

# OUR ESTUARY TRENDS: WEATHER & WATER QUALITY



Looking at water quality and weather data and what it means for Sapelo Island and the surrounding coastal waters.

## Sapelo Island National Estuarine Research Reserve (SINERR)

SINERR's mission is to promote the protection, restoration, and conservation of coastal Georgia's estuarine ecosystems; specifically on Sapelo Island. As part of the National Estuarine Research Reserve system, SINERR participates in the System-Wide Monitoring Program (SWMP). This program collects long-term data on water quality, meteorological conditions, and nutrient levels in our estuary. For more information go to:

<http://www.sapelonerr.org/>

## 2024 HIGHLIGHTS

.....  
Air temperatures ranged from 27°F - 96°F, with an average of 69°F.

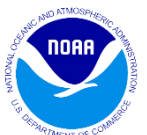
.....  
Average water temperatures ranged between 71.4°F (Lower Duplin) and 73°F (Cabretta).

.....  
November was much warmer in 2024 compared to the 20-year average.

.....  
pH values are trending down at three water quality sites.



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.



# HOW IS OUR ESTUARY CHANGING?

**Water Temperature:** Water temperature is trending warmer at all four sites.

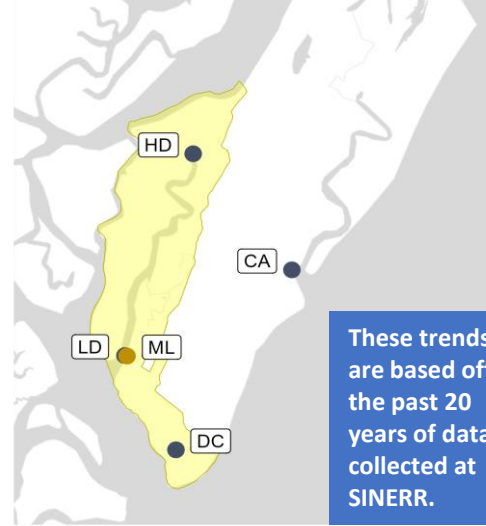
**pH:** pH is trending down at 3 sites (DC, LD, CA) and remains stable at the fourth (HD).

**Salinity:** Salinity is trending down at all four sites.

**Air Temperature:** Air temperature continued trending warmer in 2024.

**Wind Speed:** Average wind speed in 2024 remained stable compared to the 20-year average.

## Sapelo Island SWMP Sites



## Trends in Weather & Water Quality\*

Location ID	Location Name	Air Temperature	Precipitation
ML	Marsh Landing	↑	—

Location ID	Location Name	Water Temperature	Salinity	Dissolved Oxygen	pH	Sonde Depth
CA	Cabretta Creek	↑	↓	↑	↓	↑
DC	Dean Creek	↑	↓	—	↓	↑
HD	Hunt Dock	↑	↓	—	—	↑
LD	Lower Duplin	↑	↓	—	↓	↑

Location ID	Location Name	Ortho-phosphate	Ammonium	Nitrite	Nitrate	Chlorophyll-a
CA	Cabretta Creek	↓	↓	↓	↓	—
DC	Dean Creek	↓	↓	↓	↓	↑
HD	Hunt Dock	↓	↓	↓	—	—
LD	Lower Duplin	↓	↓	↓	↓	↑

\*Based on data collected from 2004 - 2024

X Insufficient Data   ↑ Increasing   — Not Changing   ↓ Decreasing

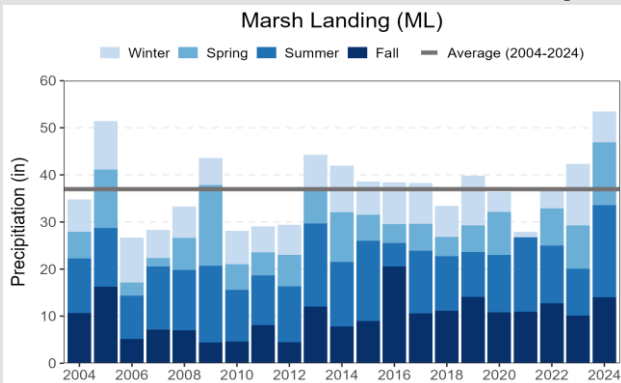
## Weather & Climate – What is the Difference?

**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.

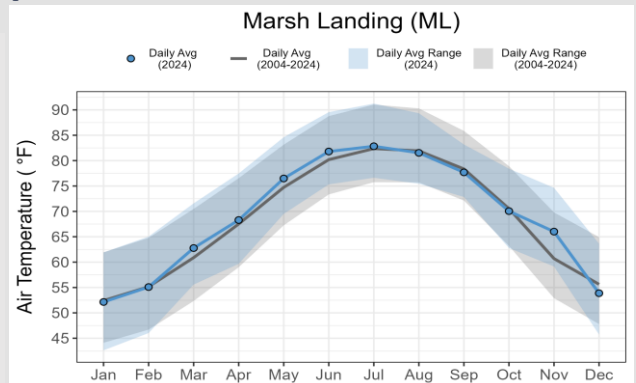
## Weather can have a major impact on water quality Precipitation & Air Temperature



Rainfall in 2024 totaled 52.6 inches at the Marsh Landing meteorological station. This was approximately 10 inches more than was recorded in 2023.

Live weather data from the Marsh Landing station on Sapelo Island is available to the public and is used by scientists to help track and predict storms. To view the live data, visit:

[https://www.ndbc.noaa.gov/station\\_page.php?station=saxg1](https://www.ndbc.noaa.gov/station_page.php?station=saxg1)

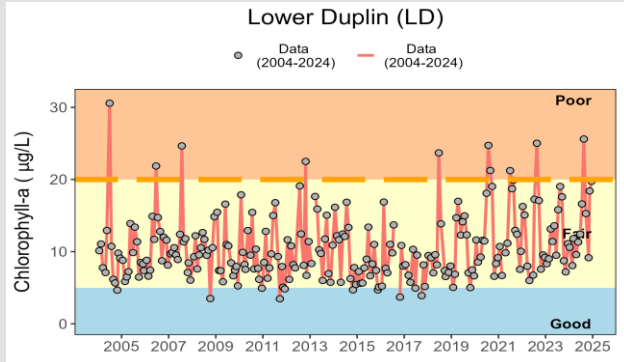


Air temperature in 2024 was slightly above the 20-year average from March - June. Temperatures in November were approximately 5°F warmer than the average.

# What Kind of (and how much?) Nutrients Are In The Water?

Phytoplankton (also called microalgae) are tiny, plant-like organisms that need nutrients (nitrogen and phosphorus) to grow. Phytoplankton are critical to estuarine and ocean health, forming the base of many marine food webs and producing a significant amount of the Earth's oxygen. However, if there are excess nutrients in the water, these tiny organisms can grow out of control and negatively affect water quality, impacting both marine organisms and humans.

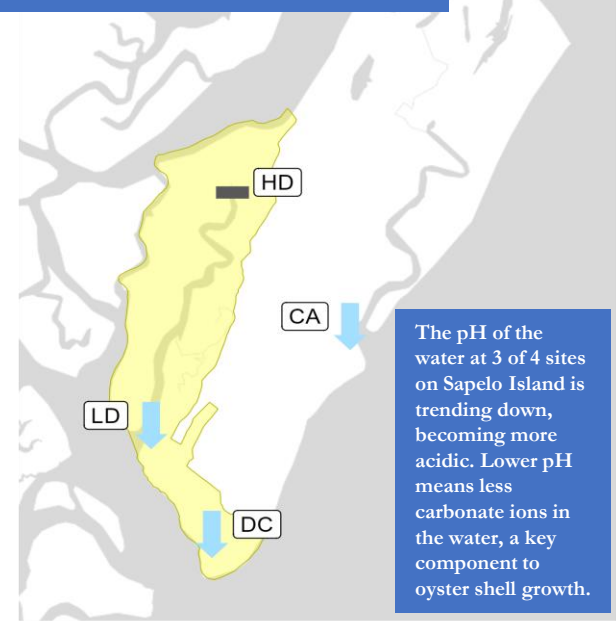
## Algae



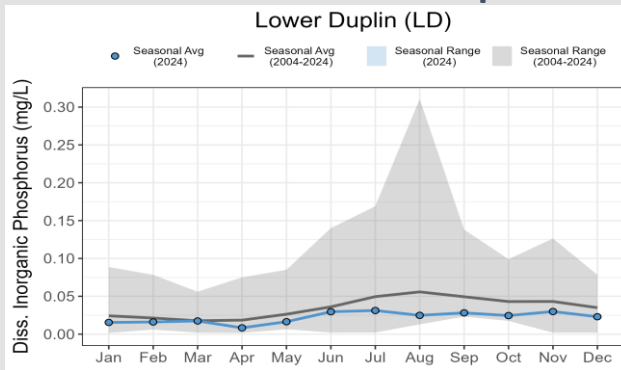
*A critical threshold value is used to determine if a water quality measurement is at a level where negative impacts may occur.*

Chlorophyll levels in our estuaries fluctuate seasonally and annually. The chlorophyll levels at Lower Duplin have stayed at healthy levels for the majority of the past 20 years, with occasional spikes.

## How is pH Changing?

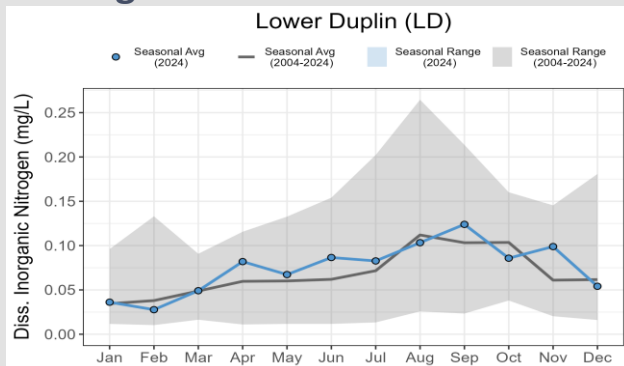


## Phosphorus



Phosphorous levels measured at the Lower Duplin site throughout the year in 2024 stayed below the 20-year average seen at this site.

## Nitrogen



Nitrogen levels measured at the Lower Duplin site in 2024 remained close to the 20-year average seen at this site.

**SWMP Technician swapping out water quality instrument at Hunt Dock site.**



## 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

## Economic Impacts



Coastal shoreline counties provided 54.6 million jobs and contributed \$9.6 trillion (nearly 45%) of the nation's gross domestic product in 2020.

## Community Benefits



Estuaries protect coastal communities by reducing flooding and storm surge impacts, enhancing water quality, and providing commercial and recreational benefits.

## Healthy Ecosystems



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.

## Habitat Diversity



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.

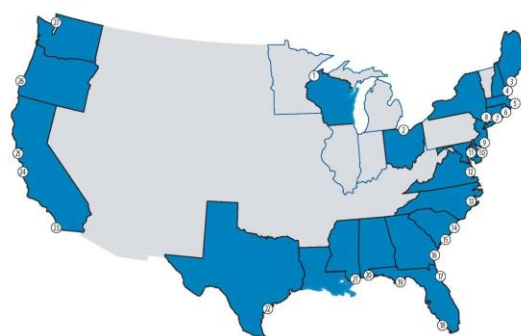
## Tracking The Health of Our Estuaries 24/7

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/>



## NATIONAL ESTUARINE RESEARCH RESERVES



- Great Lakes
  1. Lake Superior, Wisconsin
  2. Old Woman Creek, Ohio
- Northeast
  3. Wells, Maine
  4. Great Bay, New Hampshire
  5. Buzzards Bay, Massachusetts
  6. Narragansett Bay, Rhode Island
  7. Connecticut
- Mid-Atlantic
  8. Hudson River, New York
  9. Jacques Cousteau, New Jersey
  10. Delaware
  11. Chesapeake Bay, Maryland
  12. Chesapeake Bay, Virginia
- Southeast
  13. North Carolina
  14. North Inlet-Winyah Bay, South Carolina
  15. ACE Basin, South Carolina
  16. Sapelo Island, Georgia
  17. Guana Tolomato Matanzas, Florida
- Gulf of Mexico
  18. Rookery Bay, Florida
  19. Apalachicola, Florida
  20. Weeks Bay, Alabama
  21. Grand Bay, Mississippi
  22. Mission-Aransas, Texas
- West
  23. Tijuana River, California
  24. Elkhorn Slough, California
  25. San Francisco Bay, California
  26. South Slough, Oregon
  27. Pacific Est., Washington
  28. Kachemak Bay, Alaska
- Pacific
  29. Heceta, Hawaii?
- Caribbean
  30. Jobos Bay, Puerto Rico
- PROPOSED**
  - Bay of Green Bay, Wisconsin
  - Louisiana

The 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:**  
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SINERR – providing the science needed for today *and* tomorrow!