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

Eelgrass Biomass in Great Bay (1992-2013)

\[ y = -57.63x + 116238 \]
\[ R^2 = 0.676 \]

FT Short / UNH 2013
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
Nitrogen in a Pristine Landscape

Nitrogen Sources:
1. Lightening 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.

from Hubbard Brook Research Foundation 2003
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.

from Hubbard Brook Research Foundation 2003
Great Bay, New Hampshire
Nitrogen Causes Eelgrass Loss in Great Bay

Plankton clouds the water and shades eelgrass

Nuisance seaweed overgrows eelgrass
Eelgrass Distribution

Newmarket

Lamprey River

Great Bay

1947

Eelgrass Distribution

Newmarket

Great Bay

1947 Outline

2013

Density

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


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

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

HOPE
Largest Municipal Treatment Plants Discharging to the Great Bay Watershed

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<th>Plant Name</th>
<th>Discharge (mg/l)</th>
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**Total**

DES-recommended discharges for Total Nitrogen (TN) of 3 mg/l
I plan to continue eelgrass monitoring.
ACKNOWLEDGEMENTS

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