PILOT EFFORTS TO MITIGATE DITCHING IMPACTS AT A NORTHEAST NATIONAL WILDLIFE REFUGE

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Tidal Marsh Impacts

Clean Water Act - served to reduce Dredge and Fill Impacts
Fails to protect from indirect impacts - reduced tidal exchange
Fails to reduce impacts from previous activities - diking and ditching
Tidal Marsh Ditching

• Salt hay production  1600-1900
• Mosquito control   1930s-Present
  • Unintended consequences
    • loss of fish (mosquito predators)
    • spoil piles - paths for *Phragmites* invasion
Ditching also leads to sediment oxidation and loss of elevation (Vincent et al. 2014) . . . translates to loss of resilience with sea level rise.
Effect of Ditching

Figure 3.1. LIDAR map of study site
A PAIR OF PARADOXES

• Salt marshes need salinity and sediments from tidal flooding – BUT increased flooding from SLR may be drowning them!

• Salt marshes need to drain so their roots maintain energy balance - BUT draining of the underlying peat results in oxidation & subsidence, increasing susceptibility to drowning as sea level rises.
Solution: Mend ditches from the bottom up

Design: project to mend half of ditches

Procedure:
1. Mow Grass
2. Roll into Ditch
3. Fix with Twine
Tried with great success in shallow ditches
Study Site: The Great Marsh, Parker River NWR
Monitoring: Elevation Profiles and Vegetation
Ditch Remediation Results - 36 months

Site 1 - T7

Elevation NAVD88 (m)

Distance (m)

Site 1 - T7

Ditch Remediation Results - 36 months
Change in Depth of Ditches 2014-2017

Ditch Center Elevation (NAVD88 m)

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<tr>
<th>Site</th>
<th>Treated</th>
<th>Untreated</th>
<th>Average</th>
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-0.20  -0.10  0.00  0.10  0.20  0.30  0.40  0.50
Natural Re-Vegetation of Tall Form *Spartina alterniflora*

Ditch Center Vegetation

*S. alterniflora*

- **Treated**
- **Untreated**

**F ratio:** 5.11
**P value:** 0.0001

**Stem count (0.25m²)**

- 2015
- 2016
- 2017

**Percent Cover (%)**

- 2015
- 2016
- 2017
Two Treated Ditches

2014 PRE

2015 YEAR 1

2016 YEAR 2
Mending Technique:
Ditches do shallow up: 5-50 cm in 2 yrs
Mean = 18.0 +/- 5 cm
Shallow ditches revegetate across their full widths with cordgrass

Will the high marsh between the ditches begin to store more peat?
Do ditches need to fill completely?
Thank You!

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