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

January 2023 – December 2023  
Latest Update: 01/29/2024

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:**

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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. Eco Watch software is used to plot the data and generate graphs. Graphs for each deployment are studied immediately for trends and anomalies. Then any unusual variations are noted as pertaining to individual probes, and the need for their reconditioning or replacement.

Each data file is exported as a comma delimited file (.cdf) using EcoWatch software. Two copies of this .cdf file are saved in the .csv format. One is used to archive the raw data, and one is edited to adjust all records of Eastern Standard Time to read exactly on the hour or half hour. This second file is also used to delete data at the beginning and end of each deployment period when the instrument was out of the water. These data can be identified by field notes that document the start and end times for each deployment, and from conductivity and depth readings near zero.

Monthly data files are then created from the edited .csv files and processed by various macros distributed by the Centralized Data Management Organization (CDMO) which handles all data sonde data collected by the National Estuarine Research Reserve System (NERRS). The macros check files for missing data points, fill all cells that do not contain data with periods, and convert the data columns to CDMO approved formats for time, date and numeric values. They also find all data that are out of acceptable range for the sensors, save the files as Excel worksheets, and generate single parameter monthly graphs.

Questionable data are evaluated to determine if they can be deemed valid or must be rejected. Data are flagged that have fallen either outside of the expected range for the given site or outside of the range of measurements established for the data sonde sensors (see Table 1). Anomalous data are investigated for validity based on field observations, weather data, quality control checks, and instrument diagnostics. If anomalies are attributed to sensor malfunction, they are rejected. These deletions can be the direct result of a physical defect in one of the data sonde probes, such as a DO membrane puncture or a ruptured pH sensor “bulb”. If the voltage reading of the probe is outside of the range established for the sensor, or if the sensor will not calibrate, data will also be rejected.

Beginning in July 2018, data underwent 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 primary QA/QC process was performed by the CDMO and involved inserting flag columns into the data files for each water quality parameter, creating a flag record column, and creating an automated process that applied standardized flags to data if the values were outside sensor specifications as determined by YSI, the instrument manufacturer. Yearly data files that completed the primary QA/QC process were returned to Office of Resilience and Coastal Protection (RCP) staff for secondary QA/QC. Data were evaluated, and standardized flags and codes were applied to individual data points by insertion into the flag columns using the CDMO’s NERRQAQC Excel macro to provide further documentation of the data. Data files were then returned to the CDMO for ingestion into the Florida Aquatic Preserves database as provisional data. For more information on QA/QC flags and codes, see Sections 11 and 12.

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 the NE corner of the Betz Tiger Point fishing pier. 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:**

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 (30⁰ 30’12” N 81⁰ 29’41” W), 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.

The Half Moon/Nassau River (HM) site is located at (30.57364° N, -81.60653° W) 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.

The Lofton Creek site (LN) is located 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 border 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.

The Crane Island station is located within the Fort Clinch Aquatic Preserve within the Amelia River (30.614⁰, -81.479⁰) 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. Marys 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.

**Station timeline:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Station Code** | **Station Name** | **Location** | **Active Dates** | **Reason Decommissioned** | **Notes** |
| EC | Edwards Creek  (Dock) | 30⁰ 30’12”N 81⁰ 29’41”W | 11/20/2020 - Present | N/A | N/A |
| HM | Half Moon (Dock) | 30.56393° N,  81.61422° W | 4/9/2022 - Present | N/A | N/A |
| LN | LoftonCreek  (Dock) | 30⁰ 35’26”N 81⁰ 33’35”W | 04/07/2023 - Present | N/A | N/A |
| CI | Crane Island  (Dock) | 30.614⁰ N, -81.479⁰ W | 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.

The deployment and retrieval date/times for NEEC / NEHM / NELN /NECI for 2023 sampling season are listed below:

**Edwards Creek (NEEC) (2023)**

|  |  |
| --- | --- |
| **Deployment** | **Retrieval** |
| **Date/Time** | **Date/Time** |
| 01/04/2023; 09:00 | 01/26/2023; 09:00 |
| 01/26/2023; 09:00 | 02/24/2023; 16:30 |
| 02/24/2023; 16:30 | 03/14/2023; 08:30 |
| 03/14/2023; 08:30 | 04/07/2023; 11:00 |
| 04/07/2023; 11:00 | 04/21/2023; 12:30 |
| 04/21/2023; 12:30 | 05/13/2023; 08:30\* |
| 05/13/2023; 08:30 | 06/06/2023; 13:45 |
| 06/06/2023; 13:45 | 06/21/2023; 11:00\* |
| 06/21/2023; 11:00 | 07/20/2023; 13:15 |
| 07/20/2023; 13:15 | 08/07/2023; 11:15 |
| 08/07/2023; 11:15 | 08/23/2023; 12:00 |
| 08/23/2023; 12:15 | 09/07/2023; 10:00 |
| 09/07/2023; 10:00 | 10/02/2023; 15:30 |
| 10/02/2023; 15:30 | 10/23/2023; 17:00 |
| 10/23/2023; 17:00 | 11/17/2023; 13:30 |
| 11/17/2023; 13:30 | 12/19/2023; 11:15 |
| 12/19/2023; 11:15 | 01/12/2024; 10:15 |

**Halfmoon (NEHM) (2023)**

|  |  |  |
| --- | --- | --- |
| **Deployment** | | **Retrieval** |
| **Date/Time** | | **Date/Time** |
| 01/04/2023; 08:15 | | 01/26/2023; 09:45 |
| 01/26/2023; 09:45 | | 02/25/2023; 08:00 |
| 02/25/2023; 08:00 | | 03/14/2023; 09:15 |
| 03/14/2023; 09:15 | | 04/07/2023; 10:15 |
| 04/07/2023; 10:15 | | 04/21/2023; 11:45 |
| 04/21/2023; 11:45 | | 05/13/2023; 07:45 |
| 05/13/2023; 07:45 | | 06/06/2023; 14:45 |
| 06/06/2023; 14:45 | | 06/21/2023; 12:00 |
| 06/21/2023; 12:00 | | 07/20/2023; 14:15 |
| 07/20/2023; 14:15 | | 08/07/2023; 13:15 | |
| 08/07/2023; 13:15 | | 08/23/2023; 13:15 | |
| 08/23/2023; 13:15 | | 10/01/2023; 16:45 | |
| 10/01/2023; 16:45 | | 10/24/2023; 10:45 | |
| 10/24/2023; 11:00 | | 11/17/2023; 12:30 | |
| 11/17/2023; 12:45 | | 12/21/2023; 13:15 | |
| 12/21/2023; 13:30 | | 01/12/2024; 11:00 | |

**Lofton Creek (NELN) (2023)**

|  |  |  |
| --- | --- | --- |
| **Deployment** | **Retrieval** | |
| **Date/Time** | **Date/Time** | |
| 04/07/2023; 09:30 | | 04/21/2023; 11:00 |
| 04/21/2023; 11:00 | | 05/13/2023; 11:00 |
| 05/13/2023; 11:00 | | 06/06/2023; 15:30 |
| 06/06/2023; 15:30 | | 06/21/2023; 12:45 |
| 06/21/2023; 12:45 | | 07/20/2023; 15:00 |
| 07/20/2023; 15:00 | | 08/07/2023; 12:30 |
| 08/07/2023; 12:30 | | 08/23/2023; 14:00 |
| 08/23/2023; 14:00 | | 10/01/2023; 17:15 |
| 10/01/2023; 17:30 | | 10/24/2023; 10:00\* |
| 10/24/2023; 10:15 | | 11/17/2023; 11:45 |
| 11/17/2023; 12:00 | | 12/19/2023; 15:15 |
| 12/19/2023; 15:30 | | 01/12/2024; 12:00 |

**Crane Island (NECI) (2023)**

|  |  |  |
| --- | --- | --- |
| **Deployment** | **Retrieval** | |
| **Date/Time** | **Date/Time** | |
| 10/24/2023; 09:30 | | 11/17/2023; 11:15 | |
| 11/17/2023; 11:30 | | 12/19/2023; 14:30 | |
| 12/19/2023; 14:45 | | 01/12/2024; 12:45 | |

\*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.

1. **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 6600 EDS data sonde:

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Thermistor

Model #: 6560

Range: -5 to 45 °C

Accuracy: +/-0.15 °C

Resolution: 0.01 °C

Parameter: Conductivity

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

Sensor Type: 4-electrode cell with autoranging

Model #: 6560

Range: 0 to 100 mS/cm

Accuracy: +/-0.5% of reading + 0.001 mS/cm

Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependent)

Parameter: Salinity

Units: parts per thousand (ppt)

Sensor Type: Calculated from conductivity and temperature

Range: 0 to 70 ppt

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

Resolution: 0.01 ppt

Parameter: Dissolved Oxygen % saturation

Units: percent air saturation (%)

Sensor Type: Rapid Pulse – Clark type, polarographic

Model #: 6562

Range: 0 to 500 % air saturation

Accuracy: 0-200 % air saturation, +/- 2 % of the reading or 2 % air saturation, whichever is greater; 200-500 % air saturation, +/- 6 % of the reading

Resolution: 0.1 % air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature and salinity)

Units: milligrams per Liter (mg/L)

Sensor Type: Rapid Pulse – Clark type, polarographic

Model #: 6562

Range: 0 to 50 mg/L

Accuracy: 0 to 20 mg/L, +/- 2 % of the reading or 0.2 mg/L, whichever is greater; 20 to 50 mg/L, +/- 6 % 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 30 ft (9.1 m)

Accuracy: +/- 0.06 ft (0.018 m)

Resolution: 0.001 ft (0.001 m)

Parameter: pH (specify whether EDS probe or not)

Units: units

Sensor Type: Glass combination electrode

Model #: 6561

Range: 0 to 14 units

Accuracy: +/- 0.2 units

Resolution: 0.01 units

Parameter: Turbidity

Units: nephelometric turbidity units (NTU)

Sensor Type: Optical, 90 ° scatter, with mechanical cleaning

Model #: 6136

Range: 0 to 1000 NTU

Accuracy: +/- 5 % reading or 2 NTU (whichever is greater)

Resolution: 0.1 NTU

### 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) (2023)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | Temp (°C) | SpCond (mS/cm) | ROX DO % | pH | pH | Turbidity (NTU) | Depth (m) |
| Std. | N/A | 50 | 100 | 7 | 10 | 0 | N/A |
| 01/04/2023 | 17.27 | 50.156 | 100.1 | 7.16 | 10.19 | -0.03 | N/A |
| 01/26/2023 | 21.24 | 50.166 | 99.6 | 7.02 | 10.08 | -0.23 | N/A |
| 02/24/2023 | 18.58 | 50.167 | 99.7 | 7.06 | 10.04 | 0.11 | 0.057 |
| 03/14/2023 | 23.319 | 50.072 | 98.8 | 7.08 | 10.09 | 0.61\* | 0.08 |
| 04/21/2023 | 22.205 | 50.090 | 98.0 | 7.04 | 10.09 | -0.29 | -0.021 |
| 05/13/2023 | 22.34 | 50.077 | 99.1 | 7.23\* | 10.18 | 0.23 | NA |
| 06/06/2023 | 22.51 | 50.166 | 99.3 | 7.17 | 10.14 | 0.36\* | 0.075 |
| 06/21/2023 | 24.519 | 49.925 | 96.6 | 9.96 | 9.96 | 0.08 | 0.025 |
| 07/20/2023 | 24.392 | 50.106 | 99.5 | 7.17 | 10.1 | 0.09 | 0.011 |
| 08/07/2023 | 26.16 | 50.181 | 99.4 | 7.07 | 10.16 | -0.15 | 0.028 |
| 08/23/2023 | 26.95 | 50.168 | 98.3 | 7.08 | 9.93 | 0.21 | 0.054 |
| 09/07/2023 | 23.774 | 49.771 | 99.6 | 7.03 | 9.99 | 0.22 | 0.055 |
| 10/01/2023 | 21.873 | 50.089 | 99.5 | 7.06 | 10.16 | 0.2 | 0.102 |
| 10/23/2023 | 20.864 | 49.662 | 98.4 | 7.07 | 10.08 | 0.07 | 0.017 |
| 11/17/2023 | 16.95 | 50.345 | 99.8 | 7.08 | 10.17 | 0.46\* | 0.12 |
| 12/18/2023 | 17.851 | 49.910 | 100.1 | 7.19 | 10.24 | 0.17 | -0.072 |

**Half Moon (NEHM) (2023)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | | Temp (°C) | | SpCond (mS/cm) | | ROX DO % | | pH | | pH | | Turbidity (NTU) | | Depth (m) | |
| Std. | | N/A | | 50 | | 100 | | 7 | | 10 | | 0 | | N/A | |
| 01/04/2023 | | 17.246 | | 50.211 | | 99.5 | | 7.08 | | 10.15 | | -0.04 | | N/A | |
| 01/26/2023 | | 21.184 | | 50.220 | | 99.4 | | 7.08 | | 10.09 | | -0.42\* | | N/A | |
| 02/25/2023 | | 18.355 | | 50.198 | | 99.6 | | 7.02 | | 10.05 | | -0.11 | | 0.058 | |
| 03/14/2023 | | 20.35 | | 50.180 | | 99.9 | | 7.03 | | 10.08 | | 0.06 | | 0.073 | |
| 04/06/2023 | | 24.05 | | 49.580 | | 100.0 | | 7.14 | | 10.11 | | -0.2 | | NA | |
| 04/21/2023 | | 22.24 | | 50.314 | | 96.7 | | 7.06 | | 10.08 | | -0.13 | | -0.021 | |
| 05/13/2023 | | 22.61 | | 50.077 | | 98.7 | | 7.14 | | 10.09 | | 0.1 | | NA | |
| 06/03/2023 | | 22.552 | | 50.188 | | 98.4 | | 7.15 | | 10.18 | | -0.14 | | 0.078 | |
| 06/21/2023 | | 24.637 | | 49.922 | | 98.4 | | 7.03 | | 10.05 | | 0.1 | | 0.025 | |
| 07/20/2023 | | 24.3 | | 49.824 | | 97.1 | | 7.10 | | 10.09 | | -0.06 | | 0.022 | |
| 08/07/2023 | | 26.28 | | 50.199 | | 98.0 | | 7.03 | | 10.08 | | -0.03 | | 0.041 | |
| 08/23/2023 | | 23.58 | | 49.648 | | 98.3 | | 7.10 | | 10.11 | | 0.12 | | 0.044 | |
| 10/01/2023 | | 22.092 | | 49.888 | | 100.1 | | 7.10 | | 10.13 | | 0.11 | | 0.102 | |
| 10/24/2023 | | 20.766 | | 49.878 | | 97.8 | | 6.98 | | 10.03 | | 0.22 | | -0.006 | |
| 11/17/2023 | | 17.11 | | 50.244 | | 100.7 | | 7.06 | | 10.09 | | 0.03 | | 0.101 | |
| 12/21/2023 | | 17.256 | | 50.350 | | 99.9 | | 7.07 | | 10.0 | | 0.12 | | -0.075 | |

**Lofton Creek (NELN) (2023)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | Temp (°C) | SpCond (mS/cm) | ROX DO % | pH | pH | Turbidity (NTU) | Depth (m) |
| Std. | N/A | 50 | 100 | 7 | 10 | 0 | N/A |
| 04/07/2023 | 24.117 | 50.081 | 97.0 | 7.16 | 10.26\* | -0.1 |  |
| 04/21/2023 | 22.248 | 50.213 | 99.2 | 7.04 | 10.08 | -0.11 | -0.02 |
| 05/13/2023 | 22.48 | 50.081 | 98.7 | 7.15 | 10.12 | 0.13 |  |
| 05/13/2023 | 22.48 | 50.081 | 98.7 | 7.15 | 10.12 | 0.13 | N/A |
| 06/06/2023 | 22.566 | 50.209 | 99.7 | 7.09 | 10.07 | -0.07 | 0.092 |
| 06/21/2023 | 24.614 | 49.950 | 98.9 | 7.07 | 10.09 | 0.2 | 0.025 |
| 07/20/2023 | 24.41 | 50.143 | 99.3 | 7.04 | 9.99 | 0.03 | 0.026 |
| 08/07/2023 | 26.13 | 50.224 | 98.6 | 7.04 | 10.08 | -0.08 | 0.037 |
| 08/23/2023 | 23.37 | 50.090 | 100.4 | 7.08 | 10.06 | 0.05 | 0.036 |
| 10/01/2023 | 22.28 | 49.870 | 101.2 | 7.06 | 10.12 | 0.18 | 0.103 |
| 10/24/2023 | 20.305 | 50.033 | 97.9 | 7.08 | 10.11 | 0.14 | -0.009 |
| 11/17/2023 | 16.848 | 50.305 | 100.8 | 7.09 | 10.11 | 0.18 | 0.113 |
| 12/19/2023 | 17.458 | 50.205 | 99.8 | 7.15 | 10.14 | -0.06 | -0.081 |

**Crane Island (NECI) (2023)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Deployment Date | Temp (°C) | SpCond (mS/cm) | ROX DO % | pH | pH | Turbidity (NTU) | Depth (m) |
| Std. | N/A | 50 | 100 | 7 | 10 | 0 | N/A |
| 10/24/2023 | 20.511 | 49.813 | 101.5 | 7.23\* | 10.25\* | 0.15 | -0.011 |
| 11/17/2023 | 16.583 | 50.530 | 101.3 | 7 | 10.02 | 0.03 | 0.115 |
| 12/19/2023 | 17.59 | 50.460 | 98.4 | 7.13 | 10.05 | 0.04 | -0.12 |

\*Denotes failed post calibration

1. **Other remarks/notes:**

a.)06/06/2023-06/21/2023 raw data shows the NELN sonde was used and the NEEC sonde was deployed at the North Hampton location and vice versa.

b.) During the months of July and August for NEEC turbidity values were relatively high unsure if this was caused by constant rain events and an increase in wind activity.

Frequent battery issues arose for NEEC and time where power would cut-off was during deployment. The AP has sought to rectify this issue by cleaning sonde housing every week instead of just when swapping sondes.

**Missing Data**

**NEEC**.

a.)04/26/2023 05:15 - 05/13/2023 08:15;

06/06/2023 13:45-06/21/2023 10:00

08/23/2023 12:15 – 09/07/2023 09:45

\* Issues with sonde 19E101372. Thought to be battery issues. Data shows recording up until deployments. This may also be caused from dropping sonde too quickly into housing during deployment.

b.)08/07/2023 09:45-08/07/2023 11:00

\* Cleaning on 08/07/2023 09:45-11:00 sonde housing was cleaned

**NEHM**

**NELN**

a.)10/20/2023 14:30 – 10/24/2023 10:15

**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, 2023**

a.)01/08/2023 11:00 01/12/2023 12:30 01/16/2023 12:15 01/23/2023 15:15

01/23/2023 15:45 01/24/2023 20:45 01/24/2023 21:30 01/24/2023 21:45

\*Turbidity spike compared to recent activity

**February 1-28, 2023**

a.) 02/27/2023 01:15 02/27/2023 01:30 02/27/2023 01:45 02/27/2023 02:00

02/27/2023 02:15 02/27/2023 02:30 02/27/2023 02:45 02/27/2023 03:00

\*Turbidity spike compared to recent activity

**March 1-31, 2023**

a.) 03/07/2023 18:00

\*Turbidity spike compared to recent activity

b.) 03/14/2023 08:30 – 03/31/2023

\*Turbidity post-calibration out of range

c.) 03/31/2023 05:45

\*see note 4

**April 1-30, 2023**

a.)04/01/2023 - 04/21/2023

\*Turbidity post-calibration out of range

b.)04/07/2023-04/21/2023

\*SpCond did not record any data but salinity marked with NAN designator.

c.) 04/04/2023 09:15

\*see note 4

**May 1-31, 2023**

a.)5/13/2023-5/31/2023

\*pH did not pass post-calibration

b.) 05/26/2023 08:15, 05/28/2023 15:30

\*Turbidity spike compared to recent activity

**June 1-30, 2023**

a.)06/01/2023-06/06/2023

pH did not pass post-calibration

b.)06/26/2023 06:15 06/26/2023 06:30 06/26/2023 06:45 06/26/2023 07:45

06/26/2023 08:00 06/26/2023 08:30 06/26/2023 09:45 06/27/2023 09:45

06/29/2023 10:30 06/30/2023 05:30

\*Turbidity spike compared to recent activity

**July 1-31, 2023**

a.) 07/20/2023 02:45 07/20/2023 03:00 07/20/2023 07:45

\*Turbidity spike compared to recent activity

b.) 07/17/2023 05:30, 07/19/2023 06:45

\*see note 4

**August 1-31, 2023**

a.) 08/07/2023 14:15 08/07/2023 14:30 08/07/2023 19:15 08/07/2023 19:30

08/07/2023 19:45 08/09/2023 16:00 08/10/2023 09:15 08/11/2023 14:30

08/13/2023 06:30 08/13/2023 08:45 08/14/2023 23:45 08/16/2023 14:15

08/20/2023 06:00 08/21/2023 07:30 08/23/2023 00:00

\*Turbidity spike compared to recent activity( see notes above)

**September 1-30, 2023**

a.)09/18/2023 18:15, 09/28/2023 11:00

\*see note 4

b.) 09/19/2023 05:45, 09/22/2023 16:15

\*Turbidity spike compared to recent activity

**October 1-31, 2023**

a.)10/10/2023 06:00, 10/19/2023 14:45

\*see note 4

**November 1-30, 2023**

1. 11/17/2023 13:45

\*Turbidity post-calibration out of range

b.) 11/06/2023 23:45, 11/13/2023 17:15

\*see note 4

**December 1-31, 2023**

a.)12/01/2023 – 13/19/2023 11:00

**Turbidity post-calibration out of range**

**Station NEHM**

**January 1-31, 2023**

**February 1-28, 2023**

a.)02/04/2023 15:45

\*Turbidity spike compared to recent activity

**March 1-31, 2023**

a.) 03/20/2023 14:30, 03/25/2023 07:45

\*Turbidity spike compared to recent activity

**April 1-30, 2023**

a.)04/07/2023-04/21/2023

\*SpCond did not record any data but salinity marked with NAN designator.

b.) 04/21/2023 19:30 04/23/2023 12:30 (unable to clear these two suspect codes) 04/24/2023 15:30

\*Turbidity spike compared to recent activity

c.) 04/27/2023 05:15, 04/27/2023 05:30

\*DO spike/decline not observed before

**May 1-31, 2023**

a.) 05/10/2023 03:15 05/10/2023 03:30 05/12/2023 05:45 05/14/2023 07:30

05/16/2023 09:30 05/17/2023 09:45 05/17/2023 10:00

\*DO spike/decline not observed before

b.) 05/19/2023 12:30 05/21/2023 22:30 05/25/2023 13:30 05/25/2023 17:15

05/26/2023 03:15 05/27/2023 12:30

\*Turbidity spike unable to clear fault codes

**June 1-30, 2023**

a.) 06/23/2023 08:15 06/23/2023 08:30 06/27/2023 10:00 06/27/2023 10:15

06/27/2023 10:30 06/27/2023 10:45 06/27/2023 11:00 06/27/2023 11:15

06/27/2023 11:30 06/27/2023 11:45 06/27/2023 23:30 06/27/2023 23:45

06/28/2023 00:00 06/28/2023 00:15 06/28/2023 10:45 06/28/2023 11:00

06/28/2023 11:15 06/28/2023 11:30 06/28/2023 11:45 06/28/2023 12:00

06/28/2023 12:15 06/29/2023 12:15 06/29/2023 12:30 06/29/2023 12:45

06/29/2023 13:00

\*Out of water events

b.) 06/02/2023 19:15 06/03/2023 13:15 06/04/2023 09:00 06/05/2023 10:30

06/10/2023 16:30 06/14/2023 22:00 06/16/2023 07:00 06/17/2023 23:45

06/19/2023 04:30

\*Turbidity spike compared to recent activity

**July 1-31, 2023**

a.) 07/01/2023 14:15 07/01/2023 14:30 07/01/2023 14:45 07/01/2023 15:00

07/02/2023 15:00 07/02/2023 15:15 07/02/2023 15:30 07/02/2023 15:45

07/02/2023 16:00 07/03/2023 16:00 07/03/2023 16:15 07/03/2023 16:30

07/03/2023 16:45 07/03/2023 17:00 07/06/2023 19:30 07/06/2023 19:45

07/10/2023 10:00 07/10/2023 10:15 07/10/2023 10:30 07/10/2023 10:45

07/10/2023 11:00 07/10/2023 11:15 07/10/2023 23:00 07/10/2023 23:15

07/10/2023 23:30 07/10/2023 23:45 07/11/2023 11:00 07/11/2023 11:15

07/11/2023 11:30 07/11/2023 11:45 07/13/2023 12:30 07/13/2023 12:45

07/13/2023 13:00 07/13/2023 13:15 07/13/2023 13:30 07/14/2023 13:00

07/14/2023 13:15 07/14/2023 13:30 07/14/2023 13:45 07/14/2023 14:00

07/14/2023 14:15 07/14/2023 14:30 07/15/2023 13:45 07/15/2023 14:00

07/15/2023 14:15 07/15/2023 14:30 07/15/2023 14:45 07/15/2023 15:00

07/15/2023 15:15 07/15/2023 15:30 07/16/2023 04:00 07/16/2023 04:15

07/16/2023 04:30 07/16/2023 14:15 07/16/2023 14:30 07/16/2023 14:45

07/16/2023 15:00 07/16/2023 15:15 07/16/2023 15:30 07/16/2023 15:45

07/16/2023 16:00 07/16/2023 16:15 07/16/2023 16:30 07/17/2023 04:15

07/17/2023 04:30 07/17/2023 04:45 07/17/2023 05:00 07/17/2023 05:15

07/17/2023 15:15 07/17/2023 15:30 07/17/2023 15:45 07/17/2023 16:00

07/17/2023 16:15 07/17/2023 16:30 07/17/2023 16:45 07/17/2023 17:00

07/18/2023 05:30 07/18/2023 16:15 07/18/2023 16:30 07/18/2023 16:45

07/18/2023 17:00 07/18/2023 17:15 07/18/2023 17:30 07/19/2023 16:45

07/19/2023 17:00 07/19/2023 17:15 07/19/2023 17:30 07/19/2023 17:45

07/19/2023 18:00 07/19/2023 18:15 07/20/2023 05:45 07/20/2023 06:00

07/20/2023 06:15 07/20/2023 06:30 07/20/2023 06:45 07/20/2023 07:00

07/20/2023 07:15 07/20/2023 17:45 07/20/2023 18:00 07/20/2023 18:15

07/20/2023 18:30 07/29/2023 12:00 07/29/2023 12:15 07/29/2023 12:30

07/29/2023 12:45 07/29/2023 13:00 07/29/2023 13:15 07/29/2023 13:30

07/29/2023 13:45 07/29/2023 14:00 07/30/2023 13:00 07/30/2023 13:15

07/30/2023 13:30 07/30/2023 13:45 07/30/2023 14:00 07/30/2023 14:15

07/30/2023 14:30 07/30/2023 14:45 07/30/2023 15:00 07/31/2023 15:00

07/31/2023 15:15 07/31/2023 15:30

\*out of water events

**August 1-31, 2023**

a.) 08/04/2023 20:45 08/05/2023 04:45 08/06/2023 01:45 08/28/2023 15:30

\*Turbidity extreme high and evidence of heavy fouling

b.) 08/10/2023 11:00

\*see note 4

c.) 08/09/2023 12:15, 08/19/2023 16:30

\*Turbidity spike compared to recent activity

**September 1-30, 2023**

a.) 09/01/2023 05:30 09/05/2023 05:30 09/06/2023 00:45 09/07/2023 06:00

09/07/2023 19:15 09/09/2023 03:30

\*Turbidity extreme high and evidence of heavy fouling

b.) 09/02/2023 05:30 09/11/2023 18:15 09/11/2023 20:15 09/13/2023 00:1509/20/2023 20:00

\*Turbidity spike compared to recent activity

**October 1-31, 2023**

a.) 10/24/2023 12:45 10/25/2023 14:15 10/26/2023 01:30 10/26/2023 01:45

10/26/2023 02:15 10/28/2023 17:00 10/29/2023 17:00 10/29/2023 18:00

10/29/2023 18:15 10/30/2023 17:30 10/31/2023 04:30 10/31/2023 05:00

10/24/2023 11:15 10/24/2023 11:30 10/24/2023 12:00 10/24/2023 12:15

10/24/2023 13:00 10/24/2023 23:00 10/25/2023 00:15 10/25/2023 00:30

10/25/2023 01:15 10/25/2023 02:00 10/25/2023 11:15 10/25/2023 11:30

10/25/2023 12:00 10/25/2023 12:30 10/25/2023 12:45 10/25/2023 13:00

10/25/2023 13:15 10/25/2023 13:45 10/25/2023 14:00 10/25/2023 14:30

10/25/2023 14:45 10/26/2023 00:00 10/26/2023 00:15 10/26/2023 00:45

10/26/2023 02:00 10/26/2023 02:30 10/26/2023 02:45 10/26/2023 03:00

10/26/2023 03:30 10/26/2023 11:00 10/26/2023 12:00 10/26/2023 12:15

10/26/2023 12:30 10/26/2023 12:45 10/26/2023 13:45 10/26/2023 14:00

10/26/2023 14:15 10/26/2023 14:30 10/26/2023 14:45 10/26/2023 15:15

10/26/2023 15:30 10/26/2023 15:45 10/26/2023 16:00 10/27/2023 00:45

10/27/2023 01:00 10/27/2023 01:15 10/27/2023 01:30 10/27/2023 01:45

10/27/2023 02:15 10/27/2023 02:30 10/27/2023 02:45 10/27/2023 03:00

10/27/2023 04:15 10/27/2023 13:00 10/27/2023 13:15 10/27/2023 13:45

10/27/2023 14:15 10/27/2023 14:30 10/27/2023 15:30 10/27/2023 15:45

10/27/2023 16:00 10/27/2023 16:15 10/27/2023 16:30 10/27/2023 16:45

10/28/2023 01:45 10/28/2023 02:00 10/28/2023 02:15 10/28/2023 02:30

10/28/2023 02:45 10/28/2023 03:15 10/28/2023 03:45 10/28/2023 04:00

10/28/2023 04:30 10/28/2023 14:15 10/28/2023 15:00 10/28/2023 15:3

10/28/2023 15:45 10/28/2023 16:00 10/28/2023 16:15 10/28/2023 16:45

10/28/2023 17:15 10/28/2023 17:30 10/28/2023 17:45 10/28/2023 18:00

10/29/2023 02:15 10/29/2023 02:30 10/29/2023 03:15 10/29/2023 04:15

10/29/2023 04:30 10/29/2023 04:45 10/29/2023 05:00 10/29/2023 05:15

10/29/2023 05:30 10/29/2023 15:00 10/29/2023 15:15 10/29/2023 15:30

10/29/2023 16:00 10/29/2023 16:15 10/29/2023 16:30 10/29/2023 16:45

10/29/2023 17:45 10/30/2023 03:00 10/30/2023 03:45 10/30/2023 05:15

10/30/2023 06:00 10/30/2023 16:00 10/30/2023 16:15 10/30/2023 16:45

10/30/2023 17:00 10/30/2023 17:15 10/30/2023 17:45 10/30/2023 18:00

10/30/2023 18:15 10/30/2023 18:30 10/30/2023 18:45 10/31/2023 03:00

10/31/2023 03:30 10/31/2023 04:15 10/31/2023 04:45 10/31/2023 05:45

10/31/2023 06:00 10/31/2023 06:15 10/31/2023 07:00

\*Turbidity extreme high and evidence of heavy fouling

**November 1-30, 2023**

**December 1-31, 2023**

1. 12/17/2023 19:45- 12/21/2023 13:15

\*Possible drift unsure flagged as suspect

**Station NELN**

**April 1-30, 2023**

a.)04/07/2023-04/21/2023

\*SpCond did not record any data but salinity marked with NAN designator.

b.) pH failed post-calibration

c.) 04/27/2023 11:30

\*DO spike/decline not observed before

**May 1-31, 2023**

**June 1-30, 2023**

a.) 06/07/2023 10:15, 06/15/2023 05:00, 06/17/2023 06:30

\*DO spike/decline not observed before

**July 1-31, 2023**

a.) 07/02/2023 20:30, 07/05/2023 10:15, 07/16/2023 20:15, 07/17/2023 23:00,

\*Turbidity spike compared to recent activity

**August 1-31, 2023**

a.) 08/10/2023 02:15

\*Turbidity spike compared to recent activity

**September 1-30, 2023**

a.) 09/08/2023 02:45, 09/22/2023 13:30, 09/24/2023 03:30, 09/24/2023 15:15

\*Turbidity spike compared to recent activity

b.) 09/04/2023 10:15

\*DO spike/decline not observed before

**October 1-31, 2023**

a.) 09/24/2023 03:30

\*Turbidity spike compared to recent activity

**November 1-30, 2023**

**December 1-31, 2023**

a.) 12/02/2023 15:45

\*Turbidity spike compared to recent activity

b.) 12/17/2023 19:15-12/19/2023 15:15

\*originally flagged as suspected drift but believe it may just be natural

**Station NECI**

**October 1-31, 2023**

a.)10/24/2023-10/31/2023

\*Failed pH post-calibration

**November 1-30, 2023**

a.)11/01/2023-11/17/2023 11:15

\*Failed pH post-calibration

b.) 11/21/2023 19:45, 11/28/2023 11:45, 11/28/2023 12:00

\*see note 4

c.) 11/22/2023 17:00

\*Turbidity spike compared to recent activity

**December 1-31, 2023**

a.) 12/06/2023 23:30, 12/20/2023 01:00

\*Turbidity spike compared to recent activity

b.) 12/11/2023 13:30

\*see note 4