Restoring Wetlands on Retired Cranberry Farmland:
Science, Practice, and Status in Massachusetts



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Massachusetts Department of Fish and Game
Division of Ecological Restoration
Invested in Nature and Community

Commonwealth of Massachusetts
Department of Fish & Game

Massachusetts Water Resources Commission - July 2020

Today:

1. Context: Farms are retiring
2. Restoration repairs
3. Land protection + restoration = win-win
4. Building capacity

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Mission: To restore and protect the health and integrity of the Commonwealth's rivers, wetlands, and watersheds for the benefit of people, fish, and wildlife

- ~100 completed projects
- > 1,800 acres of wetlands restored
- 41 dams removed
- Around 50 active projects today
- **Action oriented**
- **Partnership based**

Photo credit: Commonwealth of Massachusetts

Photo credit USDA NRCS


2008 – Just before restoration

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Eel River Headwaters (Plymouth) <1 year after restoration
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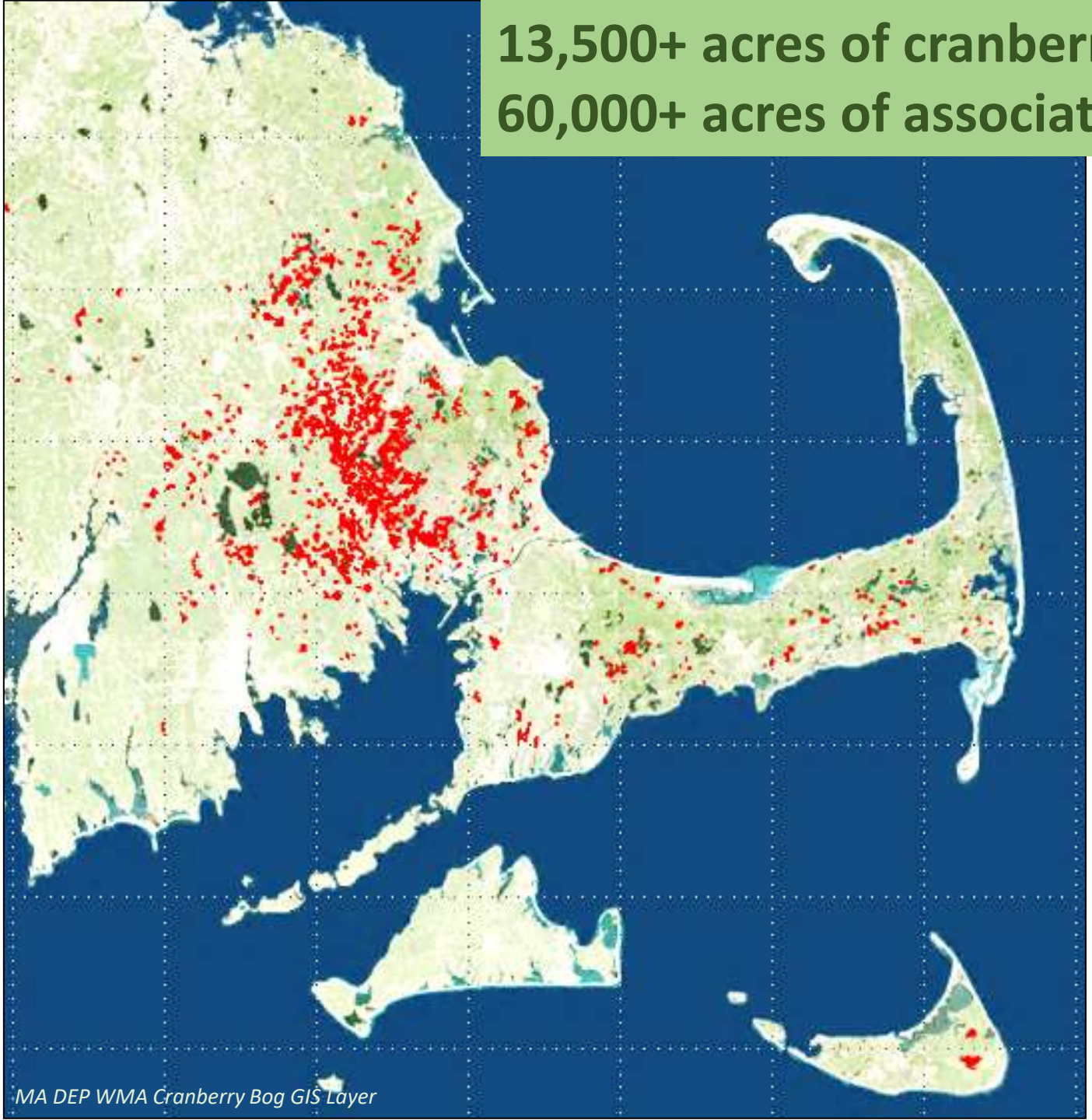
Eel River Headwaters (Plymouth) ~7 years after restoration

Eel River Headwaters (Plymouth) – former cranberry farm – 7 years post restoration

13,500+ acres of cranberry bogs
60,000+ acres of associated uplands



MA DEP WMA Cranberry Bog GIS Layer

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Takeaway #1

Our local cranberry industry is in decline

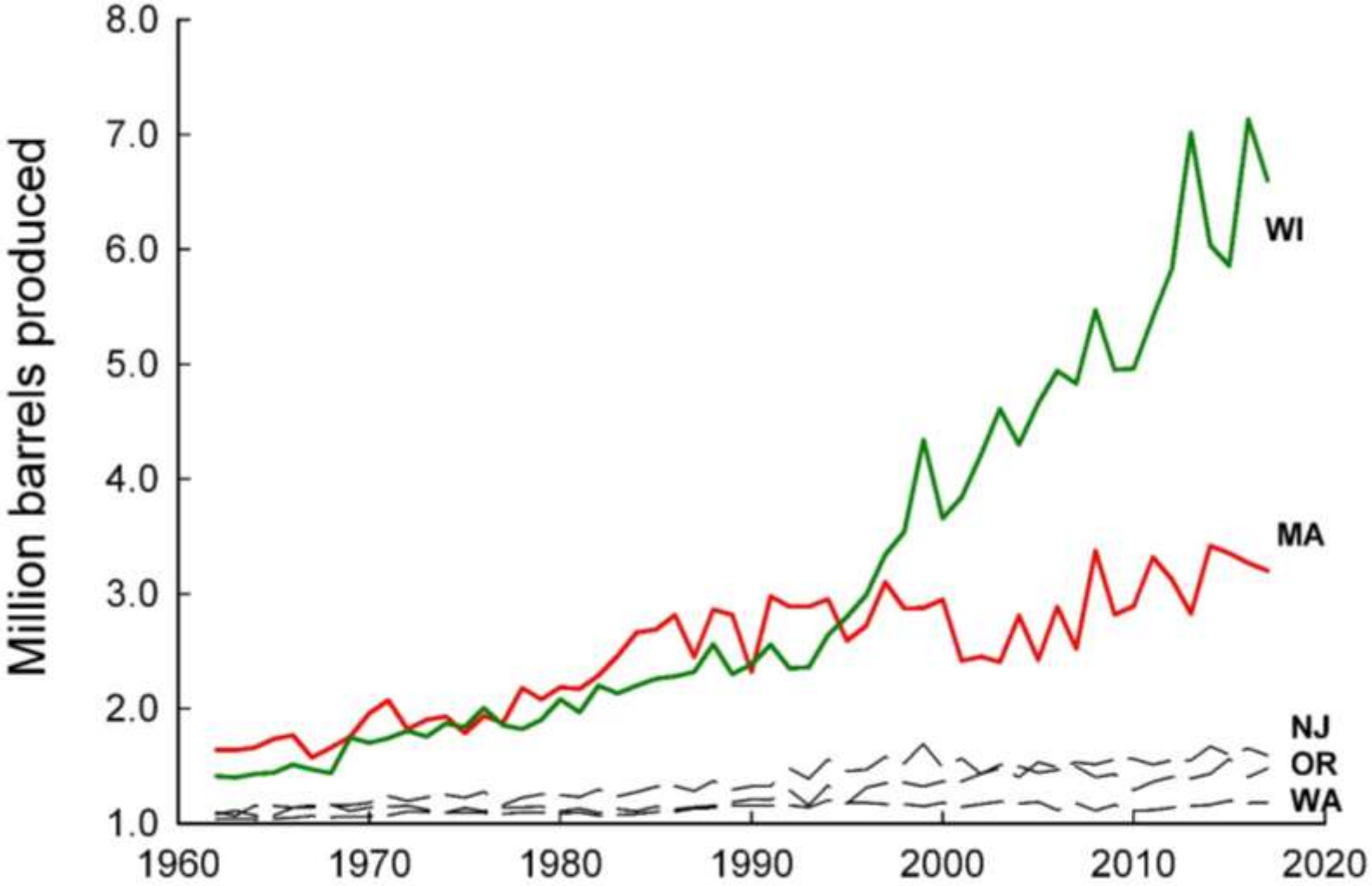
Global Changes Threaten Local Cranberry Industry

Slide courtesy of Chris Neill

New York Times, October 6, 2016

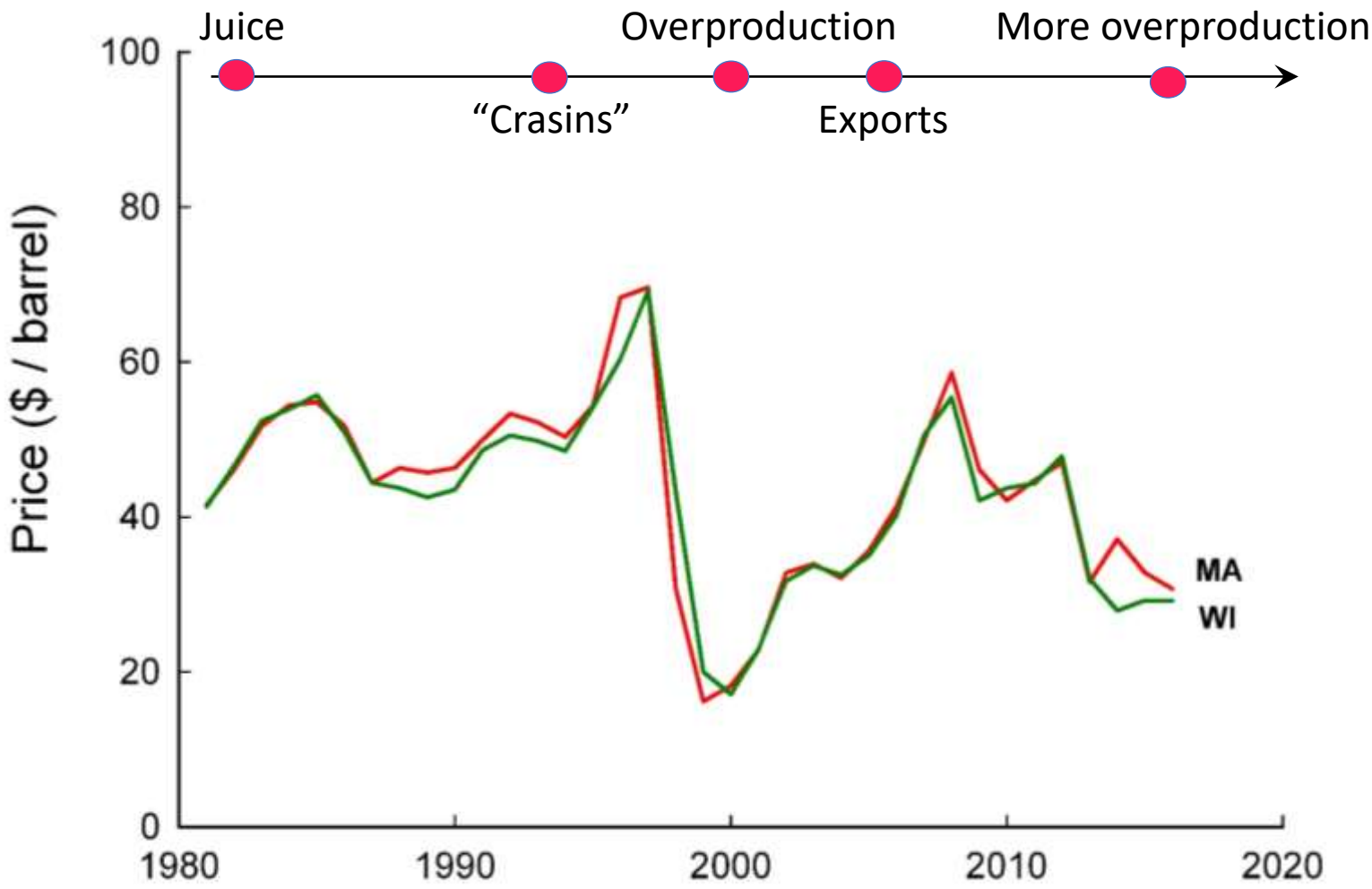
Out-of-state competition is winning

(Same trend in graphs of total production, acreage, and yield)



Slide courtesy of Chris Neill

Today's prices threaten business



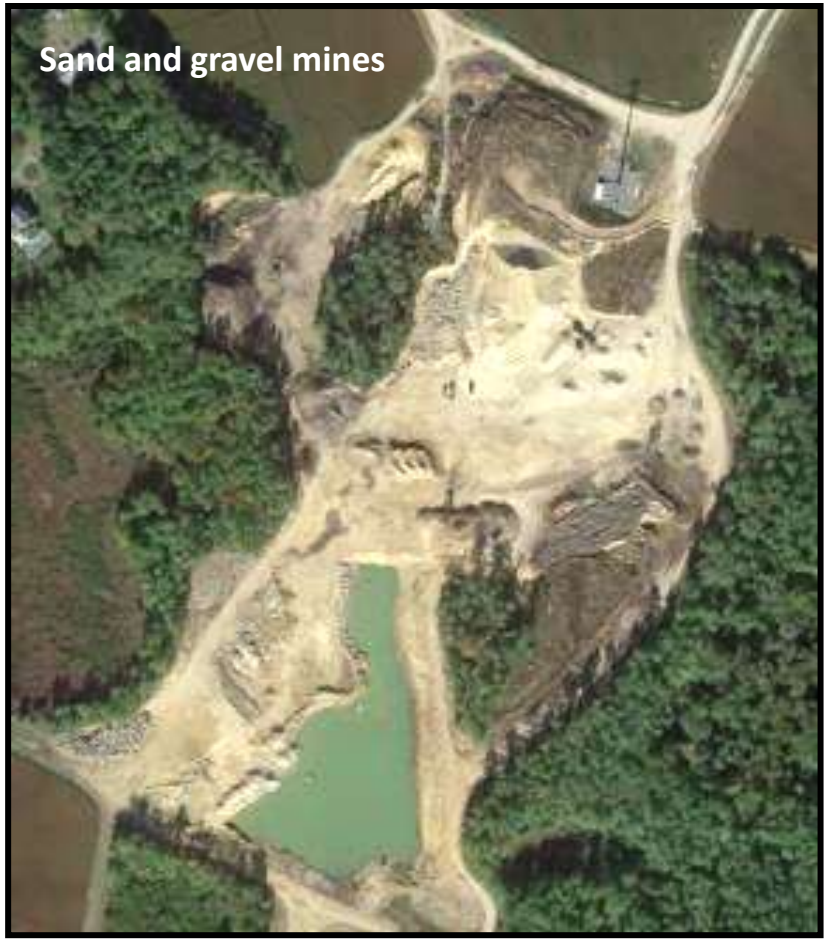
Slide courtesy of Chris Neill

"…under current trajectories, **more than 2,000 ha [4,942 acres] of active farms may be vulnerable to retirement.**"

Benjamin R. Hoekstra, Christopher Neill, and Casey D. Kennedy, 2019. ***Trends in the Massachusetts cranberry industry create opportunities for the restoration of cultivated riparian wetlands.*** *https://doi.org/10.1111/rec.13037*

Image credits Google Earth

…as a result…



Landowners need “exit strategies”


Bog abandonment
Implications for water quality, water storage, fish and wildlife habitat, public use and recreation, and more

Won't retired cranberry bogs just become wetlands again?

…some will…


...some will not...

Legacy impacts of farming limit natural wetland recovery

Photos courtesy of NH Division of Forests and Lands

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What is Restoration?

"Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."

Society for Ecological Restoration (SER) Primer (2004)

Join your local chapter – SER New England

SER SOCIETY FOR ECOLOGICAL RESTORATION

INTERNATIONAL PRINCIPLES AND STANDARDS FOR THE PRACTICE OF ECOLOGICAL RESTORATION

SECOND EDITION: September 2019

George D. Gann, Tein McDonald, Bethanie Walder, James Aronson, Cara R. Nelson, Justin Jonson, James G. Hallett, Cristina Eisenberg, Manuel R. Guariguata, Junguo Liu, Fangyuan Hua, Cristian Echeverria, Emily Gonzales, Nancy Shaw, Kris Decleer, and Kingsley W. Dixon

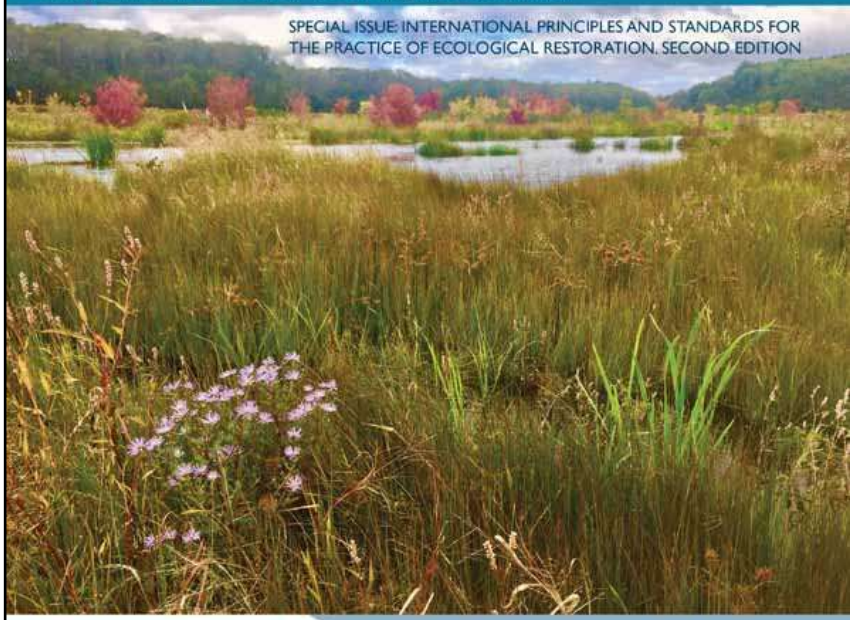
Coordinating Editors: George D. Gann, Tein McDonald, and Bethanie Walder

VOLUME 27, NUMBER S1, SEPTEMBER 2019
ISSN 1061-2971

RESTORATION ECOLOGY

The Journal of the Society for Ecological Restoration

SPECIAL ISSUE: INTERNATIONAL PRINCIPLES AND STANDARDS FOR THE PRACTICE OF ECOLOGICAL RESTORATION. SECOND EDITION



SER SOCIETY FOR ECOLOGICAL RESTORATION

WILEY

Process-based Principles for Restoring River Ecosystems

TIMOTHY J. BEECHIE, DAVID A. SEAR, JULIAN D. OLDEN, GEORGE R. PESS, JOHN M. BUFFINGTON, HAMISH MOIR, PHILIP RONI, AND MICHAEL M. POLLOCK

Process-based restoration aims to reestablish normative rates and magnitudes of physical, chemical, and biological processes that sustain river and floodplain ecosystems. Ecosystem conditions at any site are governed by hierarchical regional, watershed, and reach-scale processes controlling hydrologic and sediment regimes; floodplain and aquatic habitat dynamics; and riparian and aquatic biota. We outline and illustrate four process-based principles that ensure river restoration will be guided toward sustainable actions: (1) restoration actions should address the root causes of degradation, (2) actions must be consistent with the physical and biological potential of the site, (3) actions should be at a scale commensurate with environmental problems, and (4) actions should have clearly articulated expected outcomes for ecosystem dynamics. Applying these principles will help avoid common pitfalls in river restoration, such as creating habitat types that are outside of a site's natural potential, attempting to build static habitats in dynamic environments, or constructing habitat features that are ultimately overwhelmed by unconsidered system drivers.

Keywords: river restoration, ecosystem dynamics, ecosystem processes

Repair the engine and let the natural system heal

Practical 'Process-Based' Restoration Framework

(Developed by MA DER for cranberry bog projects but has much broader potential use)

1. Understand the site
2. Focus on key ecological processes *(the engine)*
3. Identify 'stressors' or limiting factors
4. Plan responses that relieve stress
5. Mother Nature and Father Time

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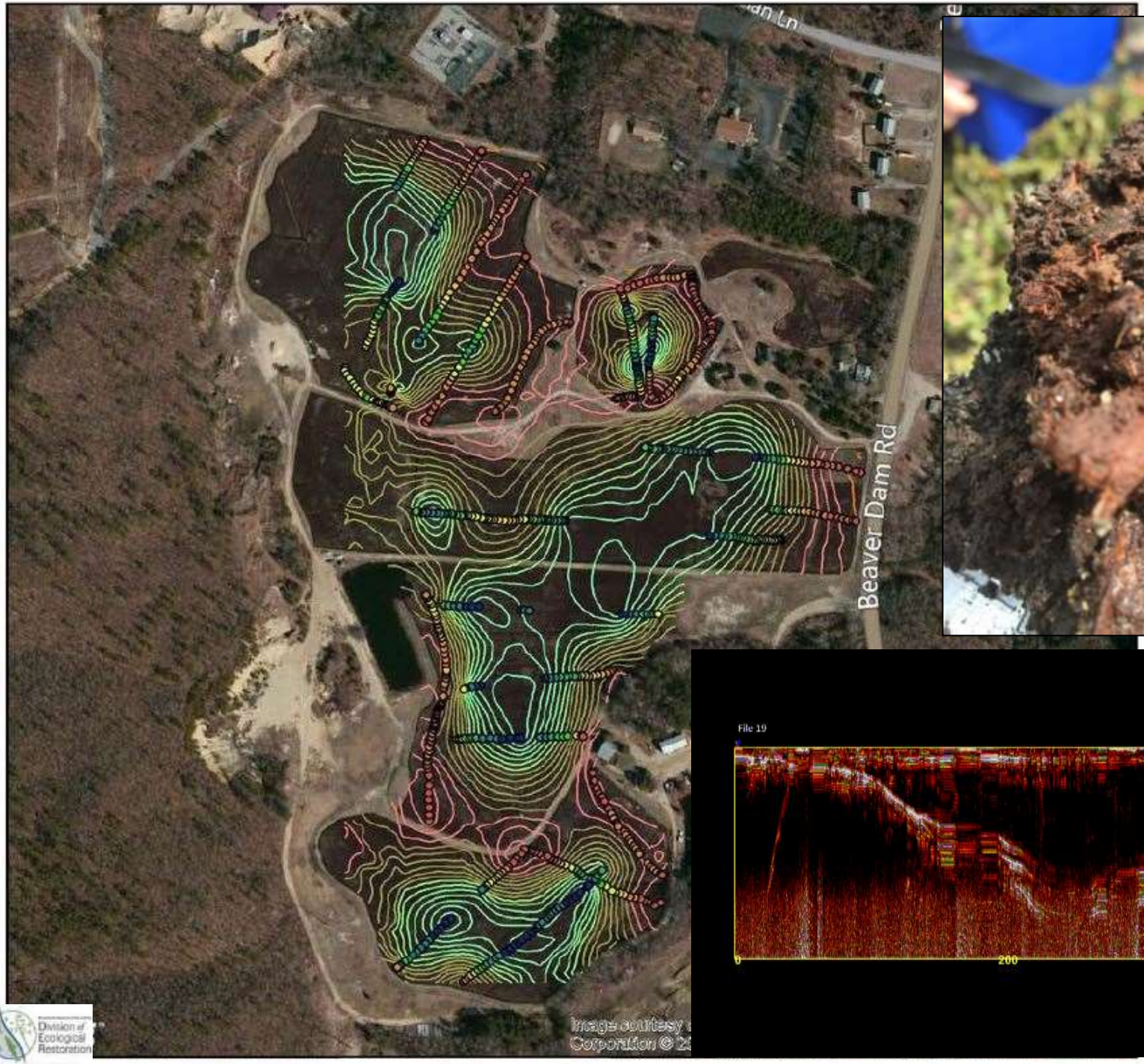
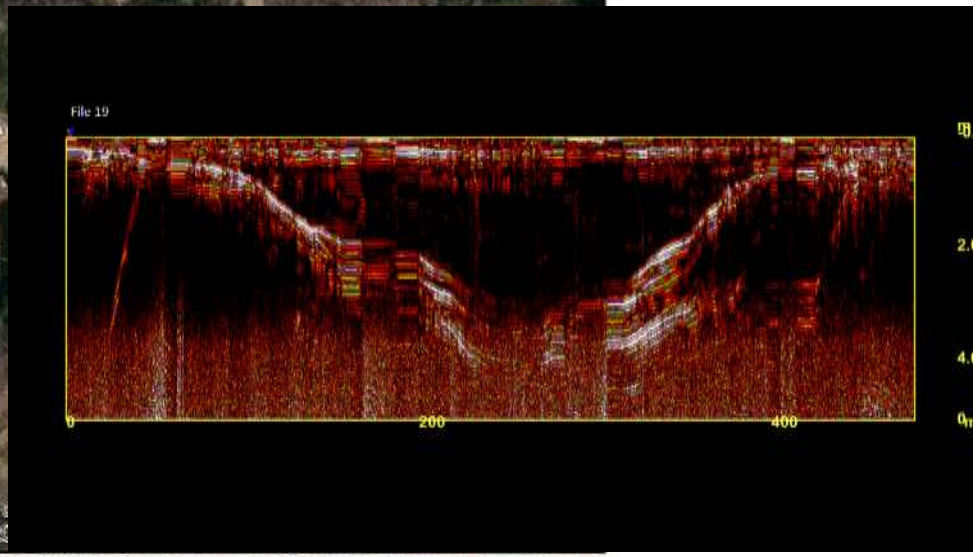
Foothills Preserve (Plymouth)





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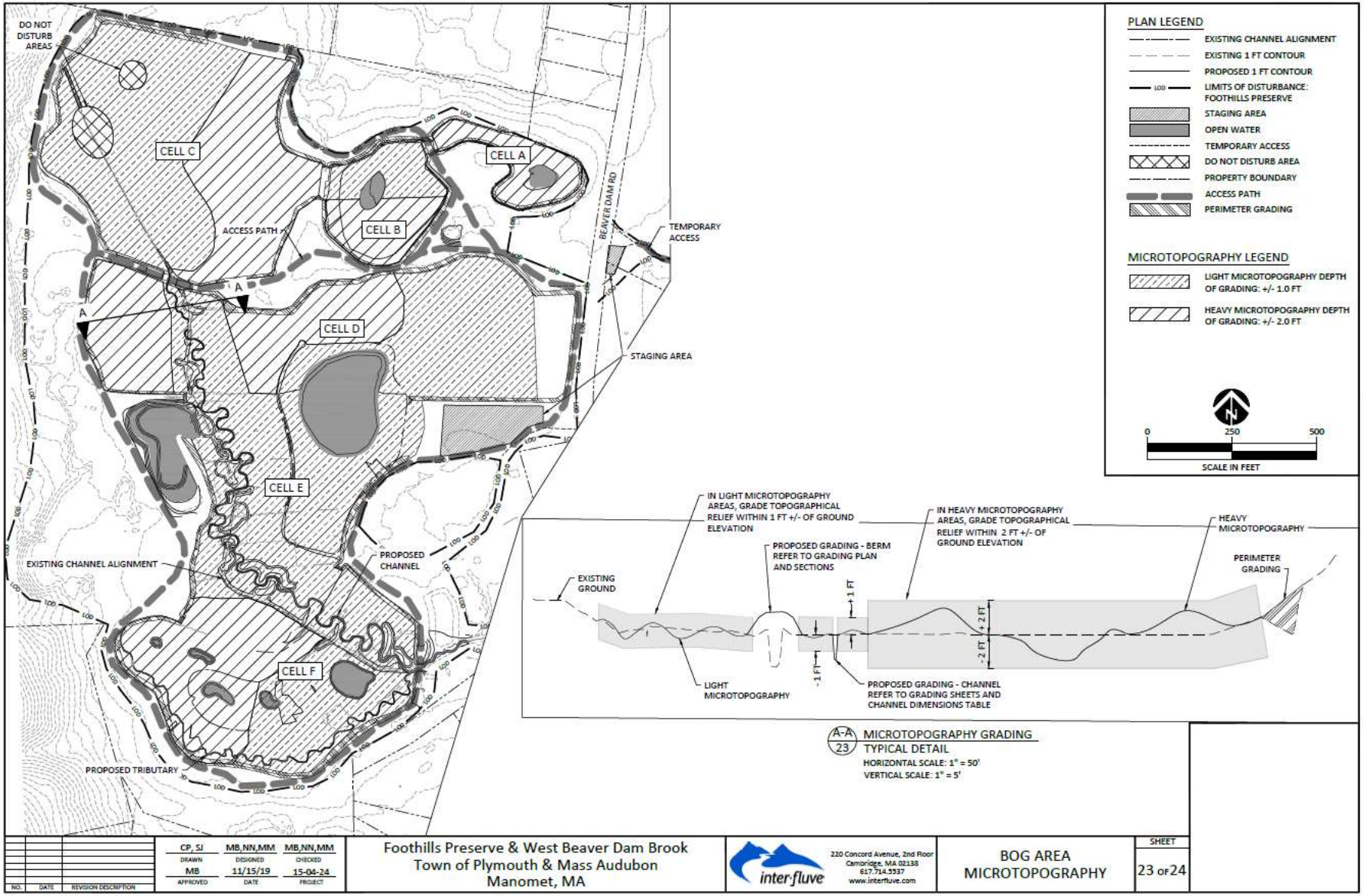
Pipeline: Assessment → Restoration Design → Permits → Bidding → Construction



Common actions: Fill ditches, roughen surface, remove sand for open water, remove dikes and dams, add wood, active native seed bank…then watch it grow.

Go time!


Just weeks later…

Before restoration (2011)

During restoration (March 2016)

Post restoration (July 2016)

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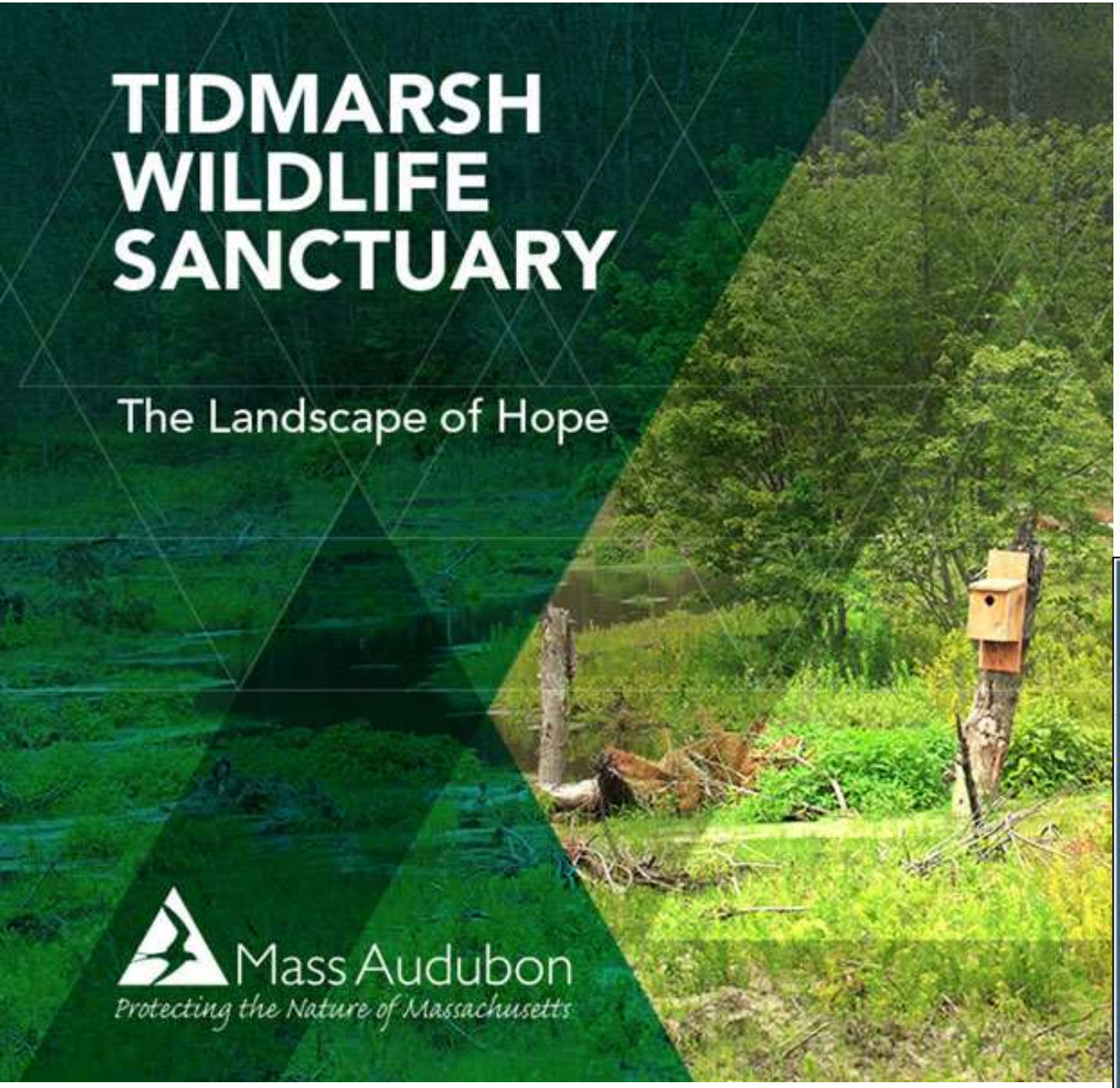
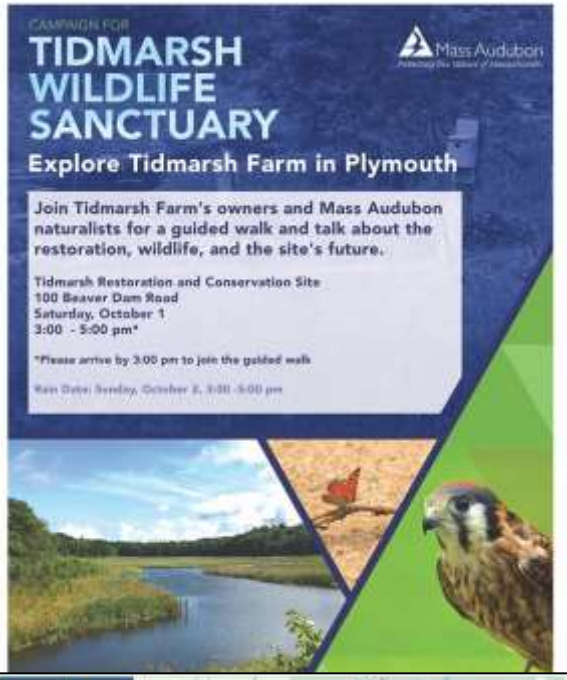
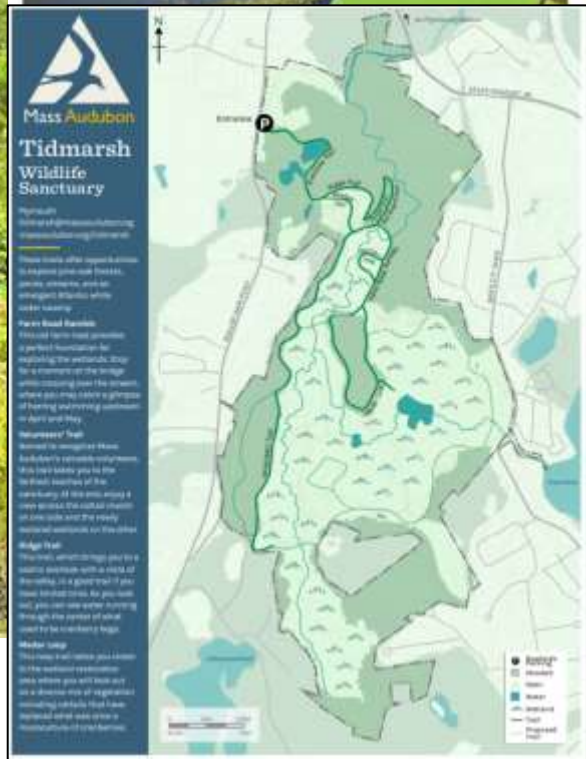
Takeaway Message #3:

Land protection + ecological restoration = high quality natural places


Wetlands
Reserve
Program
CONSERVATION
EASEMENT
BOUNDARY
LANDOWNER &
USDA / NRCS
PARTNERSHIP

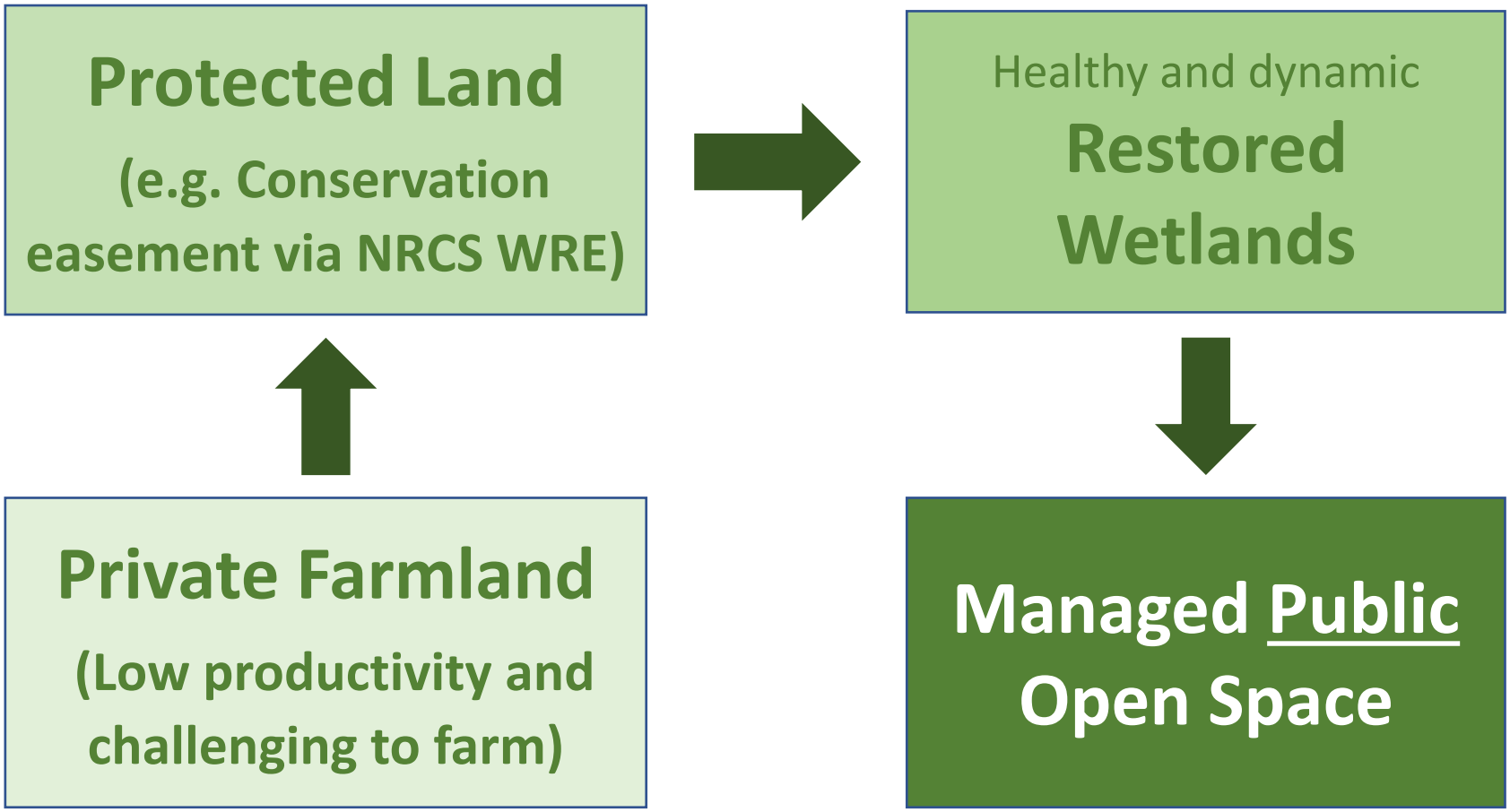






Public use and enjoyment (30,000 visitors last year)

“Green Exit Strategy”



Takeaway Message #4

We’re trying to build capacity to meet this moment

Massachusetts has a state program (2 FTE) dedicated to this work…

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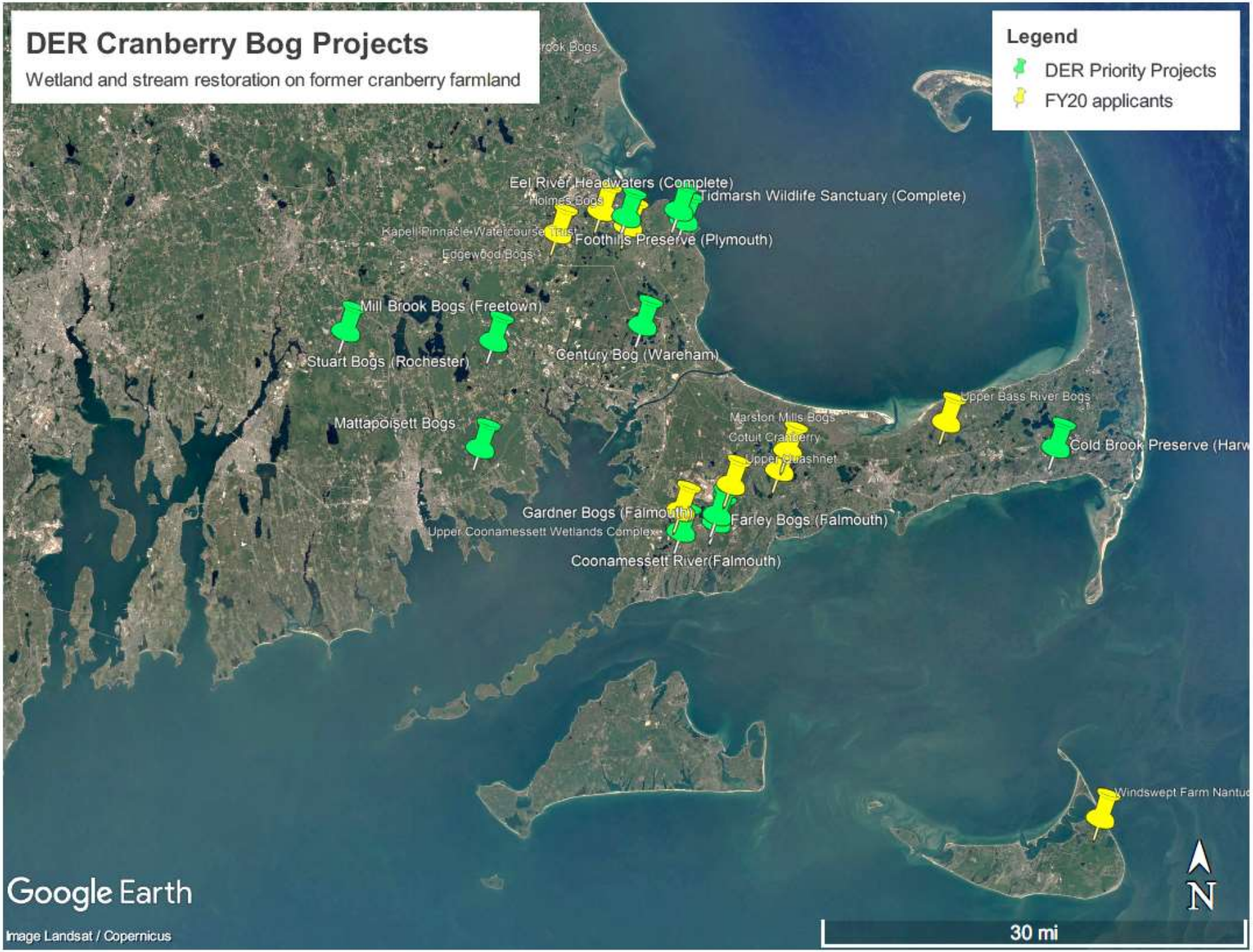
~30 organizations are working together today in the region on these issues


DER Cranberry Bog Projects
Wetland and stream restoration on former cranberry farmland
Legend
DER Priority Projects
FY20 applicants
Eel River Headwaters (Complete)
Tidmarsh Wildlife Sanctuary (Complete)
Holmes Bogs
Foothills Preserve (Plymouth)
Edgewood Bogs
Mill Brook Bogs (Freetown)
Stuart Bogs (Rochester)
Century Bog (Wareham)
Mattapoisett Bogs
Upper Bass River Bogs
Marston Mills Bogs
Cotuit Cranberry
Cold Brook Preserve (Harw
Gardner Bogs (Falmouth)
Farley Bogs (Falmouth)
Upper Coonamessett Wetlands Complex
Coonamessett River(Falmouth)
Windswept Farm Nantuc
Google Earth
Image Landsat / Copernicus
N
30 mi

AWARDED by USDA NRCS to MA DER

Regional Conservation Partnership Program (RCPP)

$20M total investment in next 5 years

1. **Land Protection** (easements)
2. **Wetland Restoration** (design, permitting, implementation)
3. Landowner/**Grower Coordination** (CCCGA)
4. **Learning** (monitoring, measurement, outcomes)
5. 17 partnering organization for application (~30-40 total)
6. Goal: 1,000+ acres of land protection and wetland restoration (~20 individual projects)

Summary:

- Declining cranberry industry = risks and opportunities for the region
- Restoration repairs
- With land protection = ideal climate change adaptation strategy

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Former commercial cranberry farm (Tidmarsh Farms) <1 year after wetland restoration