

# Narragansett Bay Research Reserve

Continuously collecting water and weather data to better understand our waters.



Chase Way, Prudence Island  
Photo Credit: Daisy Durant, Ph.D.  
South Pond, Prudence Island

Long-term monitoring data from the Reserve, together with efforts from other RI agencies, contribute to our understanding of the overall health of our estuary, Narragansett Bay.

## Narragansett Bay National Estuarine Research Reserve (NBNERR)

The Narragansett Bay Research Reserve (NBNERR) is part of National Estuarine Research Reserve System (NERRS), a network of 30 reserves on 24 states and Puerto Rico. NERRS is a partnership program between NOAA and the coastal states to protect more than 1.3 million acres of estuarine land and water.

NBNERR is located on four islands in the geographic center of Narragansett Bay in RI: Prudence, Patience, Hope, and Dyer.

The health of every reserve is continuously monitored by collecting and analyzing water and weather data through the System Wide Monitoring Program (SWMP), a guidance program from NERRS.

For more information, please visit [www.nbnerr.org](http://www.nbnerr.org)

## 2022 HIGHLIGHTS

### Warmer air and water temperatures

Temperatures were slightly higher during most of the year when compared to the long-term (2007-2022) daily average.

### No change in precipitation

Precipitation was comparable to the long-term (2007-2022) historical average.

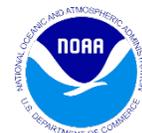
### Algal bloom

A minor peak in chlorophyll *a* concentration was observed at three of four sites, indicating a minor winter-spring bloom.

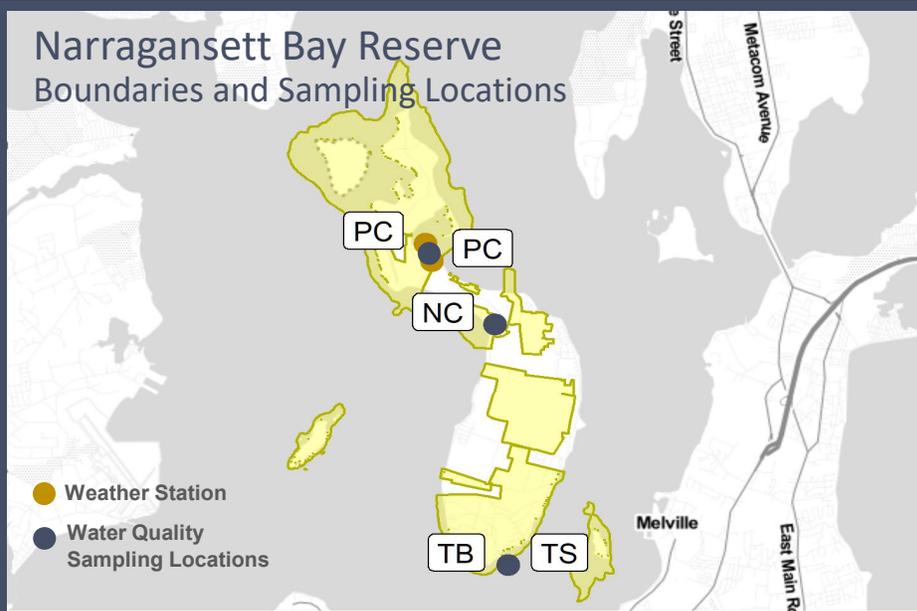


Narragansett Bay  
Research Reserve

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.



# Narragansett Bay Reserve Boundaries and Sampling Locations



## HOW IS OUR ESTUARY CHANGING IN TIME?

Statistical analysis\* of long-term (2007-2022) monitoring data showed significant trends in:

Water temperature

Showed an increasing trend across all sampling locations.

Dissolved Oxygen and pH

Showed a decreasing trend at three sampling locations.

Air temperature, barometric pressure, photosynthetic active radiation

Showed an increasing trend.

## More Trends in Weather and Water Quality

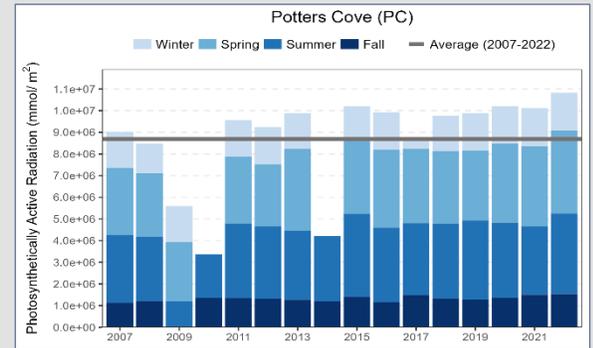
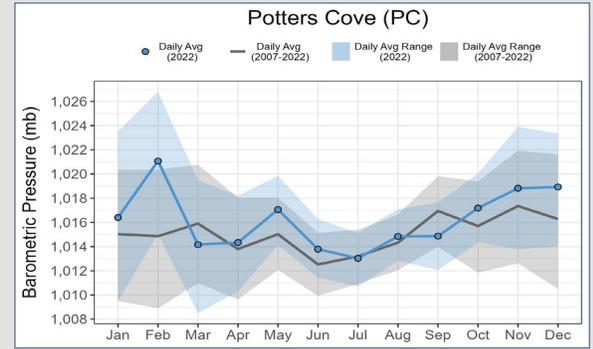
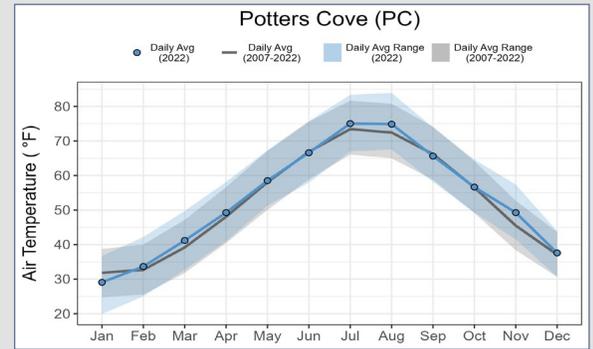
Based on statistical analysis\* of data collected from 2007-2022.

Location ID	Location Name	Air Temperature	Precipitation	Max. Wind Speed	Barometric Pressure	Photosynthetic Active Radiation
PC	Potters Cove	↑	—	↓	↑	↑
Location ID	Location Name	Water Temperature	Salinity	Dissolved Oxygen	pH	Turbidity
NC	Nag Creek	↑	↑	↓	↑	—
PC	Potters Cove	↑	—	—	↓	—
TB	T-Wharf Bottom	↑	↑	↓	↓	—
TS	T-Wharf Surface	↑	—	↓	↓	—
Location ID	Location Name	Ortho-phosphate	Ammonium	Nitrite	Nitrate	Chlorophyll-a
NC	Nag Creek	—	—	—	X	—
PC	Potters Cove	—	—	↓	—	—
TB	T-Wharf Bottom	—	—	↓	—	—
TS	T-Wharf Surface	—	—	↓	—	—

X Insufficient Data   ↑ Increasing   — Not Changing   ↓ Decreasing

## Weather Can Have A Major Impact On Water Quality: Monitoring Is Crucial

Analysis of long-term monitoring data (2007–2022) from the weather station on Prudence Island revealed significant increasing trends\* in air temperature, barometric pressure, and photosynthetic active radiation, all of which contribute to the significant increasing trend\* seen in water temperature in the area surrounding Prudence Island.



## Increasing Trend in Water Temperature

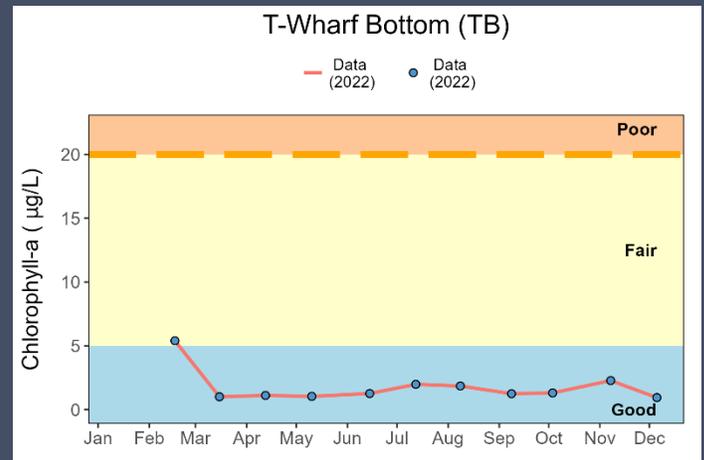
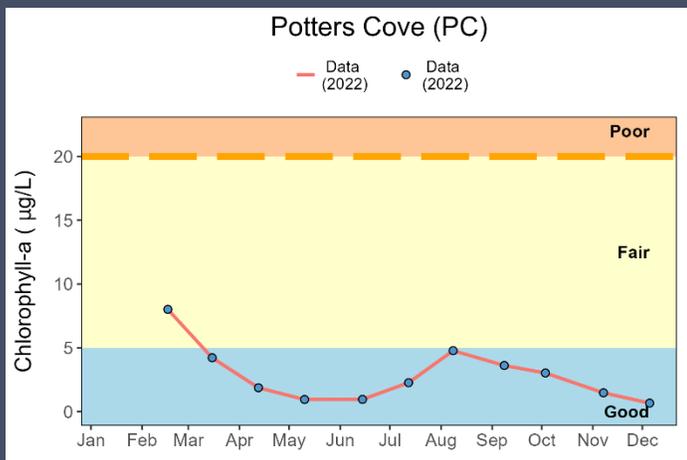
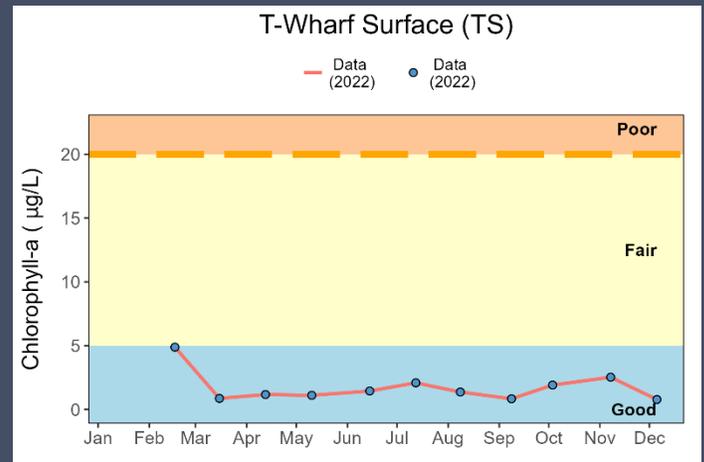
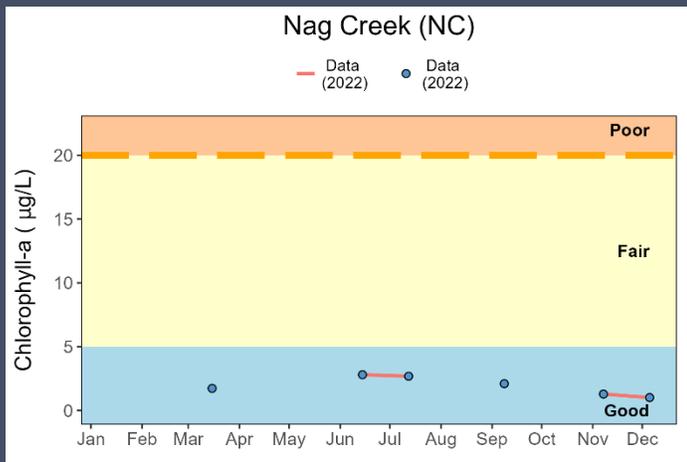


The statistical analysis\* of the long-term monitoring data from 2007–2022 shows a significant upward trend in water temperature across all sample locations on Prudence Island.

\*Kendall Test for Monotonic Trends,  $p < 0.05$

## Do We Have Too Many Nutrients In The Water?

- The growth of algae and plants is supported by critical nutrients like phosphorus and nitrogen. A surplus of these nutrients can lead to phytoplankton blooms, which can reduce the amount of dissolved oxygen required for aquatic life, have detrimental effects on human health, and affect fishing grounds, among others.
- In 2022, a minor (5-8  $\mu\text{g/L}$ ) winter-spring algal bloom event was observed at Potter Cove, and much less at T-Wharf Surface and T-Wharf Bottom. No sampling was done in January due to a winter storm. Nag Creek was frozen during January and February.
- In general, the combination of factors necessary for prompting a major algal bloom event were not ideal in waters around Prudence Island during 2022.



### Small Changes You Can Make To Help Lower Nutrient Concentrations In Our Waters

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

# Why Are Estuaries Important?

## Economic Impacts



- ❖ Family vacations
- ❖ Fishing
- ❖ Boating
- ❖ Fun activities

## Community Benefits



- ❖ Provides jobs
- ❖ Provides clean water
- ❖ Reduces flooding and storm surge damage

## Healthy Ecosystems



- ❖ Aquatic plants and animals need clean water to live
- ❖ Beautiful scenery and wildlife

## Habitat Diversity



Some habitat types include:

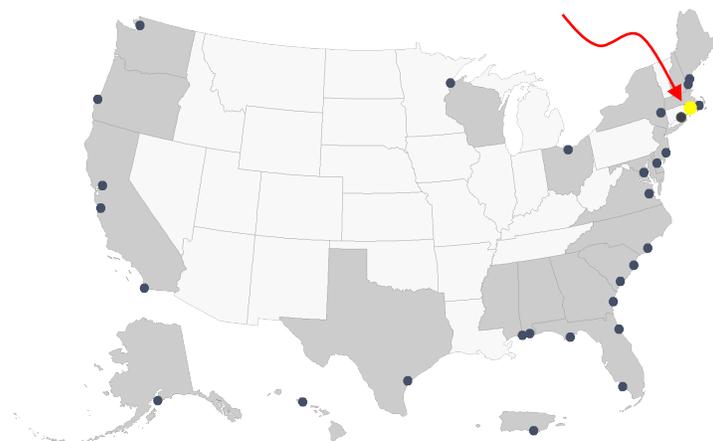
- ❖ Sandy beaches
- ❖ Salt marshes
- ❖ Rocky shoreline

## 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/>

## Narragansett Bay NERR



NERRS is a network of 30 coastal reserves established for long-term research, education and stewardship.

## More Information...

### For Stakeholders

Access data at the System Wide Monitoring Program (SWMP) Graphing Application website:  
<https://coast.noaa.gov/swmp/>

### For Scientists

Access data at the Central Data Management Office (CDMO) website:  
<http://www.nerrsdata.org/>

### Have Questions?

Contact Dr. Daisy Durant,  
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Narragansett Bay NERR- providing the science needed for today and tomorrow

