Status and Trends for Eelgrass (*Zostera marina*) in NY Waters

Chris Pickerell
cp26@cornell.edu

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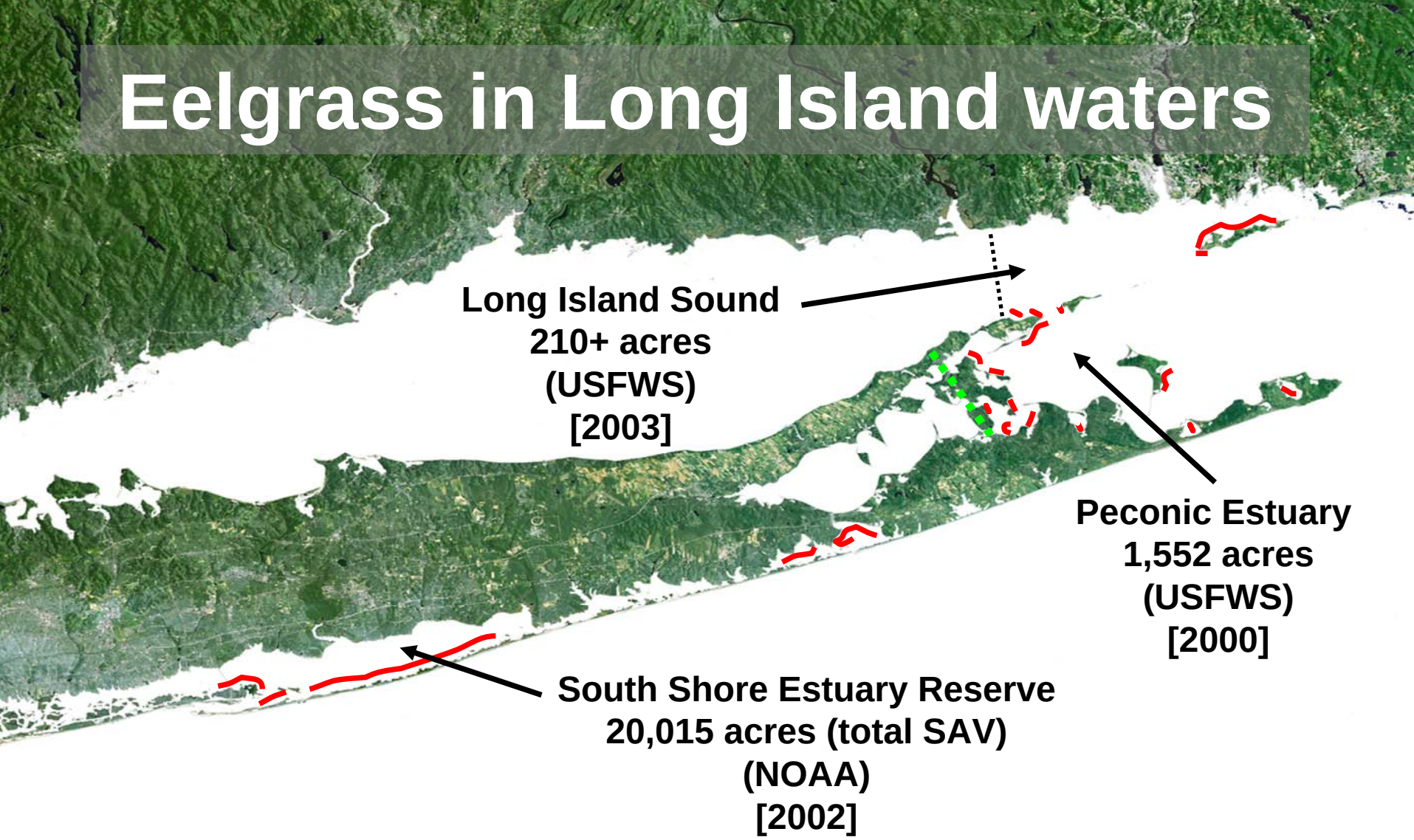
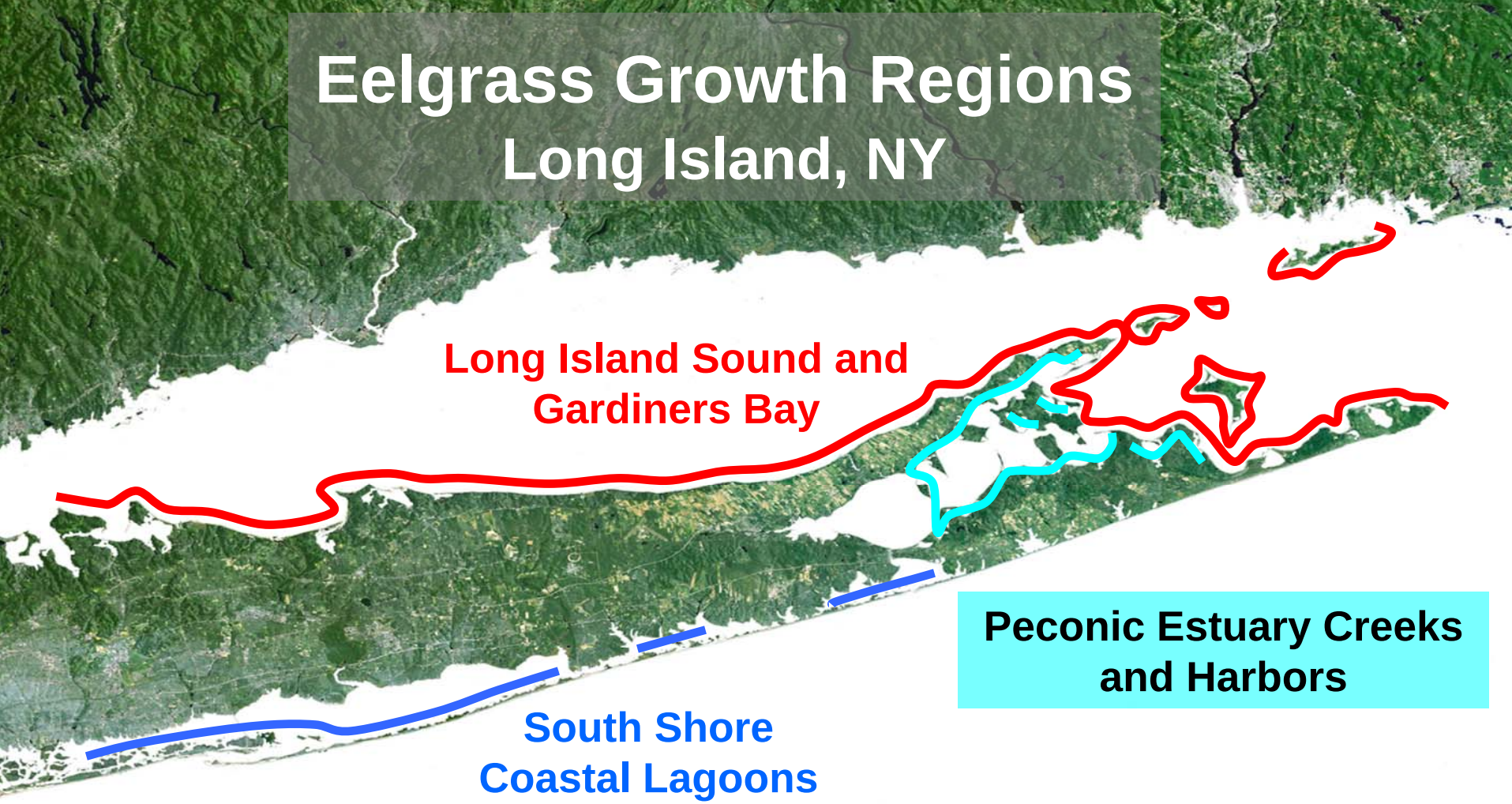
Eelgrass in Long Island waters



Loss of seagrass meadows around Long Island have been staggering since 1930, the year when the first comprehensive aerial photos were taken. Losses are estimated at 75-90% for the three estuaries. Current estimates for the PE and SSER are 6-8yrs old and need updating (scheduled for 2009!).

Eelgrass Growth Regions
Long Island, NY



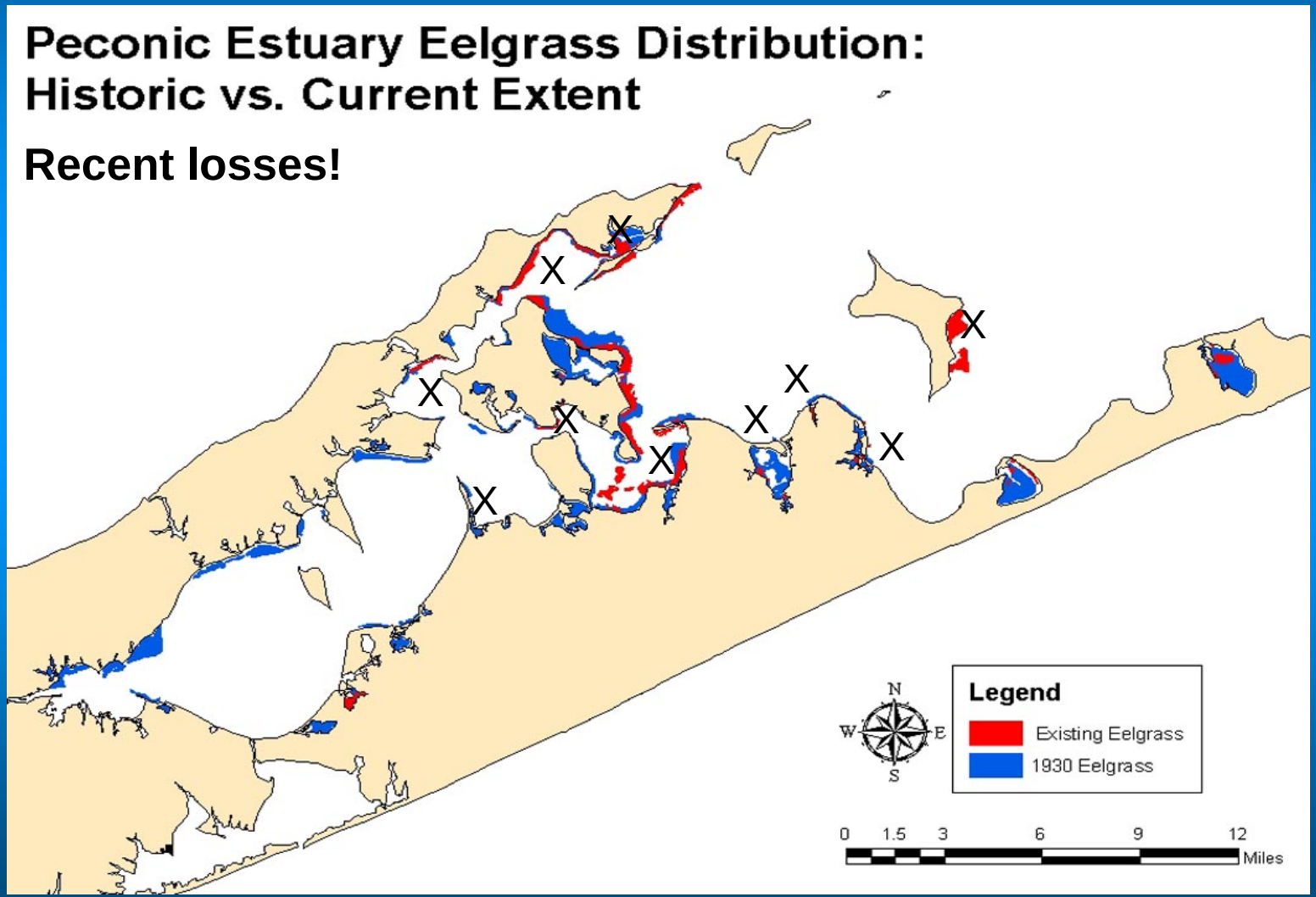
Although there is some overlap within and between the three estuaries (LIS, PE and the SSER), Long Island can generally be divided into three distinct eelgrass growth regions based on wave exposure, depth, bottom type, temperature and other physical parameters.

Eelgrass Growth Regions
Long Island, NY

Range	Meadow Type	Fetch	Sediment Type	*Z. marina* Depth	Temp.	Water Clarity	1º Stressor
Long Island Sound & Gardiners Bay	High- Energy	≥8 miles	Sand to Rock & Cobble <OM (0.5-2%)	0.5m to 7m	Low 22-25C	Good (2-7m)	Disturbance (Waves)
Peconic Bay	Sheltered	≤2 miles	Mud to Silty Sand >OM (5-10%)	1m to 2m	High 26-28C	Poor (0.5-1m)	Water Quality (Temp./Vis.)
South Shore Estuary Reserve	Coastal Lagoon	<4 miles	Mud to Sand ~OM (0.3-6%)	0.5m to 2m	Mixed 22-28C	~ poor (0.5-2m)	Water Quality (Temp./Vis.) Human

Eelgrass Distribution

Historic vs. Present: Peconic Estuary

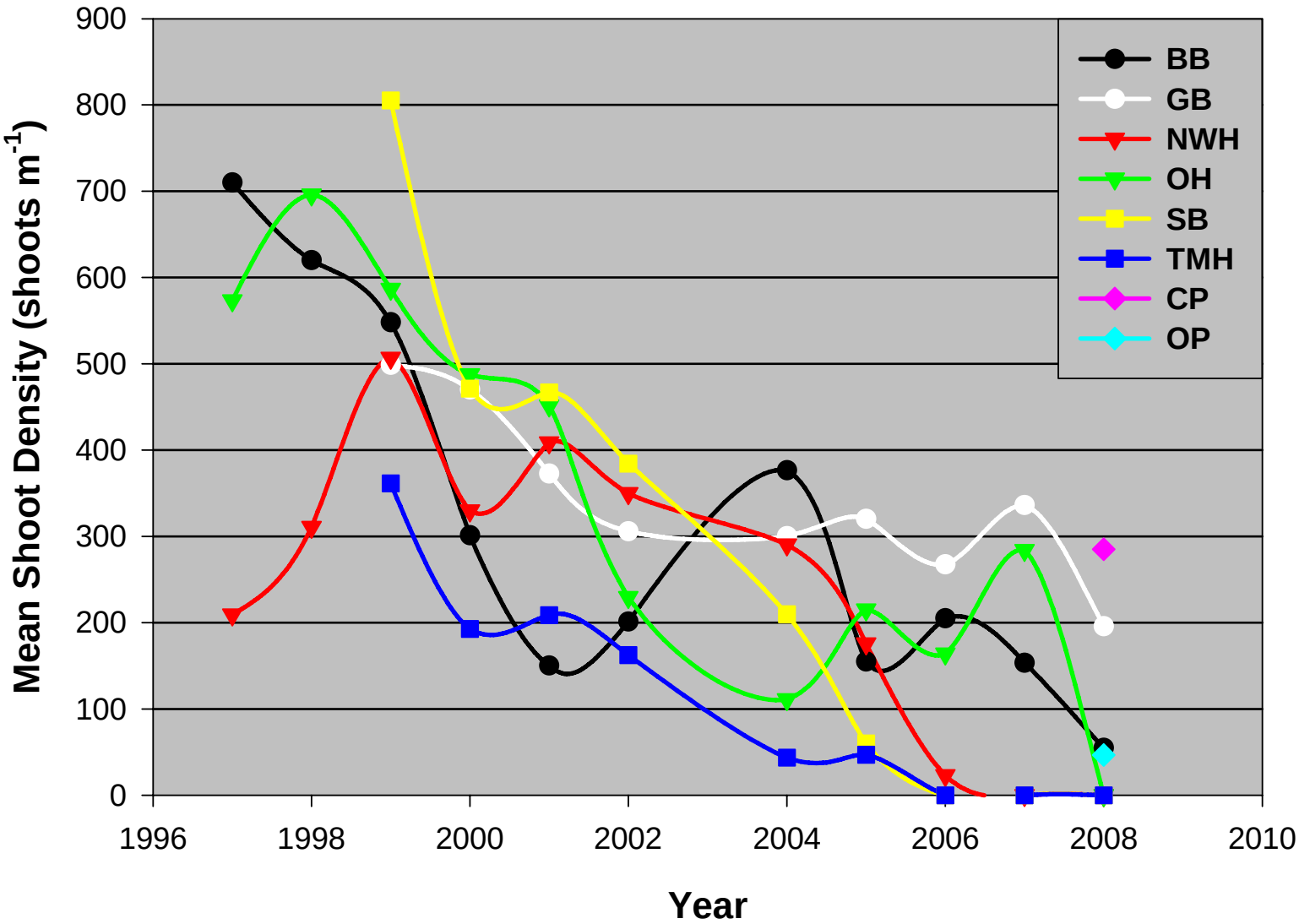


Eelgrass Distribution

Summary

- The Peconic Estuary contained 8,720 acres of eelgrass in 1930 (This is a conservative estimate and does not include 1,990 acres of unconfirmed beds).
- The Tiner report (2003) calculated 1,552 total acres of eelgrass based on 2000 flights. This work missed numerous areas of grass, but the fact that we have since lost many meadows means that this number may still be accurate.
- This represents a loss of over 80% in a 70 year period (~100 acres/year).

Eelgrass Shoot Densities for the Peconic Estuary
Long-term Eelgrass Monitoring Program



Overall Trends

Historic losses (wasting disease, dredging and eutrophication) have been documented in all of our estuaries.

Recent losses have been mostly in PE and the SSER.

Evidence of this trend includes a decrease in overall area and a gradual decline in shoot density in extant meadows.

It appears that below some critical density (~100shoots/m^2) the meadows cannot recover from disturbance. Loss of adult shoots followed buy seedling recruitment and then complete loss…

The most obvious changes have been a retreat from warm-water, harbors and creeks with muddy bottoms.

In the south shore this has manifested itself in loss of grass from deeper muddier sites in the north and a retreat towards the cool water, sandy bottom, flats near the ocean inlets.

What's causing recent Losses?

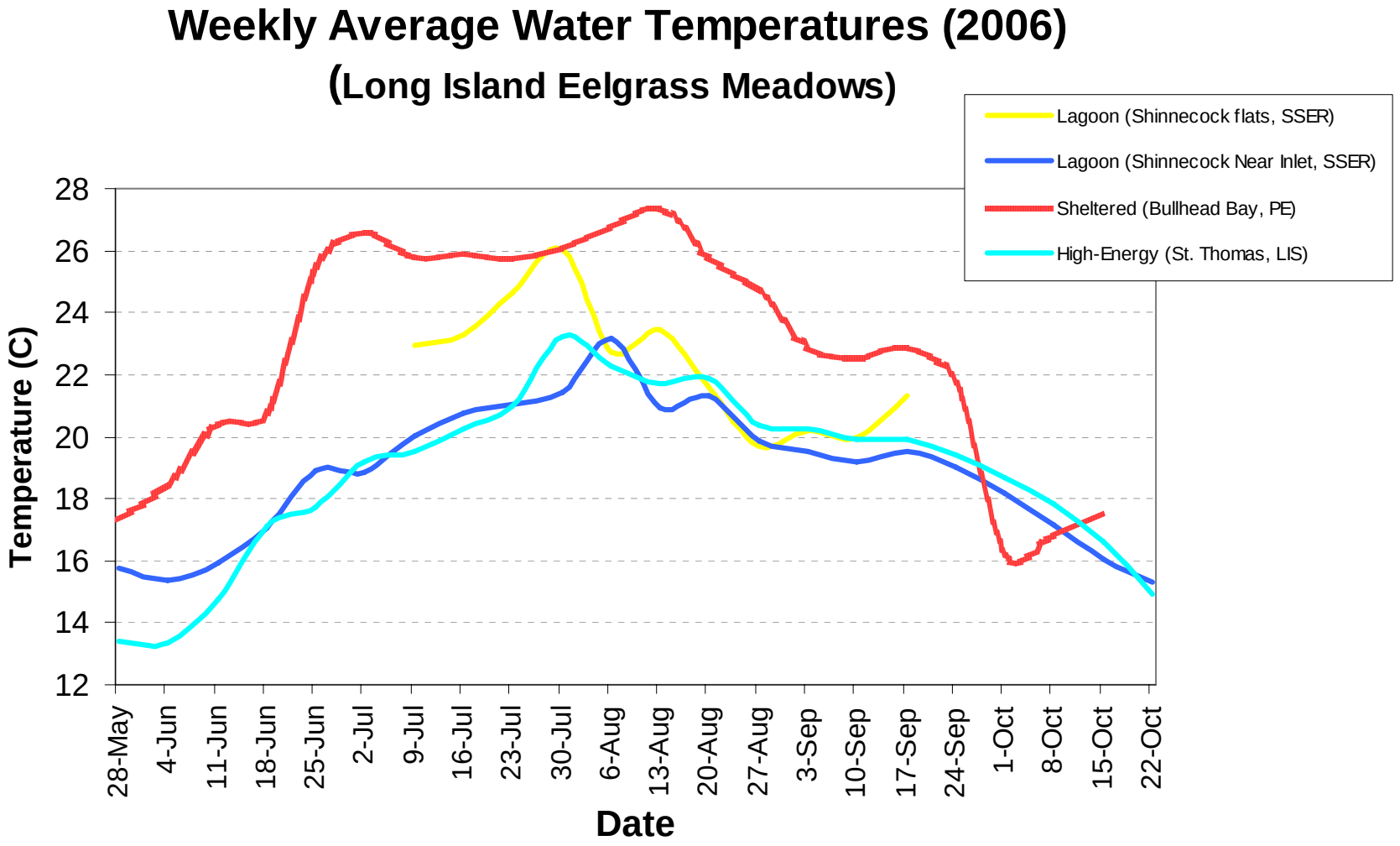
While it is difficult to establish a direct causal relationship between stressors and losses, our restoration work and regular observations point to a couple possibilities:

Before this it is important to point out that….over the last decade there has been a 36% decrease in average total N and a 24% decrease in average chorophyll-a concentrations in the Peconic Estuary.

Water Temperatures?

Evidence from restoration work indicates significant losses occurring after June and into August
25C stress/~28C fatal!

Relative Temperatures



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Sediment Biogeochemistry?

In some areas our %OM is at or above 10%!

Bioturbation?

Evidence that whelks and crabs can destroy (uproot remaining shoots) meadows once they get below a certain density (<100shoots/m^2) while searching for clams.