Restoration plan to enhance salt marsh resilience to sea level rise. John H. Chafee NWR

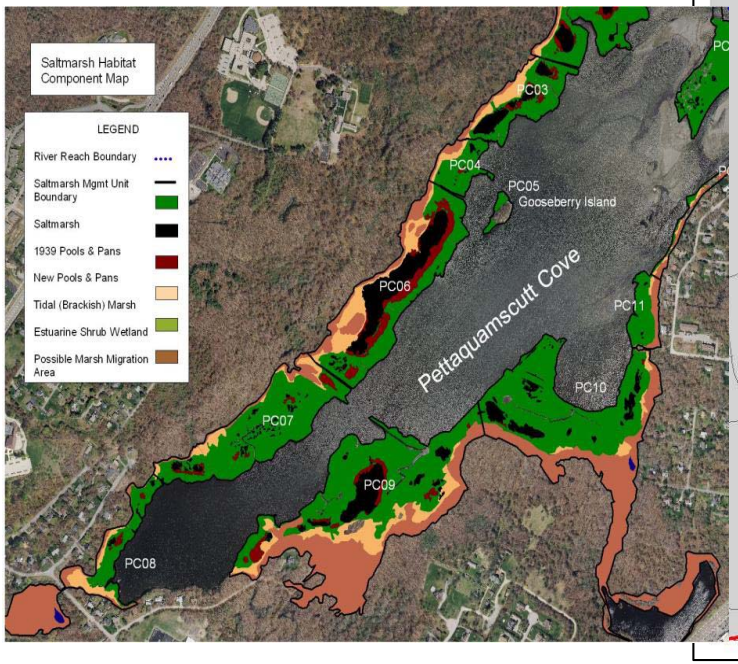
Jennifer D. White

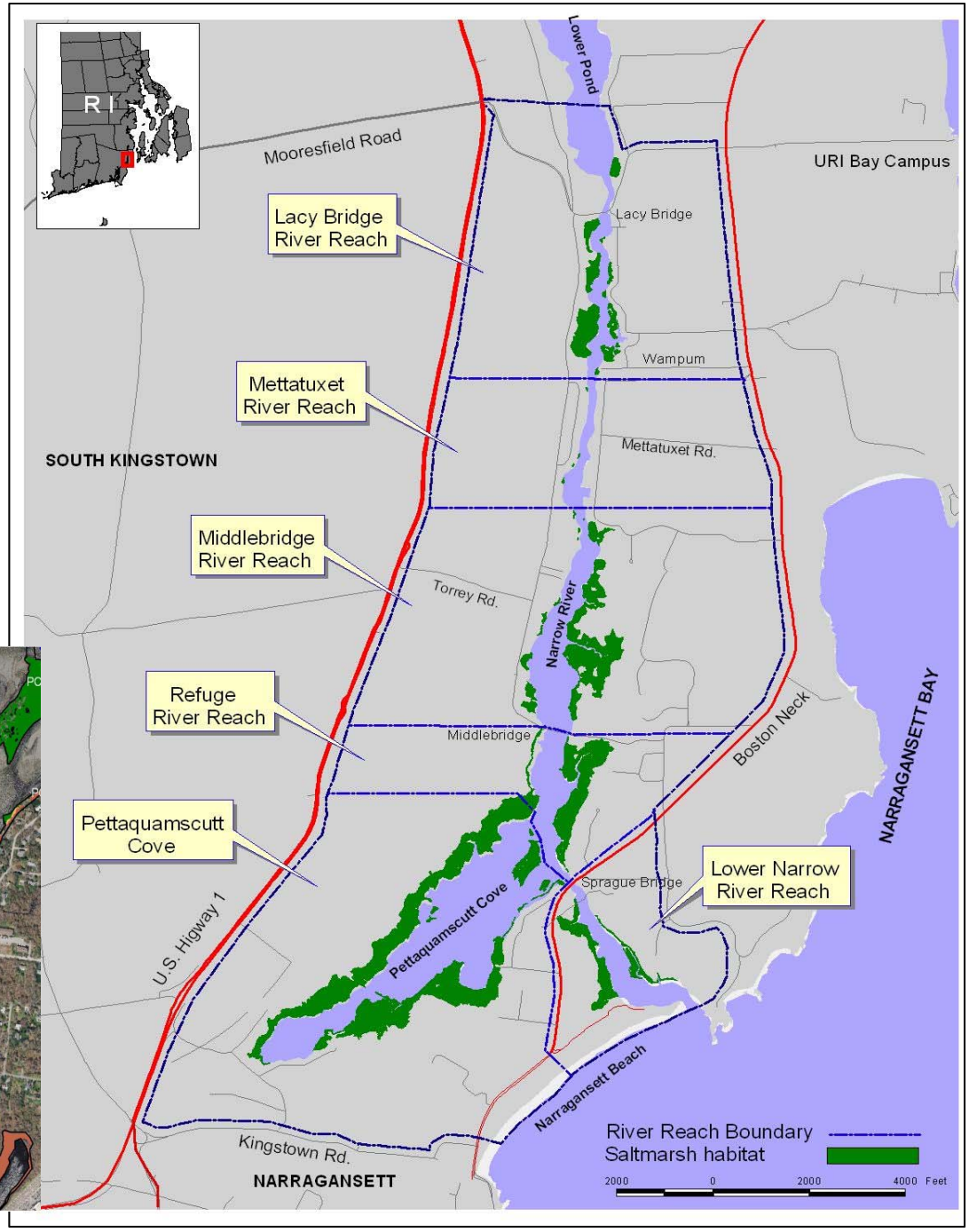
USFWS, Hurricane Sandy Resiliency Coordinator.

Rhode Island Complex Coastal Restoration

Restoration Plan

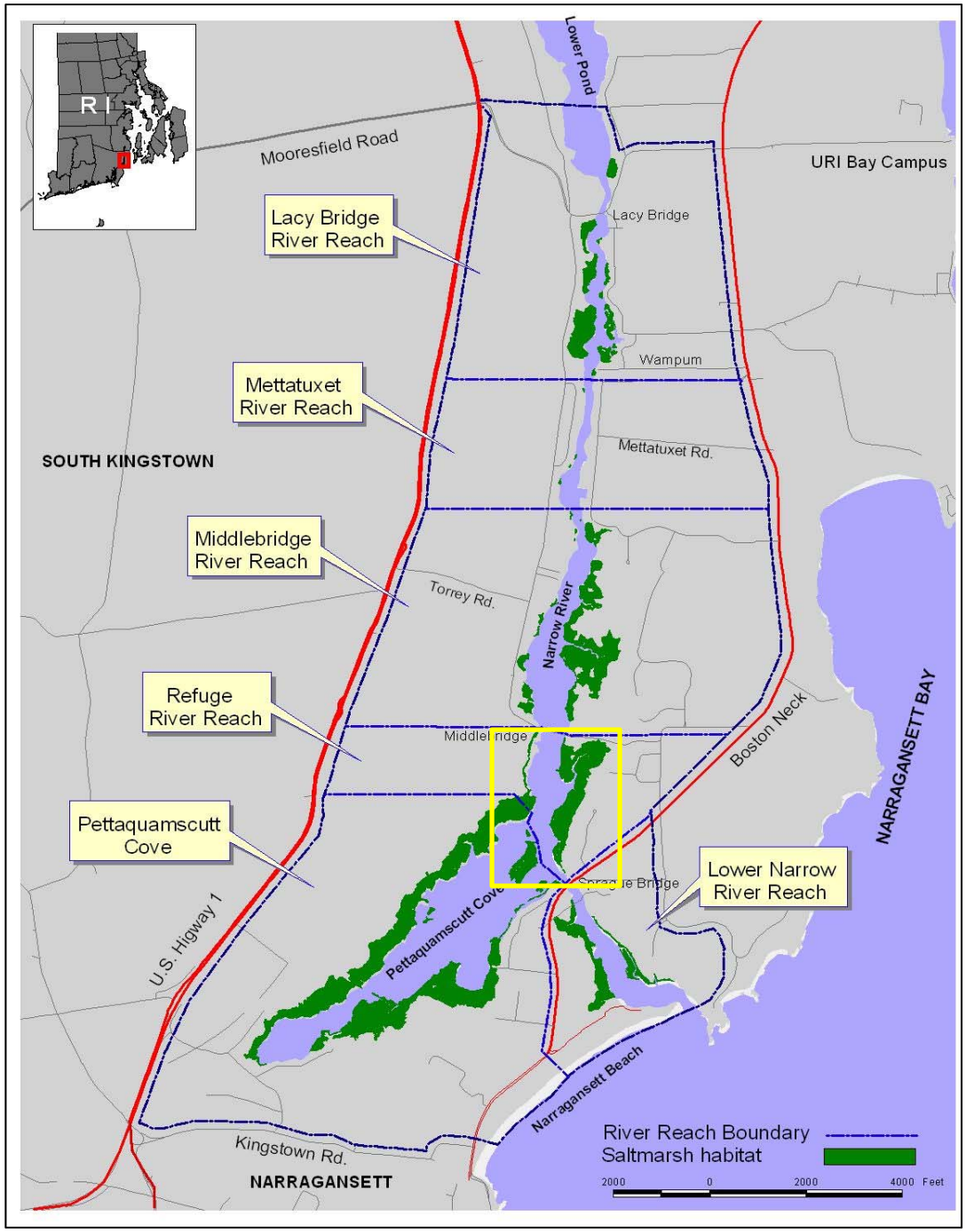
- 174 acres of salt marsh, 40% poorly drained
- Drainage via runnels





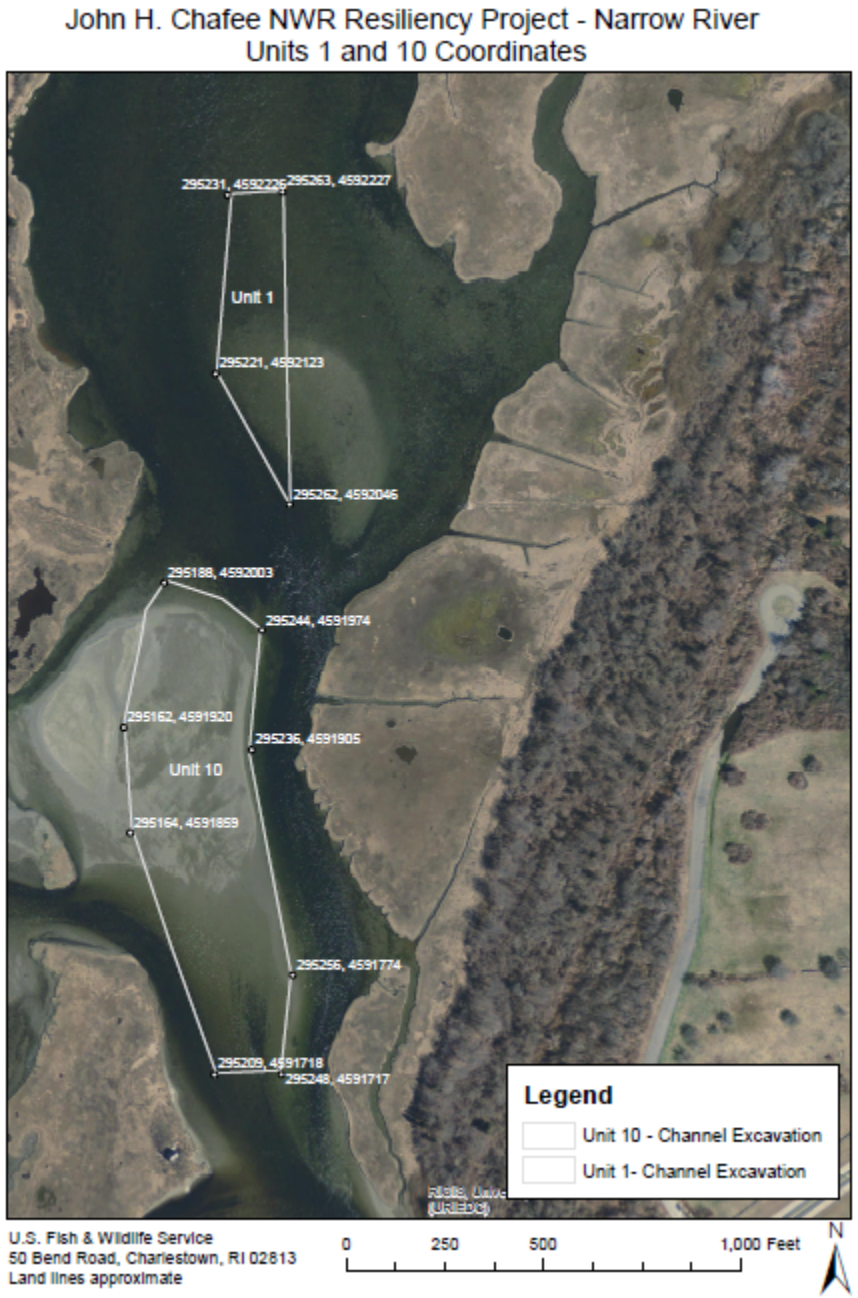
Restoration Plan

- Sediment addition planned for ~30 acres
  - Access/ feasibility



Restoration Plan

- Dredge areas
  - Create central channel for boats
  - Dredge depth, -4 ft (eelgrass, artifacts)
- Erosion control

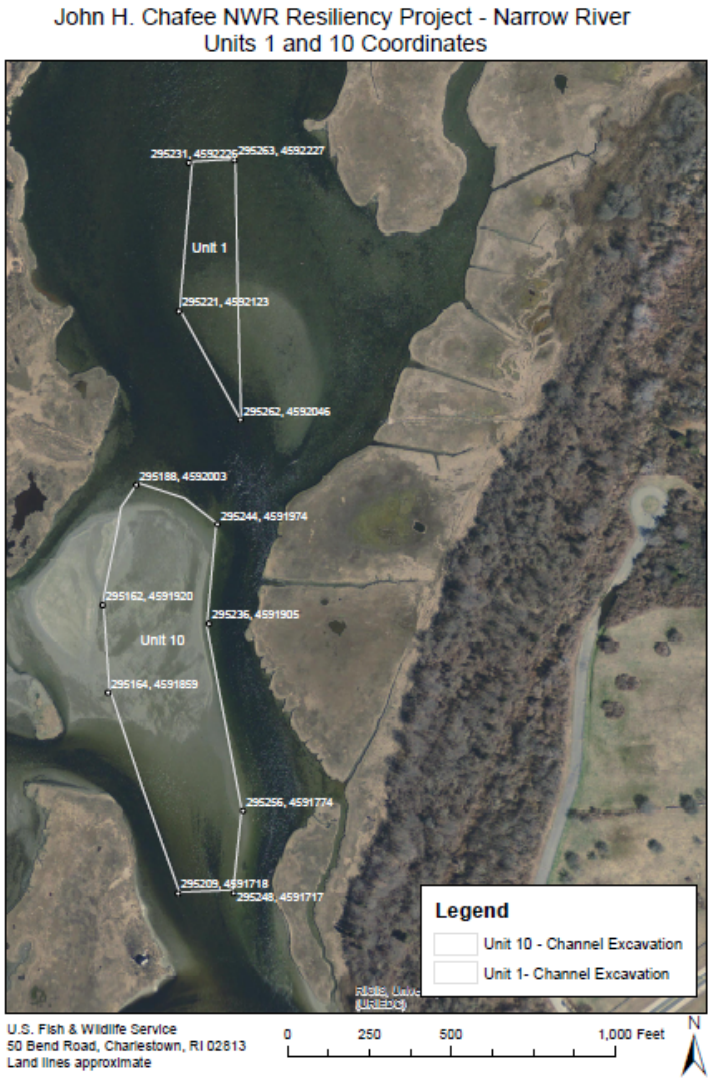


Restoration Goals

- Restore marsh health to promote plant growth and marsh accretion
- Build marsh elevation to provide nesting habitat into the future (Saltmarsh Sparrow, Willet)

Design Criteria

- Target elevation
  - High marsh elevation (*Spartina patens*)
  - Additional sediment for settling of sand, filling marsh holes

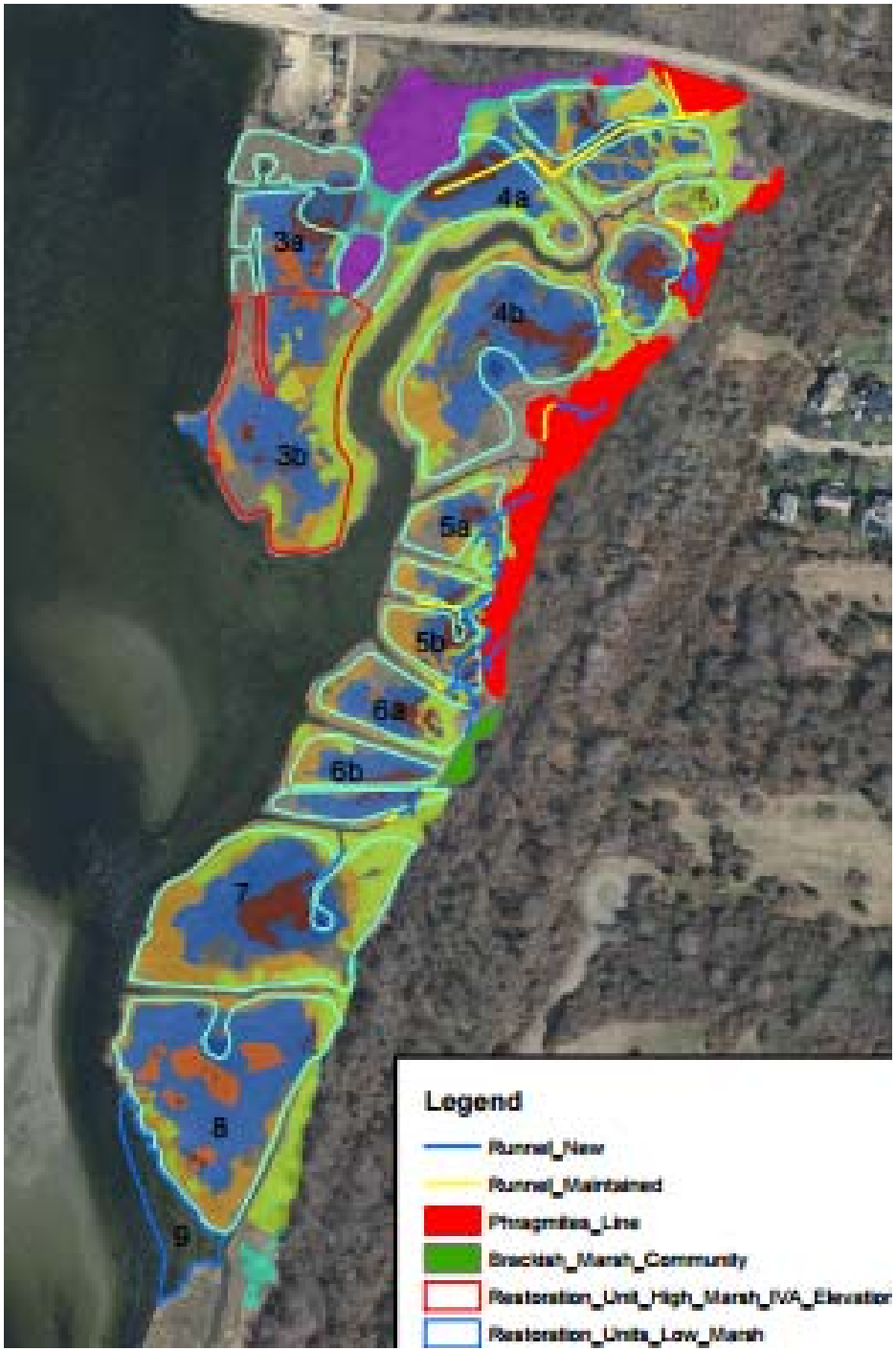


Design Criteria

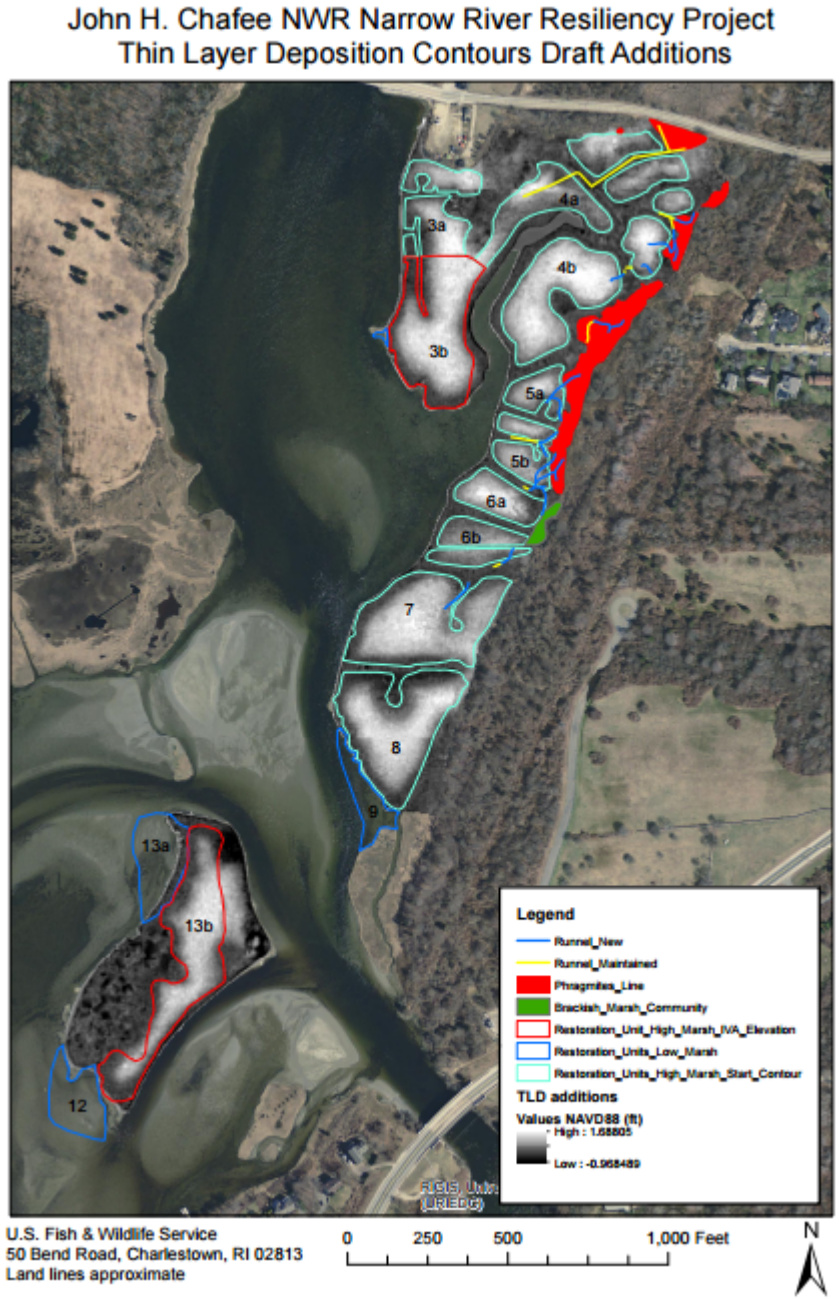
- Target elevation
- Sediment criteria
  - Sand, sieve size 10, tested for contaminants
- Marsh plain slope
  - 1 - 3% high marsh, maximize high marsh vegetation area
  - 10 - 30% rise for low marsh, bank edge

Design Metrics

- Mapped vegetation communities
- Mean elevation for high/low marsh communities



- Contoured to maintain drainage
- Avoiding old pools, *Phragmites,* brackish marsh, creek & channels
- Outlines
  - Green = high marsh
  - Red = *Iva* elevation
  - Blue = low marsh



How do we measure success of an action?

- Goal: provide habitat for the Saltmarsh Sparrow into the future
  - Create high marsh vegetative community (plant *Distichlis spicata*, will *S. patens* colonize?)
  - Will Saltmarsh Sparrows colonize? How long after restoration?
  - Will they be successful? (vital rates)

How do we measure success of an action?

- Long term monitoring response variables
  - Vegetation (community, density, height of *S. alterniflora*)
  - Salinity, water table
  - SETs (control, runnel, sediment addition)
  - Saltmarsh Sparrow (presence, survival, productivity)
  - Nekton richness, density

Sediment Addition Test Plot

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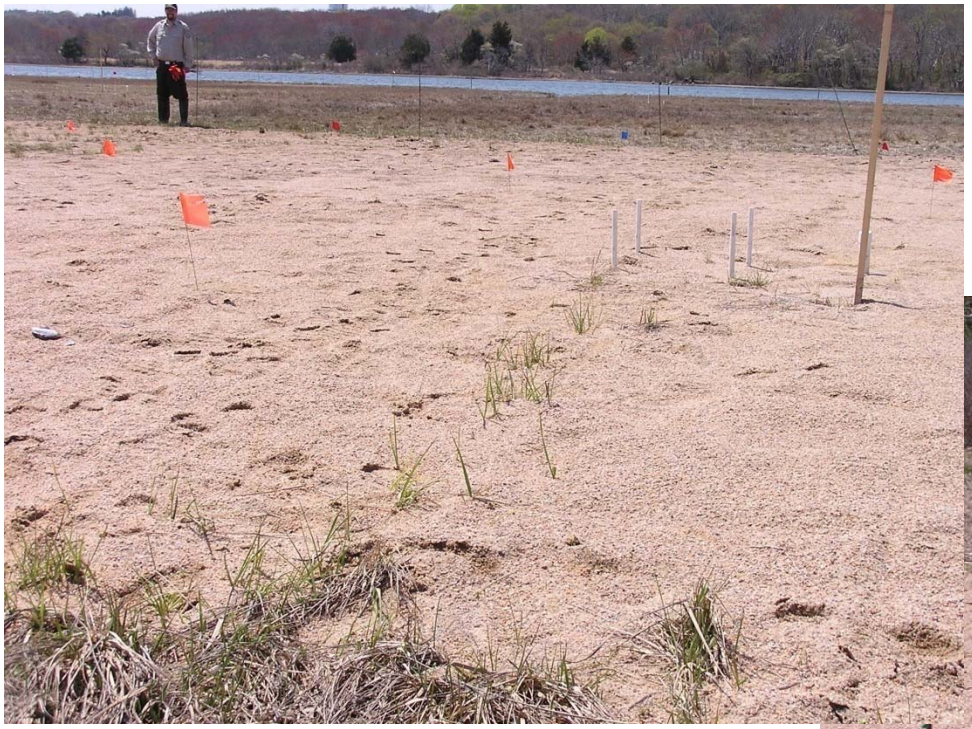

May 8, 2015

- If < 4” sand applied then plants should emerge through sand

Sediment Addition Test Plot

Sept. 10, 2015

Sediment Addition Test Plot

June 30, 2016

- Iron in sand? Fresh water layer? Water table too high?

- Rust colored sand, black layer above peat, poor plant growth/die-off
- Monosulfide formation