Long Island Sound Water Quality Workshop

July 14-15, 2015

University of Connecticut, Avery Point Campus

CIRCA
Connecticut Institute for Resilience and Climate Adaptation

SEA-BIRD COASTAL

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

NEIWPCC
New England Interstate Water Pollution Control Commission

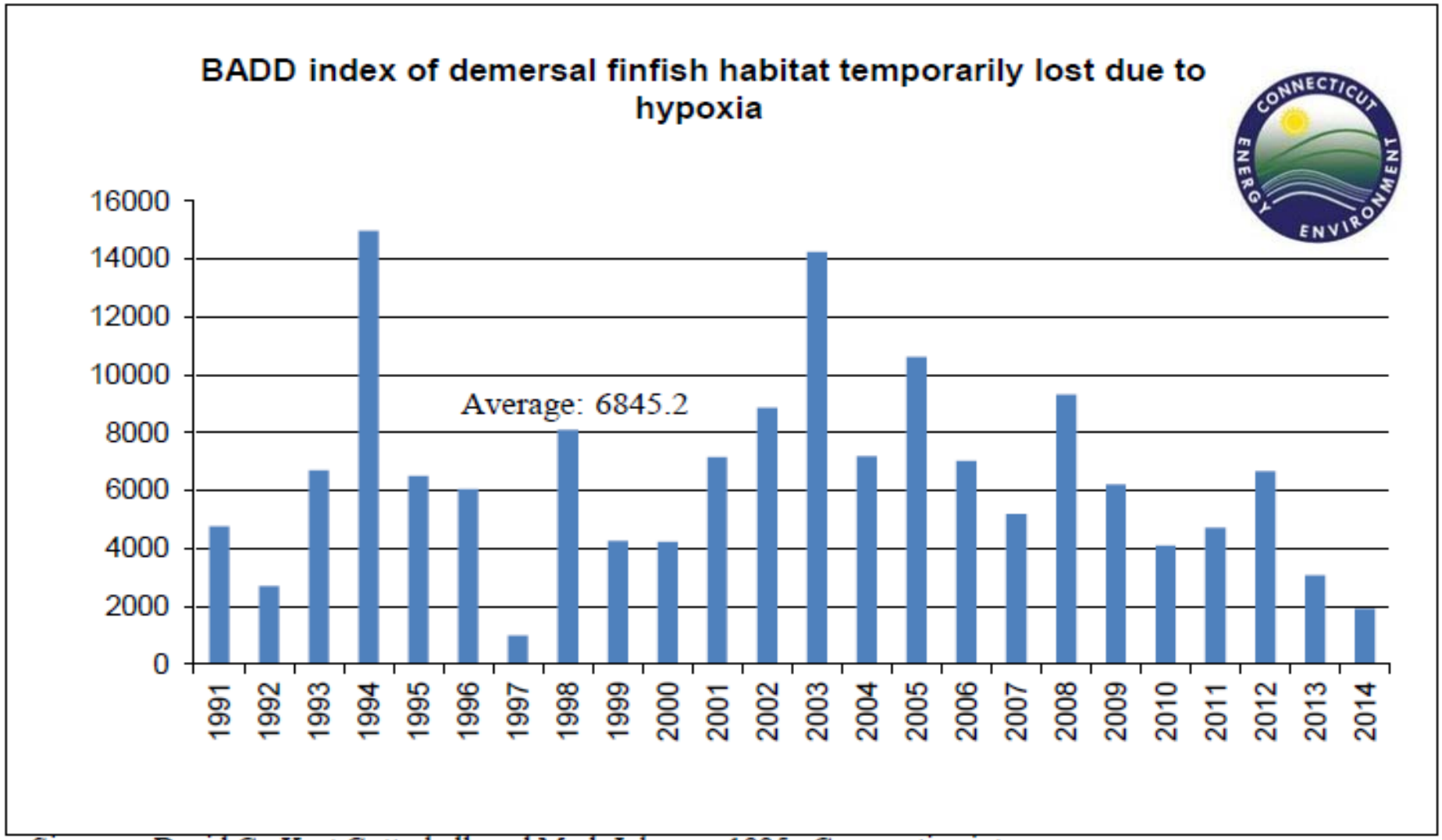
Long Island Sound Study
A Partnership to Restore and Protect the Sound

United States Environmental Protection Agency

Present Status of Monitoring Program

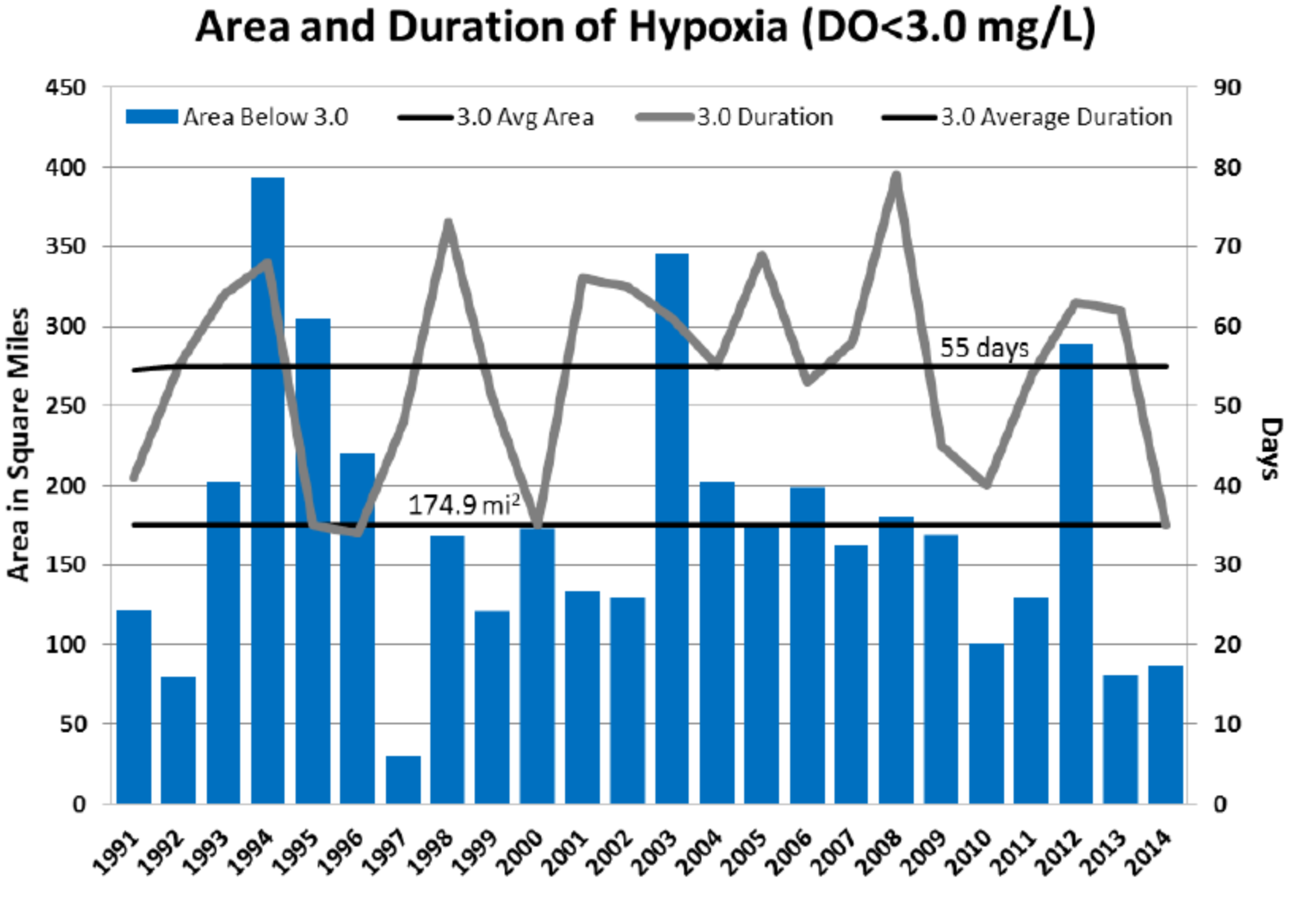
- Extensive “Open Water” monitoring program
  - Sampling carried out by CTDEEP and NEIWPCC/IEC
  - Station density increases from east to west
  - Focused on detecting and quantifying extent of hypoxia
- Supplemented by buoy network (UCONN) and tributary monitoring (USGS)
- No formal embayment monitoring program, but several excellent programs run by regional nonprofits & community groups

Frequency, Area, and Duration of Hypoxia



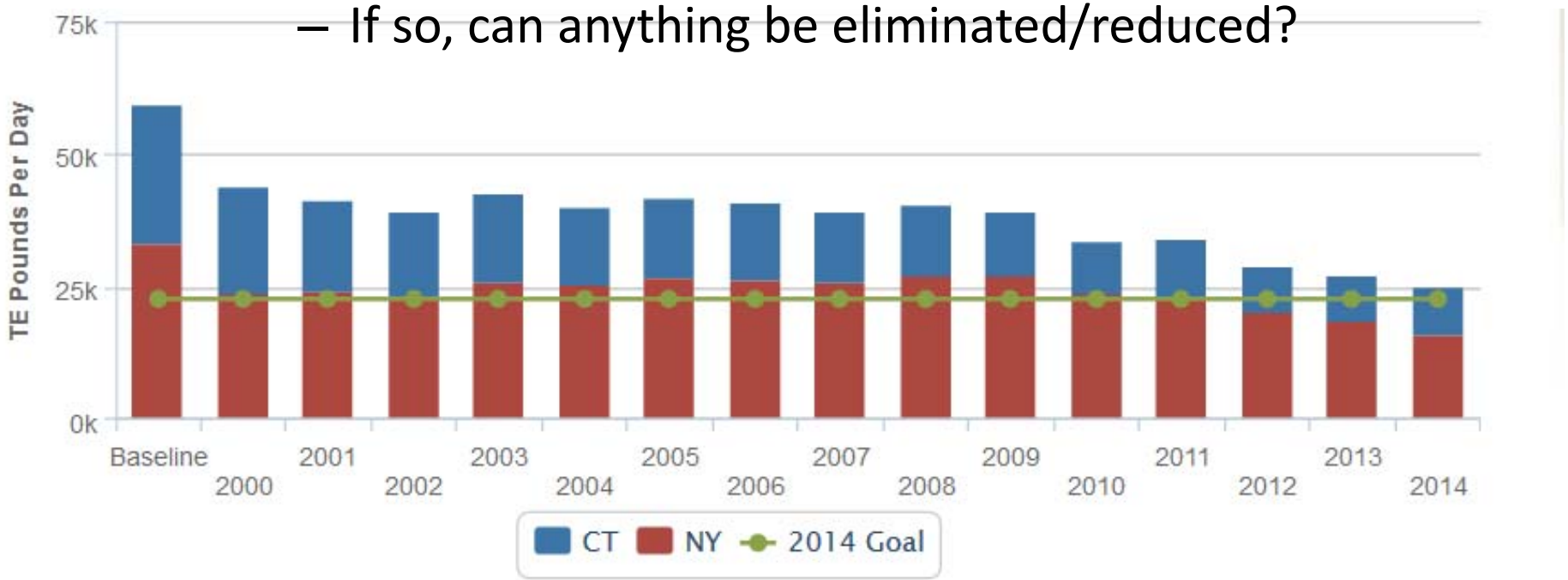
Simpson, David G., Kurt Gottschall, and Mark Johnson. 1995. Cooperative interagency resource

Potential Issues



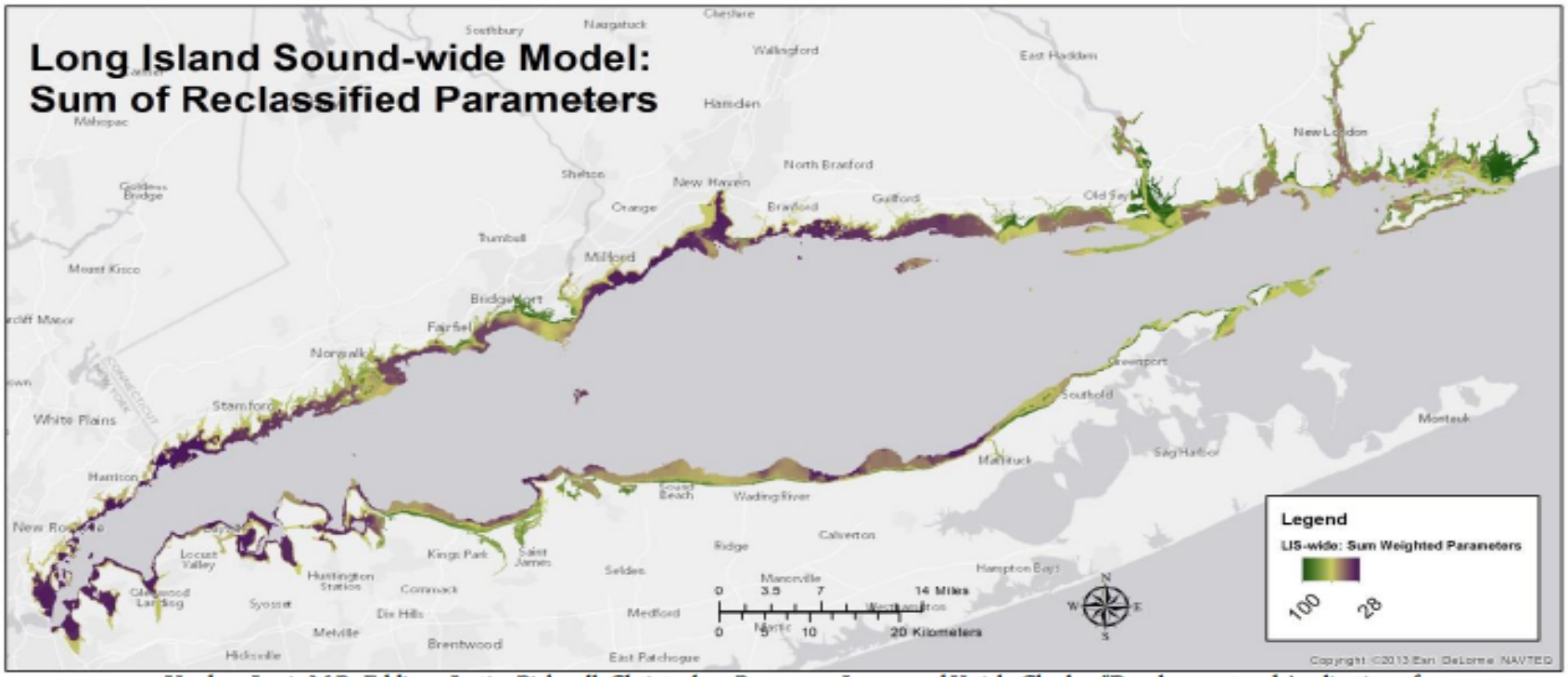
Central Workshop Questions

- Can the monitoring program detect changes in hypoxia & water quality parameters that contribute to hypoxia? Do the data adequately support tools to understand relationships between parameters?
  - If not, what would need to be changed/added?
  - If so, can anything be eliminated/reduced?



Central Workshop Questions

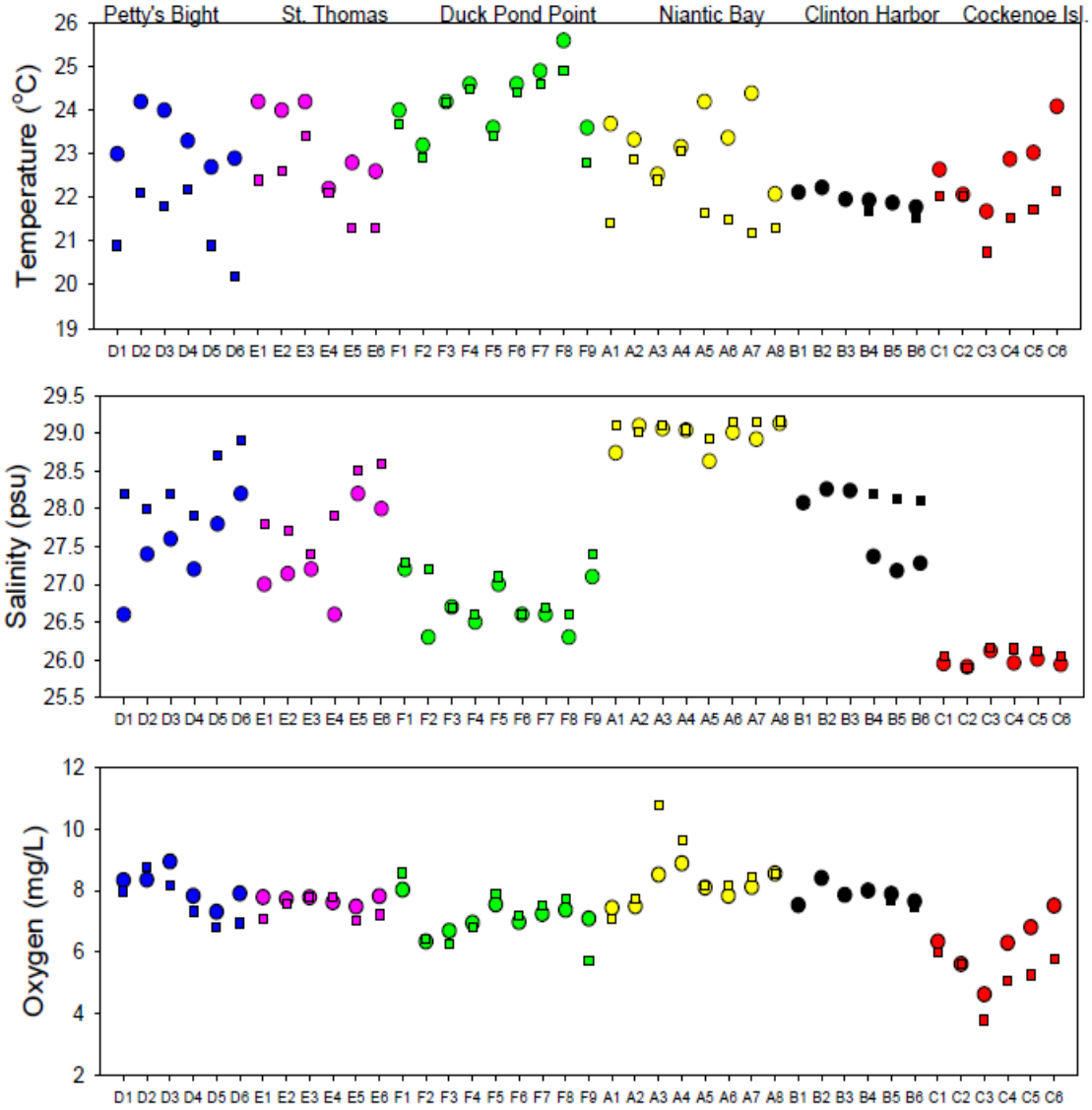
- Is the monitoring program adequate to consider other endpoints (e.g. eelgrass, chlorophyll) that relate to eutrophication impairments? If not, what would need to be added?



Vaudrey, Jamie M.P.; Eddings, Justin; Pickerell, Christopher; Brousseau, Lorne; and Yarish, Charles, "Development and Application of a GIS-based Long Island Sound Eelgrass Habitat Suitability Index Model" (2013). *Department of Marine Sciences.* Paper 3.
http://digitalcommons.uconn.edu/marine_sci/3

Central Workshop Questions

What patterns and conclusions from the open water monitoring program can and cannot be applied to embayments and nearshore areas?



Vaudrey, Jamie M.P.; Eddings, Justin; Pickerell, Christopher; Brousseau, Lorne; and Yarish, Charles, "Development and Application of a GIS-based Long Island Sound Eelgrass Habitat Suitability Index Model" (2013). *Department of Marine Sciences.* Paper 3.
http://digitalcommons.uconn.edu/marine_sci/3

Water quality illustrates the story o

D+ Eastern Narrows

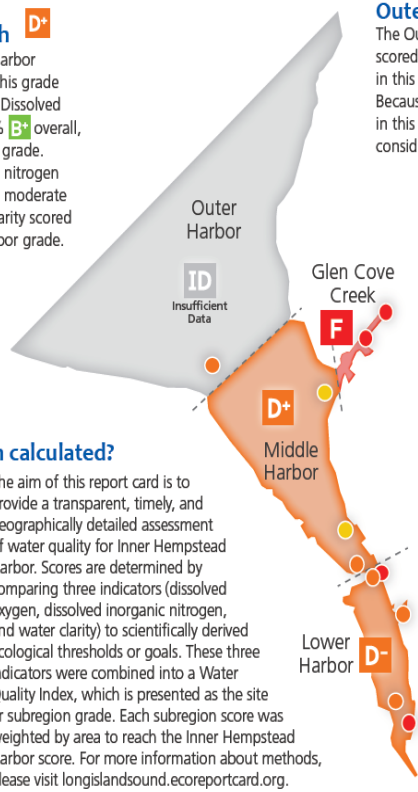
The Eastern Narrows received a D+ (69%), a poor grade, because dissolved oxygen, water clarity, and nutrients continue to be problems. The Eastern Narrows has urban and suburban development and the water has little exchange with the Atlantic Ocean.

B

D+ Harbor nitrogen levels & water clarity need improvement

Overall Inner Harbor Health D+

Inner Hempstead Harbor scored 67% D+. This grade is considered poor. Dissolved oxygen scored 87% B+ overall, a moderately good grade. Dissolved inorganic nitrogen scored 76% C, a moderate grade and water clarity scored 38% F, a very poor grade.



Outer Harbor ID

The Outer Harbor subregion was not scored, due to insufficient data collected in this region, with only one sampling site. Because of the importance of shellfishing in this region, new sampling sites are being considered in the future.

Glen Cove Creek F

The Glen Cove Creek subregion scored 54% F, a very poor grade. Dissolved oxygen scored 82% B-, a moderately good grade. Dissolved inorganic nitrogen and water clarity had very poor grades, 52% F, and 27% F, respectively.

Middle Harbor D+

The Middle Harbor subregion scored 69% D+, a poor grade. Dissolved oxygen scored 88% B+, a moderately good grade and dissolved inorganic nitrogen scored 79% C+, a moderate grade. Water clarity scored 41% F, a very poor grade.

Lower Harbor D-

The Lower Harbor subregion scored 62% D-, a poor grade. Dissolved oxygen scored 83% B, a moderately good grade. Dissolved inorganic nitrogen scored 70% C-, a moderately poor grade. Water clarity scored 31% F, a very poor grade.

How is health calculated?

DO Dissolved oxygen

N Dissolved inorganic nitrogen

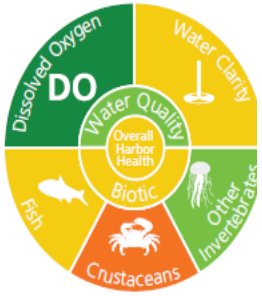
Water clarity

The aim of this report card is to provide a transparent, timely, and geographically detailed assessment of water quality for Inner Hempstead Harbor. Scores are determined by comparing three indicators (dissolved oxygen, dissolved inorganic nitrogen, and water clarity) to scientifically derived ecological thresholds or goals. These three indicators were combined into a Water Quality Index, which is presented as the site or subregion grade. Each subregion score was weighted by area to reach the Inner Hempstead Harbor score. For more information about methods, please visit longislandsound.ecoreportcard.org.

C+ Harbor water quality good, fish & crustaceans need improvement

Overall Harbor Health C+

Norwalk Harbor scored 78% (C+). This grade is considered moderate. Dissolved oxygen scored 97% (A), a very good grade, and water clarity scored 70% (C-), a moderately poor grade. The biotic indicators—fish, crustaceans, and other invertebrates—had a range of scores. Other invertebrates scored the highest with 80% (B-), moderately good, followed by fish with 73% (C), moderate, and crustaceans with 68% (D+), poor. The Harbor Health score is the average of the water quality (83%, B) and biotic (74%, C) indices.

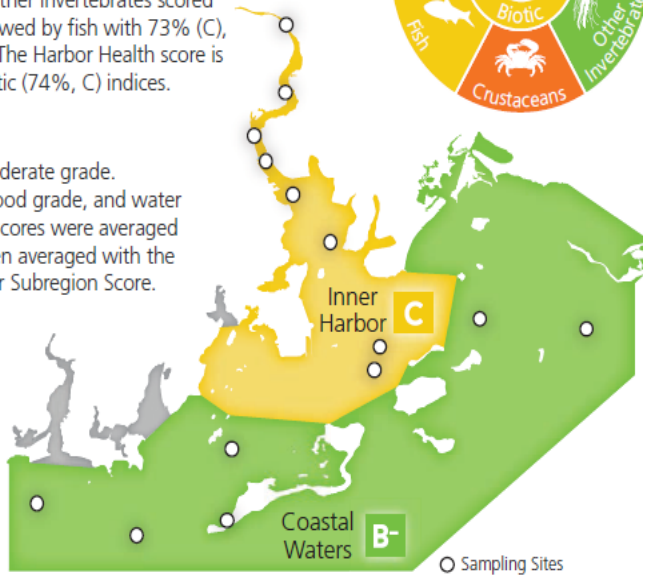


Inner Harbor C

The Inner Harbor subregion scored 74% (C), a moderate grade. Dissolved oxygen scored 86% (B), a moderately good grade, and water clarity scored 62% (D-), a poor grade. These two scores were averaged into a water quality index, 74% (C) which was then averaged with the biotic index, 74% (C), into the overall Inner Harbor Subregion Score.

Coastal Waters B-

The Coastal Waters subregion scored 80% (B-), a moderately good grade. Dissolved oxygen scored 100% (A+), a very good grade, and water clarity scored 72% (C-), a moderately poor grade. These two scores were averaged into a water quality index, 86% (B) which was then averaged with the biotic index, 74% (C), into the overall Coastal Waters Subregion Score.



www.longislandsound.ecoreportcard.org

chlorophyll a grade. This region is influenced by the poor health of the Eastern Narrows, but is somewhat less developed than the Narrows.

suburban, and agricultural uses, and has a lot of exchange with the Atlantic Ocean.

90–100%: All water quality indicators meet desired levels. Quality of water in these locations tends to be very good, most often leading to preferred habitat conditions for aquatic plants and animals.

80–90%: Most water quality indicators meet desired levels. Quality of water in these locations tends to be good, often leading to acceptable habitat conditions for aquatic plants and animals.

70–80%: There is a mix of good and poor levels of water quality indicators. Quality of water in these locations tends to be fair, leading to sufficient habitat conditions for aquatic plants and animals.

D 60–70%: Some or few water quality indicators meet desired levels. Quality of water in these locations tends to be poor, often leading to degraded habitat conditions for aquatic plants and animals.

F 0–60%: Very few or no water quality indicators meet desired levels. Quality of water in these locations tends to be very poor, leading to unacceptable habitat conditions for aquatic plants and animals.

ID Insufficient Data (ID) is a designation used for areas where there is either insufficient or no data to give a grade on desired health levels.

Central Workshop Questions

- How can LISS improve the efficiency and effectiveness of our monitoring program?

- What techniques and tools should we be considering as our monitoring program evolves?