**Nassau River-St. Johns River Marshes and Fort Clinch Aquatic Preserves  
Water Quality Metadata Report**

January 2024 – September 2024  
Latest Update: 10/23/2024

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 (Chris.kurtz@floridaDEP.gov) with any additional questions.

**I. Data Set and Research Descriptors**

1. **Principal investigator & contact persons:**

Principal Investigator:

Chris Kurtz, Environmental Specialist II

13802 Pumpkin Hill Rd

Jacksonville, FL 32226

(904) 738-9662

Chris.kurtz@floridaDEP.gov

Other Contact Persons:

Daulton Wilburn, Environmental Specialist I

13802 Pumpkin Hill Rd

Jacksonville, FL 32226

Daulton.Wilburn@floridaDEP.gov

1. **Entry verification:**

Data are collected with a YSI data sonde and uploaded to a laptop PC in the water quality lab at the Nassau River-St. Johns River Marshes and Fort Clinch Aquatic Preserves office. 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 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 Chris Kurtz.

1. **Research objectives:**

Historic data does exist for this system, but until this point nothing equivalent to the type of data made possible by deployment of the YSI 6600 EDS-S along with the more recent addition of KOR EXO2 data sondes. The instrument collects continuous readings on a 15 minute cycle during two-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:**

The sonde is housed within a vertical 10.16 cm (4-inch) diameter PVC pipe that is directly attached to one of the support pilings at associated sites. 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 3-point pH (Fisher Scientific 7.00, 10.00, 4.00 buffer solution), conductivity (Exaxol 50.00 mS/cm standard) and 2-point 0.0 (distilled) and 124 NTU turbidity. 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:**

Nassau River-St. Johns River Marshes Aquatic Preserve, located in Nassau and Duval counties, was designated an aquatic preserve on November 24, 1969, to protect the Nassau Sound area marshes and associated waters. Nassau River-St. Johns River Marshes and Fort Clinch Aquatic Preserves are in the northeastern part of the state along the Atlantic intracoastal waters of the St. Marys, St. Johns and Nassau rivers. This area consists of a vast saltmarsh estuary with numerous interconnecting tidal creeks, rivers and channels with some small tree islands. The aquatic preserve is approximately 69,000 acres.

Fort Clinch State Park Aquatic Preserve (also called Fort Clinch Aquatic Preserve), in northeastern Nassau County along Amelia Island, was designated on March 4, 1970, to provide an aesthetic buffer for the state park and historic Fort Clinch. The preserve surrounds the state park and is largely comprised of open waters around St. Marys Inlet, the Amelia River and a three-mile extension into the Atlantic Ocean off Amelia Island. The western edge of the preserve borders extensive saltmarsh along Amelia Island, and the preserve extends to the Florida-Georgia state line. This aquatic preserve is about 7,600 acres.

Ft. George River Inlet, one of the few remaining natural inlets in the state, is approximately 6 miles south of Nassau Sound and immediately north of the mouth of the St. Johns River in Northeast Florida’s Duval County. The inlet is bordered by Little Talbot Island to the north, and Ward’s bank to the south. Much of the land surrounding this system has remained relatively undeveloped due to its ownership by various governmental entities and its intended use of conservation and low impact public recreation.

Ft. George River connects to Simpson Creek a little more than a mile and a half from its mouth, and then another mile and a half to the west, the Intracoastal waterway which in turn flows north to the mainstem of the Nassau River. The surface area drained by this sub – basin of the Nassau River constitutes an area of approximately 6,2851 acres. Though this is not one of the largest freshwater contributors to the nearly 55-mile-long Nassau River, the Ft. George River drainage basin is a sizable system, and any major changes to it could exert a noticeable impact on the Nassau River as well.

**Station description:**

The Edwards dock site (EC) is located in the northern portion of Betz Tiger Point Preserve (30.500794,

-81.497122), where surrounding surface waters carry the designation of Nassau Valley State Reserve Outstanding Florida water. Edwards Creek is neighbored by two smaller creek systems, Starrett and Samples Creek, all of which are filled by the larger-bodied Pumpkin Hill Creek. The area is a mixture of salt marshes along with pine flatwoods and maritime hammock. Substrate type consists of mudflats with emergent patches of oyster beds. This station started actively recording in November of 2020.

|  |  |
| --- | --- |
| Site name | Edwards Creek (EC) |
| Latitude and longitude | 30.500794, -81.497122 |
| Tidal range *(meters)* | 1.490 |
| Salinity range *(psu)* | 10-36.5 ppt |
| Type and amount of freshwater input | Inland Nassau River westward creek systems |
| Water depth (*meters, MLW*) | 0.056 (NOAA Datums Station #8720148) |
| Sonde distance from bottom (*meters*) | 1m |
| Bottom habitat or type | Soft sediment |
| Pollutants in area | Nearby nutrient samples can be viewed in STORET public access portal |

The Half Moon/Nassau River (HM) site is located at (30.56393,-81.61422) just east of US Highway 17 and the border of the aquatic preserve. This stretch of river is much narrower and fresher than the lower reaches. The marshes are mostly needlerush dominated and only barnacles are present since the water is too fresh for oysters. The water is dark stained with tannins from the swamps and marshes to the west of Highway 17 and I-95.

|  |  |
| --- | --- |
| Site name | Half Moon (HM) |
| Latitude and longitude | 30.56393, -81.61422 |
| Tidal range (meters) | 1.269 |
| Salinity range (psu) | 0.3-34.0 ppt |
| Type and amount of freshwater input | Inland Nassau River westward creek systems |
| Water depth (meters, MLW) | 0.061 (NOAA Datums Station #8720093) |
| Sonde distance from bottom (meters) | 1m |
| Bottom habitat or type | Soft sediment |
| Pollutants in area | Nearby nutrient samples can be viewed in STORET public access portal |

The Lofton Creek site (LN) is located (30.590556, -81.559722) just inside the mouth of creek from its confluence with the Nassau River. Lofton Creek is one of the largest tributaries of the Nassau River and transitions from sawgrass dominated cypress swamps to spartina and needlerush marshes within the aquatic preserve. The creek is mostly bordered by rural home sites with septic systems though large, planned communities are being developed along the eastern bank. The meandering bends in the creeks yield steep banks and shoals with sparse oyster growth along the more saline stretches. This station is located about 10 miles north upstream of the historical NELC station. Though the site’s characteristics are similar, water quality characteristics at this site may differ from the historical Lofton Creek site.

|  |  |
| --- | --- |
| Site name | Lofton Creek (LN) |
| Latitude and longitude | 30.590556, -81.559722 |
| Tidal range (meters) | 1.075 |
| Salinity range (psu) | 0.2-24 ppt |
| Type and amount of freshwater input | Inland Nassau River westward creek systems |
| Water depth (meters, MLW) | 0.061 (NOAA Datums Station #8720097) |
| Sonde distance from bottom (meters) | 1m |
| Bottom habitat or type | Soft sediment |
| Pollutants in area | Nearby nutrient samples can be viewed in STORET public access portal |

The Crane Island (CI) station (30.614025,-81.479486) is located within the Fort Clinch Aquatic Preserve within the Amelia River and is our most Northeastern site in Florida. It is affixed to a public dock available through the Crane Island Community. This tributary flows North into the St. Mary’s River, which then leads to Cumberland Sound, flowing out to the Atlantic Ocean through a dredged inlet channel flanked by jetties. The western edge of the preserve borders extensive salt marsh along Amelia Island, and the preserve extends to the Florida-Georgia state line.

|  |  |
| --- | --- |
| Site name | Crane Island (CI) |
| Latitude and longitude | 30.614025, -81.479486 |
| Tidal range (meters) | 1.643 |
| Salinity range (psu) | 20.5-36.0 ppt |
| Type and amount of freshwater input | Inland Nassau River westward creek systems |
| Water depth (meters, MLW) | 0.051 (NOAA Datums Station #8720086) |
| Sonde distance from bottom (meters) | 1m |
| Bottom habitat or type | Soft sediment |
| Pollutants in area | Nearby nutrient samples can be viewed in STORET public access portal |

**Station timeline:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Station Code** | **Station Name** | **Location** | **Active Dates** | **Reason Decommissioned** | **Notes** |
| EC | Edwards Creek  (Dock) | 30.500794,  -81.497122 | 11/20/2020 - Present | N/A | N/A |
| HM | Half Moon (Dock) | 30.56393,  -81.61422 | 4/9/2022 - Present | N/A | N/A |
| LN | Lofton Creek  (Dock) | 30.590556,  -81.559722 | 04/07/2023 - Present | N/A | N/A |
| CI | Crane Island  (Dock) | 30.614025,  -81.479486 | 10/24/2023 -Present | N/A | N/A |

1. **Data collection period:**

NEEC is the first datasonde to be deployed in NEAP since 2011, it has been continuously operating since January of 2021 in Edwards Creek. NEHM is the second datasonde to be deployed in NEAP, it has been continuously operating since April 2022 at the Halfmoon Island boat ramp. NELN is the third datasonde to be deployed in NEAP since 2011, it has been continuously operating since April 2023 in Lofton Creek. NECI is the fourth datasonde to be deployed in the NEAP since 2011, it has been running continuously since late 2023.

The deployment and retrieval date/times for NEEC / NEHM / NELN /NECI for 2024 sampling season are listed below:

**Edwards Creek (NEEC) (2024)**

|  |  |
| --- | --- |
| **Deployment** | **Retrieval** |
| **Date/Time** | **Date/Time** |
| 12/19/2023; 11:15 | 01/12/2024; 10:30 |
| 01/12/2024; 10:30 | 02/02/2024; 11:00 |
| 02/02/2024; 11:00 | 02/28/2024; 10:30 |
| 02/28/2024; 10:30 | 03/22/2024; 09:45 |
| 03/22/2024; 09:45 | 04/08/2024; 16:45 |
| 04/08/2024; 16:45 | 04/30/2024; 07:30 |
| 04/30/2024; 07:30 | 05/14/2024; 07:30 |
| 05/14/2024; 07:30 | 05/30/2024; 07:00 |
| 05/30/2024; 07:00 | 06/18/2024; 06:30 |
| 06/18/2024; 06:30 | 07/02/2024; 06:00 |
| 07/02/2024; 06:00 | 07/24/2024; 13:45 |
| 07/24/2024; 13:45 | 08/13/2024; 06:30 |
| 08/13/2024; 06:30 | 08/26/2024; 09:30 |
| 08/26/2024; 09:30 | 09/08/2024; 09:45 |
| 09/08/2024; 09:45 | 10/02/2024; 08:45 |
| 10/02/2024; 08:45 |  |
|  |  |

**Halfmoon (NEHM) (2024)**

|  |  |  |
| --- | --- | --- |
| **Deployment** | | **Retrieval** |
| **Date/Time** | | **Date/Time** |
| 12/21/2023; 13:30 | | 01/12/2024; 11:15 |
| 01/12/2024; 11:15 | | 02/02/2024; 11:45 |
| 02/02/2024; 11:45 | | 02/28/2024; 11:30 |
| 02/28/2024; 11:30 | | 03/22/2024; 10:15 |
| 03/22/2024; 10:15 | | 04/08/2024; 17:30 |
| 04/08/2024; 17:30 | | 04/30/2024; 08:30 |
| 04/30/2024; 08:30 | | 05/14/2024; 08:30 |
| 05/14/2024; 08:30 | | 05/30/2024; 07:45 |
| 05/30/2024; 07:45 | | 06/18/2024; 07:15 |
| 06/18/2024; 07:15 | | 07/02/2024; 06:45 | |
| 07/02/2024; 06:45 | | 07/24/2024; 14:30 | |
| 07/24/2024; 14:30 | | 08/13/2024; 07:15 | |
| 08/13/2024; 07:15 | | 08/26/2024; 10:30 | |
| 08/26/2024; 10:30 | | 09/08/2024; 10:30 | |
| 09/08/2024; 10:30 | | 10/03/2024; 09:15 | |
| 10/03/2024; 09:15 | |  | |
|  | |  | |

**Lofton Creek (NELN) (2024)**

|  |  |
| --- | --- |
| **Deployment** | **Retrieval** |
| **Date/Time** | **Date/Time** |
| 12/19/2023; 15:30 | 01/12/2024; 12:15 |
| 01/12/2024; 12:15 | 02/02/2024; 12:30 |
| 02/02/2024; 12:30 | 02/28/2024; 12:15 |
| 02/28/2024; 12:15 | 03/22/2024; 11:00 |
| 03/22/2024; 11:00 | 04/09/2024; 06:45 |
| 04/09/2024; 06:45 | 04/30/2024; 09:15 |
| 04/30/2024; 09:15 | 05/14/2024; 09:15 |
| 05/14/2024; 09:15 | 05/30/2024; 08:30 |
| 05/30/2024; 08:30 | 06/18/2024; 08:00 |
| 06/18/2024; 08:00 | 07/02/2024; 07:30 |
| 07/02/2024; 07:30 | 07/24/2024; 15:45 |
| 07/24/2024; 15:45 | 08/13/2024; 08:00 |
| 08/13/2024; 08:00 | 08/26/2024; 11:15 |
| 08/26/2024; 11:15 | 09/08/2024; 11:15 |
| 09/08/2024; 11:15 | 10/02/2024; 10:15 |
| 10/02/2024; 10:15 |  |
|  |  |

**Crane Island (NECI) (2024)**

|  |  |  |
| --- | --- | --- |
| **Deployment** | **Retrieval** | |
| **Date/Time** | **Date/Time** | |
| 12/19/2023; 14:45 | | 01/12/2024; 13:00 | |
| 01/12/2024; 13:00 | | 02/02/2024; 13:15 | |
| 02/02/2024; 13:15 | | 02/28/2024; 13:00 | |
| 02/28/2024; 13:00 | | 03/22/2024; 11:45 | |
| 03/22/2024; 11:45 | | 04/09/2024; 08:30 | |
| 04/09/2024; 08:30 | | 04/30/2024; 10:00 | |
| 04/30/2024; 10:00 | | 05/14/2024; 10:15 | |
| 05/14/2024; 10:15 | | 05/30/2024; 09:30 | |
| 05/30/2024; 09:30 | | 06/18/2024; 09:00 | |
| 06/18/2024; 09:00 | | 07/02/2024; 08:30 | |
| 07/02/2024; 08:30 | | 07/24/2024; 16:45 | |
| 07/24/2024; 16:45 | | 08/13/2024; 09:00 | |
| 08/13/2024; 09:00 | | 08/26/2024; 12:00 | |
| 08/26/2024; 12:00 | | 09/08/2024: 12:45 | |
| 09/08/2024; 12:45 | | 10/02/2024; 11:00 | |
| 10/02/2024; 11:00 | |  | |
|  | |  | |

\*Indicates short term loss of data due to battery failure, out of water for maintenance, weather related causes, and/or other internal problems that occurred during deployment.

**7.) Distribution –**

Considerable effort has been made to ensure the accuracy of the information provided and meet quality assurance guidelines used by the Florida’s Department of Environmental Protection Aquatic Preserve program. Please note that the included data are estimates of actual conditions subject to improvements in accuracy and precision of field methods over time as well as infrequencies in sampling duration, rendering data in some instances, to be unsuitable for temporal or spatial comparisons. As a result, the user is responsible for interpretations based on supplied data.

Neither the State of Florida nor the Florida Department of Environmental Protection makes any warranty, expressed or implied, including the warranties of merchantability and fitness for a particular purpose arising out of the use or inability to use the data, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.

The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and the Aquatic Preserve, 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 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:**

The Office of Resilience and Coastal Protection’s Northeast Florida Aquatic Preserves office, aside from coordinating with other sections within the Department of Environmental Protection, works cooperatively with other resource protection agencies and organizations in the Nassau and St. Johns Rivers watershed. Some of these include the: 1) National Park Service (NPS), 2) St. Johns River Water Management District (SJRWMD), 3) US Army Corp. of Engineers (USACOE), 5) City of Jacksonville (COJ), 6) The Nature Conservancy (TNC), 7) DEP Division of Parks and Recreation (FPS), 8) Florida Fish and Wildlife Conservation Commission (FWCC), and 9) US Fish and Wildlife Service (USFWS).

**II. Physical Structure Descriptors**

1. **Sensor specifications:**

### YSI EXO 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

1. **Coded variable definitions:**

**Site definitions:**

|  |  |  |
| --- | --- | --- |
| **Sampling Station:** | **Sampling Site Code:** | **Station Code:** |
| Edwards Creek | EC | NEEC |
| Halfmoon | HM | NEHM |
| Lofton Creek | LN | NELN |
| Crane Island | CI | NECI |

1. **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

1. **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

1. **Post deployment information:**

**Edwards Creek (NEEC) (2024)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | Temp (°C) | SpCond (mS/cm) | DO % | DO  mg/L | pH | pH | Turbidity (NTU) | Turbidity (NTU) | Depth (m) |
| Std. | N/A | 50 | N/A | N/A | 7 | 10 | 0 | 124 | N/A |
| 12/19/2023 | 17.851 | 49.910 | 98.8 | 9.69 | 7.19 | 10.24 | 0.17 | 124.54 | -0.072 |
| 01/12/2024 | 16.789 | 49.918 | 99.4 | 9.55 | 7.19 | 10.22 | 0.23 | 120.23 | 0.002 |
| 02/02/2024 | 19.343 | 49.663 | 100.5 | 9.22 | 7.12 | 10.07 | -0.48 | 122.58 | 0.035 |
| 02/28/2024 | 19.539 | 49.175 | 100.2 | 9.19 | 7.03 | 10.05 | 0.28 | 118.75 | 0.006 |
| 03/22/2024 | 19.469 | 49.659 | 100.0 | 9.14 | 7.13 | 10.12 | 0.27 | 120.86 | 0.088 |
| 04/08/2024 | 23.092 | 49.455 | 98.8 | 8.52 | 7.42 | 10.31 | 0.42 | 118.75 | 0.012 |
| 04/30/2024 | 22.996 | 47.997 | 98.8 | 8.46 | 7.05 | 10.01 | 0.86 | 126.02 | -0.103 |
| 05/14/2024 | 23.18 | 48.632 | 100.7 | 8.57 | 7.12 | 10.15 | 0.35 | 123.19 | 0.034 |
| 05/30/2024 | 24.736 | 49.569 | 100.1 | 8.47 | 6.98 | 9.98 | 0.04 | 120.65 | 0.066 |
| 06/18/2024 | 24.041 | 48.809 | 99.7 | 8.38 | 7.06 | 10.05 | 0.15 | 127.32 | 0.045 |
| 07/02/2024 | 24.92 | 48.148 | 103.5 | 8.58 | 7.22 | 10.24 | 0.31 | 112.95 | 0.082 |
| 07/24/2024 | 24.195 | 47.251 | 99.4 | 8.18 | 6.90 | 9.86 | 0.02 | 121.5 | 0.02 |
| 08/13/2024 | 24.372 | 47.451 | 98.3 | 8.22 | 7.03 | 10.06 | 0.2 | 126.37 | 0.074 |
| 08/26/2024 | 24.422 | 49.136 | 99.8 | 8.33 | 7.01 | 10.03 | 0.03 | 124.72 | -0.095 |
| 09/08/2024 | 23.892 | 48.685 | 100.1 | 8.53 | 7.02 | 10.1 | 0.19 | 121.1 | 0.006 |
| 10/02/2024 |  |  |  |  |  |  |  |  |  |

**Half Moon (NEHM) (2024)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | | Temp (°C) | | SpCond (mS/cm) | | DO% | | DO  mg/L | | pH | | pH | | Turbidity (NTU) | | Turbidity (NTU) | | Depth (m) | |
| Std. | | N/A | | 50 | | N/A | | N/A | | 7 | | 10 | | 0 | | 124 | | N/A | |
| 12/21/2023 | | 17.256 | | 50.350 | | 99.9 | | 9.69 | | 7.07 | | 10.0 | | 0.12 | | 120.98 | | -0.075 | |
| 01/12/2024 | | 17.0 | | 49.853 | | 99.4 | | 9.49 | | 7.05 | | 10.14 | | 0 | | 122.76 | | 0.002 | |
| 02/02/2024 | | 19.831 | | 49.320 | | 100.2 | | 9.12 | | 7.13 | | 10.19 | | -0.05 | | 120.3 | | 0.036 | |
| 02/28/2024 | | 19.309 | | 49.434 | | 99.1 | | 9.11 | | 7.08 | | 10.15 | | 0.04 | | 120.44 | | 0.013 | |
| 03/22/2024 | | 19.329 | | 49.914 | | 100.5 | | 9.08 | | 7.03 | | 10.06 | | 0.12 | | 121.88 | | 0.098 | |
| 04/08/2024 | | 22.884 | | 49.191 | | 97.7 | | 8.47 | | 7.10 | | 10.1 | | 0.17 | | 121.83 | | 0.0031 | |
| 04/30/2024 | | 22.96 | | 49.030 | | 99.6 | | 8.41 | | 7.04 | | 10.06 | | 0.9 | | 124.85 | | -0.079 | |
| 05/14/2024 | | 23.309 | | 49.577 | | 99.0 | | 8.45 | | 7.11 | | 10.1 | | 0.23 | | 124.25 | | 0.025 | |
| 05/30/2024 | | 24.673 | | 48.269 | | 100.3 | | 8.45 | | 7.12 | | 10.08 | | -0.03 | | 122.04 | | 0.033 | |
| 06/18/2024 | | 24.078 | | 50.086 | | 99.8 | | 8.39 | | 7.01 | | 10.0 | | 0.05 | | 120.36 | | 0.054 | |
| 07/02/2024 | | 25.059 | | 48.633 | | 95.8 | | 7.88 | | 7.11 | | 10.11 | | 0.19 | | 113.1 | | 0.19 | |
| 07/24/2024 | | 24.622 | | 48.707 | | 98.9 | | 8.22 | | 7.08 | | 10.07 | | 0.18 | | 121.35 | | 0.017 | |
| 08/13/2024 | | 24.509 | | 48.530 | | 100.4 | | 8.37 | | 7.05 | | 10.08 | | 0.11 | | 122.57 | | 0.060 | |
| 08/26/2024 | | 24.51 | | 49.517 | | 100.2 | | 8.35 | | 7.03 | | 10.0 | | -0.01 | | 125.45 | | -0.024 | |
| 09/08/2024 | | 21.443 | | 48.859 | | 102.0 | | 9.0 | | 6.92 | | 10.0 | | 0.01 | | 121.72 | | 0.005 | |
| 10/02/2024 | |  | |  | |  | |  | |  | |  | |  | |  | |  | |

**Lofton Creek (NELN) (2024)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | Temp (°C) | SpCond (mS/cm) | DO% | DO  mg/L | pH | pH | Turbidity (NTU) | Turbidity (NTU) | Depth (m) |
| Std. | N/A | 50 | N/A | N/A | 7 | 10 | 0 | 124 | N/A |
| 12/19/2023 | 17.458 | 50.205 | 99.7 | 9.43 | 7.15 | 10.14 | -0.06 | 123.42 | -0.081 |
| 01/12/2024 | 16.559 | 49.968 | 100.4 | 9.78 | 7.05 | 10.11 | 0.14 | 121.67 | 0.005 |
| 02/02/2024 | 19.712 | 49.450 | 100.4 | 9.17 | 7.07 | 10.04 | 0.22 | 121.76 | 0.036 |
| 02/28/2024 | 19.511 | 49.281 | 99.0 | 9.08 | 6.95 | 10.15 | 0.25 | 120.27 | 0.009 |
| 03/22/2024 | 19.236 | 49.855 | 100.1 | 9.3 | 7.05 | 10.03 | -0.02 | 122.21 | 0.082 |
| 04/09/2024 | 22.962 | 48.610 | 98.4 | 8.51 | 7.0 | 9.97 | 0.06 | 124.84 | 0.005 |
| 04/30/2024 | 22.924 | 49.791 | 99.1 | 8.49 | 7.12 | 10.04 | 0.27 | 124.2 | -0.094 |
| 05/14/2024 | 23.264 | 49.281 | 99.9 | 8.52 | 7.16 | 10.08 | 0.08 | 123.45 | -0.04 |
| 05/30/2024 | 24.788 | 49.148 | 99.5 | 8.42 | 7.14 | 10.15 | 0.32 | 124.54 | 0.002 |
| 06/18/2024 | 24.066 | 49.536 | 99.7 | 8.36 | 7.10 | 10.12 | 0.23 | 118.6 | -0.012 |
| 07/02/2024 | 25.281 | 49.497 | 100.7 | 8.26 | 7.05 | 10.08 | 0.03 | 115.15 | 0.057 |
| 07/24/2024 | 24.487 | 48.707 | 98.3 | 7.96 | 6.95 | 9.97 | 0.01 | 122.13 | 0.033 |
| 08/13/2024 | 24.572 | 48.474 | 97.2 | 8.06 | 6.94 | 9.96 | 0.28 | 122.7 | 0.034 |
| 08/26/2024 | 24.473 | 49.345 | 99.4 | 8.28 | 6.97 | 9.98 | 0.03 | 126.4 | 0.035 |
| 09/08/2024 | 24.076 | 49.755 | 100.2 | 8.43 | 7.04 | 10.06 | -0.05 | 123.33 | -0.05 |
| 10/02/2024 |  |  |  |  |  |  |  |  |  |

**Crane Island (NECI) (2024)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | Temp (°C) | SpCond (mS/cm) | DO% | DO  mg/L | pH | pH | Turbidity (NTU) | Turbidity (NTU) | Depth (m) |
| Std. | N/A | 50 | N/A | N/A | 7 | 10 | 0 | 124 | N/A |
| 12/19/2023 | 17.59 | 50.460 | 98.6 | 9.32 | 7.13 | 10.05 | 0.04 | 123.48 | -0.12 |
| 01/12/2024 | 17.325 | 19.796 | 99.1 | 9.45 | 7.17 | 10.14 | 0.27 | 125.83 | 0.007 |
| 02/02/2024 | 19.515 | 49.450 | 100.4 | 9.18 | 7.08 | 10 | -0.15 | 114.63 | 0.043 |
| 02/28/2024 | 19.48 | 49.430 | 98.2 | 9.01 | 7.13 | 10.13 | 0.12 | 120.73 | 0.01 |
| 03/22/2024 | 19.389 | 49.863 | 100.7 | 9.26 | 7.19 | 10.25 | -0.05 | 119.65 | 0.102 |
| 04/09/2024 | 23.096 | 49.679 | 99.2 | 8.48 | 7.07 | 10.02 | 0.27 | 126.6 | 0.014 |
| 04/30/2024 | 22.848 | 49.443 | 100.3 | 8.53 | 7.08 | 10.08 | 0.66 | 122.27 | -0.081 |
| 05/13/2024 | 23.215 | 49.679 | 99.6 | 8.5 | 7.17 | 10.12 | 0.65 | 124.13 | 0.035 |
| 05/30/2024 | 24.653 | 48.598 | 99.8 | 8.47 | 7.17 | 10.17 | 0.08 | 122.58 | 0.046 |
| 06/18/2024 | 24.041 | 48.111 | 99.3 | 8.34 | 7.04 | 9.99 | 0.21 | 121.02 | 0.049 |
| 07/02/2024 | 25.063 | 49.094 | 100.8 | 8.25 | 7.14 | 10.13 | 0.15 | 113.62 | 0.073 |
| 07/24/2024 | 24.354 | 47.843 | 97.0 | 8.16 | 7.05 | 10.01 | 0.12 | 122.41 | 0.022 |
| 08/13/2024 | 24.401 | 47.955 | 97.0 | 8.05 | 7.0 | 10.01 | 0.06 | 121.6 | 0.034 |
| 08/26/2024 | 24.446 | 49.192 | 99.7 | 8.31 | 6.98 | 10.01 | 0.13 | 125.7 | 0.015 |
| 09/08/2024 | 23.904 | 48.991 | 100.1 | 8.43 | 7.02 | 10.06 | -0.17 | 122.36 | 0.037 |
| 10/02/2024 |  |  |  |  |  |  |  |  |  |

\*Highlight denotes failed post calibration

1. **Other remarks/notes:**

**-**All KOR logs for the month of January were not submitted due to files not being able to be retrieved.

-Both pH and turbidity had failed calibrations for NEEC during the deployment 4/8/2024-4/30/2024 marked as suspect since data did not seem anomalous (steep decline in battery voltage near end of deployment.)

-NEHM did not have a three-point post calibration but passed two-point calibration. Three-point calibration started after 4/8/2024 deployment.

-Sites NEEC, NEHM, NECI on 4/30/2024 deployment all failed post-cal 0 turbidity but passed 124 these are all labeled as suspect since no anomalous data appears throughout deployment.

-Wiper for NECI on 4/30/2024 deployment was recovered on the bottom of sonde guard during recovery labeled all data as suspect due to this.

-Hurricane Helene made landfall on 09/26/2024 no flags were recorded during event.

**Missing Data**

**NEEC**

-03/22/2024; 09:30 This time stamp actually contained the discrete sample and was not in sonde housing.

**NEHM**

**NELN**

**NECI**

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 Principal Investigator.

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

**Anomalous/Suspect/Rejected Data:**

**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 NTU for EXO series sondes) were not deleted from the monthly records. Readings greater than 1000 NTU for 6600 series sondes and 4000 NTU 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 throughout the year at all four sites. 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:** 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. These instances are coded as suspect when they do not affect other parameters. In cases where other related parameters are impacted, the Conductivity and its associated parameters (Salt, DO mg/L, and Depth) are rejected.

**Station NEEC**

**January 1-31, 2024**

-No events for January-

**February 1-28, 2024**

* 02/02/2024-02/28/2024
  + Turbidity failed post-calibration
* 02/28/2024; 16:15
  + Turbidity spike compared to recent activity

**March 1-31, 2024**

* 03/27/2024; 09:30
  + Turbidity spike compared to recent activity

**April 1-30, 2024**

* 04/05/2024; 13:15-13:45
  + Sonde housing maintenance

**May 1-31, 2024**

* 05/14/2024; 07:30- 05/30/2024; 06:45
  + Turbidity failed post-calibration

**June 1-30, 2024**

-No events for June-

**July 1-31, 2024**

* 07/02/2024; 06:00 – 07/24/2024; 13:30
  + Both pH and Turbidity failed post-calibration data appeared to fit normal trends so labeled as suspect. New lot was used for turbidity.
* 07/10/2024; 19:45,21:15; 07/11/2024; 07:00; 07/14/2024; 08:00, 09:15, 09:45; 07/15/2024; 04:45, 09:15
  + see note 4
* 07/24/2024; 13:45 – 08/13/2024, 06:15
  + Failed post-calibration for conductivity labeled all associated parameters as suspect. End of deployment looks like drift but named storm Debby was the root driver of salinity crashing

**August 1-31, 2024**

* 07/24/2024; 13:45 – 08/13/2024, 06:15
  + Failed post-calibration for conductivity labeled all associated parameters as suspect. End of deployment looks like drift but named storm Debby was the root driver of salinity crashing

**September 1-30, 2024**

* 09/03/2024
  + Salinity and pH increase as temperature decreased from large NE wind driven storm, no other events for September

**October 1-31, 2024**

**November 1-30, 2024**

**December 1-31, 2024**

**Station NEHM**

**January 1-31, 2024**

-No events for January-

**February 1-28, 2024**

-No events for February-

**March 1-31, 2024**

-No events for March-

**April 1-30, 2024**

* 04/04/2024; 13:30-13:45
  + Sonde housing maintenance

**May 1-31, 2024**

* 04/30/2024-05/14/2024
  + Failed post-cal turbidity
* 05/14/2024-05/30/2024
  + Failed post cal pH turbidity by less than 1mV labeled as suspect since deployment did not seem to pick up any erroneous readings and all others passed

**June 1-30, 2024**

* 06/15/2024, 12:15; 06/24/2024, 11:30; 06/28/2024, 12:00
  + Turbidity spike compared to recent activity
* 06/21/2024
  + See note #4

**July 1-31, 2024**

* 07/02/2024-07/24/2024
  + Failed both DO and Turbidity post-calibration labeled as suspect as overall data trends appear normal. There were recorded turbidity spikes on 7/10 07:15,07/13 06:30, 07/16 11:30, 07/20 11:45. New lot was used for turbidity.

**August 1-31, 2024**

-No events for August-

**September 1-30, 2024**

-Early September data trends fit expected conditions of NE storm events with no other events in September-

**October 1-31, 2024**

**November 1-30, 2024**

**December 1-31, 2024**

**Station NELN**

**January 1-31, 2024**

-No events for January-

**February 1-28, 2024**

-No events for February-

**March 1-31, 2024**

-No events for March-

**April 1-30, 2024**

-No events for April-

**May 1-31, 2024**

* 05/18/2024; 07:15
  + See note 4
* 05/22/2024-05/30/2024
  + no data was marked as suspect but DO recordings did have single point dips these were not labeled as suspect since they were following the overall trend and did not correspond with single point drops in salinity as with note 4

**June 1-30, 2024**

* 06/05/2024, 12:00; 06/14/2024, 13:45; 06/16/2024, 11:30
  + See note #3
* 05/30/2024-06/18/2024
  + Turbidity failed 0 post cal but was accurate for 124 standard marked deployment as suspect

**July 1-31, 2024**

* 07/02/2024-07/24/2024
  + Turbidity failed post cal labeled all data as suspect. It is important to note that a new lot was used for the post calibration and may have been the reason for not passing post-cal. Data did appear to be slightly higher than normal trends.
* 07/24/2024 – 08/16/2024
  + DO post-cal low reading labeled data as suspect. Data started to record lower readings after the storm and continued for the rest of deployment.

**August 1-31, 2024**

-pH started to tapper off towards middle of deployment initially thought it could possibly be drift but next deployment pH balanced out and remained lower, no other events for August-

**September 1-30, 2024**

-shifts in parameters for week of 9/13/24 are a result of large rain event and fit trends, no other events for September-

**October 1-31, 2024**

**November 1-30, 2024**

**December 1-31, 2024**

**Station NECI**

**January 1-31, 2024**

-No events for January-

**February 1-28, 2024**

* 02/28/2024; 17:00-17:45, 23:15 and 02/29/2024; 05:15-06:00
  + Out of water events data rejected
* 02/06/2024; 12:15
  + See note 4
* 02/02/2024-02/28/2024
  + Turbidity failed 124 post calibration but passed 0 labeled as suspect

**March 1-31, 2024**

* 03/06/2024; 23:30,23:45, 03/08/2024; 00:30-01:00, 03/09/2024; 14:45, 03/10/2024; 02:00-03:30, 14:30-16:00, 03/11/2024; 02:30-04:15, 15:30-16:45, 03/12/2024; 04:00-06:00, 16:30-18:15, 03/14/2024; 06:00-06:30, 17:30-19:00
  + Out of water events data rejected
* 03/06/2024; 20:30
  + Turbidity spike compared to recent activity

**April 1-30, 2024**

* 04/16/2024; 09:45, 04/17/2024; 02:45
  + Turbidity spike compared to recent activity
* 04/30/2024-05/14/2024
  + Failed post-cal turbidity

**May 1-31, 2024**

* 04/30/2024-05/14/2024
  + Failed post-cal turbidity
* 05/16/2024; 09:00
  + Turbidity rejected due to spike that did not fit any upward trend
* 05/16/2024; 18:15 and 05/22/2024; 01:00
  + Turbidity spike compared to recent activity
* 05/29/2024; 08:30
  + DO suspect since single point drop of over 20%, only sensor that showed drastic dip
* 05/31/2024
  + See note #4

**June 1-30, 2024**

* 06/06/2024; 19:30, 06/09/2024; 10:30, 06/09/2024; 18:00, 06/10/2024; 04:15
  + Turbidity spike compared to recent activity
* 06/18/2024
  + High turbidity near end of deployment possibly caused by precipitation and high winds did **not** flag as suspect
* 06/21/2024
  + See note #4

**July 1-31, 2024**

* 07/02/2024-07/24/2024
  + Turbidity failed post-calibration marked data as suspect. Variable range in second half of deployment cause unknown. Turbidity spikes over 4000 were rejected outright.
* 07/08/204; 14:15, 07/13/2024; 04:15, 07/14/2024; 07:00,11:15,11:30, 07/23/2024; 18:15, 07/24/2024; 03:30,03:45,04:00
  + See note #4

**August 1-31, 2024**

-No events for August-

**September 1-30, 2024**

-No events for September-

**October 1-31, 2024**

**November 1-30, 2024**

**December 1-31, 2024**