

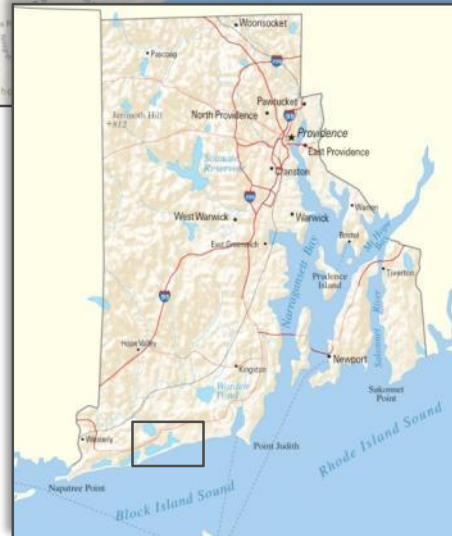
Beneficial Reuse and Marsh Elevation Enhancement on Rhode Island's South Shore

**Workshop on Beneficial Use of Dredged Materials for
Resilient Tidal Marsh Restoration and Creation
September 28, 2017**

Caitlin Chaffee, RI Coastal Resources Management Council
Maren Frisell, Fuss & O'Neill, Inc.

2014 South Shore Habitat & Community Resilience Project: Project Overview

- Focused on RI southern coastal ponds and back-barrier marshes
- Planning and design for three ponds
- Dredging and marsh restoration in Ninigret Pond



Partners:



Funding:





Heather Island

Marshneck
Point

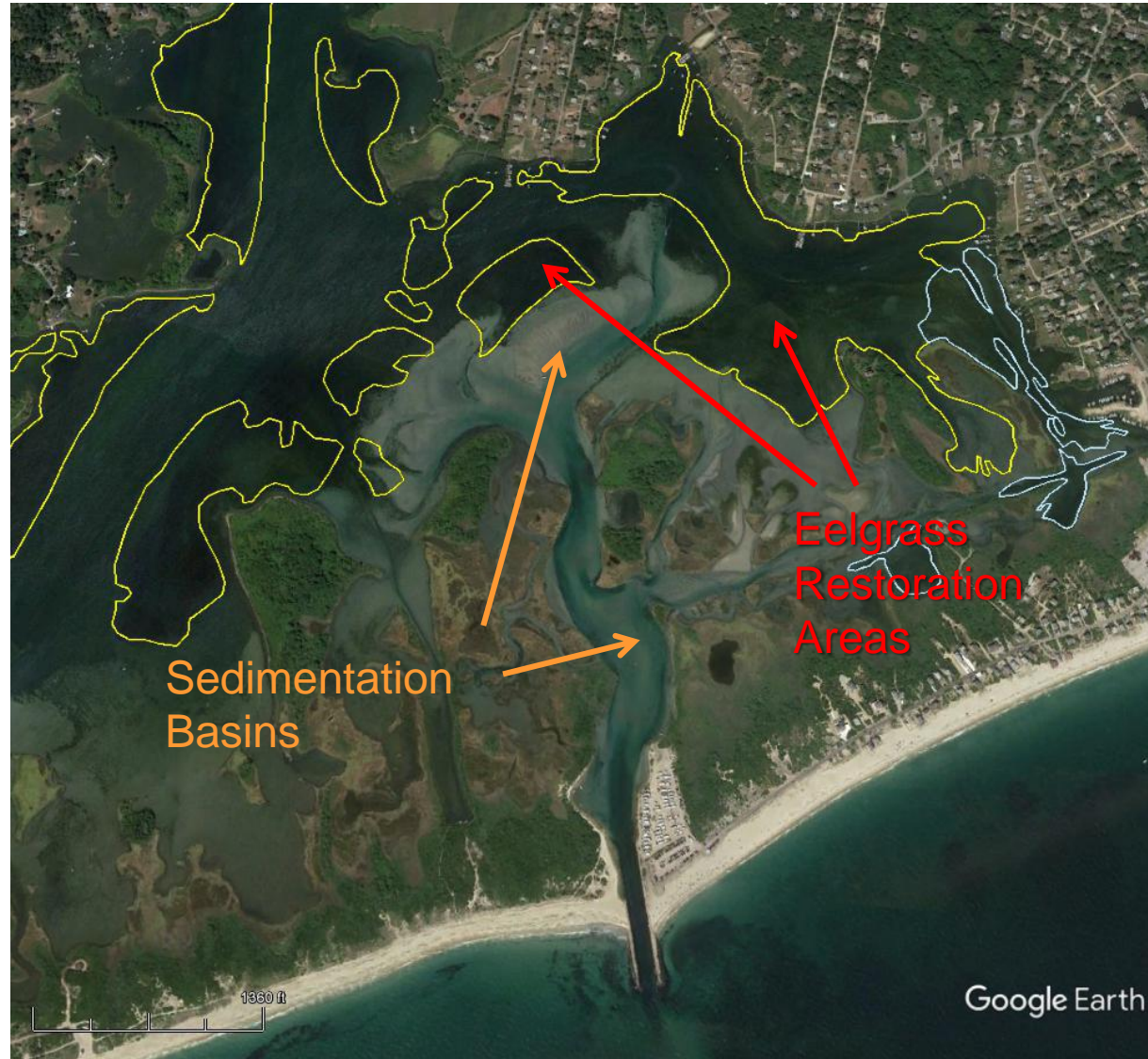
Ward Island

South Shore
Management Area

Charlestown Breachway

Site History

- **2007 USACE Habitat Restoration Project**
 - Dredged 40 acres of tidal shoals for eelgrass restoration
 - Dredged channel sedimentation basins to slow future shoaling and improve navigation
- **2010 Maintenance**



Material Beneficial Reuse Location and Proposed Pipeline



Observed Impacts to Project Site

- **Vegetation die-off**
- **Shallow ponded areas with algal mats**
- **Loss of high marsh species**

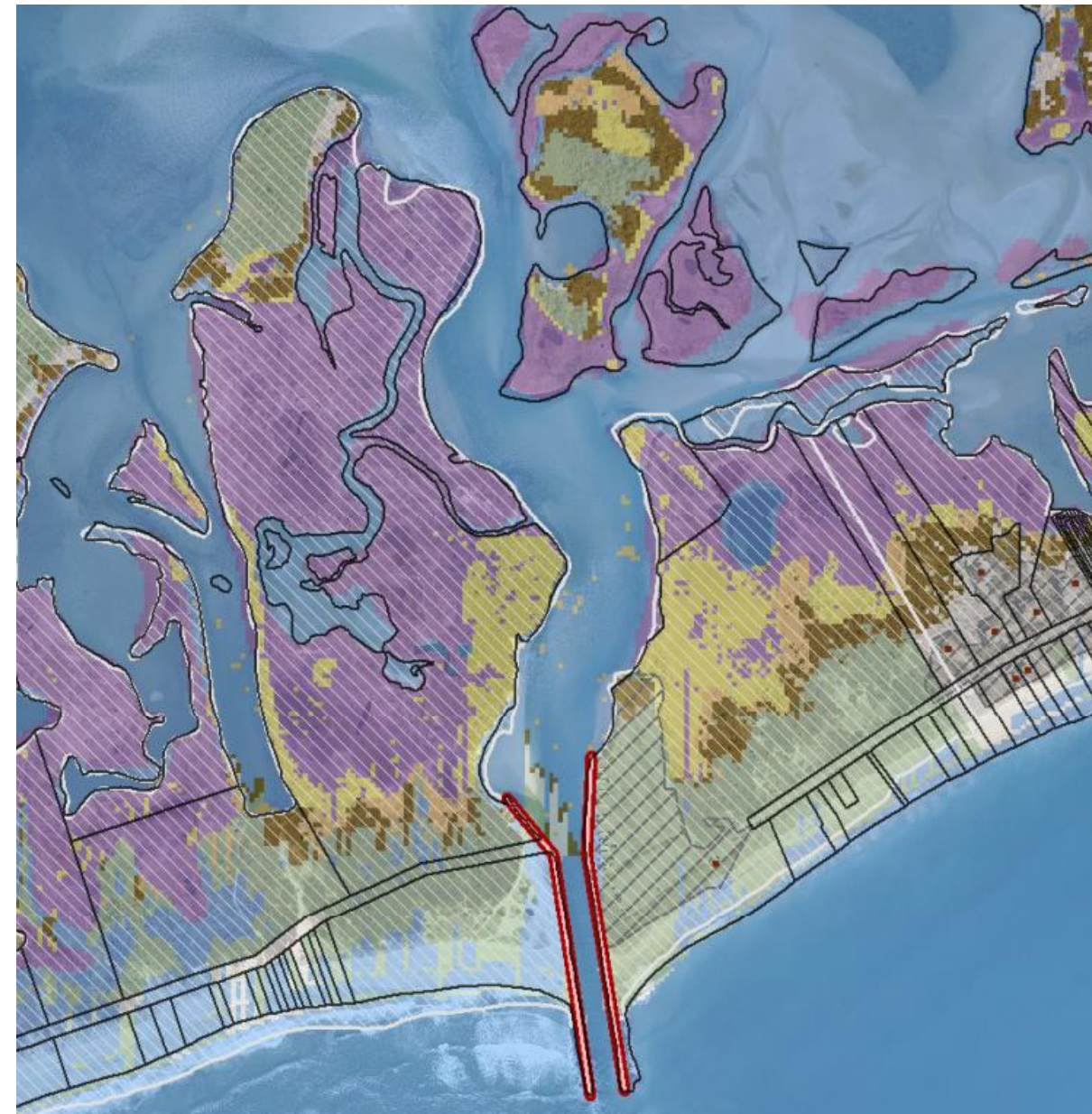










© Ayla Fox

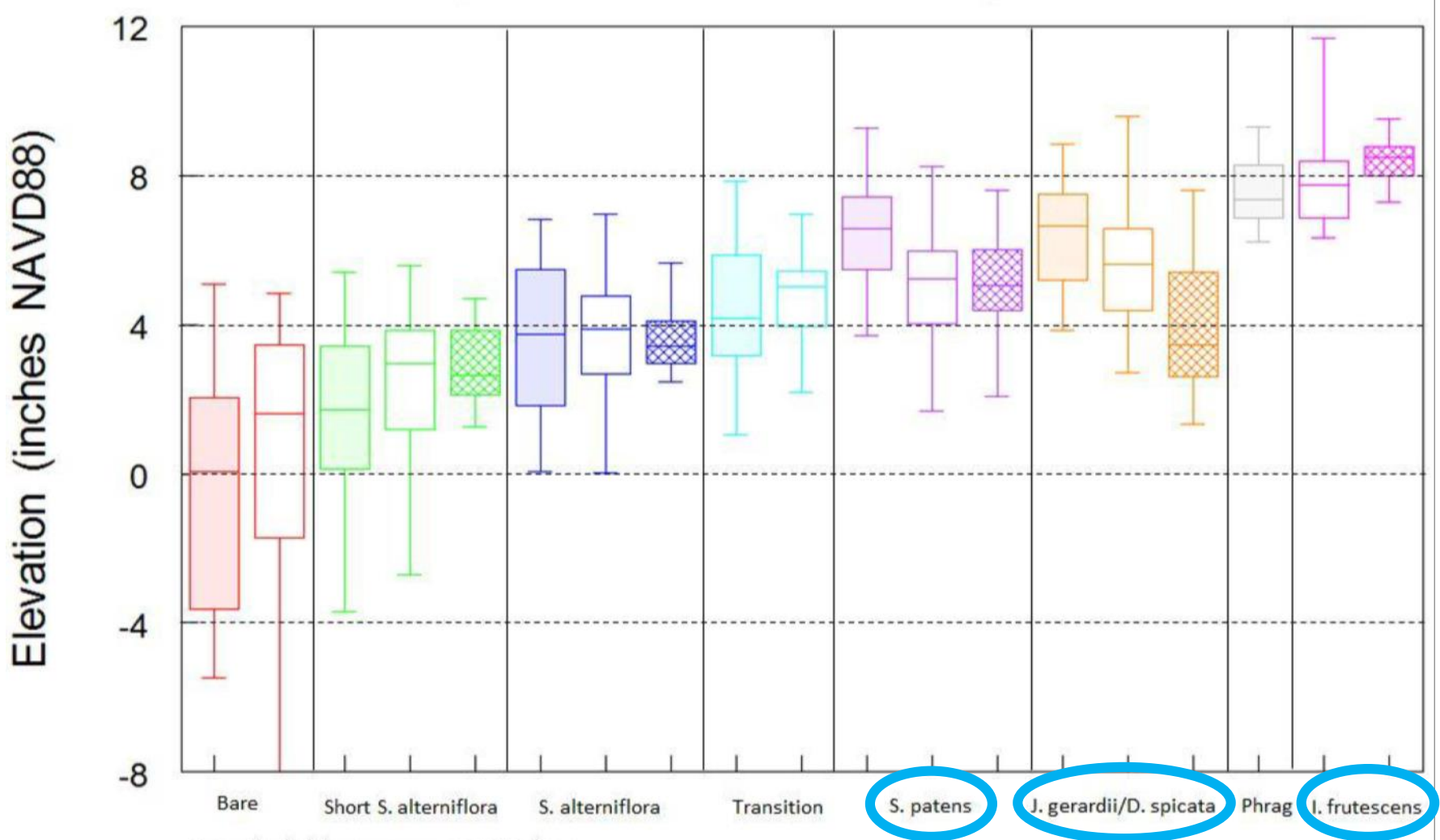
Sea Level Affecting Marshes Model

Results: 3ft SLR



-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space

Design: Vegetation Elevation Ranges



Note: Shaded boxes represent 2014 data
 Unshaded boxes represent 2015 data (points)
 Cross-hatched boxes represent 2015 data (polygons)

Design: Sediment Analysis

- **Estimated compaction/consolidation evaluated based on bulk density and depth of organic layers**
 - **<0.5" compaction for areas with 6" or less of organic material**



0 200 400 800

Feet

Total Area
45.08 Acres

Area A
2.83 acres

Area B
2.37 acres

Area C
2.92 acres

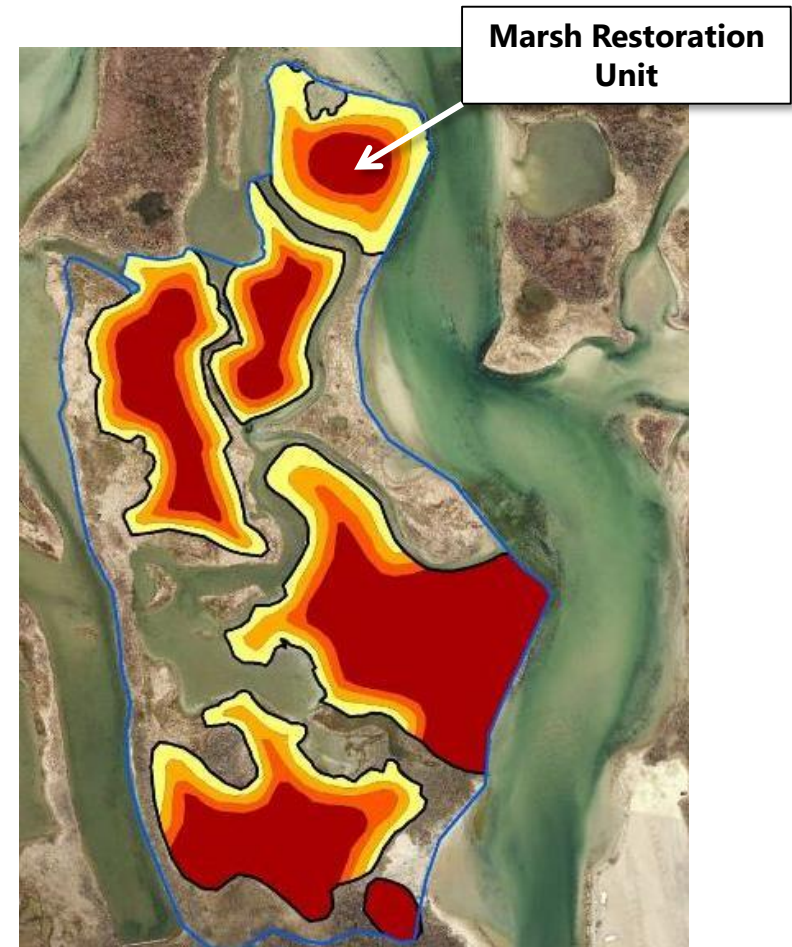
Area D
2.51 acres

Area E
3.86 acres

Area F
0.37 acres

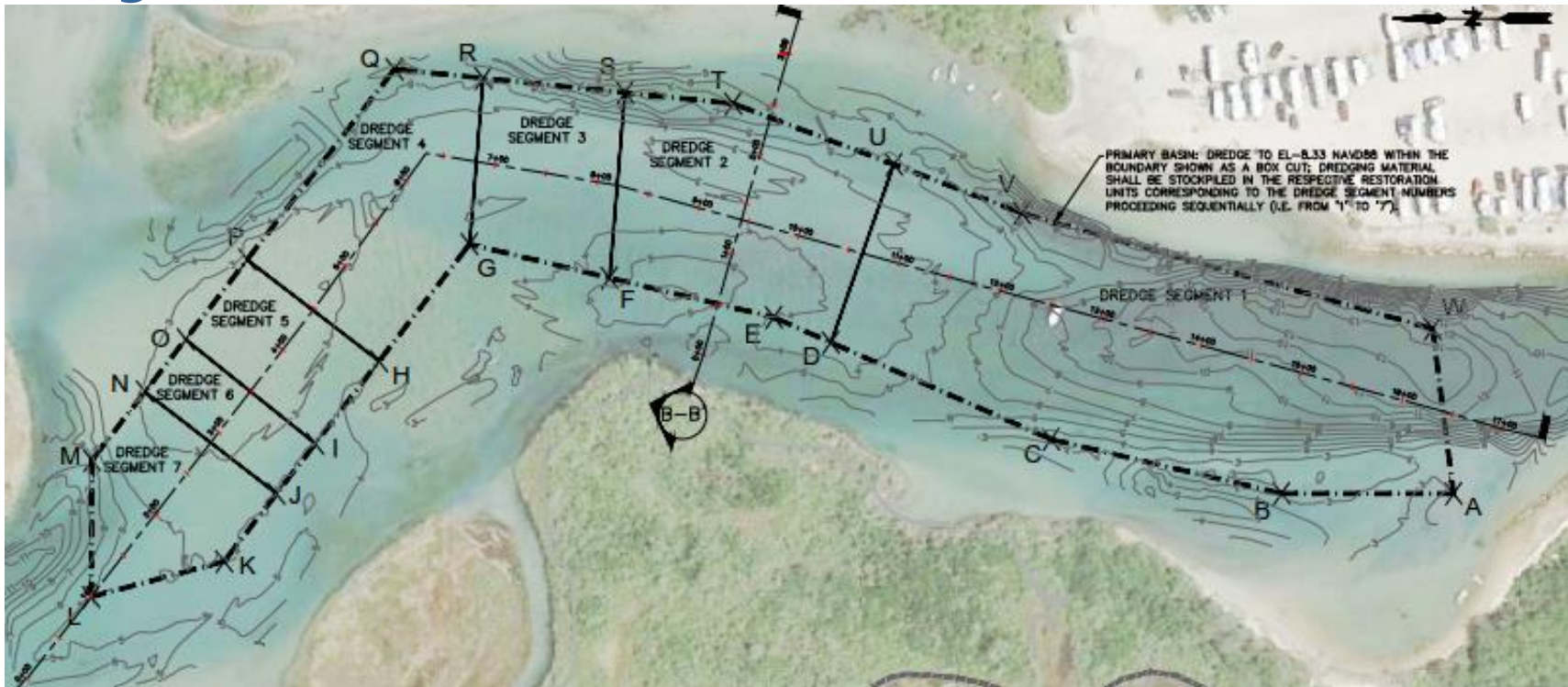
Design: Fill Elevations and Grading

- **Set max target elevation at elevation 1.2 ft NAVD88**
 - **Compaction**
 - **Sea Level Rise**
 - **20% Contingency Volume**
- **Grading/ Runnels for drainage**
- **Historic creeks and pools to remain**



Design: Dredging Plan

- Basin volumes determined using bathymetric survey and target elevations
- Established segments of basin for specific marsh restoration units



Stakeholder and Community Engagement: Proposal to Implementation

- **Town of Charlestown**
 - GIS Coordinator
 - Town Administrator
 - Harbor Master
 - Police Dept.
- **Salt Ponds Coalition**
 - Community support and outreach
- **Save The Bay**
 - Volunteer mobilization
- **Press and Public Events**



Permitting and Regulatory Compliance

- NEPA EA /Section 106 (USFWS lead federal agency)
- USACE Section 404 Category 2 General Permit (includes sign-off by EPA, NOAA Nat. Marine Fisheries Service)
- State Section 401 Water Quality Certification
- CRMC Assent



US Army Corps
of Engineers®



Rhode Island
Department of
Environmental
Management



Lessons Learned: Permitting

- **Meet early and often with permitting agencies to identify issues up-front**
- **Conduct site visits**
- **Provide sound documentation of impacts to project sites as well as future projections if possible**
- **Plan for extensive data collection to support project design and application development**
- **Plan and budget for measures to avoid adverse impacts**

Implementation



Implementation



Implementation



Implementation



Implementation



Implementation



Implementation



Monitoring/ Adaptive Management

- **Coordination with Save The Bay, SHARP program, EPA AED and USFWS**
- **BACI design, reference site at adjacent National Wildlife Refuge**
- **Implementation and performance monitoring**



Challenges

- **Uncharted territory for New England permit team**
- **Addressing habitat trade-off concerns**
- **Addressing needs and expectations of local partners while meeting project deliverables**
- **Time-of-year restrictions (for dredging AND placement)**
- **Limited local pool of expertise / equipment**
- **Multiple projects in RI pipeline**

Minimization of Adverse Impacts

- Time of year restrictions
- Equipment specifications (LGP, discharge pipe size, flow diffusers)
- Sediment control
- Establishment of no-go zones
- Performance specifications for unavoidable impacts to existing habitats
- Construction oversight is key to identifying potential problems!
- Develop RFP to ensure a contractor with the right expertise, equipment and capacity

Lessons Learned

- **Manage partner expectations for design and outcomes**
- **Single contractor for dredging and in-marsh work**
- **Listen to bidder feedback and be open to issuing addenda**
- **Contractor should have survey team / capabilities**
- **Be prepared to make in-the-field decisions about project design / target elevations**
- **Provide for regular construction oversight**
- **Provide for immediate and long-term adaptive management measures**

Project Costs

Approx. 68,000 cy dredged material to restore approx. 20 acres of marsh

- **Design, Engineering and Permitting: \$110,453**
- **Construction**
 - **Mobilization / Demobilization: \$334,400**
 - **Dredging, spreading and grading of material: \$543,900**
 - **Alternate dredging: \$530,812**
- **Planting: \$100,000**
- **TOTAL: \$1,619,565**



Thanks!

Caitlin Chaffee
cchaffee@crmc.ri.gov

