**Biscayne Bay Aquatic Preserves (BBAP)** **Water Quality Metadata**

**January 2020 – December 2020**

**Latest Update:** 1/31/2021

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 general email at Biscayne.Bay@FloridaDEP.gov or the Water Quality Specialist at Aliza.Karim@FloridaDEP.gov with any additional questions.

**I. Data Set and Research Descriptors**

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

Laura Eldredge - Biscayne Bay Aquatic Preserves Manager

305-795-3486, Laura.Eldredge@FloridaDEP.gov

1277 NE 79th St., Miami FL, 33138

* Project supervisor, field assistance, datasonde deployment

Aliza Karim - Water Quality Specialist

305-795-3486, Aliza.Karim@FloridaDEP.gov

1277 NE 79th St., Miami FL, 33138

* Datasonde specialist, water quality data analyst, Quality Assurance/ Quality Control (QAQC) officer, data handling, field assistance, datasonde calibration & deployment, metadata report preparer

Claire Burgett - Spatial Ecology Coordinator

305-795-1256, Claire.Burgett@FloridaDEP.gov

1277 NE 79th St., Miami FL, 33138

* Database manager, data handling, field assistance, datasonde calibration & deployment

Sarah Gumbleton - Environmental Programs Coordinator

305-795-3485, Sarah.Gumbleton@FloridaDEP.gov

1277 NE 79th St., Miami FL, 33138

* Field assistance, datasonde calibration & deployment

**2) Entry verification –**

Deployment data are uploaded from the YSI datasonde to a Personal Computer (IBM compatible). Files are exported from EcoWatch in a comma-delimited format (.CDF), EcoWatch Lite in a comma separated file (.CSV) or KOR EXO v2.2.05 Software in a comma separated file (.CSV) and uploaded to the National Estuarine Research Reserve System (NERRS) Centralized Data Management Office (CDMO) Non-System Wide Monitoring Program (SWMP) Data Upload Service where data undergo automated primary QAQC. All pre- and post-deployment data are removed from the file prior to upload.

During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the Office of Resilience and Coastal Protection (RCP) Data Coordinator and/or the Aquatic Preserve office for secondary QAQC where it is opened in Microsoft Excel and processed using the CDMO’s NERRQAQC Excel macro. The macro inserts station codes, creates metadata worksheet 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 (AP) database.

Upload after secondary QAQC results in incorporation into the AP database as provisional plus data, and finally tertiary QAQC by the RCP’s Data Coordinator and assimilation into the AP database as authenticated data. Where deployment overlap occurs between files, the data produced by the newly calibrated sonde is accepted as being the most accurate. For more information on QAQC flags and codes, see Sections 11 and 12.

Data was handled by Claire Burgett from January 2019 - January 2020 and then by Aliza Karim from February 2020 - present.

**3) Research objectives –**

This three-step research project was initiated in response to a 2,000-3,000-acre seagrass loss event in Northern Biscayne Bay, specifically in and around the Julie Tuttle Basin (Basin). Stations were chosen in an array to understand the relationship between the Little River flow into the Basin and across the large, central shoal containing seagrass habitat. Stations with historical data (not necessarily datasonde data) sampled by other agencies were chosen for this project, when appropriate. Not all parameters are taken at all sites across the project, however some stations included sampling for all three research steps.

* Currently, three deployed datasonde stations monitor abiotic parameters at 15-minute intervals.
* In addition to the datasondes, this project involves taking monthly water quality grab samples at 17 sites. The 31 parameters are collected during water quality grab sampling, including nutrients, pharmaceuticals, herbicides, fungicides, insecticides, and chlorophyll-a. All datasonde stations are also monthly water quality grab sampling stations.
* The 21 benthic assessment sites include seagrass and macroalgae tissue sampling for elemental analyses and stable isotopes, sediment sampling & depth, Braun-Blanquet & cover abundance surveys, and some abiotic factors. There is quarterly sampling of 11 benthic sites and all 21 sites are sampled semiannually.

**4) Research methods –**

YSI datasondes are deployed monthly at three locations, BBLR03, BBBB14, and BBJT71. Data is collected in 15-minute intervals. All sondes are calibrated before deployment and a pre-deployment calibration verification (ICV) is done as a QAQC check. Approximately every month, the deployed sondes are removed from the water and returned to the lab for data retrieval, cleaning, verifying post-deployment calibration (CCV) and conducting any necessary maintenance or repairs. Freshly calibrated sondes are swapped at the time of retrieval.

All time is reported as Eastern Standard Time.

A YSI 6600 datasonde (site: BBBB14) was operating in the Basin until April 15th, 2020. Currently, YSI EXO2 sondes are swapped at each deployment. The sonde is placed into a horizontally deployed PVC piping unit with holes to allow for water flow. The unit is mounted to a concrete slab and submerged.

YSI EXO2 (10m Depth) datasondes (site: BBJT71) have been swapped in the southeast corner of the Basin since March 2019. The sonde is placed into a horizontally deployed PVC piping unit with holes to allow for water flow. The unit is mounted to a concrete slab and submerged.

In the Little River (site: BBLR03), two YSI 6920 sondes were operating in the Basin until March 17th, 2020. Currently, YSI EXO2 sondes are swapped at each deployment. The sonde is placed into a vertically deployed PVC piping unit with holes to allow for water flow. The unit is attached to a dock piling and the bottom portion, which contains the sonde, remains submerged year-round.

Specific conductance, pH, turbidity, depth, chlorophyll and dissolved oxygen are calibrated on the EXO2’s and the 6600. All the parameters except chlorophyll and DO are calibrated on the 6920s. Calibrations are conducted in the BBAP lab by BBAP staff.

Specific conductance is 1-point calibrated with the 50,000 uS/cm standard (from Ricca). The ICV is done with the 1,000 uS/cm standard while the CCV is done with the 100,000 uS/cm standard. pH is 2-point calibrated with the pH7 standard and pH10 standard (from Fisher Scientific). The ICV and CCV are done with one of the 2 standards. Turbidity is 2-point calibrated with 0 FNU/NTU Milli-Q water and 124 FNU (EXO2)/126 NTU (6-series) standard (from YSI). The ICV and CCV are done with both the 0 and the 124/126 FNU/NTU standard. Chlorophyll is 2-point calibrated with 0 ug/L Milli-Q water and a rhodamine WT dye standard (from Kingscote). The 6-series is calibrated for chlorophyll-a (ug/L). The Tal-PE sensor on the EXO 2 is calibrated for chlorophyll-a (ug/L) and Blue-Green Algae – Phycoerythrin (BGA) (RFU and ug/L).

Chlorophyll calibrations using rhodamine WT dye allow for consistency in values across our sondes and deployments. During monthly water quality sampling, sonde readings are paired with water bottle grabs that are tested for chlorophyll using a fluorometric method, allowing for verification of sonde chlorophyll readings.

**5) Site location and character –**

All sites are in relatively close proximity and part of the same watershed. The watershed is an urban, primarily residential part of Miami-Dade County. There are septic tanks in the watershed draining into this area and repeated issues with sewage overflows or other spills. Tidal Range is around 2 feet.

BBLR03 is in between the mouth of the Little River and an upriver, salinity control structure, and is therefore tidally influenced. The Little River is suspected to be a major source of nutrients and other pollutants into the Basin and generally has poorer water quality than the bay sites. This site was part of Miami-Dade County’s long-term water quality monitoring BayRun program but monitoring at this location was suspended. Freshwater inflow is determined by the salinity control structure and varies depending on management actions, rainfall, and timed releases of Lake Okeechobee water from the salinity control structures.

* Location: 25.846841, -80.182861
* Salinity range: 0.0 – 36.0 ppt
* Depth: about 10 feet in center of river; sonde is up against the seawall edge at around 4 feet deep
* Bottom habitat: bare muddy sediment
* Pollutants detected in 2020:
	+ Surface:
		- **Pesticides:** 2,4 D, AMPA, Bentazon, Dinotefuran, Diuron, Fenuron, Fluridone, Glyphosate, Imazapyr, Imidacloprid
		- **Pharmaceuticals:** Acetaminophen, Afidopyropen, Carbamazepine, Ibuprofen, Naproxen, Primidone
		- **Artificial Sweeteners:** Acesulfame-K, Sucralose
	+ Bottom
		- **Pesticides**: 2,4 D, AMPA, Bentazon, Dinotefuran, Diuron, Fenuron, Fluridone, Glyphosate, Imazapyr, Imidacloprid
		- **Pharmaceuticals:** Acetaminophen, Carbamazepine, Ibuprofen, Naproxen
		- **Artificial Sweeteners:** Acesulfame-K, Sucralose

BBBB14 is in the Northern Biscayne Bay Basin in the northwest section of the shoal. This site was highly impacted by the seagrass die-off event in the northern portion of the shoal where full loss of the prior seagrass cover was observed. The seagrass loss event occurred as an edge-in effect, especially from the northern edge. BBBB14 was likely one of the first sites to switch to a macroalgal dominated bed. The site is part of Miami-Dade County’s long-term water quality monitoring BayRun program. Benthic sampling by BBAP at this site began in 2019 and involves cardinal direction quadrat throws. It’s a marine site with freshwater inflow primarily coming from rainfall and secondarily from the nearby Little River but also has exchange with other basins in Biscayne Bay influenced by other rivers and canals. Seagrass has never been observed in quadrats during our 2019 benthic surveys at this site, however extremely sparse *Syringodium filiforme* was seen in March 2020, while visiting the site. Historical benthic data was not taken at this station, however sites nearby showed high seagrass cover prior to the die-off event.

* Location: 25.830030, -80.158600
* Salinity range: 20.2 - 36.0 ppt
* Depth: 2-4 feet.
* Bottom habitat: Currently dominated by *Halimeda discoidea* (previously seagrass habitat). Sediment is largely made up of Halimeda hash (remains of calcified algal discs) at the surface in a muddy matrix.
* Pollutants detected in 2020:
	+ Bottom:
		- **Pesticides:** 2,4 D, Bentazon**,** Diuron**,** Fluridone, Imazapyr**,** Imidacloprid, Tolfenpyrad
		- **Pharmaceuticals:** Carbamazepine
		- **Artificial Sweeteners:** Sucralose

BBJT71 is in the Northern Biscayne Bay Basin in the southeast section of the shoal, further from the Little River than BBBB14. This site was chosen to observe the area where some seagrass still survived or potentially had not yet been impacted by the die-off event at the initiation of the project. The southeast interior section of the shoal in the Basin was previously fully covered by dense refugia of seagrasses, with the dominant species being *Syringodium filiforme*. While there is some seagrass remaining at this site, it is very patchy and sparse. This site was impacted later than BBBB14. Historical data showed averages of 50-75% *Syringodium filiforme* cover before the die-off event, but now has on average 1% *Syringodium filiforme* cover and 3% *Halodule wrightii* cover. Historical data at this site is primarily composed of benthic surveys, but there was a short term datasonde deployment by county researchers. This site was sampled originally by United States Geological Survey (USGS**)** during Fish and Invertebrate Assessment Network surveys in 2014. Miami-Dade County then resampled this location following the seagrass die-off event. Our program established a transect in 2018 at this location for quarterly benthic surveys.

* Location: 25.821730, -80.151250
* Salinity range: 22.2 – 36.7 ppt
* Depth: 3-5 feet.
* Bottom habitat: Currently dominated by *Halimeda discoidea* but has a mix of seagrasses and other macroalgal species. Sediment is muddy sand with some Halimeda hash (remains of calcified algal discs).
* Pollutants detected in 2020:
	+ Bottom:
		- **Pesticides:** 2,4 D,Bentazon**,** Diuron, Fluridone**,** Imazapyr**,** Imidacloprid
		- **Pharmaceuticals:** Carbamazepine
		- **Artificial Sweeteners:** Sucralose

August 2020 Fish Kill in Northern Biscayne Bay

Beginning on August 10, 2020, BBAP responded to reports of dead fish washing up on shore in theBasin (near Morningside Park). The reports and images were of mainly benthic dwelling species (like checkered puffers, toadfish and rays). Fish were also spotted gasping at the surface and congregating by the hundreds in shallow areas around Pelican Harbor. On August 13th, August 17th and August 26th, BBAP staff conducted vertical sonde profiles around the area and collected water samples for analysis on biological oxygen demand, sulfide/sulfate, dissolved organic content, total organic content, chlorophyll, NOx and a suite of sewage tracers. This data can be acquired by contacting Aliza Karim (see contact information above).

The event was associated with anoxic conditions east of Morningside Park. The low DO persisted for about 4 days and was detected by the BBLR03 and BBBB14 sondes. The event was also associated with high particulate organic content, high turbidity, a sulfuric smell and high sulfate readings. The event was followed by a chlorophyll bloom.

Many local organizations responded to the distressed fish by inserting aerators in highly affected areas: boat ramps (Morningside Park, Albert Pallot Park, and Margaret Pace Park), and north Pelican Harbor. The City of Miami and Miami-Dade County’s Fire Rescue also dispatched vessels capable of aerating the water for short periods of time. There were increases in the surface DO though in certain areas, the benthic DO remained anoxic for over a week.

BBAP Station Deployment Timeline:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station Code | Station Name | Location | Active Dates | Reason Decommissioned | Notes |
| BBLR03 | Little River (LR03) | 25.846841, -80.182861 | 4/19/2019 - present | NA | Model 6920 (Jan 1-Mar 17, 2020), EXO2 (Mar 17, 2020-present) |
| BBBB14 | Tuttle Basin NW (BB14) | 25.830030, -80.158600  | 1/18/2019 - present | NA | Model 6600V2-4 (Jan 1-Apr 15, 2020), EXO2 (Apr 15, 2020-present) |
| BBJT71 | Tuttle Basin SE (JT71) | 25.821730, -80.151250 | 3/5/2019 - present | NA | Model EXO2 |

**6) Data collection period –**

**BBLR03**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |  |
| --- | --- | --- |
| **Deployment date/time** | **Retrieval date/time** | **Notes** |
| 12/20/19 11:30 | 1/17/2020 11:45 | No data recorded due to programming error |
| 1/17/20 12:00 | 3/9/2020 16:15 | Stopped collecting due to battery failure |
| 3/17/20 16:15 | 4/16/2020 10:15 | First deployment of EXO2 at LR03 |
| 4/16/20 10:30 | 5/6/2020 10:15 |  |
| 5/6/2020 10:30 | 6/3/2020 10:30 |  |
| 6/3/2020 10:45 | 7/8/2020 10:30 |  |
| 7/8/2020 10:45 | 8/5/2020 12:30 |  |
| 8/5/2020 12:45 | 8/20/2020 10:15 |  |
| 8/20/2020 11:30 | 9/9/2020 18:00 | Stopped collecting due to sonde malfunction |
| 9/22/2020 12:00 | 10/22/2020 10:45 |  |
| 10/22/2020 11:00 | 11/19/2020 11:15 |  |
| 11/19/2020 11:30 | 12/8/2020 13:45 |  |
| 12/8/2020 14:00 | 1/15/2021 11:15 |  |

 |
|  |  |  |

**BBBB14**

|  |  |  |
| --- | --- | --- |
| **Deployment date/time** | **Retrieval date/time** | **Notes** |
| 12/11/2019 13:00 | 1/8/2020 10:45 |  |
| 1/13/2020 14:30 | 2/4/2020 10:00 |  |
| 2/11/2020 13:30 | 3/4/2020 10:00 |  |
| 3/6/2020 10:45 | 4/15/2020 8:00 |  |
| 4/15/2020 8:15 | 5/18/2020 11:15 | No data recorded due to sonde malfunction |
| 5/18/2020 11:45 | 6/17/2020 9:00 | First deployment of EXO2 at BB14 |
| 6/17/2020 9:30 | 7/28/2020 9:00 |  |
| 7/28/2020 9:30 | 8/18/2020 11:00 |  |
| 8/18/2020 11:15 | 9/16/2020 11:15 |  |
| 9/16/2020 11:45 | 10/7/2020 12:30 | No data recorded from 9/18 0:00 to 10/4 0:00 due to sonde malfunction |
| 10/7/2020 12:45 | 10/23/2020 9:30 |  |
| 10/23/2020 10:00 | 11/30/2020 11:45 |  |
| 11/30/2020 12:15 | 1/5/2021 15:15 |  |

**BBJT71**

|  |  |  |
| --- | --- | --- |
| **Deployment date/time** | **Retrieval date/time** | **Notes** |
| 12/11/2019 12:15 | 1/8/2020 13:15 |  |
| 1/8/2020 13:45 | 2/11/2020 12:15 |  |
| 2/11/2020 12:45 | 3/6/2020 11:00 |  |
| 3/6/2020 11:30 | 4/15/2020 9:00 |  |
| 4/15/2020 9:30 | 5/18/2020 12:00 |  |
| 5/18/2020 12:30 | 6/17/2020 9:45 |  |
| 6/17/2020 10:15 | 7/28/2020 10:00 | No pH probe deployed |
| 7/28/2020 10:30 | 9/2/2020 12:00 |  |
| 9/2/2020 12:30 | 9/29/2020 13:15 |  |
| 9/29/2020 13:45 | 10/23/2020 10:30 |  |
| 10/23/2020 11:00 | 11/30/2020 12:45 |  |
| 11/30/2020 13:15 | 1/5/2021 14:15 |  |

\*Missing data between deployments due to maintenance or deployment failure (battery or sonde malfunction)

**7) Distribution –**

The Principle Investigator (PI) retains the right to be fully credited for having collected and process the data.  Following academic courtesy standards, the Florida Department of Environmental Protection and 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 site (please see Principal Investigators and Contact Persons) and online at the Aquatic Preserve’s data portal home page [www.floridaapdata.org](http://www.floridaapdata.org). Data are available in comma delimited format.

**8) Associated researchers and projects –**

There are several agencies conducting water quality monitoring within Biscayne Bay. The following are the projects that we are aware of though there may be more.

(This Project) Florida Department of Environmental Protection (DEP) – Biscayne Bay Aquatic Preserve (BBAP)

* Currently, three deployed datasonde stations monitor abiotic parameters at 15-minute intervals.
* In addition to the datasondes, this project involves taking monthly water quality grab samples at 17 sites. The 31 parameters are collected during water quality grab sampling, include nutrients, pharmaceuticals, herbicides, fungicides, insecticides, and chlorophyll-a. All datasonde stations are also monthly water quality grab sampling stations. Data can be acquired from Sarah Gumbleton.
* The 21 benthic assessment sites include seagrass and macroalgae tissue sampling for elemental analyses and stable isotopes, sediment sampling & depth, Braun-Blanquet & percent cover abundance surveys, and some abiotic factors. There is quarterly sampling of eleven benthic sites and all twenty-one sites are sampled semiannually. Data can be acquired from Claire Burgett.
	+ In September 2020, an additional 7 benthic sites were added in the Rickenbacker Basin (the outflow basin of the Miami River). These sites will be sampled for all the above parameters, quarterly.
	+ Sediment sulfide analyses have also been done in conjunction with the SAV sampling
* <https://floridadep.gov/rcp/aquatic-preserve/locations/biscayne-bay-aquatic-preserves>
* This project will be expanding to the Rickenbacker basin and Miami River starting in fall 2020 under and EPA grant. Four EXO2 datasonde sites will be added: 1 in the basin, 1 at the mouth of the river and 2 upriver.
* BBAP has begun (in August 2020) monthly bird surveys on 11 islands within Northern Biscayne Bay in response to a bird rookery collapse on Bird Key island. Data can be acquired from Sarah Gumbleton.

Florida Department of Environmental Protection (DEP) – Office of Resilience and Coastal Protection (RCP)

* RCP is handling the establishment and characterization of the Government Cut Inlet Contributing Area (ICA) that includes the upland watershed that flows into Biscayne Bay, Biscayne Bay itself, and the coastal reef area just offshore of the government cut inlet. The watershed will be characterized by partners at NOAA via increased water quality monitoring in collaboration with this BBAP project, Miami-Dade County’s BayRun project, and NOAA’s pollutant loading model development. Methodology development conversations are ongoing with a planned initiation in fall 2021. The program’s goals include addressing EPA’s 9 elements of a comprehensive Watershed Management Plan for the ICA.
* Further research will be initiated through a DEP Coral Reef Protection and Restoration Grant program that will be awarded in late 2020/early 2021

Florida International University (FIU)

* Datasonde monitoring program with live telemetry data available in sites located in the same basin and adjacent basins as the BBAP sondes
* <https://crestcache.fiu.edu/research/research-buoys/index.html>
* Long-term water quality sampling within Biscayne Bay as part of the Southeast Environmental Research Center (SERC) Water Quality Monitoring Network
* <http://serc.fiu.edu/wqmnetwork/>
* EPA funded project on hydrodynamic modeling of Biscayne Bay with preliminary results available.through Dr. Henry Briceno and Dr. Piero Gardenali.

Miami-Dade County Department of Environmental Resources Management (DERM)

* Long-term monitoring for environmental data and water quality parameters within Biscayne Bay, canals, and their tributaries (BayRun program)
* Data available via request and through .pdf reports
* <http://www.miamidade.gov/environment/surface-water-quality.asp>

South Florida Water Management District (SFWMD)

* Long-term surface water quality monitoring at coastal and canal sites in central and south Biscayne Bay
* Flow monitoring from canal and river outputs around Biscayne Bay
* Groundwater, sediment, rainfall and weather monitoring data available as well
* Data stored and accessible through DBHYDRO database
* <http://my.sfwmd.gov/dbhydroplsql/show_dbkey_info.main_menu>

Miami Waterkeeper (MWK) and Florida Department of Health (DOH)

* DOH Healthy Beaches program supplemented by bay sampling from Miami Waterkeeper
* Sample monitoring for fecal indicator bacteria
* <http://www.floridahealth.gov/environmental-health/beach-water-quality/index.html>
* Continuous surface parameter data available via deployed buoys in Northern Biscayne Bay
* <https://crestcache.fiu.edu/research/research-buoys/index.html>

National Oceanic and Atmospheric Administration (NOAA)

* Long-term water quality sampling
* Turbidity study done in Northern Biscayne Bay, including a station in the Tuttle Basin that included instrument deployments and bottle grabs.
* <https://pdfs.semanticscholar.org/70c8/c68607f1bf40bc13c331fb2d8e09213f5658.pdf>

University of Florida, Institute of Food and Agricultural Sciences (IFAS) Sea Grant Extension Program

* Biscayne Bay Water Watch Program
* Community-based volunteer monitoring program to take over SFMWD and DERM sites that lost funding
* Abiotic, nutrient, and chlorophyll a data collected
* <https://sfyl.ifas.ufl.edu/miami-dade/natural-resources/biscayne-bay-water-watch-/>

University of Central Florida

* eDNA analysis of surface waters at 8- ecologically different sites with Biscayne Bay (4 of which will be in Northern Biscayne Bay). Project to be initiated in Aug. 2020 by Michelle Gaither’s Lab.
* <https://sciences.ucf.edu/biology/gaitherlab/>
* Rapid Evaluation of Estrogenic Endocrine Disrupting Compounds sampling event through surface sampling at 10 sites in Biscayne Bay. Project to be initiated Fall 2020 by John Fauth’s Lab

University of Miami

* Substrate and temporal viability of enterococci bacteria by Dr. Helena Solo-Gabriele and students
* Various project within and around Biscayne Bay
* <https://www.rsmas.miami.edu/research/projects/index.html>

Kenn State University

* Imaging and analysis of fluorescent pigment data collected through satellite imagery by Dr. Joseph Ortiz.
* In preliminary stages but intended to be able to determine the spatial extent of seagrass versus macro-algal dominated beds as well as chlorophyll blooms

**II. Physical Structure Descriptors**

**9) Sensor specifications –**

Currently, we have 9 YSI EXO2 Sondes that are interchangeably swapped monthly at each station. At BBLR03, prior to March 17, 2020, two YSI 6920s were swapped monthly. At BBBB14, prior to April 15, 2020, one YSI 6600 V2-4 was deployed monthly.

**YSI6600V2-4 data sonde:**

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Thermistor and 4 electrode cell

Model#: YSI 6560

Range: -5 to +50 ºC

Accuracy: +/- 0.15 ºC

Resolution: 0.01 unit

Parameter: Conductivity

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

Sensor Type: Thermistor and 4 electrode cell

Model#: YSI 6560

Range: 0 to 100 mS/cm

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

Resolution: 0.001 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 pr 0.1 ppt, whichever is greater

Resolution: 0.01 ppt

Parameter: Chlorophyll-a

Units: micrograms/liter

Sensor Type: optical, fluorescence

Model#: YSI 6425-AF

Range: 0-200 micrograms/L

Accuracy: +/- 5% reading or 1 microgram/L, whichever is greater

Parameter: Optical DO % saturation

Units: percent air saturation

Sensor Type: optical, luminescence lifetime

Model#: YSI 6450-AF ROX

Range: 0 to 500%

Accuracy: 0 to 200: +/- 1% of reading or 1% air saturation, whichever is greater; 200 to 500%: +/1 15% of reading

Resolution: 0.01 mg/L

Parameter: Optical DO mg/L

Units: milligrams/Liter (mg/L)

Sensor Type: Optical probe w/ mechanical cleaning

Model#: YSI 6450-AF ROX

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: +/- 15% of the reading

Resolution: 0.01 mg/L

Parameter: pH

Units: pH units

Sensor Type: glass combination electrode

Model#: YSI 6561

Range: 0 to 14 units

Accuracy: +/- 0.2 units

Resolution: 0.01

Parameter: Turbidity

Units: nephelometric turbidity units (NTU)

Sensor Type: optical, 90 degrees scatter

Model#: YSI 6436-AF

Range: 0 to 1000 NTU

Accuracy: +/- 2% of reading or 0.3 NTU, whichever is greater

Resolution: 0.1 NTU

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)

**YSI 6920 data sonde:**

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Thermistor and 4 electrode cell

Model#: YSI 6560

Range: -5 to +50 ºC

Accuracy: +/- 0.15 ºC

Resolution: 0.01 unit

Parameter: Conductivity

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

Sensor Type: thermistor and 4 electrode cell

Model#: YSI 6560

Range: 0 to 100 mS/cm

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

Resolution: 0.001 to 0.1 mS/cm

Parameter: Salinity

Units: parts per thousand (ppt)

Sensor Type: Calculated from conductivity and temperature

Range: 0 to 70 ppt

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

Resolution: 0.01 ppt

Parameter: Turbidity

Units: nephelometric turbidity units (NTU)

Sensor Type: optical, 90 degrees scatter

Model#: 6436-AF

Range: 0 to 1000 NTU

Accuracy: +/- 2% of reading or 0.3 NTU, whichever is greater

Resolution: 0.1 NTU

Parameter: pH

Units: pH units

Sensor Type: glass combination electrode

Model#: 6561

Range: 0 to 14 units

Accuracy: +/- 0.2 units

Resolution: 0.01 units

Parameter: 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)

**YSI EXO2 (10m depth) data sonde:**

Parameter: Total algae

Units: micrograms/Liter

Sensor Type: optical sensor

Model#: YSI 599103-01

Range: 0 to 400 µg/L chl

Accuracy: Linearity: r2 ≥ 0.999 for Rhodamine WT across full range

Resolution: 0.01 RFU or 0.01 µg/L chl

Parameter: Conductivity

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

Sensor Type: 4-electrode nickel cell

Model#: YSI 599827

Range:0 to 200 mS/cm

Accuracy: 0 to 100: +/- 0.5% of reading or 0.001 mS/cm, w.i.g.; 100 to 200 +/- 1% of reading

Resolution: 0.0001 to 0.01 mS/cm

Parameter: Temperature

Units: Celsius (C)

Sensor Type: 4-electrode nickel cell

Model#: YSI 599827

Range: -5 to 35 ºC, 35 to 50 ºC

Accuracy: -5 to 35 ºC: +/- 0.01 ºC2, 35 to 50 ºC: +/- 0.05 ºC2

Resolution: 0.001 ºC

Parameter: dissolved oxygen, % air saturation

Units: percent air saturation (%)

Sensor Type: optical sensor

Model#: YSI 599100-01

Range: 0 to 500% air saturation

Accuracy: 0 to 200%: +/1 1% of reading or 1% saturation, w.i.g.; 200 to 500% +/- 5% of reading

Resolution: 0.1% air saturation

Parameter: dissolved oxygen, mg/L

Units: mg/L

Sensor Type: optical sensor

Model#: YSI 599100-01

Range: 0 to 50 mg/L

Accuracy: 0 to 20 mg/L: +/- 0.1 mg/L or 1% of reading, w.i.g.; 20 to 50 mg/L: 5% of reading

Resolution: 0.01 mg/L

Parameter: pH

Units: pH units

Sensor Type: unguarded

Model#: YSI 599702

Range: 0 to 14 units

Accuracy: +/- 0.1 pH units within +/- 10ºC of calibration temp; +/- 0.2 pH units for entire temp range

Resolution: 0.01 units

Parameter: Turbidity

Units: FNU (formazin nephelometric units)

Sensor Type: optical sensor

Model#: YSI 599101-01

Range: 0 to 4000 FNU

Accuracy: 0 to 999 FNU: 0.3 FNU or +/- 2% of reading, w.i.g.; 1000 to 4000 FNU: +/- 5% of reading

Resolution: 0 to 999 FNU=0.01 FNU; 1000 to 4000 FNU=0.1 FNU

Parameter: Depth

Units: meters

Sensor Type: integral, non-vented depth sensor

Range: 0 to 10 m

Accuracy: +/- 0.04 FS (+/- 0.004m or +/-0.013ft)

Resolution: 0.001 ft (0.001 m)

**Sensor 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 6600 series sondes report salinity in parts per thousand (ppt) units, the EXO sondes report practical salinity units (psu). These units are essentially the same and for Aquatic Preserve purposes are understood to be equivalent, however psu is considered the more appropriate designation. Moving forward the Aquatic Preserve program will assign psu salinity units for all data regardless of sonde type.

**Turbidity Qualifier:**

The 6600 series sondes report turbidity in nephelometric turbidity units (NTU), the EXO sondes use formazin nephelometric units (FNU). These units are essentially the same but indicate a difference in sensor methodology, for Aquatic Preserve purposes they will be considered equivalent. Moving forward, the Aquatic Preserve program will use FNU/NTU as the designated units for all turbidity data regardless of sonde type. If turbidity units and sensor methodology are of concern, please see the Sensor Specifications portion of the metadata.

**Chlorophyll Fluorescence Disclaimer:**

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

**10) Coded variable definitions –**

Sampling station: Sampling site code: Station code:

Little River SE BBLR03

JT71 WI BBJT71

BB14 VA BBBB14

**11) QAQC flag definitions –**

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

-5 Outside High Sensor Range

-4 Outside Low Sensor Range

-3 Data Rejected due to QAQC

-2 Missing Data

-1 Optional SWMP Supported Parameter

 0 Data Passed Initial QAQC Checks

 1 Suspect Data

 2 *Open - reserved for later flag*

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

 4 Historical Data: Pre-Auto QAQC

 5 Corrected Data

**12) QAQC code definitions** –

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

General Errors

 GIC No instrument deployed due to ice

 GIM Instrument malfunction

 GIT Instrument recording error; recovered telemetry data

 GMC No instrument deployed due to maintenance/calibration

 GNF Deployment tube clogged / no flow

 GOW Out of water event

 GPF Power failure / low battery

 GQR Data rejected due to QA/QC checks

 GSM See metadata

Corrected Depth/Level Data Codes

 GCC Calculated with data that were corrected during QA/QC

 GCM Calculated value could not be determined due to missing data

 GCR Calculated value could not be determined due to rejected data

 GCS Calculated value suspect due to questionable data

 GCU Calculated value could not be determined due to unavailable data

Sensor Errors

 SBO Blocked optic

 SCF Conductivity sensor failure

 SCS Chlorophyll spike

 SDF Depth port frozen

 SDG Suspect due to sensor diagnostics

 SDO DO suspect

 SDP DO membrane puncture

 SIC Incorrect calibration / contaminated standard

 SNV Negative value

 SOW Sensor out of water

 SPC Post calibration out of range

 SQR Data rejected due to QAQC checks

 SSD Sensor drift

 SSM Sensor malfunction

 SSR Sensor removed / not deployed

 STF Catastrophic temperature sensor failure

 STS Turbidity spike

 SWM Wiper malfunction / loss

Comments

 CAB\* Algal bloom

 CAF Acceptable calibration/accuracy error of sensor

 CAP Depth sensor in water, affected by atmospheric pressure

 CBF Biofouling

 CCU Cause unknown

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

 CDB\* Disturbed bottom

 CDF Data appear to fit conditions

 CFK\* Fish kill

 CIP \* Surface ice present at sample station

 CLT\* Low tide

 CMC\* In field maintenance/cleaning

 CMD\* Mud in probe guard

 CND New deployment begins

 CRE\* Significant rain event

 CSM\* See metadata

 CTS Turbidity spike

 CVT\* Possible vandalism/tampering

 CWD\* Data collected at wrong depth

 CWE\* Significant weather event

**13) Post deployment information** –

CCV values in red did not pass the established acceptance criteria for the Florida AP database. Data from the deployments that did not pass CCV were labeled as suspect. AC was ±2% of standard value for specific conductance, turbidity, DO (mg/L) and chlorophyll. AC was ±5% for DO (%). AC was ±0.2 for pH and temperature (°C). CCV values in ~~dark red~~ that are bold and have a strikethrough, fell beyond 3x the acceptance criteria so the data from the deployment was rejected. Values in italics are standard values. Standard values for DO (mg/L), Chlorophyll (ug/L), BGA (ug/L) and BGA (RFU) are determined by temperature.

Sondes A-H are EXO2s. Sonde A and B were previously called 4 and 5, respectively.

Sonde 1 is a 6000 v2. Sonde 2 and 3 are 6920s. All 6-series sondes are currently decommissioned.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LR03** | **Parameter** | **Specific Conductivity (uS/cm)** | **pH** | **Turbidity (FNU)** |  | **Dissolved Oxygen (%, ug/L)** | **Temperature (°C)** | **Depth (m)** |
| **Sonde**  | **Date/Standard** | **100,000** | **7** | **0** | **126/124** | **100%** | **DO CCV**  | ***Std*** | **Sonde** | ***Thermometer*** | **0** |
| 2 | 1/17/2020 | 100007 | 6.77 | 0 | 128.8 | - | *-* | - | 22.11 | *22.4* | 0.04 |
| 3 | 3/17/2020 | **~~92576~~** | 6.93 | -0.08 | 124 | - | *-* | - | 21.9 | *22.15* | -0.012 |
| B/5 | 4/16/2020 | 101773 | 7.05 | 0.28 | 124.33 | 98.9 | 8.64 | *8.66* | 24.27 | *24.5* | -0.057 |
| E | 5/6/2020 | 102066 | 6.88 | 0.16 | 123.65 | 98.6 | 8.51 | *8.66* | 28.169 | *28.5* | -0.081 |
| B/5 | 6/3/2020 | 101068 | 7.02 | -0.04 | 123.42 | 100.6 | 8.7 | *8.66* | 22.315 | *22.6* | 0.011 |
| D | 7/8/2020 | 101084.4 | 7.09 | 0.35 | 125.8 | 101.6 | 8.81 | *8.66* | 26.34 | *26.6* | -0.022 |
| A | 8/5/2020 | 100819.6 | 7.16 | 0.21 | 125.55 | 101.1 | 8.32 | *8.263* | - | *-* | -0.018 |
| C | 8/20/2020 | 101214.1 | 7.07 | 0.04 | 120.53 | 99.4 | 8.27 | *8.34* | - | *-* | -0.072 |
| D | 9/22/2020 | **~~1494.2~~** | 7.07 | 2.31 | 121.22 | 100.2 | 8.84 | *8.83* | - | *-* | 0.004 |
| F | 10/22/2020 | 101307.7 | 7.02 | 0.55 | 129.06 | 99.8 | 8.45 | *8.418* | ­ | ­ | -0.017 |
| G | 11/19/2020 | 102441.2 | 7.06 | 0.89 | 124.32 | 104.5 | 9.1 | *8.743* | - | *-* | 0.128 |
| C | 12/8/2020 | 102120.3 | 6.99 | 0.3 | 120.96 | 102.6 | 8.92 | *8.743* | ­ | ­ | -0.181 |
| F | 1/15/2021 | 101457.4 | 7.08 | 0.07 | 123.97 | 100.1 | 8.53 | *8.5* |   |  | 0.052 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **LR03 (Cont.)** | **Parameter** | **Chlorophyll-a (ug/L)** | **Chlorophyll- BGA (ug/L)** | **Chlorophyll- BGA (RFU)** |
| **Sonde**  | **Date/Standard** | **0** | **Chl CCV** | ***Std*** | **0** | **Chl CCV** | ***Std*** | **0** | **Chl CCV** | ***Std*** |
| 2 | 1/17/2020 | - | - | *-* | - | - | *-* | - | - | *-* |
| 3 | 3/17/2020 | - | - | *-* | - | - | *-* | - | - | *-* |
| B/5 | 4/16/2020 | 0.03 | 62.22 | *62.18* | -0.12 | 119.01 | *117* | -0.09 | 42.4 | *41.8* |
| E | 5/6/2020 | 0.08 | 68.03 | *63.17* | -0.17 | 117.51 | *119.25* | -0.11 | 42.1 | *42.7* |
| B/5 | 6/3/2020 | 0.06 | 62.93 | *63.28* | -0.12 | 120 | *119.5* | -0.04 | 43.1 | *42.8* |
| D | 7/8/2020 | 0.08 | 56.99 | *62.18* | -0.23 | 115.28 | *117* | -0.05 | 41.11 | *41.8* |
| A | 8/5/2020 | 0.03 | 62.65 | *61.74* | -0.12 | 116.03 | *116* | -0.05 | 41.51 | *41.4* |
| C | 8/20/2020 | -0.26 | 56.92 | *61.04* | -0.37 | 115.75 | *114.4* | -0.15 | 41.39 | *40.81* |
| D | 9/22/2020 | 0.01 | 59.32 | *62.29* | -0.33 | 116.05 | *117.25* | -0.1 | 41.41 | *41.9* |
| F | 10/22/2020 | 0.11 | 55.75 | *63.28* | 1.28 | 116.03 | *119.5* | 0.45 | 41.5 | *42.8* |
| G | 11/19/2020 | -0.37 | 61.38 | *63.17* | -0.45 | 119.07 | *119.25* | -0.45 | 42.32 | *42.7* |
| C | 12/8/2020 | -0.67 | 63.79 | *[22.3]* | -0.71 | 115.48 |  | -0.27 | 41.3 |  |
| F | 1/15/2021 | -0.12 | 76.89 | *66.36* | -0.58 | 118.73 | *126.9* | -0.22 | 42.79 | *45.4* |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **BB14** | **Parameter** | **Specific Conductivity (uS/cm)** | **pH** | **Turbidity (FNU)** | **Dissolved Oxygen (%, ug/L)** | **Temperature (°C)** | **Depth (m)** |
| **Sonde**  | **Date/Standard** | **100,000** | **7** | **0** | **126/124** | **100%** | **DO CCV**  | ***Std*** | **Sonde** | ***Thermometer*** | **0** |
| 1 | 1/8/2019 | 98891 | 6.99 | -2 | 124 | 100.3 | 9.13 | *9.092* | ­ | ­ | 0.059 |
| 1 | 2/4/2020 | 98634 | 6.95 | 0.3 | 124.3 | 100.9 | 8.64 | *8.578* | 22.56 | *22.9* | -0.097 |
| 1 | 3/4/2020 | 99493 | 6.97 | 1.5 | - | 99.9 | 8.8 | *8.743* | ­ | ­ | 0.05 |
| 1 | 4/15/2020 | 99725 | 7.05 | 1.1 | 128.2 | 99 | 8.34 | *8.418* | 24.4 | *24.6* | -0.018 |
| C | 5/19/2020 | 101343 | 7.04 | 0.23 | 121.34 | 99.7 | 8.52 | *8.578* | 28.217 | *28.5* | -0.038 |
| A/4 | 6/17/2020 | 101443 | 7.05 | **~~5.14~~** | **~~101.67~~** | 100.5 | 8.71 | *8.66* | 25.862 | *25.68* | -0.035 |
| B/5 | 7/28/2020 | 101577.9 | 7.02 | 1.04 | 125.05 | 101.7 | 8.56 | *8.5* | 24.121 | *24.4* | 0.029 |
| D | 8/18/2020 | **~~12055.3~~** | 6.94 | 0.58 | 122.13 | 100.6 | 8.51 | *8.5* | ­ | ­ | -0.076 |
| F | 9/16/2020 | 1013325.2 | 7.77 | 0.91 | 126.04 | 100.2 | 8.48 | *8.418* | ­ | ­ | -0.002 |
| E | 10/7/2020 | 101766.1 | 7.02 | 0.18 | 123.77 | 99.5 | 8.78 | *8.83* | ­ | ­ | -0.011 |
| C | 10/23/2020 | 101345.2 | 7.03 | 1.21 | 123.85 | 100.1 | 8.69 | *8.66* | ­ | ­ | -0.025 |
| F | 11/30/2020 | 101,825.2 | 7.11 | 0.28 | 124.29 | 98.5 | 8.14 | *8.263* | ­ | ­ | -0.017 |
| D | 1/5/2021 | **~~15,816~~** | 6.96 | 0.28 | 125.03 | 101.2 | 9 | *8.915* | ­ | ­ | 0.013 |
| **BB14 (Cont.)** | **Parameter** | **Chlorophyll-a (ug/L)** | **Chlorophyll- BGA (ug/L)** | **Chlorophyll- BGA (RFU)** |
| **Sonde**  | **Date/Standard** | **0** | **Chl CCV** | ***Std*** | **0** | **Chl CCV** | ***Std*** | **0** | **Chl CCV** | ***Std*** |
| 1 | 1/8/2019 | -0.2 | 106.5 | *108* | - | - | *-* | - | - | *-* |
| 1 | 2/4/2020 | -0.2 | 108 | *110.9* | - | - | *-* | - | - | *-* |
| 1 | 3/4/2020 | -0.2 | 115 | *111.65* | - | - | *-* | - | - | *-* |
| 1 | 4/15/2020 | 5.7 | 106.4 | *108.4* | - | - | *-* | - | - | *-* |
| C | 5/19/2020 | -0.24 | 68.06 | *67.68* | -1.06 | 117.46 | *130.2* | -0.46 | 42.19 | *46.4* |
| A/4 | 6/17/2020 | 2.59 | 64.66 | *62.95* | 5.12 | 127.47 | *118.75* | 1.79 | 45.59 | *42.5* |
| B/5 | 7/28/2020 | -0.02 | 62.33 | *61.85* | -0.23 | 116.99 | *116.5* | -1.19 | 41.89 | *41.6* |
| D | 8/18/2020 | 0.07 | 62.25 | *61.63* | -0.22 | 116.02 | *115.75* | -0.06 | 41.4 | *41.3* |
| F | 9/16/2020 | 1.31 | 59.92 | *62.18* | 0.24 | 117.07 | *117* | 0.17 | 41.21 | *41.8* |
| E | 10/7/2020 | 0.01 | 60.98 | *61.74* | -0.57 | 115.7 | *116* | -0.19 | 41.37 | *41.4* |
| C | 10/23/2020 | 0.18 | 61.25 | *62.51* | -0.08 | 115.52 | *117.25* | -0.05 | 41.32 | *42.1* |
| F | 11/30/2020 | 0.52 | 63.85 | *62.62* | 0.05 | 118.78 | *118* | 0.01 | 42.8 | *42.2* |
| D | 1/5/2021 | -0.07 | 69.48 | *64.875* | -0.13 | 115.7 | *123.3* | -0.04 | 41.28 | *44.1* |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **JT71** | **Parameter** | **Specific Conductivity (uS/cm)** | **pH** | **Turbidity (FNU)** | **Dissolved Oxygen (%, ug/L)** | **Temperature (°C)** | **Depth (m)** |
| **Sonde**  | **Date/Standard** | **100,000** | **pH CCV** | ***Std*** | **0** | **124** | **100%** | **DO CCV**  | ***Std*** | **Sonde** | ***Thermometer*** | **0** |
| B/5 | 1/8/2020 | 101890.7 | 7.11 | *7* | 0.14 | 120.17 | 101 | 8.99 | *8.915* | 21.015 | *21.3* | 0.089 |
| A/4 | 2/11/2020 | 101635.1 | 7.05 | *7* | 0.63 | - | 99.6 | 8.77 | *8.743* | 22.314 | *22.4* | -0.004 |
| B/5 | 3/6/2020 | 100027.8 | 9.95 | *10* | 0.28 | 117.53 | 100.2 | 8.78 | *8.743* | 19.574 | *19.7* | -0.045 |
| A/4 | 4/15/2020 | 101636 | 7.11 | *7* | 0.26 | 124.54 | 100.2 | 8.55 | *8.578* | 19.673 | *19.7* | -0.072 |
| D | 5/19/2020 | **~~1.22~~** | 6.85 | *7* | -1.87 | 124.31 | 101 | 8.66 | *8.578* | 28.173 | *28.5* | -0.059 |
| E | 6/17/2020 | 100951.3 | 7.0 | *7* | 4.04 | 122.96 | 101.9 | 8.75 | *8.578* | 25.862 | *25.68* | -0.065 |
| F | 7/28/2020 | 102682.2 | ­ | ­ | 0.41 | 123.36 | 100.9 | 8.59 | *8.5* | 24.143 | *24.4* | 0.033 |
| E | 9/2/2020 | 101055.5 | 7.01 | *7* | -0.03 | 123.3 | 101.8 | 8.36 | *8.263* | ­ | ­ | -0.022 |
| C | 9/29/2020 | 101823.8 | 6.98 | *7* | 0.42 | 119.7 | 100.3 | 8.9 | *8.83* | ­ | ­ | -0.067 |
| D | 10/23/2020 | **~~12125.2~~** | 6.97 | *7* | 0.46 | 123.03 | 99.9 | 7.85 | *7.827* | ­ | ­ | 0.076 |
| H | 11/30/2020 | 104830.2 | 7.01 | *7* | *2.82* | 118.36 | 100.9 | 8.37 | *8.34* | ­ | ­ | -0.06 |
| F | 1/5/2021 | 101515.8 | 7 | *7* | *0.22* | 123.8 | 101.3 | 9.01 | *8.915* | ­ | ­ | 0.059 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **JT71 (Cont.)** | **Parameter** | **Chlorophyll-a (ug/L)** | **Chlorophyll- BGA (ug/L)** | **Chlorophyll- BGA (RFU)** |
| **Sonde**  | **Date/Standard** | **0** | **Chl CCV** | ***Std*** | **0** | **Chl CCV** | ***Std*** | **0** | **Chl CCV** | ***Std*** |
| B/5 | 1/8/2020 | 0.09 | 61.49 | *64.625* | -0.02 | 122.09 | *122.7* | -0.03 | 44.4 | *43.9* |
| A/4 | 2/11/2020 | 0.04 | 62.7 | *63.18* | -0.48 | 121.16 | *119.5* | -0.06 | 43.8 | *42.8* |
| B/5 | 3/6/2020 | 0.08 | 65.09 | *63.5* | -0.02 | 120.62 | *119.95* | -0.01 | 45 | *42.9* |
| A/4 | 4/15/2020 | 0.05 | 61.18 | *62.4* | 0.06 | 123.51 | *117.5* | 0.02 | 45.61 | *42* |
| D | 5/19/2020 | -0.05 | 68.06 | *68.16* | 0.07 | 117.76 | *131.4* | -0.01 | 42.19 | *46.8* |
| E | 6/17/2020 | 0.72 | 69.03 | *62.84* | 0.07 | 117.51 | *118.5* | -0.01 | 42.1 | *42.4* |
| F | 7/28/2020 | -0.15 | 62.84 | *61.96* | -0.14 | 117.07 | *116.5* | 0.12 | 41.71 | *41.6* |
| E | 9/2/2020 | -0.01 | 59.49 | *60.26* | -0.44 | 116.07 | *116.2* | -0.19 | 41.41 | *40.24* |
| C | 9/29/2020 | 0.03 | 65.66 | *62.18* | 0.01 | 115.19 | *117* | 0 | 41.08 | *41.8* |
| D | 10/23/2020 | *0.05* | 62.88 | 62.51 | *0.07* | 115.72 | 117.25 | *0.03* | 41.29 | 42.1 |
| H | 11/30/2020 | 0.14 | 66.28 | *62.84* | -0.02 | 118.74 | *118.5* | -0.27 | 42.31 | *42.4* |
| F | 1/5/2021 | 0.08 | 67.96 | *65.125* | -0.16 | 119.06 | *123.9* | -0.34 | 42.32 | *44.3* |

**14) Other remarks/notes –**

Data are missing due to equipment or associated specific probes not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. If additional information on missing data is needed, contact the Aquatic Preserve office. Copies of the calibration/deployment logs can be obtained through the Water Quality Specialist.

All data files are QAQC’d using the 2012 CDMO Excel macro. This macro automatically flags DO values less than 3 mg/L as Passed Initial QAQC Checks with the comment DO Hypoxia (<3 mg/L) (0, CDA). The DO flag is based on Federal standards. During the primary QAQC session, any reading that falls outside a sensor’s range (see section II. Physical Structure descriptors) is rejected (-3). Additionally, negative turbidity readings between (0) and (-2) have been automatically flagged as suspect data (1, CAF) since the value is within the accuracy of the probe per the CDMO operations manual. All negative chlorophyll readings are labeled as (-4) since they fall outside the chlorophyll sensor range and are manually rejected during QAQC (-3, SNV). All the first data points for each new deployment are labeled (0, CND).

The parameters that are QC’d are depth (m), temperature (°C), salinity (ppt), specific conductance (mS), turbidity (FNU/NTU), pH (SU), DO (mg/L and %) and chlorophyll (ug/L). All other parameters have not been QC’d.

All data collected after the 30-days in each deployment is noted in the F\_Record column of the dataset with {CSM}. No viable DO or Chlorophyll data exists for LR03 in 2019.

All turbidity readings over 124 NTU/FNU are rejected (-3, STS) since they are out of the calibration range that BBAP applies (0-124 NTU/FNU). All chlorophyll readings over the upper calibration value are rejected (-3, SCS) since they are out of the calibration range (varies by deployment). Additionally, for BBAP, anomalous turbidity and chlorophyll spikes are labeled suspect (1, STS/SCS) if BOTH of the following conditions apply:

1. Data point is not within a well-defined peak (e.g., there is no incremental increase before data point or decrease after data point based on the neighboring readings)
2. The previous and next data points are BOTH less than the data point by the calculated value: STANDARD DEVIATION\*3 (SD calculated after rejected data removed)

For LR03, turbidity values > 6.44 NTU/FNU from the previous and next data point were marked (1, STS). Chlorophyll values > 11.67 ug/L from the previous and next data point were marked (1, SCS).

For BB14, turbidity values > 21.05 NTU/FNU from the previous and next data point were marked (1, STS). Chlorophyll values > 11.17 ug/L from the previous and next data point were marked (1, SCS).

For JT71, turbidity values > 8.04 FNU from the previous and next data point were marked (1, STS). Chlorophyll values > 5.11 ug/L from the previous and next data point were marked (1, SCS).

These readings may either be caused by optical interference by animals or fouling, or an unknown local disturbance. Readings within a well-defined peak were maintained and given a (0) flag.

January 1-31, 2020

BBLR03

 Missing: 1/1 0:00 - 1/17 11:45, Deployment failure

 Missing: 1/17 12:15, Sonde malfunction, not sure why recording stopped

 Missing: Chlorophyll for 1/17 12:00 and 1/7 12:30 – 1/31 23:45, No sensor deployed

Suspect: Turbidity for 1/30 6:15, Anomalous turbidity spike

Suspect: Turbidity for 1/17 12:00, Bottom disturbed during deployment

Reject: DO (ug/L and %) for 1/17 12:00 – 1/31 23:45, Sensor malfunction

BBBB14

 Missing: 1/8 11:00 – 1/13 14:15, Out for maintenance

Suspect: Turbidity for many points between 1/1 0:45 and 1/8 10:45, Negative value within accuracy of sensor

BBJT71

Missing: 1/8 13:30, Out for sonde exchange

Reject: Turbidity for 1/11 4:30, Outside calibration range turbidity spike (>124 FNU)

February 1-29, 2020

BBLR03

Missing: Chlorophyll for 2/1 0:00 - 2/29 23:45, No sensor deployed

Suspect: Turbidity for 2/8 3:15, 2/9 4:00, 2/13 15:00, 2/13 18:15, 2/14 21:30 2/16 5:30, 2/19 22:00, 2/24 13:15 and 2/26 8:30, Anomalous turbidity spike

Reject: DO (ug/L and %) for 2/1 0:00 – 2/29 23:45, Sensor malfunction

{CSM}: All parameters for 2/17 12:15 – 2/29 23:45, Deployment passed 30 days

BBBB14

Missing: 2/4 10:15 – 2/11 13:15, Out for maintenance

Suspect: Chlorophyll for 2/25 5:00, Anomalous chlorophyll spike

Reject: Turbidity for 2/3 19:15, Outside calibration range turbidity spike (>124 FNU)

BBJT71

Missing: 2/11 12:30, Out for sonde exchange

Suspect: Turbidity for 2/4 22:45, 2/14 11:00, 2/17 11:00 and 2/21 8:45, Anomalous turbidity spike

Suspect: Chlorophyll for 2/20 7:30, Anomalous chlorophyll spike

{CSM}: All parameters for 2/8 14:00 – 2/11 12:15, Deployment passed 30 days

March 1-31, 2020

BBLR03

Missing: Chlorophyll for 3/1 0:00 - 3/17 16:00, No sensor deployed

Missing: 3/9 16:30 – 3/17 16:00, Battery failure

Suspect: Turbidity for 3/2 12:30, Anomalous turbidity spike

Reject: Turbidity for 3/29 22:15 and 3/30 23:00, Outside calibration range turbidity spike (>124 FNU)

Reject: DO (ug/L and %) for 3/1 0:00 – 3/9 16:15, Sensor malfunction

{CSM}: All parameters for 3/1 0:00 – 3/9 16:15, Deployment passed 30 days

BBBB14

 Missing: 3/4 10:15 – 3/6 10:30, Sonde out for maintenance

Suspect: Turbidity for 3/23 20:30, 3/23 23:45 and 3/24 0:15, Anomalous turbidity spike (Fish seen in mount at retrieval on 4/15 – laid eggs on sensors)

Suspect: Chlorophyll for 3/3 0:45, 3/16 4:45 and 3/28 15:45, Anomalous chlorophyll spike

Reject: Turbidity for 3/23 0:45, 3/23 7:30 and 3/23 21:30, Outside calibration range turbidity spike (>124 FNU)

Reject: Salinity and Specific Conductivity for 3/21 15:45, Anomalous conductivity sensor error

BBJT71

Missing: 3/6 11:15, Out for sonde exchange

Suspect: Turbidity for 3/3 9:00, 3/9 11:00, 3/14 16:00, 3/15 7:15, 3/20 0:45, 3/23 8:00, 3/24 9:45, 3/26 4:15, 3/26 22:15, 3/27 0:15 and 3/28 9:45, Anomalous turbidity spike

Suspect: Chlorophyll for 3/24 9:45, Anomalous chlorophyll spike

Reject: Turbidity for 3/8 16:30, Outside calibration range turbidity spike (>124 FNU)

April 1-30, 2020

BBLR03

Suspect: Turbidity for 4/9 9:00, 4/11 20:30, 4/16 10:30, 4/19 15:30, 4/22 7:45, 4/27 12:15, 4/28 8:45 and 4/28 14:15, Anomalous turbidity spike (fish seen near mount at retrieval on 4/16, crabs seen in mount on 5/6)

Suspect: Turbidity for 4/16 10:30, Bottom disturbed during deployment

Reject: Turbidity for 4/8 21:00, Outside calibration range turbidity spike (>124 FNU)

BBBB14

{CSM}: Missing: 4/15 8:15 – 4/30 23:45, Sonde C had power malfunction and was later repaired by YSI

Suspect: Chlorophyll for 4/11 16:45, Anomalous chlorophyll spike

{CSM}: All parameters for 4/6 11:00 – 4/15 8:00, Deployment passed 30 days

BBJT71

 Missing: 4/15 9:15, Sonde out for maintenance

Suspect: Turbidity for 4/5 7:30, 4/21 11:15, 4/21 11:30 and 4/29 17:15, Anomalous turbidity spike (fish seen in mount at retrieval on 4/15 and 5/18)

Suspect: Chlorophyll for 4/5 7:30, Anomalous chlorophyll spike

{CSM}: All parameters for 4/6 11:45 – 4/15 9:00, Deployment passed 30 days

May 1-31, 2020

BBLR03

Suspect: Turbidity for 5/5 14:30 and 5/31 10:45, Anomalous turbidity spike (crabs seen in mount at retrieval on 5/6)

BBBB14

{CSM}: Missing: 5/1 0:00 – 5/18 11:30, Sonde C had power malfunction and was later repaired by YSI

 (CSM) Reject: Turbidity for 5/18 11:45 – 5/31 23:45, Calibration error

BBJT71

Missing: 5/18 12:15, Sonde out for maintenance

Suspect: Turbidity for 5/3 6:00, 5/3 19:45, 5/6 6:15, 5/7 9:30, 5/12 8:00, 5/17 7:15, 5/17 7:30, 5/23 11:15, 5/23 11:30 and 5/25 10:45, Anomalous turbidity spike (fish seen in mount at retrieval on 5/18)

Reject: Turbidity for 5/4 20:00, Outside calibration range turbidity spike (>124 FNU)

 (CSM) Reject: Salinity and Specific Conductivity for 5/6 14:00 – 5/18 12:00, Conductivity sensor failure, temperature not impacted, sent to YSI and then replaced after 5/18/2020

{CSM}: All parameters for 5/15 9:45 – 5/18 12:00, Deployment passed 30 days

June 1-30, 2020

BBLR03

Suspect: Turbidity for 6/16 18:15, Anomalous turbidity spike

BBBB14

Missing: 6/17 9:15, Sonde out for maintenance

Suspect: Turbidity for 6/23 15:30 and 6/23 15:45, Anomalous turbidity spike

(CSM) Reject: Turbidity for 6/1 0:00 – 6/17 9:00, Calibration error

BBJT71

Missing: 6/15 23:15, Sonde malfunction, not sure why recording stopped

 Missing: 6/17 10:00, Sonde out for maintenance

 Missing: pH for 6/17 10:15 – 6/30 23:45, pH sensor not deployed

Suspect: Turbidity for 6/2 16:45, 6/3 22:45, 6/7 7:45, 6/7 8:30, 6/10 19:15, 6/11 12:15, 6/15 0:30, 6/17 4:15, 6/17 4:30, 6/21 8:15, 6/25 16:00, 6/25 19:00 and 6/29 20:45, Anomalous turbidity spike (fish seen in mount at retrieval on 6/17)

Reject: Turbidity for 6/15 23:45, Outside calibration range turbidity spike (>124 FNU)

(CSM) Reject: Depth, pH, Salinity and Specific Conductivity for 6/15 23:45, NAN reading and 0 readings, cause unknown, “NAN” and “0” may need to be removed for analyses

July 1-31, 2020

BBLR03

Suspect: Turbidity for 7/1 17:00, 7/3 17:30, 7/7 8:15, 7/12 0:15, 7/20 9:15 and 7/23 1:30, Anomalous turbidity spike

Reject: Turbidity for 7/8 5:45, Outside calibration range turbidity spike (>124 FNU)

BBBB14

Missing: 7/28 7:15, Sonde out for maintenance

Suspect: Turbidity for 7/8 7:30 and 7/31 19:00, Anomalous turbidity spike

{CSM}: All parameters for 7/18 9:30 – 7/28 9:00, Deployment passed 30 days

BBJT71

Missing: 7/28 10:15, Sonde out for maintenance

 Missing: pH for 7/1 0:00 – 7/28 10:00, pH sensor not deployed

Suspect: Turbidity for 7/3 7:30, 7/6 10:45, 7/20 7:15, 7/24 6:15 and 7/30 7:30, Anomalous turbidity spike (fish seen in sensor guard at retrieval on 8/20)

Suspect: Chlorophyll for 7/11 7:54 and 7/13 15:30, Anomalous chlorophyll spike

 {CSM} All parameters for 7/18 10:15 – 7/28 10:00, Deployment passed 30 days

August 1-31, 2020

BBLR03

Suspect: Chlorophyll for 8/24 2:45, 8/30 1:45, 8/30 3:00 and 8/30 4:00, Anomalous chlorophyll spike

Reject: Turbidity for 8/9 1:30 and 8/30 2:30, Outside calibration range turbidity spike (>124 FNU)

Reject: Chlorophyll for 8/21 23:00, 8/22 2:00 and 8/30 2:15, Outside calibration range chlorophyll spike (>61.04-63.28 ug/L)

(CSM) Reject: Salinity and Specific Conductivity for 8/20 10:30 – 8/31 23:45, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hrs

{CSM} 8/10 3:15 - 8/14 12:00, readings associated with a fish kill event in this basin that impacted the dissolved oxygen of the LR03 site. For more information on the fish kill event, see section 5, above.

BBBB14

Suspect: Turbidity for 8/6 7:45, 8/22 1:15, 8/23 12:45, 8/24 2:00, 8/24 2:45, 8/24 5:30, 8/24 15:00, 8/24 16:15, 8/25 6:30, 8/26 3:15, 8/27 7:30, 8/27 7:45, 8/29 13:15, 8/29 14:00, 8/30 3:15, 8/30 9:15, 8/30 12:45, 8/31 12:30 and 8/31 17:15, Anomalous turbidity spike (fish seen in sensor guard at retrieval)

Suspect: Chlorophyll for 8/6 6:30 and 8/19 14:30, Anomalous chlorophyll spike

Reject: Turbidity for 8/6 7:15, 8/23 23:15, 8/24 15:15, 8/25 3:15, 8/25 7:00 8/28 10:00, 8/29 8:15, 8/29 13:45, 8/29 14:30, 8/30 13:15, 8/30 15:45, 8/30 16:15, 8/31 12:45 and 8/31 13:00, Outside calibration range turbidity spike (>124 FNU)

Reject: Chlorophyll for 8/6 7:30 and 8/6 8:00, Outside calibration range chlorophyll spike (>61.85-67.68 ug/L)

(CSM) Reject: Salinity and Specific Conductivity for 8/1 21:30 – 8/18 11:00, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hrs

Reject: Salinity and Specific Conductivity for 8/25 10:15, Anomalous conductivity sensor error

Reject: pH for 8/18 11:15 – 8/31 23:45, Incorrect Calibration (reading high)

{CSM} 8/9 3:15 - 8/13 9:15, readings associated with a fish kill event in this basin that impacted the dissolved oxygen and turbidity of the BB14 site. For more information on the fish kill event, see section 5, above.

BBJT71

Suspect: Turbidity for 8/3 6:45, 8/4 10:00, 8/4 12:15, 8/4 12:30, 8/5 7:30, 8/17 8:15, 8/24 8:45, 8/24 9:00, 8/24 10:15, 8/24 22:30, 8/27 17:00, 8/27 18:45, 8/28 2:30 and 8/28 7:00, Anomalous turbidity spike (fish seen in sensor guard at retrieval)

Suspect: Chlorophyll for 8/24 13:15, Anomalous chlorophyll spike

{CSM} All parameters for 8/29 10:30 – 8/30 23:45, Deployment passed 30 days

September 1-31, 2020

BBLR03

Missing: 9/9 18:15 – 9/22 11:45, Instrument malfunction related to battery connectivity

Suspect: Turbidity for 9/24 13:30, Anomalous turbidity spike

Reject: Turbidity for 9/8 23:00, Outside sensor range turbidity spike (>124 FNU)

(CSM) Reject: Salinity and Specific Conductivity for 9/1 0:00 – 9/9 18:00, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hours

BBBB14

Missing: 9/16 11:30, Sonde out for maintenance

{CSM}: Missing: 9/19 15:15-15:30, 9/19 17:30, 9/19 20:15 – 9/30 23:45, Sonde malfunction due to battery connectivity, Sonde E sent to YSI for repairs

Suspect: Turbidity for 9/1 14:00, 9/1 16:30, 9/2 10:30, 9/2 13:00, 9/2 14:30, 9/2 17:15, 9/3 6:45, 9/3 7:00, 9/3 13:15, 9/3 14:15, 9/3 15:00, 9/4 7:15, 9/4 8:15, 9/4 10:45, 9/5 7:30, 9/5 9:30, 9/5 10:00, 9/5 10:45, 9/6 4:45, 9/6 9:30, 9/6 9:45, 9/6 11:30, 9/6 16:30, 9/6 16:45, 9/7 7:45, 9/7 8:00, 9/78:15, 9/7 8:45, 9/7 10:15, 9/7 10:30, 9/7 11:00, 9/7 12:00, 9/7 12:15, 9/7 13:00, 9/7 15:15, 9/9 6:15, 9/9 8:15, 9/9 8:45, 9/9 13:15, 9/12 4:45, 9/15 2:00 and 9/16 11:15, Anomalous turbidity spike (fish seen in sensor guard at retrieval)

Suspect: Chlorophyll for 9/3 22:15, Anomalous chlorophyll spike

(CSM) Suspect: Chlorophyll for 9/12 4:45 -9/16 11:15, High chlorophyll readings due to missing wiper brush. There was a toadfish living in the sensor guard that likely removed the wiper brush, which allowed for some fouling on the sensors. Only the chlorophyll readings failed the verification with freshly calibrated sonde. The CCV values failed low, so not due to sensor drift.

Reject: Turbidity for 9/1 3:00, 9/1 15:45, 9/2 8:00, 9/2 10:45, 9/2 12:45, 9/2 13:15, 9/2 13:45, 9/2 15:00, 9/2 17:30, 9/3 14:30, 9/3 15:15, 9/7 8:30 and 9/7 10:45, Outside calibration range turbidity spike (>124 FNU)

Reject: pH for 9/1 0:00 – 9/16 11:15, Incorrect Calibration (reading high)

BBJT71

 Missing: 9/2 12:15 and 9/29 13:30, Sonde out for maintenance

Suspect: Turbidity for 9/1 6:30, 9/4 9:15, 9/5 6:30, 9/18 10:00, 9/19 15:30, 9/21 8:30 and 9/22 8:30, Anomalous turbidity spike (fish seen in sensor guard at retrieval)

Suspect: Chlorophyll for 9/1 8:30, Anomalous chlorophyll spike

Reject: Depth for 9/18 23:30, unknown inconsistency in depth

(CSM) Reject: Depth for 9/18 23:00 and 9/18 23:30, NAN reading

(CSM) Reject: pH for 9/18 23:30, NAN reading

(CSM) Reject: Salinity and Specific Conductivity for 9/29 13:45 - 9/30 23:45, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hrs

{CSM} All parameters for 9/1 0:00 – 9/2 12:00, Deployment passed 30 days

October 1-31, 2020

BBLR03

Suspect: Turbidity for 10/10 3:45 and 10/13 18:30, Anomalous turbidity spike

Reject: Chlorophyll for 10/5 5:45, Outside calibration range chlorophyll spike (>61.04-63.28 ug/L)

BBBB14

{CSM}: Missing: 10/1 0:00 – 10/4 19:15, Sonde malfunction due to battery connectivity, Sonde E sent to YSI for repairs

Missing: 10/23 9:45, Sonde out for maintenance

Suspect: Turbidity for 10/5 23:00, 10/6 0:30, 10/6 14:30, 10/6 21:45, 10/7 0:15, 10/7 2:45, 10/7 4:30, 10/7 4:45, 10/9 17:30, 10/12 1:30, 10/13 4:45, 10/14 5:00, 10/16 13:30, 10/20 8:15, 10/20 14:00, 10/21 7:30 and 10/31 15:45, Anomalous turbidity spike (fish seen in sensor guard at retrieval)

Reject: Turbidity for 10/7 10:45, 10/17 5:15 and 10/18 2:30, Outside calibration range turbidity spike (>124 FNU)

Reject: Salinity and Specific Conductivity for 10/7 10:45 and 10/22 17:45, Anomalous conductivity sensor error

BBJT71

Missing: 10/23 10:45, Sonde out for maintenance

Suspect: Turbidity for 10/11 19:00 and 10/15 20:45, Anomalous turbidity spike (fish seen in sensor guard at retrieval)

(CSM) Reject: Salinity and Specific Conductivity for 10/1 0:00 – 10/23 10:30, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hours

November 1-30, 2020

BBLR03

 Suspect: Turbidity for 11/19 11:30, 11/23 16:45 and 11/27 10:00, Anomalous turbidity spike

BBBB14

 Missing: 11/30 12:00, Sonde out for maintenance

Reject: Chlorophyll for 11/2 11:15, Outside calibration range chlorophyll spike (>61.85-67.68 ug/L)

(CSM): Reject: Salinity and Specific Conductivity for 11/30 12:15 – 11/30 23:45, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hours

{CSM}: All parameters for 11/23 10:15 – 11/30 11:45, Deployment passed 30 days

BBJT71

Missing: 11/30 13:00, Sonde out for maintenance

Suspect: Turbidity for 11/10 7:15, 11/12 9:45, 11/15 14:45 and 11/26 7:30, Anomalous turbidity spike

 Suspect: Chlorophyll for 11/12 9:45 and 11/21 8:30, Anomalous chlorophyll spike

Reject: Turbidity for 11/10 7:00, Outside calibration range turbidity spike (>124 FNU)

December 1-31, 2020

BBLR03

BBBB14

Suspect: Turbidity for 12/18 21:15, 12/22 6:30, 12/22 6:45 and 12/22 18:45, Anomalous turbidity spike

Reject: Turbidity for 12/18 19:45, 12/22 12:45, 12/29 18:00 and 12/29 19:30, Outside calibration range turbidity spike (>124 FNU)

(CSM): Reject: Salinity and Specific Conductivity for 12/1 0:00 – 12/31 23:45, Strange calcification found between sensor, temperature not impacted, repaired by soaking in vinegar for 24 hours

{CSM}: All parameters for 12/30 12:30 – 12/31 23:45, Deployment passed 30 days

BBJT71

Suspect: Turbidity for 12/5 2:00, 12/5 15:30, 12/6 18:15, 12/10 17:00, 12/16 15:45, 12/28 19:45 and 12/30 18:15, Anomalous turbidity spike

 Suspect: Chlorophyll for 12/28 19:45, Anomalous chlorophyll spike

**15) Acknowledgement:**

The data included with this document were collected by the staff of the Florida Department of Environmental Protection at Biscayne Bay Aquatic Preserves. Any products derived from these data should clearly acknowledge this source (please use the attached logos). This recognition is important for ensuring that this long-term monitoring program continues to receive the necessary political and financial support.