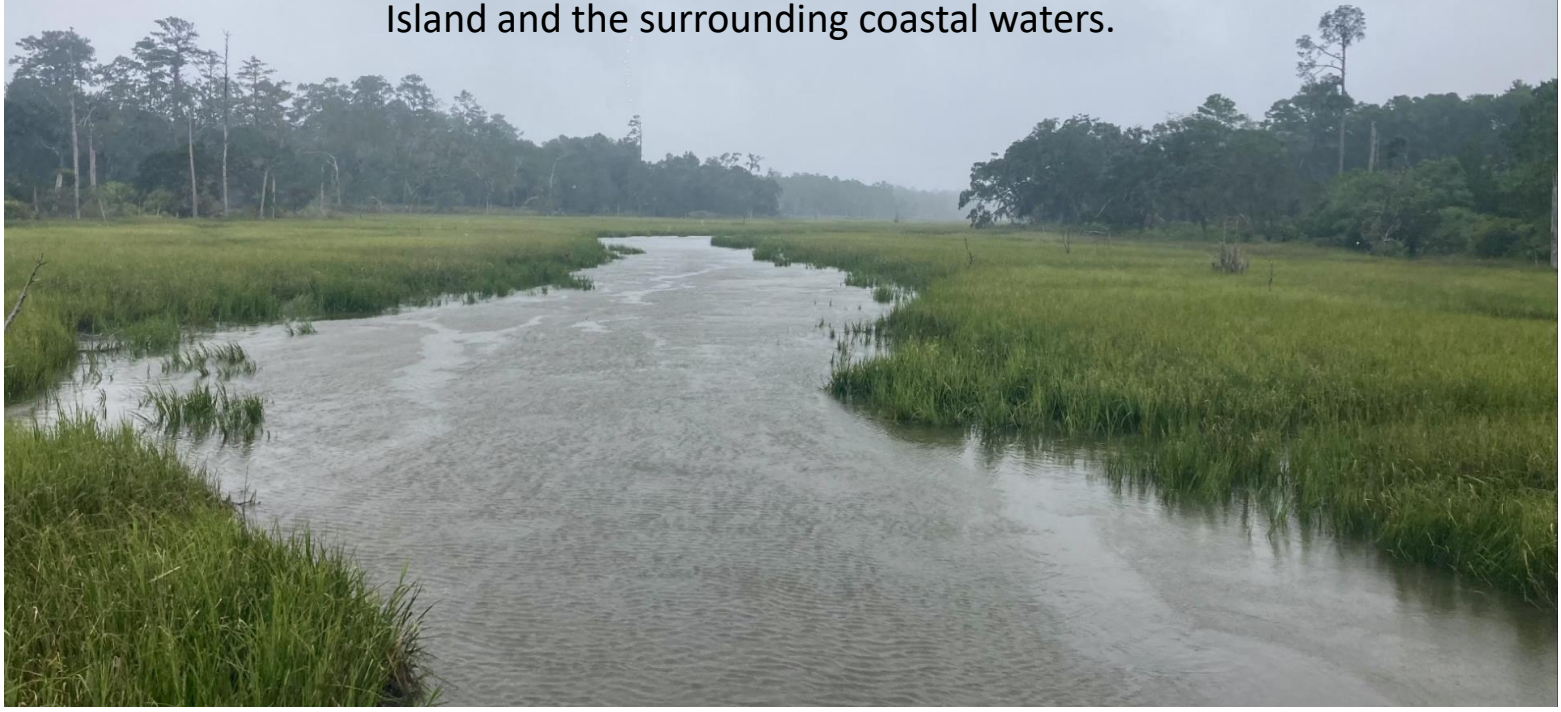
OUR ESTUARY TRENDS: WEATHER & WATER QUALITY

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:

https://sapelonerr.org/

2023 HIGHLIGHTS

Water Temperature in the winter months was higher than average in 2023.

Air Temperature in the winter months was higher than average in 2023.

Water depth continues to trend upward at all four water quality sites.

Chlorophyll levels in the water peaked in late summer at all four 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**.

GEORGIA DEPARTMENT OF NATURAL RESOURCES
WILDLIFE RESOURCES DIVISION

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

HOW IS OUR ESTUARY CHANGING?

Temperature: Water temperature is rising across all sites.

pH: pH is decreasing at all sites, the water is becoming more acidic.

Depth: Water depth is rising across all sites, sea level is rising.

Air Temperature: Air temperature is rising.

Precipitation: Annual rainfall has remained stable.

Trends in Weather & Water Quality*

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

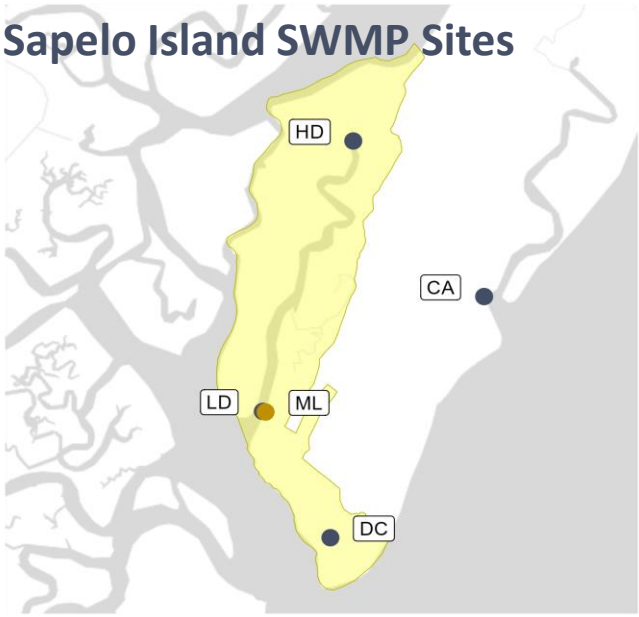
Location ID	Location Name	Water Temperature	Salinity	Dissolved Oxygen	pH	Turbidity
CA	Cabretta Creek	↑	↓	↑	—	↑
DC	Dean Creek	↑	↓	—	↓	—
HD	Hunt Dock	↑	↓	—	↓	↓
LD	Lower Duplin	↑	↓	—	—	↓

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 2007-2023

X Insufficient Data ↑ Increasing — Not Changing ↓ Decreasing

Sapelo Island SWMP Sites



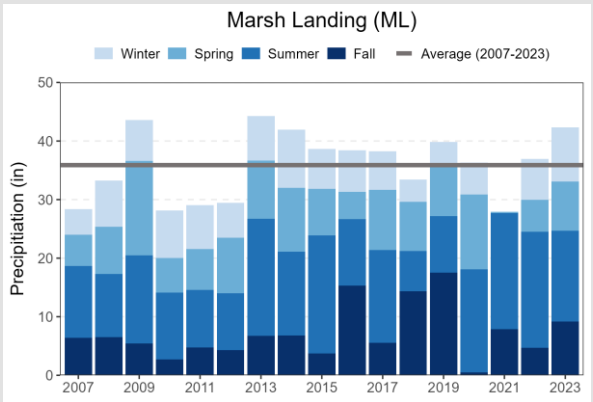
Weather & Climate – What is the Difference?

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

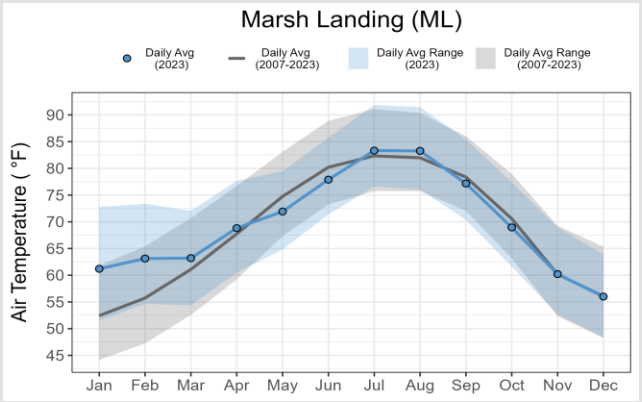
CLIMATE tells us the average daily weather for an extended period of time (years, decades, centuries) at a certain location.

Weather Can Have A Major Impact On Water Quality

Precipitation & Air Temperature



The island received approximately 42 inches of rainfall in 2023.

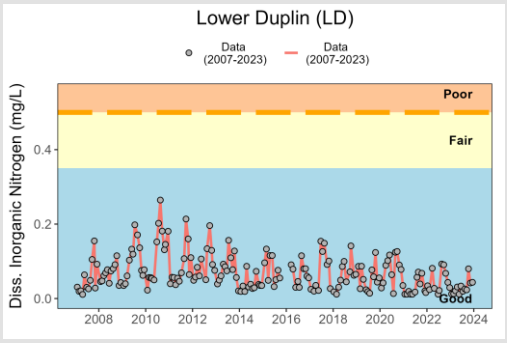


Average air temperature in the winter months was higher in 2023 than the average since 2007.

Weather data helps scientists and managers understand water circulation patterns, plant growth, shellfish and fish distribution, storm frequency and intensity and much more…

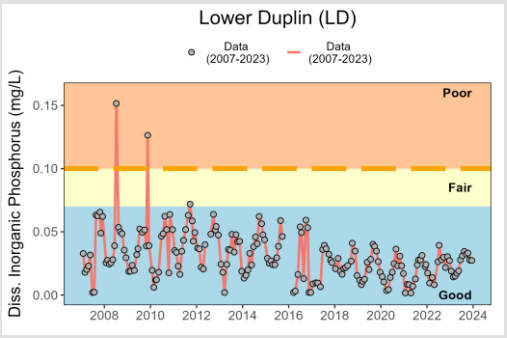
Do We Have Too Many Nutrients In The Water?

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. However, some conditions, such as excess nutrients, can cause phytoplankton blooms. The blooms can decrease the dissolved oxygen underwater life needs to survive, negatively impact human health, and close fishery harvest areas. The charts below show nitrogen , phosphorous, and chlorophyll levels from the Lower Duplin water quality site (pictured bottom right).



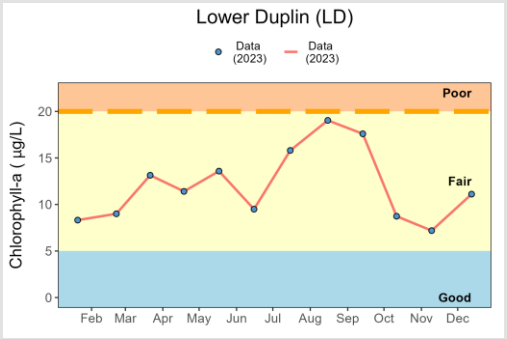
Dissolved inorganic nitrogen levels recorded at the Lower Duplin site in 2023 (and every year since 2007) were well below the threshold that indicates problematic water quality.

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



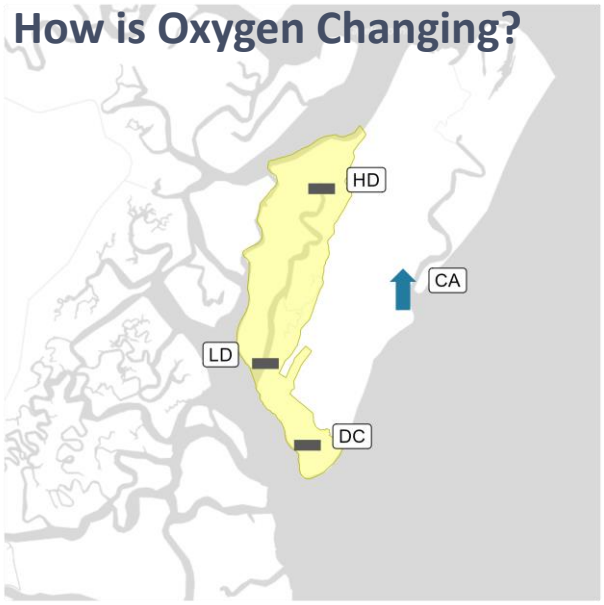
Dissolved inorganic phosphorous levels at Lower Duplin have been at healthy levels consistently since 2010.

Due to the limited amount of human development and agriculture on and around Sapelo, nutrient levels tend to remain at healthy levels year- round. Limiting stormwater runoff and using compost instead of fertilizer are great ways to prevent excess nutrients in our waters!



Chlorophyll levels fluctuate seasonally, as seen here at the Lower Duplin site. Chlorophyll levels at all sites were the highest in late summer.

How is Oxygen Changing?



Dissolved oxygen in the waters around Sapelo Island have remained relatively steady over the past 15 years with the only detectable increase occurring at Cabretta Creek.

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

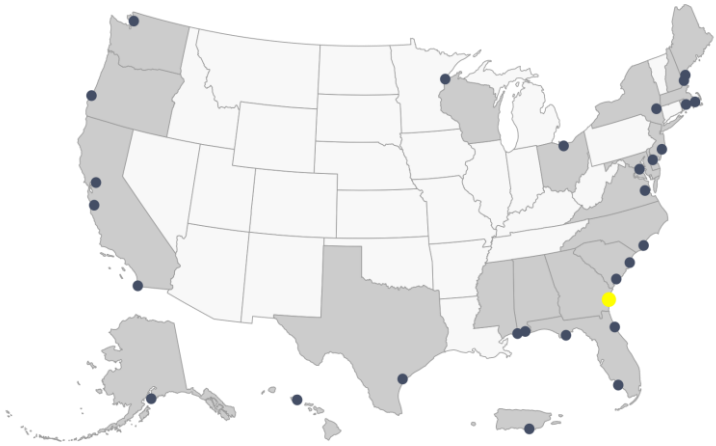
Up to two-thirds of the nation's commercial fish and shellfish spend some part of their life cycle in an estuary or depend on this resource for food.

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/**



NERRS is a network of 29 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?

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