Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Long Island Sound Water Quality Monitoring

14 July 2015

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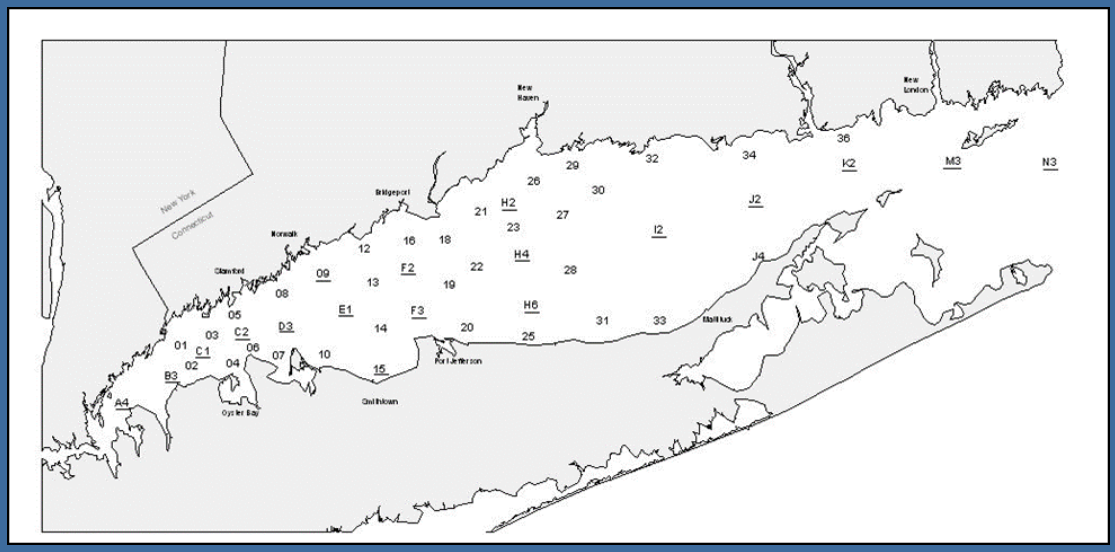
Long Island Sound Water Quality Workshop

University of Connecticut's Avery Point Campus, Groton, Connecticut

Connecticut Department of Energy and Environmental Protection

- Since 1991, CT DEEP has conducted an intensive year-round monthly water quality monitoring program at 17 sites on Long Island Sound, utilizing the Department's Research Vessel *John Dempsey*

During the summer months (June – Sept) up to ~30 additional sites are sampled to determine the extent of hypoxic conditions



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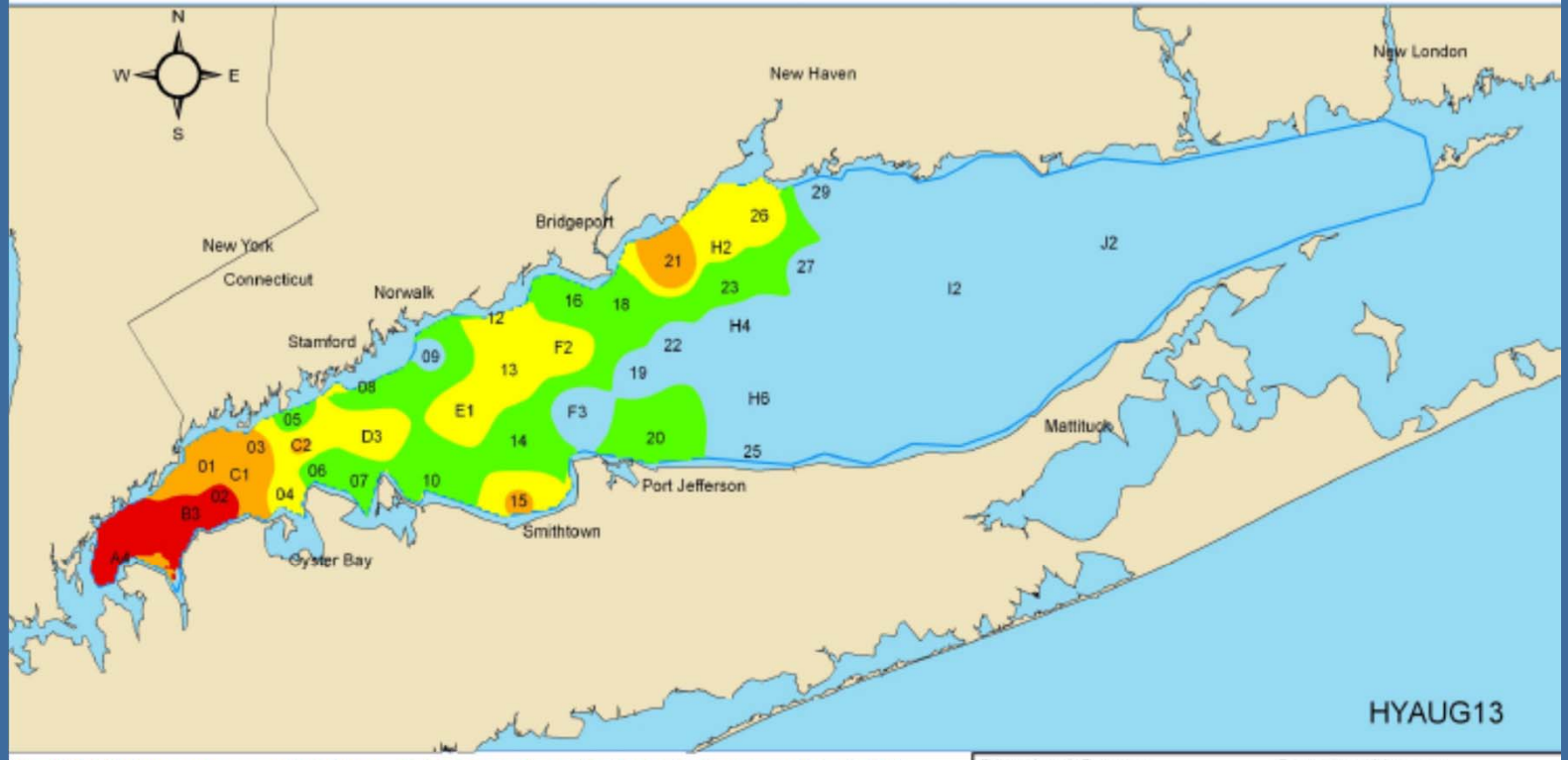
Dissolved Oxygen in Long Island Sound Bottom Waters
August 12, 13 and 14, 2013



The HYAUG13 survey was conducted from 12-14 August aboard the R/V John Dempsey. A total of 38 stations were sampled. Dissolved oxygen concentrations were below 3.0 mg/L at nine stations with the lowest value being 1.34 mg/L at Station A4. This is slightly better than in 2012 when 23 stations were below 3.0 mg/L and the lowest DO concentration was 0.9 mg/L at Station A4. Additionally, eight stations had DO concentrations between 3.5 mg/L and 3.0 mg/L and ten stations had DO concentrations that were above 3.5 mg/L but less than 4.8 mg/L. The areal extent of bottom water where DO values fell below 4.8 mg/L was 1051.3 km^2 (405.9 mi^2). The areal extent of bottom waters affected by hypoxia (DO<3 mg/L) was found to be 209.1 km^2 (80.7 mi^2) and is the fifth lowest area over the past 15 years.

Dissolved Oxygen	Severity of impact
0.0 - 0.99	Severe
1.0 - 1.99	Moderately severe
2.0 - 2.99	Moderate
3.0 - 3.49	Marginal
3.5 - 4.79	Interim management goal
4.8+	Excellent - Supportive of marine life

Physical and Chemical

CTD profile conducted top to bottom (temp, pH, DO, salinity, fluorometer, PAR)

Water samples are collected using a Rosette Sampler that holds ten water sampling bottles

Samples are collected :

- five (5) meters off the bottom (BOTTOM SAMPLES)
- two (2) meters below the surface (SURFACE SAMPLES)

<u>Parameters include:</u>

dissolved silica
particulate silica
particulate carbon
dissolved organic carbon
dissolved nitrogen
particulate nitrogen
ammonia
nitrate + nitrite
particulate phosphorus
total dissolved phosphorus
orthophosphate
chlorophyll a
total suspended solids

Analysis conducted by the
University of Connecticut
Center for Environmental Science
and Engineering Laboratory in Storrs

Biological- Plankton

Since 2002, CT DEP has collected zooplankton samples from six (6) stations (B3, D3, F2, H4, I2, K2)

Samples are sent to the University of Connecticut for species composition, abundance, community structure, and spatial and temporal distribution throughout the Sound

HPLC- 10 stations

- High-Performance Liquid Chromatography or HPLC to examine phyotplankton.
- a unique composition of pigments that produces a characteristic color in its tissue.
- chart the pigment composition of the sample on a graph.
- read the graph to identify the composition of phytoplankton species

Special Projects- National Coastal Condition Assessment

The EPA's National Coastal Condition Assessment (NCCA) is a statistical survey of the condition of our Nation's marine and Great Lakes coasts.

- Conducted on a 5 year rotating basis

Ecological Integrity Indicators

- Infaunal/Benthic Macroinvertebrates
- Whole fish contaminants*
- Sediment toxicity

Recreational Indicator

- Pathogen indicator (enterococci)

Stressor indicators

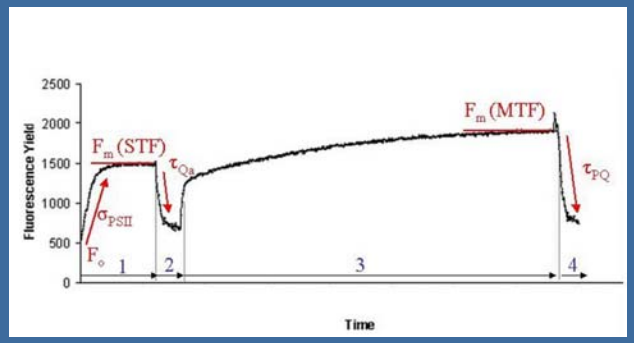
- In situ temperature, pH, dissolved oxygen (DO), salinity and conductivity
- Light attenuation
- Water chemical quality and nutrient concentrations
- Chlorophyll a, Secchi disk depth,
- Sediment chemistry and composition*
- Habitat Assessment

FIRe Project

FIRe- Fluorescence Induction and Relaxation System

An advanced active fluorometer designed to measure variable chlorophyll fluorescence in photosynthetic organisms.

- Started in summer 2014
- Hope is to examine primary productivity
- Need additional data



See Poster during the evening social

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Embayment Pilot Project- to begin in 2016-2017

The goal of this project is to establish a tiered monitoring program for near-shore coastal sampling that can be performed by volunteer monitors to help assess the health of Long Island Sound embayments.

- Adapt CT's freshwater tiered program structure to near shore estuarine sampling
- Develop guidance for determining sampling locations (bacterial, water quality, benthic, other parameters)
- Expand upon the generic QAPP developed by Vaudrey et al. 2013, as part of the framework project and develop standard operating procedures for bacteria and water quality sampling in near shore waters
- Conduct bacteria, water quality, and biological sampling in at least one embayment over the summer to refine the guidance and SOPs before engaging potential volunteer groups
- Investigate collaboration with the IEC and NYDEC to initiate a volunteer program in waters under their jurisdiction

Collaboration with Guest Researchers

- Collect Samples for Dr. Mark Altabet on a monthly basis
- Since Fall 2014, Birders have accompanied the cruises
- Others upon request
  including last survey Ewelina Rubin, post doc with Dr. George McManus looking at plankton DNA

Questions?

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