

# Long Island Sound Report Card 2016

*Grading the water quality and ecosystem health of the Urban Sea*



Save the Sound®



# New monitoring initiative for your bays and harbors

**Though they are not depicted in this report card, bays and harbors around the Sound are critically important.**

The bays and harbors of Long Island Sound – home to many beaches, parks, and marinas – are often the places where the public comes into direct contact with Sound waters. Each bay and harbor (“embayment”) has its own unique hydrology influenced by a number of factors including depth, tidal flushing, and the presence of tributary streams and rivers. Measuring water quality conditions in embayments requires a different approach than the one used to measure open water conditions. This Report Card only reports on open water conditions.

To learn more about the health of Sound bays and harbors, the Long Island Sound Funders Collaborative and Save the Sound have initiated a Sound-wide embayment study. A coalition of interested monitoring groups, scientists, and representatives of regulating agencies are collaborating on the study with the goal of gathering “apples-to-apples” data from a network of monitoring groups around the Sound.

The study is designed to measure human impact on, and the relative health of, the bays and harbors of Long Island Sound. Standard Operating Procedures are provided and must be followed in their entirety by participating groups to ensure consistent comparisons of embayments. The study was piloted by three groups in the 2016 summer monitoring season and is open to participation by any interested, qualifying group or community on the Sound starting in the 2017 monitoring season. The findings of the embayment study – to be published in future Report Cards – will further deepen our understanding of the Sound and inform our actions to preserve and protect it.



*Top: Harbor Watch at sunrise conducting water sampling. Bottom left: Mystic Aquarium and Clean Up Sound and Harbors (CUSH) surveying seaweed. Bottom right: Save the Sound measuring dissolved oxygen.*



## Water Quality Indicators

### DO Dissolved oxygen

Dissolved oxygen is critical to the survival of fish and shellfish. Low levels of dissolved oxygen can stress fish, shellfish, and other marine life living on the bottom, reducing growth and reproduction, and at low enough levels results in mortality.

### Water clarity

Water clarity is a measure of how far light penetrates through the water. Clear water allows fish to find prey and helps underwater plants to thrive.

### Chlorophyll *a*

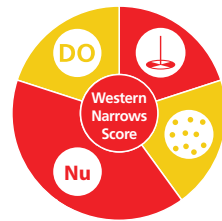
Chlorophyll *a* measures the amount of phytoplankton (microalgae) in the water column. Too much algae in the water reduces water clarity, and decomposing algae leads to reduced dissolved oxygen.

### Nu Nutrients

Nutrients (nitrogen and phosphorus) are the building blocks for life, but too much in a natural system can lead to problems. Our communities contribute excess nutrients to the Sound from wastewater, septic systems, fertilizer, and fossil fuel burning. Nitrogen fertilizes excessive growth of plant-like organisms (phytoplankton and seaweed), leading to algae blooms. As these organisms and the animals that feed on them respire, die, and decompose, oxygen in the water is depleted. Our other indicators capture the impact of high nutrient inputs (low DO, high chlorophyll *a*, low water clarity). When conditions are very bad, we sometimes see fish kills and harmful algal blooms.

# Water quality illustrates the story of Long Island Sound's ecological health

## F Western Narrows

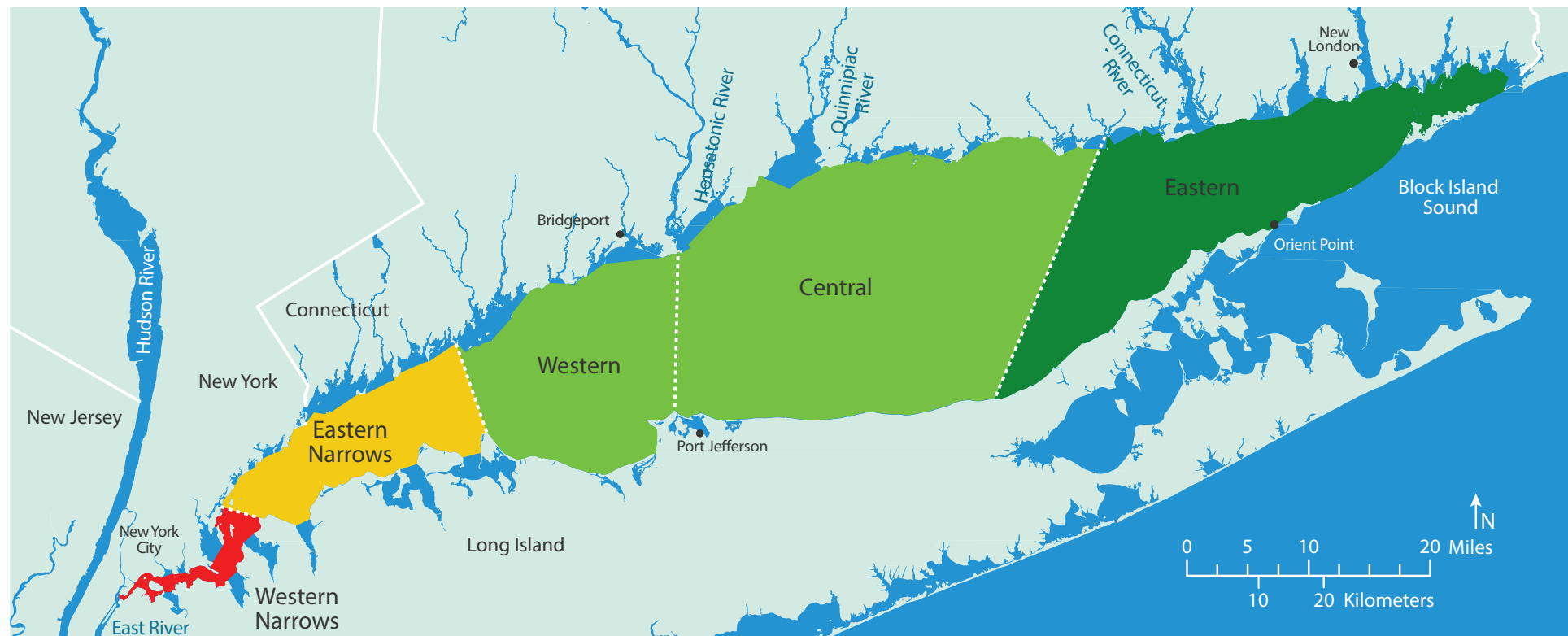


The Western Narrows received an F (51%), the worst grade of the Sound, because nutrient levels and water clarity are very poor. This area is densely developed, and has very little exchange with the Atlantic Ocean.

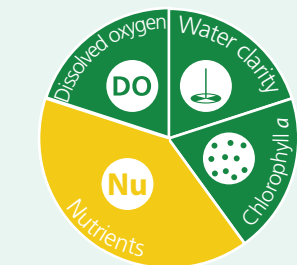
## C- Eastern Narrows



The Eastern Narrows received a C- (70%), a moderately poor grade, reflecting degraded water quality, due to poor nutrient levels. This region has urban and suburban development and the water has little exchange with the Atlantic Ocean.



## Long Island Sound

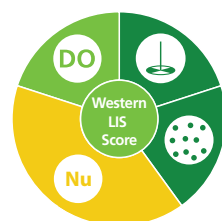


There is a gradient from west to east of unhealthy (F) to healthy open Sound water quality (A-). The Western Narrows, home of the highly populated New York

City metropolitan area, scored very poorly, reflecting a very high load of nutrients and very poor water clarity. In addition to the polluting impacts of dense population and development, the western end of the Sound is further impacted by having only minor flushing and tidal exchange with New York Harbor.

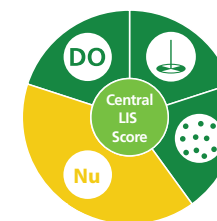
As you move east, you generally move toward a lower density of people and toward stronger tidal flushing from the Atlantic Ocean at the Sound's east end, which is reflected in better grades. It is important to note that these grades are for open water conditions only. Communities on bays and inlets in any part of the Sound can experience water quality problems similar to the Western and Eastern Narrows due to low tidal flushing rates combined with high pollutant loads. We will have more information on these hyperlocal conditions in future Report Cards.

## B Western



Western Long Island Sound received a B (83%) because most indicators scored well. Nutrients continue to be a problem which leads to occasional reduced dissolved oxygen levels. This region is less developed than the Narrows but still densely populated.

## B+ Central



Central Long Island Sound received a B+ (88%). Although nutrients are still a cause for concern in this region, increased exchange with the Atlantic Ocean leads to water quality generally supportive of aquatic life.

## A- Eastern



Eastern Long Island Sound received an A- (92%), the best grade of the Sound. This region has a lower population and a mix of rural, suburban, and agricultural uses, and has a lot of exchange with the Atlantic Ocean.

## How are the scores calculated?

This Report Card compares water quality indicators (dissolved oxygen, nutrients, chlorophyll *a*, and water clarity) to scientifically derived thresholds or goals. These indicators are combined into an overarching Water Quality Index, which is presented as a subregion percent score. The Sound-wide scores are derived by combining the regional scores for each indicator and weighting them based on the area of water in that region. For more information about methods, please visit [longislandsound.ecoreportcard.org](https://longislandsound.ecoreportcard.org).

**A** 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.

**B** 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.

**C** 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 marginal, and occasionally degraded 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.

This Report Card is based on data collected in 2015.

# Reducing nutrients that enter the Sound

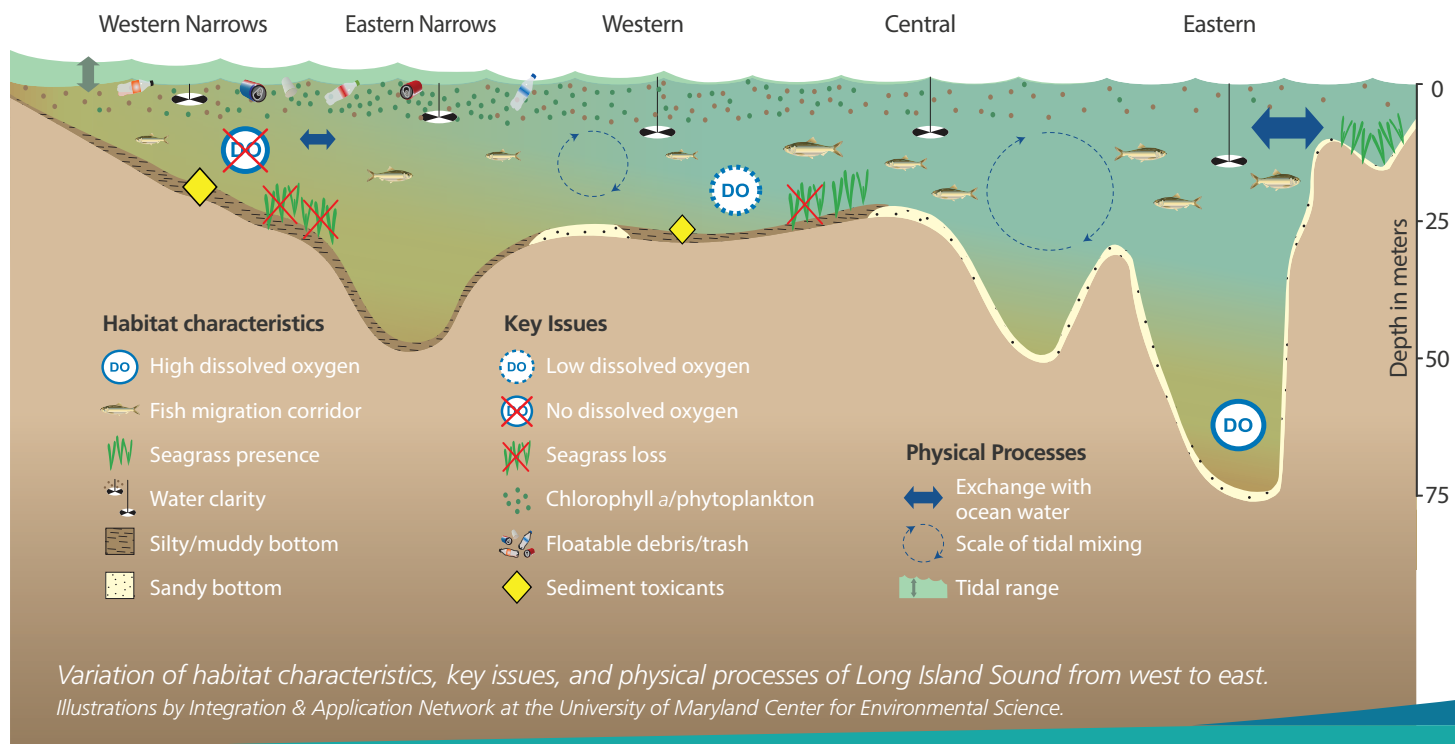


Above: Major watersheds of Long Island Sound.

Long Island Sound is our nation’s great urbanized estuary. The primary pollutant that threatens the current and future health of the Sound is excess nutrients, particularly nitrogen, entering the water from our wastewater treatment plants, septic systems, fossil fuel burning, and fertilizer use. High nitrogen loads can overfertilize coastal waters, causing the growth of excess seaweed and phytoplankton. Oxygen is consumed as these plant-like organisms and the animals that feed on them respire, die, and decompose; in some cases causing a perilous low oxygen condition, called “hypoxia.” High nutrient levels can lead to fish die-offs, harmful algae blooms, loss of coastal marshes, and increased ocean acidification which is harmful to shellfish.

In response to the threat from excess nutrients, over the past decade communities around the Sound have made a substantial investment in nutrient removal technology at wastewater plants in New York and Connecticut, as well as an investment in tracking the response in the Sound through water quality monitoring. The good news is that this investment appears to be working. Dissolved oxygen levels have generally improved in the western Sound over the past decade, but there is still work to be done.

With continued leadership from the U.S. Environmental Protection Agency (EPA), state and local governments around the Sound are currently working on additional measures to continue reducing nitrogen inputs. Please review the back page for actions that individuals, families, and businesses can take to help with this effort.



Variation of habitat characteristics, key issues, and physical processes of Long Island Sound from west to east.  
Illustrations by Integration & Application Network at the University of Maryland Center for Environmental Science.



# Healthy waters, healthy communities

During the recreational season fecal bacteria is measured at the 200+ beaches that line the Sound to determine if the water quality meets the EPA guidelines for safe swimming. Exposure to fecal bacteria in recreational water can lead to a variety of illnesses including viral, parasitic, and bacterial infections.

Fecal bacteria levels are also measured in waters where shellfish are harvested for human consumption because consuming the bacteria in shellfish can lead to illness. The loss of beach days and shellfish harvests has a direct negative impact on local economies and livelihoods around the Sound. Investing in our wastewater infrastructure keeps our beaches and shellfish healthy and accessible for public enjoyment.

This Report Card does not include data or grades for bacteria levels in Sound waters. For data on bacteria levels at Sound beaches, visit [SoundHealthExplorer.org](http://SoundHealthExplorer.org).



Pollution affects shellfish harvests and local economies.

## How you can help



### Reduce water usage

Less water means improved water treatment at plants, plus less wear and tear on pipes.



### Eliminate or reduce fertilizer use

Prevents nutrient runoff from polluting your waterways.



### Keep litter out of waterways

Trash and debris are hazards to wildlife.



### Go native

Natural vegetation and forested buffers (not a lawn) along a stream, ditch, or waterfront help filter pollutants.



### Pump out your septic system

A properly maintained septic system prevents costly repairs and untreated sewage discharge into your local waterways. Every 3-5 years is recommended.



### Care for your pipes

Properly dispose of harmful chemicals, household grease, and used cooking oil. The pipes in your house protect the water you drink and play in.

## About the Long Island Sound Report Card

Visit [longislandsound.ecoreportcard.org](http://longislandsound.ecoreportcard.org) for information on specific methodologies, indicators, thresholds, grading, and subregion designations.

This Report Card was produced by Save the Sound, a bi-state program of Connecticut Fund for the Environment, and published in October 2016 using 2015 data. Funding was provided by the Long Island Sound Funders Collaborative. Science direction was provided by Jamie Vaudrey, Ph.D. and Jason Krumholz, Ph.D.

The Report Card provides a geographic assessment of annual Long Island Sound ecosystem health for 2015.

Cover photo is Five Mile Point Lighthouse, in New Haven, CT.

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### Data provided courtesy of:



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