

**Sapelo Island (SAP) NERR Water Quality Metadata**  
**January – December 2024**  
**Latest Update: 3/27/2025**

Note: This is a provisional metadata document; it has not been authenticated as of its download date. Contents of this document are subject to change throughout the QAQC process and it should not be considered a final record of data documentation until that process is complete. Contact the CDMO ([cdmosupport@baruch.sc.edu](mailto:cdmosupport@baruch.sc.edu)) or reserve with any additional questions.

**I. Data Set and Research Descriptors**

**1) Principal investigator(s) and contact persons –**

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1 Long Tabby Lane  
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**2) Entry verification –**

Deployment data are uploaded from the YSI data logger to a personal computer with Windows 7 or newer operating system. Files are exported from EcoWatch in a comma-delimited format (.CDF), EcoWatch Lite in a comma separated file (CSV) or KOR Software in a comma separated file (CSV) and uploaded to the CDMO where they undergo automated primary QAQC; automated Depth/Level corrections for changes in barometric pressure (cDepth or cLevel parameters); and become part of the CDMO's online provisional database. All pre- and post-deployment data are removed from the file prior to upload. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the reserve for secondary QAQC where it is opened in Microsoft Excel and processed using the CDMO's NERRQAQC Excel macro. The macro inserts station codes, creates metadata worksheets for flagged data and summary statistics, and graphs the data for review. It allows the user to apply QAQC flags and codes to the data, remove any overlapping deployment data, append files, and export the resulting data file for upload to the CDMO. Upload after secondary QAQC results in ingestion into the database as provisional plus data, recalculation of cDepth or cLevel parameters, and finally tertiary QAQC by the CDMO and assimilation into the CDMO's authoritative online database. Where deployment overlap occurs between files, the data produced by the newly calibrated sonde is generally accepted as being the most accurate. For more information on QAQC flags and codes, see Sections 11 and 12.

**3) Research objectives –**

Hydrological studies (Ragotskie and Bryson, 1955; Imberger et al., 1983) have shown that there are three tidal excursions along the length of the Duplin River, resulting in three distinct water masses. The two monitoring sites in the Duplin River, called the Lower Duplin site and the Hunt Dock site are located within the lower and upper water masses, respectively. Water passing the Lower Duplin site during flood tide has come from Doboy Sound,

which receives input from the Altamaha River via the Intra-Coastal Waterway and from the Atlantic Ocean. The water in the lower water mass is pushed further up the Duplin or up smaller tidal creeks and some is pushed onto the marsh surface by the flood tide and recedes into the main channel during ebb tide. The water in the upper water mass, which passes the Hunt Dock station, is pushed up small creek channels and onto the marsh at each high tide. Thus, the two stations monitor conditions in two hydrological separate water masses, one of which is heavily influenced by exchanges with Doboy Sound and the other, which is influenced by its twice-daily contact with the marsh surface. The Cabretta site is in close proximity to the Atlantic Ocean, and its conditions are very similar to what you would find in a marine environment. It is heavily influenced by the Atlantic Ocean due to this proximity. The Dean Creek site is located in a tidal creek that also empties into Doboy Sound, similar to the Duplin River. This creek, though, is further east along the sound compared to the Duplin. This results in the site being influenced by Doboy Sound, but in closer proximity to the sound's mouth where it empties into the Atlantic. All four sites are influenced in different ways by the surrounding water masses (Altamaha River, Doboy Sound, and Atlantic Ocean) and long-term monitoring of how these water masses affect these different sites is important to understanding the hydrology and ecology of the reserve and of Sapelo Island as a whole.

#### **4) Research methods –**

Sapelo Island NERR does not report Level data at this time.

Before each YSI EXO2 data sonde is deployed, calibration and maintenance are performed following the manufacturer's instructions and NERRS SWMP standard operating procedures. KOR software is used for the pre-deployment calibration. Calibration standards are only required for pH, conductivity, and turbidity, all other parameters are calibrated as described in the manual. The conductivity, pH, and turbidity calibrations use a YSI produced traceable solution.

When deployed, environmental data are recorded from the site and added to the deployment log. These data include water temperature, specific conductivity, salinity, dissolved oxygen percentage, and dissolved oxygen concentration. This data is recorded using a handheld YSI EXO1. The calibrated EXO2 data sonde is placed inside a length of PVC pipe attached to the dock or other fixed structure. All sites in SAP are fixed. The data sonde is attached to a steel cable and run down a PVC pipe to rest 0.5m above the surface bottom. Because of the large tidal range, water is continually flushed through 1" holes in the PVC pipes at the sonde location, thus eliminating the problem of creating a stagnant column of water within the pipe. Every 15 minutes during the sampling period measurements are taken for temperature, specific conductivity, salinity, pH, dissolved oxygen concentration, percent saturation, depth and turbidity. At the end of the sample period the data sonde is retrieved and immediately replaced by another calibrated data sonde. The data sonde is then taken back to the lab and connected to KOR software and post-deployment readings are taken for each sensor. Data are rejected or flagged suspect if the post-deployment readings are out of range or if technical problems are noted. All data rejected due to these issues are noted in the metadata. The data from the deployment is downloaded into KOR, exported as a .csv document, and uploaded to the CDMO website for initial QAQC. After post-deployment readings are taken and data is downloaded from sonde, the sensors are removed from the sonde and the sonde and sensors are cleaned of any biofouling or accumulated sediment. Data sondes are usually deployed for 2-3 weeks at time.

A YSI WaterLog Storm 3 transmitter was installed at the Lower Duplin (LD) station in November 2021 and transmits data to the NOAA GOES satellite, NESDIS ID #3B0376E4. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen-minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The "real-time" telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation in the CDMO's authoritative online database. Provisional and authoritative data are available at [www.nerrsdata.org](http://www.nerrsdata.org).

## 5) Site location and character –

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site name                                    | Lower Duplin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Latitude and longitude                       | 31°25'04.3"N 81°17'45.4"W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Tidal range ( <i>meters</i> )                | 3 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Salinity range ( <i>psu</i> )                | 15 – 35 psu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Type and amount of freshwater input          | The Altamaha River partially drains into Doboy Sound which is the water body that influences the tidal fluctuation of the Duplin River. This site is close to the mouth of the Duplin River where it empties into Doboy Sound. Rainwater runoff also influences freshwater input.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Water depth ( <i>meters, MLW</i> )           | Estimated at 3 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Sonde distance from bottom ( <i>meters</i> ) | 0.5 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Bottom habitat or type                       | Soft, muddy bottom. Site is located on part of the dock used by the ferry which makes multiple scheduled trips on/off the island daily                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Pollutants in area                           | none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Description of watershed                     | <p>This site is located on the Marsh Landing Dock in the Duplin River on Sapelo Island and consists of a muddy bottom habitat. Water passing the dock during flood tide originates from the Doboy Sound. The Doboy Sound receives input from the Atlantic Ocean, and the freshwater Altamaha River via the Intra-Coastal Waterway. The water is pushed up the river or up smaller tidal creeks and some is pushed onto the marsh surface by the flood tide and recedes into the main channel during ebb tide. Primary freshwater input consists of rainwater runoff. The Marsh Landing dock is used as the main dock to the island where the ferry makes several daily runs. An asphalt parking lot is adjacent to the dock. Small boats also dock here occasionally. The surrounding area vegetation is dominated by salt marsh with <i>Spartina</i> being the predominant flora.</p> |

|                                              |                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site name                                    | Hunt Dock                                                                                                                                                                                                                                                                                                                                       |
| Latitude and longitude                       | 31°28'43.3"N 81°16'23.2"W                                                                                                                                                                                                                                                                                                                       |
| Tidal range ( <i>meters</i> )                | 3 meters                                                                                                                                                                                                                                                                                                                                        |
| Salinity range ( <i>psu</i> )                | 10 - 30 psu                                                                                                                                                                                                                                                                                                                                     |
| Type and amount of freshwater input          | The Altamaha River drains into Doboy Sound which is the water body that influences the tidal fluctuation of the Duplin River. This site is approximately 5 miles up river from the mouth of the Duplin River where it empties into Doboy Sound, so input from the Altamaha is very minimal. Rainwater runoff is the primary input at this site. |
| Water depth ( <i>meters, MLW</i> )           | Estimated at 2 meters                                                                                                                                                                                                                                                                                                                           |
| Sonde distance from bottom ( <i>meters</i> ) | 0.5 meters                                                                                                                                                                                                                                                                                                                                      |

|                          |                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bottom habitat or type   | Soft, muddy bottom with some oyster reefs towards the shore.                                                                                                                                                                                                                                                                            |
| Pollutants in area       | none                                                                                                                                                                                                                                                                                                                                    |
| Description of watershed | This site is located on the Duplin River, off of Moses Hammock, which is separated from Sapelo Island by a small tidal channel. The primary runoff at the site is from tidal creeks flowing through Spartina marsh and through the mud. Bottom habitat at this site includes soft mud and some oyster bed building along the shoreline. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site name                                    | Dean Creek                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Latitude and longitude                       | 31°23'41.2"N 81°16'11.5"W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Tidal range ( <i>meters</i> )                | 2.5 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Salinity range ( <i>psu</i> )                | 15 – 32 psu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Type and amount of freshwater input          | Dean Creek is a small tidal basin fed from the waters of Doboy Sound, which is located on Sapelo Island's south end. Primary freshwater input is from rainfall.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Water depth ( <i>meters, MLW</i> )           | Estimated at 0.35 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Sonde distance from bottom ( <i>meters</i> ) | 0.5 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Bottom habitat or type                       | Soft, muddy bottom with interspersed oyster reefs along banks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Pollutants in area                           | none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Description of watershed                     | The site is located on a small metal bridge spanning Dean Creek, in close proximity to the adjacent Nannygoat Beach causeway. Dean Creek is a small tidal basin fed from the waters of Doboy Sound, which is located on Sapelo Island's south end. The small creek feeds approximately 150 acres of <i>Spartina alterniflora</i> dominated salt marsh, which is interspersed with small 0.5-1 acre hammocks and salt pans. Fringe community components range from Loblolly pine forests with a sub-canopy of Yaupon holly to Wax myrtle and Sable Palm. Salinity at this site is especially influenced by rainfall due to its shallow depth. Temperature and dissolved oxygen values can also fluctuate due to the shallow depth. |

|                                     |                                                                                                                     |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Site name                           | Cabretta Creek                                                                                                      |
| Latitude and longitude              | 31°26'19.2"N 81°14'19.5"W                                                                                           |
| Tidal range ( <i>meters</i> )       | 3 meters                                                                                                            |
| Salinity range ( <i>psu</i> )       | 20 – 35 psu                                                                                                         |
| Type and amount of freshwater input | The primary freshwater input at this site is rainwater. This site receives tidal influence from the Atlantic Ocean. |
| Water depth ( <i>meters, MLW</i> )  | Estimated at 2.5 meters                                                                                             |

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sonde distance from bottom<br>(meters) | 0.5 meters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bottom habitat or type                 | Soft, muddy bottom with oyster reefs on banks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pollutants in area                     | none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description of watershed               | The station is located on a small (one-lane), wooden roadway bridge spanning Cabretta creek located on the island's extreme eastern side, bordering the Atlantic Ocean. The creek is fed directly from waters of the Atlantic Ocean. Adjacent to the site is extensive, intertidal, bank stabilization (armoring) in the form of woven rip-rap fencing and granite rocks. This manipulation is slowly becoming stabilized via oyster reef community colonization. The adjacent marshes are dominated by <i>Spartina alterniflora</i> with occasional <i>Juncus roemerianus</i> in the nearby fringe community habitat. The creek has very little adjacent uplands due to: 1) the low elevational gradient and 2) the area's geologically recent accretion genesis (Holocene) resulting in sandy soils; of which neither conditions allow for extensive floral colonization or stabilization. |

#### SWMP station timeline

| Station Code | SWMP status | Station Name   | Location                            | Active Dates     | Reason Decommissioned | Notes                                                                                              |
|--------------|-------------|----------------|-------------------------------------|------------------|-----------------------|----------------------------------------------------------------------------------------------------|
| CA           | P           | Cabretta Creek | 31°26'19.2" N<br>81°14'19.5" W      | 4/2004 - present | NA                    | NA                                                                                                 |
| DC           | P           | Dean Creek     | 31°23'41.2" N<br>81°16'11.5" W      | 5/2004 - present | NA                    | NA                                                                                                 |
| HD           | P           | Hunt Dock      | 31°28'43.3" N<br>81°16'23.2" W      | 7/1999 - present | NA                    | NA                                                                                                 |
| LD           | P           | Lower Duplin   | 31°25'04.3" N<br>81°17'45.4" W      | 1/1999 - present | NA                    | NA                                                                                                 |
| ML           | S           | Marsh Landing  | 31° 25' 04.23" N<br>81° 17'46.30" W | 5/1995 – 12/1998 | Site character        | Near surface deployment and the fouling with such a setup was too severe to harvest reliable data. |
| FL           | S           | Flume Dock     | 31° 28'53.85" N<br>81° 16'12.37" W  | 1/1995 – 12/1998 | NA                    | NA                                                                                                 |

#### 6) Data collection period –

## Cabretta Creek

| Deploy Date | Deploy Time | Retrieve Date | Retrieve Time |
|-------------|-------------|---------------|---------------|
| 1/24/2024   | 11:45       | 2/9/2024      | 11:30         |
| 2/9/2024    | 11:45       | 2/22/2024     | 11:15         |
| 2/22/2024   | 11:30       | 3/6/2024      | 11:00         |
| 3/6/2024    | 11:15       | 3/19/2024     | 10:30         |
| 3/19/2024   | 10:45       | 4/4/2024      | 10:15         |
| 4/4/2024    | 10:30       | 4/17/2024     | 9:30          |
| 4/17/2024   | 10:00       | 5/2/2024      | 10:15         |
| 5/2/2024    | 10:30       | 5/17/2024     | 11:30         |
| 5/17/2024   | 11:45       | 5/31/2024     | 10:45         |
| 5/31/2024   | 11:00       | 6/13/2024     | 10:15         |
| 6/13/2024   | 10:30       | 6/27/2024     | 10:30         |
| 6/27/2024   | 10:45       | 7/9/2024      | 10:30         |
| 7/9/2024    | 10:45       | 7/25/2024     | 10:15         |
| 7/25/2024   | 10:30       | 8/7/2024      | 11:00         |
| 8/7/2024    | 11:15       | 8/20/2024     | 10:45         |
| 8/20/2024   | 11:00       | 9/3/2024      | 10:45         |
| 9/3/2024    | 11:00       | 9/19/2024     | 10:00         |
| 9/19/2024   | 10:15       | 10/3/2024     | 10:30         |
| 10/3/2024   | 10:45       | 10/16/2024    | 11:00         |
| 10/16/2024  | 11:15       | 10/31/2024    | 11:15         |
| 10/31/2024  | 11:30       | 11/15/2024    | 13:45         |
| 11/15/2024  | 14:00       | 12/3/2024     | 12:00         |
| 12/3/2024   | 12:15       | 12/17/2024    | 11:15         |
| 12/17/2024  | 11:30       | 12/31/2024    | 10:30         |
| 12/31/2024  | 10:45       | 1/16/2025     | 11:30         |

## Dean Creek

| Deploy Date | Deploy Time | Retrieve Date | Retrieve Time |
|-------------|-------------|---------------|---------------|
| 12/18/2023  | 13:30       | 1/4/2024      | 10:15         |
| 1/4/2024    | 10:30       | 1/19/2024     | 11:30         |
| 1/19/2024   | 11:45       | 2/5/2024      | 10:30         |
| 2/5/2024    | 10:45       | 2/16/2024     | 10:30         |
| 2/16/2024   | 10:45       | 3/1/2024      | 11:30         |
| 3/1/2024    | 11:45       | 3/22/2024     | 11:00         |
| 3/22/2024   | 11:15       | 4/10/2024     | 10:00         |
| 4/10/2024   | 10:15       | 4/23/2024     | 9:15          |
| 4/23/2024   | 9:30        | 5/8/2024      | 9:00          |
| 5/8/2024    | 9:15        | 5/24/2024     | 11:00         |
| 5/24/2024   | 11:15       | 6/7/2024      | 11:00         |
| 6/7/2024    | 11:15       | 6/18/2024     | 10:30         |
| 6/18/2024   | 10:45       | 7/3/2024      | 10:15         |

|            |       |            |       |
|------------|-------|------------|-------|
| 7/3/2024   | 10:30 | 7/17/2024  | 11:00 |
| 7/17/2024  | 11:15 | 7/31/2024  | 9:30  |
| 7/31/2024  | 9:45  | 8/15/2024  | 12:15 |
| 8/15/2024  | 12:30 | 8/29/2024  | 14:00 |
| 8/29/2024  | 14:15 | 9/12/2024  | 9:00  |
| 9/12/2024  | 9:30  | 9/25/2024  | 9:30  |
| 9/25/2024  | 9:45  | 10/9/2024  | 10:30 |
| 10/9/2024  | 10:45 | 10/30/2024 | 9:00  |
| 10/30/2024 | 9:15  | 11/8/2024  | 10:15 |
| 11/8/2024  | 10:30 | 11/21/2024 | 10:00 |
| 11/21/2024 | 10:15 | 12/4/2024  | 12:15 |
| 12/4/2024  | 12:30 | 12/18/2024 | 13:00 |
| 12/18/2024 | 13:15 | 1/2/2025   | 11:00 |

## Hunt Dock

| Deploy Date | Deploy Time | Retrieve Date | Retrieve Time |
|-------------|-------------|---------------|---------------|
| 12/20/2023  | 13:45       | 1/3/2024      | 13:00         |
| 1/3/2024    | 13:15       | 1/16/2024     | 11:15         |
| 1/16/2024   | 11:30       | 1/31/2024     | 11:00         |
| 1/31/2024   | 11:15       | 2/16/2024     | 11:15         |
| 2/16/2024   | 11:30       | 3/4/2024      | 11:45         |
| 3/4/2024    | 12:00       | 3/26/2024     | 9:15          |
| 3/26/2024   | 9:30        | 4/12/2024     | 10:15         |
| 4/12/2024   | 10:30       | 4/26/2024     | 10:00         |
| 4/26/2024   | 10:15       | 5/13/2024     | 11:45         |
| 5/13/2024   | 12:00       | 5/28/2024     | 11:15         |
| 5/28/2024   | 11:30       | 6/10/2024     | 9:45          |
| 6/10/2024   | 10:00       | 6/26/2024     | 10:30         |
| 6/26/2024   | 10:45       | 7/8/2024      | 9:45          |
| 7/8/2024    | 10:00       | 7/24/2024     | 10:15         |
| 7/24/2024   | 10:30       | 8/8/2024      | 10:15         |
| 8/8/2024    | 10:30       | 8/22/2024     | 10:00         |
| 8/22/2024   | 10:15       | 9/5/2024      | 9:45          |
| 9/5/2024    | 10:00       | 9/19/2024     | 9:30          |
| 9/19/2024   | 9:45        | 10/4/2024     | 9:15          |
| 10/4/2024   | 9:30        | 10/22/2024    | 13:15         |
| 10/22/2024  | 13:30       | 11/7/2024     | 11:15         |
| 11/7/2024   | 11:30       | 11/22/2024    | 13:15         |
| 11/22/2024  | 13:30       | 12/6/2024     | 11:30         |
| 12/6/2024   | 11:45       | 12/18/2024    | 10:15         |
| 12/18/2024  | 10:30       | 1/3/2025      | 10:15         |

## Lower Duplin

| Deploy Date | Deploy Time | Retrieve Date | Retrieve Time |
|-------------|-------------|---------------|---------------|
|-------------|-------------|---------------|---------------|

|            |       |            |       |
|------------|-------|------------|-------|
| 12/29/2023 | 10:15 | 1/12/2024  | 12:15 |
| 1/12/2024  | 12:30 | 1/25/2024  | 10:45 |
| 1/25/2024  | 11:00 | 2/8/2024   | 11:30 |
| 2/8/2024   | 11:45 | 2/26/2024  | 11:15 |
| 2/26/2024  | 11:30 | 3/18/2024  | 11:15 |
| 3/18/2024  | 11:30 | 4/8/2024   | 10:00 |
| 4/8/2024   | 10:15 | 4/29/2024  | 10:15 |
| 4/29/2024  | 10:30 | 5/15/2024  | 9:45  |
| 5/15/2024  | 10:00 | 5/29/2024  | 10:00 |
| 5/29/2024  | 10:15 | 6/12/2024  | 9:15  |
| 6/12/2024  | 9:30  | 6/26/2024  | 9:45  |
| 6/26/2024  | 10:00 | 7/10/2024  | 10:00 |
| 7/10/2024  | 10:15 | 7/30/2024  | 11:00 |
| 7/30/2024  | 11:15 | 8/9/2024   | 9:30  |
| 8/9/2024   | 9:45  | 8/21/2024  | 9:30  |
| 8/21/2024  | 9:45  | 9/3/2024   | 11:30 |
| 9/3/2024   | 11:45 | 9/18/2024  | 9:00  |
| 9/18/2024  | 9:15  | 10/3/2024  | 11:45 |
| 10/3/2024  | 12:00 | 10/18/2024 | 10:45 |
| 10/18/2024 | 11:15 | 11/1/2024  | 10:30 |
| 11/1/2024  | 10:45 | 11/13/2024 | 10:30 |
| 11/13/2024 | 10:45 | 12/3/2024  | 12:45 |
| 12/3/2024  | 13:00 | 12/11/2024 | 10:15 |
| 12/11/2024 | 10:30 | 12/26/2024 | 10:00 |
| 12/26/2024 | 10:15 | 1/8/2025   | 9:45  |

## 7) Distribution –

NOAA retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The NERRS retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the NERR site where the data were collected should be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

Requested citation format:

NOAA National Estuarine Research Reserve System (NERRS). System-wide Monitoring Program. Data accessed from the NOAA NERRS Centralized Data Management Office website: <http://www.nerrsdata.org/>; accessed 12 October 2023.

Also include the following excerpt in the metadata which will address how and where the data can be obtained.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Principal Investigators and Contact Persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general

information link on the CDMO home page) and online at the CDMO home page [www.nerrsdata.org](http://www.nerrsdata.org). Data are available in comma delimited format.

## 8) Associated researchers and projects –

As part of the SWMP long-term monitoring program, SAP NERR also collects 15-minute meteorological data and monthly grab and diel samples for nutrient/pigment data which may be correlated with this water quality dataset. These data are available at [www.nerrsdata.org](http://www.nerrsdata.org). Sapelo Island has a long history of maintaining research. In 1953, the University of Georgia Marine Institute (UGAMI) was formed, and the island became a working laboratory for many. The research continues today with SAP NERR and UGAMI creating a unique partnership with much of the current research being done facilitated by SAP NERR and UGAMI together. Given UGAMI's long history on Sapelo, a bibliographic list of over 800 articles of current and previous research can be found on the UGAMI website: <http://www.uga.edu/ugami> and on the Sapelo Island NERR site: <http://www.sapelonerr.org>.

## II. Physical Structure Descriptors

### 9) Sensor specifications –

SAP NERR deployed YSI EXO2 sondes with identical sensor configurations at all sites in 2024.

All sondes used the following models of sensors:

model # 599827 sensors for temperature, salinity, and conductivity

model # 599100-01 for DO % saturation and mg/L

model #s 577602 and 599702 for pH

model # 599101-01 for turbidity

As of the writing of this document (3/24/25), six of our active sondes use 577602 pH sensors, and two use 599702 pH sensors. The sensors get rotated between sondes based on availability and performance.

YSI EXO Sonde:

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Wiped probe; Thermistor

Model#: 599827

Range: -5 to 50 C

Accuracy:  $\pm 0.2$  C

Resolution: 0.001 C

Parameter: Conductivity

Units: milli-Siemens per cm (mS/cm)

Sensor Type: Wiped probe; 4-electrode cell with autoranging

Model#: 599827

Range: 0 to 100 mS/cm

Accuracy:  $\pm 1\%$  of the reading or 0.002 mS/cm, whichever is greater

Resolution: 0.0001 to 0.01 mS/cm (range dependent)

Parameter: Salinity

Units: practical salinity units (psu)/parts per thousand (ppt)  
Model#: 599827  
Sensor Type: Wiped probe; Calculated from conductivity and temperature  
Range: 0 to 70 ppt  
Accuracy:  $\pm 2\%$  of the reading or 0.2 ppt, whichever is greater  
Resolution: 0.01 psu

Parameter: Dissolved Oxygen % saturation  
Sensor Type: Optical probe w/ mechanical cleaning  
Model#: 599100-01  
Range: 0 to 500% air saturation  
Accuracy: 0-200% air saturation:  $\pm 1\%$  of the reading or 1% air saturation, whichever is greater 200-500% air saturation:  $\pm 5\%$  or reading  
Resolution: 0.1% air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature, and salinity)  
Units: milligrams/Liter (mg/L)  
Sensor Type: Optical probe w/ mechanical cleaning  
Model#: 599100-01  
Range: 0 to 50 mg/L  
Accuracy: 0-20 mg/L:  $\pm 0.1$  mg/l or 1% of the reading, whichever is greater  
20 to 50 mg/L:  $\pm 5\%$  of the reading  
Resolution: 0.01 mg/L

Parameter: Non-vented Level - Shallow (Depth)  
Units: feet or meters (ft or m)  
Sensor Type: Stainless steel strain gauge  
Range: 0 to 33 ft (10 m)  
Accuracy:  $\pm 0.013$  ft (0.004 m)  
Resolution: 0.001 ft (0.001 m)

Parameter: pH  
Units: pH units  
Sensor Type: Glass combination electrode  
Model#: 599701(guarded) or 599702(wiped)  
Range: 0 to 14 units  
Accuracy:  $\pm 0.1$  units within  $\pm 10^\circ$  of calibration temperature,  $\pm 0.2$  units for entire temperature range  
Resolution: 0.01 units

Parameter: Turbidity  
Units: formazin nephelometric units (FNU)  
Sensor Type: Optical, 90 degree scatter  
Model#: 599101-01  
Range: 0 to 4000 FNU  
Accuracy: 0 to 999 FNU: 0.3 FNU or  $\pm 2\%$  of reading (whichever is greater); 1000 to 4000 FNU  $\pm 5\%$  of reading  
Resolution: 0 to 999 FNU: 0.01 FNU, 1000 to 4000 FNU: 0.1 FNU

Include the following Depth, Salinity and Turbidity data disclaimers:

**Depth qualifier:**

The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either vented or non-vented depth/level sensors. Readings for both vented and non-vented sensors are automatically compensated for water density change due to variations in temperature and salinity; but for all non-vented depth measurements, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.02 cm for every 1 millibar change in atmospheric pressure, and is eliminated for vented sensors because they are vented to the atmosphere throughout the deployment time interval.

Beginning in 2006, NERR SWMP standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg). To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in the SWMP calibration sheet or digital calibration log. This offset procedure standardizes each depth calibration for the entire NERR System. If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR can be corrected.

In 2010, the CDMO began automatically correcting Depth/Level data for changes in barometric pressure as measured by the reserve's associated meteorological station during data ingestion. These corrected Depth/Level data are reported as cDepth and cLevel, and are assigned QAQC flags and codes based on QAQC protocols. Please see sections 11 and 12 for QAQC flag and code definitions.

**NOTE: older Depth data cannot be corrected without verifying that the depth offset was in place and whether a vented or non-vented depth sensor was in use. No SWMP data prior to 2006 can be corrected using this method.** The following equation is used for corrected Depth/Level data provided by the CDMO beginning in 2010:  

$$((1013-BP)*0.0102)+Depth/Level = cDepth/cLevel.$$

#### **Salinity units qualifier:**

In 2013, EXO sondes were approved for SWMP use and began to be utilized by reserves. While the 6600 series sondes report salinity in parts per thousand (ppt) units, the EXO sondes report practical salinity units (psu). These units are essentially the same and for SWMP purposes are understood to be equivalent, however psu is considered the more appropriate designation. Moving forward the NERR System will assign psu salinity units for all data regardless of sonde type.

#### **Turbidity qualifier:**

In 2013, EXO sondes were approved for SWMP use and began to be utilized by reserves. While the 6600 series sondes report turbidity in nephelometric turbidity units (NTU), the EXO sondes use formazin nephelometric units (FNU). These units are essentially the same but indicate a difference in sensor methodology, for SWMP purposes they will be considered equivalent. Moving forward, the NERR System will use FNU/NTU as the designated units for all turbidity data regardless of sonde type. If turbidity units and sensor methodology are of concern, please see the Sensor Specifications portion of the metadata.

## **10) Coded variable definitions –**

| Sampling station: | Sampling site code: | Station code: |
|-------------------|---------------------|---------------|
| Cabretta Creek    | CA                  | sapcawq       |
| Dean Creek        | DC                  | sapdcwq       |
| Hunt Dock         | HD                  | saphdwq       |
| Lower Duplin      | LD                  | sapldwq       |

## 11) QAQC flag definitions –

QAQC flags provide documentation of the data and are applied to individual data points by insertion into the parameter's associated flag column (header preceded by an F\_). During primary automated QAQC (performed by the CDMO), -5, -4, and -2 flags are applied automatically to indicate data that is missing and above or below sensor range. All remaining data are then flagged 0, passing initial QAQC checks. During secondary and tertiary QAQC 1, -3, and 5 flags may be used to note data as suspect, rejected due to QAQC, or corrected.

- 5 Outside High Sensor Range
- 4 Outside Low Sensor Range
- 3 Data Rejected due to QAQC
- 2 Missing Data
- 1 Optional SWMP Supported Parameter
- 0 Data Passed Initial QAQC Checks
- 1 Suspect Data
- 2 Depth collected from surface or near surface sonde
- 3 Calculated data: non-vented depth/level sensor correction for changes in barometric pressure
- 4 Historical Data: Pre-Auto QAQC
- 5 Corrected Data

## 12) QAQC code definitions –

QAQC codes are used in conjunction with QAQC flags to provide further documentation of the data and are also applied by insertion into the associated flag column. There are three (3) different code categories, general, sensor, and comment. General errors document general problems with the deployment or YSI datasonde, sensor errors are sensor specific, and comment codes are used to further document conditions or a problem with the data. Only one general or sensor error and one comment code can be applied to a particular data point, but some comment codes (marked with an \* below) can be applied to the entire record in the F\_Record column.

### General Errors

- GIC No instrument deployed due to ice
- GIM Instrument malfunction
- GIT Instrument recording error; recovered telemetry data
- GMC No instrument deployed due to maintenance/calibration
- GNF Deployment tube clogged / no flow
- GOW Out of water event
- GPF Power failure / low battery
- GQR Data rejected due to QA/QC checks
- GSM See metadata

### Corrected Depth/Level Data Codes

- GCC Calculated with data that were corrected during QA/QC
- GCM Calculated value could not be determined due to missing data
- GCR Calculated value could not be determined due to rejected data
- GCS Calculated value suspect due to questionable data
- GCU Calculated value could not be determined due to unavailable data

### Sensor Errors

- SBO Blocked optic
- SCF Conductivity sensor failure
- SCS Chlorophyll spike
- SDF Depth port frozen
- SDG Suspect due to sensor diagnostics

|     |                                                                                                                                              |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------|
| SDO | DO suspect                                                                                                                                   |
| SDP | DO membrane puncture                                                                                                                         |
| SFD | Depth from a surface or near surface sonde deployed from a floating platform, does not reflect the depth of the water column or tidal change |
| SIC | Incorrect calibration / contaminated standard                                                                                                |
| SNV | Negative value                                                                                                                               |
| SOW | Sensor out of water                                                                                                                          |
| SPC | Post calibration out of range                                                                                                                |
| SQR | Data rejected due to QAQC checks                                                                                                             |
| SSD | Sensor drift                                                                                                                                 |
| SSM | Sensor malfunction                                                                                                                           |
| SSR | Sensor removed / not deployed                                                                                                                |
| STF | Catastrophic temperature sensor failure                                                                                                      |
| STS | Turbidity spike                                                                                                                              |
| SWM | Wiper malfunction / loss                                                                                                                     |
| SXD | Depth from a surface or near surface sonde deployed at a fixed depth, offset to substrate may be applied                                     |

#### Comments

|      |                                                         |
|------|---------------------------------------------------------|
| CAB* | Algal bloom                                             |
| CAF  | Acceptable calibration/accuracy error of sensor         |
| CAP  | Depth sensor in water, affected by atmospheric pressure |
| CBF  | Biofouling                                              |
| CCU  | Cause unknown                                           |
| CDA* | DO hypoxia (<3 mg/L)                                    |
| CDB* | Disturbed bottom                                        |
| CDF  | Data appear to fit conditions                           |
| CFK* | Fish kill                                               |
| CIP* | Surface ice present at sample station                   |
| CLT* | Low tide                                                |
| CMC* | In field maintenance/cleaning                           |
| CMD* | Mud in probe guard                                      |
| CND  | New deployment begins                                   |
| CRE* | Significant rain event                                  |
| CSM* | See metadata                                            |
| CTS  | Turbidity spike                                         |
| CVT* | Possible vandalism/tampering                            |
| CWD* | Data collected at wrong depth                           |
| CWE* | Significant weather event                               |

### 13) Post deployment information –

\*Note: pH post-deployment readings are temperature dependent and minor variations are expected as a result.

## Cabretta Creek

| Deploy Date | Sonde Nickname | SpCond       | ROXDO1 | ROXDO2 | pH7  | pH10  | Turb       | Turb          | Depth          |
|-------------|----------------|--------------|--------|--------|------|-------|------------|---------------|----------------|
| 1/24/2024   | Catherine      | 50.018(50.0) | 101.5  | 101.8  | 7.14 | 10.18 | 2.41(0.0)  | 121.82(124.0) | 0.12(0.12)     |
| 2/9/2024    | Manatee        | 50.029(50.0) | 102.3  | 102.9  | 7.05 | 10.12 | 2.28(0.0)  | 125.35(124.0) | 0.067(0.079)   |
| 2/22/2024   | Catherine      | 49.57(50.0)  | 97.9   | 98.5   | 7.09 | 10.13 | 0.18(0.0)  | 125.6(124.0)  | -0.025(-0.025) |
| 3/6/2024    | Manatee        | 49.675(50.0) | 100.6  | 100.6  | 7.05 | 10.03 | 2.52(0.0)  | 124.67(124.0) | 0.099(0.103)   |
| 3/19/2024   | simon          | 50.339(50.0) | 100.8  | 96.7   | 7.11 | 10.1  | -2.12(0.0) | 122.25(124.0) | -0.035(-0.035) |
| 4/4/2024    | Manatee        | 50.243(50.0) | 102.5  | 102.6  | 7.01 | 9.98  | 0.67(0.0)  | 124.3(124.0)  | 0.1(0.1)       |

|            |            |              |       |       |      |       |            |               |                |
|------------|------------|--------------|-------|-------|------|-------|------------|---------------|----------------|
| 4/17/2024  | simon      | 50.013(50.0) | 98.1  | 97.7  | 7.1  | 10.09 | 0.48(0.0)  | 125.03(124.0) | 0.047(0.048)   |
| 5/2/2024   | July       | 50.33(50.0)  | 98.8  | 98.9  | 7.06 | 10.07 | 0.27(0.0)  | 123.61(124.0) | 0.011(0.013)   |
| 5/17/2024  | simon      | 50.157(50.0) | 99.3  | 99.4  | 7.18 | 10.1  | 1.47(0.0)  | 122.7(124.0)  | 0.103(0.107)   |
| 5/31/2024  | July       | 49.976(50.0) | 97.7  | 95.2  | 7.25 | 10.22 | 1.09(0.0)  | 125.2(124.0)  | 0.008(0.017)   |
| 6/13/2024  | simon      | 50.095(50.0) | 100.5 | 97.7  | 7.23 | 10.14 | 0.24(0.0)  | 123.22(124.0) | -0.006(-0.011) |
| 6/27/2024  | July       | 50.039(50.0) | 99.7  | 100.1 | 7.15 | 10.15 | -0.07(0.0) | 125.39(124.0) | 0.028(0.044)   |
| 7/9/2024   | simon      | 50.199(50.0) | 100.3 | 99.3  | 7.1  | 10.11 | 0.32(0.0)  | 123.58(124.0) | 0.097(0.103)   |
| 7/25/2024  | Blackbeard | 49.878(50.0) | 99.9  | 99.7  | 7.14 | 10.18 | -0.06(0.0) | 123.42(124.0) | -0.089(-0.094) |
| 8/7/2024   | Ossabaw    | 49.886(50.0) | 97.9  | 94.5  | 7    | 10.05 | 2.25(0.0)  | 139.42(124.0) | 67.72(0.006)   |
| 8/20/2024  | July       | 50.579(50.0) | 90.9  | 91.3  | 7.06 | 10.06 | 4.68(0.0)  | 130.37(124.0) | 0.06(0.069)    |
| 9/3/2024   | simon      | 50.025(50.0) | 97.2  | 95    | 7.25 | 10.15 | 2.27(0.0)  | 124.14(124.0) | -0.025(0.006)  |
| 9/19/2024  | Sturgeon   | 49.081(50.0) | 96.9  | 98.6  | 7.05 | 10.15 | 2.74(0.0)  | 125.08(124.0) | 0.055(0.055)   |
| 10/3/2024  | Manatee    | 50.058(50.0) | 104.1 | 104   | 7.14 | 10.22 | 1.44(0.0)  | 121.38(124.0) | 0.094(0.096)   |
| 10/16/2024 | Catherine  | 49.968(50.0) | 101.6 | 102.1 | 7.08 | 10.08 | 0.22(0.0)  | 122.8(124.0)  | 0.13(0.138)    |
| 10/31/2024 | simon      | 48.348(50.0) | 99    | 97.8  | 7.15 | 10.2  | 0.38(0.0)  | 124.98(124.0) | 0.05(0.02)     |
| 11/15/2024 | Catherine  | 51.034(50.0) | 104.2 | 104.1 | 7.06 | 10.1  | 1.76(0.0)  | 118.05(124.0) | 0.185(0.179)   |
| 12/3/2024  | simon      | 49.721(50.0) | 102.3 | 102.3 | 7.13 | 10.15 | 1.22(0.0)  | 125.14(124.0) | 0.13(0.124)    |
| 12/17/2024 | Catherine  | 49.833(50.0) | 100.9 | 100.7 | 7.12 | 10.05 | 0.78(0.0)  | 122.32(124.0) | -0.003(0.003)  |
| 12/31/2024 | simon      | 50.46(50.0)  | 101.9 | 101.9 | 7.13 | 10.16 | 0.57(0.0)  | 125.38(124.0) | 0.106(0.11)    |

## Dean Creek

| Deploy Date | Sonde Nickname | SpCond       | ROXDO1 | ROXDO2 | pH7  | pH10  | Turb       | Turb          | Depth          |
|-------------|----------------|--------------|--------|--------|------|-------|------------|---------------|----------------|
| 12/18/2023  | Catherine      | 50.186(50.0) | 102.6  | 102.8  | 7.09 | 10.24 | 1.3(0.0)   | 124.99(124.0) | 0.081(0.076)   |
| 1/4/2024    | Sturgeon       | 49.771(50.0) | 102.1  | 102.2  | 7.02 | 10.1  | -0.12(0.0) | 123.37(124.0) | 0.029(0.031)   |
| 1/19/2024   | July           | 50.01(50.0)  | 94.7   | 96.7   | 7.12 | 10.11 | -0.52(0.0) | 124.42(124.0) | -0.062(-0.076) |
| 2/5/2024    | Cumberland     | 49.917(50.0) | 99.2   | 98.5   | 7.05 | 10.07 | 2.94(0.0)  | 114.96(124.0) | 0.05(0.048)    |
| 2/16/2024   | simon          | 50.241(50.0) | 99.9   | 99.8   | 7.07 | 10.09 | 1.11(0.0)  | 122.59(124.0) | 0.118(0.124)   |
| 3/1/2024    | Amelia         | 49.782(50.0) | 99.6   | 99.1   | 7.1  | 10.11 | 0.88(0.0)  | 123.64(124.0) | 0.045(0.041)   |
| 3/22/2024   | July           | 50.04(50.0)  | 92.2   | 88.2   | 7.21 | 10.21 | 1.75(0.0)  | 124.13(124.0) | 0.063(0.062)   |
| 4/10/2024   | Amelia         | 50.136(50.0) | 101    | 100.5  | 7.1  | 10.14 | 1.57(0.0)  | 124.77(124.0) | 0.135(0.138)   |
| 4/23/2024   | Sturgeon       | 50.005(50.0) | 101.2  | 100.2  | 7.04 | 10.1  | 0.17(0.0)  | 122.92(124.0) | 0.019(0.02)    |
| 5/8/2024    | Amelia         | 50.087(50.0) | 99.9   | 100.8  | 7.17 | 10.16 | 0.9(0.0)   | 124.18(124.0) | 0.02(0.02)     |
| 5/24/2024   | Sturgeon       | 50.114(50.0) | 101    | 100.9  | 7.09 | 10.11 | 0.25(0.0)  | 124.58(124.0) | -0.015(-0.014) |
| 6/7/2024    | Amelia         | 50.155(50.0) | 98.9   | 99.7   | 7.1  | 10.08 | 3.06(0.0)  | 124.52(124.0) | 0.091(0.086)   |
| 6/18/2024   | Sturgeon       | 49.935(50.0) | 101    | 100.7  | 7.04 | 10.14 | 2.39(0.0)  | 122.13(124.0) | 0.089(0.089)   |
| 7/3/2024    | Amelia         | 50.103(50.0) | 102.1  | 102.5  | 7.15 | 10.12 | 0.18(0.0)  | 125.17(124.0) | 0.063(0.065)   |
| 7/17/2024   | Manatee        | 49.881(50.0) | 101    | 101    | 7.17 | 10.19 | 1.55(0.0)  | 124.83(124.0) | 0.072(0.072)   |
| 7/31/2024   | Amelia         | 50.146(50.0) | 102.1  | 102.3  | 7.12 | 10.11 | 0.12(0.0)  | 123.92(124.0) | 0.061(0.062)   |
| 8/15/2024   | Manatee        | 50.208(50.0) | 100.9  | 101.1  | 7.09 | 10.1  | 0.15(0.0)  | 126.25(124.0) | 0.081(0.082)   |
| 8/29/2024   | Sturgeon       | 50.016(50.0) | 98.2   | 98.4   | 7.03 | 10.08 | 1.24(0.0)  | 127.66(124.0) | 0.038(0.031)   |
| 9/12/2024   | Blackbeard     | 49.947(50.0) | 95     | 98.7   | 7.1  | 10.14 | 1.44(0.0)  | 124.24(124.0) | 0.038(0.031)   |
| 9/25/2024   | Amelia         | 50.099(50.0) | 98.9   | 98     | 7.05 | 10.11 | 1.69(0.0)  | 123.72(124.0) | 0.009(0.02)    |
| 10/9/2024   | July           | 50.164(50.0) | 101.2  | 100.5  | 7.05 | 10.15 | -0.95(0.0) | 122.26(124.0) | 0.132(0.172)   |
| 10/30/2024  | Manatee        | 50.195(50.0) | 95.8   | 97     | 7.09 | 10.19 | 0.42(0.0)  | 124.21(124.0) | 0.073(0.072)   |
| 11/8/2024   | July           | 50.46(50.0)  | 86     | 89.4   | 7.11 | 9.94  | 0.32(0.0)  | 113.0(124.0)  | 0.01(0.017)    |

|            |            |              |       |       |      |       |            |               |               |
|------------|------------|--------------|-------|-------|------|-------|------------|---------------|---------------|
| 11/21/2024 | Amelia     | 50.124(50.0) | 104.4 | 104.4 | 6.97 | 10.11 | 0.12(0.0)  | 123.27(124.0) | 0.16(0.165)   |
| 12/4/2024  | July       | 49.667(50.0) | 87.8  | 85.3  | 7.06 | 10.06 | -0.31(0.0) | 127.95(124.0) | -0.268(0.093) |
| 12/18/2024 | Cumberland | 50.399(50.0) | 91.4  | 93.3  | 6.98 | 10.05 | 2.1(0.0)   | 119.57(124.0) | 0.158(0.158)  |

## Hunt Dock

| Deploy Date | Sonde Nickname | SpCond       | ROXDO1 | ROXDO2 | pH7  | pH10  | Turb       | Turb          | Depth          |
|-------------|----------------|--------------|--------|--------|------|-------|------------|---------------|----------------|
| 12/20/2023  | simon          | 49.979(50.0) | 102.7  | 102.4  | 7.07 | 10.19 | -2.65(0.0) | 121.48(124.0) | 0.057(0.065)   |
| 1/3/2024    | Cumberland     | 49.938(50.0) | 101    | 100.9  | 7.05 | 10.13 | 0.14(0.0)  | 112.58(124.0) | -0.012(-0.011) |
| 1/16/2024   | simon          | 49.976(50.0) | 102    | 101.8  | 7.14 | 10.16 | 0.48(0.0)  | 125.96(124.0) | 0.039(0.038)   |
| 1/31/2024   | Amelia         | 49.698(50.0) | 104    | 103.4  | 7.06 | 10.05 | 1.51(0.0)  | 123.24(124.0) | 0.047(0.058)   |
| 2/16/2024   | July           | 50.335(50.0) | 97     | 95.2   | 7.37 | 10.18 | -1.06(0.0) | 122.72(124.0) | 0.093(0.096)   |
| 3/4/2024    | Cumberland     | 50.176(50.0) | 96     | 98.8   | 6.96 | 10.06 | 8.57(0.0)  | 118.91(124.0) | 0.052(0.051)   |
| 3/26/2024   | Catherine      | 50.081(50.0) | 100.8  | 100.8  | 7.07 | 10.13 | 2.22(0.0)  | 123.98(124.0) | 0.038(0.041)   |
| 4/12/2024   | Cumberland     | 50.062(50.0) | 101.1  | 98.2   | 6.94 | 10.05 | -1.01(0.0) | 125.94(124.0) | 0.12(0.114)    |
| 4/26/2024   | Catherine      | 50.138(50.0) | 100.5  | 100.8  | 7.15 | 10.19 | 0.61(0.0)  | 123.92(124.0) | 0.046(0.051)   |
| 5/13/2024   | Cumberland     | 49.578(50.0) | 100.6  | 99.9   | 7.1  | 10.18 | 1.13(0.0)  | 123.9(124.0)  | -0.102(0.031)  |
| 5/28/2024   | Catherine      | 50.09(50.0)  | 101.3  | 100.4  | 7.11 | 10.13 | 0.31(0.0)  | 125.18(124.0) | -0.027(-0.025) |
| 6/10/2024   | Cumberland     | 50.119(50.0) | 94.1   | 93.2   | 7.04 | 10.11 | 3.06(0.0)  | 122.9(124.0)  | 0.004(0.003)   |
| 6/26/2024   | Manatee        | 50.224(50.0) | 101.2  | 101.2  | 7.11 | 10.21 | -0.45(0.0) | 125.82(124.0) | 0.059(0.058)   |
| 7/8/2024    | Ossabaw        | 50.118(50.0) | 99.1   | 96.1   | 7.13 | 10.15 | 0.79(0.0)  | 126.97(124.0) | 0.514(0.114)   |
| 7/24/2024   | July           | 50.146(50.0) | 100.9  | 101.2  | 7.16 | 10.17 | 1.24(0.0)  | 124.49(124.0) | -0.073(-0.066) |
| 8/8/2024    | simon          | 50.547(50.0) | 99.9   | 99.3   | 7.13 | 10.13 | 2.17(0.0)  | 125.55(124.0) | 0.077(0.082)   |
| 8/22/2024   | Catherine      | 50.079(50.0) | 100.5  | 100.4  | 7.08 | 10.13 | 0.79(0.0)  | 124.61(124.0) | 0.073(0.076)   |
| 9/5/2024    | Manatee        | 50.03(50.0)  | 99     | 98.7   | 7.21 | 10.2  | 1.01(0.0)  | 123.96(124.0) | 0.017(0.01)    |
| 9/19/2024   | Catherine      | 49.602(50.0) | 102.1  | 102.2  | 7.07 | 10.13 | 2.91(0.0)  | 125.96(124.0) | 0.083(0.086)   |
| 10/4/2024   | Sturgeon       | 50.45(50.0)  | 102.9  | 102.8  | 7.06 | 10.1  | -3.6(0.0)  | 121.59(124.0) | 0.152(0.155)   |
| 10/22/2024  | Cumberland     | 50.076(50.0) | 100.2  | 100.4  | 7.1  | 10.14 | 0.55(0.0)  | 133.61(124.0) | 0.075(0.072)   |
| 11/7/2024   | Wassaw         | 45.55(50.0)  | 95.8   | 94.3   | 7.02 | 10.03 | -0.91(0.0) | 112.64(124.0) | 0.002(-0.0)    |
| 11/22/2024  | Cumberland     | 51.968(50.0) | 99.6   | 100.3  | 7    | 9.99  | 0.63(0.0)  | 127.73(124.0) | 0.139(0.141)   |
| 12/6/2024   | Wassaw         | 50.335(50.0) | 93.7   | 93.6   | 6.99 | 9.94  | 0.87(0.0)  | 125.83(124.0) | 0.117(0.117)   |
| 12/18/2024  | Amelia         | 50.087(50.0) | 109.7  | 107.5  | 7.05 | 10.22 | 1.49(0.0)  | 122.9(124.0)  | 0.12(0.127)    |

## Lower Duplin

| Deploy Date | Sonde Nickname | SpCond       | ROXDO1 | ROXDO2 | pH7  | pH10  | Turb      | Turb          | Depth          |
|-------------|----------------|--------------|--------|--------|------|-------|-----------|---------------|----------------|
| 12/29/2023  | Amelia         | 49.881(50.0) | 102.0  | 102.1  | 7.07 | 10.22 | 0.87(0.0) | 123.32(124.0) | -0.032(-0.028) |
| 1/12/2024   | Manatee        | 50.348(50.0) | 103    | 102.9  | 7.09 | 10.05 | 0.65(0.0) | 122.9(124.0)  | 0.118(0.12)    |
| 1/25/2024   | Blackbeard     | 49.81(50.0)  | 104.2  | 103.9  | 7.07 | 10.13 | 1.48(0.0) | 125.03(124.0) | 0.114(0.148)   |
| 2/8/2024    | Sturgeon       | 49.952(50.0) | 102.9  | 102.9  | 7.04 | 10.14 | 0.51(0.0) | 123.95(124.0) | 0.116(0.12)    |
| 2/26/2024   | Blackbeard     | 49.762(50.0) | 98.6   | 98.6   | 7.04 | 10.06 | 0.7(0.0)  | 124.44(124.0) | 0.005(0.006)   |
| 3/18/2024   | Sturgeon       | 50.125(50.0) | 101.5  | 101.8  | 6.99 | 10.07 | 0.63(0.0) | 125.09(124.0) | 0.126(0.127)   |
| 4/8/2024    | Blackbeard     | 49.799(50.0) | 100.4  | 100.5  | 7.05 | 10.09 | 0.17(0.0) | 124.28(124.0) | 0.105(0.096)   |
| 4/29/2024   | Manatee        | 49.848(50.0) | 99.9   | 99.9   | 7.16 | 10.01 | 1.65(0.0) | 123.08(124.0) | -0.028(-0.025) |
| 5/15/2024   | Blackbeard     | 50.19(50.0)  | 104.7  | 103.3  | 7.05 | 10.09 | 1.7(0.0)  | 125.39(124.0) | 0.062(0.062)   |

|            |            |              |       |       |      |       |            |               |              |
|------------|------------|--------------|-------|-------|------|-------|------------|---------------|--------------|
| 5/29/2024  | Manatee    | 50.012(50.0) | 102.4 | 101.5 | 7.24 | 10.19 | -0.5(0.0)  | 123.77(124.0) | 0.023(0.027) |
| 6/12/2024  | Blackbeard | 49.805(50.0) | 101.1 | 102.4 | 6.92 | 9.98  | 0.33(0.0)  | 122.87(124.0) | 0.017(0.01)  |
| 6/26/2024  | Catherine  | 49.961(50.0) | 100.5 | 99.4  | 7.06 | 10.1  | 2.13(0.0)  | 128.88(124.0) | 0.018(0.024) |
| 7/10/2024  | Sturgeon   | 50.219(50.0) | 101.2 | 100.6 | 7.13 | 10.17 | -0.56(0.0) | 123.43(124.0) | 0.02(0.062)  |
| 7/30/2024  | Catherine  | 50.52(50.0)  | 99.5  | 99.1  | 7.1  | 10.11 | 2.6(0.0)   | 125.91(124.0) | 0.006(0.003) |
| 8/9/2024   | Sturgeon   | 49.875(50.0) | 103.3 | 103.4 | 6.99 | 10.1  | 0.63(0.0)  | 126.91(124.0) | 0.033(0.058) |
| 8/21/2024  | Blackbeard | 50.153(50.0) | 105.1 | 104.5 | 7.08 | 10.08 | 0.4(0.0)   | 124.65(124.0) | 0.071(0.072) |
| 9/3/2024   | Amelia     | 49.99(50.0)  | 99.1  | 99.8  | 7.07 | 10.19 | 0.54(0.0)  | 123.37(124.0) | 0.032(0.027) |
| 9/18/2024  | July       | 50.053(50.0) | 91.5  | 96.1  | 7.19 | 10.12 | 1.72(0.0)  | 127.28(124.0) | 0.19(0.055)  |
| 10/3/2024  | simon      | 50.278(50.0) | 103.6 | 103.7 | 7.15 | 10.18 | -1.19(0.0) | 101.42(124.0) | 0.169(0.175) |
| 10/18/2024 | Amelia     | 49.929(50.0) | 99    | 98.8  | 7.09 | 10.12 | 1.78(0.0)  | 123.52(124.0) | 0.111(0.11)  |
| 11/1/2024  | Sturgeon   | 49.716(50.0) | 101.1 | 100.6 | 7.08 | 10.16 | -0.49(0.0) | 125.41(124.0) | 0.122(0.12)  |
| 11/13/2024 | Manatee    | 50.584(50.0) | 101.6 | 101.9 | 7.15 | 10.17 | 0.12(0.0)  | 119.07(124.0) | 0.176(0.179) |
| 12/3/2024  | Sturgeon   | 48.726(50.0) | 97.2  | 97.1  | 7.05 | 9.97  | 1.44(0.0)  | 127.4(124.0)  | -0.002(-0.0) |
| 12/11/2024 | Manatee    | 50.28(50.0)  | 104.4 | 104.2 | 7.08 | 10.15 | -0.65(0.0) | 125.33(124.0) | 0.118(0.138) |
| 12/26/2024 | Sturgeon   | 53.775(50.0) | 106.7 | 107.5 | 7.14 | 10.24 | 1.84(0.0)  | 126.36(124.0) | 0.14(0.141)  |

#### 14) Other remarks/notes –

Data are missing due to equipment or associated specific probes not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. Any NaNs in the dataset stand for “not a number” and are the result of low power, disconnected wires, or out of range readings. If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

During quarter 3, two significant storms affected the reserve. While neither system passed directly over Sapelo Island, both were close enough to have an effect.

The first, Tropical Storm Debby impacted the reserve from Monday 8/5/24 – Wednesday 8/7/24. Over the course of these three days, approximately 7 inches of rain fell. This rainfall influenced water quality at all four sites with salinity, conductivity, and turbidity being the three parameters with noticeable changes in the data.

The second, Hurricane Helene, impacted the reserve from Thursday 9/26/24 – Friday 9/27/24. This storm brought sustained winds but little rainfall. The storm surge from this event is reflected in the water quality data.

#### Cabretta

##### Q1:

Data from 01/01/24 00:00 – 01/24/24 11:30 is missing due to a deployment tube failure in November 2023. A new deployment tube at the CA site was installed on 1/23/24 and a calibrated sonde was deployed on 1/24/24 11:30. A Compliance Log Request was filled out for the missing data spanning from 11/23/23 – 1/24/24 and approved by the CDMO.

During deployment 012424, pH, salinity, and DO values shift around 2/4/24. After looking at weather data from this time period, heavy rainfall from 2/3-4/24 seems to be the cause of this shift. Not flagging, but added to metadata.

DO levels from 3/19 – 3/21 well above what is usually expected at this site. As similar spike occurs during the same deployment from 4/1 – 4/2. Post deployment readings don't suggest a faulty sensor. Data not being flagged but added to metadata.

Q2:

During deployment 040424, turbidity values steadily begin to rise above expected towards the end of the deployment. From 4/16 to end of deployment, these values are flagged as suspect due to biofouling. There were a lot of tunicates inside sensor guard, on sonde, and on top of sonde.

A significant rain event on 4/11/24 led to a steep drop off in salinity levels at this site from 4/11 – 4/13.

Disregard <1>[SDO] flags from 041724 deployment. DO values above 120 % saturation should be accepted, was unable to unflag.

Q3:

Depth values for deployment sapcawq080724 were flagged <1>[SDG](CSM) from the start of deployment 080724 11:15 - 080824 8:00. Depth values from 080824 8:15 – 082024 10:30 (end of deployment) were flagged <-3>[SSM](CSM). The depth port on the sonde calibrated orange before deployment, but calibration went fine, so sonde was deployed. The affected sonde has been taken out of service until this problem can be addressed.

Probable tampering with sonde during deployment sapcawq082024. Depth values shift considerably at 08/30/24 21:00 and upon retrieval, it was observed that the sonde had become trapped in the middle of the deployment tube. This is believed to have been caused by an unauthorized individual pulling the sonde up from its deployment and letting go, causing the sonde to become tangled in the wire/rope and remain suspended in the deployment tube. All depth values from 083024 21:00 – end of deployment (09/03/2024 10:45) have been flagged as <-3> (CVT) and all other data during this time period has been flagged <1>(CWD) to reflect data being collected at the wrong depth.

Q4:

There were no major issues with the CA site during the fourth quarter of 2024. During a couple of sonde swaps, one fifteen-minute record is missing (flagged <-2> [GMC]) due to deployment tube maintenance. This was limited to removing biofouling from the inside of the tube to ensure the sonde was able to reach the bottom of the tube.

## Dean Creek

Q1:

Heavy rains on 1/6 and 1/9 affect salinity at this site, dips in salinity values attributed to this rainfall.

Salinity and sp.cond. data fluctuates in a strange way during the 021624 deployment. Some of the higher salinity values are seen at lower depths and the lower salinity values seen at higher depths. The range of salinity values is also strange for this site with values on the lower end of the range below 10ppu and higher values close to 25ppu. Low salinity values aren't uncommon for this site, but the drastic changes seen in this dataset are odd. Not flagging, but will add to metadata.

There were a couple instances during the 032224 deployment when the depth values hovered around 0, getting as close as 0.02m. This site does occasionally become very shallow at low tide, but these values did not reflect any negative tides. In comparison, negative low tides on 4/8 and 4/9 gave minimum depth values of 0.27m and 0.24m respectively. These very low values also seemed to stagnate, remaining the same over 2-3 hour

periods, which would not reflect the normal tidal cycles of this site. Flagging the depth values below 0.10 as suspect.

At the beginning of deployment 032224, a similar trend in salinity and depth values as was seen in the 021624 deployment is present. Salinity values are lowest at the highest depths and vice versa. Again, not flagging but will add to metadata.

Q2:

Through this quarter, have continued flagging depth data < 0.10 as suspect.

On 4/11, during deployment 041024, a series of turbidity spikes occurred from 0530 – 0645. The values from 0545 – 0630 would usually be flagged as rejected, but this time period coincided with a significant rain event which may have increased runoff from marsh or otherwise increased turbidity at this site. Flagged data as suspect. Salinity and Sp. Cond. data values for this time also drop off, flagged as accepted.

This site experienced a wide range of DO values for this quarter. With water temperatures increasing and the shallow nature of this site, certain values on the high and low ends of the range have been flagged either as suspect or in rare cases rejected. This flagging was done with the site's character as the main factor in flagging decisions.

Q3:

No major issues with the DC site during third quarter of 2024.

Q4:

Depth records for the deployment sapdcwq120424 were all flgged as <-3>[SIC](CSM). These records were rejected because of a post-deployment depth reading of -0.268m when it should have been 0.093m. Some of the depth values from the deployment went into negative territory, in-sync with low tide times. I believe that the depth sensor was calibrated incorrectly using the incorrect depth offset. Barometric pressure value could have been calculated incorrectly leading to the incorrect offset value. See deployment log for further details.

## Hunt Dock

Q1:

Deployment 011624 had some weird salinity, sp. Cond., and temp data. There seems to be a switch somewhere around 1/24 in the deployment. There was significant rain on the island on 1/23 – 24 which could be the reason behind the weird readings. Salinity and Sp. Cond stay relatively stable until 1/24 and then show values expected with tidal fluctuations. The end of the previous deployment showed stabilizing salinity and Sp. Cond. values before the sonde swap. No data was flagged but will add to metadata.

Deployment 013124 had a similar pattern of salinity/sp. Cond. data compared to the previous deployment of 011624. The values start stable, and then start to fluctuate and drop slightly around 2/4. It should be noted that the island received over an inch of rain on 2/4 which may have led to the salinity data pattern. The values from the end of the 011624 deployment match up with the values from the beginning of the 013124 deployment. No data was flagged but will add this to metadata.

During deployment 021624, turbidity values stayed consistently very low, rarely exceeding 10 and for the most part staying below 5. No negative values were recorded and no flags were used.

During post-deployment of 021624, the pH slope was 156.9. Acceptable slopes should fall between 165-180. After looking through the pH data from this deployment, this low post-deployment reading does not seem to affect the pH data from this deployment. No data was flagged, but want to mention in metadata.

Turbidity data from deployment 030424 gradually and consistently increases over the span of the deployment. The post-deployment readings were a little off, but nothing crazy (8.57 @0.00 and 118.91 @124.00). When deploying this sonde again on 4/12, the turbidity sensor was swapped out because of inconsistent readings during calibration. This data was not flagged because values stayed below 40 NTU for the most part.

Q2:

Steep drop off in salinity values on 4/11 due to significant rain event.

No pH data was recorded for the entire deployment 041224. This gap spans from 4/12/24 – 4/26/24. Cause unknown. pH values were recorded during pre- and post-deployment times, but none during in-water deployment.

During deployment 061024, the sonde's SD card failed while deployed. This resulted in no data being recorded from 06/20/2024 17:45 – 06/26/2024 10:30. This sonde (Cumberland) has been taken out of service until repaired. All sensors from Cumberland have been transferred to a reserve sonde, Ossabaw, to be used in the interim.

Q3:

Post depth readings for deployment saphdwq070824 were pretty far off. Standard should be 0.114 and sonde reads 0.514. Small shell fragments removed from depth port while cleaning after doping post-cal. This was Ossabaw's first deployment since being taken out of reserve to replace Cumberland.

Q4:

Post-deployment readings for deployment saphdwq100424 were done a week after end of deployment due to staff shortage and connectivity (Kor) issues. The sonde was pulled from deployment on 10/22/24 and the post-deployment readings were taken on 10/28/24. The sonde sat in an aerated water bath during the interim between retrieval and post-deployment readings.

During deployment saphdwq112224, when retrieving the sonde on 12/5/24 10:45 – 11:15, the sonde became lodged in the deployment tube while being retrieved. Use of barnacle buster and other tools were unsuccessful in freeing sonde. The tech went back on 12/6/24 and successfully freed and retrieved sonde. Depth data from 12/5/24 11:00 – 12/6/24 11:30 have been rejected and flagged as <-3>[GSM](CSM). All other parameters during this time period have been flagged as suspect <1>[GSM](CWD).

## Lower Duplin

Q1:

All salinity and sp.cond. data from the beginning of deployment 022624 until 2/29/24 06:30 are flagged as suspect due to sensor drift. Pre-deployment calibration and post-deployment readings aren't off at all, but for the first approximately three days of deployment, salinity and sp. cond. values are lower than to be expected at this site. This includes four low points associated with the first four low tides of the deployment. There are no associated rain events during this period that may have affected salinity at this site.

Q2:

The sonde deployed at Lower Duplin for deployment 061224 had a damaged pin which prevented it from charging during the deployment (this is a telemetered site). The sonde being used (Blackbeard) was having battery issues and was exclusively deployed at this site to enable it to charge and remain active during a regular 2-3 week deployment. Once charging ceased, the sonde lost battery at an accelerated rate and died resulting in missing data from 6/25/24 05:00 – 6/26/24 09:45.

Q3:

No major issues with the LD site during third quarter of 2024.

Q4:

pH slope in post-deployment readings for deployment sapldwq091824 is slightly low. No flags applied.

On the afternoon of October 19, 2024, the ramp that connects the ferry dock to the island collapsed dropping people into the water and causing multiple fatalities. The LD water quality site is adjacent to this ramp. Some elevated turbidity values during the morning of 10/20/24 have not been flagged, but this may be a result of increased activity in and around the water near the LD water quality site.

During deployment sapldwq122624, multiple parameters shifted considerably at 1/5/25 16:00. Temperature, salinity, sp. Cond., and DO values were all flagged as <-3>(SSM)[CSM]. The cause of this shift is unknown. Post-deployment temperature readings were also lower than expected. pH sensor showed orange after this deployment, with post-deployment readings higher than expected but slope within acceptable range.