FOWL RIVER MARSH RESTORATION AND SHORELINE STABILIZATION PROJECT

INTRODUCTION:

Degraded marsh spits, breaching shorelines, and disappearing islands along the intertidal region of Fowl River, where fresh and brackish water meets, were prioritized by the community during development of the Fowl River Watershed Management Plan (2016). Historically, the extent and health of these important features have declined. Following Plan development, the Mobile Bay National Estuary Program (MBNEP) has been working with impacted landowners and the community to implement a fitting project for this important river system. This project represents more than $17M invested by the State and the project funder, the National Fish and Wildlife Foundation.

PURPOSE: The purpose of this Project is to develop a holistic, nature-based engineering approach to:

- Stabilizing priority coastal spits and shorelines
- Restoring and enhancing habitat
- Providing long-term sustainability of ecosystem services
- Supporting estuarine living resources and the Fowl River Community including the marsh spit areas, seagrass beds, and the species these habitats support

PROJECT UPDATES:

- 2017-2019 – MBNEP secured funding from the National Fish and Wildlife Foundation to undertake a comprehensive marsh health and recovery study to guide engineering and design efforts related to restoration of these spits. This Fowl River study represents the most comprehensive effort ever undertaken of a coastal river system discharging to Mobile Bay. Outcomes of the marsh study concluded the system is transitioning from Tupelo-Cypress swamp to degraded herbaceous marsh because of sediment starvation, saltwater intrusion, sea level rise, and boat wakes.

- 2019-2023 – Environmental Science Associates were contracted to undertake engineering, design, and permitting to stabilize and protect five priority spits (Figure 1). Data review and environmental assessments led to a design approach incorporating **thin-layer sediment placement** to restore spit elevation (adding sand to the hourglass); combined with shoreline protection techniques, **including timber wave screens and limited riprap**. Adaptive management will be used to determine the intervals for sediment placement and the extent of shoreline stabilization measures. This design addresses project challenges and constraints uncovered during the assessment process, including:

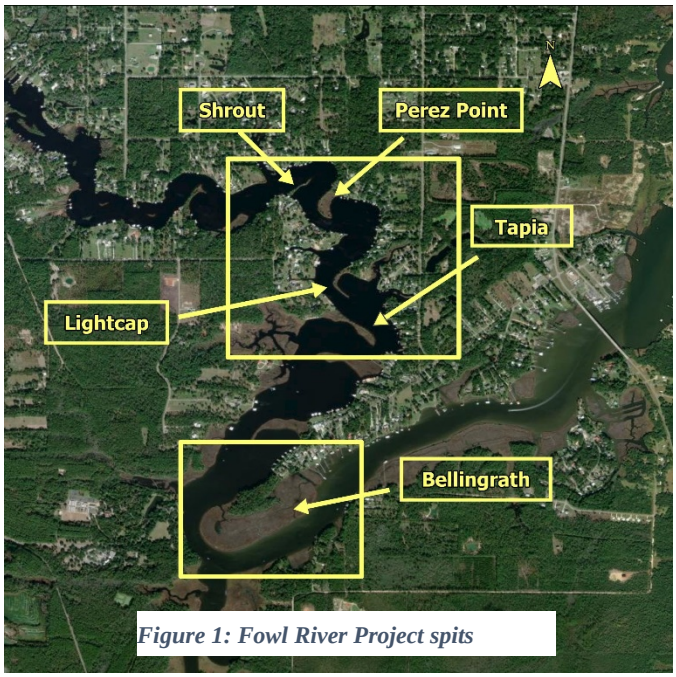

Figure 1: Fowl River Project spits

    - *Sediment Quality*: Presence of soft sediments limiting construction options.
    - *Sensitive Habitats*: Extensive submerged aquatic vegetation (SAV) around spits which limit the project footprint due to regulatory agency concerns over impacts. Since **43%** of the SAV along Fowl River spits is in the project area, it was determined that, as the spits diminish and become submerged, both the habitat-rich marsh spits and critical SAV stands would be lost.
    - *Permitting:* After a thorough two-year regulatory review, all required regulatory authorizations from multiple Federal and State agencies have been acquired.

- 2024 Next Steps- Construction will start **June 2024** and likely last into November. Phase I will include placing six inches of material on the five spits and installation of timber wave screen and limited riprap at strategic locations around each spit. The contractor will likely start at the most upstream site (Shrout) and work their way down to Bellingrath. Use caution and reduce speed in construction zones.

Design Elements Supporting Conservation Priorities

TIMBER WAVE SCREENS:

The timber wave screens are designed to reduce shoreline erosion by buffering wave energy along the marsh edge to allow vegetation to recruit and become re-established along the shoreline. Nearly all wave energy in Fowl River is the result of boat wakes. Timber wave screens have proven successful in Dog River, Alabama as presented in Figure 2; and along the shorelines of the Pamlico River in North Carolina, where a wave screen protected an eroding shoreline allowing natural recruitment of marsh vegetation (Rogers Jr., 2017). Timber wave screens can protect a wide range of submerged and emergent vegetation.

Figure 2: Timber wave screen on Dog River (MBNEP 2014)

WAVE SCREEN DESIGN:

The timber wave screens will be installed in 72-foot-long segments with a 10-foot-wide, offset 10-feet landward to allow for fish, alligators, manatees, kayaks, and boats to traverse inside and outside of the timber wave screen (required by permit). An 18-ft section of wave screen will fill the gap at a 10-foot offset, providing continuous protection (Figures 3 & 4).

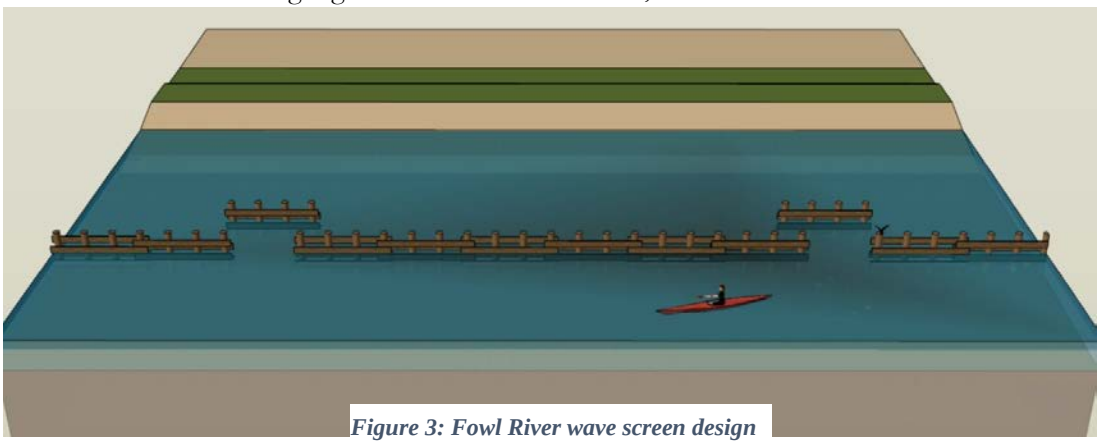

Figure 3: Fowl River wave screen design

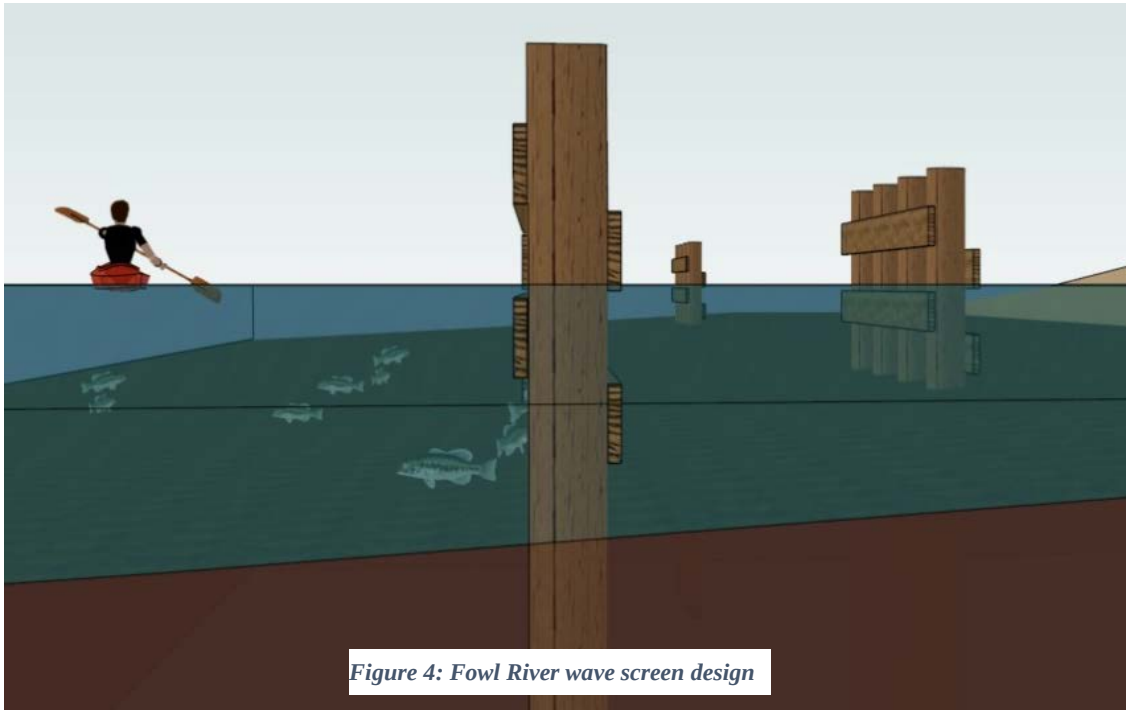

Figure 4: Fowl River wave screen design

- The lowest slat will be approximately 1-2 feet off the river bottom, depending on location. This will reduce the potential for scour and allow for water exchange under the wave screen. The highest slat will be 3.3 feet above mean high water, with posts breaching 4 feet above. Wave screens will be installed along the -3 feet depth contour.
- Wave tank testing has shown timber wave screens can reduce the wave energy transmitted by 60-80% (Thomson, 2000). This reduction in wave energy is comparable to a riprap breakwater at 60-90% (Seeling, 1980).
- This is different from a seawall or bulkhead where all the energy is reflected, no water or wave energy is allowed to move behind the wall, and there is no mixing in the water column.
- The permeable wave screen will also reduce local scour due to returning water during river flooding events. The openings in the screen will allow highwater to return to the main river flow through the entire length of the structure rather than only at designated breaks in the structure as is the case with bulkhead or riprap. (Rogers Jr., 2017).

The wave screen design, which is elevated off the river bottom and above the waterline, will provide vertical habitat structure in the middle to upper portion of the water column and at the surface. This will benefit a range of species including crustaceans, gastropods, invertebrates, reptiles, and birds, as well as provide shelter for juvenile fish and baitfish out of the main river current and adjacent to the SAV beds.

DESIGN VALUE TO LOCAL FISH HABITATS**:**

- Largemouth Bass: This species has been known to prefer their spawning beds to be in tight quarters, adjacent to timber structures; with fish congregating post-spawn on nearby grass beds (AL.com, 2014).
- Redfish: This species also seeks hard structures like oyster reefs, shell bottoms, riprap, gas well, dock pilings, jetties, and other objects when water temperatures drop (Alabama Outdoor News, 2020).
- Flounder: This species likes dock pilings, because just about everything they eat love them too." (Florida Sportsman, 2022).

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Project updates will be provided and can be accessed at https://www.mobilebaynep.com/watersheds/fowl-river-watershed or contact Jason Kudulis at jkudulis@mobilebaynep.com

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