Promoting Resilience by Removing Vestiges of Hydrologic Manipulations in the Great Marsh, MA

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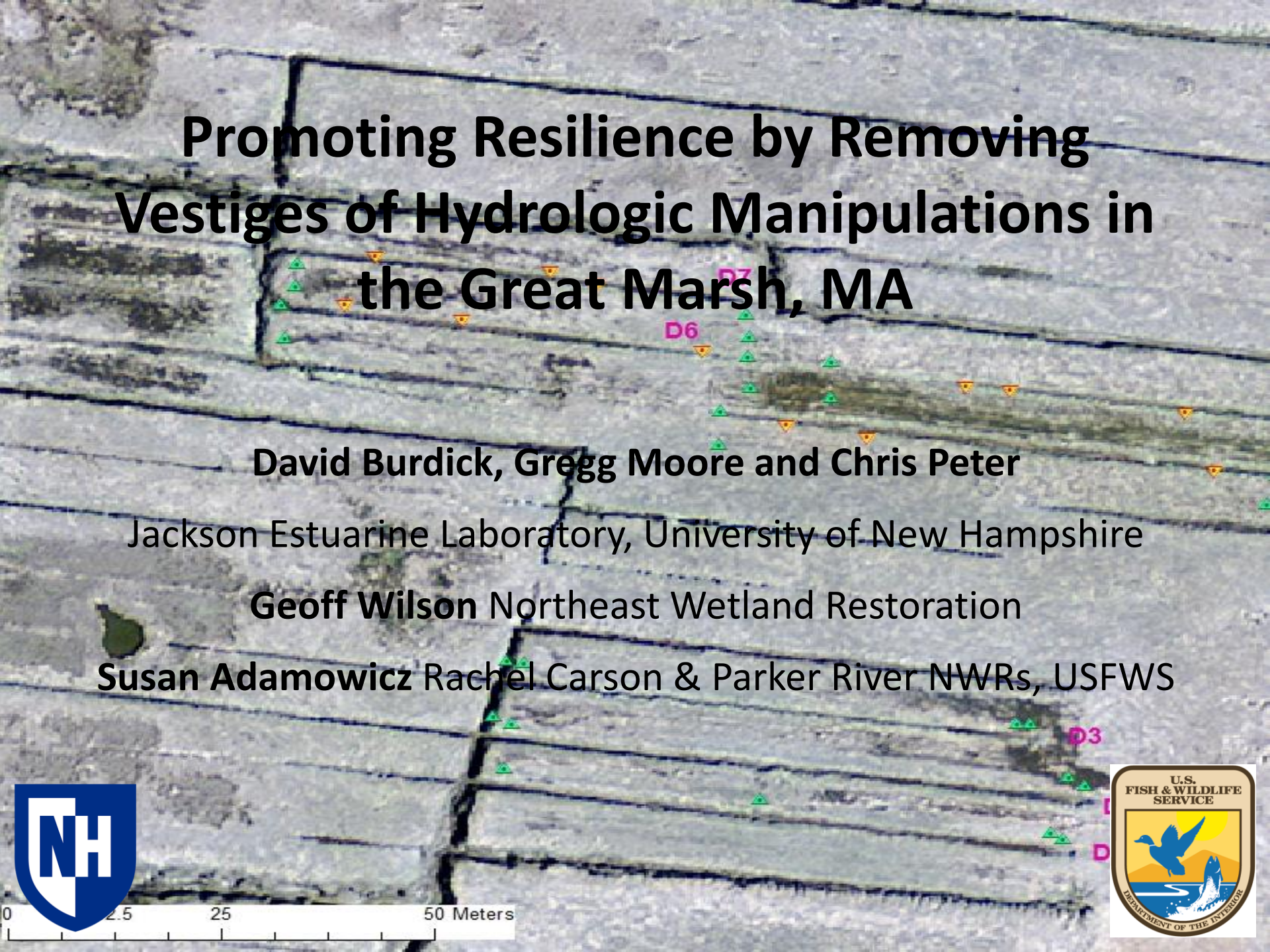


Tidal Marsh Impacts

Clean Water Act has served to reduce impacts from Dredging and Filling

But fails to protect marshes from indirect impacts like reduced tidal exchange

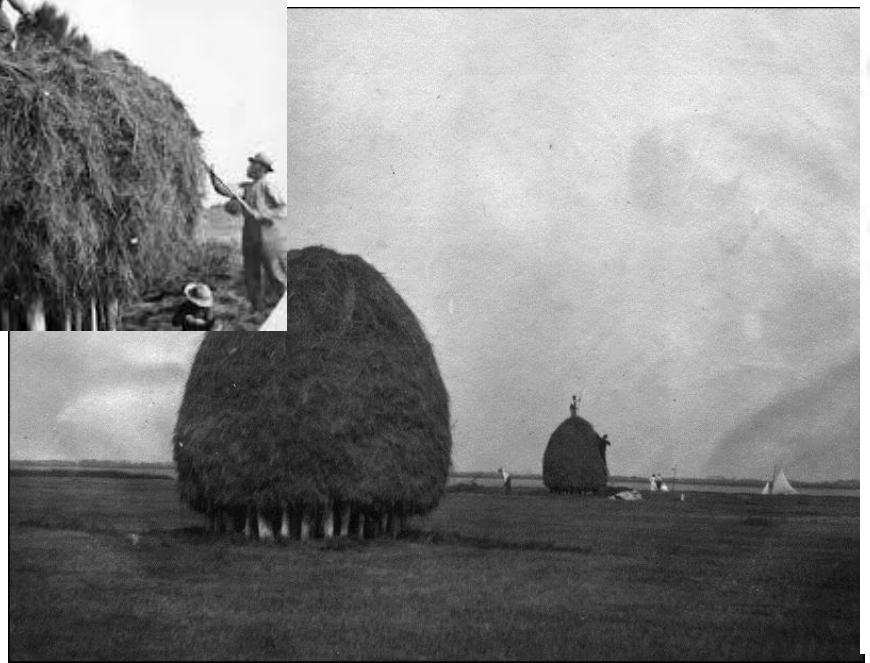
Also fails to reduce impacts from previous activities like diking and ditching

Today I want to talk about ditching

- History
- Hydrologic Impacts
- Approaches to Remediate Impacts

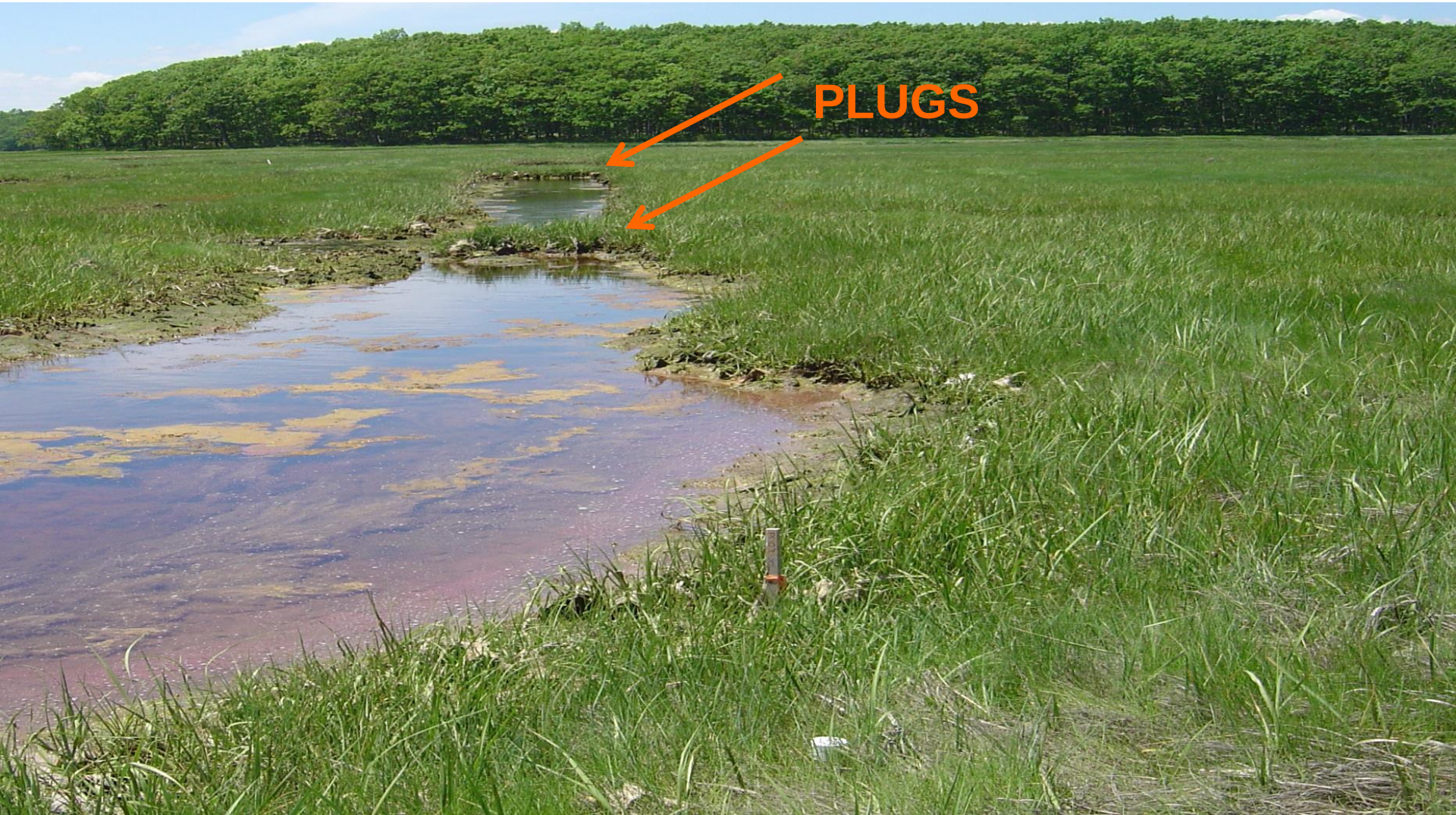
Tidal Marsh Ditching

- Salt hay production 1600-1900
- Mosquito control 1930s-Present
  - Unintended consequences
    - loss of fish (mosquito predators)
    - spoil piles - paths for *Phragmites* invasion

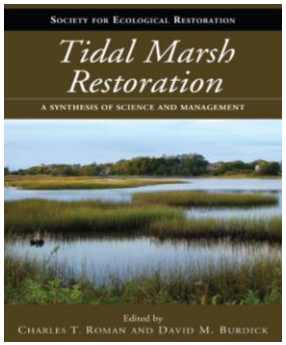


Ditching leads to sediment oxidation and loss of elevation (Vincent et al. 2014) . . . translates to loss of resilience with sea level rise

We have tried plugging ditches,
but that impounds water and kills the vegetation



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.

Mosquito ditching and ditch plugging -

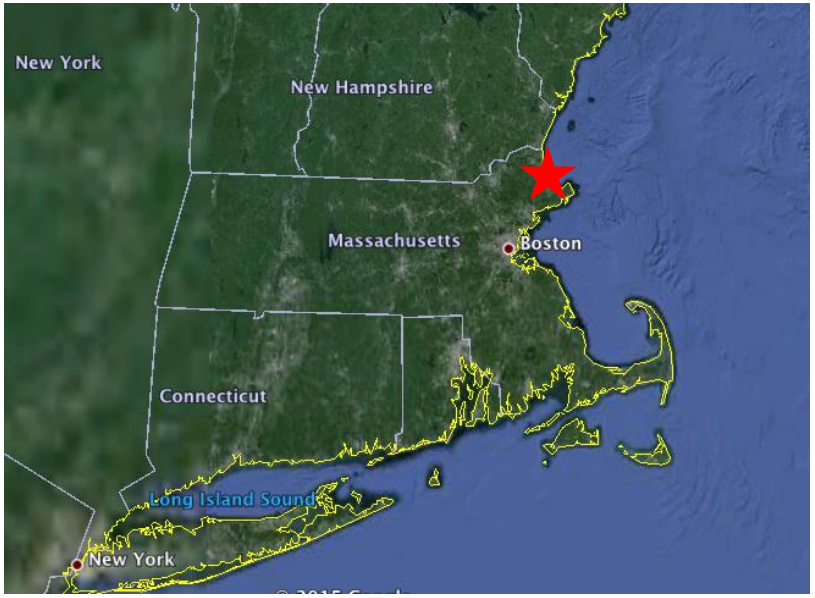
Degrade the resilience of the marsh to sea level rise

A light, subtle touch may be more effective

- Mend the ditches from the bottom up

Tried with great success in shallow ditches

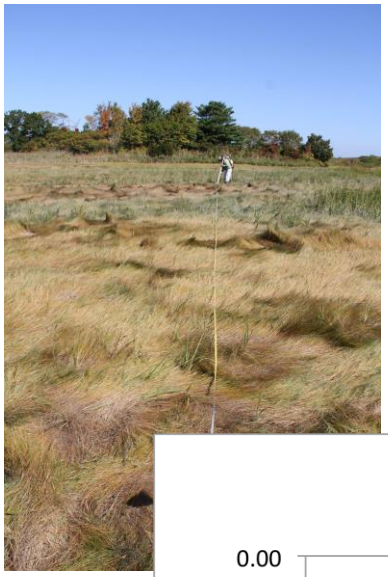
Study Site: The Great Marsh, Parker River NWR

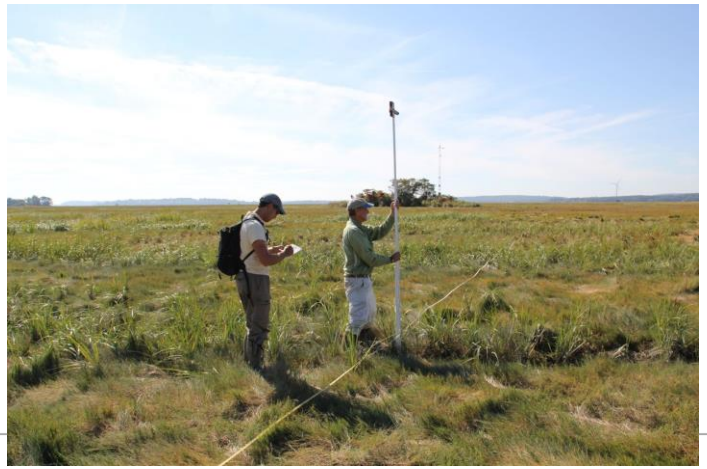


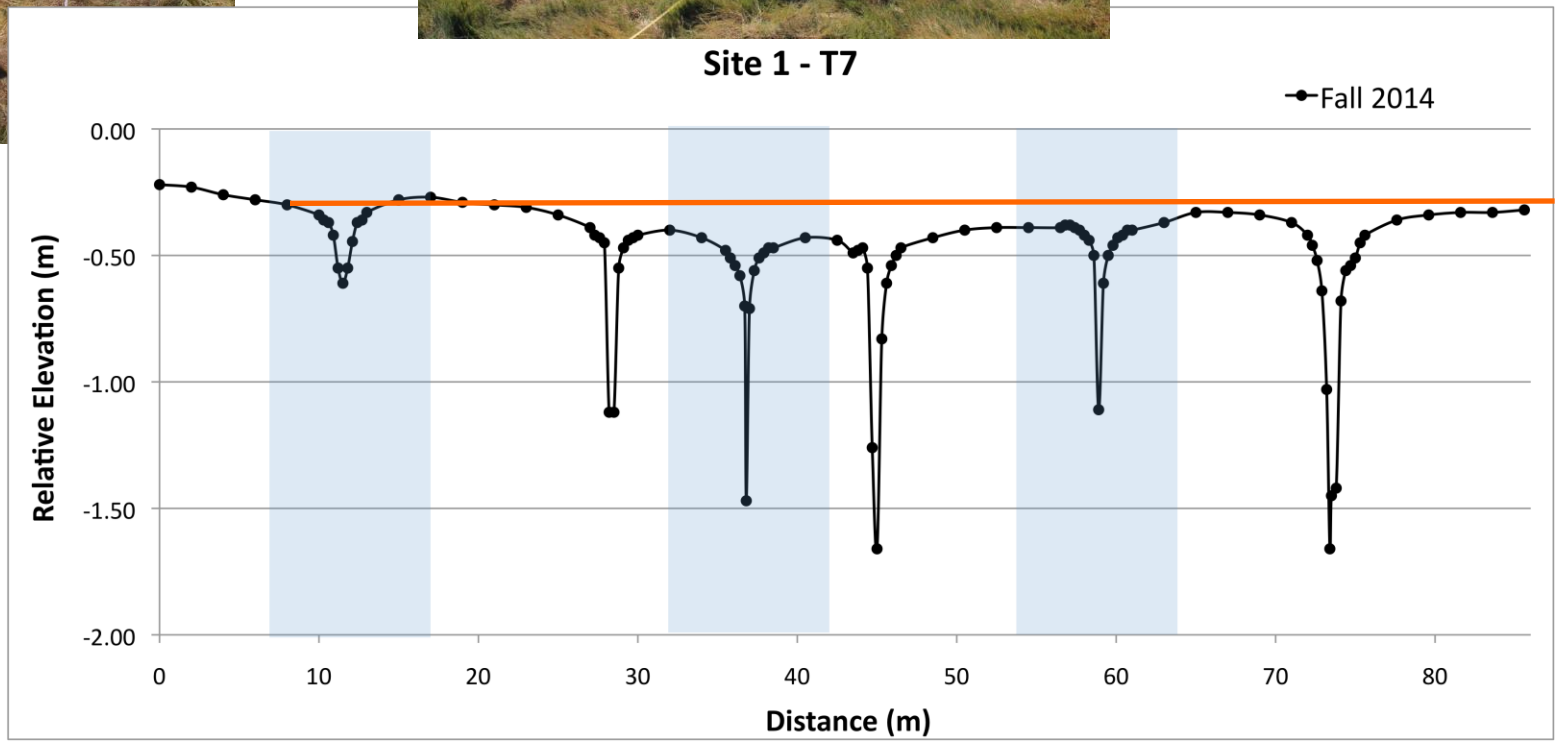
Procedure:

1. Mow Grass
2. Roll into Ditch
3. Fix with Twine

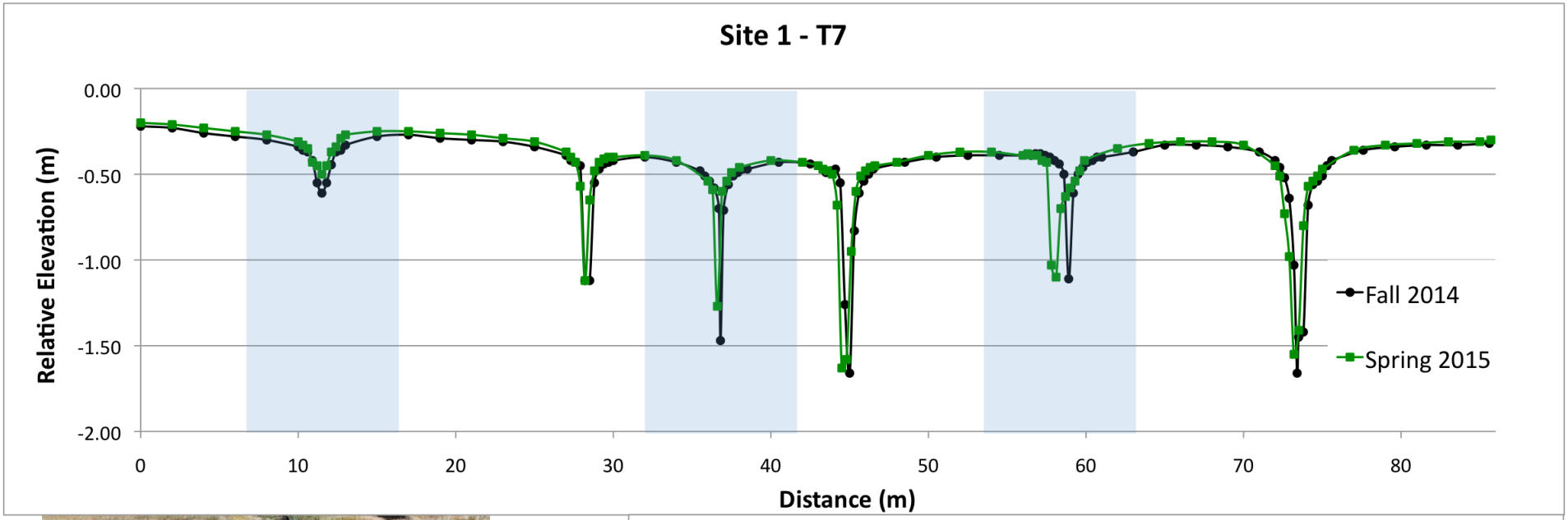
Elevation Profiles

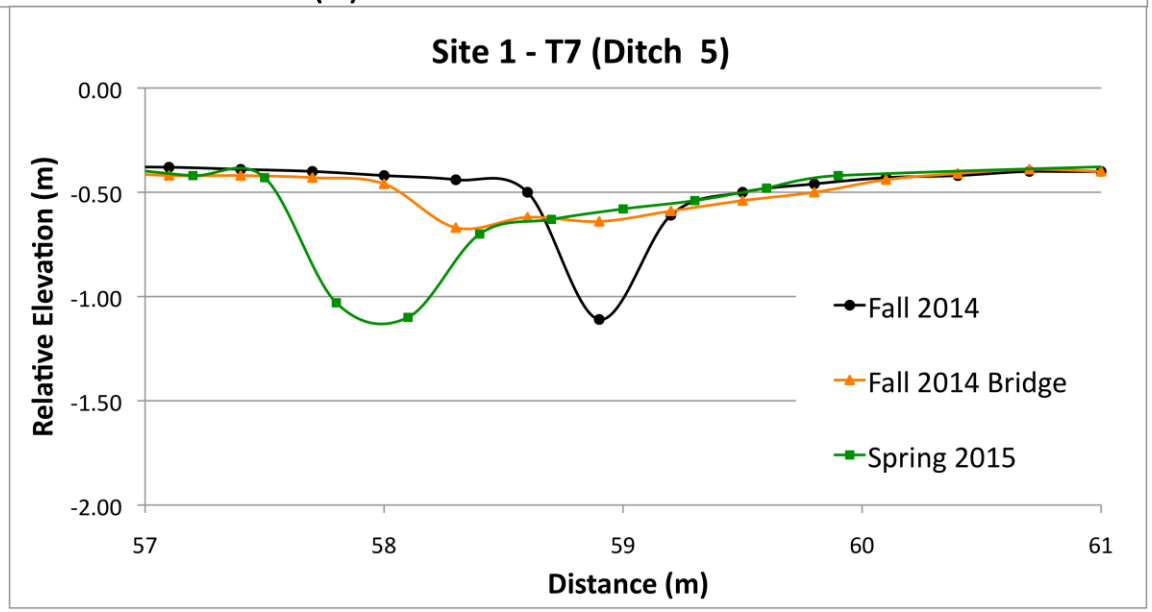






Preliminary results (6 months)





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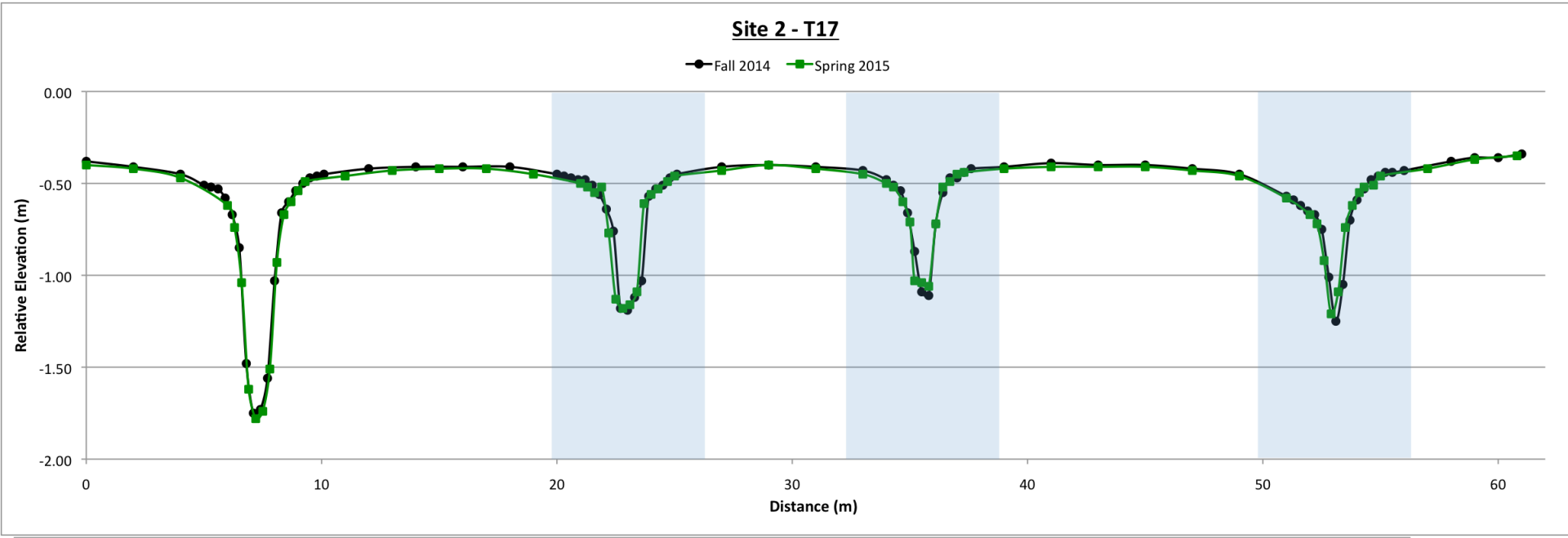
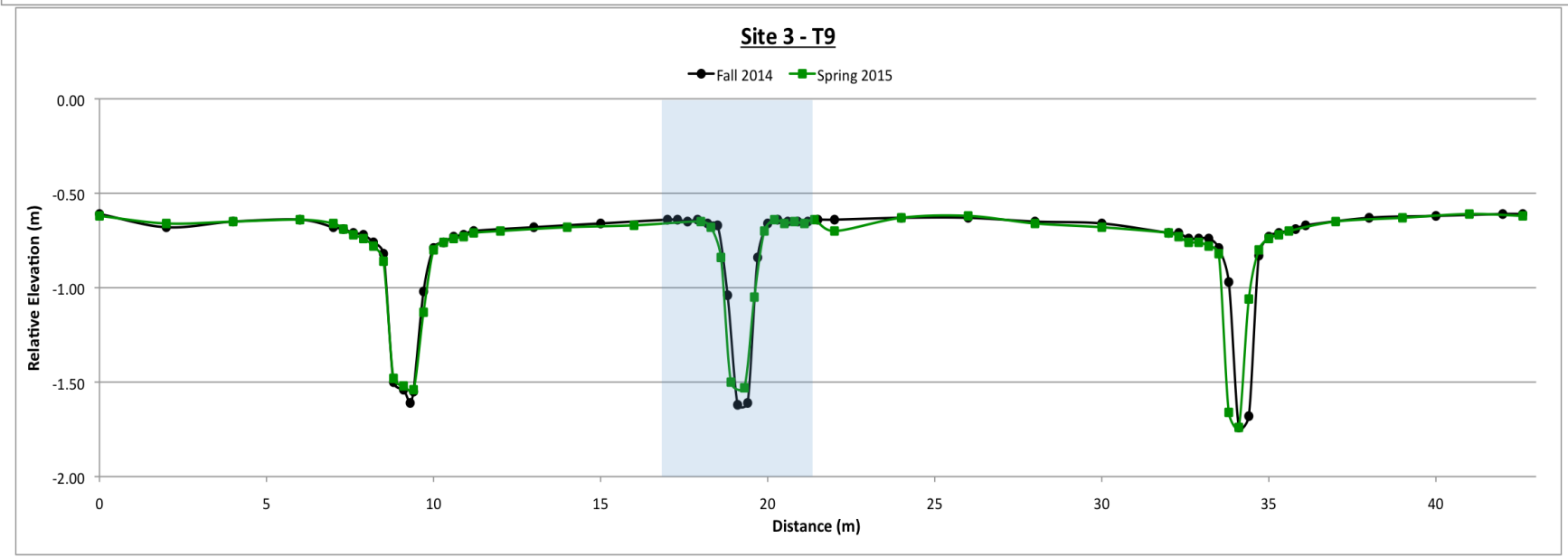
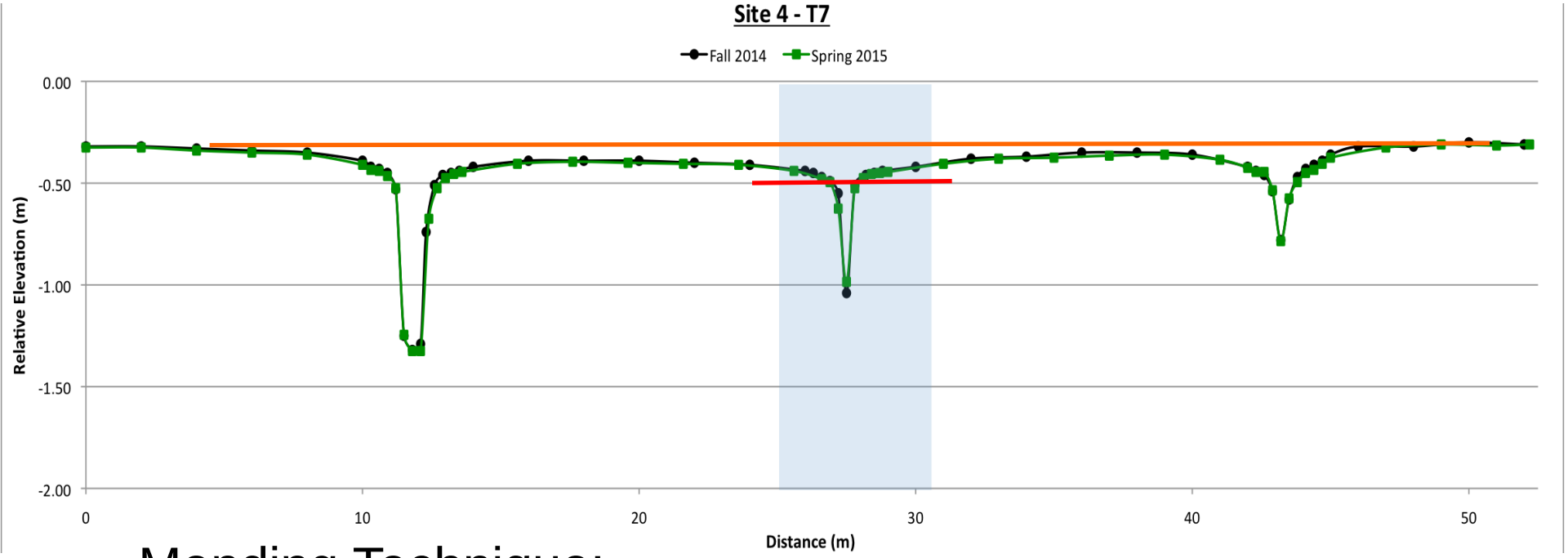




Elevation Profiles



Mending Technique:

Most Ditches do shallow up (5-20 cm in 6 months)

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?

Questions

Thank you to: USFWS and staff at Parker River NWR
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