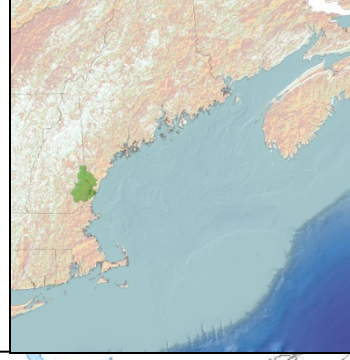
Community-Based Oyster Restoration in New Hampshire

COLD WATER ~ WARM HEARTS

Ray Konisky, Director of Marine Science, NH Chapter

The Nature Conservancy
Protecting nature. Preserving life.™

Piscataqua Region and the Great Bay Estuary of NH



By the Numbers…

- 671,000 ac watershed: +20% population last 20 yrs
- Strong growth: +2500ac/yr impervious last 7 yrs
- Sediment loads on rise: +28% in 10 yrs
- Nitrogen a major issue: +42% last 5 yr
- Eelgrass cover in decline: -37% last 10 yrs
- Oysters at ~10% of 1970s levels … but persisting

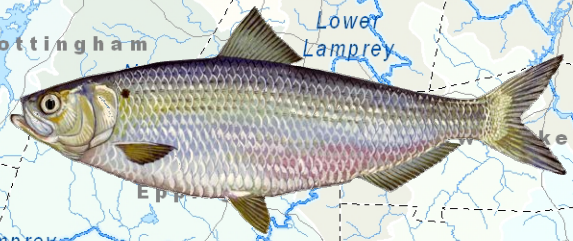
Keystone Species
Oyster Filtration Services (adults 20 gal/day)

Chlorophyll removed

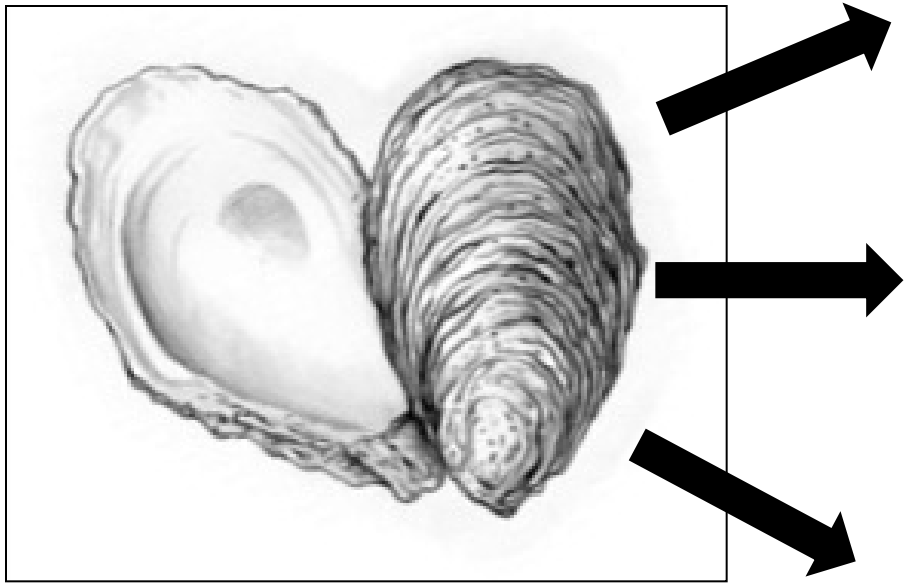
Nitrogen sequestered

Clarity improved

Silt trapping



Oyster Paths & Goals For Nitrogen Control



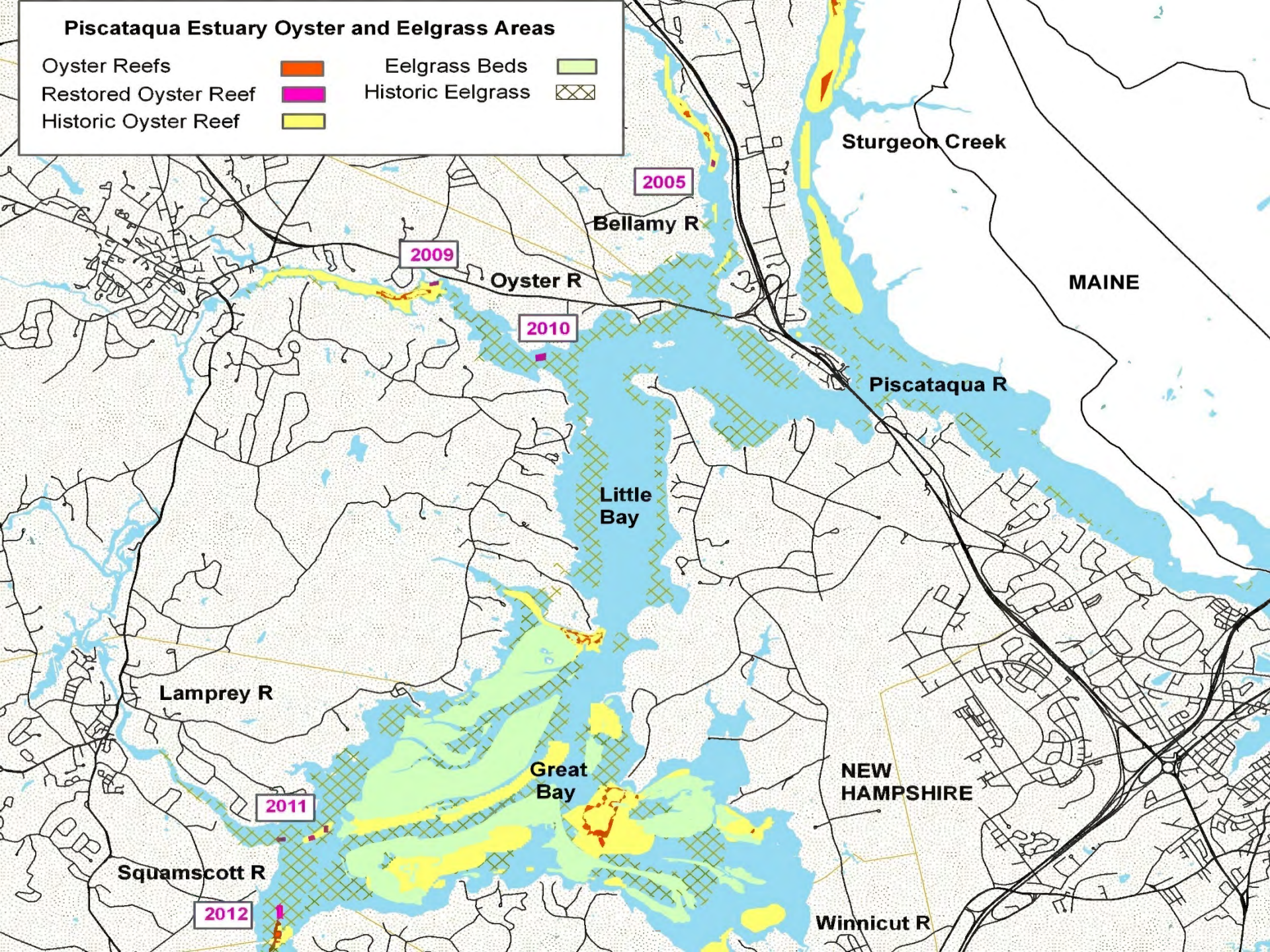
0.25	Released to Atmosphere (Denitrification) Piehler and Smyth (2011)
0.15	Sequestered in Shell and Tissue Higgins et al. (2011)
0.13	Buried in Sediments Newell et al. (2005)

0.53 **Tons N per yr per ac of Oysters (50/m^2)**

2011 Total N Load in Great Bay Estuary, NH: 1250 Tons

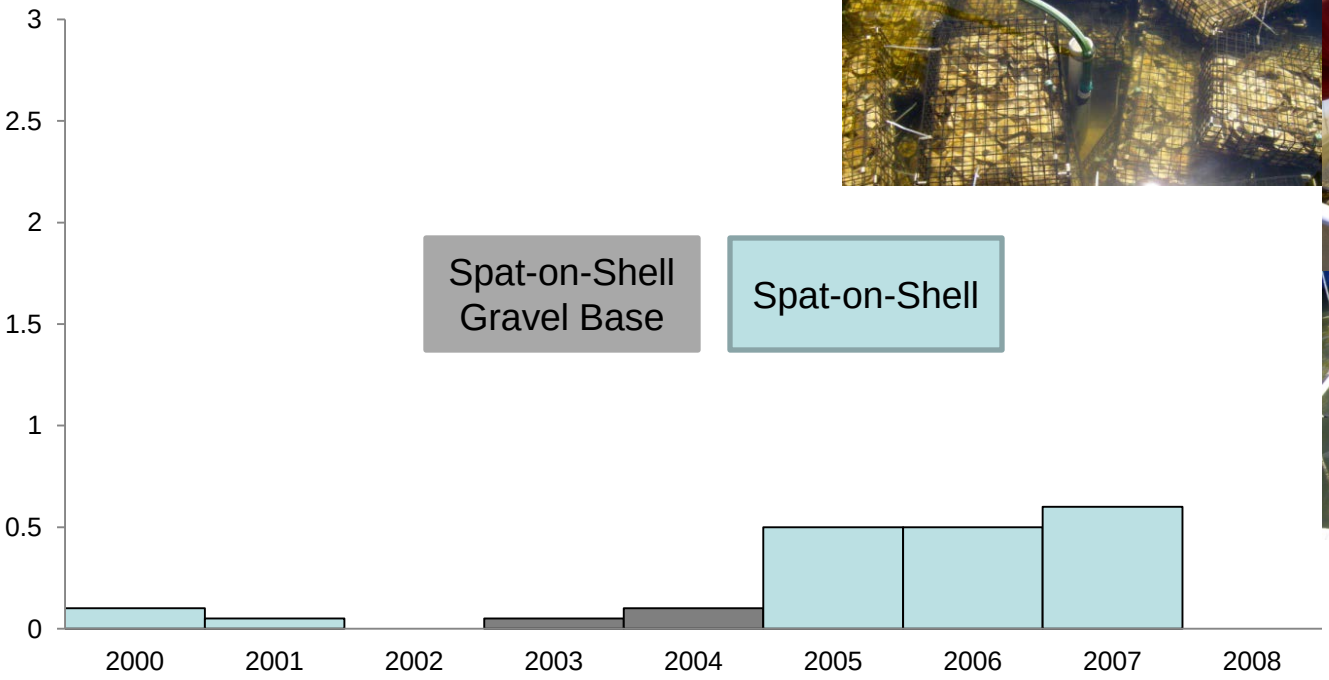
With Load Reduction to 775 Tons N
200 ac of Oyster Reefs and 100 ac of Oyster Farms = 18% N Control

Oyster Filtration Capacity = Great Bay Estuary Residence Time


Piscataqua Estuary Oyster and Eelgrass Areas
Oyster Reefs
Restored Oyster Reef
Historic Oyster Reef
Eelgrass Beds
Historic Eelgrass
Sturgeon Creek
2005
Bellamy R
2009
Oyster R
2010
MAINE
Piscataqua R
Little Bay
Lamprey R
Great Bay
NEW HAMPSHIRE
2011
Squamscott R
2012
Winnicut R

UNH Jackson Lab

Dr. Ray Grizzle and Krystin Ward



Oyster Reef Acres Restored

Remote Set Operations

Coastal Conservation Association
Oyster Shell Recycling

www.ccanh.org

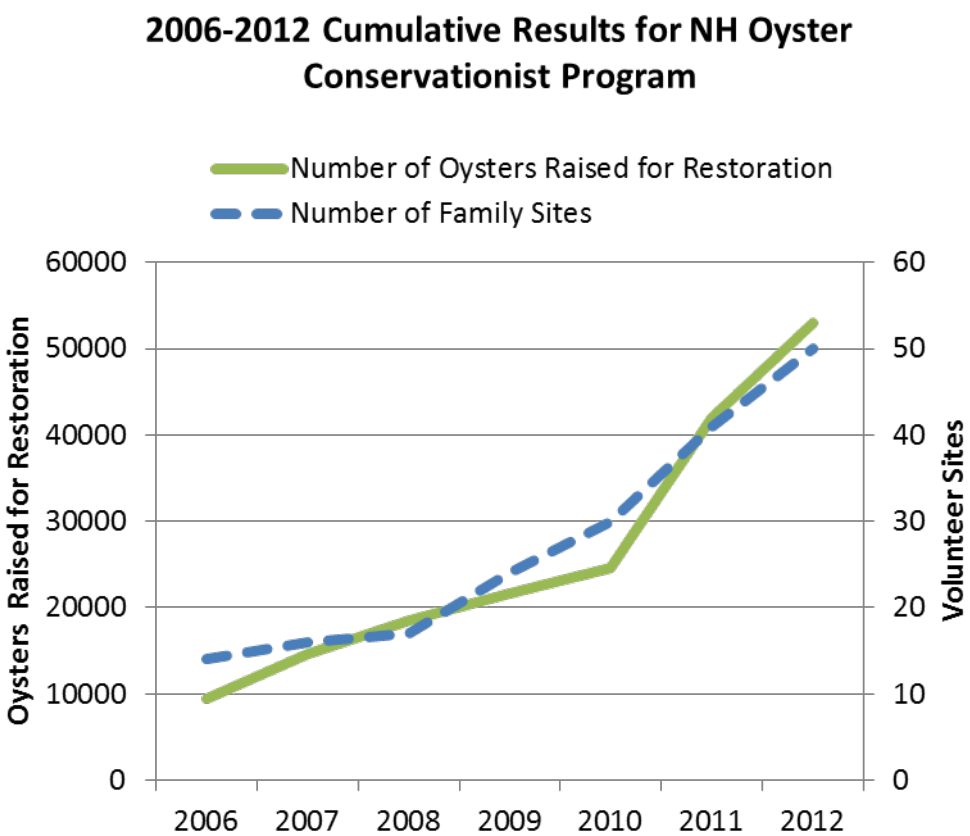
Participating Restaurants

Surf
Jumpin Jays
Roberts Maine Grill
The Oar House
The Old Salt Tavern
Sanders Market
Philbricks Fresh Market

10 Tons/Yr for Spat-on-Shell

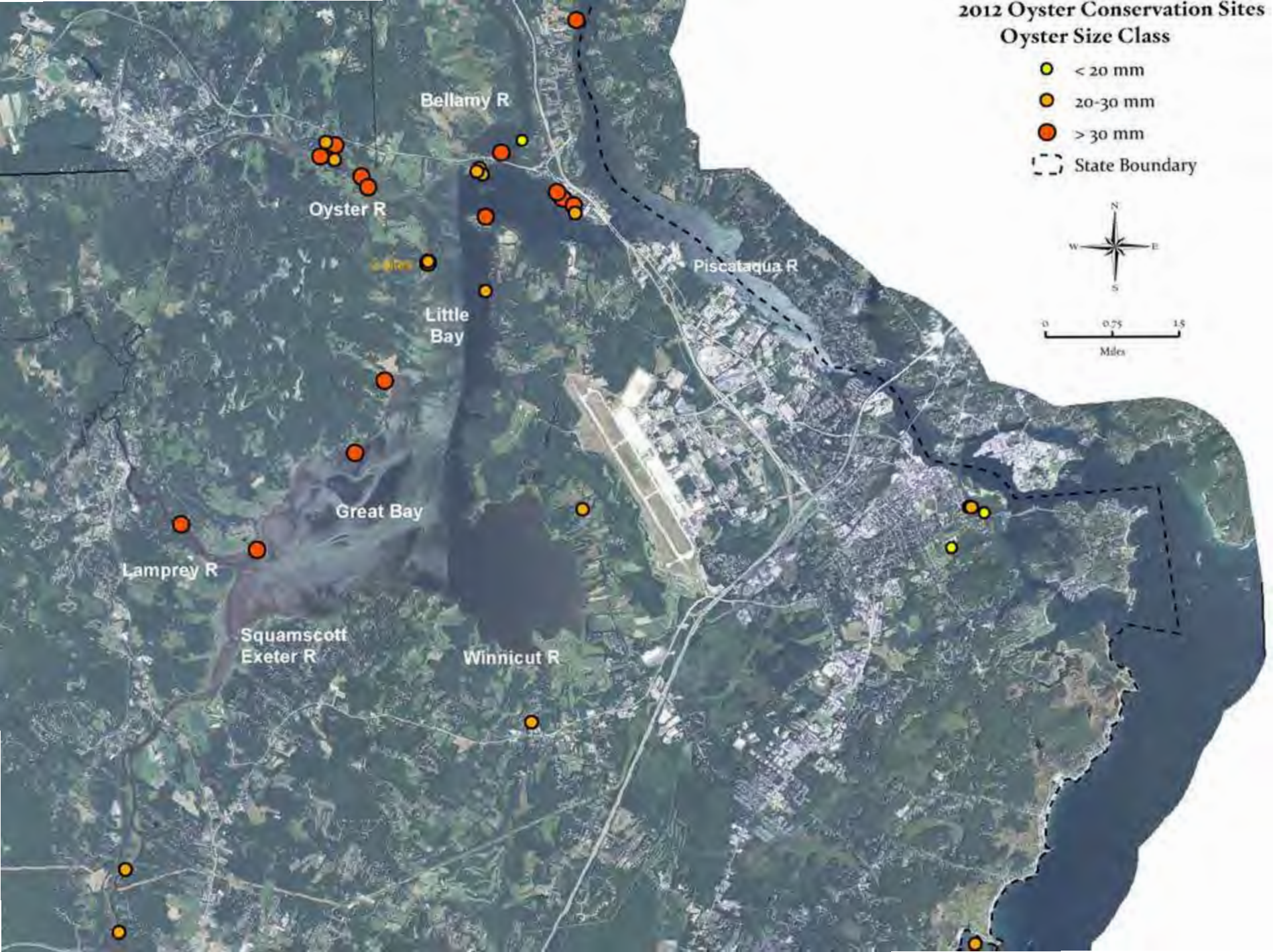
The Nature Conservancy

Oyster Conservationist Program



Program Highlights:

- Seven years of operation
- **Learn about oysters & ecology**
- **Raise oysters for restoration**
- **A simple 10 week program**
- **Get involved to help the Estuary**


2012 Oyster Conservation Sites
Oyster Size Class
< 20 mm
20-30 mm
> 30 mm
State Boundary
N
W
E
S
0
0.75
1.5
Miles
Bellamy R
Oyster R
Piscataqua R
Little Bay
Great Bay
Lamprey R
Squamscott
Exeter R
Winnicut R

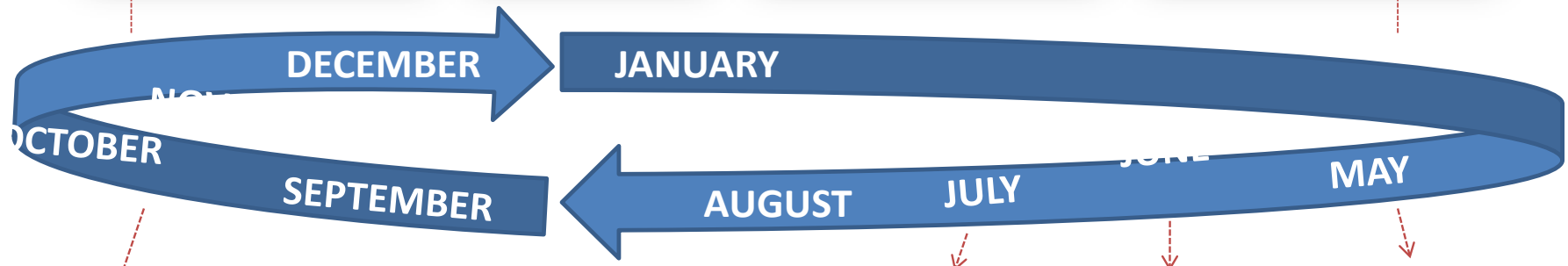
How do we restore oysters in NH's Estuary?

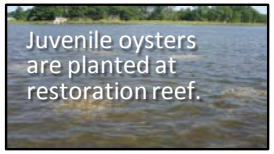
Collect recycled oyster shell for hatchery operations.

Acquire and transport clam shell to Kingman Farm.

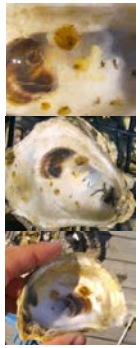
Quarantine shell for 6 months (Nov – April).

Clam shell is used to construct reef foundation.





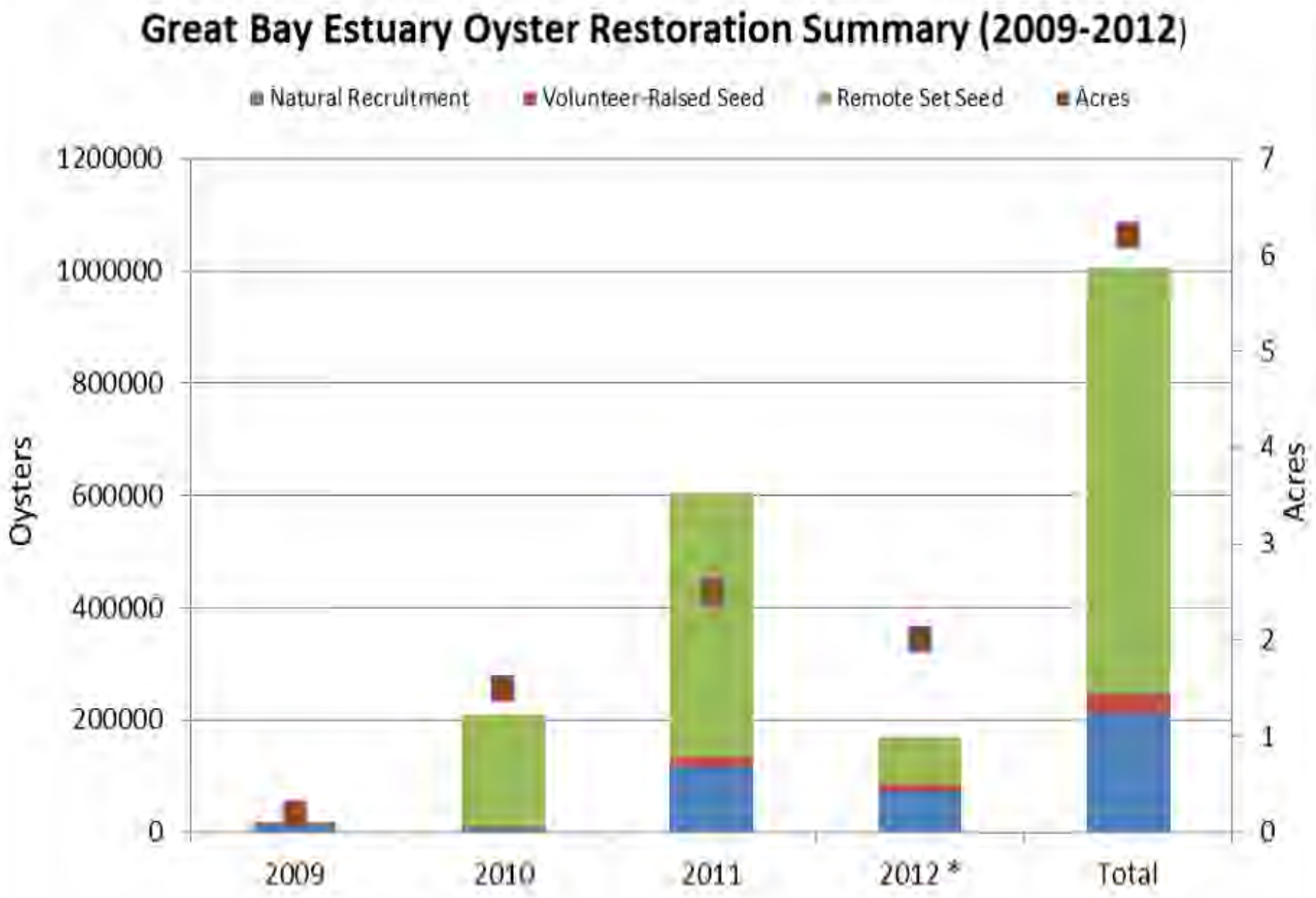
<u>July – September</u>:
TNC's Oyster Conservationists and UNH staff raise oyster spat to juvenile size.



<u>Hatchery Operation:</u>
Set larvae onto shell at UNH's Jackson Estuarine Laboratory.

Construct new reef base by barge operation.

Load shell into 1-ton bags for transport to restoration site.


Great Bay Estuary Oyster Restoration Summary (2009-2012)
Natural Recruitment
Volunteer-Raised Seed
Remote Set Seed
Acres
Oysters
Acres
1200000
1000000
800000
600000
400000
200000
0
7
6
5
4
3
2
1
0
2009
2010
2011
2012 *
Total

Primary Partners

Federal

Permitting Agencies

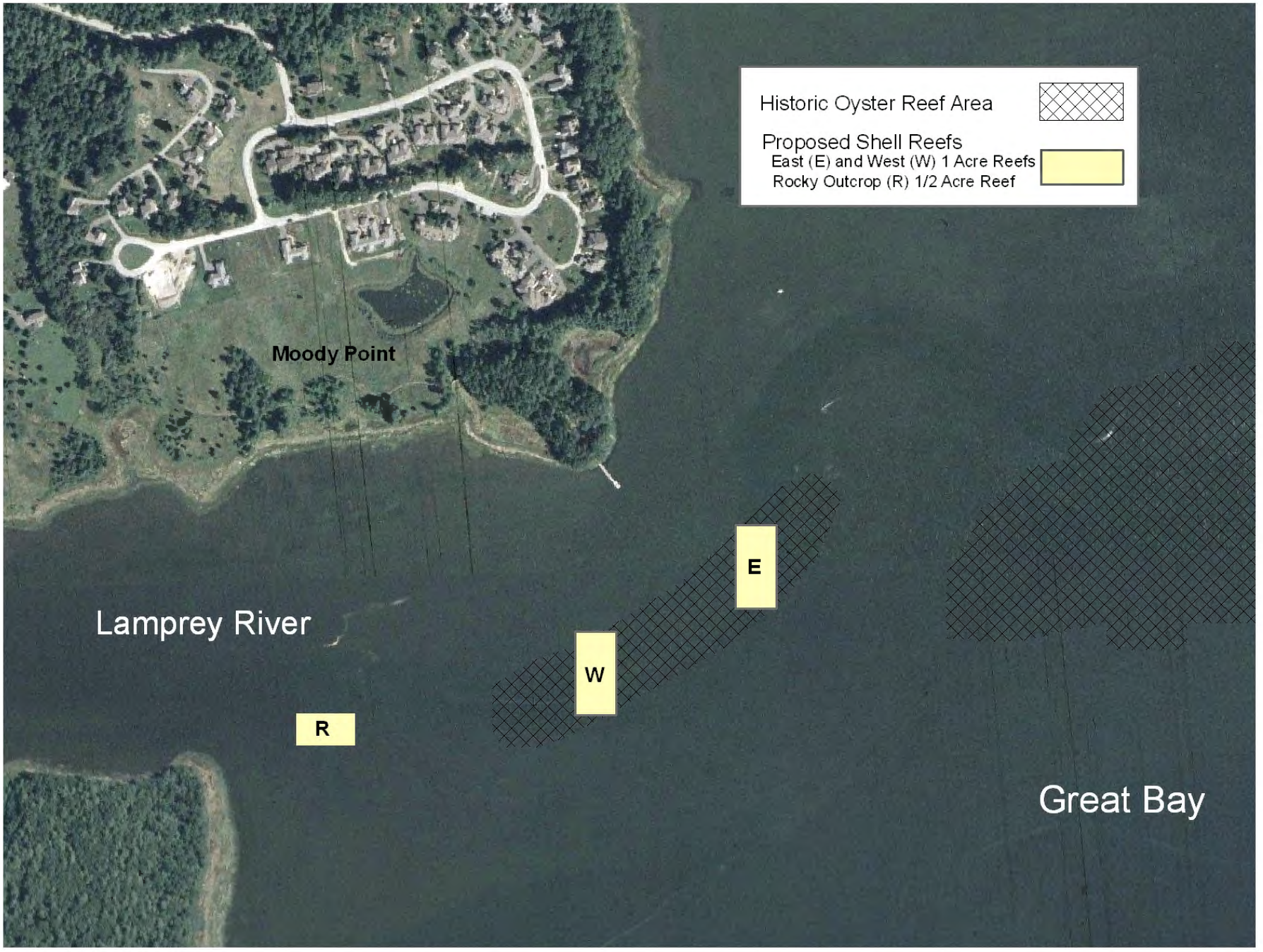
State

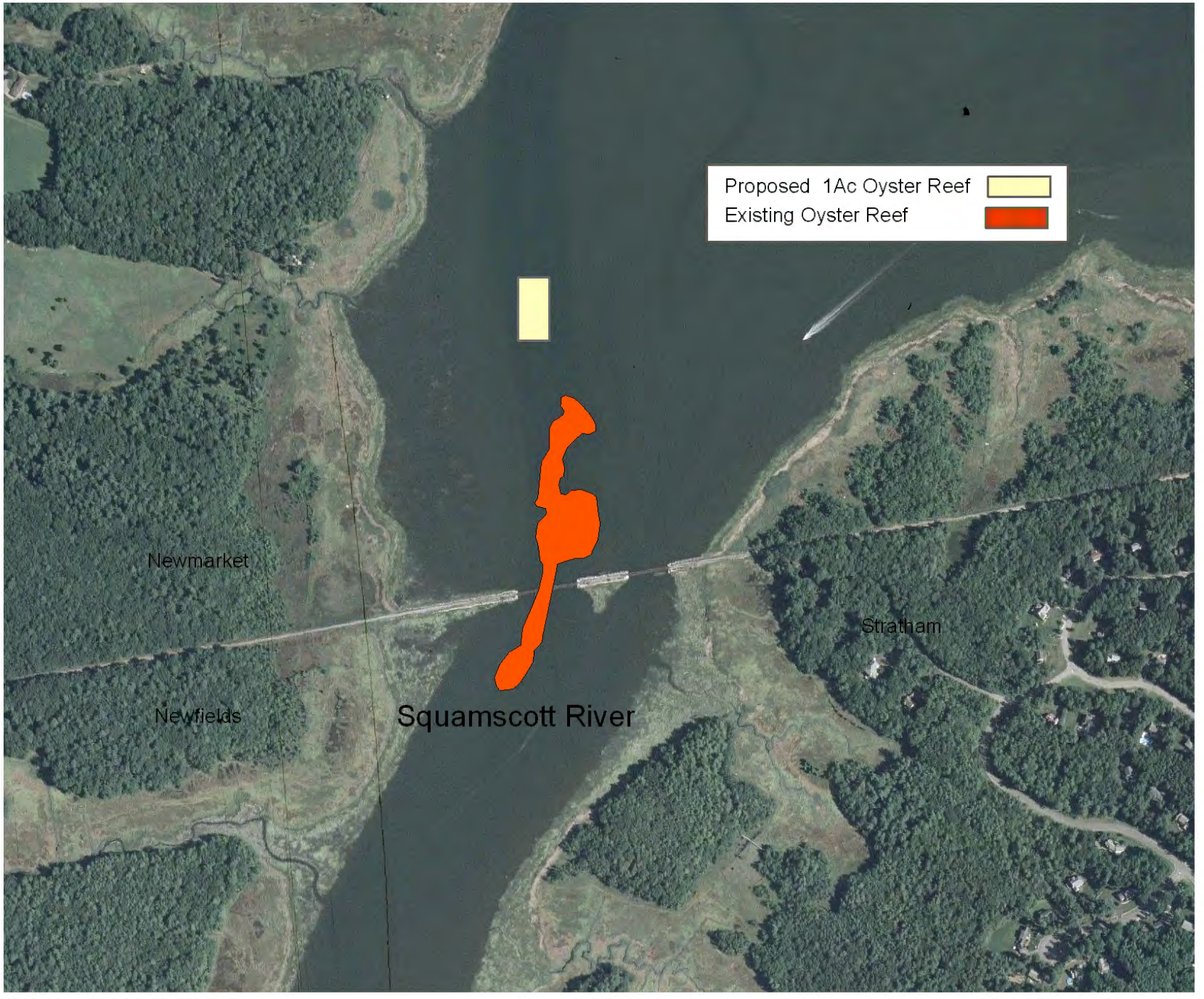
Oyster Farmers

Private (Many TNC donors)

Thanks!
Questions?

N
W
E
S
Rt 4
Wagon Hill
Created Shell Reef
Oysters Present
Proposed Oyster Reef
1,100
550
0
1,100 Feet


Historic Oyster Reef Area
Proposed Shell Reefs
East (E) and West (W) 1 Acre Reefs
Rocky Outcrop (R) 1/2 Acre Reef
Moody Point
Lamprey River
Great Bay
E
W
R


Proposed 1Ac Oyster Reef
Existing Oyster Reef
Newmarket
Newfields
Squamscott River
Stratham