

# 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
  - Rachel Rouillard
  - Abigail Lyon
  - Trevor Mattera







# Resilience

Resilience, the ability of a system to withstand stress, disturbance and maintain its essential characteristics.

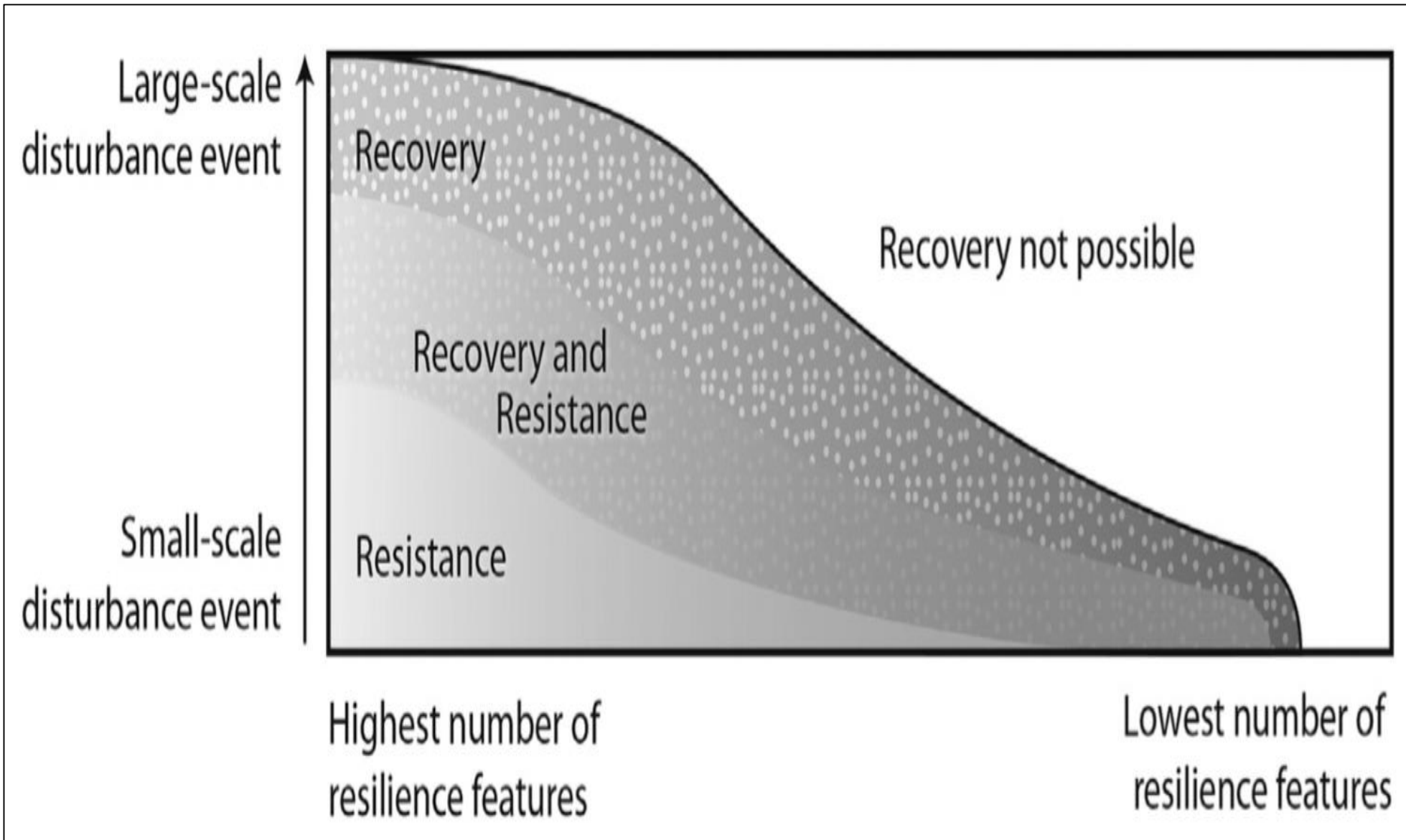




# Our “Big Picture” Messages

- 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

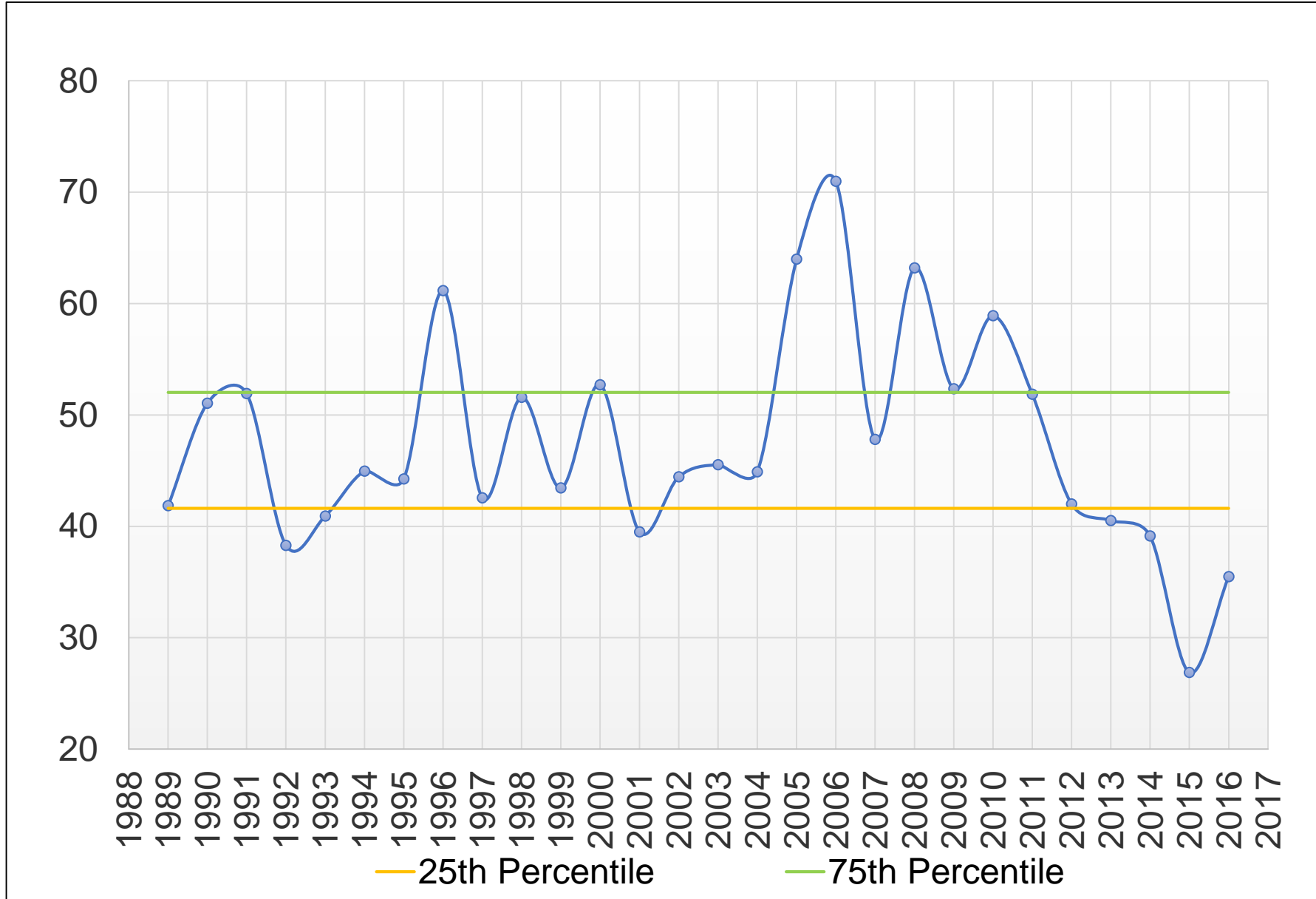




**Unsworth et al. 2015**



# 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)

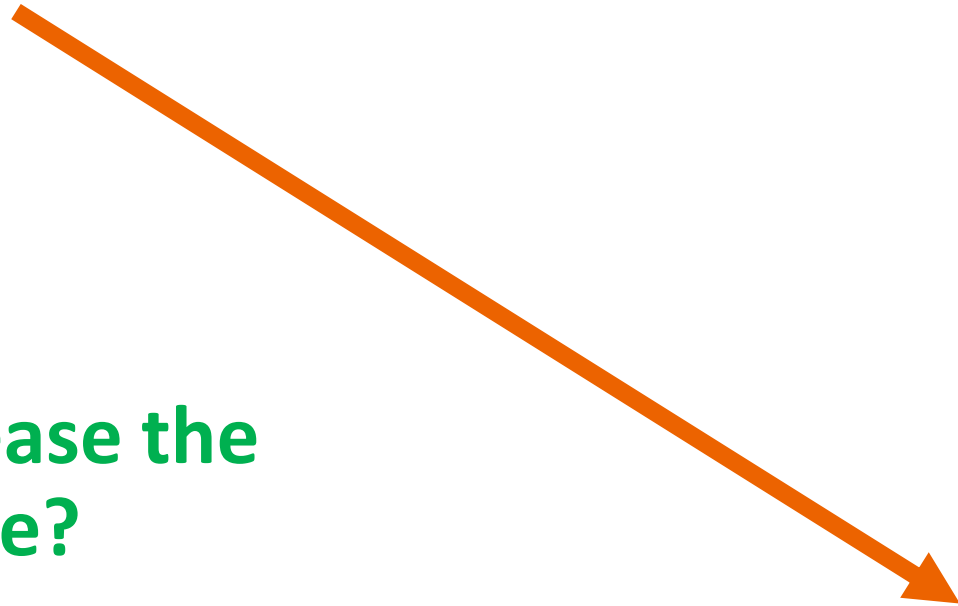




# Standing Stock Oysters 1993

25,729,204

Is addressing disease the  
only recourse?



# Standing Stock Oysters 2016

1,954,240





# Eelgrass Great Bay (proper)

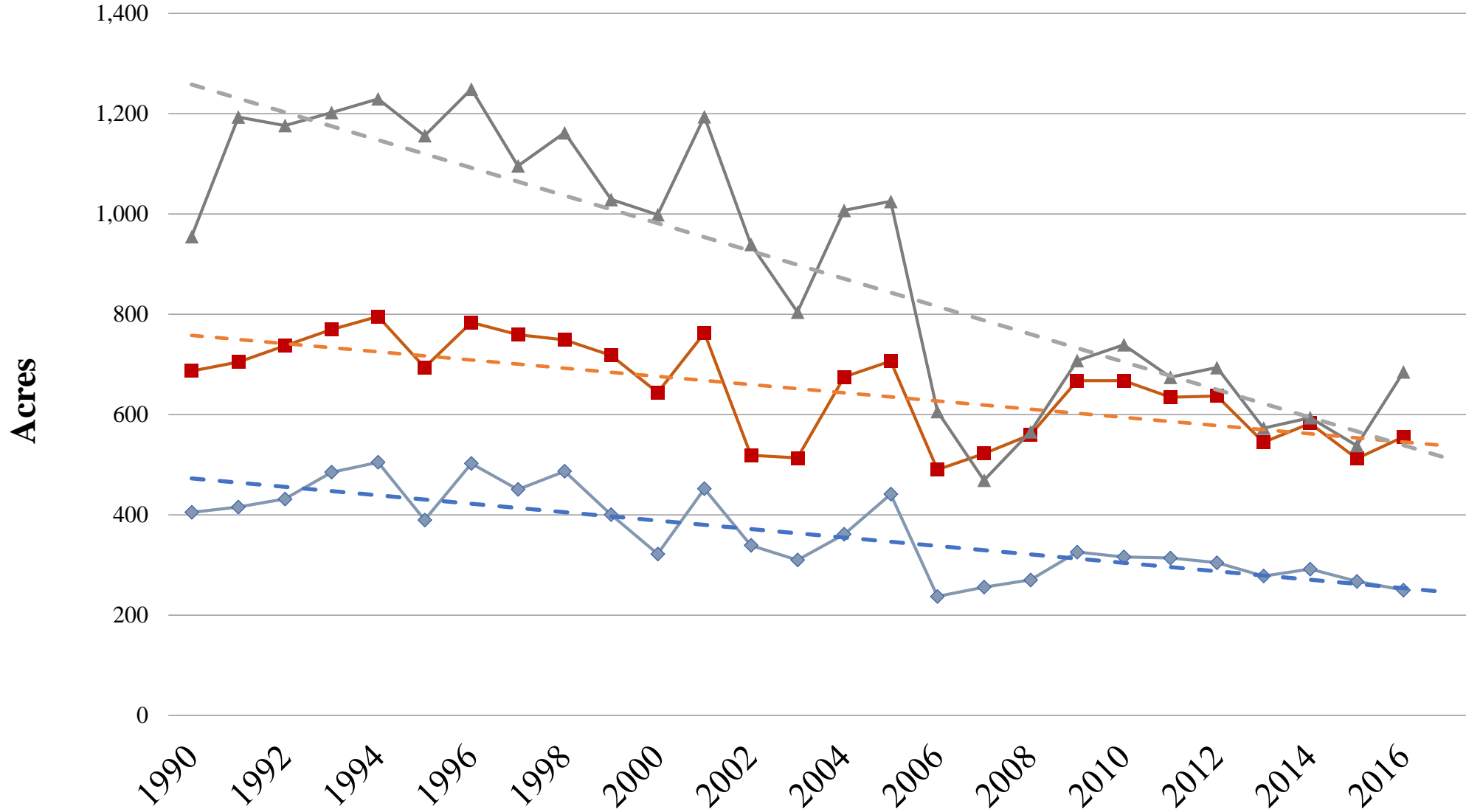


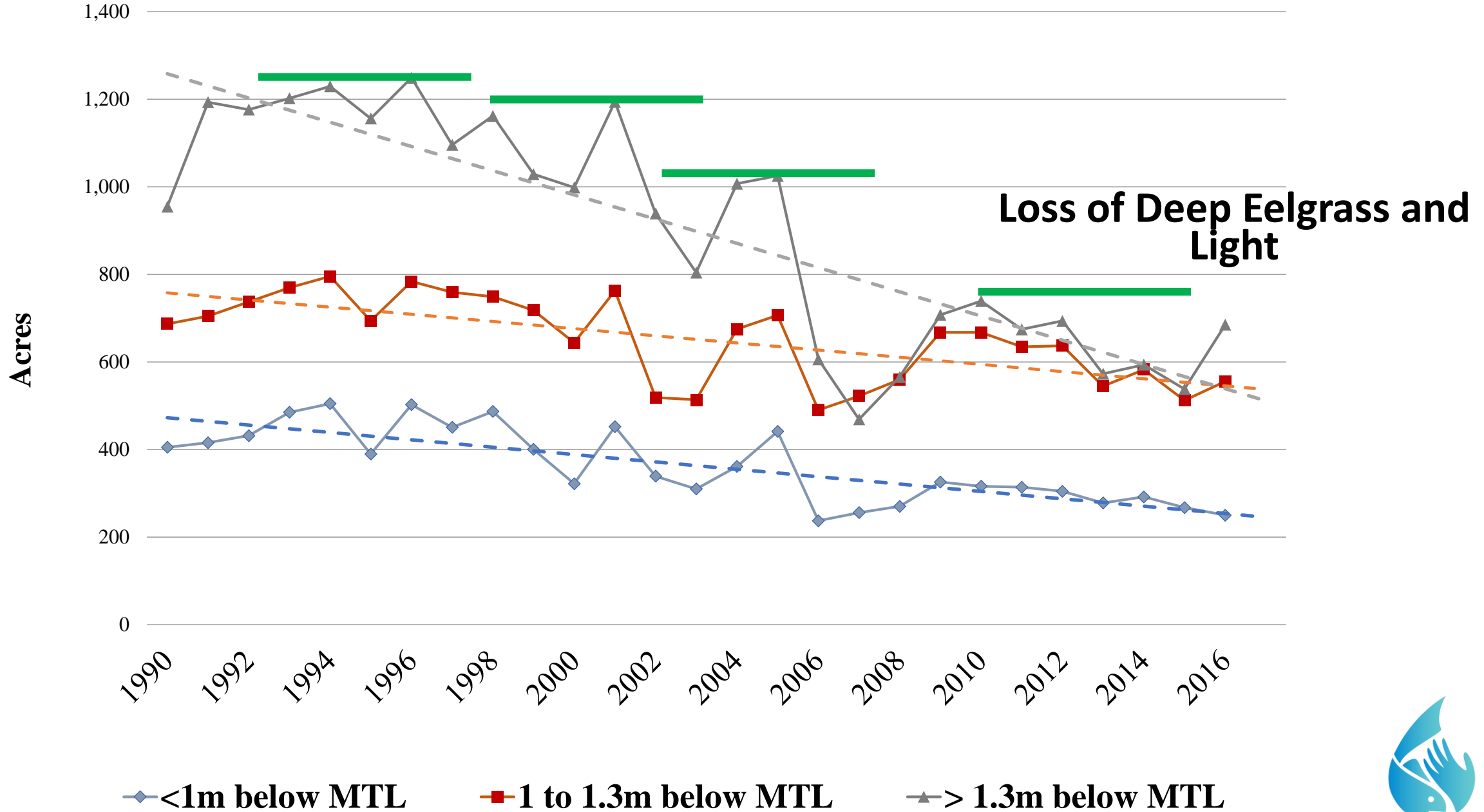
Chart from  
NH DES

◆ <1m below MTL      ■ 1 to 1.3m below MTL      ▲ > 1.3m below MTL





# Eelgrass Great Bay (proper)



# Phytoplankton

CDOM

TSS

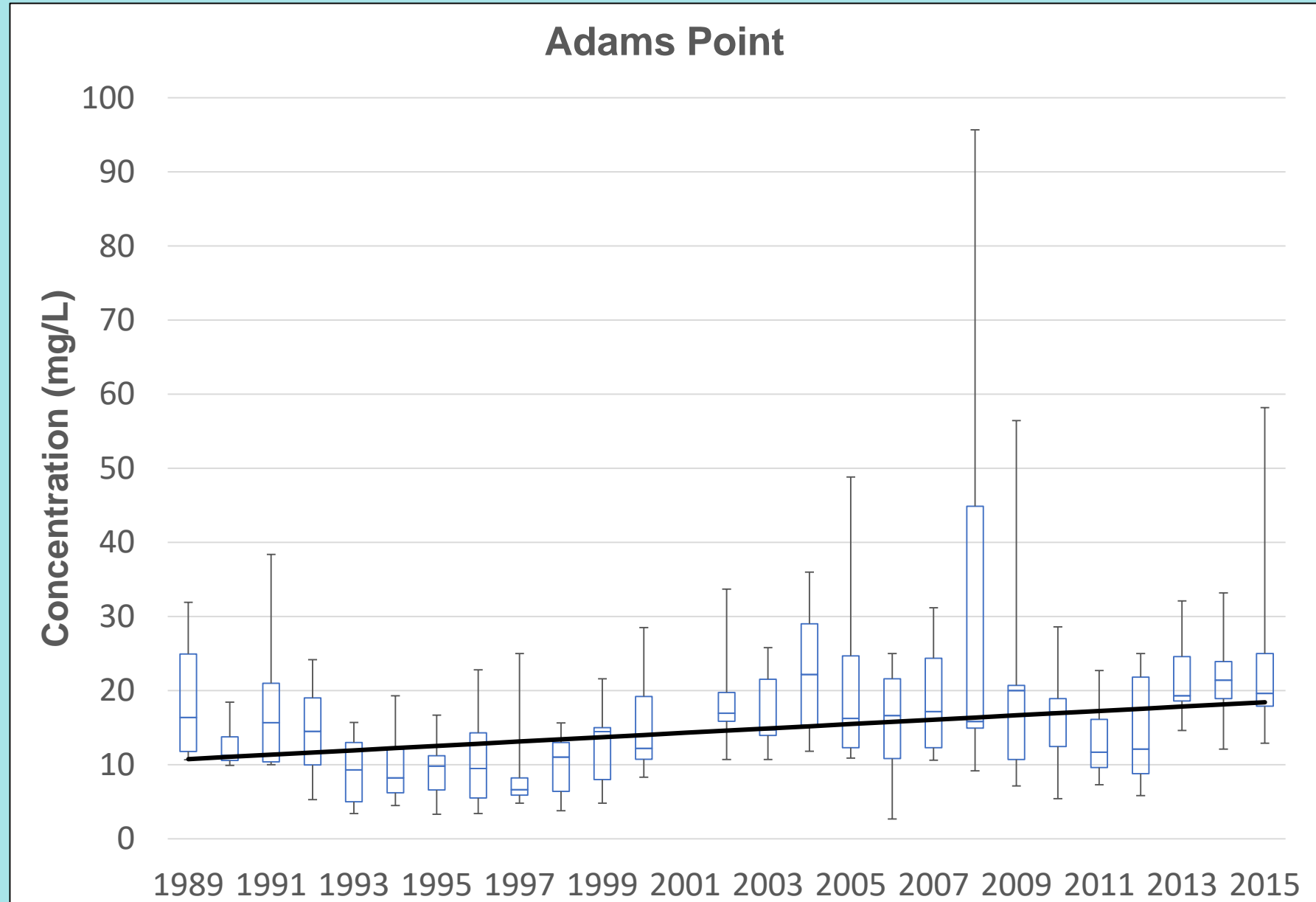
Epiphytes

Seaweed

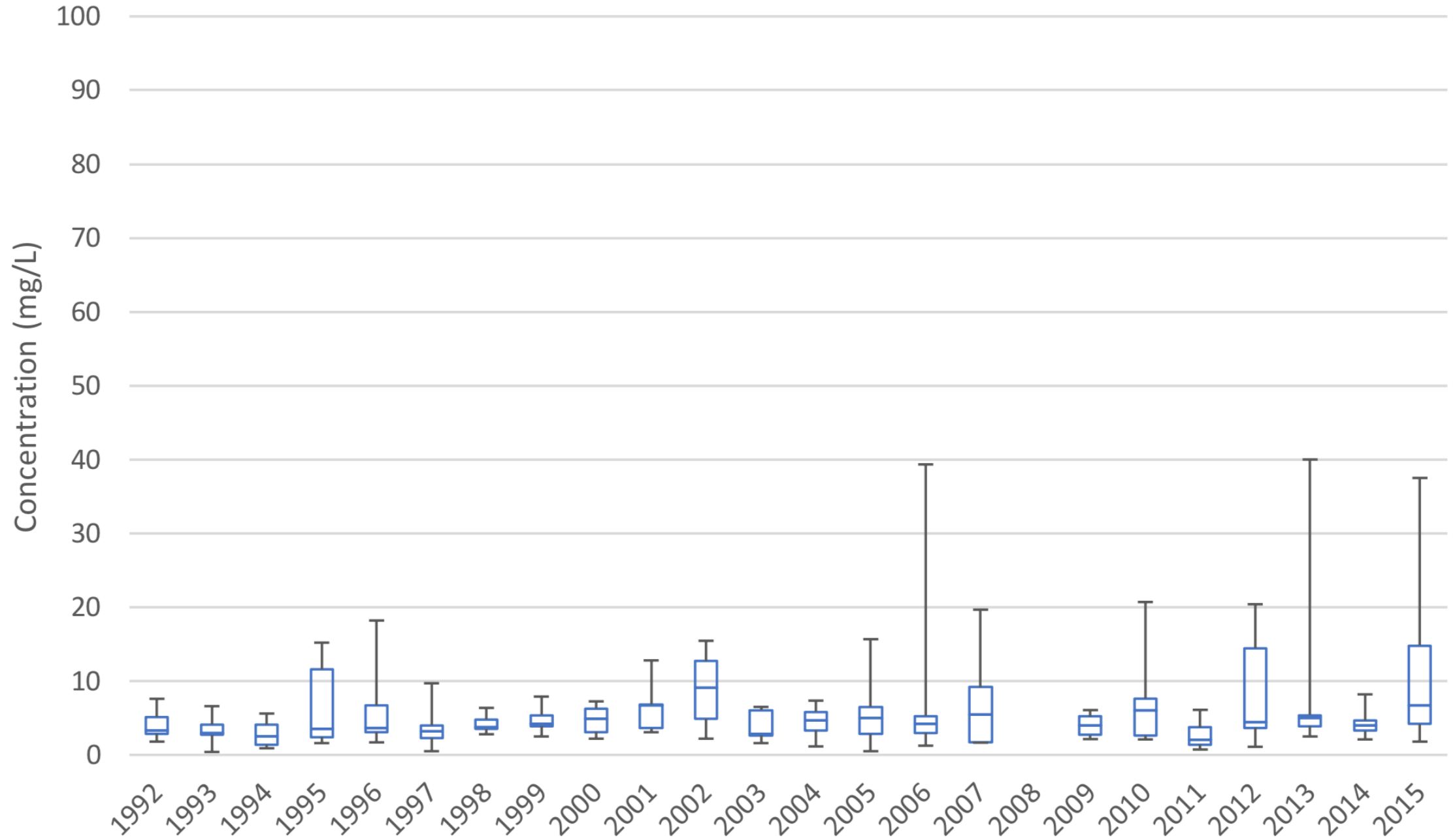




# Total Suspended Solids (TSS)



# TSS Concentrations at Lamprey River



# Phytoplankton

CDOM

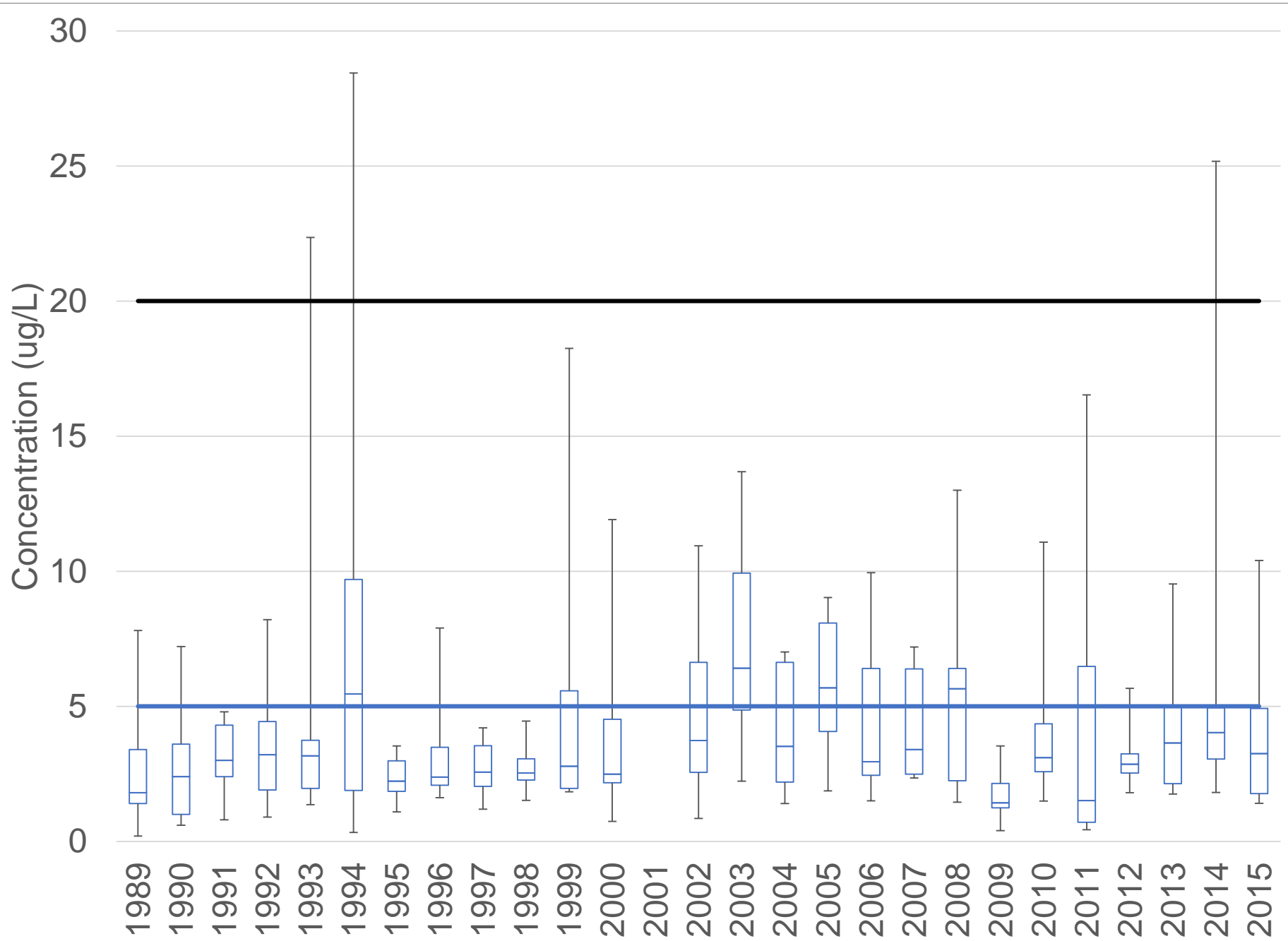
TSS

Epiphytes

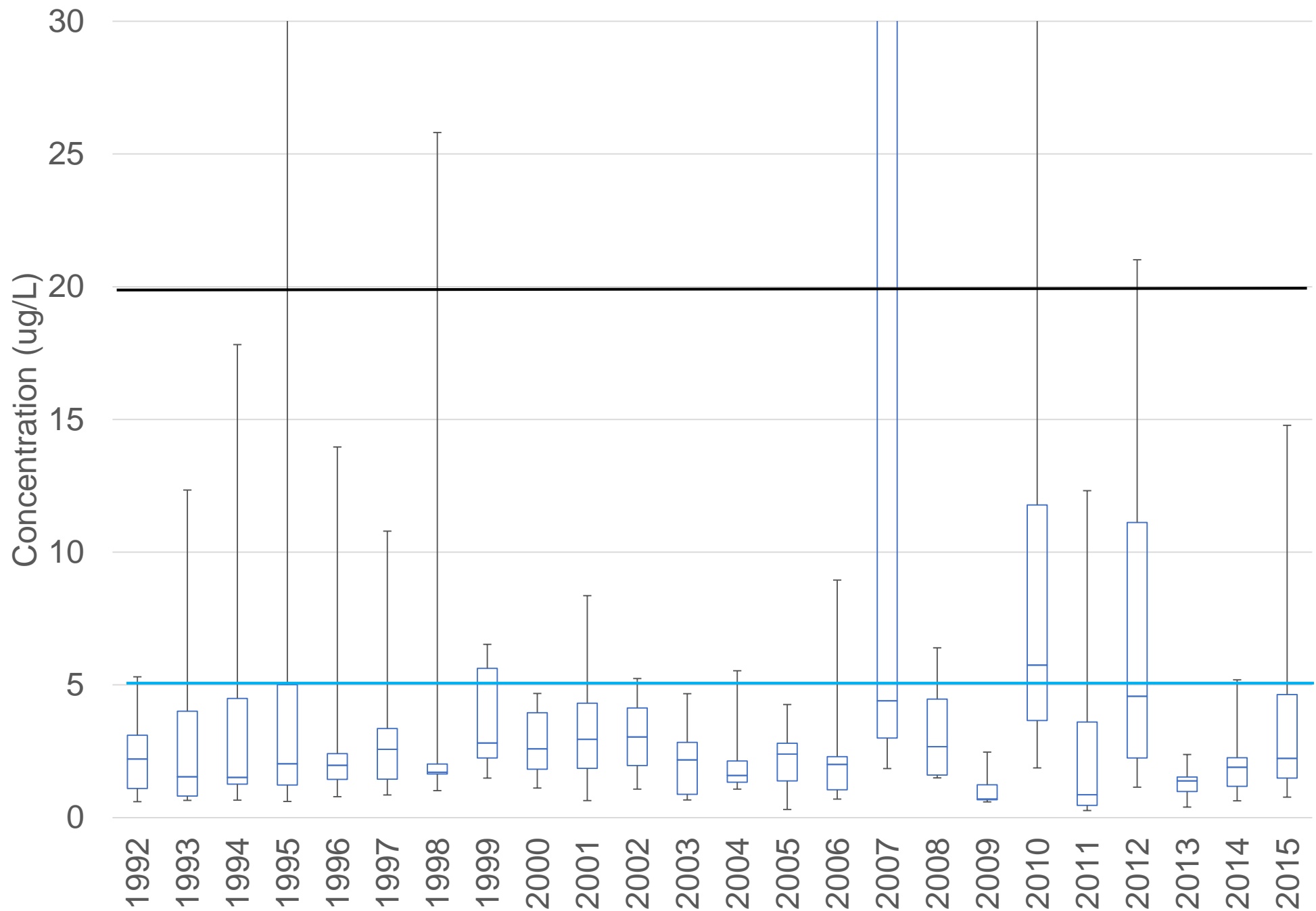
Seaweed



# Chlorophyll-a Adams Point



# Chlorophyll-a Lamprey River



Misunderstanding  
Regarding the  
Phytoplankton  
Signal  
Versus the  
Seaweed Signal

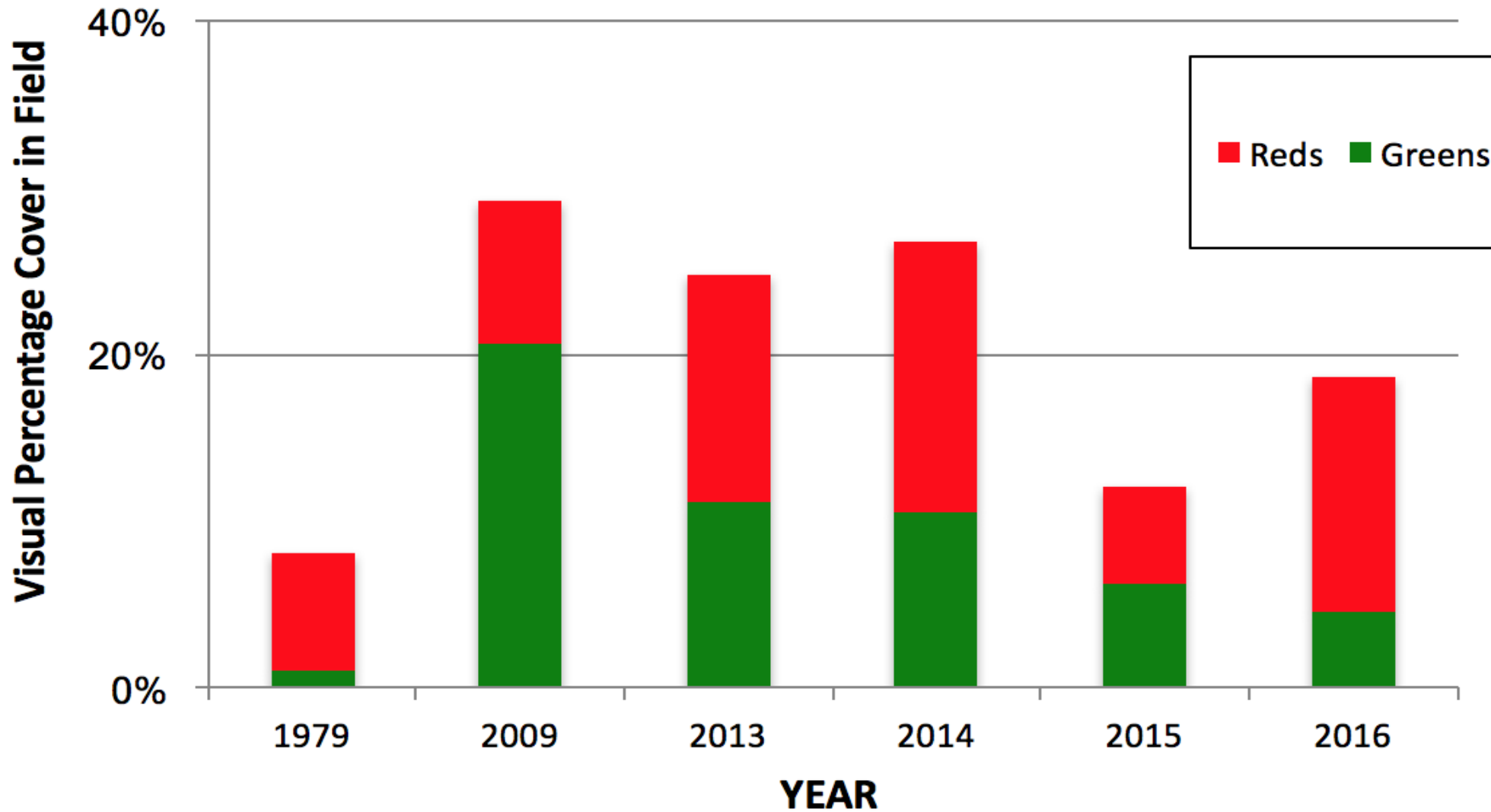




Seaweed



# Seaweeds – Intertidal Stations – Great Bay Estuary





2017/10/16 13:01:13





2017/10/17 09:41:08





# Phytoplankton

CDOM

TSS

Stormwater Management  
Riparian Buffers  
Shoreline Erosion

Epiphytes

Seaweed

Nutrients

Eelgrass vs  
Seaweed

Light  
Nutrients





ENVIRONMENTAL DATA REPORT

**December 2017**

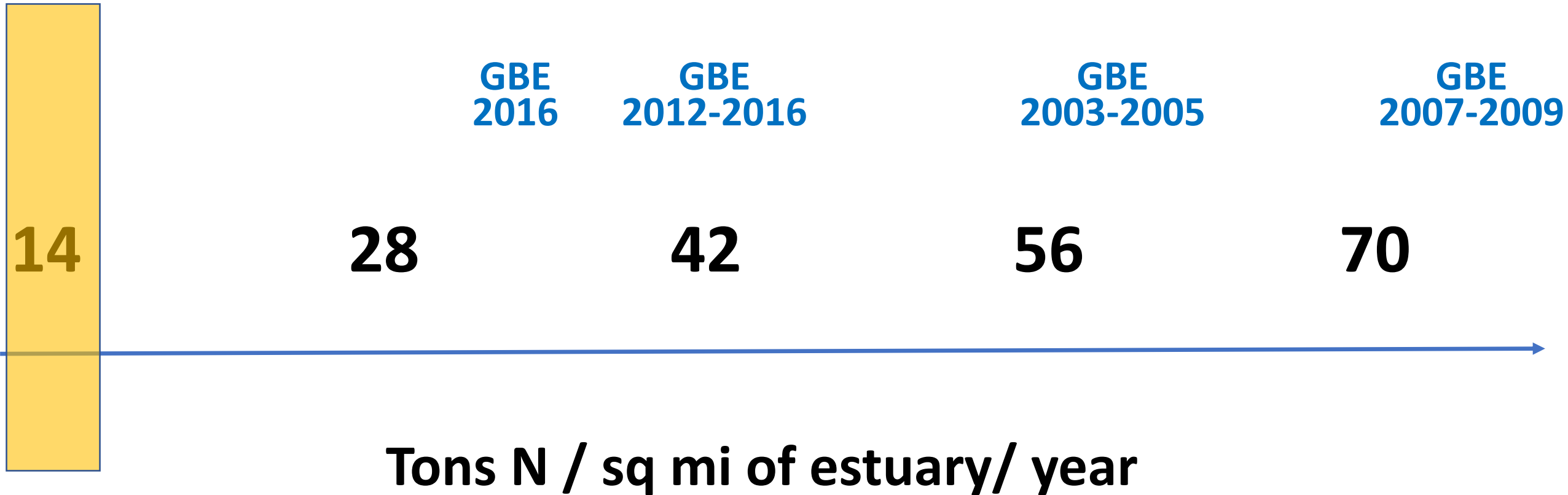
Technical Support Document for the  
2018 State of Our Estuaries Report



University of New Hampshire  
Durham, NH 03824  
[www.PREPestuaries.org](http://www.PREPestuaries.org)

“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.”

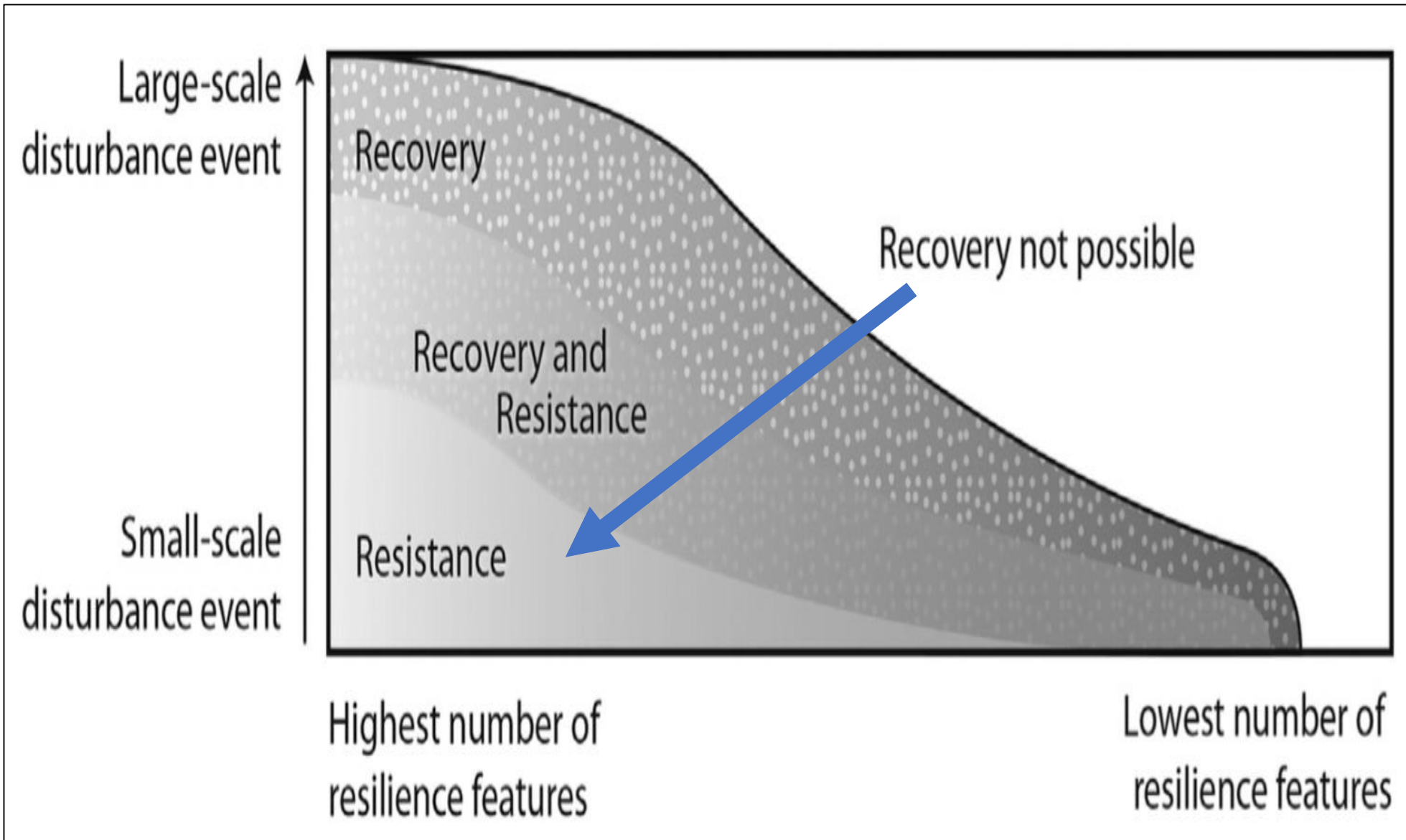




Latimer & Rego (2010)

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





# STATE OF OUR ESTUARIES

**WELCOME**

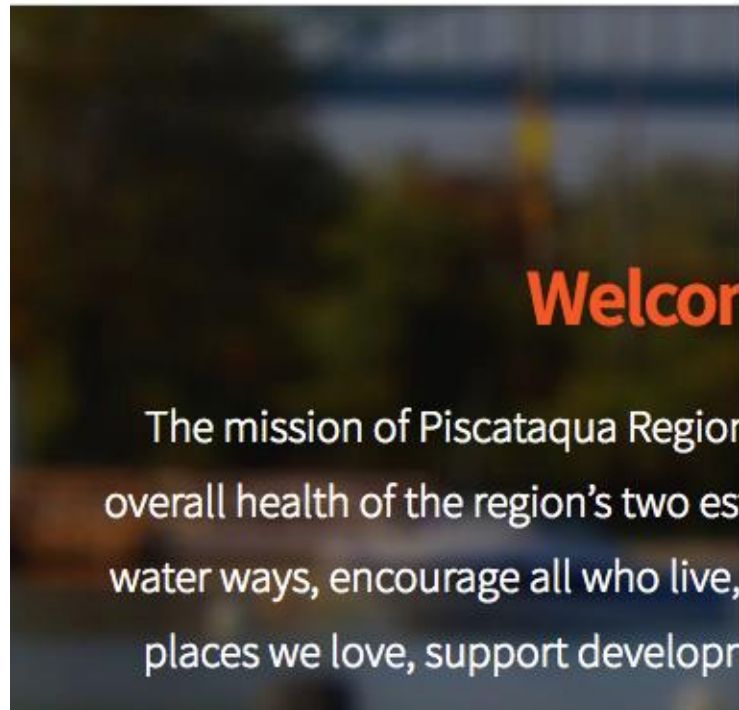
THE BIG PICTURE

**EXPLORE THE INDICATORS** ⌵

CONFERENCE ⌵

OUR REPORTS ⌵

RESOURCES ⌵



**Welcom**

The mission of Piscataqua Region Estuaries Partnership is to protect and improve the overall health of the region's two estuaries, encourage all who live, work and play in these water ways, encourage all who live, work and play in these places we love, support development

- Bacteria
- Beach Advisories
- Clams
- Conservation Lands (Focus)
- Conservation Lands (General)
- Dissolved Oxygen
- Eelgrass
- Housing Permit Approvals
- Impervious Surfaces
- Migratory Fish
- Migratory Fish Restoration
- Nutrient Concentration



**PREP.**  
**Estuaries Partnership.**

PREP (PREP) is to protect and improve the water quality and overall health of the region's two estuaries, Hampton-Seabrook. We monitor and research the region's two estuaries, the Seacoast to take actions to help protect and preserve the region's water quality, maintain open spaces and important

