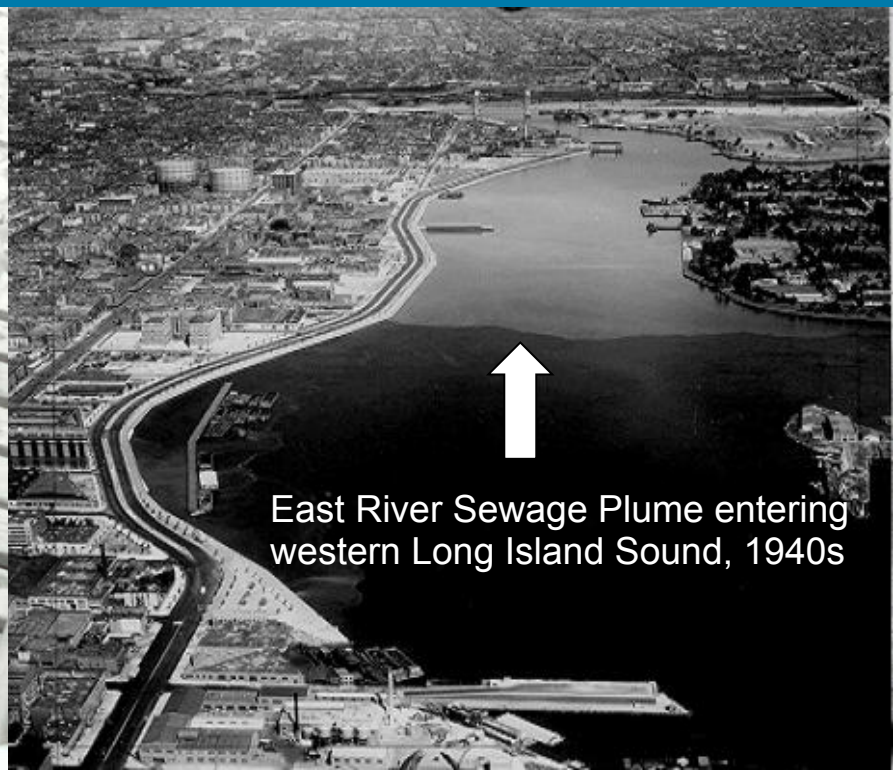
LONG ISLAND SOUND STUDY

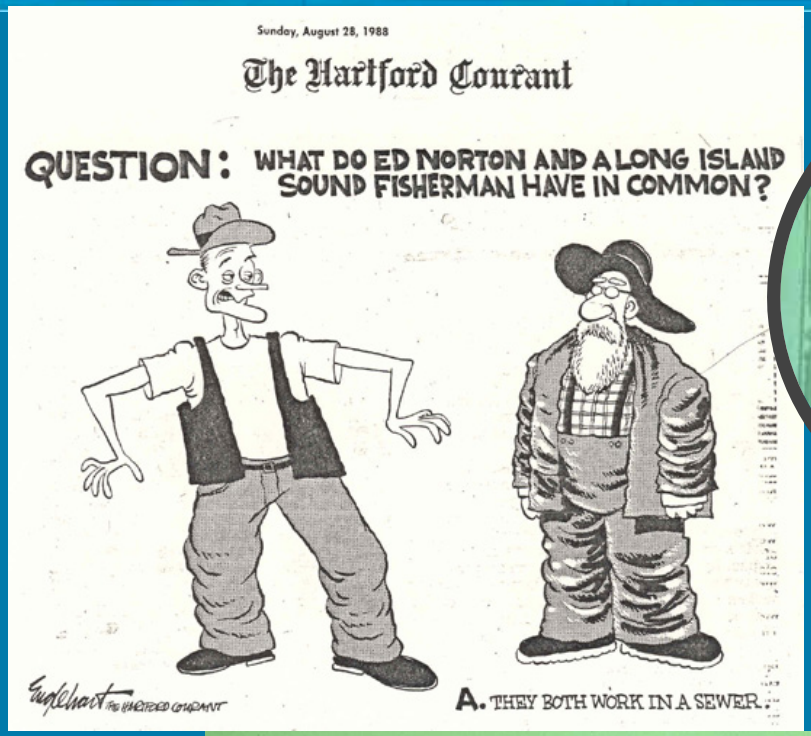
A PARTNERSHIP TO RESTORE AND PROTECT THE SOUND

The need for science in ecosystem recovery has increased

Fish kill, 1980s



East River Sewage Plume entering western Long Island Sound, 1940s



Where we started

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Long Island Sound Study Partnership

long island sound study

Sponsors

US EPA

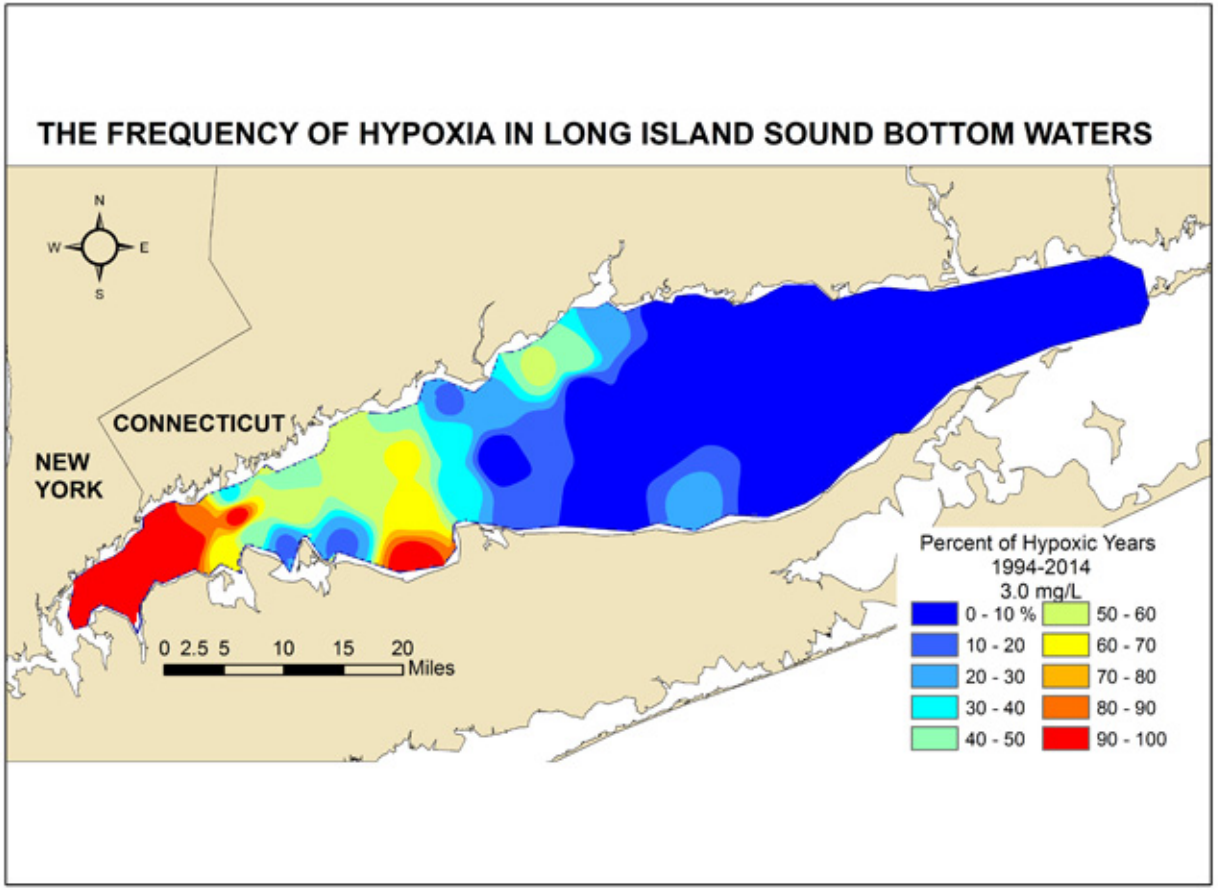
CT Department of Energy and Environmental Protection

NYS Department of Environmental Conservation

Problem: Eutrophication

Hempstead Harbor, NY

Hypoxia occurs regularly and extensively



2000 TMDL to Attain DO

In-Basin WWTPs	Range from 58.5% to 86% reduction
In-Basin NPS	10% reduction for SW and NPS
Upper Basin WWTPs	25% reduction for point source wastewater
Upper Basin NPS	10% reduction for SW and NPS
Atmospheric Deposition	18% reduction expected (not required) from implementation of 1990 CAAA
Alternatives to Nitrogen Reduction	Aeration, bioextraction, etc.

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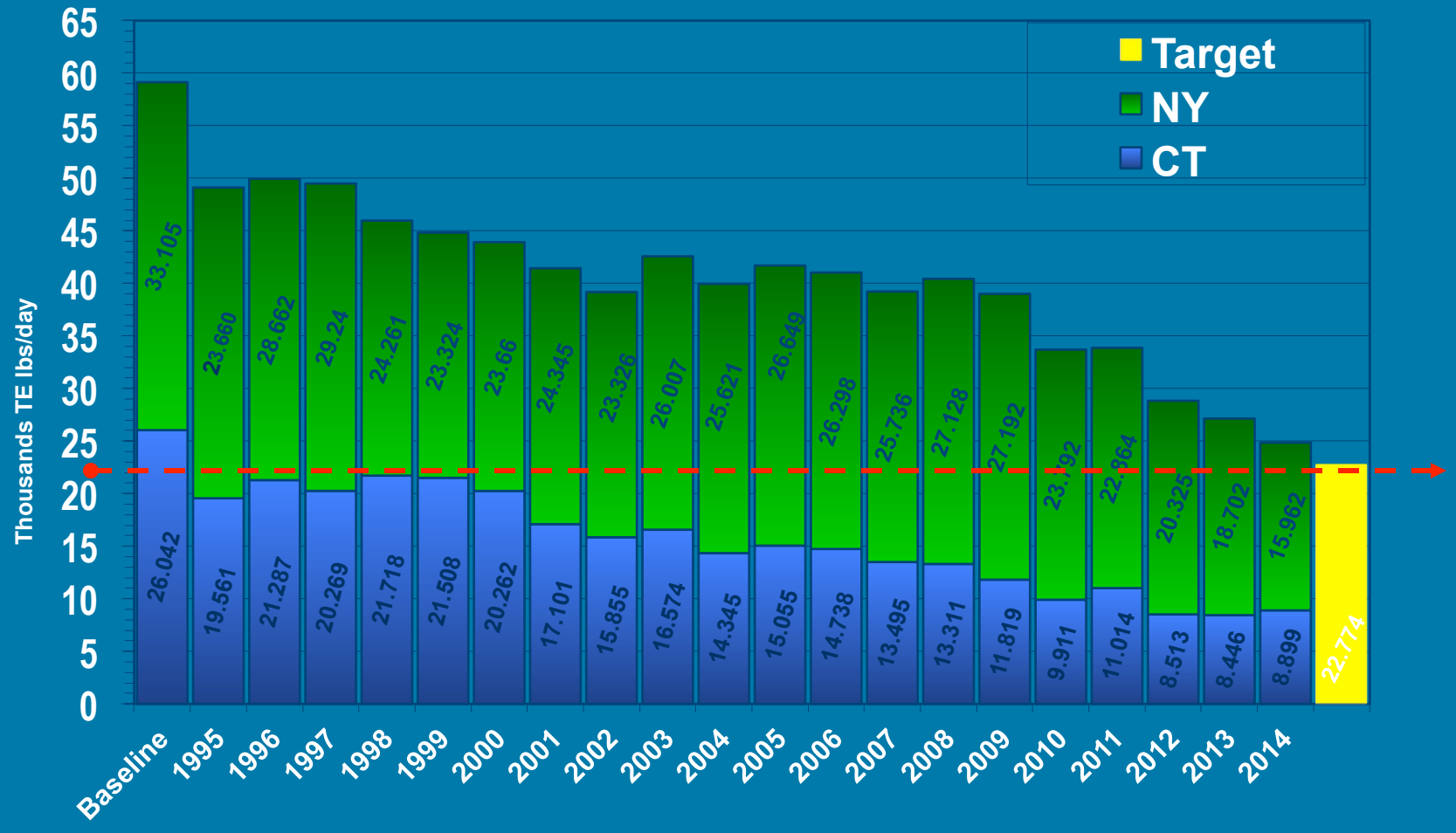
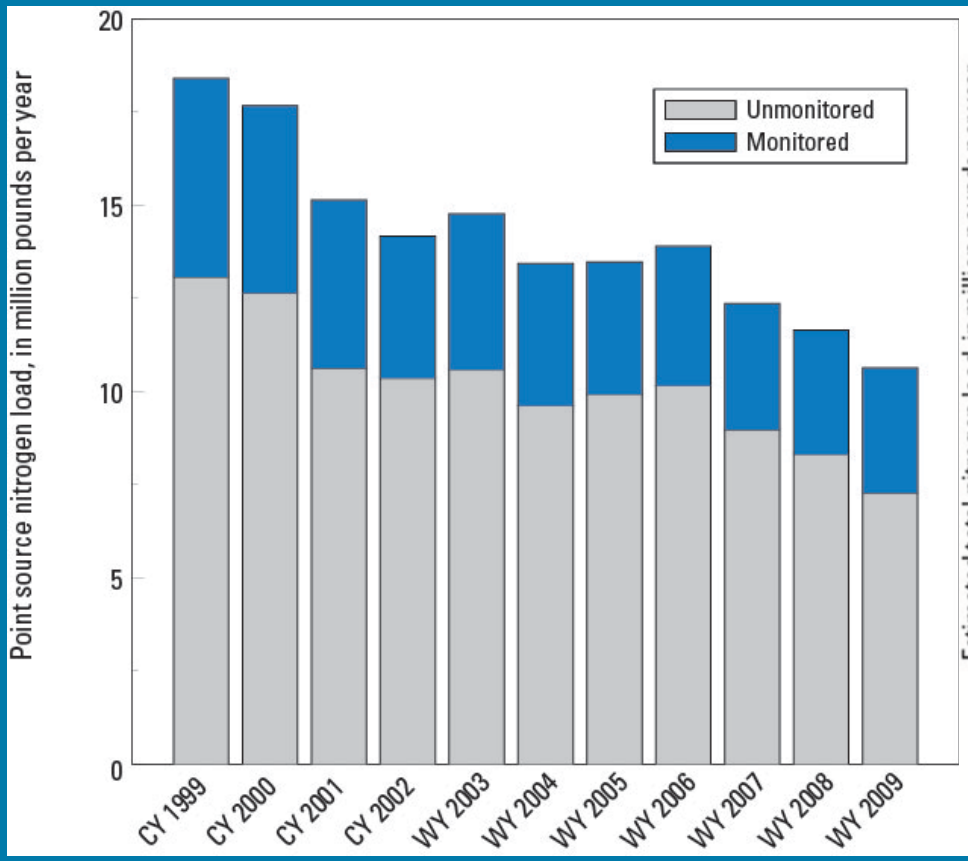
Point Source Nitrogen Trade-Equalized Loads

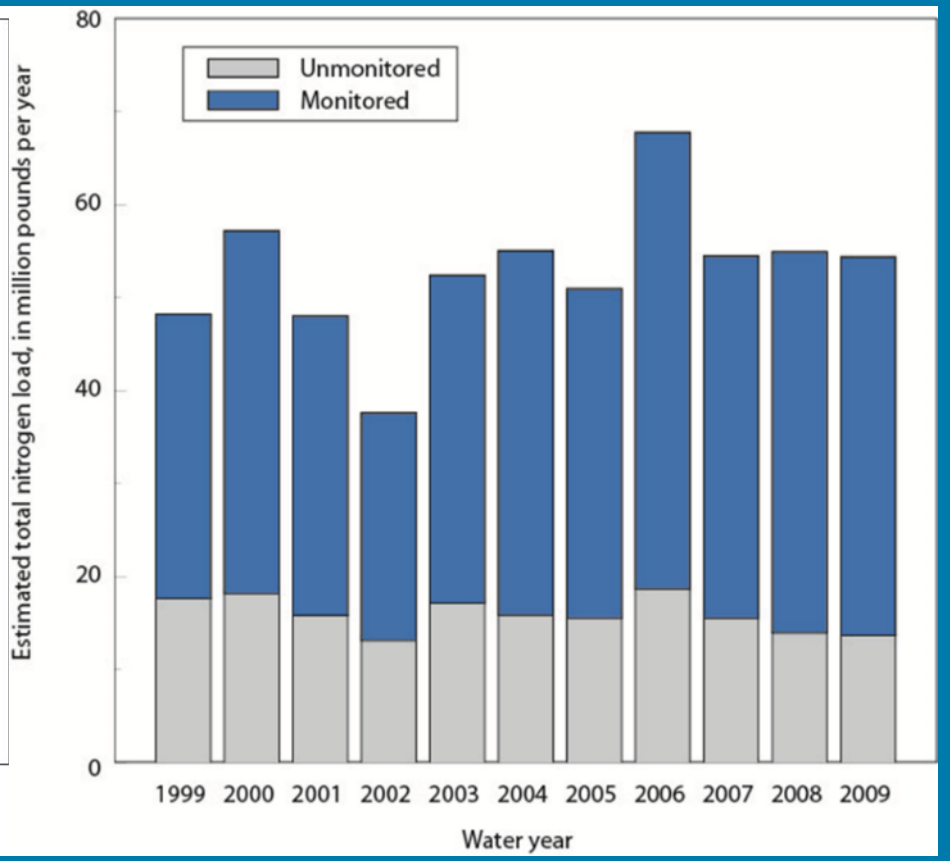
1995-2014

106 NY/CT STPs



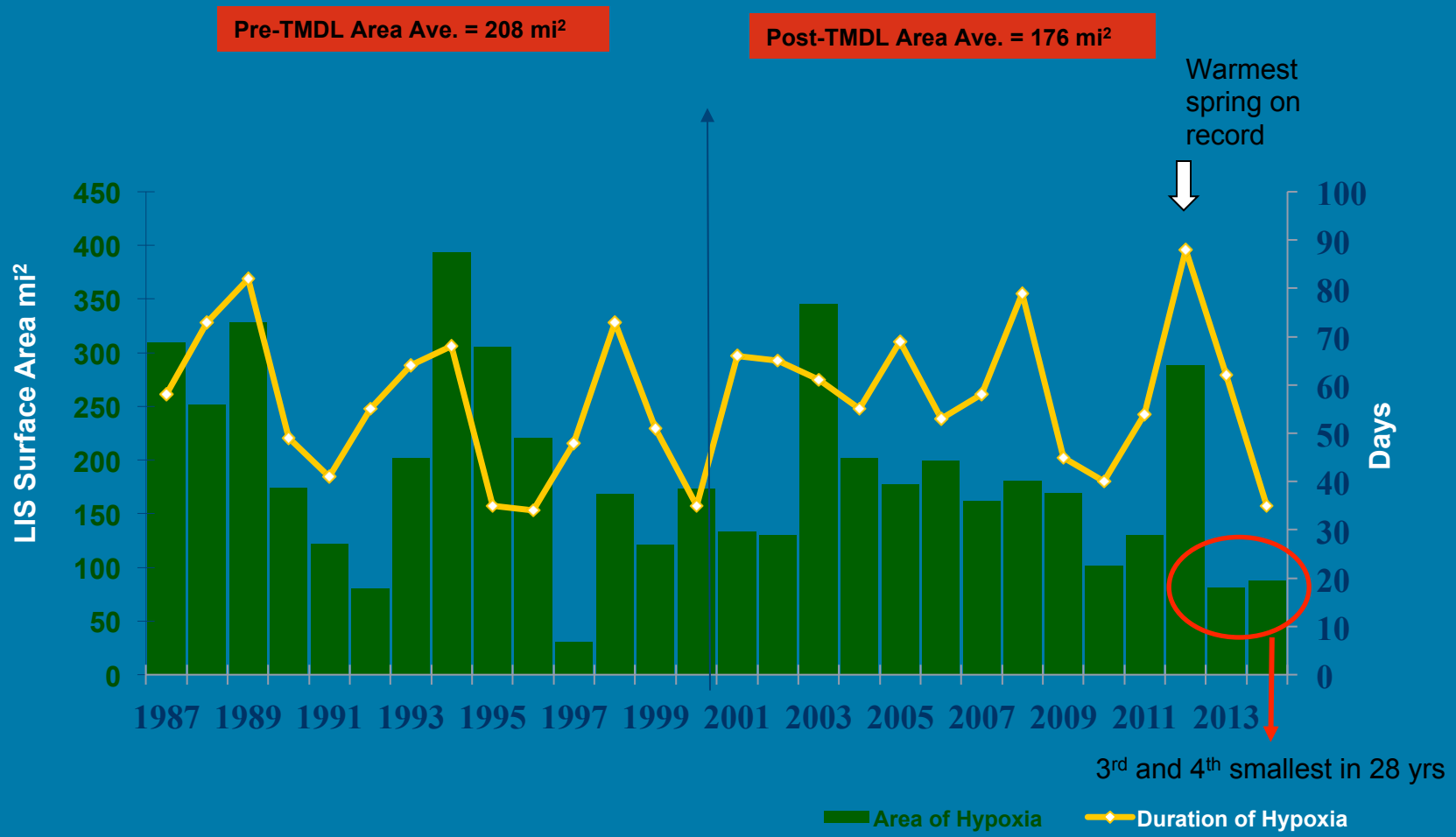
Large decreases in point source loads of nitrogen, not evident in loads to the Sound





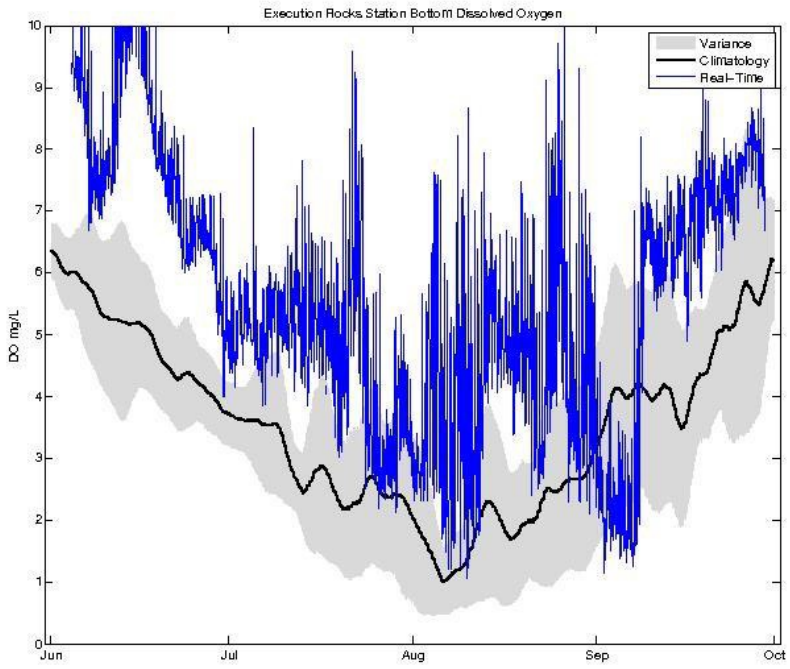
From Mullaney and Schwarz, USGS, 2013

Maximum Area/Duration of Hypoxia

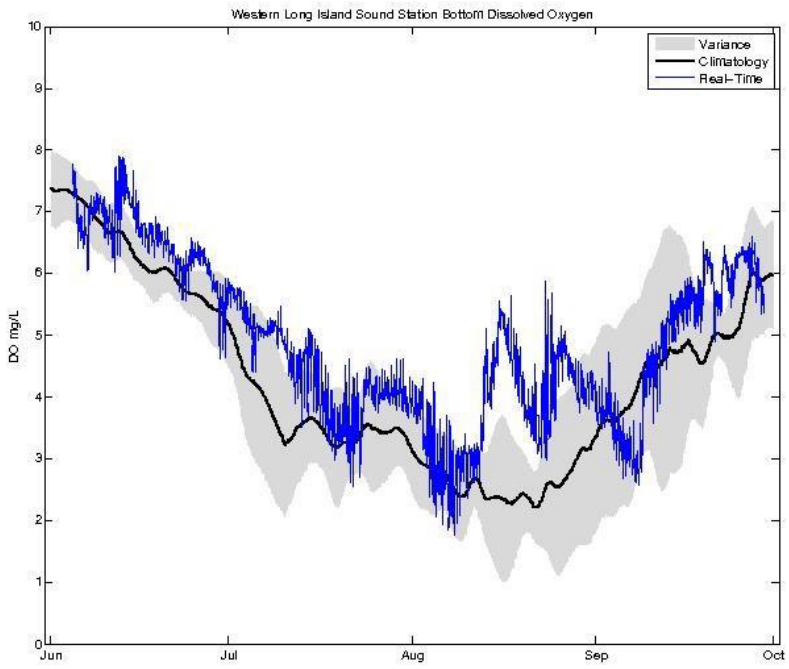


Summer 2014 DO conditions were generally better than the long term average

Execution Rocks Bottom Dissolved Oxygen



Western LIS Bottom Dissolved Oxygen



Based on LISICOS Buoy Data Collected Between 1 June to 29 September, 2014

Eelgrass is Expanding

Historical eelgrass distribution by Town (black dot)

Current eelgrass (in orange)

- Increase of 4.5% in eelgrass 2009-2012, 29% between 2002-2012

LIS Eelgrass Survey, US Fish & Wildlife Service

Success: Declines in big sources of N

Source	Trend	Description
WWTPs (CT, NY)	⇩	88% of WLA target
Atm. Deposition	⇩	26% ↓ TN, 50% ↓ NO_3
Agricultural	⇩	25-40% ↓ in fertilizer and livestock
Urban storm water	⇧	2-3% ↑ in impervious areas
Septic	⇧	8% ↑ in basin population (1990-2010)*
Turf Fertilizer	? ⇧	1-2% ↑ in turf/grass areas

* 40-200% increase in NO_3 in Suffolk County groundwater (1987-2010)

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Success: Restoring Habitat

Restored 1,548 acres of habitat since 1998, 77% of 2000 acres by 2020 goal.

Opened 300 miles of riverine migratory corridors to diadromous fish since 1998.

Protected 2,580 acres of land since 2006

Model Forecast Improvements in Survival and Fish Biomass Indices

Simulation	Reduction in in larval mortality	Reduction in fish biomass loss
2000 TMDL	69%	90%
Run 2 – reduced atmospheric deposition	78%	95%
Run 7 – highly reduced runoff + “3 mg/L” STPs	83%	98%
Pastoral	99%	100%

(1988 hydrodynamics)

Challenges:


Infrastructure upgrades


Increased storms


Lawns


Marsh loss


We are an urbanizing state/region/country
Growth and development
CT's Changing Landscape


Septic systems


Storm water


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