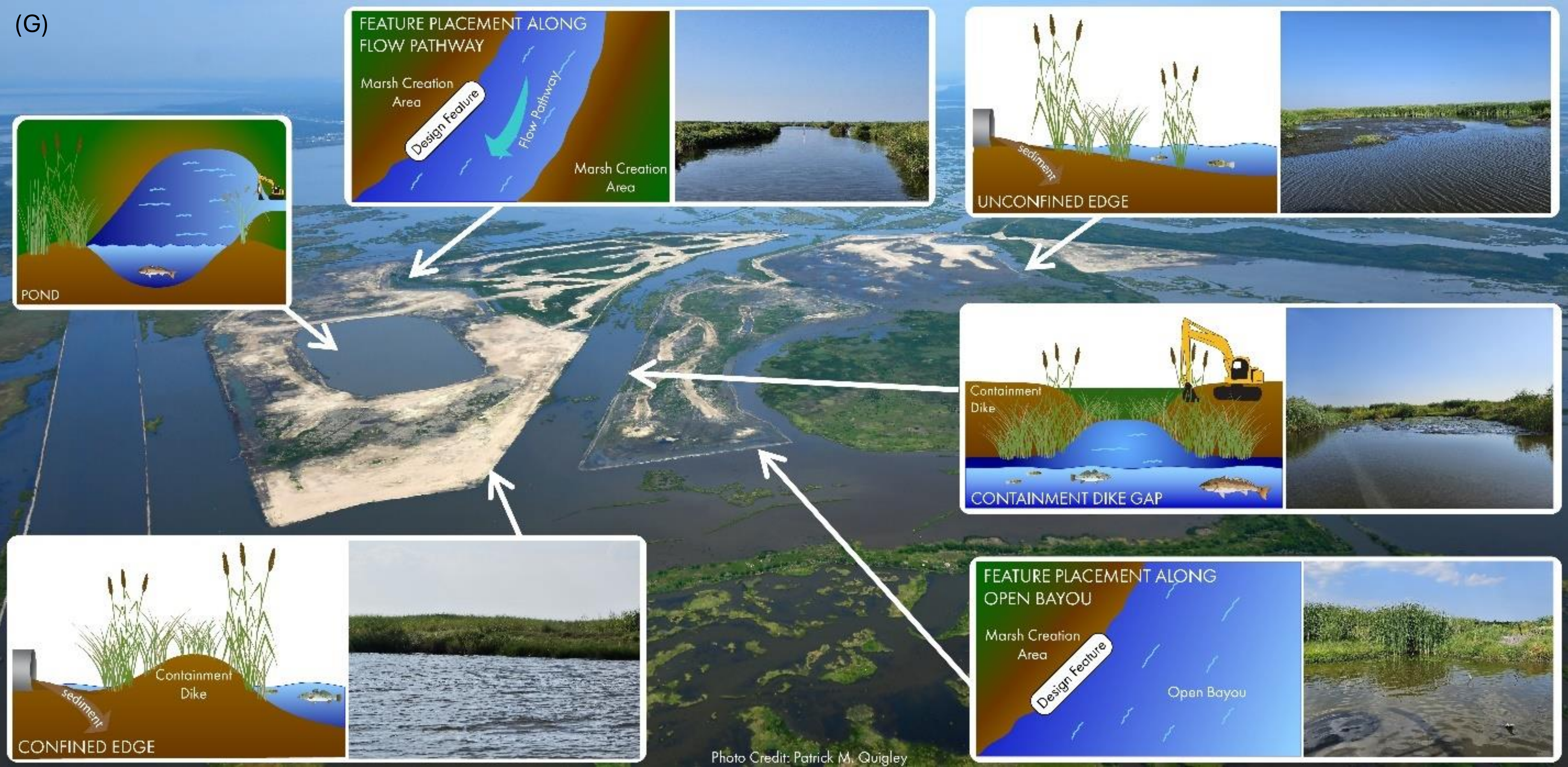
Hypothesis

Nekton densities in marsh edge and adjacent open water habitat types differ across different project design features within the Project area and when compared to natural reference marshes.

Nekton Monitoring Methods

- Nekton monitoring in the Project area is being conducted using fixed area drop samplers deployed by boat at the marsh edge and in adjacent shallow water habitats.
- Fixed area nekton sampling in the Project area occurred in Aug 2024 as part of Year 1 post-construction monitoring. Subsequent fixed area sampling will occur every 2 years from Y1-Y7, then every 4 years from Y7-20.
- Fixed area nekton samples were collected within the Project at locations of various design features as well as in a natural reference marsh south of the Project area (Figure F)

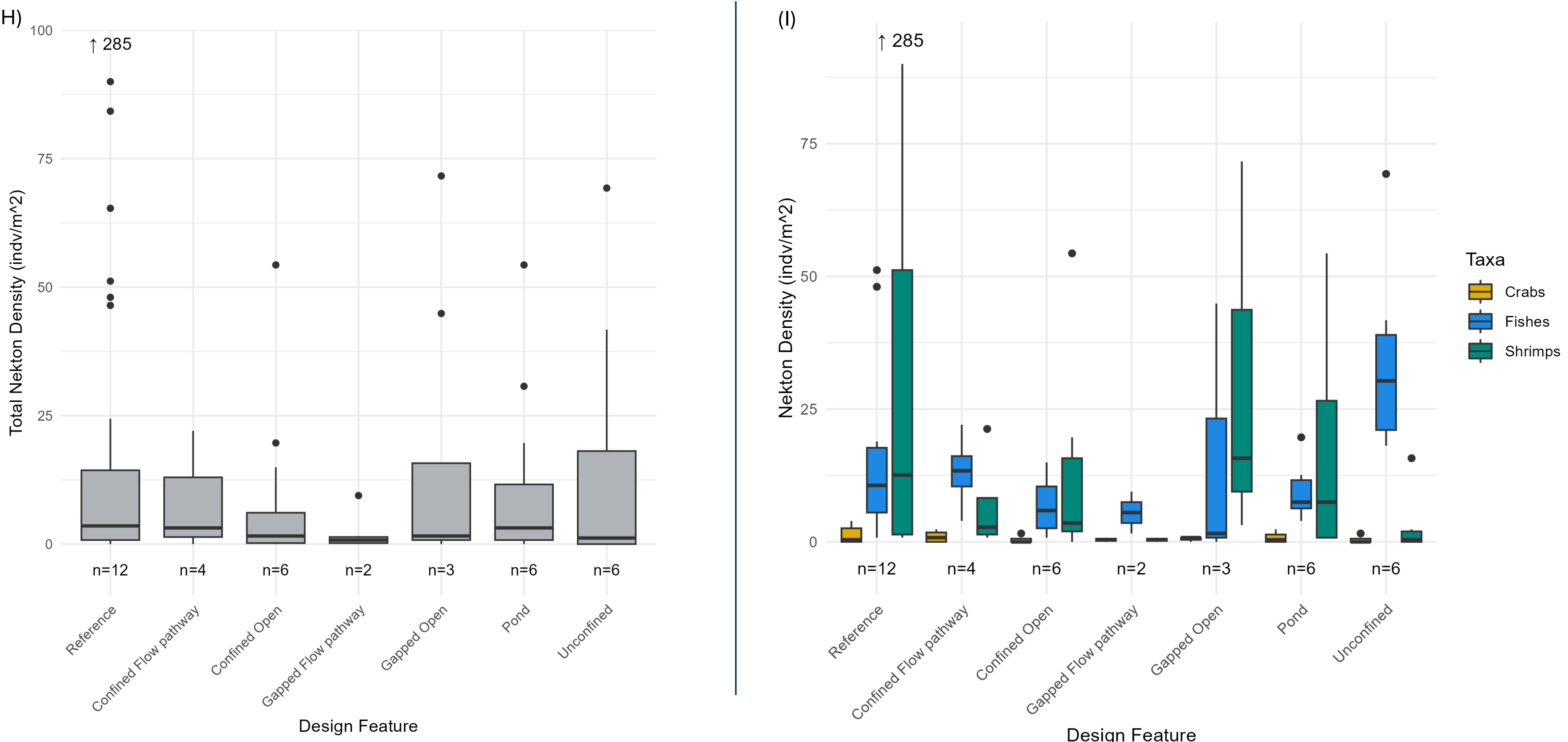
Upper Barataria Design Features



(G) Aerial image of the Project area taken in 2023 with illustrations of project design features and photographs collected in 2024. Background image taken by Patrick M. Quigley and illustrations.

(H) Total nekton density (individuals/m²) across the Project design features and natural reference marsh. Boxplots display the 25th and 75th percentiles (box boundaries), median (central line) and outliers (points). Data combine collections from marsh edge and adjacent open water habitats for each design feature. Note: One extreme outlier (285 individuals/m²) in the Reference category is indicated but not shown at scale.

(I) Density (individuals/m²) of crabs, fishes, and shrimps across the Project design features and natural reference marsh. Boxplots display the 25th and 75th percentiles (box boundaries), median (central line), and outliers (points). Data combine collections from marsh edge and adjacent open water habitats for each design feature. Note: One extreme outlier (285 individuals/m²) in the Reference category for shrimps is noted but not shown at scale.



Results

- In total, 40 crabs, 774 fishes, and 1090 shrimps were identified from 32 samples in the project area and 12 samples in the reference area.
- The only design features where marsh edge was inaccessible to the drop sampler due to shallow water depth included Gaps Along Flow Pathways and Gaps Along Open Bayou.

Discussion

- Visual differences between taxa densities across Project design features - may yield statistical differences as we collect more samples and increase statistical power
- Fishes were more abundant in areas without containment dikes, suggesting this method could provide better access for nekton to the created marsh platform during the early years post-construction.
- Marsh edge habitat at gapped project features was not possible to sample due to low water levels, but may also provide valuable nekton habitat. As the marsh area settles further over the 20-year life of the project, it is likely that these and other project design features – including their habitat value for nekton – will evolve.

Acknowledgements

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Ongoing Monitoring

- Continued efforts to process fixed area samples to lowest taxon and quantify standing stock metrics will contribute further to understanding how the target design features influence nekton communities in previously degraded estuarine areas.
- Monitoring information gathered to evaluate the Project will help inform adaptive management, future project design, and ecological monitoring practices for other restoration projects implemented to provide habitat benefits.
- Data collected for the Project will also augment existing data collection efforts underway across coastal Louisiana.