**Nature Coast Aquatic Preserve (NCBP) Water Quality Metadata**

**March and April 2025**

**Latest Update:** 5/7/2025

Note: This is a provisional metadata document; it has not been authenticated as of its download date. Contents of this document are subject to change throughout the QAQC process and it should not be considered a final record of data documentation until that process is complete. Contact the Aquatic Preserve office [(3266 N Sailboat Ave, Crystal River, FL 34428)] with any additional questions.

**I. Data Set and Research Descriptors**

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

Technician and Person in Charge of Data Management:

Morgan Edwards

Biological Scientist III

University of Florida

1692 McCarty Drive

Building A, Room 2181

Gainesville, FL 32611

(352) 514-3744

Aquatic Preserve Manager:

Tyler Ferguson

NCAP Consulting Manager

3266 N Sailboat Ave

Crystal River, FL 34428

(305) 393-3746

**2) Entry verification –**

Deployment data are uploaded from the YSI data sonde to a University of Florida computer (IBM compatible). Files are exported from KOR Software, the software platform used for managing the EXO data sonde and water quality data, in a comma separated file (.csv) and uploaded to the NERRS Centralized Data Management Office (CDMO) Non-SWMP Data Upload Service where data undergo automated primary QAQC. All pre- and post-deployment data are removed from the file prior to upload. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the 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 Morgan Edwards.

**3) Research objectives –**

The station at the Bayport fishing pier is newly established as of March 2025, with the first set of data collected ranging from March 18 to April 10, 2025. The goal of this station is to collect long-term water quality data, helping to fill in a gap in continuous data collection along the Nature Coast. The fixed station sits at the mouth of the Weeki Wachee River in Bayport, Florida.

**4) Research methods –**

During Quarter 1, a single (first for the site) deployment was conducted that started on March 18 at 9:46 AM with a start time of 10:00 AM EST, and ran until April 10 with retrieval occurring at 9:10 AM EST. Readings were taken at 15-minute intervals. The logger passed all calibrations and initial calibration verifications prior to deployment, as well as all continuing calibration verifications after retrieval. All pH, conductivity, and turbidity standards were purchased from YSI. The stock solution for the rhodamine standard used for calibration of the TAL-PC sensor was made by the technician.

**5) Site location and character –**

|  |  |
| --- | --- |
| Site name | Nature Coast Bayport (NCBP) |
| Latitude and longitude | *28.53386, -82.65048* |
| Tidal range *(meters)* | 3-5 feet |
| Salinity range *(psu)* | 0.5 to 24 |
| Type and amount of freshwater input | 145 cubic feet/s Weeki Wachee River |
| Water depth (*meters, MLW*) | *0.75 ft* |
| Sonde distance from bottom (*meters*) | *0.3* |
| Bottom habitat or type | *Soft sediment and oyster hash* |
| Pollutants in area | Unknown |
| Description of watershed | *The Weeki Wachee River is part of the Springs Coast Watershed. Weeki Wachee is a first magnitude spring with a spring run of approximately 7.5 miles to the Gulf. This watershed includes 5 other springs.* |

**Station Timeline:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station Code | Station Name | Location | Active Dates | Reason Decommissioned | Notes |
| NCBP | Nature Coast Bayport | Bayport fishing pier | March 18 2025 to present | NA | NA |
|  |  |  |  | NA | NA |
|  |  |  |  | NA | NA |
|  |  |  |  | NA | NA |

**6) Data collection period – First Deployment for NCBP**

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| --- | --- |
| **Deployment Date/Time** | **Retrieval Date/Time** |
| 03/18/2025 09:46 | 04/10/2025 09:10 |
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\*Instrument and/or battery malfunction

**7) Distribution –**

[Instructions/Remove: This section will address data ownership and data liability by including something similar to the following excerpt]

The Principle Investigator (PI) retains the right to be fully credited for having collected and process the data.  Following academic courtesy standards, the Aquatic Preserve site where the data were collected should be contacted and fully acknowledged in any subsequent publications in which any part of the data are used.  The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement.  The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons.

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

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

FDEP has contracted the University of Florida to perform monthly water quality sampling at 10 sites in the Weeki Wachee area. This data collection has been ongoing since March of 2021. Additionally, annual seagrass monitoring also takes place in the Weeki Wachee estuary. These data can be used to enhance and inform data collected by the continuous station and vise versa.

**II. Physical Structure Descriptors**

**9) Sensor specifications –**

NCBP deployed EXO 2 data sondes starting March 18, 2025. There is only one station currently run by our office at the University of Florida.

YSI EXO Sonde:

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Wiped probe; Thermistor

Model#: 599827

Range: -5 to 50 C

Accuracy: ±0.2 C

Resolution: 0.001 C

Parameter: Conductivity

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

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

Model#: 599827

Range: 0 to 100 mS/cm

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

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

Parameter: Salinity

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

Model#: 599827

Sensor Type: Wiped probe; Calculated from conductivity and temperature

Range: 0 to 70 ppt

Accuracy: ±2% of the reading or 0.2 ppt, whichever is greater

Resolution: 0.01 psu

Parameter: Dissolved Oxygen % saturation

Sensor Type: Optical probe w/ mechanical cleaning

Model#: 599100-01

Range: 0 to 500% air saturation

Accuracy: ± 1% of reading or 1% of air saturation, whichever is greater; 200-500% air sat: ± 5% of reading Resolution: 0.1% air saturation

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

Units: milligrams/Liter (mg/L)

Sensor Type: Optical probe w/ mechanical cleaning

Model#: 599100-01

Range: 0 to 50 mg/L

Accuracy: 0-20 mg/L: ±0.1 mg/L or 1% of the reading, whichever is greater; 20-50 mg/L: ± 5% of the reading, relative to calibration gasses

Resolution: 0.01 mg/L

Parameter: Non-vented Level - Shallow (Depth)

Units: feet or meters (ft or m)

Sensor Type: Stainless steel strain gauge

Range: 0 to 33 ft (10 m)

Accuracy: +/- 0.013 ft (0.004 m)

Resolution: 0.001 ft (0.001 m)

Parameter: pH

Units: pH units

Sensor Type: Glass combination electrode

Model#: 599602

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

Include the following DO (unless ALL your sondes are EDS or have an Optical DO sensor), Depth, Salinity and Turbidity data disclaimers:

**Depth Qualifier:**

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

Standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg).  To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in the Aquatic Preserve calibration sheet or digital calibration log.  This offset procedure standardizes each depth calibration. If accurate atmospheric pressure data are available, non-vented sensor depth measurements can be corrected. The Principal Investigator should be contacted in order to obtain information regarding atmospheric pressure data availability.

**Salinity Units Qualifier:**

The EXO sondes report practical salinity units (psu). These units are essentially the same and for Aquatic Preserve purposes are understood to be equivalent, however psu is considered the more appropriate designation. Moving forward the Aquatic Preserve program will assign psu salinity units for all data regardless of sonde type.

**Turbidity Qualifier:**

The EXO sondes use formazin nephelometric units (FNU). These units are essentially the same but indicate a difference in sensor methodology, for Aquatic Preserve purposes they will be considered equivalent. Moving forward, the Aquatic Preserve program will use FNU/NTU as the designated units for all turbidity data regardless of sonde type. If turbidity units and sensor methodology are of concern, please see the Sensor Specifications portion of the metadata.

**Chlorophyll Fluorescence Disclaimer:**

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

**10) Coded variable definitions –**

[Instructions/Remove: List the sampling station, sampling site code, and station code used in the data.]

Site definitions:

|  |  |  |
| --- | --- | --- |
| **Sampling Station:** | **Sampling Site Code:** | **Station Code:** |
| Nature Coast Bayport | NCBP | NCBP |
|  |  |  |
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**11) QAQC flag definitions –**

[Instructions/Remove: This section details the automated and secondary QAQC flag definitions. Include the following excerpt**:]**

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

-5 Outside High Sensor Range

-4 Outside Low Sensor Range

-3 Data Rejected due to QAQC

-2 Missing Data

-1 Optional SWMP Supported Parameter

0 Data Passed Initial QAQC Checks

1 Suspect Data

2 *Open - reserved for later flag*

3 Calculated data: non-vented depth/level sensor correction for changes in barometric pressure

4 Historical Data: Pre-Auto QAQC

5 Corrected Data

**12) QAQC code definitions** –

[Instructions/Remove: This section details the secondary QAQC Code definitions used in combination with the flags above. Include the following excerpt:]

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

General Errors

GIC No instrument deployed due to ice

GIM Instrument malfunction

GIT Instrument recording error; recovered telemetry data

GMC No instrument deployed due to maintenance/calibration

GNF Deployment tube clogged / no flow

GOW Out of water event

GPF Power failure / low battery

GQR Data rejected due to QA/QC checks

GSM See metadata

Corrected Depth/Level Data Codes

GCC Calculated with data that were corrected during QA/QC

GCM Calculated value could not be determined due to missing data

GCR Calculated value could not be determined due to rejected data

GCS Calculated value suspect due to questionable data

GCU Calculated value could not be determined due to unavailable data

Sensor Errors

SBO Blocked optic

SCF Conductivity sensor failure

SCS Chlorophyll spike

SDF Depth port frozen

SDG Suspect due to sensor diagnostics

SDO DO suspect

SDP DO membrane puncture

SIC Incorrect calibration / contaminated standard

SNV Negative value

SOW Sensor out of water

SPC Post calibration out of range

SQR Data rejected due to QAQC checks

SSD Sensor drift

SSM Sensor malfunction

SSR Sensor removed / not deployed

STF Catastrophic temperature sensor failure

STS Turbidity spike

SWM Wiper malfunction / loss

Comments

CAB\* Algal bloom

CAF Acceptable calibration/accuracy error of sensor

CAP Depth sensor in water, affected by atmospheric pressure

CBF Biofouling

CCU Cause unknown

CDA\* DO hypoxia (<3 mg/L)

CDB\* Disturbed bottom

CDF Data appear to fit conditions

CFK\* Fish kill

CIP \* Surface ice present at sample station

CLT\* Low tide

CMC\* In field maintenance/cleaning

CMD\* Mud in probe guard

CND New deployment begins

CRE\* Significant rain event

CSM\* See metadata

CTS Turbidity spike

CVT\* Possible vandalism/tampering

CWD\* Data collected at wrong depth

CWE\* Significant weather event

**13) Post deployment information** –

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Post-deployment (CCV) readings of all sondes deployed at the [NCBP] site during [2025].** | | | | | | | | |
| **Deployment Date** | **Temp (°C)** | **SpCond (mS/cm)** | **ROX DO**  **%** | **ROX DO**  **mg/L** | **pH** | **pH** | **Turbidity (FNU)** | **Turbidity (FNU)** | **Depth (m)** |
|  | **°C** | **50.00** | **100.0** | **NA** | **7.00** | **10.00** | **0.0** | **124.0** | **m** |
| 4/11/2025 | 20.28 | 50.072 | 101 | 8.06 | 6.96 | 10.00 | 0.25 | 124.1 | 0.049 |
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\*Data missing from calibration log

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

**14) Other remarks/notes –**

The stock solution was accidentally used to do the calibrations for the total algae and chlorophyll, rather than the diluted 0.625 µg/L solution. Therefore, all total algae and chlorophyll values should be considered suspect. Based on other monthly water quality samples take upstream and downstream from the data logger, average values typically range from 2.1 µg/L (upstream) to 1.3 µg/L (downstream). The average chlorophyll value from this first deployment was 2.6 µg/L. This is slightly elevated from expected, and most likely due to the stock solution being used during calibration for the higher standard. This error was caught during the third round of calibrations in preparation for deployment number three. Therefore, this error will also be present in the second deployment that started April 10 and ended on May 6.

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

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

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

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

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

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

**(NCBP)**

**March 1-31, 2024**

1. N/A All probes passed verification and no data anomalies appear to be present.