

Historical use revealed by salt marsh impairments informs new restoration approaches



University of
New Hampshire

Coastal Habitat
Restoration Team

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BEAR CREEK
WILDLIFE SANCTUARY



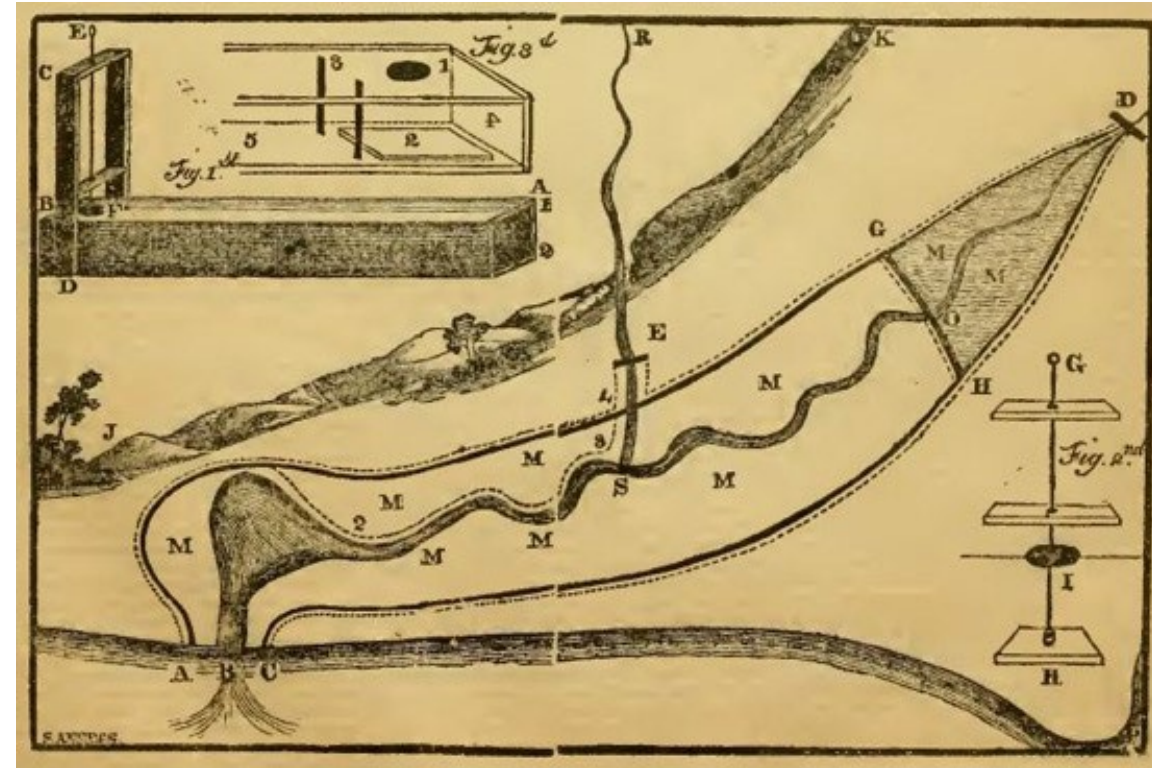
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Saltmarsh Sparrow Initiative

Early farming history was poorly documented



"Repairing a dyke" c. 1720 by Azor Vienneau;
Nova Scotia Museum, Accession number 87.120.2



American Farmer – 1824 Detailed
infrastructure 'blueprints' for farming tidal
marshes

Early farming history



... and what is left

Curtis Creek Marsh, Harrington, Maine



In New England, farmers abandoned some infrastructure c.1860 but continued to cut salt hay



Martin Johnson Heade



So, by the time photography emerged, most farming was merely cutting the salt hay

What happened to all the infrastructure?



- Embankments settled into the growing peat
- Ditches filled (parallel hydrology was more than nature needed to fill and drain the tides)

Embankments and ditches - legacy effects of agriculture interacting with greater rates of Sea Level Rise:

Ditches lower water tables and allow oxygen to convert peat to CO₂ (elevation falls) marshes become more susceptible to drowning

Embankments from farming and ditch spoils hold water on the marsh, leading to plant die-off, mega-pools and elevation loss

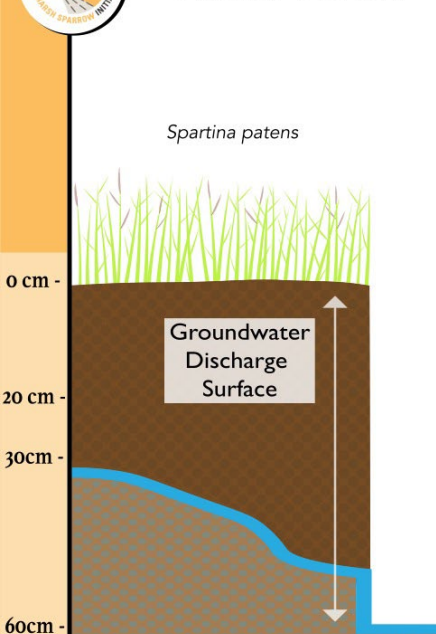
Loss of marsh elevation is caused by Ditching AND Embankments



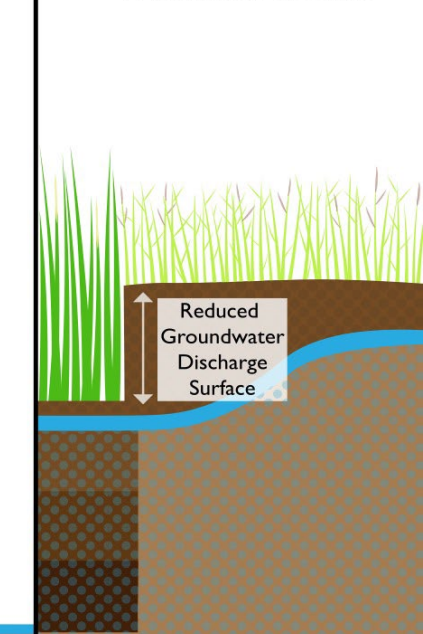
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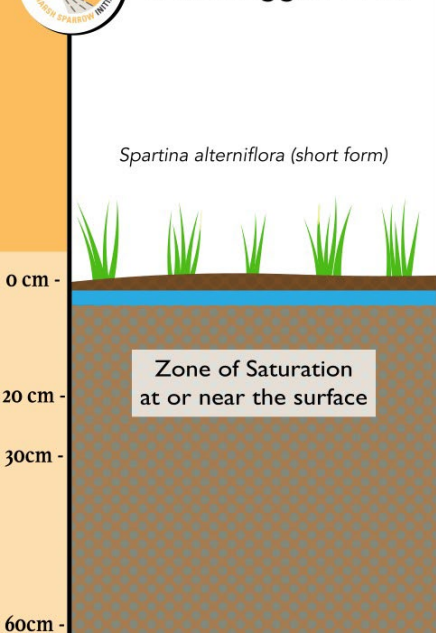
Untreated Farmer's Ditch



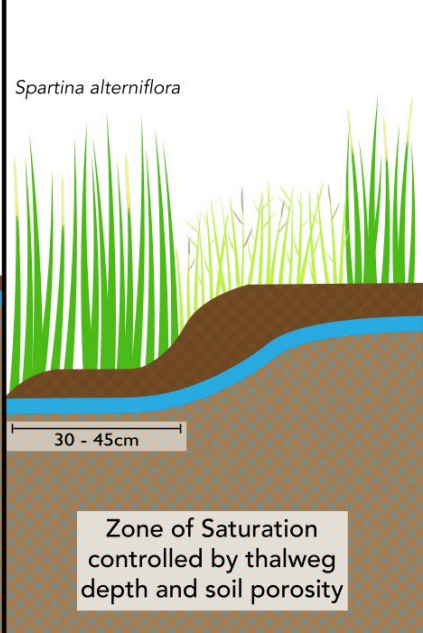
Ditch Remediation Treatment Ditch



Untreated Waterlogged Area



Micro-Runnel Treatment Area

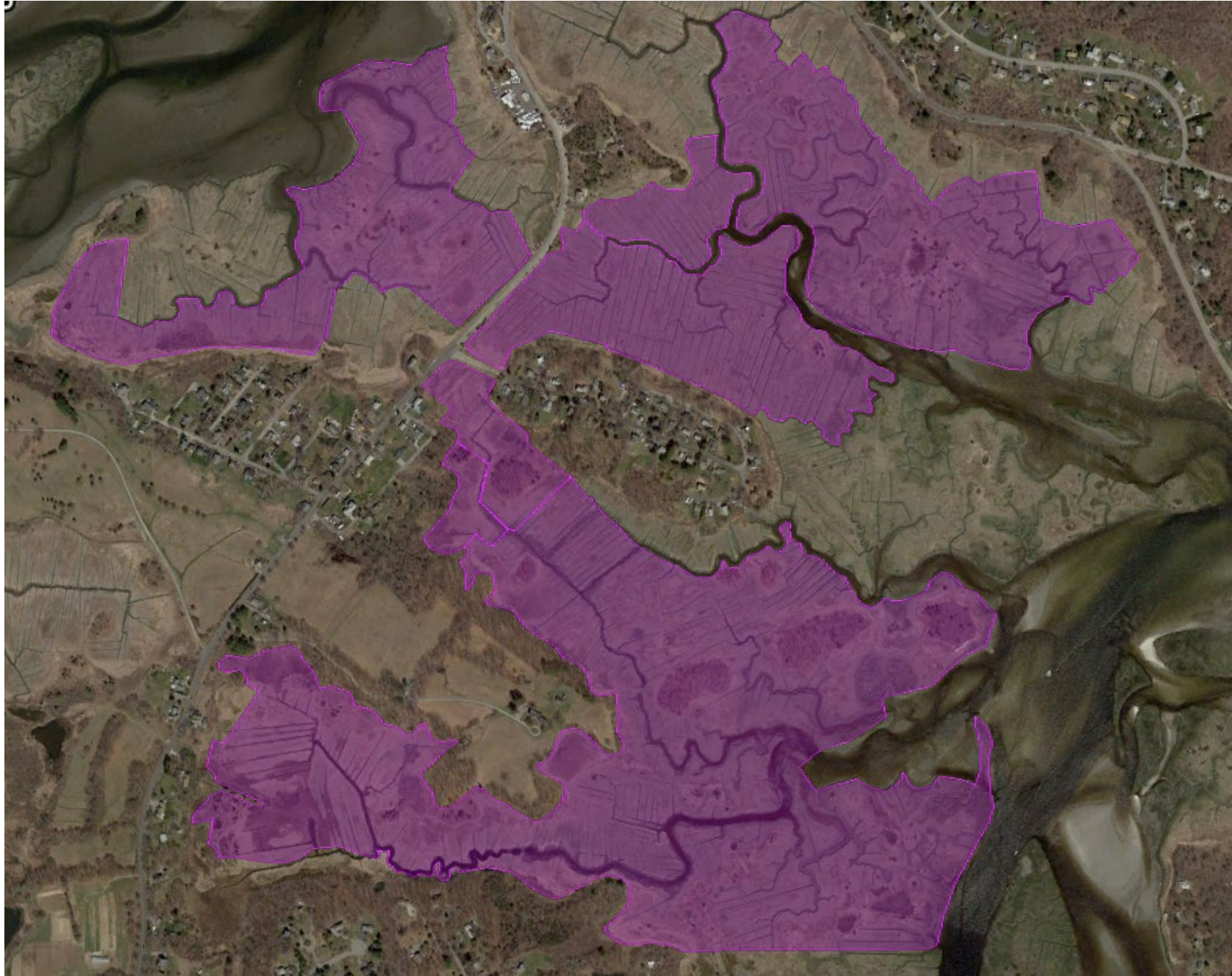


SMARTeams 4-Tier Restoration Approach

- 1) Halt Subsidence of Marsh
- 2) Increase Plant Productivity and C storage
- 3) Wildlife Considerations
- 4) Monitor and Adaptively Manage



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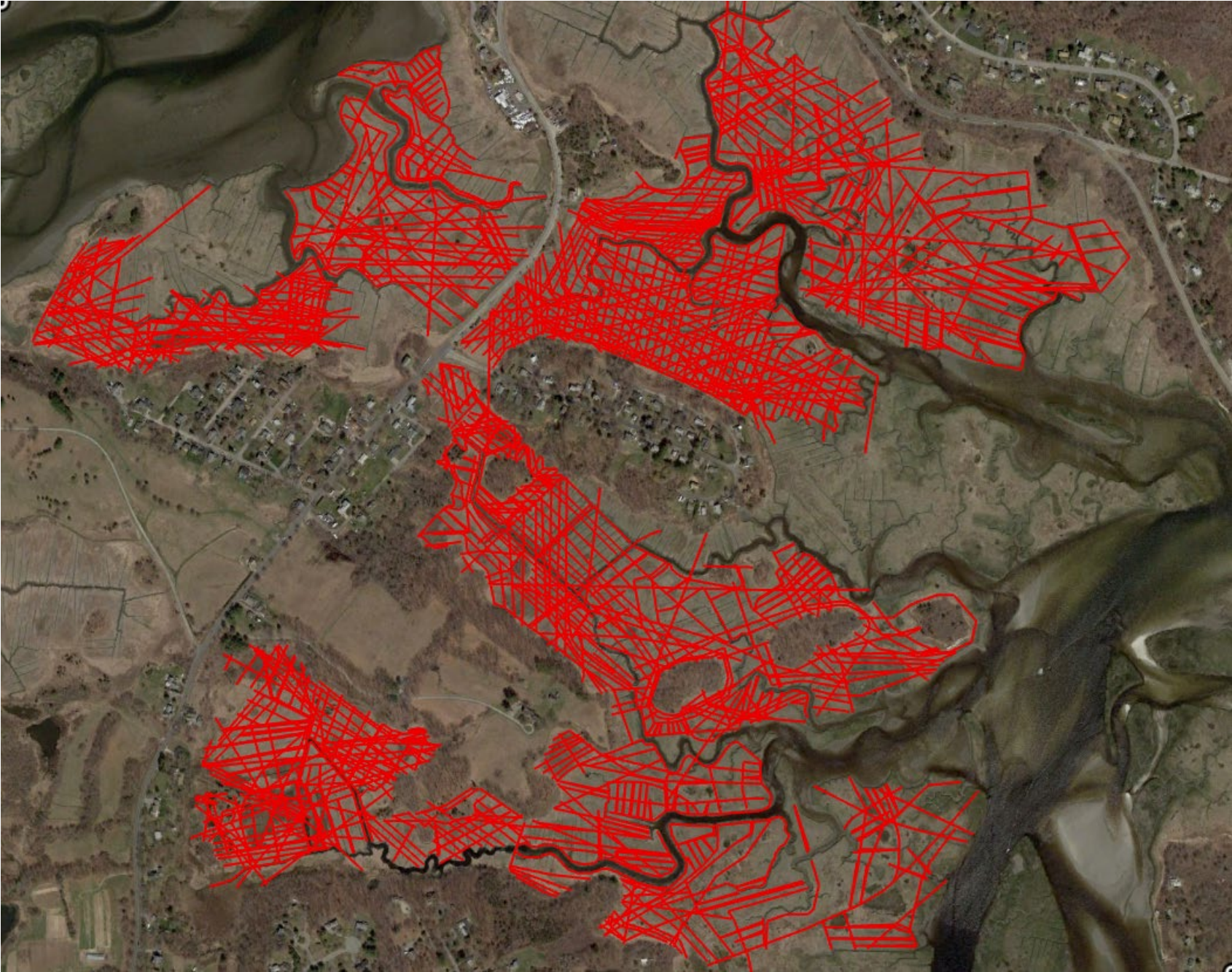


Trustees of Reservations Great Marsh

Jeffrey's Neck Work Unit

- 294-Acres
- 7 Properties





Trustees

Jeffrey's Neck Work Unit

- 294-Acres
- 7 Properties

- 1,044 Agricultural Embankments Identified





Trustees

Jeffrey's Neck Work Unit

- 294-Acres
- 7 Properties
- 1,319 Remediation Ditches

trustees





Trustees

Jeffrey's Neck Work Unit

- 294-Acres
- 7 Properties

- 228 Runnels Within Existing Hydrological Pathways





Trustees

Jeffrey's Neck Work Unit

- 294-Acres
- 7 Properties
- 588 Tidal Channel Networks Restored Within the Existing Agricultural Infrastructure

trustees





8 acre pool in 2014



Same shoreline in 2022

Projects in New Hampshire:

Fairhill Marsh, Rye

Philbrick Pond, N. Hampton

Hampton Ditch Pilot

North of Depot Road, Hampton Falls

Lubberland Creek Marsh – interest by TNC



(NHCP's America the Beautiful Grant)

UNH's NFWF Grant

Thank You



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What have we learned and how to proceed?

- Halt subsidence; Optimize accretion
- Hydrology is the organizing force - plants respond to changes in hydrology
- Restoration of Surface Hydrology sets up natural processes for long term sustainability
- Restoration targets need to aim forward rather than backward in time
- Define “Success”
- ‘Learn it forward’ with monitoring design and support adaptive management
- Every marsh is different; approach each project with humility
- Consider community/local knowledge, desires and equity in outcome