

HABITAT RESTORATION

Increasing Marsh Elevation and Hydrologic Connectivity on Edwin B. Forsythe National Wildlife Refuge



Moving Sediment onto the Refuge Marsh

INTRODUCTION

Edwin B. Forsythe National Wildlife Refuge (the refuge) is a coastal system of barrier islands, salt marsh, and freshwater wetlands on the Atlantic Flyway's flight path in New Jersey. The refuge provides crucial habitat for many coastal bird species and buffers neighboring communities from storms and flooding. Sea level rise, erosion, and human activities have degraded the area, leading to widespread habitat conversion. Hurricane Sandy resilience funds provided an opportunity for habitat recovery and the enhancement of coastal resiliency. The refuge and partners used nature-based solutions such as sediment placement to restore tidal flow, increase marsh habitat, and protect community infrastructure.

KEY ISSUES ADDRESSED

Ditch digging and impoundment creation have decreased hydrological connectivity and disrupted natural tidal flow. This disruption resulted in poorly drained marshlands and changed the marsh chemistry. These impacts have been exacerbated by sea level rise, storm surge, and edge erosion.

Significant vegetation loss and subsidence degraded the ecological integrity of the salt marsh at the refuge's northern end. Wildlife is dependent on areas of both high and low elevation to sustain native vegetation. As marshes sink, suitable habitat for native vegetation decreases, which often results in low quality marsh and even conversion to open water.

Hurricane Sandy left many areas damaged, and flooding exacerbated the existing conditions. Federal disaster funding allowed the refuge to study and determine how to begin improving marsh habitat for priority species.

PROJECT GOALS

- Use sediment placement to increase marsh elevation and foster native vegetation growth
- Build up shoreline to increase buffering potential and protect surrounding communities
- Remove barriers to restore tidal flow and allow native vegetation to return to impounded areas



Project Location

PROJECT HIGHLIGHTS

Sediment Placement: The refuge chose Good Luck Point (northern part of refuge) for its first sediment placement project due to its proximity to the dredge material site and road accessibility. They enhanced approximately seven acres of marsh by using a mix of dredged sand and fine materials. Additionally, sand was sprayed along the beach edge, creating a large buffer to wind-driven bay waters. Through reestablishment of the marsh, refuge biologists learned that a combination of sediment deposition and placement of organic material, such as compost, was needed to foster high marsh vegetative growth that allowed plants to thrive.

Building Resiliency: Raising marsh elevation allows vegetative communities to develop deep root systems, increasing the marsh's resiliency. Adding sand along the shoreline creates a beach and barrier that buffers the marsh from erosion. Ultimately, these actions protect surrounding community infrastructure, such as roads, from flooding and subsidence.

Barrier Removal: Removal of a low-flow dam opened about eight miles of waterway to natural tidal flow. Upland and wetland habitat on the site was restored through revegetation. Refuge monitoring efforts have demonstrated an increase in species such as the American eel (*Anguilla rostrata*).



Looking Upstream at a Water-Control Structure Before its Removal

LESSONS LEARNED

By proactively collecting baseline data using in-house research, refuge staff were prepared to take advantage of the large Hurricane Sandy project funds when they became available. They hired consultants to determine high and low-risk areas for sediment deposition, ensuring successful placement. For effective restoration projects, funds must also be available to build up the marsh's vegetative structure after building elevation with sediment placement.

Refuge staff recognized that increasing marsh elevation was a priority and built partnerships with agencies like the New Jersey (NJ) Department of Transportation's (DOT) Maritime Division that had access to dredge materials. Placing sediment onto the refuge's deteriorating marshes provides a dual benefit for the refuge (increasing marsh elevation), as well as the DOT (removing sediment from unwanted areas).

Even with strong, long-term partnerships, not every project aligns well with everyone's goals; priorities can shift over time. In these scenarios, it is important to stay true to your objectives; if partner goals differ too much, it is okay to walk away from that specific project and remain strong partners.

NEXT STEPS

- Evaluate experimental strategies to more rapidly recover high marsh after restoration intervention
- Partner with the NJ DOT to seek funding from the National Fish and Wildlife Foundation to continue on-site restoration

PARTNERS

- See online for full list of partners
- For more information, contact Virginia Rettig: virginia_rettig@fws.gov



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