**Guana River Marsh Aquatic Preserves  
Water Quality Metadata Report**

January 2025 – March 2025  
Latest Update: 5/26/2025

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 Aquatic Preserve Office ([Jessica.lee@FloridaDEP.gov](file:///\\CAM-GTMNERR1-12\all_common\Physical%20and%20Environmental%20Monitoring\Guana%20Lake%20Water%20Quality\DATA\Micklers%20EXO%20data\Metadata\2022\Jessica.lee@FloridaDEP.gov)) with any additional questions.

**I. Data Set and Research Descriptors**

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1. **Entry verification:**

Deployment data are collected with a YSI data sonde and uploaded to a PC in the water quality lab at the Guana Tolomato Mantanzas National Estuary Research Reserve office. Files are exported from KorEXO Software, the software platform used for managing the EXO data sonde and water quality data, in a comma separated file (.csv). Two copies of this .csv file are saved and then uploaded to the AP Water Quality Sharepoint. One file is used to archive the raw data, and the other is edited to adjust all records to Eastern Standard Time and to delete pre- and post-deployment data. Pre- and post-deployment data are identified by field notes that document the start and end times for each deployment, and from conductivity and depth readings near zero.

Data then undergo a two-step (primary and secondary) Quality Assurance/Quality Control (QA/QC) procedure as outlined in the NERRS CDMO Data Management Manual Version 6.6 (<http://cdmo.baruch.sc.edu/request-manuals/>). The edited file is uploaded to the NERRS Centralized Data Management Office (CDMO) Non-SWMP Data Upload Service where data undergo automated primary QAQC. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the FCO 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 Florida Coastal Office’s 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 Jessica Lee.

1. **Research objectives:**

Freshwater enters the Guana Marsh Aquatic Preserve (GMAP) through a single point, Micklers Weir. Land use north of GAMP is highly residential/commercial, and development of this area is expected to increase due to its coastal living desirability. It is important to understand and establish baseline water quality trends of the water entering the GMAP.

The KOR EXO2 data sonde collects continuous readings on a 15-minute cycle during three-week deployments. At the conclusion of the deployment the sonde is retrieved and exchanged for a clean, newly calibrated unit. In this way there is a constant, unbroken recording of data, and therefore a much higher rate of consistency in the resultant tables and graphs.

The objective of this project is to take the data generated from these data sonde deployments and study them for potential trends in water quality and any unusual deviations from expected values. In addition, to report any incidences of variation from state water quality standards, and to see how the data relate to concurrently collected meteorological data.

1. **Research Methods:**

A YSI KOR EXO2 data sonde has been continuously operating (collecting data every 15 minutes) at our Micklers site since October 2020. The sonde is housed within a vertical 10.16 cm (4-inch) diameter PVC pipe that is directly attached to a wooden piling on Micklers Weir. The sonde is lowered on an attached rope within the PVC tube until its probes are just barely exposed beyond the lower edge of the pipe. At this point it is suspended approximately one meter above the substrate. A sheet of copper mesh (1/4-inch opening) surrounds the protective guard on the data sonde to prevent fish and crabs from entering the guard and damaging any of the probes. A locking cap on the dock end of the PVC tube prevents any unwanted tampering, and a 10.16 cm (4-inch) stainless steel carriage bolt below the submerged edge prevents accidental slippage out of the other end should the rope or attachment hardware give way. Exchange of the data sondes (replacing an operating unit for a clean, calibrated unit at the end of a deployment period) usually takes about 5 - 10 minutes. Retrieval and replacement of the sondes never occurs within 5 minutes of a scheduled data recording in order to assure continuous collection of information. Field notes are also recorded during the exchange regarding weather conditions, tidal stage, condition of the retrieved sonde, and any unusual occurrences at the site.

After retrieval from the sampling site, data sondes are returned to the laboratory where post deployment readings and reconditioning take place in accordance with methods outlined in the YSI Operating and Service Manual. [This process is similar, though somewhat less extensive, to the initial calibration process that is performed before each data sonde is taken out for deployment.] The sonde is rinsed with tap water then sequentially submersed in each of the various standards in order to obtain post deployment readings. Standards consist of pH (Fisher Scientific 7.00, 10.00, 4.00 buffer solution), conductivity (Exaxol 50.00 mS/cm standard) and 0.0 NTU turbidity (distilled water). The dissolved oxygen membrane, if requiring replacement, can also be exchanged at this point, as a period of at least 24 hours is required for it to equilibrate before its next deployment. These post deployment readings are then used to evaluate the validity of the data collected for that deployment period.

1. **Site location and character:**

Guana River Marsh Aquatic Preserve, located within the boundaries of GTM Research Reserve, is unusual because it includes uplands. Nearly 12,000 acres of uplands were purchased by the state of Florida in 1984 because of their environmental sensitivity and to protect several species of endangered and threatened plants and animals. Approximately 9,500 acres are managed by the Florida Fish and Wildlife Conservation Commission, and 2,600 acres are managed by the Office of Resilience and Coastal Protection and house the visitor center near Guana Dam.

Guana River Marsh Aquatic Preserve has a rich association of habitats including salt marshes, a large artificial freshwater-to-brackish water lagoon, open ocean and a complete cross-section of a relatively undisturbed barrier island. This diversity provides habitat for a wide variety of resident and migratory wildlife. Bird rookeries, including a sizable breeding population of the endangered wood stork, are found within the preserve. The preserve also contains 13 miles of high-energy beach fronting the Atlantic Ocean with high dunes (35-40 feet) and stabilized with native coastal vegetation. These beaches provide breeding and nesting habitat for sea turtles and ground-nesting shorebirds such as the threatened least tern.

The Guana River begins north of the preserve in Ponte Vedra Beach and flows south to join the Tolomato River. In 1957, an earthen dam was constructed across the Guana River creating Guana Lake. This wetland is approximately 2,400 acres and provides both open water and marsh habitats. This shallow lagoonal lake extends 10 miles north from the dam. The drainage basin includes approximately 7,800 acres extending from the dam 17 miles north into Jacksonville Beach.

**Station description:**

|  |  |
| --- | --- |
| Site name | Micklers |
| Latitude and longitude | *30⁰ 09'38" N 81⁰ 21'37" W* |
| Tidal range *(meters)* |  |
| Salinity range *(psu)* | *0.3 – 3.6 psu* |
| Type and amount of freshwater input | *Single point input north of weir and rainwater* |
| Water depth (*meters, MLW*) | *0.71 m MLW estimated* |
| Sonde distance from bottom (*meters*) | *Fixed distance sonde is deployed above the bottom 0.5 m* |
| Bottom habitat or type | *Soft sediment* |
| Pollutants in area | Nutrient runoff from golf courses, residences, and roads. |
| Description of watershed | *(in reference to station)* |

The Micklers station is located at Micklers Weir, a water control structure at the head of Guana Lake just south of the intersection of Florida A1A and Mickler Road. The sonde is housed in a PVC tube that is attached to a boardwalk on the south side of the weir. Freshwater flows into the preserve through this single point; however, saltwater influxes can occur depending on the Florida Fish and Wildlife Conservation Commission’s (FWC) management of the Guana Dam, which is located at the southern end of Guana Lake. The area is relatively shallow, and its substrate consists of soft, muddy sand that is easily disturbed. There is an abundance of submerged aquatic vegetation, including invasive hydrilla (*Hydrilla verticillata*) and coontail (*Ceratophyllum demersum*). Invasive macrophytes water hyacinth (*Eichhornia crassipes*) and water lettuce (*Pistia stratiotes)* often float into and over the weir catch, causing vegetation buildup. This buildup is occasionally cleared and can be affected by storms and high rain events.

**Station Timeline:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Station Code** | **Station Name** | **Location** | **Active Dates** | **Reason Decommissioned** | **Notes** |
| MK | Micklers | 30.0938° N, 81.2137° W | 10/1/2020-Current |  | N/A |

**6) Data collection period –**

Though the data sonde protective housing was installed at the Micklers site in mid-September of 2020, the first data sonde unit was placed in the housing by the end of that month, data for this study was not collected until October 24th, 2020. The month of September and early October was used as a “break in period” for the staff working with the data sondes in terms of familiarization with calibration, deployment, data handling, and any possible trouble shooting for problems that might arise in the initial phase of the project. Data recording began on October 24th, 2020 and remains active.

|  |  |  |
| --- | --- | --- |
| **Sonde** | **Deployment Date/Time** | **Retrieval Date/Time** |
| 20D102638 (Mickey) | 11/27/2024 11:15 am | 1/24/2025 2:41 pm |
| 22A105471 (Goofy) | 01/24/2025 2:45 pm | 04/08/2025 10:00 am |
| 20D102638 (Mickey) | 04/08/2025 10:15 am | 05/05/2025 11:45 am |
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\*Instrument and/or battery malfunction

**7) Distribution**

The Principle Investigator (PI) retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and Aquatic Preserve (AP) site where the data were collected will 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. Water quality data and metadata can be obtained from the PI (see section 1).

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**

Associated projects within the Guana Marsh Aquatic Preserve include:

* Monthly sampling for nutrients, chlorophyll, bacteria, and total suspended solids at 10 stations located in Guana River and Lake, including the Micklers site
* The Guana Nuts and Bivalves collaborative project conducted by GTM Research Reserve and the University of Florida. This project is studying nutrient cycling and loading as well as the role shellfish play in mitigating water quality issues.

**II. Physical Structure Descriptors**

**9) Sensor specifications (**Refer to Section 6)

### YSI EXO2 Sonde:

### Parameter: Temperature

### Units: Celsius (C)

### Sensor Type: CT2 Probe, Thermistor

### Model#: 599870

### Range: -5 to 50 C

### Accuracy: -5 to 35: +/- 0.01, 35 to 50: +/- .005

### Resolution: 0.01 C

### Parameter: Conductivity

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

### Sensor Type: CT2 Probe, 4-electrode cell with autoranging

### Model#: 599870

### Range: 0 to 200 mS/cm

### Accuracy: 0 to 100: +/- 0.5% of reading or 0.001 mS/cm; 100 to 200: +/- 1% of reading

### Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependant)

### Parameter: Salinity

### Units: practical salinity units (psu)/parts per thousand (ppt)

### Sensor Type: CT2 probe, Calculated from conductivity and temperature

### Range: 0 to 70 psu

### Accuracy: +/- 1.0% of reading pr 0.1 ppt, whichever is greater

### Resolution: 0.01 psu

### OR

### 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: 0-200% air saturation: +/- 1% of the reading or 1% air saturation, whichever is greater 200-500% air saturation: +/- 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: +/-0.1 mg/l or 1% of the reading, whichever is greater

### 20 to 50 mg/L: +/- 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: +/- 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

### Parameter: Chlorophyll

### Units: micrograms/Liter

### Sensor Type: Optical probe

### Model#: 599102-01

### Range: 0 to 400 ug/Liter

### Accuracy: Dependent on methodology

### Resolution: 0.1 ug/L chl a, 0.1% FS

**Dissolved Oxygen Qualifier:**

The reliability of the dissolved oxygen (DO) data after 96 hours post-deployment for non-EDS (Extended Deployment System) data sondes may be problematic due to fouling which forms on the DO probe membrane during some deployments (Wenner et al. 2001). Many Aquatic Preserves have upgraded to YSI 6600 EDS data sondes, which increase DO accuracy and longevity by reducing the environmental effects of fouling. The user is therefore advised to consult the metadata and to exercise caution when utilizing the DO data beyond the initial 96-hour time period. However, this potential drift is not always problematic for some uses of the data (e.g., periodicity analysis). It should be noted that the amount of fouling is site specific and that not all data are affected. The Principal Investigator at should be contacted concerning the reliability of the DO data because of the site and seasonal variation in the fouling of the DO sensor.

**Depth Qualifier:**

The water quality monitoring program utilizes YSI data sondes that can be equipped with either depth or water level sensors. Both sensors measure water depth, but by convention, level sensors refer to atmospherically vented measurements and depth refers to non-vented measurements. Standard calibration protocols for the non-vented sensor use the atmosphere pressure at the time of calibration. Therefore, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.03 cm for every 1millibar change in atmospheric pressure. This error is eliminated for level sensors because they are vented to the atmosphere throughout the deployment time interval. If proper atmospheric pressure data is available, non-vented sensor depth measurements can be corrected for deployments between calibrations. Readings for both vented and non-vented sensors are automatically compensated for water density changes due to variations in temperature and salinity. The Principal Investigator should be contacted in order to obtain information regarding atmospheric pressure data availability. All data sondes used at all 6600 sites in 2006 were non-vented models.

**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.

**Chlorophyll Fluorescence Disclaimer:**

YSI chlorophyll sensors (6025 or 599102-01) are designed to serve as a proxy for chlorophyll concentrations in the field for monitoring applications and complement traditional lab extraction methods; therefore, there are accuracy limitations associated with the data that are detailed in the YSI manual including interference from other fluorescent species, differences in calibration method, and effects of cell structure, particle size, organism type, temperature, and light on sensor measurements.

**10) Coded variable definitions –**

Site definitions:

|  |  |  |
| --- | --- | --- |
| **Sampling Station:** | **Sampling Site Code:** | **Station Code:** |
| Micklers Weir | MK | GMMK |

**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** –

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Table 1. Post-deployment readings of all sondes deployed at the Micklers site during 2025.** | | | | | | | | | |
| **Deployment Date** | **Temp (°C)** | **SpCond (mS/cm)** | **ROX DO %** | **ROX DO**  **mg/L** | **pH** | **pH** | **Turbidity (FNU)** | **Turbidity (FNU)** | **Depth (m)** | **CHL**  **(ug/L)** |
|  | **°C** | **50.00** | **100.0** | **NA** | **7.00** | **10.00** | **0.0** | **124.0** | **m** | **0.00** |
| 11/27/2024 | 19.499 | 48.745 | 101.2 | 8.92 | 6.96 | 9.94 | 0.20 | 127.5 | 0.134 | 0.76 |
| 01/24/2025 |  |  |  |  |  |  |  |  |  |  |
| 04/05/2025 | 21.67 | 49.947 | 99.9 | 8.65 | 7.10 | 10.12 | 0.02 | 123.65 | 0.065 | 0.4 |
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\*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.

**January 1-31, 2025**

1. Sonde deployed longer than 30 days

**February 1-28, 2025**

1. Sonde deployed longer than 30 days
2. Wind and rain events may have contributed to increased turbidity during February and March.

**March 1-31, 2025**

1. Sonde deployed longer than 30 days