**Estero Bay Aquatic Preserve (EBAP) Water Quality Metadata**

**January 1, 2024 - September 30, 2024**

**Latest Update:** October 30, 2024

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 Aquatic Preserve office ([Stephanie.Erickson@floridadep.gov](mailto:Stephanie.Erickson@floridadep.gov)) with any additional questions.

**I. Data Set and Research Descriptors**

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**2) Entry verification –**

Deployment data are uploaded from the YSI data sonde to a Personal Computer (IBM compatible). Files are exported from KOR Software, the software platform used for managing the EXO data sonde and water quality data, in a comma separated file (.csv) and uploaded to the NERRS Centralized Data Management Office (CDMO) Non-SWMP Data Upload Service where data undergo automated primary QAQC. 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 Office of Resilience and Coastal Protection (RCP) Data Coordinator and/or the Aquatic Preserve office 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 Aquatic Preserve database. Upload after secondary QAQC results in ingestion into the Aquatic Preserve database as provisional plus data, and finally tertiary QAQC by the RCP Data Coordinator and assimilation into the Aquatic Preserve database as authenticated data. 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.

Anomalous data are evaluated to determine whether to flag or reject the suspect values. Data outside the "normal" range of water quality parameters for each site are investigated for validity based on weather data, field observations, QC checks, graphs and instrument diagnostics. Data are rejected if the anomalies are attributed to sensor malfunction and/or excessive fouling. In addition to observations of any physical damage (e.g., compromised DO probe membrane), sensor malfunctions are detected if the reading of the probe is outside the range established for the sensor or the sensor will not post calibrate. All data management and QAQC checks are handled by Rebecca Cray and/or Alexis Marino. Tertiary QAQC is handled by Jessica Lee.

**3) Research objectives –**

In 2004, the Florida Department of Environmental Protection’s (FDEP) Office of Coastal and Aquatic Managed Areas (CAMA), now RCP, began a pilot program using extended deployed water quality monitoring devices, or datasondes, across several of its field offices. After the Estero Bay Aquatic Preserve (EBAP) office was selected, three datasonde monitoring sites were set up within the bay. There were several factors considered when selecting the monitoring sites including salinity gradients, water depth, freshwater inputs, tidal circulation patterns and the location of navigational markers. Additionally, to correlate existing data collection efforts and refrain from duplicating data, locations of other water quality studies were also taken into consideration.

The datasondes, located in a long, shallow estuary, are affected by saltwater in-flow from several Gulf of Mexico inlets and freshwater input from five tributaries. The passes are, from north to south: Hurricane Pass, Matanzas Pass, Big Carlos Pass, New Pass, Big Hickory Pass, and Wiggins Pass in Collier County. The tributaries are, from north to south: Hendry Creek, Mullock Creek, Estero River, Spring Creek, and the Imperial River. The watershed for Estero Bay spans 359.6 square miles and encompasses both the Southern Coastal Plain and Southern Florida Coastal Plain ecoregions, which comprise areas that are typical of low, flat, southern Florida lands dominated by wetlands and characterized by slow, sheet-flow drainage patterns. Natural communities include mangrove-dominated areas along the coast with salt marsh habitats occurring landward of the mangrove zone, pine flatwoods, cypress swamps, and cabbage palm hammocks. The communities within the bay include seagrass beds, mangrove islands, salt marshes, tidal flats, and oyster bars. In the past, the naturally dispersed water patterns distributed nutrients over broad areas of wetland vegetation and seasonal fluctuations in flow from rainfall created the necessary salinity regime in Estero Bay for good estuarine productivity. However, increased development in the area since the 1960’s has led to changes in the natural river systems around Estero Bay, altering freshwater inflow patterns. The watershed activities that potentially impact the bay include point-source wastewater discharge and non-point source runoff or leaching of pollution from roads, agriculture lands, urban areas, and un-vegetated lands which contain fertilizers, pesticides, herbicides, metals, sediments, petroleum compounds, and bacteria.

The goals of EBAP’s program are to establish baseline water quality; evaluate daily, seasonal and long-term water quality trends; and to quantify the effects of specific events, such as hurricanes and hydrological changes. In addition, the data is used to aid in interpreting changes observed in indicator organisms and habitats and for making comparisons to other geographical areas. The data may also assist with the understanding of effects from anthropogenic changes within the bay. The principle goal of the program is to attain baseline data on the overall water quality of Estero Bay for the purpose of preventing further degradation.

**4) Research methods –**

Beginning July 14, 2004 two water quality stations, EB01 (Tom Winter) in the north end of Estero Bay and EB02 (Spring Creek) in the central portion of the bay, were designated as permanent Continuous Water Quality Monitoring Program sites for Estero Bay Aquatic Preserve. A third water quality station, EB03 (Fish Trap Bay), was added on November 23, 2004 at the southern end of the preserve. On May 11, 2021, a fourth station, EB04 (Hendry & Mullock Creeks) was added in the northeastern region of the bay. On September 28, 2022, Hurricane Ian made landfall in southwest Florida as a Category 4 storm. Estero Bay and the surrounding communities were among the hardest hit, especially with regards to storm surge. Fifteen feet of surge was measured on Fort Myers Beach. The storm took out the EB03 station piling and that sonde was lost. That piling was re-installed by Lee County in 2023 and monitoring at that location was re-established on Dec. 12, 2023. The storm also damaged the private dock on which EB01 was affixed. The property owner decided to sell and requested EBAP remove the equipment, so monitoring ceased at that location on Oct. 11, 2022. A new station (EB01b) in the same area, less than 200m away and between Estero Island and Julies Island, was established on Dec. 12, 2023. The depth profiles of EB01 and EB01b differ but both stations are within the same waterbody, allowing EBAP to continue monitoring water quality continuously in that portion of Estero Bay. The datasets from each monitoring station have been otherwise essentially uninterrupted since the first day of deployment.

Until July 2017, all sondes deployed had been YSI 6600 Extended Deployment System (EDS) with three that are the V2-2 model. Beginning on July 5, 2017, YSI EXO2 sondes were deployed at EB01. Beginning on March 29, 2018, YSI EXO3 sondes were deployed at EB02. Beginning on July 9, 2020, EXO sondes were used at all three stations. Prior to deployment, the sondes are calibrated for pH, specific conductivity, turbidity, dissolved oxygen, and depth following the procedures outlined in the YSI Operating and Service Manual. Prior to the December 2011 deployment, the depth was calibrated using a barometric pressure value of 760 mmHg for each calibration, actual atmospheric pressure was not calculated. For the December 6, 2011 deployment a NIST certified barometer was used to obtain the actual atmospheric pressure and determine the depth offset value. Prior to the June 29, 2010 deployment, rapid pulse dissolved oxygen sensors were used; from that deployment onward, all YSI 6600 sondes were equipped with optical dissolved oxygen sensors with mechanical cleaning.

A two-point calibration is used for pH (YSI buffers 7 & 10) and turbidity (0 FNU deionized water & 124 FNU YSI, Inc.). A 50 mS/cm solution (YSI conductivity calibrator) is used to calibrate specific conductivity. Beginning March 24, 2020, initial calibration verifications were conducted for each of the following parameters: specific conductivity, pH, and turbidity. For specific conductivity, calibration is verified using a 10 mS/cm solution. For pH, calibration is verified in pH 10 buffer. For turbidity, calibration is verified in the 124 FNU standard. Beginning June 10, 2024, a new formula for 124 FNU standard from YSI was implemented. Calibrating a sonde in the old formula and verifying in the new formula could result in a “failure” of approximately 10 FNU. Dissolved oxygen (DO) is calibrated in oxygen saturated water, using a bucket and an aerator. Prior to June 29, 2010, rapid pulse dissolved oxygen sensors were calibrated using water saturated air, using a small amount of water in a vented calibration cup. The percent saturation value is determined by entering the current barometric pressure into Kor. The depth is also calibrated by using the current barometric pressure to determine the depth offset value to enter into Kor.

All sondes are deployed within 4-inch diameter PVC pipes, which are attached to either a private residential dock (EB01 until October 2022) or “aid-to-navigation” pilings (EB01b, EB02, EB03, and EB04). The pipes are oriented vertically and attached with stainless steel brackets molded to wrap around the piling and bolted to stainless steel offset clamps. Up to three brackets are used depending on the height of the pipe. A stainless-steel bolt is also installed at the bottom of the pipes to keep the sonde from falling through. Since Dec. 12, 2023, the submerged end of the PVC pipes at EB02 and EB03 have two rows of oblong holes whose short ends are rounded (pill/stadium shaped). There are 4 holes per row measuring vertically approximately 8 inches tall and horizontally 2 inches wide. At EB04 and EB01b, the holes are drilled per YSI recommendations. Sondes are secured by rope to an eyebolt in the top of the PVC caps. An additional hole is drilled through the top of the pipes in order to insert a bolt and lock for security. The bottoms of the pipes are open and positioned such that the sensors are between 0.25 and 0.5 meters above the bottom.

The sondes are further protected from crabs and other live organisms by attempting to restrict the openings on the sonde guard with plastic or copper mesh screening. The plastic mesh (with 1/8-inch diamond-shaped holes) is attached to the outside of the sondes guard’s circumference using low-profile zip ties. In 2015, increased antifouling efforts were applied to guards in the form of copper tape on the exterior of the plastic guards plus copper alloy woven mesh (McNichols Co., 4 mesh, 0.047’’ woven square weave, 66% open area). This same copper mesh is applied to the exterior of the copper antifouling sonde guards on EXO sondes as well.

Sondes are deployed, generally, for two weeks to one month at a time. The sampling period is set for 15-minute intervals (readings are made every 15 minutes). The following physical water quality parameters are recorded: temperature (degrees Celsius), specific conductivity (mS/cm), salinity (parts per thousand), dissolved oxygen (mg/L and % saturation), depth (m), pH and turbidity (FNU. To test how well the sondes hold calibration, field measurements are performed using a handheld YSI instrument (YSI 85 2004-Feb. 2008, YSI556 Feb. 2008-July 2015, YSI ProDSS July 2015-present) which serves as a “spot check” at the time of deployment and retrieval. The parameters recorded with the handhelds are temperature, specific conductivity, conductivity, salinity, dissolved oxygen (mg/L and % saturation), and depth. Starting with the introduction of the ProDSS in 2015, turbidity is also recorded. Additionally, a post-deployment calibration verification is conducted on each retrieved sonde in the lab. The parameters include temperature, pH (7.0 and 10.0), turbidity (0 FNU and beginning with the 4/16/2019 deployment 124 FNU for EXOs and 126 NTU for 6600s), specific conductivity (50 mS/cm), DO%, depth, and battery volts.

**5) Site location and character –**

Estero Bay Aquatic Preserve is the state’s first, designated by the legislature in 1966. The state-owned submerged lands within the boundary are protected in accordance with Florida rules and statutes. Estero Bay is approximately 13,800 acres and is characterized as a long, shallow estuary affected by saltwater in-flow from several Gulf of Mexico inlets and freshwater input from five tributaries. The passes are, from north to south: Hurricane Pass, Matanzas Pass, Big Carlos Pass, New Pass, Big Hickory Pass, and Wiggins Pass in Collier County. The tributaries are, from north to south: Hendry Creek, Mullock Creek, Estero River, Spring Creek, and the Imperial River. The watershed for Estero Bay spans 359.6 square miles and encompasses both the Southern Coastal Plain and Southern Florida Coastal Plain ecoregions, which comprise areas that are typical of low, flat, southern Florida lands dominated by wetlands and characterized by slow, sheet-flow drainage patterns. Natural communities include mangrove-dominated areas along the coast with salt marsh habitats occurring landward of the mangrove zone, pine flatwoods, cypress swamps, and cabbage palm hammocks. The communities within the bay include seagrass beds, mangrove islands, salt marshes, tidal flats, and oyster bars. In the past, the naturally dispersed water patterns distributed nutrients over broad areas of wetland vegetation and seasonal fluctuations in flow from rainfall created the necessary salinity regime in Estero Bay for good estuarine productivity. However, increased development in the area since the 1960’s has led to changes in the natural river systems around Estero Bay, altering freshwater inflow patterns. The watershed activities that potentially impact the bay include point-source wastewater discharge and non-point source runoff or leaching of pollution from roads, agriculture lands, urban areas, and un-vegetated lands which contain fertilizers, pesticides, herbicides, metals, sediments, petroleum compounds, and bacteria. Development continues throughout much of the watershed, replacing much of the natural habitat.

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| Site name | EB01 – Tom Winter, Inactive |
| Latitude and longitude | *26.434944, -81.911389* |
| Tidal range *(meters)* | 0.85 – 1.39 |
| Salinity range *(psu)* | 2.2 – 34.4 |
| Type and amount of freshwater input | Hendry Creek, Mullock Creek, Caloosahatchee River, rainfall, sheetflow |
| Water depth (*meters, MLW*) | *Estimated MLW depth of 1.5m.* |
| Sonde distance from bottom (*meters*) | *Tube bottom was 0.175m off the bottom, as measured in 2016.* |
| Bottom habitat or type | *Fine sand, no vegetation* |
| Pollutants in area | *Based on the Florida Impaired Waters Rule, this waterbody is listed as impaired for nutrients (total nitrogen). For up-to-date impairment information, see* [*https://floridadep.gov/DEAR/Watershed-Assessment-Section*](https://floridadep.gov/DEAR/Watershed-Assessment-Section)*.* |
| Description of watershed | *This station is located on the bay side of Estero Island in Matanzas Pass (WBID 3258A1, 8-digit HUC: 03090204), across from Julies Island, and is the most northern of the site locations. The Tom Winter labeling is to clarify the sonde location which is affixed to a residential dock (parcel 28-46-24- W3-0020B.0390) approximately 300 meters across the channel from Julies Island. The monitoring site is approximately 5.0 km (linear dimension) from Matanzas Pass Bridge to the northwest and 4.4 km from Big Carlos Pass to the southeast. The closest tributary is the Y- junction of the mouths of Hendry Creek and Mullock Creek, approximately 5.1 km northeast of the sonde location. Matanzas Pass is roughly 8.9 km long and has a mid-channel depth of approximately 1.0 to 3.6 meters at MHW. At the sampling site, the depth is 2.05 meters at MHW and the width of the water body is 335 meters. Tides at EB01 are mixed semidiurnal and range from 0.85 m to 1.39 m (NOAA Tides and Currents website; Estero Island, Estero Bay, FL Datum, Station ID 8725351, 1983-2001 Epoch). Generally, Estero Island’s shoreline, on the bay side, is sea walled and will not have any vegetation. The Town of Fort Myers Beach on Estero Island continues to be developed. The closest vegetation are red and black mangrove islands across the channel. The land to the north of the site contains a significant amount of protected state-owned preserve area known as Estero Bay Preserve State Park.* |

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| Site name | EB01b – Julies Island |
| Latitude and longitude | *26.43497, -81.90964* |
| Tidal range *(meters)* | 0.85 – 1.39 |
| Salinity range *(psu)* | 2.2 – 34.4 |
| Type and amount of freshwater input | Hendry Creek, Mullock Creek, Caloosahatchee River, rainfall, sheetflow |
| Water depth (*meters, MLW*) | *Estimated MLW depth of 0.93m* |
| Sonde distance from bottom (*meters*) | *Bottom of deployment tube is 0.26m off the bottom* |
| Bottom habitat or type | *Sand, shoal grass, drift algae* |
| Pollutants in area | *Based on the Florida Impaired Waters Rule, this waterbody is listed as impaired for nutrients (total nitrogen). For up-to-date impairment information, see* [*https://floridadep.gov/DEAR/Watershed-Assessment-Section*](https://floridadep.gov/DEAR/Watershed-Assessment-Section)*.* |
| Description of watershed | *This station is located on the bay side of Estero Island in Matanzas Pass (WBID 3258A1, 8-digit HUC: 03090204), across from Julies Island, and is the most northern of the site locations. The Tom Winter labeling is to clarify the sonde location which is affixed to a residential dock (parcel 28-46-24- W3-0020B.0390) approximately 300 meters across the channel from Julies Island. The monitoring site is approximately 5.0 km (linear dimension) from Matanzas Pass Bridge to the northwest and 4.4 km from Big Carlos Pass to the southeast. The closest tributary is the Y- junction of the mouths of Hendry Creek and Mullock Creek, approximately 5.1 km northeast of the sonde location. Matanzas Pass is roughly 8.9 km long and has a mid-channel depth of approximately 1.0 to 3.6 meters at MHW. At the sampling site, the depth is 2.05 meters at MHW and the width of the water body is 335 meters. Tides at EB01 are mixed semidiurnal and range from 0.85 m to 1.39 m (NOAA Tides and Currents website; Estero Island, Estero Bay, FL Datum, Station ID 8725351, 1983-2001 Epoch). Generally, Estero Island’s shoreline, on the bay side, is sea walled and will not have any vegetation. The Town of Fort Myers Beach on Estero Island continues to be developed. The closest vegetation are red and black mangrove islands across the channel. The land to the north of the site contains a significant amount of protected state-owned preserve area known as Estero Bay Preserve State Park.* |

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| Site name | EB02 – Spring Creek |
| Latitude and longitude | *26.385917, -81.846333* |
| Tidal range *(meters)* | 0.74 - 1.2 |
| Salinity range *(psu)* | 8.2 – 35.9 |
| Type and amount of freshwater input | Spring Creek, rainfall, sheetflow |
| Water depth (*meters, MLW*) | *Estimated MLW depth of 1.18m* |
| Sonde distance from bottom (*meters*) | *Deployment tube is 0.42m off the bottom.* |
| Bottom habitat or type | *Sand and silt, no bottom vegetation but seagrass is found in the vicinity* |
| Pollutants in area | *Based on the Florida Impaired Waters Rule, this waterbody (WBID 82581) is listed as impaired for nutrients (total nitrogen). Spring Creek (WBID 3258H2) is impaired for dissolved oxygen (percent saturation), iron, copper, Enterococci, and nutrients (total nitrogen). For up-to-date impairment information, see* [*https://floridadep.gov/DEAR/Watershed-Assessment-Section*](https://floridadep.gov/DEAR/Watershed-Assessment-Section)*.* |
| Description of watershed | *The EB02 site is located northwest of the mouth of Spring Creek and south of Coconut Point (WBID: 32581, 8-digit HUC: 03090204). The sonde is affixed to navigational marker 9A within the Spring Creek access channel. The average depth at this site is approximately 1.70 meters at MHW. Tides at EB02 are mixed semidiurnal and range from 0.74 m to 1.27 m according to the NOAA Tides and Currents website; Coconut Point, Estero Bay, FL Datum, Station ID 8725319, 1983-2001 Epoch. Mature red and black mangrove forests dominate the nearby banks of the bay and several mangrove islands are nearby. The mouth of Spring Creek is approximately 4.4 km downstream from where a six-lane highway (SR 41) crosses over the tributary.* |

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| Site name | EB03 – Fish Trap Bay |
| Latitude and longitude | *26.354972, -81.844528* |
| Tidal range *(meters)* | 0.62 – 0.81 |
| Salinity range *(psu)* | 1.6 – 33.6 |
| Type and amount of freshwater input | Imperial River, rainfall, sheetflow |
| Water depth (*meters, MLW*) | *Estimated MLW depth of 1.2m.* |
| Sonde distance from bottom (*meters*) | *Deployment tube is 0.27m off the bottom.* |
| Bottom habitat or type | *Sand and silt, no bottom vegetation* |
| Pollutants in area | *Based on the Florida Impaired Waters Rule, this waterbody (WBID 82581) is listed as impaired for nutrients (total nitrogen). The Imperial River (WBID 3258EB) is listed as impaired for iron, copper, dissolved oxygen (percent saturation), nutrients (chlorophyll a), nutrients (total nitrogen), and Enterococci. For up-to-date impairment information, see* [*https://floridadep.gov/DEAR/Watershed-Assessment-Section*](https://floridadep.gov/DEAR/Watershed-Assessment-Section)*.* |
| Description of watershed | *The EB03 site is located east of Broadway Channel and north of Intrepid Waters at the southern end of EBAP (WBID 32581; 8-digit HUC: 03090204). The sonde is affixed to a piling (manatee caution sign) in the center of Big Hickory Bay. The mouth of the Imperial River is approximately 2.1 km to the south of the sonde’s location and is the closest tributary. The average depth at MHW is approximately 1.40 meters. Tides are mixed semidiurnal and range from 0.62m to 0.81m (NOAA Tides and Currents website; Fish trap Bay, Estero Bay, FL Datum, Station ID 8725272, 1983-2001 Epoch). Mature red and black mangrove forests dominate the nearby banks of the preserve. The dominant natural vegetation of the watershed is hydric pine, scrubby flatwoods, and cypress. The mouth of Imperial River is approximately 2.1 km downstream from a six-lane highway (SR 41) and approximately 7.6 km from I-75, both of which cross over the tributary.* |

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| Site name | EB04 – Hendry & Mullock Creeks |
| atitude and longitude | *26.449685, -81.871465* |
| Tidal range *(meters)* | 0.89 – 1.34 |
| Salinity range *(psu)* | 1.0 – 32.0 |
| Type and amount of freshwater input | Hendry Creek, Mullock Creek, rainfall, sheetflow |
| Water depth (*meters, MLW*) | *Estimated MLW depth of 1.01m.* |
| Sonde distance from bottom (*meters*) | *Deployment tube is 0.315cm off the bottom* |
| Bottom habitat or type | *Soft sediment, grassbed, subtidal oysters with intertidal oyster bars in the vicinity* |
| Pollutants in area | *Based on the Florida Impaired Waters Rule, this waterbody (WBID 82581) is listed as impaired for nutrients (total nitrogen). Hendry Creek (WBID 3258B2) is listed as impaired for iron, copper, dissolved oxygen (percent saturation), nutrients (chlorophyll a), and Enterococci. There is a bacteria reduction plan currently in place for this area and a Basin Management Action Plan has been adopted. Mullock Creek (WBID) is impaired for iron, selenium, copper, and Enterococci. For up-to-date impairment information, see* [*https://floridadep.gov/DEAR/Watershed-Assessment-Section*](https://floridadep.gov/DEAR/Watershed-Assessment-Section)*.* |
| Description of watershed | *The EB04 site is located in northeast Estero Bay, downstream of the confluence of Hendry Creek and Mullock Creek where they empty into Estero Bay, an area called Rocky Bay (WBID , 8-digit HUC: 03090204). The sonde is affixed to a navigational piling maintained by Lee County, green channel marker #9. The mouth of Hendry & Mullock Creeks are approximately 1.0 km to the northeast of the sonde’s location. The average depth at MHW is approximately 1.45 meters. Tides are mixed semidiurnal and range from 0.89m to 1.34m (NOAA Tides and Currents website; Hendry Creek, Estero Bay FL, Datum: STND, Station ID 8725377, 1983-2001). Salinities range from 1 ppt to 32 ppt and fluctuate daily with tides, wind, rainfall, and freshwater discharge (USGS Scientific Investigations Report 2007-5217, Mullock Creek data, 07/1/2002-01/01/2004). The substrate within the channel is muddy sand, and beyond the channel lies a long oyster bar. Directly beneath the deployment tube lie subtidal oysters. Mature red and black mangrove forests dominate the nearby banks of the preserve. Much of the watersheds lie within the wetlands protected in Estero Bay Preserve State Park, including mangrove forests as well as some areas of salt marsh. Further upstream, the natural vegetation is hydric pine, cypress, and scrubby flatwoods.* |

**Station Timeline:**

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| Station Code | Station Name | Location | Active Dates | Reason Decommissioned | Notes |
| EB01 | Tom Winter | 26.434944, -81.911389 | 07/14/2004 – 10/11/2022 | Dock damaged during Hurricane Ian, 9/28/2022; site no longer accessible. | Succeeded by EB01b in December 2023.. |
| EB01b | Julies Island | 26.43497, -81.90964 | 12/12/2023 - Current | NA | Established after Hurricane Ian led to decommission of EB01. |
| EB02 | Spring Creek | 26.385917, -81.846333 | 07/14/2004 - Current | NA | NA |
| EB03 | Fish Trap | 26.354972, -81.844528 | 11/30/2004 - Current | NA | NA |
| EB04 | Hendry & Mullock Creeks | 26.449685, -81.871465 | 05/11/2023 - Current | NA | NA |

**6) Data collection period –**

EB01b:

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| --- | --- |
| **Deployment Date/Time** | **Retrieval Date/Time** |
| 12/12/2023 11:35 am | 01/10/2024 11:40 am |
| 01/10/2024 11:49 am | 01/30/2024 11:08 am |
| 01/30/2024 11:20 am | 02/27/2024 11:02 am |
| 02/27/2024 11:02 am | 03/26/2024 09:54 am |
| 03/26/2024 09:54 am | 04/16/2024 09:18 am |
| 04/16/2024 09:23 am | 05/14/2024 09:03 am |
| 05/14/2024 09:06 am | 06/10/2024 14:50 pm |
| 06/10/2024 14:59 pm | 07/09/2024 08:05 am |
| 07/09/2024 08:53 am | 08/07/2024 09:44 am |
| 08/07/2024 10:03 am | 09/04/2024 09:20 am |
| 09/04/2024 09:38 am | 10/01/2024 09:42 am |
| 10/01/2024 09:52 am |  |
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\*Instrument and/or battery malfunction

Data collection began 12/12/2023.

EB02:

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| **Deployment Date/Time** | **Retrieval Date/Time** |
| 12/12/2023 13:30 pm | 01/10/2024 12:35 pm |
| 01/10/2024 12:44 pm | 01/30/2024 12:17 pm |
| 01/30/2024 12:38 pm | 02/27/2024 12:16 pm |
| 02/27/2024 12:16 pm | 03/26/2024 09:03 am |
| 03/26/2024 09:11 am | 04/16/2024 11:19 am |
| 04/16/2024 11:29 am | 05/14/2024 12:17 pm |
| 05/14/2024 12:23 pm | 06/10/2024 14:02 pm |
| 06/10/2024 14:10 pm | 07/09/2024 11:19 am |
| 07/09/2024 11:37 am | 08/07/2024 12:34 pm |
| 08/07/2024 12:38 am | 09/04/2024 11:48 am |
| 09/04/2024 12:08 pm | 10/01/2024 11:46 am |
| 10/01/2024 11:52 am |  |
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\*Instrument and/or battery malfunction

Data collection began 07/14/2004.

EB03:

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| --- | --- |
| **Deployment Date/Time** | **Retrieval Date/Time** |
| 12/12/2023 10:20 am | 01/10/2024 13:12 pm |
| 01/10/2024 13:24 pm | 01/30/2024 13:03 pm |
| 01/30/2024 13:12 pm | 02/27/2024 12:47 pm |
| 02/27/2024 12:47 pm | 03/26/2024 14:02 pm |
| 03/26/2024 14:08 pm | 04/16/2024 11:48 am |
| 04/16/2024 11:58 am | 05/14/2024 11:03 am |
| 05/14/2024 11:08 am | 06/10/2024 13:32 pm |
| 06/10/2024 13:41 pm | 07/09/2024 10:33 am |
| 07/09/2024 10:56 am | 08/07/2024 11:48 am |
| 08/07/2024 11:57 am | 09/04/2024 11:03 am |
| 09/04/2024 11:29 am | 10/01/2024 11:18 am |
| 10/01/2024 11:23 am |  |
|  |  |
|  |  |

\*Instrument and/or battery malfunction

Data collection began 11/30/2004.

EB04:

|  |  |
| --- | --- |
| **Deployment Date/Time** | **Retrieval Date/Time** |
| 12/12/2023 12:25 pm | 01/10/2024 14:00 pm |
| 01/10/2024 14:11 pm | 01/30/2024 09:48 am |
| 01/30/2024 10:14 am | 02/27/2024 10:16 am |
| 02/27/2024 10:16 am | 03/26/2024 11:03 am |
| 03/26/2024 11:07 am | 04/16/2024 10:03 am |
| 04/16/2024 10:32 am | 05/14/2024 09:48 am |
| 05/14/2024 09:53 am | 06/10/2024 15:48 pm |
| 06/10/2024 15:54 pm | 07/09/2024 09:34 am |
| 07/09/2024 09:44 am | 08/07/2024 10:51 am |
| 08/07/2024 10:59 am | 09/04/2024 10:18 am |
| 09/04/2024 10:17 am | 10/01/2024 10:33 am |
| 10/01/2024 10:40 am |  |
|  |  |
|  |  |

\*Instrument and/or battery malfunction

Data collection began 05/11/2021.

**7) Distribution –**

The Principle Investigator (PI) retains the right to be fully credited for having collected and process the data.  Following academic courtesy standards, the Aquatic Preserve 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.

Aquatic Preserve water quality data and metadata can be obtained from the Manager at the individual Aquatic Preserve office (please see Principal Investigators and Contact Persons) and online at the Aquatic Preserves data portal home page [www.floridaapdata.org](http://www.floridaapdata.org). Data are available in comma delimited format.

**8) Associated researchers and projects** (link to other products or programs) **–**

In addition to this water quality dataset, Estero Bay Aquatic Preserve conducts epibenthic monitoring of five seagrass sites. Starting in 2002, five fixed stations located throughout the aquatic preserve are monitored twice a year, once in the dormant season and once in the growing season, using Braun-Blanquet techniques. Beginning in 2016, macroalgae has been collected at each of these transects during seagrass surveys. These samples are analyzed to determine species present and biomass of each species. Abundance scores are also applied to algae as part of the seagrass monitoring. Two of these seagrass sites are located within close proximity of the EB02 and EB03 sonde locations.

Since 1998, volunteers with the Charlotte Harbor Estuaries Volunteer Water Quality Monitoring Network (CHEVWQMN) have collected water quality data once a month at up to 7 sites within Estero Bay (or 46 sites within the greater Charlotte Harbor region). This program is currently coordinated through the Charlotte Harbor Aquatic Preserves office in Punta Gorda, FL.

In 2008, EBAP began monitoring the nesting effort of wading and diving birds which use mangrove islands within the bay as rookeries.

In 2018, EBAP established a protocol for annual mapping and assessment of eight oyster bars around Estero Bay to establish a baseline for oyster health within the bay and track its trends through time. In addition, during the Fall of 2018, sampling to collect death assemblage specimens from three oyster bars was completed to examine the age and changes in historical body size.

Beginning in February 2012, red tide samples for Florida Fish and Wildlife Conservation Commission’s (FWC) Fish and Wildlife Research Institute (FWRI) have been collected by Estero Bay Aquatic Preserve staff during datasonde retrieval, by the CHEVWQMN volunteers, and/or more often as requested by FWRI.

Lee County and FDEP’s Division of Environmental Assessment and Restoration collect water quality samples within Estero Bay and the watershed.

Researchers and staff at Florida Gulf Coast University (FGCU) study water quality, seagrass, oyster, mangroves, soil, chemicals and pollutants, and other data from Estero Bay and the surrounding watershed. In the 2020s, the Vester Field Station began setting up a network of continuous water quality monitoring stations at locations within and surrounding Estero Bay.

**II. Physical Structure Descriptors**

**9) Sensor specifications –**

EBAP deployed either EXO 2 or EXO 3 models during 2024. Regardless of model, sondes were equipped with: (1) a wiped CT sensor; (2) a pH sensor; (3) a DO sensor; and (4) a turbidity sensor. Both models include a depth sensor as part of the sonde body. On the EXO 2 models, the extra two ports had port plugs installed. EBAP has seven EXO 2 sondes and four EXO 3 sondes. Models were not exclusive to particular sites.

YSI EXO Sonde:

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Wiped probe; Thermistor

Model#: 599827

Range: -5 to 50 C

Accuracy: ±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: ±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: ±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: ± 1% of reading or 1% of air saturation, whichever is greater; 200-500% air sat: ± 5% of 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: ±0.1 mg/L or 1% of the reading, whichever is greater; 20-50 mg/L: ± 5% of the reading, relative to calibration gasses

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: +/- 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: +/- 0.1 units within +/- 10° of calibration temperature, +/- 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 +/-2% of reading (whichever is greater); 1000 to 4000 FNU +/-5% of reading

Resolution: 0 to 999 FNU: 0.01 FNU, 1000 to 4000 FNU: 0.1 FNU

**Depth Qualifier:**

YSI data sondes 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.

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 Aquatic Preserve calibration sheet or digital calibration log.  This offset procedure standardizes each depth calibration. If accurate atmospheric pressure data are available, non-vented sensor depth measurements can be corrected. The Principal Investigator should be contacted in order to obtain information regarding atmospheric pressure data availability.

**Salinity Units Qualifier:**

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 Aquatic Preserve purposes are understood to be equivalent, however psu is considered the more appropriate designation. Moving forward the Aquatic Preserve program will assign psu salinity units for all data regardless of sonde type.

**Turbidity Qualifier:**

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 Aquatic Preserve purposes they will be considered equivalent. Moving forward, the Aquatic Preserve program 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 –**

Site definitions:

|  |  |  |
| --- | --- | --- |
| **Sampling Station:** | **Sampling Site Code:** | **Station Code:** |
| Tom Winter | EB01 | EB01 |
| Julies Island | EB01b | EB01b |
| Spring Creek | EB02 | EB02 |
| Fish Trap Bay | EB03 | EB03 |
| Hendry & Mullock Creeks | EB04 | EB04 |

**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 *Open - reserved for later flag*

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

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

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** –

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Post-deployment readings of all sondes deployed at the EB01b – Julies Island site during 2024.** | | | | | | | | |
| **Deployment Date** | **Temp (°C)** | **SpCond (mS/cm)** | **ROX DO**  **%** | **ROX DO**  **mg/L** | **pH** | **pH** | **Turbidity (FNU)** | **Turbidity (FNU)** | **Depth (m)** |
|  | **°C** | **50.00** | **100.0** | **NA** | **7.00** | **10.00** | **0.0** | **124.0** | **m** |
| 12/12/2023 |  | 49.645 | 102.8 (100.2) | 10.02 (9.767) | 7.14 | 10.15 | 0.07 | 123.75 | 0.014 (0.014) |
| 1/10/2024 | 17.741 (17.89) | 49.324 | 101.9 (100.7) | 9.68 (9.526) | 7.05 | 10.04 | 0.18 | 123.45 | 0.085 (0.068) |
| 01/30/2024 | 17.944 (18.06) | 49.791 | 100.1 (100.6) | 9.54 (9.467) | 7.20 | 10.19 | 0.18 | 123.18 | 0.063 (0.054) |
| 02/27/2024 | 22.446 (23.42) | 48.033 | 102.1 (100.1) | 8.86 (8.693) | 7.03 | 10.08 | 0.13 | 122.07 | 0.014 (0.014) |
| 03/26/2024 | 23.284 (23.25) | 49.480 | 101.5 (100.4) | 8.63 (8.530) | 6.96 | 10.02 | 0.21 | 123.99 | 0.050 (0.041) |
| 04/16/2024 | 17.116 (17.19) | 50.442 | 100.1 (100.0) | 9.62 (9.645) | 7.09 | 10.06 | -0.01 | 121.90 | -0.019 (0.00) |
| 05/14/2024 | 22.328 (22.21) | 48.436 | 97.0 (100.0) | 8.41 (8.693) | 7.19 | 10.20 | 61.42 | 135.68 | -0.003 (0.000) |
| 06/10/2024 | 22.926 (22.90) | 49.959 | 98.1 (100.2) | 8.40 (8.595) | 7.18 | 10.12 | 0.19 | 124.04 | 0.024 (0.014) |
| 07/09/2024 | 18.584 (18.69) | 49.172 | 100.9 (99.4) | 9.42 (9.352) | 7.09 | 10.01 | 1.28 | 121.13 | -0.044 (-0.068) |
| 08/07/2024 | 22.467 (22.56) | 49.956 | 100.1 (100.3) | 8.65 (8.660) | 7.03 | 10.06 | 0.20 | 124.04 | 0.043 (0.027) |
| 09/04/2024 | 21.343 (21.44) | 50.440 | 99.9(99.8) | 8.82 (8.863) | 7.03 | 10.05 | 0.22 | 121.70 | -0.009 (-0.027) |
| 10/01/2024 |  |  |  |  |  |  |  |  |  |
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\*Data missing from calibration log

Red data indicate parameters that did not meet post calibration criteria.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Post-deployment readings of all sondes deployed at the EB02 – Spring Creek site during 2024.** | | | | | | | | |
| **Deployment Date** | **Temp (°C)** | **SpCond (mS/cm)** | **ROX DO**  **%** | **ROX DO**  **mg/L** | **pH** | **pH** | **Turbidity (FNU)** | **Turbidity (FNU)** | **Depth (m)** |
|  | **°C** | **50.00** | **100.0** | **NA** | **7.00** | **10.00** | **0.0** | **124.0** | **m** |
| 12/12/2023 |  | 49.430 | 105.4 (100.6) | 10.16 (9.665) | 7.05 | 10.07 | 0.05 | 121.81 | 0.067 (0.068) |
| 01/10/2024 | 17.865 (17.97) | 49.376 | 99.6 (100.7) | 9.43 (9.506) | 7.06 | 10.12 | 0.17 | 123.71 | 0.068 (0.068) |
| 01/30/2024 | 17.963 (18.02) | 49.538 | 102.4 (100.6) | 9.67 (9.467) | 7.10 | 10.1 | 0.24 | 158.77 | 0.059 (0.054) |
| 02/27/2024 | 23.323 (23.41) | 49.608 | 100.8 (100.1) | 8.57 (8.530) | 7.06 | 10.04 | 0.06 | 123.36 | 0.004 (0.014) |
| 03/26/2024 | 23.342 (23.24) | 49.426 | 100.7 (100.4) | 8.56 (8.530) | 7.01 | 10.06 | 0.02 | 126.59 | 0.036 (0.041) |
| 04/16/2024 | 17.142 (17.24) | 50.705 | 99.8 (99.9) | 9.59 (9.645) | 7.13 | 10.16 | 0.16 | 122.75 | -0.006 (-0.014) |
| 05/14/2024 | 22.363 (22.17) | 48.839 | 101.1 (99.9) | 8.76 (8.677) | 6.93 | 9.98 | -0.05 | 123.51 | -0.01 (-0.014) |
| 06/10/2024 | 22.892 (22.87) | 50.154 | 98.5 (100.2) | 8.44 (8.595) | 7.09 | 10.03 | 0.05 | 123.52 | 0.015 (0.014) |
| 07/09/2024 | 18.488 (18.58) | 49.379 | 100.5 (99.4) | 9.40 (9.390) | 7.11 | 10.09 | 0.02 | 123.5 | -0.057 (-0.068) |
| 08/07/2024 | 22.489 (22.53) | 49.491 | 98.6 (100.3) | 8.52 (8.660) | 7.08 | 10.04 | 0.07 | 123.43 | 0.038 (0.027) |
| 09/04/2024 | 21.353 (21.45) | 50.090 | 99.7 (99.8) | 8.81 (8.863) | 7.06 | 10.06 | 0.23 | 123.04 | -0.01 (-0.027) |
| 10/01/2024 |  |  |  |  |  |  |  |  |  |
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\*Data missing from calibration log

Red data indicate parameters that did not meet post calibration criteria.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Post-deployment readings of all sondes deployed at the EB03 – Fish Trap site during 2024.** | | | | | | | | |
| **Deployment Date** | **Temp (°C)** | **SpCond (mS/cm)** | **ROX DO**  **%** | **ROX DO**  **mg/L** | **pH** | **pH** | **Turbidity (FNU)** | **Turbidity (FNU)** | **Depth (m)** |
|  | **°C** | **50.00** | **100.0** | **NA** | **7.00** | **10.00** | **0.0** | **124.0** | **m** |
| 12/12/2023 |  | 49.242 | 104.2 (100.7) | 10.06 (9.685) | 7.15 | 10.15 | 0.15 | 123.02 | 0.068 (0.054) |
| 01/10/2024 | 17.667 (17.79) | 49.609 | 100.1 (100.7) | 9.51 (9.526) | 7.09 | 10.11 | 0.24 | 124.25 | 0.069 (0.068) |
| 01/30/2024 | 18.091 (18.10) | 50.146 | 100.4 (100.6) | 9.45 (9.448) | 7.1 | 10.13 | 0.14 | 124.22 | 0.069 (0.054) |
| 02/27/2024 | 23.317 (23.39) | 49.392 | 100.1 (100.1) | 8.51 (8.530) | 7.07 | 10.07 | 0.08 | 123.53 | 0.025 (0.014) |
| 03/26/2024 | 23.288 (23.20) | 49.219 | 100.9 (100.4) | 8.58 (8.530) | 7.15 | 10.13 | -0.05 | 125.36 | 0.044 (0.041) |
| 04/16/2024 | 17.109 (17.19) | 50.439 | 99.0 (99.9) | 9.57 (9.645) | 7.06 | 10.06 | 0.24 | 123.31 | -0.005 (0.00) |
| 05/14/2024 | 22.233 (22.19) | 48.745 | 99.1 (99.9) | 8.60 (8.710) | 7.02 | 10.06 | 0.19 | 122.38 | 0.006 (-0.014) |
| 06/10/2024 | 22.922 (22.89) | 49.696 | 98.2 (100.2) | 8.41 (8.595) | 7.15 | 10.13 | 0.18 | 122.37 | 0.019 (0.014) |
| 07/09/2024 | 18.565 (18.64) | 49.217 | 99.9 (99.4) | 9.33 (9.371) | 7.04 | 9.99 | 0.27 | 127.72 | -0.032 (-0.068) |
| 08/07/2024 | 22.494 (22.56) | 49.742 | 98.8 (100.3) | 8.53 (8.660) | 7.05 | 10.04 | 0.18 | 124.4 | 0.32 (0.014) |
| 09/04/2024 | 21.389 (21.44) | 50.125 | 99.1 (99.8) | 8.74 (8.846) | 7.07 | 10.03 | 0.17 | 123.13 | -0.014 (-0.027) |
| 10/01/2024 |  |  |  |  |  |  |  |  |  |
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\*Data missing from calibration log

Red data indicate parameters that did not meet post calibration criteria.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Post-deployment readings of all sondes deployed at the EB04 – Hendry & Mullock Creeks site during 2024.** | | | | | | | | |
| **Deployment Date** | **Temp (°C)** | **SpCond (mS/cm)** | **ROX DO**  **%** | **ROX DO**  **mg/L** | **pH** | **pH** | **Turbidity (FNU)** | **Turbidity (FNU)** | **Depth (m)** |
|  | **°C** | **50.00** | **100.0** | **NA** | **7.00** | **10.00** | **0.0** | **124.0** | **M** |
| 12/12/2023 |  | 49.604 | 102.2 (100.2) | 9.98 (9.787) | 7.19 | 10.21 | -0.02 | 125.13 | 0.014 (0.014) |
| 01/10/2024 | 17.741 (17.89) | 49.814 | 100.2 (100.7) | 9.52 (9.526) | 7.08 | 10.12 | 0.19 | 123.96 | 0.102 (0.068) |
| 01/30/2024 | 17.967 (18.00) | 49.869 | 101.1 (100.6) | 9.54 (9.486) | 7.11 | 10.11 | 0.17 | 126.97 | 0.036 (0.054) |
| 02/27/2024 | 23.355 (23.42) | 49.427 | 100.7 (100.1) | 8.56 (8.514) | 7.09 | 10.07 | -0.08 | 123.44 | 0.011 (0.014) |
| 03/26/2024 | 23.232 (23.19) | 49.268 | 101.2 (100.4) | 8.62 (8.546) | 6.98 | 10.07 | 0.27 | 123.00 | 0.052 (0.041) |
| 04/16/2024 | 17.139 (17.24) | 50.633 | 99.2 (99.9) | 9.54 (9.645) | 7.15 | 10.19 | 0.08 | 124.41 | -0.013 (-0.014) |
| 05/14/2024 | 22.331 (22.21) | 49.034 | 99.7 (99.9) | 8.65 (8.693) | 7.06 | 10.07 | 0.27 | 124.40 | -0.001 (-0.014) |
| 06/10/2024 | 22.877 (22.88) | 49.852 | 98.5 (100.2) | 8.44 (8.595) | 7.09 | 10.13 | 0.12 | 123.58 | 0.041 (0.014) |
| 07/09/2024 | 18.648 (18.59) | 49.550 | 100.5 (99.4) | 9.37 (9.352) | 7.10 | 10.13 | -0.08 | 126.18 | -0.048 (-0.068) |
| 08/07/2024 | 22.483 (22.53) | 49.761 | 100.8 (100.4) | 8.70 (8.660) | 7.13 | 10.12 | 0.08 | 125.21 | 0.026 (0.014) |
| 09/04/2024 | 21.525 (21.46) | 49.776 | 99.3 (99.8) | 8.74 (8.829) | 7.12 | 10.04 | 0.22 | 121.84 | -0.018 (-0.027) |
| 10/01/2024 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

\*Data missing from calibration log

Red data indicate parameters that did not meet post calibration criteria.

**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 Aquatic Preserve office. Dates displayed below represent the duration of the deployment. Suspect, rejected, and missing data are all grouped under the deployment dates.

**See Metadata “CSM” “GSM” Notes/Comments from Data Files**

**Note #1:** Slight shifts in data are sometimes correlated with sonde exchanges. These shifts are most noticeable in pH, specific conductivity, salinity, DO% and DO conc, and may be related to sensor drift (e.g., due to fouling) and/or calibration/performance differences between sondes.

**Note #2:** Turbidity “outliers” (i.e., values that are negative or greater than 1000 NTU for 6600 series sondes and 4000 FNU for EXO series sondes) were not deleted from the monthly records. Readings greater than 1000 NTU for 6600 series sondes and 4000 FNU for EXO series sondes are considered out of range and are rejected. They have been left in the database to provide users with a complete dataset and to allow true visual representation of the data in graphs. Negative turbidity values occur. Some of these negative values are within the accuracy range of the sensor (+/- 2.0 %) and, therefore, were not removed from the dataset. They were marked suspect with the CAF code.

**Note #3**: Turbidity data is subject to single and clusters of spikes that occur in the beginning and middle of deployments. Turbidity values that fall between 500 and 1000 are not specifically indicated as suspect data, but possibly could be interpreted as suspect. Turbidity spikes may be associated with wiper malfunction but mostly the reason is unknown. Data users should exercise caution when interpreting turbidity data that fall within this range.

**Note #4**: Obvious outliers, data associated with probe malfunction, and/or calibration (both pre and post) problems are rejected as specified below. For more details about rejected data, contact the Principal Investigator.

**Note #5:** Specific conductance data is subject to occasional single ‘dips’ of reduced concentrations occurring anytime throughout a deployment. This decrease is most likely attributed to debris or live critters disrupting the signal being sent between the electrodes and the Conductivity/Temperature sensor during sample collection.

**EB01b**

**December 12, 2023 – January 10, 2024**

1. Low water events on 12/13/2023, 12/14/2023, 12/15/2023, and 1/8/2024 in conjunction with low tide. Rejected portions of these events in which Specific Conductivity was close to zero and other parameters showed changes from the time periods surrounding them. Portions of these events were marked suspect when the Specific Conductivity was low but other parameters seemed to match the surrounding readings. Those latter occurrences could be related to a freshwater wedge on the water’s surface rather than an out-of-water event.
2. All turbidity spikes appear to have distinct peaks associated with them, therefore no readings were flagged.

**January 10 – January 30, 2024**

1. Specific Conductivity and Salinity flagged suspect on 1/11/2024 at 08:15 due to an unusual drop in value, cause unknown. May be related to Note #5 above.Turbidity from same time flagged suspect because appears to spike without a peak.
2. Low water events on 1/21/2024 and 1/22/2024 in conjunction with low tides. Rejected portions of these events in which Specific Conductivity was close to zero and other parameters showed changes from the time periods surrounding them. Portions of these events were marked suspect when the Specific Conductivity was low but other parameters seemed to match the surrounding readings. Those latter occurrences could be related to a freshwater wedge on the water’s surface rather than an out-of-water event.
3. Turbidity data on 1/21/2024 at 07:30 rejected due to turbidity spike outside of calibration range.

**January 30 – February 27, 2024**

1. Low water events on 2/7/2024, 2/8/2024, and 2/21/2024 in conjunction with low tides. Rejected portions of these events in which Specific Conductivity was close to zero and other parameters showed changes from the time periods surrounding them. Portions of these events were marked suspect when the Specific Conductivity was low but other parameters seemed to match the surrounding readings. Those latter occurrences could be related to a freshwater wedge on the water’s surface rather than an out-of-water event.
2. Turbidity data on 2/26/2024 at 21:30 rejected due to turbidity spike outside of sensor range.
3. Biofouling was cleaned from the outside of this deployment tube prior to this deployment (after the retrieval of the previous deployment). The distance between the sediment and the bottom of the deployment tube was checked at the time and was the same as when the tube was placed. Unfortunately, on July 9, during tube maintenance between deployments, the tube was found to have slid down the piling and was resting on the bottom (see more detailed note “d” for June 10-July 9 deployment). All depth data for this deployment have been flagged suspect as 1/30/24 is the last known time that the tube was in the original location on the piling.

**February 27 – March 26, 2024**

1. Temperature sensor failed by approximately 1 degC. Sensor had crack in one of the electrodes. 3/11/24 4:15-4:30 shows a .8degC dip in temperature so that may indicate when sensor cracked. However, that is an unknown. Because all other sensors, besides turbidity rely on the CT sensor thermistor, all readings for the deployment were rejected, except for turbidity.
2. Turbidity readings outside sensor range (>4000 FNU) were rejected. All turbidity readings >1000 FNU outside of calibration range and distinct turbidity peak were also rejected. All turbidity readings >124 FNU were flagged as suspect if they exist outside a turbidity peak because they are outside of the sensor’s calibration range.
3. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.

**March 26 – April 16, 2024**

1. Temperature 03/29/2024 from 09:45 to 10:00 drops 1.2 degC below surrounding temperatures and marked suspect since cause was unknown. The timing is a bit delayed from low tide and the day was windy so it is possible this caused a lower water event in which the entirety of the sensor was not underwater. There could also have been boat wakes. Turbidity increased and DO dropped for a short period of time surrounding this event as well.
2. Turbidity readings outside sensor range were all flagged rejected. Turbidity readings outside of distinct turbidity spikes and outside of calibration range (0-124 FNU) were flagged suspect. 2 gobies were found within guard upon retrieval and eggs were attached to sonde body. Eggs hatch within 4 to 10 days and turbidity spike events appear to begin about 7 days before retrieval. Gobies may be causing some interference with the optical sensor.
3. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.

**April 16 – May 14, 2024**

1. Two hypoxia events during deployment, detected during primary QAQC via non-SWMP upload: 05/06/2024 from 00:45 to 01:00, and 05/12/2024 at 19:15. Data marked as hypoxic when DO pct drops below 50% and/or DO mg/L drops below 3.0.
2. Two events showing drops in salinity and specific conductivity, 05/11/2024 at 17:45 and 05:13/2024 at 19:15. Marked suspect in accordance with Note #5 above.
3. Turbidity readings outside sensor range (>4000 FNU) were rejected. All turbidity readings >1000 FNU outside of calibration range and distinct turbidity peak were also rejected. All turbidity readings >124 FNU were flagged as suspect if they exist outside a turbidity peak because they are outside of the sensor’s calibration range.
4. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.

**May 14 – June 10, 2024**

1. Upon retrieval, the turbidity sensor face was covered by a tunicate. From the data, the turbidity readings seem to begin curving upward and spiking more frequently beginning on 6/2, so all data after 12:00pm on 6/2/24 through the end of the deployment was flagged rejected due to a blocked optic as a result of biofouling. Other turbidity spikes >1000 FNU and >124 FNU prior to that time were flagged rejected and suspect, respectively.
2. Specific Conductivity and Salinity begin experiencing intermittent dips on 5/22, seemingly in conjunction with tidal shifts. Rainy season began around this time, so more freshwater may have entered the system. This station is around the location of a null zone where saltwater inflows through Matanzas Pass to the north (influenced by the Caloosahatchee estuary) and Big Carlos Pass to the south (primarily Gulf of Mexico influenced) meet, so there may be slight differences in salinity when those waters meet or mix. Wave action, haloclines, or other factors may explain these fluctuations. They do not appear to continue into the next deployment; however the 6/10 deployment began with a large multi-day rain event. No flags have been applied to this period as there is no indication that this sensor failed or had anything but light biofouling and these signals may be normal for the beginning of rainy season at this new station.
3. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.

**June 10 – July 9, 2024**

1. A significant rain event occurred from 6/11/2024 through 6/14/2024 and was flagged as such in the F\_Record column. This event appears to affect all parameters except depth and turbidity.
2. Several hypoxia events occurred throughout this deployment.
3. Turbidity values from 125-999 (and not existing within a distinct turbidity peak) were flagged as suspect as they are outside of the calibration range. Those 1000-3999 were flagged as suspect. All values greater than or equal to 4000 are outside of the sensor range and flagged as rejected. Turbidity spikes during this deployment may be a result of the large number of crabs found in the guard at retrieval.
4. After retrieval on 7/9/2024, staff conducted deployment tube maintenance by cleaning biofouling from the deployment tube. At the time, it was noted that the deployment tube was resting on the bottom sediment. The sensors would all still have been above the sediment during deployment. The brackets holding the offset PVC tube appear to have slid down the piling about 0.37m to rest on the bottom. The last tube maintenance event was on 1/30/2024 and the deployment tube was still at the correct depth then. Depth data was examined during the intervening period but no major sudden changes in depth were noted. It may be that the tube slowly slid down the piling over a period a time and with tidal fluctuations, changed in barometric pressure, and other factors over the course of several months, it is not possible to determine when that occurred. All depth data beginning with the 1/30/2024 deployment have therefore been flagged as suspect.

**July 9 – August 7, 2024**

1. Hurricane/Tropical Storm Debby passed through the Gulf around 08/04/2024. F\_Record marked from 08/03/2024 to 08/06/2024 to reflect effects of the storm. Appears to have affected all parameters except turbidity.
2. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.
3. Several hypoxia events throughout the data.
4. Turbidity failed post-cal in 0.0 FNU (1.28) but passed in 124 FNU, even after cleaning the sensor face. Turbidity for the entire deployment has been marked as Rejected due to post-cal failure and lack of consistency with the surrounding deployments. The graph appears to show drift but it is unclear in the data where that drift begins.

**August 7 – September 4, 2024**

1. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.
2. Several hypoxia events throughout the data.
3. Several turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**September 4 – October 1, 2024**

1. All depth data are flagged suspect. See note “b” for Jan. 30 – Feb. 27 and note “d” for June 10 – July 9 deployments.
2. A Significant Weather Event {CWE} marked from 09/26/2024 to 09/27/2024 to account for effects of Hurricane Helene crossing the state. Affected all parameters. Appears that began at about 06:00 on 09/26 and ended about 12:00 09/27, though "rebound" was seen in all parameters for the next several days.
3. Several hypoxia events throughout the data.
4. Several turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.
5. Dips in salinity and specific conductance marked suspect. See Note #5. Dips were not marked if they appeared to be associated with Hurricane Helene from 09/26/2024 through 09/27/2024.

**EB02**

**December 12, 2023 – January 10, 2024**

1. DO% and DO\_mgL were flagged as rejected for entire deployment. The DO sensor did not pass post-deployment CCV.

**January 10 – January 30, 2024**

1. Specific Conductivity and Salinity flagged suspect on 1/20/2024 at 23:45. Dips low with no apparent cause, as the timing does not align with low tide and weather conditions for the single data point.
2. All turbidity spikes appear to have distinct peaks associated with them, therefore no readings were flagged.

**January 30 – February 27, 2024**

1. All turbidity data flagged as rejected due to post-calibration verification failure (158.77). Field readings at deployment (1/30/2024) showed 5.03 FNU on the handheld and 6.67 FNU on the datasonde. Field readings at retrieval (2/27/2024) showed 5.70 FNU on the handheld and 10.21 FNU on the datasonde.

**February 27 – March 26, 2024**

1. Two odd SpCond/Sal drops on 3/8/2024 (09:45) and 3/10/2024 (19:15), but no reason to assume out of range.
2. All turbidity spikes have accompanying curves.

**March 26 – April 16, 2024**

1. Turbidity readings outside of sensor range flagged rejected and those outside calibration range were flagged as suspect.

**April 16 – May 14, 2024**

1. All data appears reliable, as all spikes/extremes in value appear to have associated curves before and after.

**May 14 – June 10, 2024**

1. Occasional sharp drops in Salinity and Sp. Conductivity, possibly attributable to Note #5.
2. Three hypoxia events in data: 5/28/2024, 5/29/2024, and 5/30/2024.
3. Two rejected turbidity events, as they were outside calibration range (over 1000 FNU): 5/22/2024 at 20:45 and 6/3/2024 at 13:00.

**June 10 – July 9, 2024**

1. Significant rain event occurred from 6/11/2024 through 6/14/2024. Event appeared to affect all parameters except depth and turbidity through the event, with recovery through 6/19/2024.
2. Several hypoxia events throughout the data.
3. Several dozen turbidity events throughout the data, possibly attributable to high presence of crabs within the field guard. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**July 9 – August 7, 2024**

1. Hurricane/Tropical Storm Debby passed through the Gulf around 08/04/2024. F\_Record marked from 08/03/2024 to 08/06/2024 to reflect effects of the storm. Appears to have affected all parameters except turbidity.
2. Several hypoxia events throughout the data.
3. A few turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**August 7 – September 4, 2024**

1. Several hypoxia events throughout the data.
2. Several turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**September 4 – October 1, 2024**

1. A Significant Weather Event {CWE} marked from 09/26/2024 to 09/27/2024 to account for effects of Hurricane Helene crossing the state. Affected all parameters. Appears that began at about 06:00 on 09/26 and ended about 12:00 09/27, though "rebound" was seen in all parameters for the next several days.
2. Several hypoxia events throughout the data.
3. Several turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**EB03**

**December 12, 2023 – January 10, 2024**

1. Some data missing due to temporary power failures in the sonde during deployment (12/21/2023, 12/23, 2023, 01/04/2024, 01/06/2024, 01/08/2024, 01/09/2024).
2. DO% and DO\_mgL were flagged as rejected due to sensor failing post-deployment CCV.

**January 10 – January 30, 2024**

1. Low water event on 1/21/2024 in conjunction with low tide. Rejected portions of this event in which Specific Conductivity was close to zero and other parameters showed changes from the time periods surrounding them. Portions of this event were marked suspect when the Specific Conductivity was low but other parameters seemed to match the surrounding readings. Those latter occurrences could be related to a freshwater wedge on the water’s surface rather than an out-of-water event.

**January 30 – February 27, 2024**

1. All data appears reliable, as all spikes/extremes in value appear to have associated curves before and after.

**February 27 – March 26, 2024**

1. All turbidity spikes appear to have accompanying curves, so no flags were applied.

**March 26 – April 16, 2024**

1. The sonde experienced four blackouts (4/2/2024 1:30, 4/6/2024 13:15, 4/7/2024 14:30, 4/7/2024 14:15) occurred during deployment. Only the 4/2/2024 event resulted in a missing sample. The missing data was flagged as a power failure. During post-deployment CCV rinses and shaking the sonde caused it to disconnect from Kor software indicating a battery disconnect issue. Therefore, it is likely that if the sonde was jostled inside the deployment tube by a vessel wake or wave that it may have caused a similar disconnect.

**April 16 – May 14, 2024**

1. All data appears reliable, as all spikes/extremes in value appear to have associated curves before and after.
2. Data was imported in three separate chunks, and shaking during CCV rinses lead to disconnection. No apparent loss of data during deployment as a result.

**May 14 – June 10, 2024**

1. Scattered hypoxia events throughout the data.
2. Sharp drop in salinity on 5/24/2024 at 11:30, see Note #5.
3. Salinity drop on 6/2/2024, possibly as a result of an afternoon storm.

**June 10 – July 9, 2024**

1. Data missing from 6/13/2024 at 00:00, likely due to a battery disconnection.
2. Significant rain event occurred from 6/11/2024 through 6/14/2024. Event appeared to affect all parameters except depth and turbidity through the event, with recovery through 6/19/2024.
3. Several hypoxia events throughout the data.
4. Several turbidity spikes through data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**July 9 – August 7, 2024**

1. Hurricane/Tropical Storm Debby passed through the Gulf around 08/04/2024. F\_Record marked from 08/03/2024 to 08/06/2024 to reflect effects of the storm. Appears to have affected all parameters except turbidity.
2. Several hypoxia events throughout the data.
3. A few turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**August 7 – September 4, 2024**

1. Several hypoxia events throughout the data.
2. A few DO readings were negative; marked rejected for being below sensor range.

**September 4 – October 1, 2024**

1. A Significant Weather Event {CWE} marked from 09/26/2024 to 09/27/2024 to account for effects of Hurricane Helene crossing the state. Affected all parameters. Appears that began at about 06:00 on 09/26 and ended about 12:00 09/27, though "rebound" was seen in all parameters for the next several days.
2. Several hypoxia events throughout the data.
3. Several turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**EB04**

**December 12, 2023 – January 10, 2024**

1. Turbidity reading on 12/29/2023 at 21:45 rejected as it exists outside the sensor range.

**January 10 – January 30, 2024**

1. Turbidity reading on 1/20/2024 at 14:00 marked suspect because no apparent curve in data, yet within calibration range (112).

**January 30 – February 27, 2024**

1. Turbidity data showed a number of spikes and peaks, several of which included values outside the sensor range. The wiper brush was at the bottom of the guard upon retrieval, but may have jostled off while removing the guard. Sonde technicians heard something drop inside the guard. Turbidity readings outside distinct peaks were flagged suspect if greater than 124 FNU (outside calibration range). Those readings greater than 1000 FNU were flagged rejected. Some of these readings exist within what could be peaks; however many readings within those are much greater than sensor range (>4000 FNU) and with uncertainty about the wiper’s proper functioning, these readings were still flagged as either suspect or rejected. That said, there were windy weather conditions on some of these days and boat wakes are a possibility as this time period is tourist season.

**February 27 – March 26, 2024**

1. Several turbidity readings >124 FNU were flagged as suspect as they exist outside sensor calibration range. Those greater than 1000 FNU were flagged as rejected. On 3/25/24, the readings between 05:15 and 06:00 are all fairly high. All of these were flagged suspect, even the two >1000 FNU since it appears that it might be a distinct peak.

**March 26 – April 16, 2024**

1. Turbidity readings during this deployment were flagged suspect when >124 FNU and rejected when >1000 FNU.

**April 16 – May 14, 2024**

1. Eight hypoxia events during deployment, detected during primary QAQC via non-SWMP upload. Data marked as hypoxic when DO pct drops below 50% and/or DO mg/L drops below 3.0.
2. Turbidity readings during this deployment were flagged suspect when >124 FNU and rejected when >1000 FNU.

**May 14 – June 10, 2024**

1. Sharp drops in conductivity on 6/5/2024 at 15:00 and 6/8/2024 at 14:45 with no apparent cause; see Note #5.
2. Several turbidity spikes through data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.
3. Several hypoxia events throughout the data.

**June 10 – July 9, 2024**

1. Significant rain event occurred from 6/11/2024 through 6/14/2024. Event appeared to affect all parameters except depth and turbidity through the event, with recovery through 6/19/2024.
2. Several hypoxia events throughout the data.
3. Turbidity spikes on 6/30/2024 at 12:30 and 7/4/2024 at 07:30 suspect for being outside the calibration range (1001-4000 FNU). Turbidity spike on 7/1/2024 at 09:15 rejected for being outside the sensor range (over 4000 FNU).

**July 9 – August 7, 2024**

1. Hurricane/Tropical Storm Debby passed through the Gulf around 08/04/2024. F\_Record marked from 08/03/2024 to 08/06/2024 to reflect effects of the storm. Appears to have affected all parameters. Turbidity spikes on 08/06/2024 have comments regarding the storm, but are not considered suspect at this time.
2. Several hypoxia events throughout the data.
3. Several turbidity events throughout the data. Anything over 4000 FNU was rejected for being outside the sensor range, over 1000 FNU was rejected for being outside the calibration range, and over 124 was marked suspect for being outside the calibration range.

**August 7 – September 4, 2024**

1. Several hypoxia events throughout the data.
2. All other parameters appear to be within acceptable criteria.

**September 4 – October 1, 2024**

1. A Significant Weather Event {CWE} marked from 09/26/2024 to 09/27/2024 to account for effects of Hurricane Helene crossing the state. Affected all parameters. Appears that began at about 06:00 on 09/26 and ended about 12:00 09/27, though "rebound" was seen in all parameters for the next several days.
2. Several hypoxia events throughout the data.
3. Despite turbidity spikes above the calibration range of 124 FNU, no data points were flagged, as they appear to occur around and during Hurricane Helene, occurring approximately from late 09/22/2024 to the afternoon of 09/29/2024.