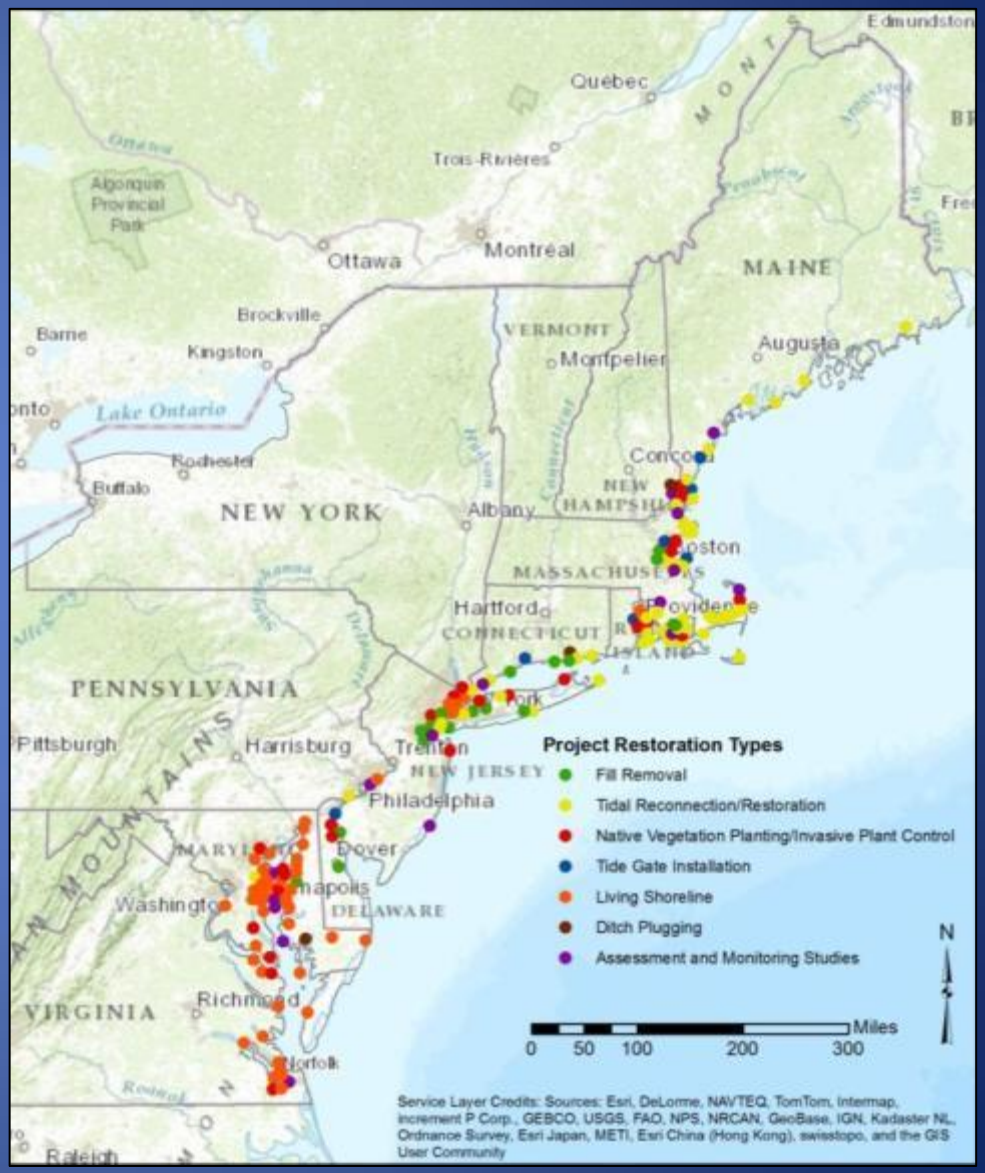
NOAA RC Northeast Tidal Marsh Restoration Projects

Project Type:

Fill removal	20 (10.0%)
Tidal hydrology reconnection	60 (29.9%)
Plant community management	27 (13.4%)
Tide gate	6 (3.0%)
Living shoreline	63 (31.3%)
Ditch plugging	3 (1.5%)
Assessment/studies	22 (10.9%)
Total Projects:	**201**
Total Acres:	**4,000.5**

http://www.habitat.noaa.gov/

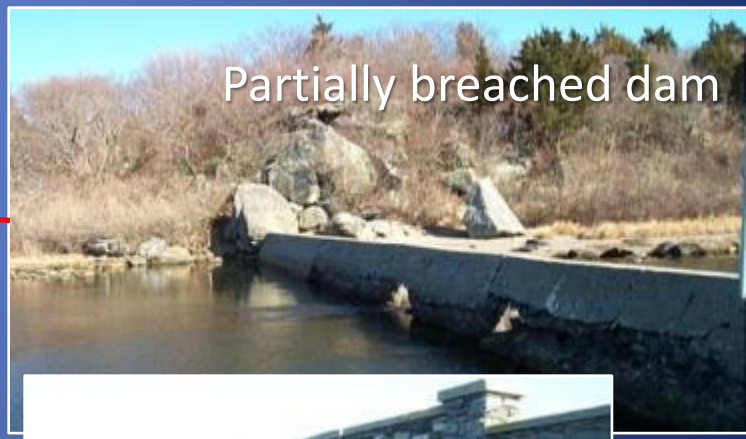


Map by R. King, NOAA

Tidal Reconnection

Gooseneck Cove, Newport, RI

Substrate degradation, see: Ainsfield et al., 1999)

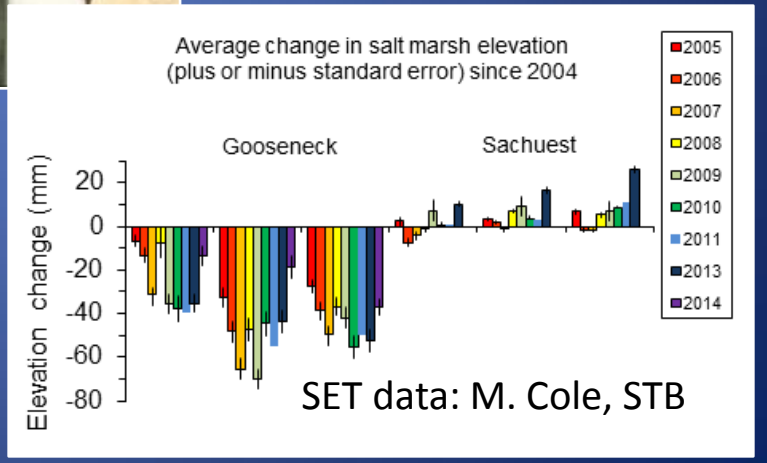


Gooseneck Cove Construction, 2009

Culvert installation


Dam removal


Hydrologic enhancement



SET data: M. Cole, STB

Restored Hydrology, Ecological Changes Padanaram Marsh, Dartmouth, MA

Restoring

Tidal Reconnection Challenges

Beachfront channel and channel migration

Low-level groin and apron protection at beachfront

Bordering low-lying development

Self-regulating tide gates

Fill Removal

Fill or soil removal projects (Marsh restoration or creation)

Evaluate cost/benefit of fill removal

Take into account predicted SLR rates for setting excavation depth (e.g., NOAA SLR planning document, 2011)

http://www.habitat.noaa.gov/pdf/slr_workshop_report_december_2011.pdf

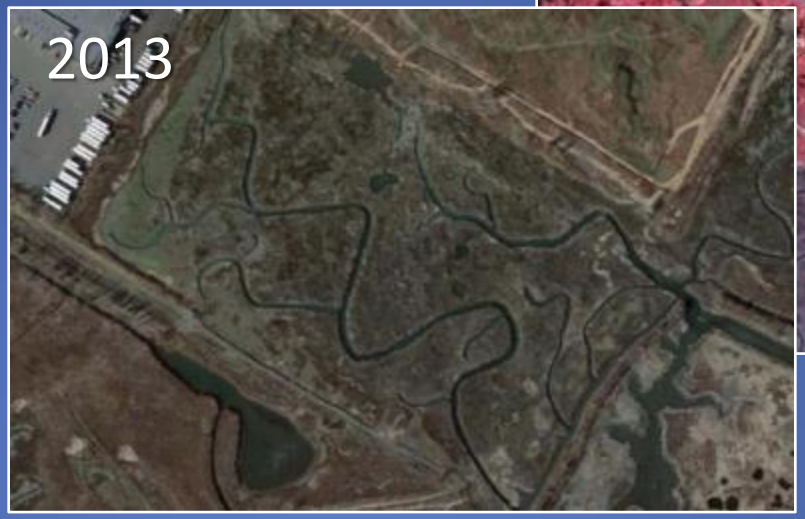
Consider reuse of non-contaminated soils (e.g., restoring elevation capital of nearby degraded peat-dominated marshes)

Volunteer marsh planting

Spartina community 1-yr later

Hempstead Harbor Park, North Hempstead, NY

McKinney NWR, GMU, Stratford, CT



Channel evolution and design: Myrick and Leopold, 1963, PWA, 1995, Zeff, 1999, Williams et al., 2002

Restoration development: Craft et al., 1999, 2003; Warren et al., 2002

Declining Health of Northeast Marshes

Marsh Health Symptoms


Marsh loss, Westerly, RI


Plant dieback


Bank erosion


Marsh edge calving


Marsh loss, Narragansett, RI


Plant zonation succession


Edge fragmentation

See: DeLaune et al., 1994; Davey et al., 2011; Deegan et al., 2012; Wigand et al., 2014

Thin-Layer Spraying

Thin-Layer Sediment Slurry Placement, Gulf of Mexico

Cahoon and Cowan, 1988; DeLaune et al., 1990; Ford et al., 1999

Slocum et al. 2005: intermediate (5-12 cm) soil placement depth resulted in greatest plant vigor over 7-yr period due with >elevation and bulk density; results: >plant cover, <hydrogen sulfides (mineral soil Fe/Mn precipitating hydrogen sulfide), plus shorter-term (≤3 yrs) nutrient and mineral enrichment benefit

Option of thin-layer slurry placement using pipes carrying slurry into marsh interior, as opposed to slurry spraying with limited spray distance

Source: USACE ERDC/EL TN-07-1, December 2007

Thin-Layer Sediment Spraying: Big Egg Marsh Pilot Project, Jamaica Bay, NY

NPS 2-acre marsh restoration using spraying technique after Ford et al. (1999)

Up to 1.6 ft (0.48 m) gain in marsh plain elevation

Dredged sediment source in close proximity to pilot site

Photos: D. Cahoon, USGS

Fill Placement

Jamaica Bay Marsh Islands, Gateway National Recreational Area, NY

26 mi^2 bay

Marsh loss rate of
47 ac/yr (1994-1999)

Source: Christiano and Mellander, USPS, GNRA

Jamaica Bay, NY Wetland Restoration: Fill Placement (ACE)

Site	Area (AC)	Soil Volume (CY)	Calc Fill Depth (FT)	Project Cost	Cost/Acre
Elders East (2006)	43	249,000	3.6	$12.9M	$300,967
Elders West (2010)	40	302,000	4.7	$17.2M	$430,000
Yellow Bar (2012)	45.5	375,000	5.1	$19.6M	$431,711
Black Wall (2013)	20.5	155,000	4.7	$2.1M	$102,439
Rulers Bar (2013)	9.8	95,000	6.0	$1.3M	$133,775
	158.8	1,176,000		$53.1M	

Jamaica Bay, Elders East (2006) and Elders West (2010)

Photos: Galvin Brothers, Inc.
U.S. Army Corps of Engineers

Jamaica Bay, Elders Point East: Fill placement, 2006

Site conditions, November 2014

2-4 ft depth of compacted soils

High density of plantings (1.5-ft oc)

High percent plant cover achieved

Seven marsh plant species present

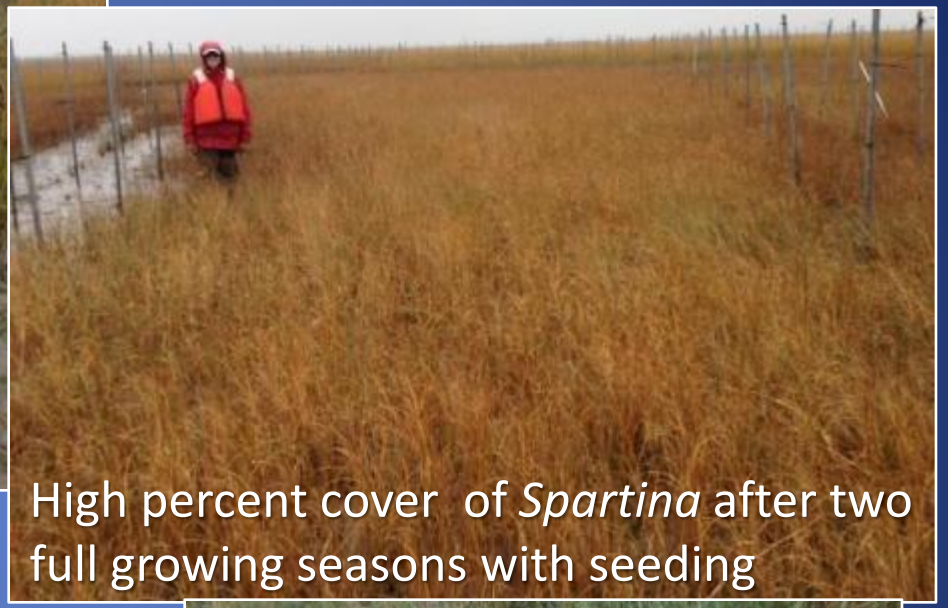
Coir logs installed for soil containment; coir log did not contribute functional purpose to soil stability; significant NW fetch contributes to soil erosion

Shoreline retreat and soil loss was gradual with multiple moderate storms causing soil loss
(M. Alvarez, pers. commun.)

Tidal channel constructed with natural bed adjustment

Jamaica Bay, Yellow Bar: Fill placement 2012


Seeding tracks, high seed germination rate


High percent cover of *Spartina* after two full growing seasons with seeding

Site conditions, November 2014


Marsh plug transplants (3+-ft dimension) installed along shorefront; good resiliency even with Storm Sandy


Overwash along high-energy marsh shorefront

Jamaica Bay, Yellow Bar

High estuarine nutrient load

Waterfowl foraging, localized effects

USACE and NPS site information:

http://www.nan.usace.army.mil/Missions/CivilWorks/ProjectsinNewYork/EldersPointJamaicaBaySaltMarshIslands.aspx

http://www.nan.usace.army.mil/Portals/37/docs/civilworks/projects/ny/ecor/JamBay/restoration.pdf

www.nature.nps.gov/ParkScience - Volume 27(3): 34-41