

# Windswept Bog Wetland Restoration Project, Nantucket Island, MA: Lessons Learned from Taking a Phased Implementation Approach



Photo: Michael Soares



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Department of Ecological Research, Stewardship & Restoration  
Nantucket Conservation Foundation



# Our Team

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Mass. DER:	Jessica Cohn
Fuss & O'Neill:	Michael Soares Dr. Julianne Busa
SumCo:	Travis Sumner



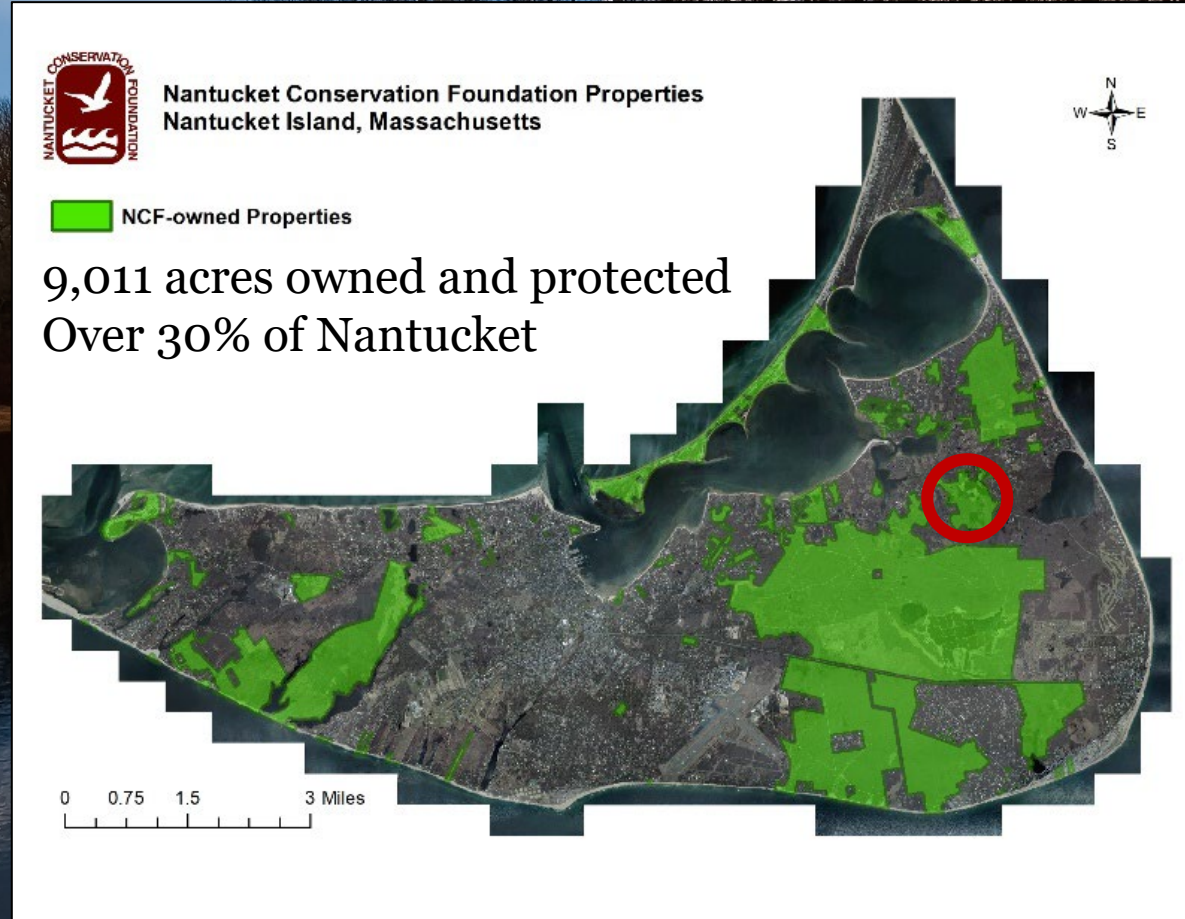
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*The Windswept Bog Wetland Restoration Project is funded in part through grants from the Massachusetts Department of Fish and Game Division of Ecological Restoration, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, Southeast New England Program, Restore America's Estuaries, and the Richard King Mellon Foundation.*



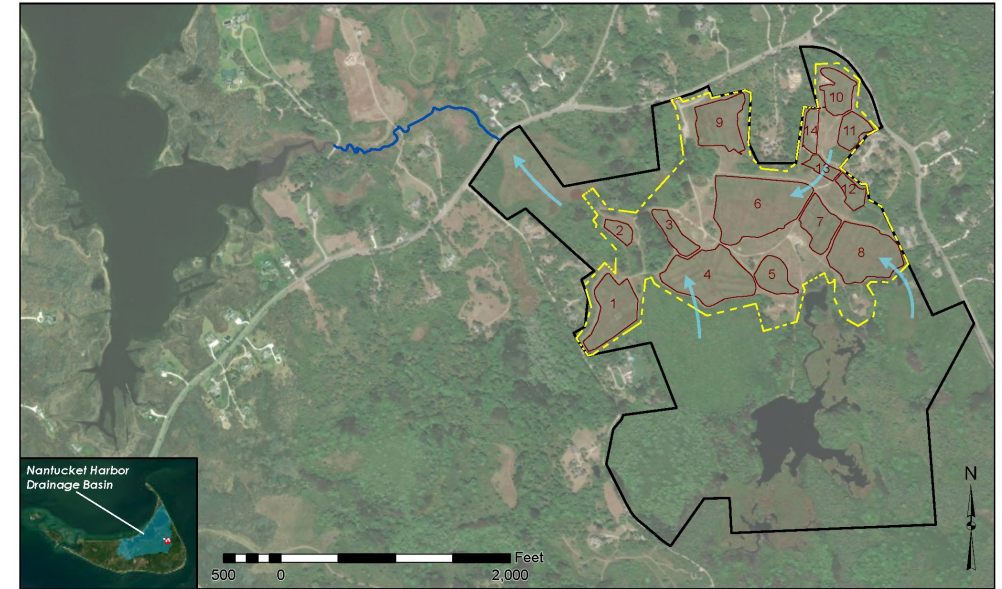
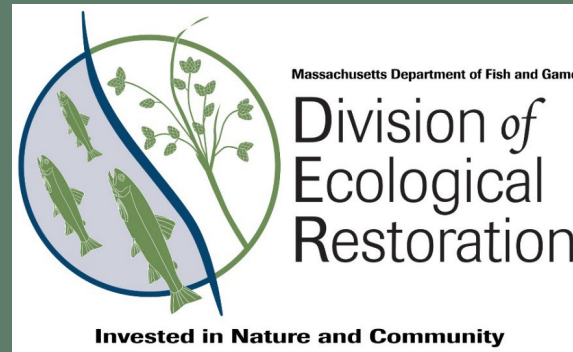
The Nantucket Conservation Foundation owns, protects and stewards over 9,000 acres of land and coastal shoreline, conserves Nantucket's rare and significant natural resources, and engages in impactful ecological research to inform resource management and further our knowledge of Nantucket's unique ecosystems and species. We share our environmental expertise with the wider community and provide educational and recreational opportunities to encourage respectful enjoyment and appreciation of our properties.





# Site Characteristics and Timeline

- Bog cells constructed in early 1900's
- Property purchased by NCF in 1980 (231 acres total):
  - 40 acres in 14 formerly cultivated bog cells
  - 110 acres of wetlands
  - 81 acres of uplands
- Cranberry cultivation retired by NCF in 2018
- DER Priority Project Designation in 2021



 <b>FUSS &amp; O'NEILL</b> 1550 Main Street, Suite 400 Springfield, MA 01103 413.452.0445   <a href="http://www.fando.com">www.fando.com</a>	<b>Project Area Map</b> Windswept Bog Wetland Restoration Nantucket, Massachusetts Date: 03/29/2023
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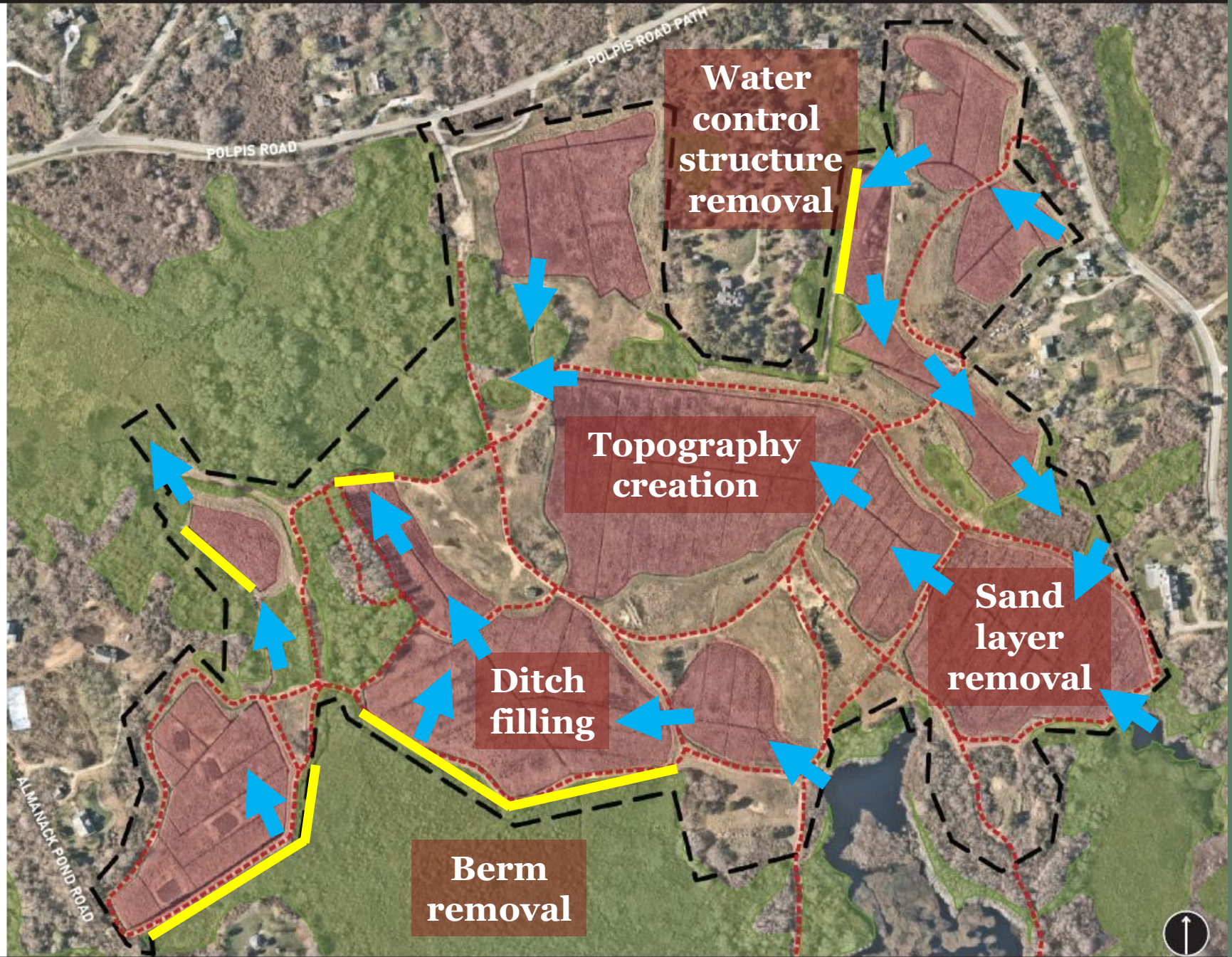
# WINDSWEPT BOG WETLAND RESTORATION

EXISTING CONDITIONS

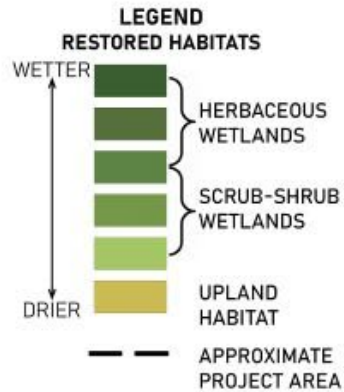
## LEGEND EXISTING CONDITIONS

-  EXISTING VEGETATED WETLANDS
-  RETIRED CRANBERRY BOGS
-  APPROXIMATE PROJECT AREA
-  EXISTING TRAIL NETWORK

## Restoration Actions at Windswept



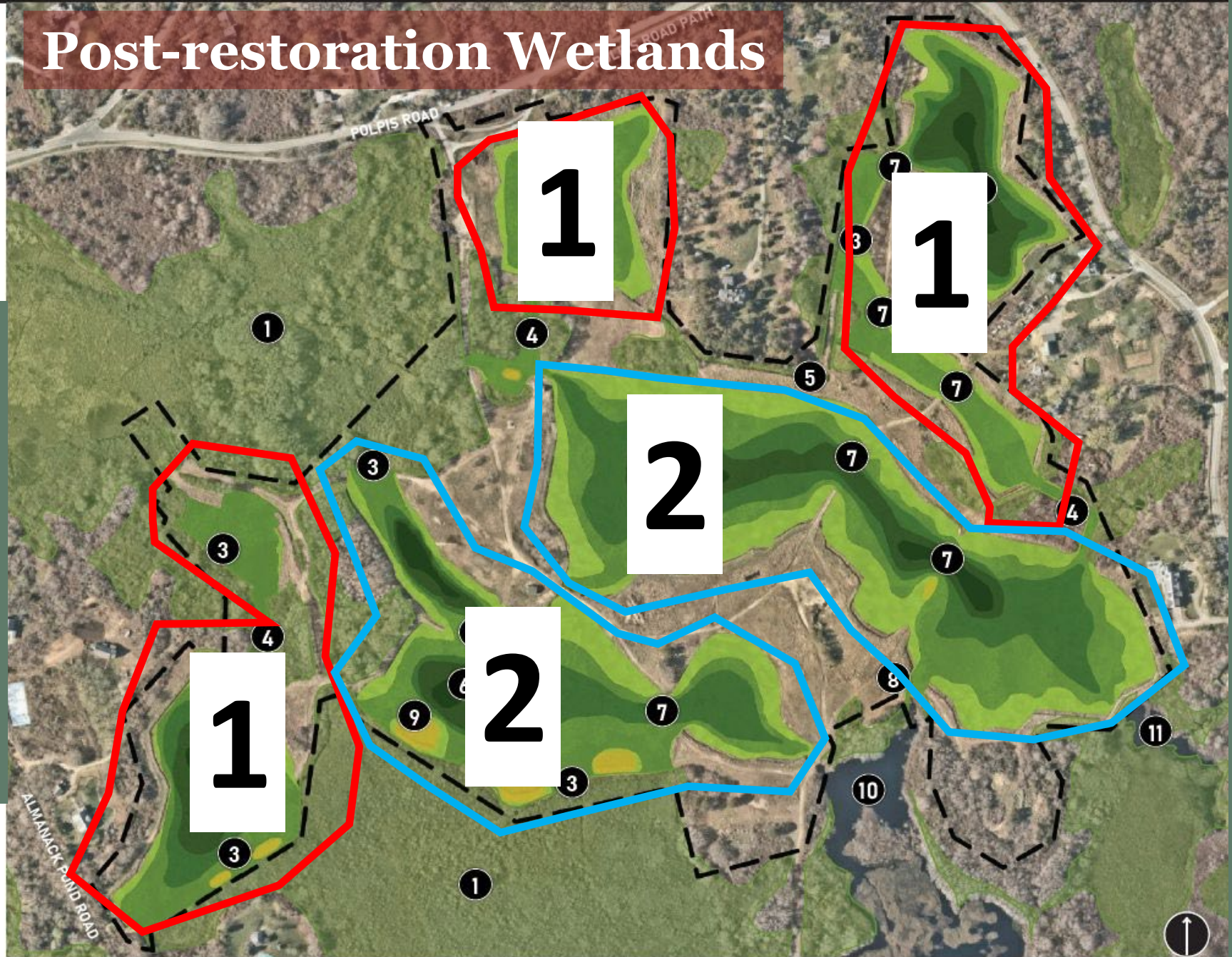




## Post-restoration Wetlands

Restoration phased over 2 years to allow monitoring and adaptation as needed:

- Phase 1: completed March 2024
- Phase 2: to be completed by March 2025






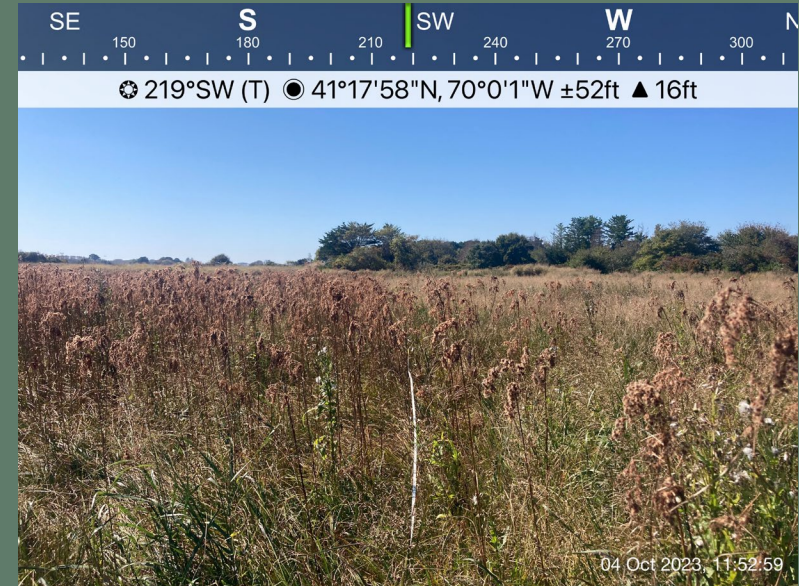
# Extensive Research and Monitoring Informed the Restoration Design and Decision to Phase Construction

- Site-wide Plant Species and Community Inventories
- Rare Plant Surveys
- Rare Wildlife Monitoring



Habitat  
Management Plan

 **Natural Heritage  
& Endangered Species  
Program**  
Massachusetts Division of Fisheries & Wildlife  
Route 135, Westborough, MA 01581





# Plant Species and Communities Inventory

Property-wide  
Botanical Inventory  
(2019-2024):

**395+ species  
documented**



- During farming, bog borders were mowed repeatedly to limit seed spread into bogs
- After frequent mowing ceased, these areas transitioned into diverse wet meadow and sandplain grassland habitats with many rare species

Regularly mowed grasslands surrounding bogs in 2013 (during cranberry cultivation)





# Wet Meadow Habitat Protection and Maintenance

- Seasonally wet herbaceous community that supports marsh birds and numerous rare plant species
- Protection and management:
  - Excluded from deposition areas
  - Mowing only during dormant season to allow seed set and prevent shrub encroachment
  - Protective fencing



Spatulate-leaved Sundew  
(*Drosera intermedia*)



Ladies' Tress Orchid  
(*Spiranthes tuberosa*)



Yellow-eyed Grass  
(*Xyris torta*)



Virginia Meadow-beauty  
(*Rhexia virginica*)





# Rare Plant Protection Strategies

- Protective fencing (uplands)
- Micro-topography avoidance (wetlands)
- Seed collection
- Construction when plants are dormant



Saltpond Pennywort  
(*Hydrocotyle verticillata*)



Creeping St. John's-wort  
(*Hypericum adpressum*)



St. Andrew's Cross  
(*Hypericum stragulum*)



Slender Blue Flag Iris  
(*Iris prismatica*)



New England Blazing Star  
(*Liatris novae-angliae*)



Sandplain Flax  
(*Linum intercursum*)



Foxtail Clubmoss  
(*Lycopodiella alopecuroides*)



# Rare Wildlife Monitoring: Spotted Turtles

*Threatened, endangered or vulnerable throughout much of range*

## Goals:

- Provide baseline data to determine population status
- Document habitat use to inform restoration design and timing

## Methods:

- Trapped within and around bogs (pre and during restoration)
- Uniquely marked all captured individuals;
- Used radio transmitters to track movement, estimate home range and habitat use



Danielle O'Dell  
NCF Wildlife Research Ecologist





# Seasonal Habitat Use Results

*Pre-restoration:  
spotted  
turtles used the  
retired bog cells  
during spring  
through fall, but  
most left in winter  
to hibernate in  
adjacent wooded  
shrub swamps*





# Restoration Timing and Habitat Enhancement

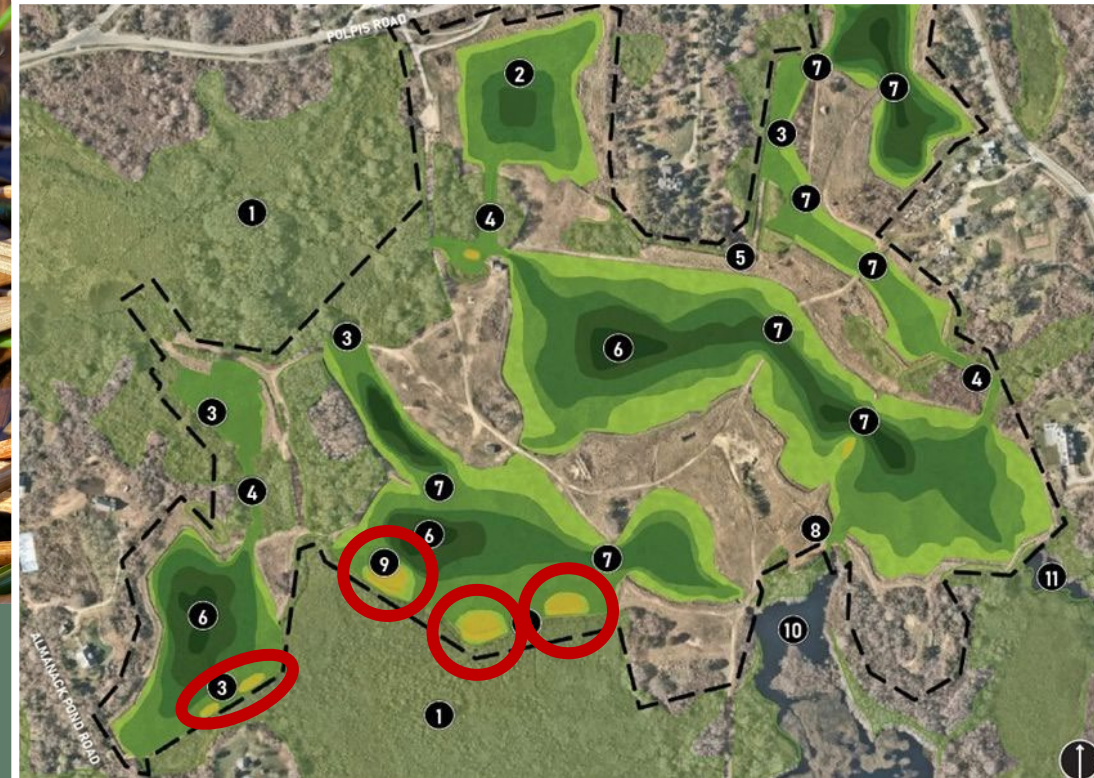
Construction timing to minimize impacts: winter (Nov. 1<sup>st</sup> - Mar. 15<sup>th</sup>)

Turtle-minded Restoration Design:

- Diverse wetlands ranging from shallow to deeper water
- Connectivity between wetlands
- Sandy islands left in berms for nest sites



Photo: Nantucket Current





# Monitoring After Phase 1 to Inform Phase 2

## Vegetation:

- Establishment in wetlands, uplands, deposition areas

## Hydrology:

- Pre-restoration water level monitoring loggers re-installed
- Visual monitoring of flow and connectivity within restoration site and adjacent wetlands

## Soils:

- Erosion/stability in bogs and uplands

Plans are being adaptively “tweaked”



Photo: Michael Soares





# Phase 1 Restoration Results

Photo: Julie Busa





Bog 9 - early April 2024





**Bog 9 – late July 2024**

**Photo: Michael Soares**





Bog 11 - early April 2024





# Bog 11 – late July 2024

**Photo: Michael Soares**





**Bog 1 - early April 2024**





**Bog 1 – late July 2024**





**Coming Soon: Phase 2, November 2024**



# To Summarize....

- Four years of pre-construction research and monitoring informed the restoration design
- Phasing by limiting construction activities to dormant season (Nov. 1 – Mar. 15) is expected to reduce impacts on rare plants and disturbance to turtles and other wildlife
- Monitoring Phase 1 restoration response allows Phase 2 construction plans to be adaptively adjusted
- Pre-restoration data collected is serving as a baseline for determining post-restoration success

## Take Home Message:

Gaining a thorough understanding of existing site conditions, species composition and habitat use prior to initiating large scale ecological restoration work is important

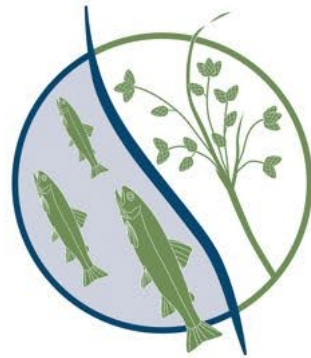




# Acknowledgements



**FUSS &  
O'NEILL**



Massachusetts Department of Fish and Game

**Division of  
Ecological  
Restoration**

*Invested in Nature and Community*



**RICHARD  
KING MELLON  
FOUNDATION**



**RESTORE  
AMERICA'S  
ESTUARIES**



## FUNDERS + PARTNERS

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# Questions?



**Photo: Michael Soares**



**Thanks for listening!**

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