Great Bay National Estuarine Research Reserve (NERR)

The Great Bay NERR is a complex embayment and New Hampshire’s largest estuarine system, encompassing all of Great Bay and Little Bay, as well as the tidal portions of seven rivers: Bellamy, Cocheco, Lamprey, Oyster, Salmon Falls, Squamscott and Winnicut. The Great Bay Reserve includes diverse land and water areas, including upland forest, salt marsh, mudflats, tidal creeks, rocky intertidal, eelgrass beds, and upland field habitats. The Bay’s cultural heritage is equally diverse, from paleo-Indian villages dating to 6,000 years ago to colonial transportation and industrial use, to a proposed oil refinery in 1973. For more information, please visit:

http://greatbay.org/

2019 HIGHLIGHTS

2019 was slightly wetter, driven by above average rain in the fall. As a result, salinity was lower in the spring and summer.

pH trended upward throughout the Bay, leading towards less acidic conditions.

Dissolved Inorganic Nitrogen (DIN) concentrations did not significantly change over 2019.

Chlorophyll-a levels were higher in Great Bay in 2019 than the long-term historical average.

Water quality issues influence human and environmental health. The more we monitor our water, the better we will be able to recognize and prevent problems.
Weather data helps scientists and managers understand water circulation patterns, plant growth, shellfish and fish distribution, storm frequency and intensity and much more…

**WEATHER** is what you see outside on any particular day in terms of precipitation, temperature, humidity, cloudiness, visibility and wind.

**CLIMATE** tells us the average daily weather for an extended period of time (years, decades, centuries) at a certain location.

**Weather Can Have A Major Impact On Water Quality**

Precipitation in 2019 was slightly higher than the past 10-year average. Most of the precipitation occurred in the fall, which along with 2018 were the highest fall precipitation in the past 10 years.

Precipitation can have an effect on salinity. Compared to historical averages, 2019 salinity was lower during the spring months but higher during the summer months.
Phytoplankton are tiny, plant-like organisms that need nutrients (nitrogen and phosphorus) to grow. Phytoplankton are critical to estuarine and ocean health. However, excess nutrients can cause rapid phytoplankton growth or "blooms" that can affect water quality and wildlife. These blooms can block light and deplete the dissolved oxygen underwater life needs to survive: negatively impacting fish, shellfish, and eelgrass.

**Nitrogen**

Dissolved inorganic nitrogen (DIN) is an important form of nitrogen used by phytoplankton in order to grow. In the heart of Great Bay, DIN concentrations in 2019 have been slightly increasing, mostly due to a large spike in the spring.

**Algae**

Chlorophyll-a concentrations are an indication of phytoplankton growth. Overall, Chlorophyll-a levels increased at the Great Bay station (GB) in 2019 but not at the other three locations. Most chlorophyll-a concentrations fall within the Fair to Good range, however, sometimes concentrations exceed the critical threshold of 20 ug/L, especially in the spring at the GB station.

**How is Oxygen Changing?**

Dissolved oxygen (DO) levels are mostly unchanged throughout the Bay except for decreasing levels at SQ.

**Small Changes You Can Make To Help**

- Limit use of fertilizers/pesticides and apply responsibly
- Use compost as fertilizer in gardens
- Collect pet droppings
- Plant trees and rain gardens
- Redirect downspouts away from impervious surfaces like driveways and sidewalks
- Wash cars and boats on lawn and not the driveway

**Water Quality is a MAJOR Driver of Ecosystem Change**

What happens on the land affects the quality of the water and the health of the plants and animals that live in the estuary.
Why Estuaries Matter

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<th>Economic Impacts</th>
<th>Community Benefits</th>
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<td>Coastal shoreline counties provided 53 million jobs and contributed $7.4 trillion (nearly 44%) of the nation's gross domestic product in 2012.</td>
<td>Estuaries protect coastal communities by reducing flooding and storm surge impacts, enhancing water quality, and providing commercial and recreational benefits.</td>
<td>Up to two-thirds of the nation's commercial fish and shellfish spend some part of their life cycle in an estuary or depend on this resource for food.</td>
<td>Habitat types include shallow open waters, freshwater/salt marshes, swamps, sandy beaches, mud/sand flats, rocky shores, oyster reefs, mangrove forests, river deltas, tidal pools and seagrasses.</td>
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Tracking The Health of Our Estuaries 24/7

The NERRS is a partnership program between NOAA and the coastal states to manage designated reserves. More than 1.3 million acres of estuarine land and water are protected. Each reserve is managed on a daily basis by a lead state agency or university with input from local partners. The health of every reserve is continuously monitored by the System Wide Monitoring Program (SWMP). SWMP is a robust, long-term, and versatile monitoring program that uses the NERRS network to intensively study estuarine reference sites for evaluating ecosystem function and change. Reserve-generated data and information are available to local citizens and decision makers. For more information, go to: [https://coast.noaa.gov/nerrs/](https://coast.noaa.gov/nerrs/)

More Information...

For Stakeholders
Access data at the System Wide Monitoring Program (SWMP) Graphing Application website: [https://coast.noaa.gov/swmp/](https://coast.noaa.gov/swmp/)

For Scientists

Have Questions?
Contact Chris Peter
Christopher.Peter@wildlife.nh.gov
(603) 294-0146

Great Bay NERR- providing the science needed for today and tomorrow