

Historical Perspective of Invasive Vegetation Management in the Great Marsh

efforts by the
Great Marsh Revitalization Task Force



Step 1. Creation of the Great Marsh Revitalization Task Force



Task Force Chairman
Senator Bruce Tarr

- Five Committees

1. Resource/Research

2. Permitting

3. Funding

4. Education/Outreach


5. Executive

-Sets Task Force Annual Direction

**- 40 + Participating NGOs, State,
Federal, and Local entities**

Task Force Membership (partial)

- US Fish and Wildlife Service
- MA Audubon Society
- The Trustees of Reservations
- US Army Corps of Engineers
- Essex County Greenbelt Association
- Merrimack College
- MA Division of Ecological Restoration
- Merrimack Valley Planning Commission
- Jackson Lab, University of New Hampshire
- MA Department of Conservation and Recreation
- MA Department of Environmental Protection
- Parker River National Wildlife Refuge
- Northeast Mosquito Control
- Towns of Salisbury, Newbury, Rowley, Essex,
Ipswich, Gloucester, Newburyport
- SPS New England
- Parker River Clean water Association
- MA Endanger Species Program
- MA Department of Transportation
- Senator John Kerry
- Metropolitan Area Planning Council
- NOAA



The Task Force Mission is the Short-term and the Long-term Management and Control of Invasive *Phragmites australis* in the Great Marsh Coastal Ecosystem

Includes:

- **identification of the problem and its extent**
- **physical and chemical controls**
- **understanding root causes of expansion in the marsh**
- **development of long-term solutions**

Funding Committee



General Project Goals Requiring Funding

➤ Short term control

- Herbicide treatment \$\$
- Mapping \$
 - Identify 'at risk' areas for immediate attention \$

➤ Long term

- Research \$\$ - \$\$\$
- Implementation \$\$ - \$\$\$\$
- Education and outreach \$

Funding Sources (existing and potential)



▪ Federal

- MA Congressional Delegation
- Federal Agencies -NOAA, GOMC, USF&W, ACOE, USGS, etc
- Hurricane Sandy Resiliency Grant

▪ State

- State Agencies – DCR, F&G, DAR, DMF, DER
- Environmental Bond Funds

▪ Private Foundations and Businesses





Step 2: Mapping And Treating Phragmites in the Great Marsh

Healthy Saltmarsh Conditions





From This.....



To This.....



In just a few short years!



Typical marsh conditions in the northern portion of the Great Marsh





Cataloguing Phragmites





High and Medium Density Phragmites Stands



Low (Emergent) Density Stands

Collect data about individual stands including:

- Ambient surrounding vegetation
- Height of tallest Phragmites stems
- Stand Density
- Stand maturity; seedheads present/absent
- Walk the circumference to get an accurate measure of acreage
- and marking



Identifying ambient vegetation



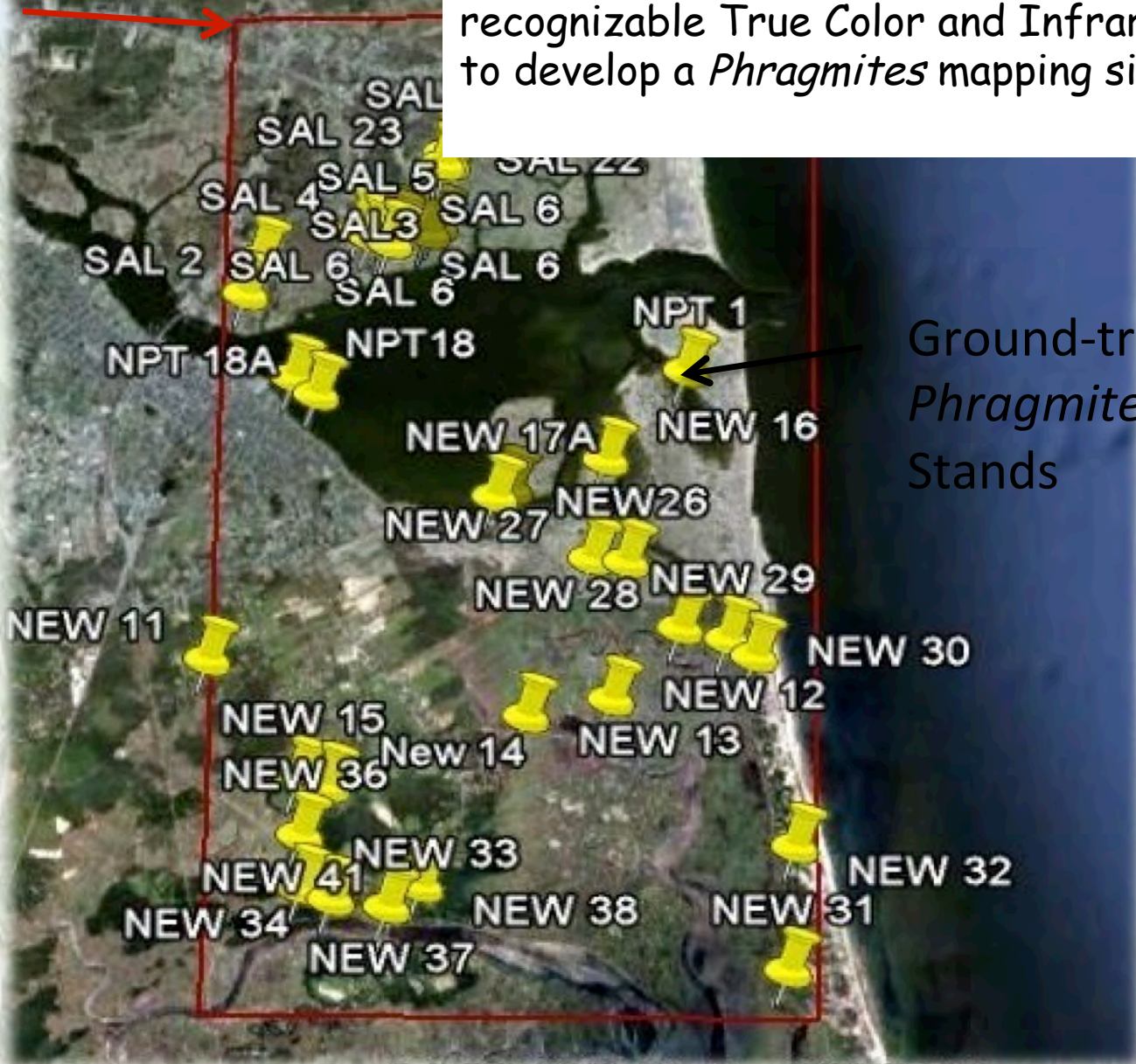
Presence/absence of seed heads



Marking a stand that has been measured

Pilot Area

Used **Pictometry** low elevation, oblique angle, high resolution photography to create highly recognizable True Color and Infrared images to develop a *Phragmites* mapping signature.



Ground-truthed
Phragmites
Stands



Urban areas



Near plants with similar structure



Mixed vegetation



Partially under tree cover



Expansive stands



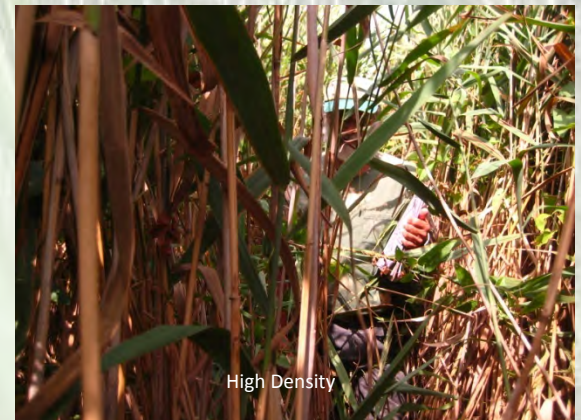
Adjacent to water



Low density



In the open marsh



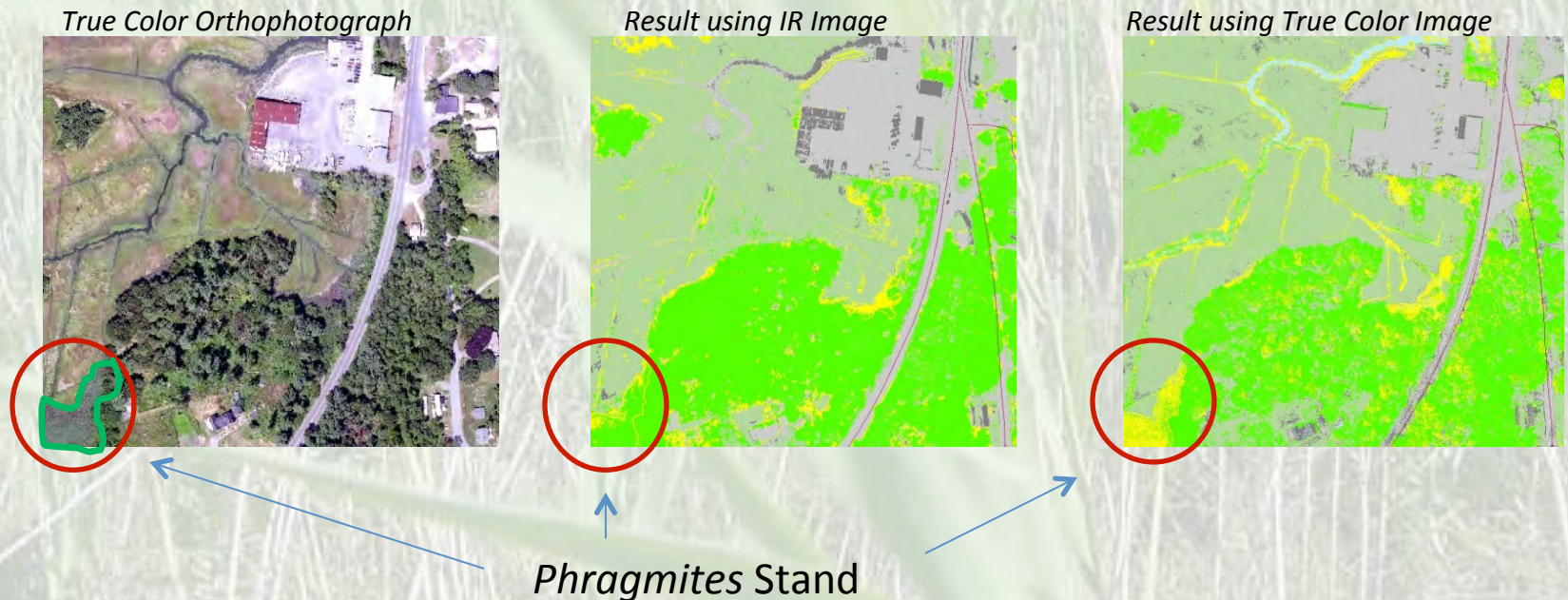
High Density

Variety of Phragmites Stands to Test the Limits Imagery Software

Supervised Imagery using Training Areas

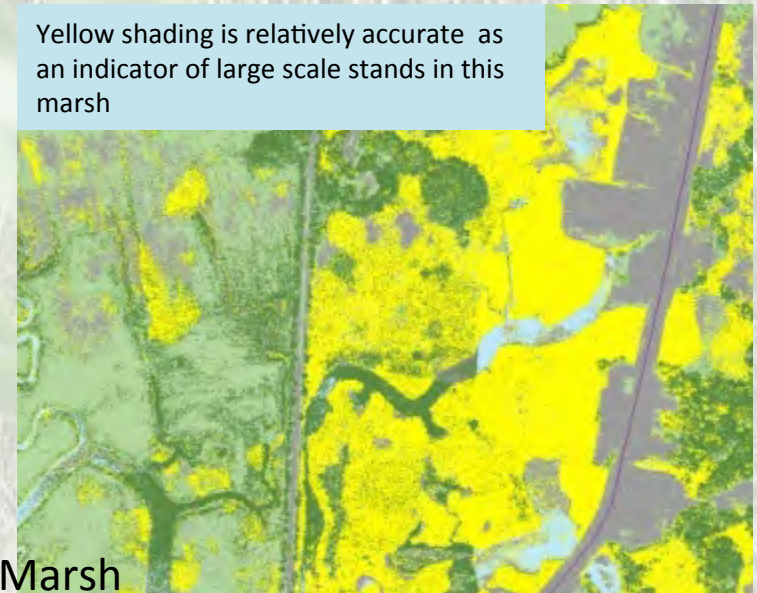
- Red circles indicate known *Phragmites* stands
- Yellow shading indicates projected *Phragmites* stands

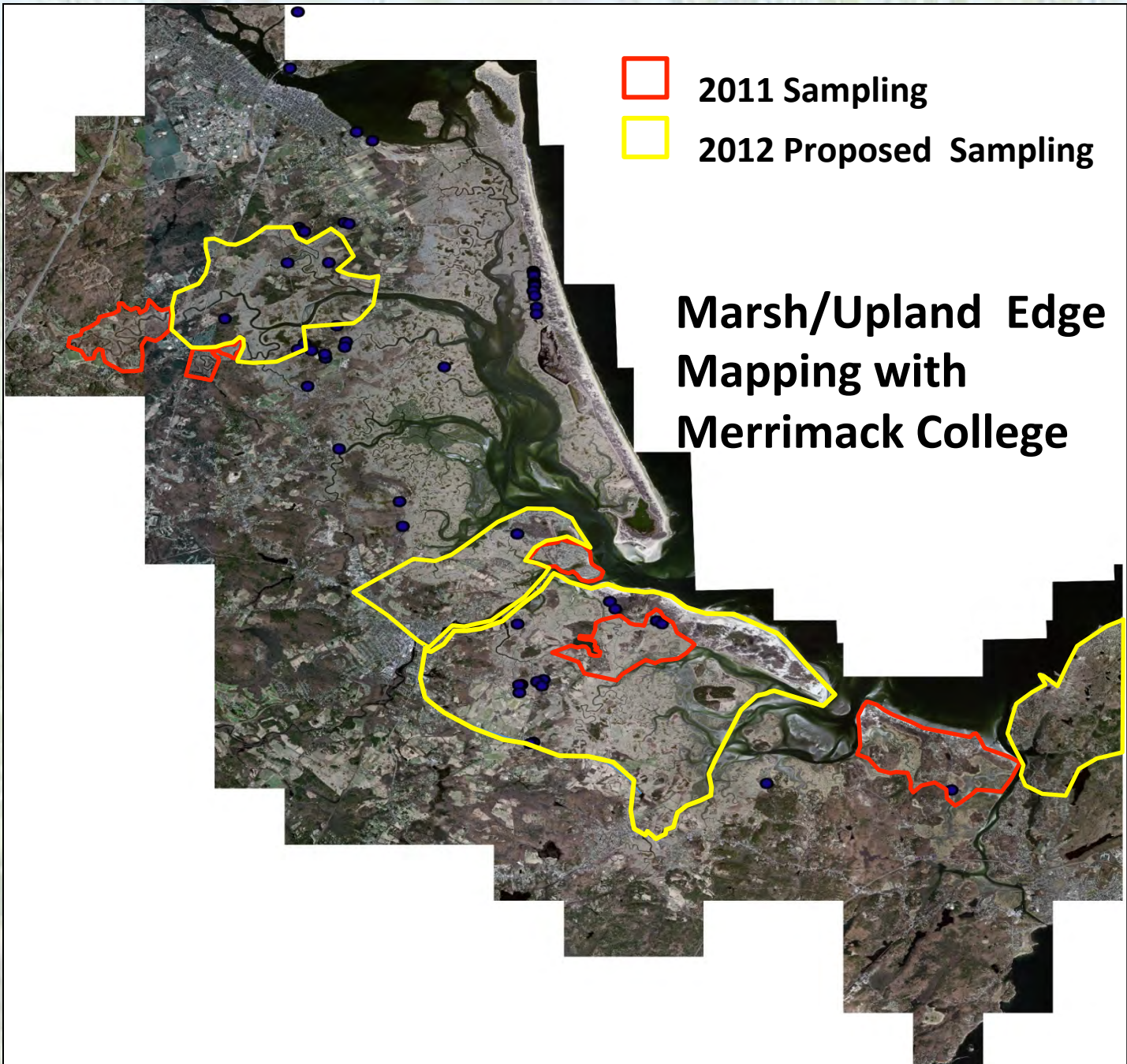
Processed Images



True color imagery gives a moderately better result than the infrared imagery for identifying the known *Phragmites* stand

True Color Imagery





Phragmites Sites on the Great Marsh

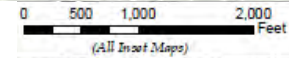


MAPPING RESULTS

OPEN MARSH PHRAGMITES IN THE GREAT MARSH



Mapped 2009 -2012



Density and Radius of Phragmites Stands (feet)

High Density	Medium Density	Low Density	Unknown Density
● 0 - 10	● 0 - 10	● 0 - 10	● < 10
● 10 - 25	● 10 - 25	● 10 - 25	● 10 - 25
● 25 - 50	● 25 - 50	● 25 - 50	● 25 - 50
● 50 - 100	● 50 - 100	● 50 - 100	● 50 - 100
● > 100	● > 100	● > 100	● > 100

2

NEWBURYPORT TURNPIKE

PLUM ISLAND RIVER

PINE ISLAND

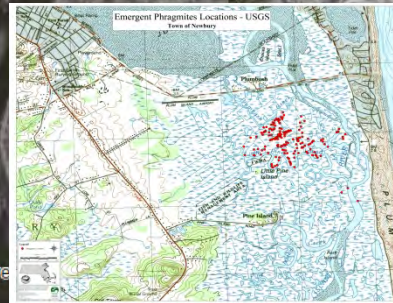
Stand Density

Low

Medium

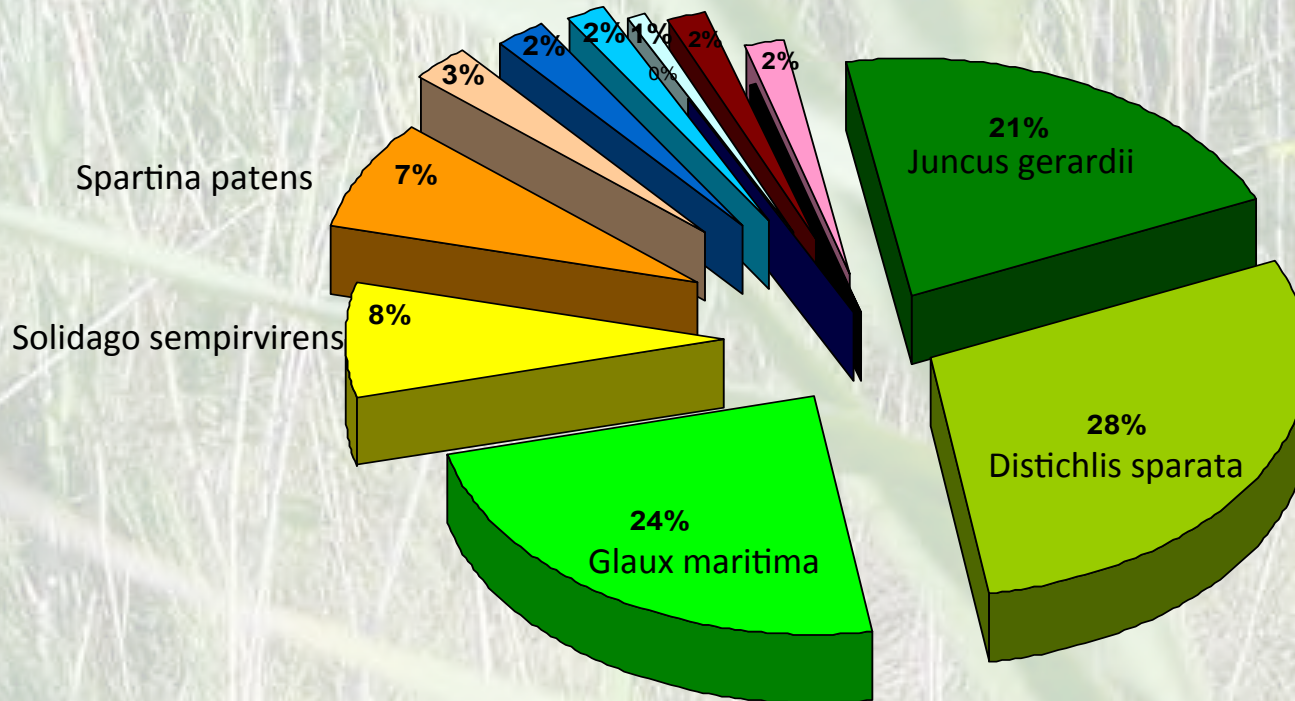
High

Source: Esri, DeLorme, USDA, USGS, AEX, GeoEye, User Community

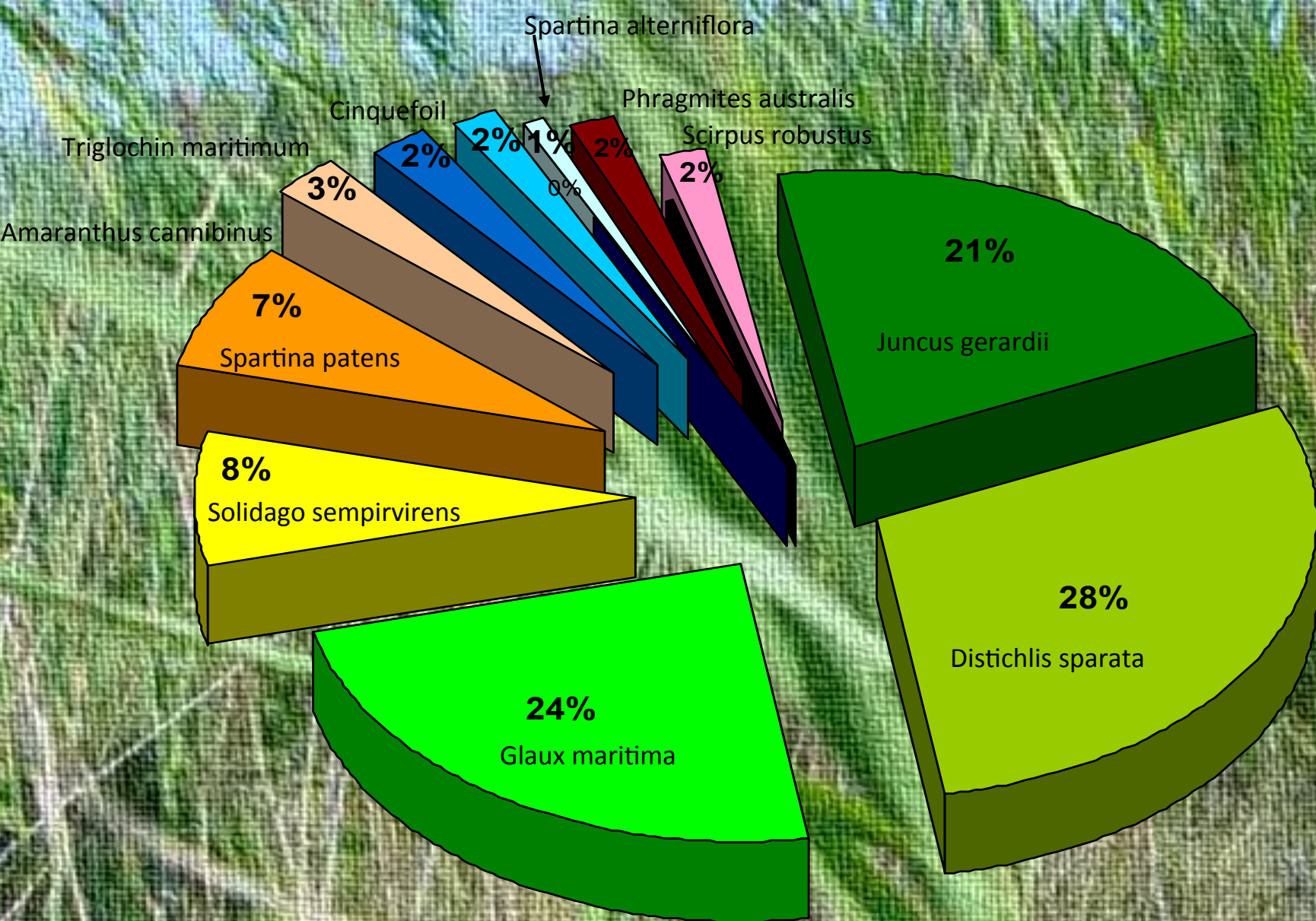


Basic Stand Statistics for Phragmites in Section 2

- 325+/- Phragmites stands in 750 acres
- Over 55% of all Stands Low Density
- Mean Stand Radii Average Ranged from 2m (low density) to 20m (high density)
- Low Density Stand Stem Heights (1m), about half that of High Density Stand Stem Heights (2m)



Total Plant Percentages



6

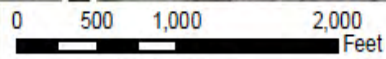
IPSWICH RIVER

FOX CREEK

LABOR IN VAIN CREEK

ARGILLA ROAD

Stand Density
Low
Medium
High



(All Inset Maps)






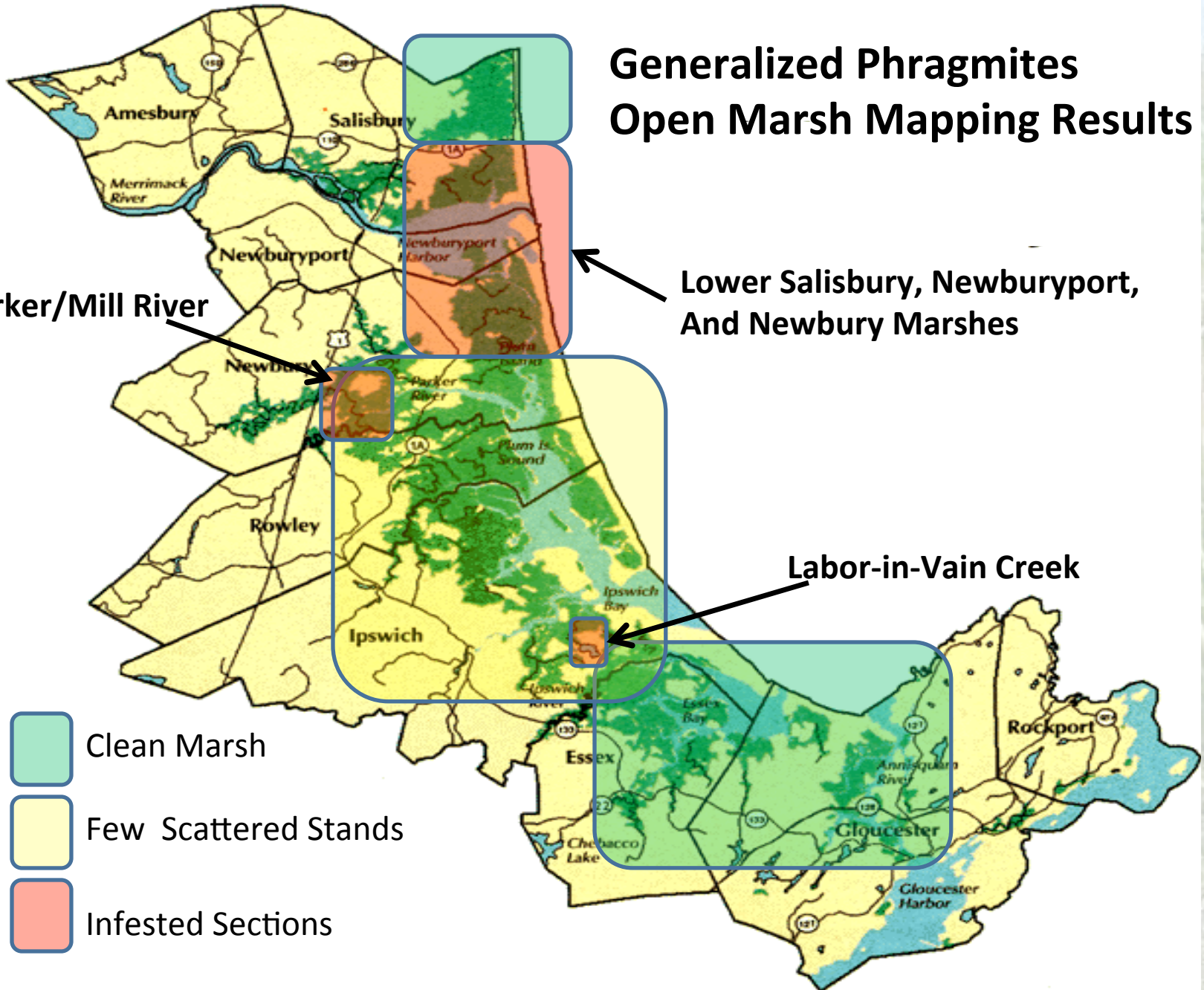
Generalized Phragmites Open Marsh Mapping Results

Parker/Mill River

Lower Salisbury, Newburyport,
And Newbury Marshes

Labor-in-Vain Creek

-  Clean Marsh
-  Few Scattered Stands
-  Infested Sections



Emergent Phragmites Locations - Orthophoto Pilot Sites

Town of Newbury



Little Pine Island Creek

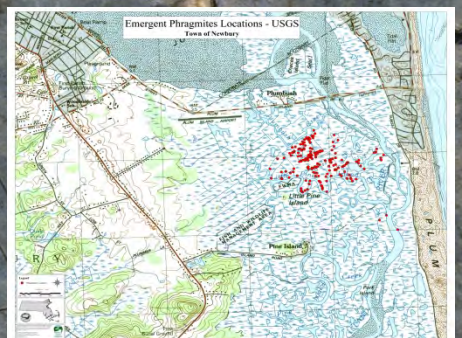
Legend

- Town Boundary
- Phragmites Density**
 - High
 - Medium
 - Low
- Phragmites Radius (Ft)**
 - 0 - 5
 - 6 - 13
 - 14 - 21
 - 22 - 40
 - 41 - 70

Scale: 1:500 at 1" = 80' Feet

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U.S. Department of Homeland Security
U.S. Environmental Protection Agency
U.S. Army Corps of Engineers
U.S. Forest Service
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. National Aeronautics and Space Administration
U.S. National Oceanic and Atmospheric Administration
U.S. National Science Foundation
U.S. National Security Agency
U.S. National Security Council
U.S. National Security Intelligence Council
U.S. National Security Intelligence Council
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U.S. National Security Intelligence Council



Pilot Site Chemical Treatment Options



Mobilization via Boat



Backpack Spraying



Cut and Drip

Backpack Spraying



Pilot Site Chemical Control Results



Cut and Drip



Treated Pilot sites

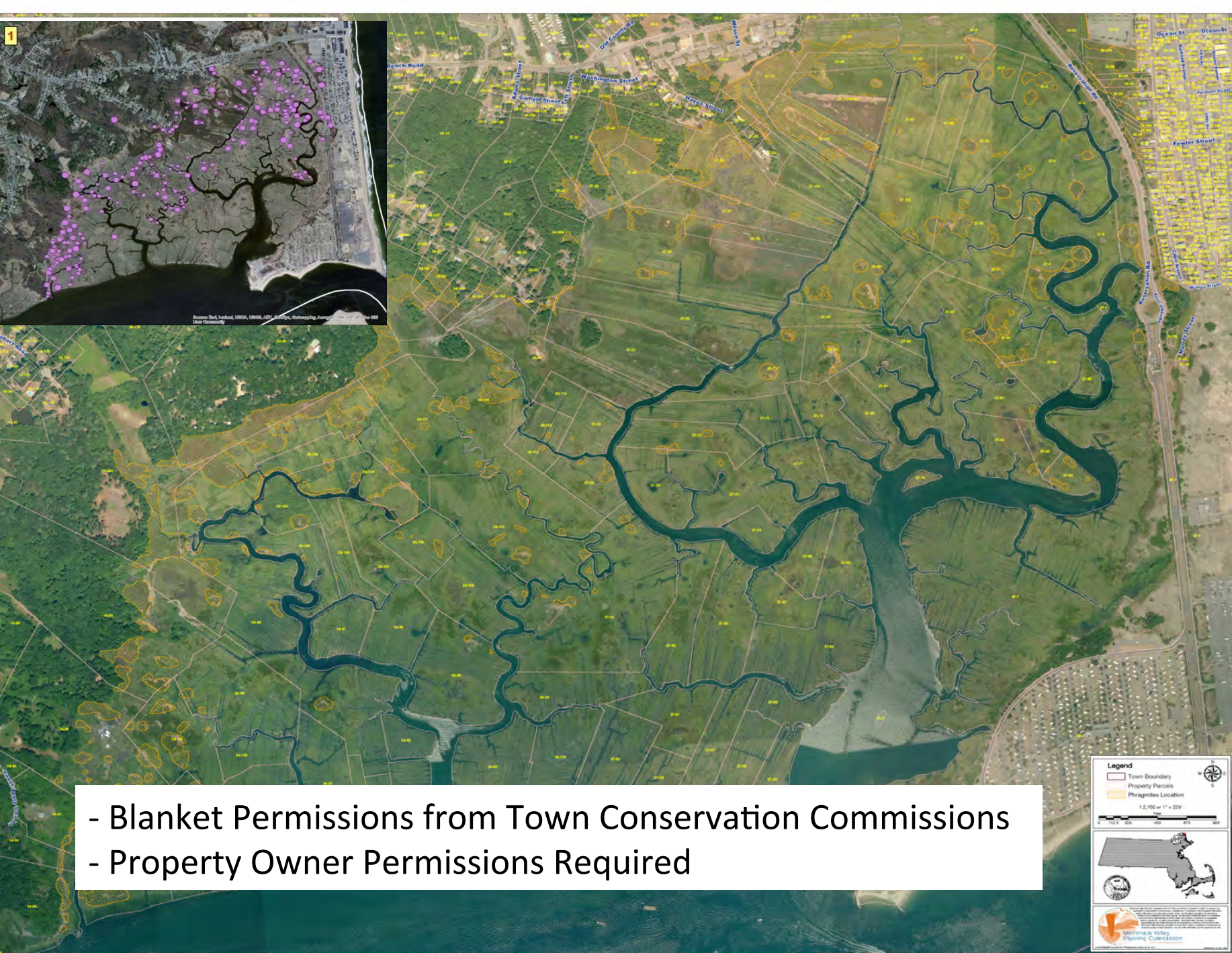
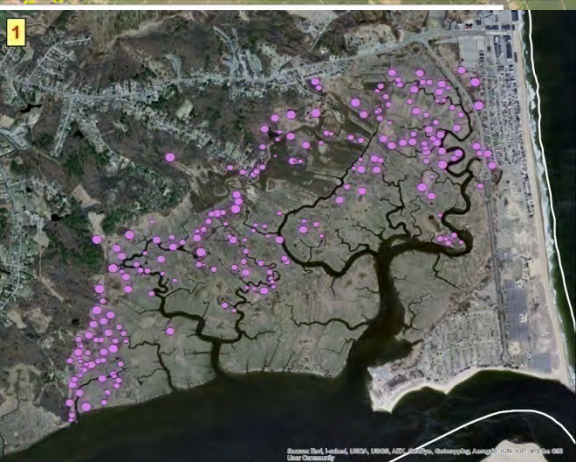
Large Stands Required Large Measures



Smaller Stands are Treated by Backpack Spraying



Treatments occur in the late summer/early fall



- Blanket Permissions from Town Conservation Commissions
- Property Owner Permissions Required

Legend

- Town Boundary
- Property Parcel
- Permittees Location

1:2,100 or 1" = 229'

Marlborough Valley Planning Commission