

Status of Eelgrass in the Lamprey and Great Bay Watershed

Fred Short

Jackson Estuarine Lab
UNH



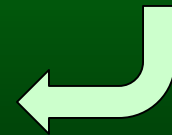


Eelgrass in the Great Bay Estuary

--

New Hampshire /
Maine

*How it looked
in the past!*





Jackson Estuarine Lab

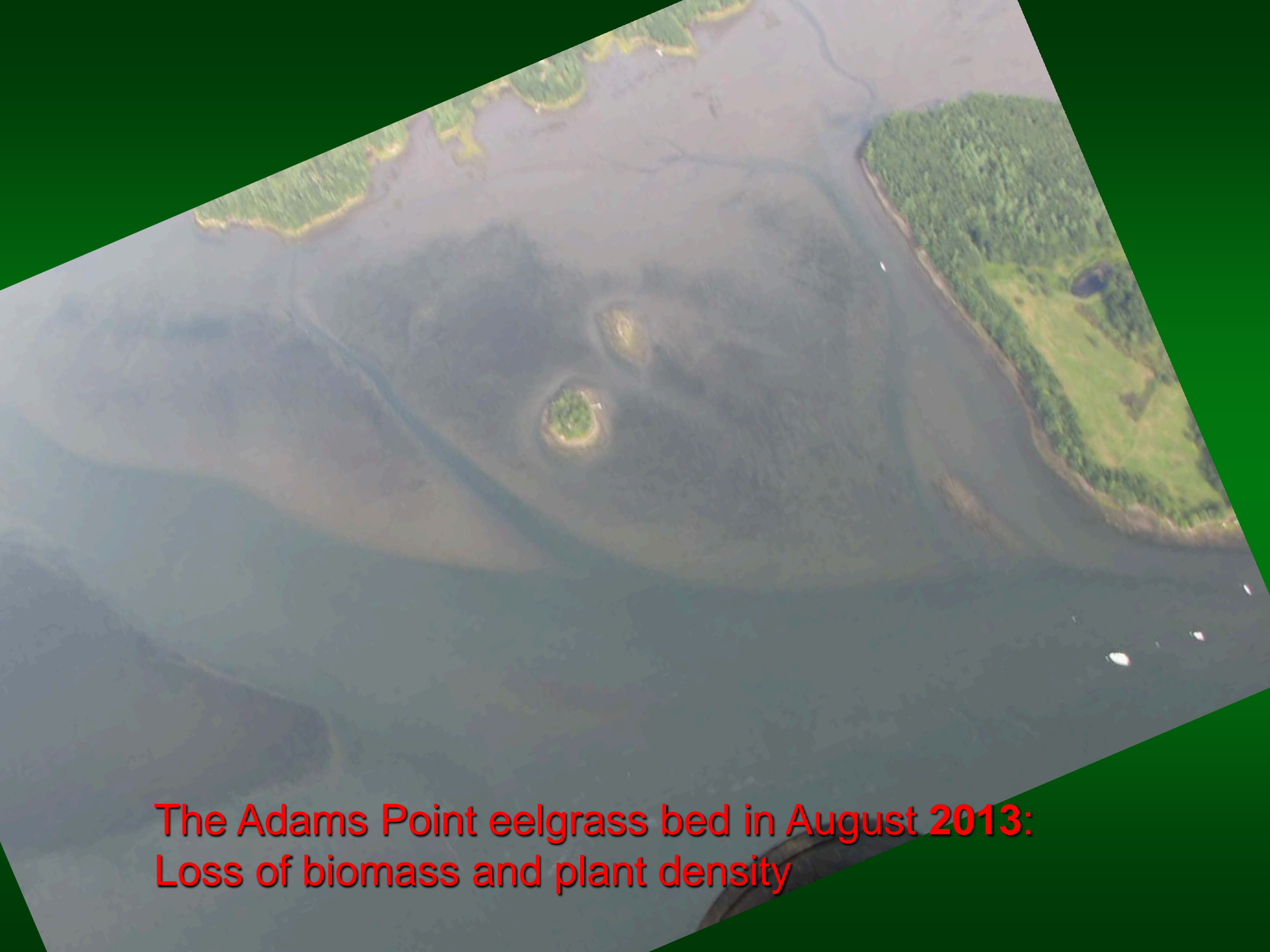


Dense eelgrass beds near Adams Point,
Great Bay, NH - August **1996**



Jackson Estuarine Lab

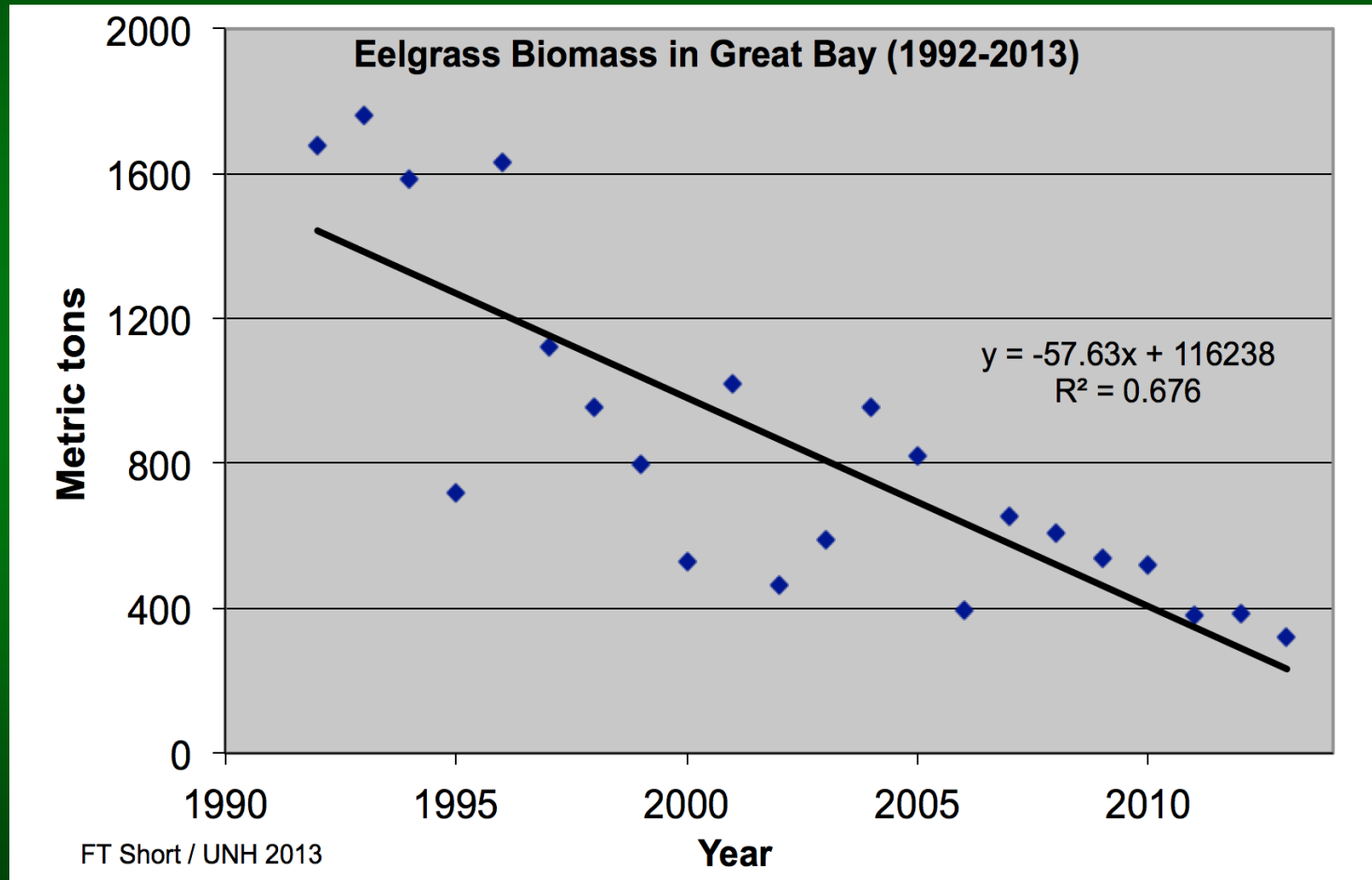
The Adams Point eelgrass bed in August **2009**:
Loss of biomass and plant density

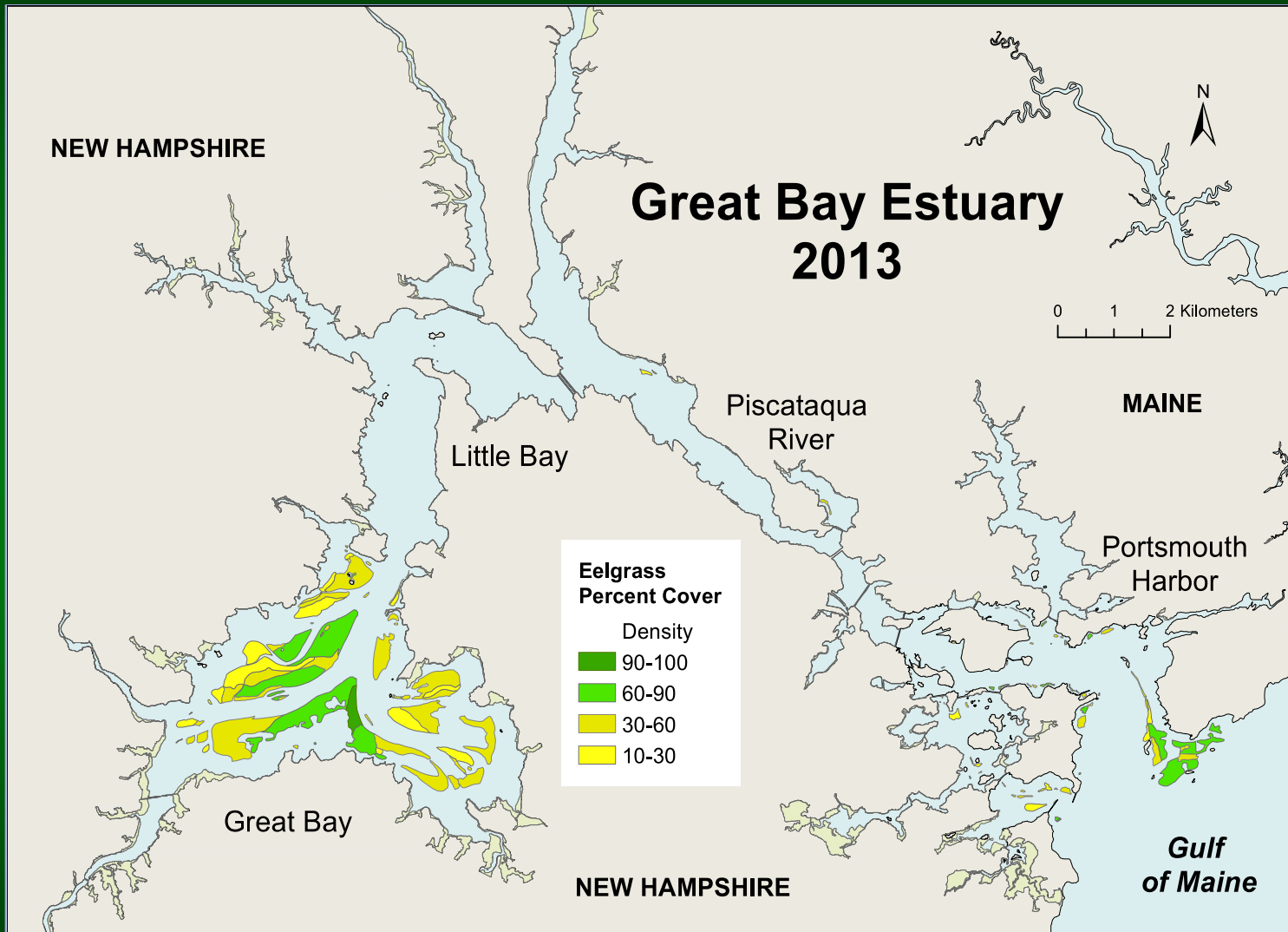


The Adams Point eelgrass bed in August 2013:
Loss of biomass and plant density

Eelgrass Monitoring in New Hampshire

From: NH State of the Estuary Report 2009 - PREP





Between 2012 and 2013 the Great Bay lost 333 acres of eelgrass!

Why do we care?

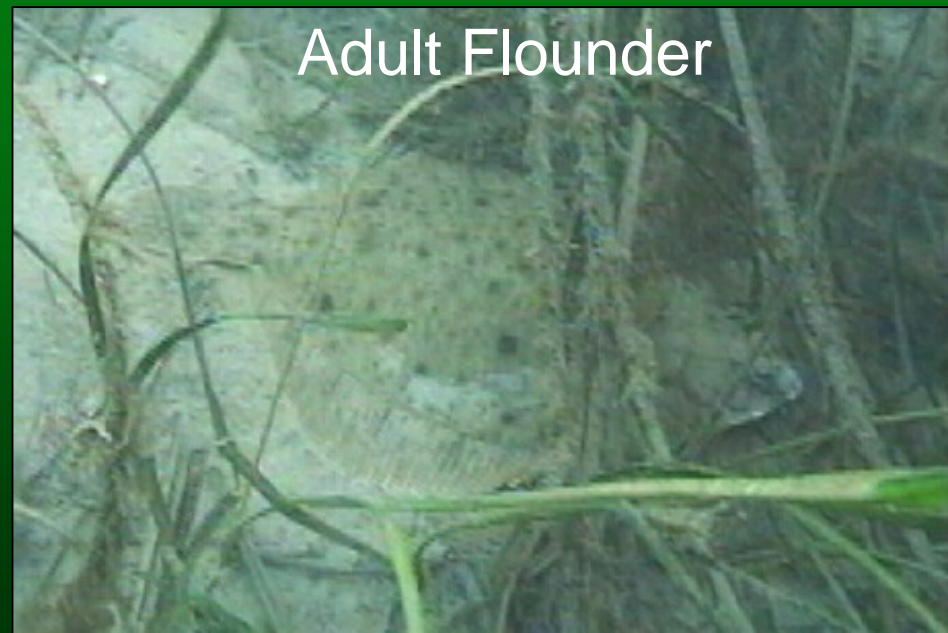
Eelgrass is an indicator of the health of the GBE

What does eelgrass do for us?

- Filters the Bay waters
- Attracts more fish (flounder, striped bass, etc.)
- Nursery for fish and shellfish
- Feeds waterfowl
- Produces oxygen

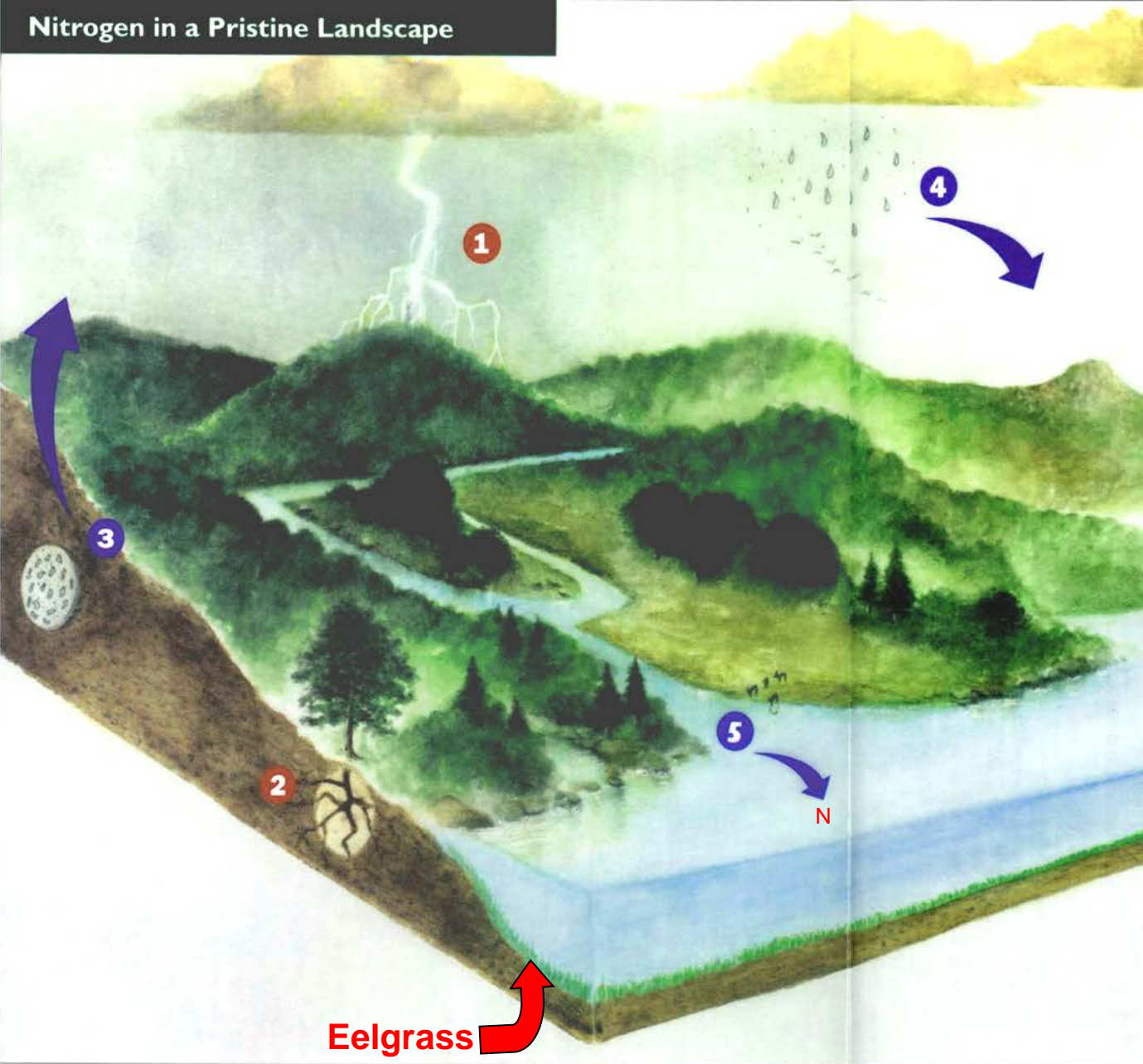


Young Lobster



Adult Flounder

Nitrogen in a Pristine Landscape



Nitrogen Sources:

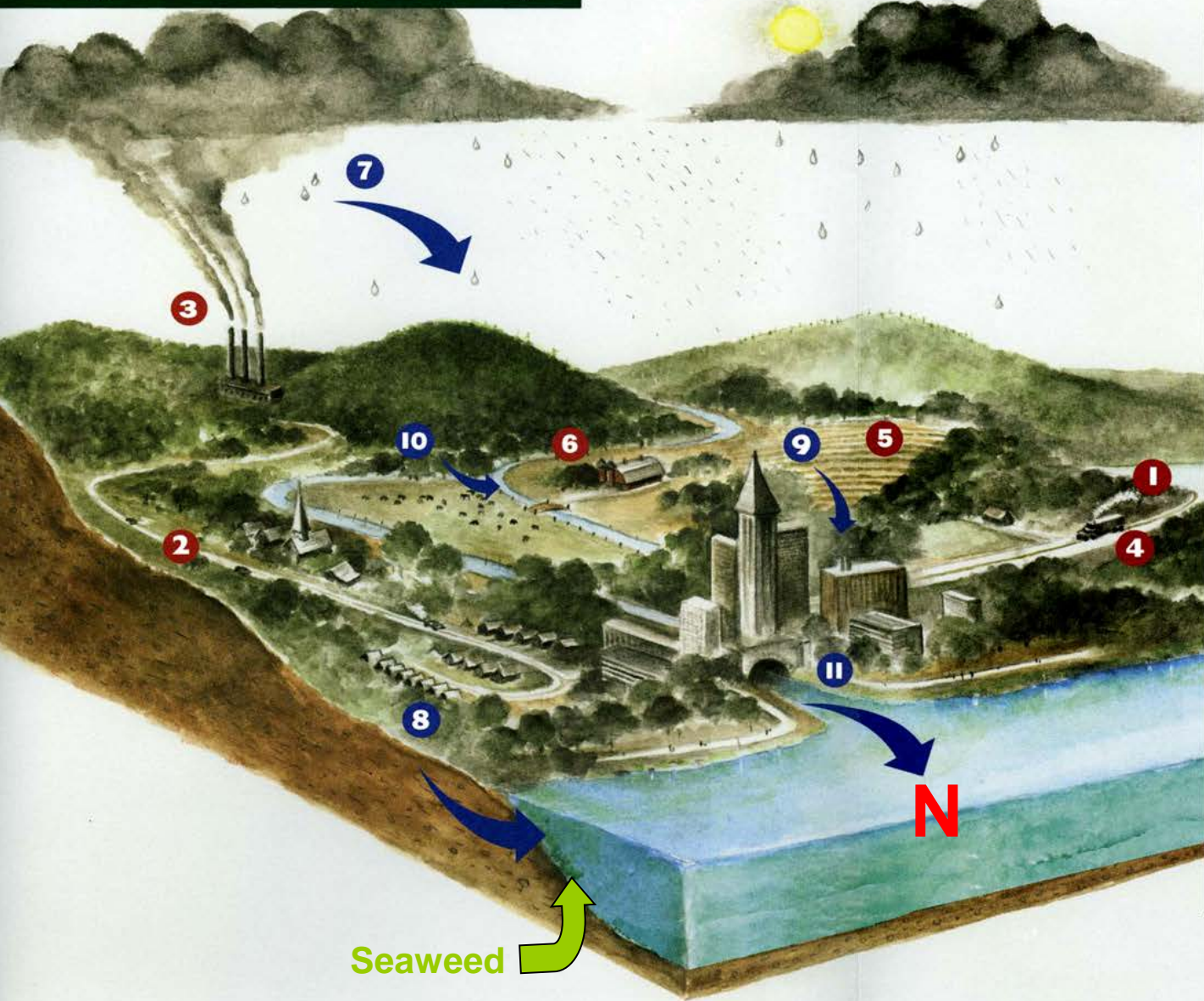
1. Lightning strikes
2. Fixation by plant-associated and soil bacteria

Nitrogen Fluxes:*

3. Denitrification by bacteria
4. Atmospheric deposition
5. Watershed runoff

* A flux is the movement of nitrogen from one component of the ecosystem to another.

Nitrogen in a Human-Altered Landscape



Nitrogen Sources:

- 1. Imported food and feed
- 2. Vehicle emissions
- 3. Powerplant emissions
- 4. Fertilizer imports
- 5. Fixation in croplands
- 6. Agricultural emissions

Nitrogen Fluxes:*

- 7. Atmospheric deposition
- 8. Wastewater from septic tanks and treatment plants
- 9. Agricultural runoff
- 10. Forest runoff
- 11. Urban runoff

* A flux is the movement of nitrogen from one component of the ecosystem to another.



Nitrogen Causes Eelgrass Loss in Great Bay

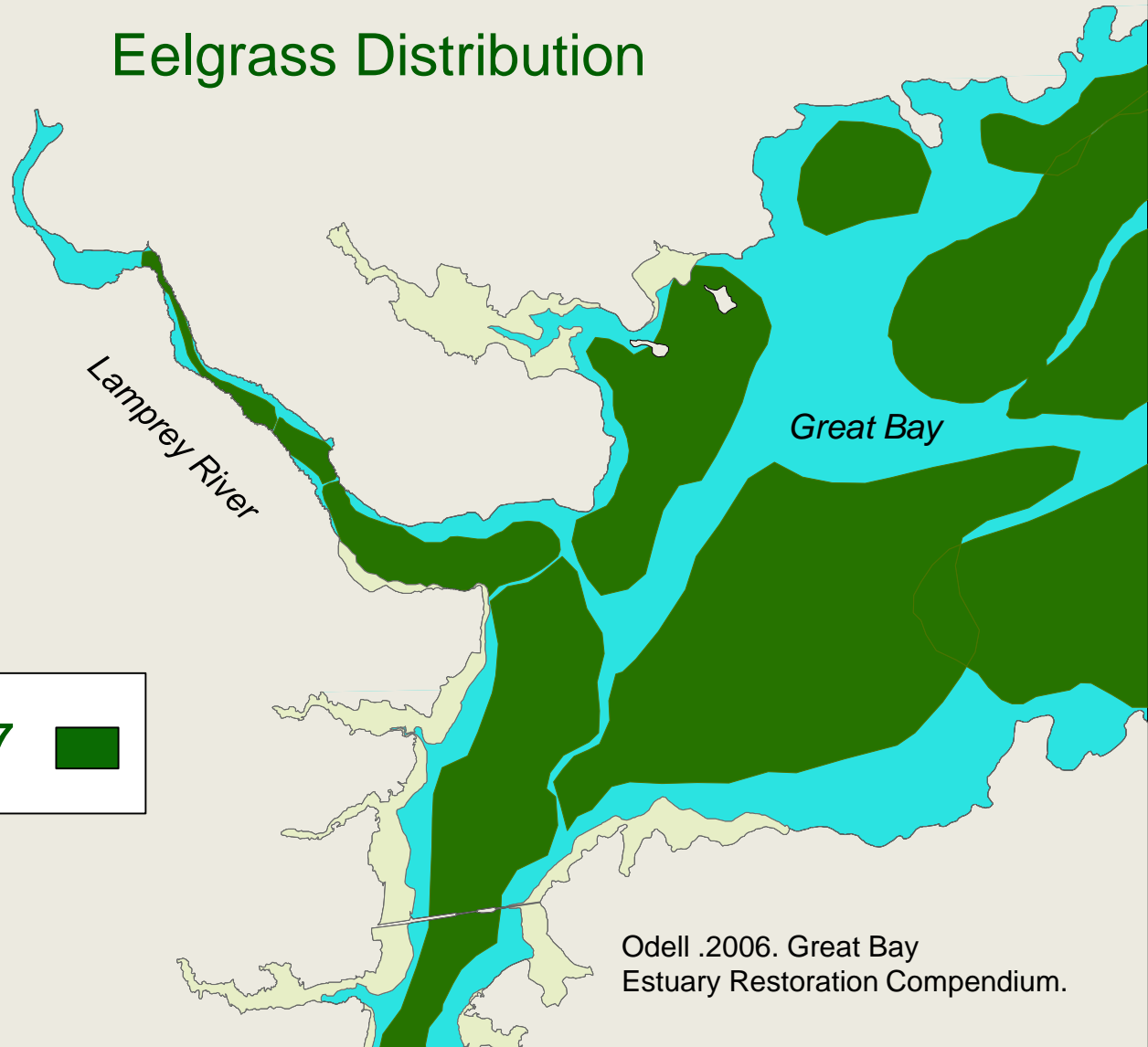
Plankton clouds the water
and shades eelgrass

Nuisance seaweed overgrows eelgrass



Eelgrass Distribution

Newmarket



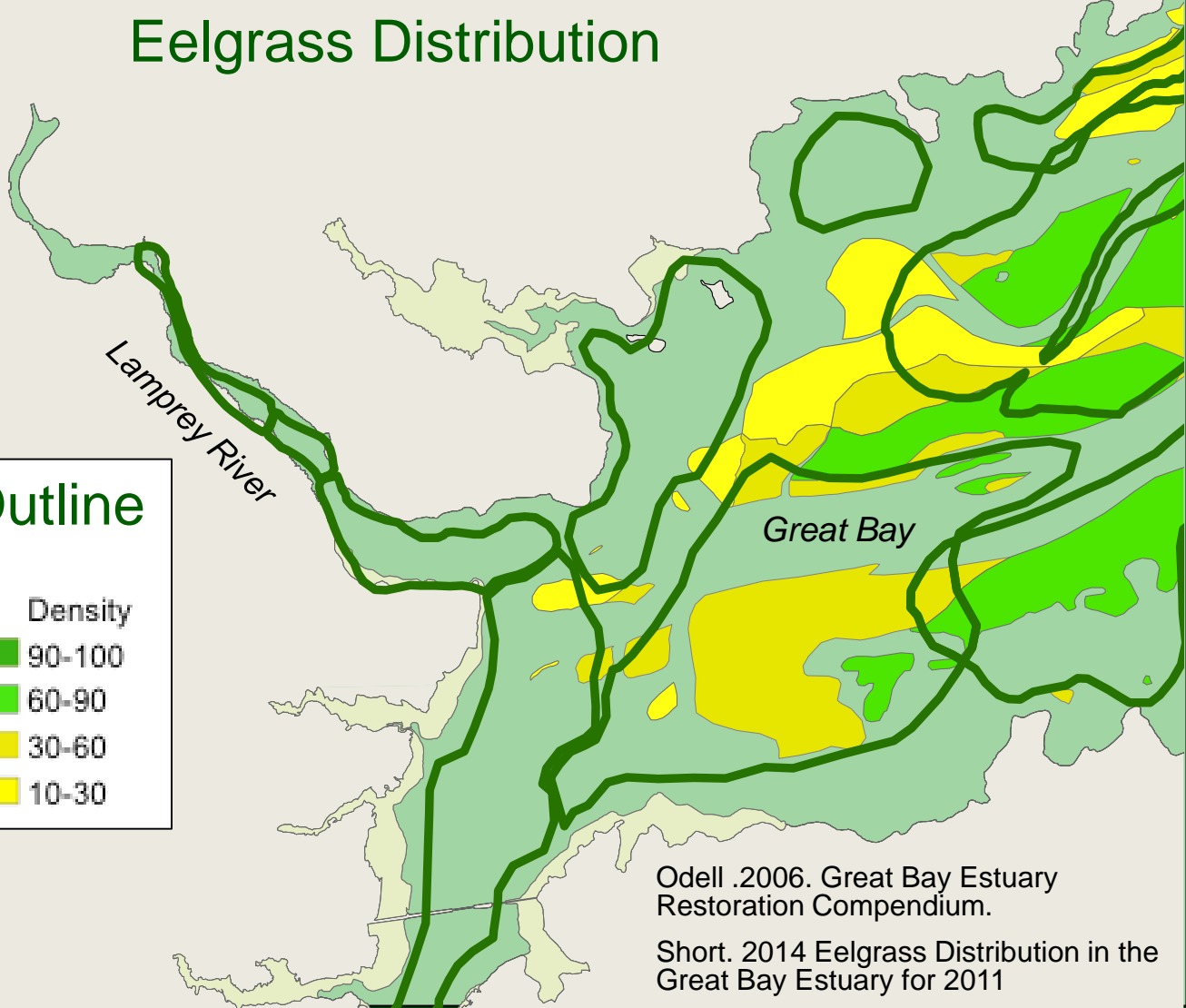
1947



Odell .2006. Great Bay Estuary Restoration Compendium.

Eelgrass Distribution

Newmarket



1947 Outline

2013

Density

- 90-100
- 60-90
- 30-60
- 10-30

Odell .2006. Great Bay Estuary Restoration Compendium.

Short. 2014 Eelgrass Distribution in the Great Bay Estuary for 2011

Take Away Message

Too much Nitrogen entering GBE!

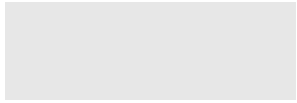
- Wastewater treatment facilities
- Non-point sources
- Atmospheric N

HOPE

What to do?

- Advocate for WWTF upgrades
- Advocate for reducing atmospheric N
- Advocate to reduce non-point runoff
- Support science for estuarine restoration
- Carry the message: the problem and the solutions

Largest Municipal Treatment Plants Discharging to the Great Bay Watershed

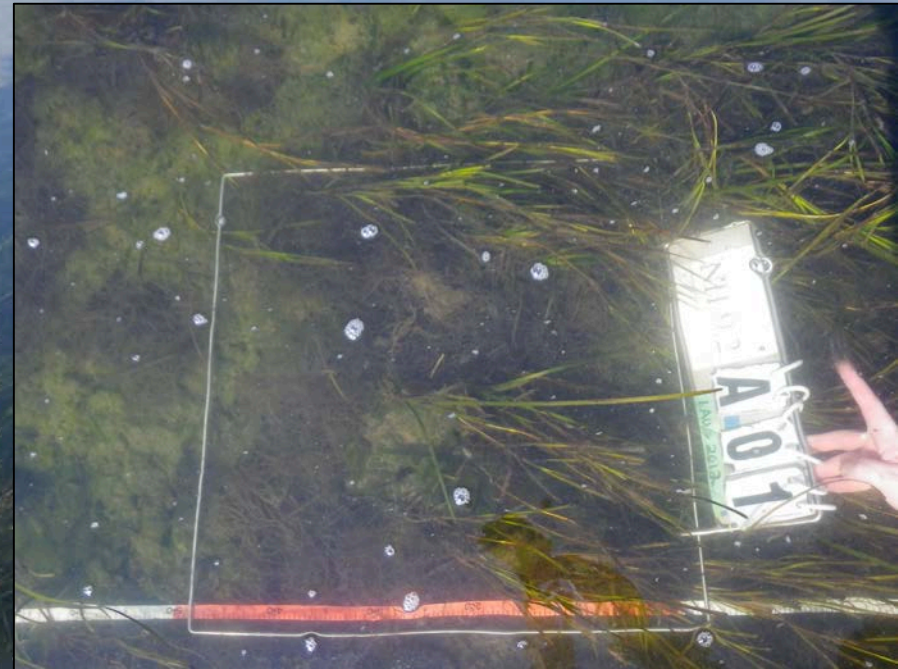


e

Total

DES-recommended discharges for Total Nitrogen (TN) of 3 mg/l

I plan to continue eelgrass monitoring.





ACKNOWLEDGEMENTS

Jackson Estuarine Laboratory

University of New Hampshire

Piscataqua Region Estuaries Partnership

New Hampshire Port Authority

Great Bay National Estuarine Research Reserve

NH Charitable Foundation & Tom Haas