Stress and Resilience
and the Great Bay

Lamprey River
Symposium 2018
Piscataqua Region Estuaries Partnership (PREP)

- One of 28 National Estuary Programs sponsored by EPA
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Resilience

Resilience, the ability of a system to withstand stress, disturbance and maintain its essential characteristics.
Our “Big Picture” Messages

• The resilience of our ecosystems has declined as a result of many stressors...not just one
• Changes in each habitat affect other habitats
• Changes in stressors affect other stressors
• Some stressors are amenable to management...others much less so
Precipitation (inches)
Oysters

• Questions:

• Compared with 1993, how many oysters have we lost?
  • Over 90%

• Do we know what the main cause is? If so, what is it?
  • Disease (microscopic parasitic organisms)
Standing Stock Oysters 1993

25,729,204

Is addressing disease the only recourse?

Standing Stock Oysters 2016

1,954,240
Eelgrass Great Bay (proper)

Chart from NH DES

- Blue diamonds: <1m below MTL
- Red squares: 1 to 1.3m below MTL
- Gray triangles: > 1.3m below MTL
Eelgrass Great Bay (proper)

Loss of Deep Eelgrass and Light

Acres

<1m below MTL  1 to 1.3m below MTL  > 1.3m below MTL
Total Suspended Solids (TSS)

Most other stations don’t have increasing trends but that may also be because they start in 2003.
TSS Concentrations at Lamprey River

Concentration (mg/L)

[Graph showing TSS Concentrations at Lamprey River from 1992 to 2015.]
Chlorophyll-a Adams Point

Concentration (ug/L)

[Graph showing concentration levels from 1989 to 2015]
Misunderstanding Regarding the Phytoplankton Signal Versus the Seaweed Signal
CDOM
TSS
Stormwater Management
Riparian Buffers
Shoreline Erosion

Phytoplankton

Nutrients

Eelgrass vs Seaweed
Light Nutrients

Epiphytes

Seaweed
“Despite encouraging reductions in nitrogen from wastewater treatment plants, loading levels are still well above levels found to be related to environmental degradation and reduced estuarine ecosystem resiliency in many other systems.”
Latimer & Rego (2010)

Tons N / sq mi of estuary/ year

14

28  42  56  70


Significant Reductions of WWTF N (Newmarket example)
Next: Reduce Non-Point Sources
Welcome

The mission of Piscataqua Region Estuaries Partnership (PREP) is to protect and improve the water quality and overall health of the region’s two estuaries, Piscataqua and Hampton-Seabrook. We monitor and research the region’s waterways, encourage all who live, work, or play in places we love, support development of sustainable practices, protect water quality, maintain open spaces and important habitats, and provide science-based solutions to our local challenges.

Our work focuses on keeping estuaries healthy and protecting the waterways that connect them to the sea and the river.

Visit stateofourestuaries.org for more information.