Grand Bay (GND) National Estuarine Research Reserve Water Quality Metadata

January – December 2010

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I. Data Set & Research Descriptors

1) Principal investigators & contact persons:

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2) Entry verification:

Deployment data are uploaded from the YSI data logger to a Personal Computer (IBM compatible). Files are exported from EcoWatch in a comma-delimited format (.CDF) and uploaded to the CDMO where they undergo automated primary QAQC and become part of the CDMO’s online provisional database. Excessive pre- and post-deployment data are removed from the file prior to upload with up to 2 hours of pre- and post-deployment data retained to assist in data management. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the Reserve 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 remaining pre- and post-deployment data, append files, and export the resulting data file to the CDMO for tertiary QAQC and assimilation into the CDMO’s authoritative online database. 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. Christine Walters is responsible for data management.

3) Research objectives:

The National Estuarine Research Reserve (NERR) System-wide Monitoring Program (SWMP) was designed to fulfill two major overall goals: 1) to support state-specific non-point pollution control programs by establishing local networks of continuous water quality monitoring stations in representative protected estuarine ecosystems and 2) to develop a nation-wide database on baseline environmental conditions in the NERR system of estuaries. The specific goal of SWMP is to identify and track short-term variability and long-term changes in the integrity and biodiversity of representative estuarine ecosystems and coastal watersheds for the purpose of contributing to effective national, regional, and site specific coastal zone management. This comprehensive program consists of three phased components: 1) abiotic factors such as water quality and meteorological monitoring; 2) biodiversity monitoring; and 3) land-use planning analysis. With the initial focus of phase 1, the NERR SWMP will provide data necessary for intra- and inter- site baseline studies, trend analyses, and impact assessment.

Four long-term monitoring stations have been established across the Grand Bay NERR in order to collect essential baseline water quality information to improve our understanding of the tidal dynamics and freshwater inputs into this system. Specifically, the Grand Bay NERR system wide monitoring program stations collect continuous data to address the following objectives: (1) track short-term variability and long-term changes in estuarine water parameters within three different regions within the reserve and (2) provide bayou-specific water quality data to be applied towards the development of a hydrologic model for the Grand Bay NERR.

The Grand Bay NERR is part of the Grand Bay coastal streams watershed which consists of three primary sub-watersheds that provide much of the freshwater inputs into the system. The Bayou Heron site, located in the upper reaches of the Bayou Heron sub-watershed, monitors water quality for a semi-pristine area with no development and serves as a reference site for the reserve. The Bayou Cumbest site monitors water quality for the Bayou Cumbest sub-watershed which is a moderately impacted area with some residential housing development and non-point source pollution issues related to failing septic tanks (i.e., elevated levels of fecal coliforms). Located towards the southern end of the Bangs Lake sub-watershed, the Bangs Lake site monitors water quality for a second impacted area with minimal residential development. Although this sub-watershed has less development than the Bayou Cumbest sub-watershed, a recent study found extremely elevated levels of fecal coliforms. Subsequent investigations of the Bangs Lake area showed a small drainage ditch running directly into the northern end of the sub-watershed from several residential housing units with failing septic systems. The fourth water quality monitoring site was located at Crooked Bayou, near the south-central boundary of the reserve. During 2005, this site was relocated to Point Aux Chenes Bay, near the southern boundary of the Reserve. Both of these sites provide baseline data of the relative influence of marine inputs and tidal influence from the East Mississippi Sound.

Current and future research projects will be developed around this monitoring program. The four sites identified here monitor areas with varying degrees of human disturbance and impacts, providing an excellent framework for developing reserve-wide research projects.

4) Research methods:

Sonde cleaning and calibrations of the DO, Conductivity, Depth, pH, and Turbidity probes are performed as outlined in the YSI manual. For Conductivity and Salinity, YSI calibrator solution 3169 (50,000 µS/cm) is used without dilution. For pH calibrations, YSI calibrator solution 3822 and 3823 are used for pH 7 and 10, respectively. A two-point calibration is used for Turbidity, distilled water serves as the calibrator solution for 0 NTU and YSI 6073G is used for 123 NTU. Depth is calibrated in air and is barometrically corrected. The DO membrane is replaced and calibrated every deployment. It is allowed to stretch for 16-20 hours, and re-calibrated prior to actual deployment. The sonde is programmed to brush the probes 1 minute prior to the actual measurement. All data are collected every 15 minutes. All data are recorded in Central Standard Time.

One data logger is deployed at each permanent monitoring station in the Grand Bay estuary at all times. Two permanently assigned data loggers are interchanged among each site. Sites are accessed using a small skiff equipped with an outboard motor. During transport, each sonde is wrapped in a white towel soaked in tap water and placed horizontally in a cooler for insulation against jarring. For deployment, the data loggers are affixed to a PVC rack using a stainless steel hose clamp, as well as, hung by the pail from a PVC hook built into the rack for additional support. This rack is lowered into a five inch diameter stainless steel (SS) pipe that has been bolted to a log piling driven into the mud at each site. The SS pipes have cut outs to ensure adequate tidal flushing and exposure of the probes to ambient water conditions. A grate across the bottom of the pipe prevents the rack from descending beyond the bottom of the pipe and ensures that the logger monitors at the same depth on every deployment. The pipes, along with the probes, are also coated with an anti-fouling paint to minimize biofouling.

As a quality assurance measure, a discreet reading is taken with a freshly calibrated sonde and recorded on the calibration sheet during sonde deployment and retrieval. During retrieval, the data loggers are again wrapped in a saturated white towel and placed in a cooler for transport to the lab. At least two data points are recorded while the sonde is wrapped in the towel to record post-deployment dissolved oxygen in 100% water-saturated air. The other post-deployment calibrations are performed in the laboratory prior to cleaning to determine if instrument drift has occurred and to evaluate the validity of the data. After post-deployment calibrations, the sondes are cleaned and stored in calibration cups until the next deployment.

A A Sutron Sat-Link2 transmitter was installed at the Bangs Lake station on 6/21/06 and transmits data to the NOAA GOES satellite, NESDIS ID #3B02A276. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The “real-time” telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation in the CDMO’s authoritative online database. Provisional and authoritative data are available at [http://cdmo.baruch.sc.edu](http://cdmo.baruch.sc.edu/).

5) Site location and character:

Thousands of years ago, the Escatawpa River built a sizable delta in southeast Mississippi. The deterioration of this delta began when the Escatawpa River changed its course hundreds of years ago. In 1999, the retrograding delta became home to the 24th National Esturarine Research Reserve, the Grand Bay NERR.

The four water quality monitoring sites within the Grand Bay NERR have a tidal range of approximately .5 meter. Additional site specific characteristics are as follows:

a) Bayou Heron (BH): [30° 25.068’ N, 88° 24.324’W]. The Bayou Heron site provides water quality data for the Bayou Heron sub-watershed. The water depth range is from .16 m to 1.69 m and the salinity range is from 0 ppt to 25.3 ppt. Salinity tends to decrease rapidly when rain events occur at the site or within the watershed. Because the sensor is located .25m from the bottom and there are no major sources of freshwater into this bayou, it has been concluded that some source of freshwater exist close to the bottom of the bayou. Hydrology studies are being designed to further understand this occurrence. This site tends to become hypoxic during warmer months (March – October). The bottom habitat is soft sediments.

b) Point Aux Chenes (PC): [30° 20.916’N, 88° 25.112’W]. The Point Aux Chenes site is the most southern water quality site within the boundaries of Grand Bay NERR. It is located in Point Aux Chenes Bay and is highly influenced by the Mississippi Sound. The water depth range is from .3 m to 1.6 m and the salinity range is from 17.2 ppt to 32.1 ppt. The bottom habitat is soft sediments.

c) Bayou Cumbest (BC): [30° 23.016’N, 88° 26.184’W]. The Bayou Cumbest site monitors water quality for the Bayou Cumbest sub-watershed. The water depth range is from 0 m to 1.10 m and the salinity range is from 0.5 ppt to 27.8 ppt. The site is located in soft sediments with unconsolidated oyster shell reefs.

d) Bangs Lake (BL): [30° 21.426’N, 88° 27.774’W]. The Bangs Lake site monitors the water quality of the Bangs Lake sub-watershed. The water depth range is from 0 m to 1.37 m and the salinity range is from 9.6 ppt to 28.0 ppt. The site is located on a soft sediment bottom.

6) Data Collection Periods:

Data loggers were first deployed at Bayou Heron (BH) and Crooked Bayou (CR) on January 22, 2004. Additional data loggers were deployed at Bayou Cumbest (BC) and Bangs Lake (BL) on March 25, 2004. Bayou Heron, Bayou Cumbest, and Bangs Lake have been in service continuously since inception. Crooked Bayou (CR) was relocated to the weather station across the bayou in August 2004 [30° 21.551’N, 88° 25.202’W] due to the loss of the permanent log piling at the original site [30° 21.597’N, 88° 25.143’W]. During August 2005, the Crooked Bayou site was discontinued due to the magnitude of data lost during low tide events. The Point Aux Chenes site (PC) [30° 20.916’N, 88° 25.112’W] was designated to replace the Crooked Bayou site. Also during August 2005, all sites were lowered from .5m to .25m to increase data collection during low tide events.

In 2010, the collection dates and times were as follows:

Site Deploy Date Time Retrieve Date Time

Bayou Heron

10/21/09 1100 01/04/10 1045

01/04/10 1100 02/18/10 1415

02/18/10 1430 03/23/10 1100

03/23/10 1115 04/20/10 1030

04/20/10 1045 06/02/10 1230

06/02/10 1245 07/16/10 0830

07/16/10 0845 08/12/10 1200

08/12/10 1215 09/08/10 1400

09/08/10 1415 10/07/10 1730

10/07/10 1745 11/18/10 1615

11/18/10 1630 12/21/10 1100

12/21/10 1115 01/26/11 1730

Site Deploy Date Time Retrieve Date Time

Point Aux Chenes

01/04/10 1215 02/18/10 1345

02/18/10 1400 03/23/10 0915

03/23/10 0930 04/20/10 0915

04/20/10 0930 06/02/10 1000

06/02/10 1030 06/17/10 1015

06/17/10 1045 07/16/10 0900

07/16/10 0915 08/12/10 1130

08/12/10 1145 09/08/10 1245

09/08/10 1315 10/07/10 1615

10/07/10 1630 11/18/10 1515

11/18/10 1530 12/21/10 1000

12/21/10 1015 01/26/11 1630

Site Deploy Date Time Retrieve Date Time

Bayou Cumbest

10/21/09 1030 01/04/10 1245

01/04/10 1315 02/18/10 1300

02/18/10 1315 03/23/10 0945

03/23/10 1000 04/20/10 0945

04/20/10 1000 06/02/10 1045

06/02/10 1115 07/16/10 1030

07/16/10 1045 08/12/10 1045

08/12/10 1115 09/08/10 1330

09/08/10 1345 10/08/10 0915

10/08/10 0945 11/18/10 1530

11/18/10 1545 12/21/10 0945

12/21/10 1000 01/26/11 1700

Site Deploy Date Time Retrieve Date Time

Bangs Lake

10/21/09 1000 01/04/10 1215

01/04/10 1245 02/03/10 0600\*

02/18/10 1345 03/23/10 0930

03/23/10 0945 04/20/10 0930

04/20/10 0945 06/02/10 1045

06/02/10 1100 07/16/10 0930

07/16/10 0945 08/12/10 1115

08/12/10 1130 09/08/10 1315

09/08/10 1330 10/07/10 1630

10/07/10 1645 11/18/10 1530

11/18/10 1545 12/21/10 1015

12/21/10 1030 01/26/11 1645

7) Distribution

NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from this NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. 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. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Principal Investigators and Contact Persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page [http://cdmo.baruch.sc.edu/](http://cfcdmo.baruch.sc.edu/). Data are available in text tab-delimited format.

8) Associated researchers and projects:

Several research and monitoring projects are currently using the water quality data from the Grand Bay NERR. These projects are listed below:

* **The use of remote sensing and molecular detection to predict the risk of infection by *Vibrio parahaemolyticus*** – Dr, Jay Grimes (University of Southern Mississippi, Gulf Coast Research Laboratory)
* **Ecological modeling of potential habitat for submerged aquatic vegetation at Grand Bay National Estuarine Research Reserve, Mississippi** – Cristina Nica (Jackson State University)
* **Breeding Ecology and Ecotoxiocology of Clapper Rails in Coastal Mississippi Marshes –** collaborators: Dr. Bob Cooper (University of Georgia), Scott Rush (Ph.D. Candidate, UGA), Dr. Courtney Conway (University of Arizona), Dr. Mark Woodrey (Mississippi State University/Grand Bay NERR);
* **Development of a Decision-Support Tool to Assess the Risk of Habitat Degradation Following Watershed Land Use Changes –** Dr. Mark S. Woodrey **(**Co-PI; *coauthor of grant proposal* with C.A. May, Grand Bay NERR (CO-PI), Dr. J. Cebrian, Dauphin Island Sea Lab (Co-PI), Dr. R.H. Beard, NOAA (Co-PI), and Dr. A.R. Parsons, NOAA (Co-PI);
* **Developing Optimal Survey Techniques for Monitoring Population Status of Rails, Snipe, Coots, and Gallinules -** Dr. Mark S. Woodrey **(**Co-PI; *coauthor of grant proposal* with Dr. C.J. Conway, U.S.G.S. (PI);
* **Fish Communities of Nearshore Habitats within the Grand Bay NERR/NWR** – Gretchen Grammer (Grand Bay NERR), Jake Walker (Grand Bay NERR), Dr. Mark Woodrey (Mississippi State University/Grand Bay NERR);
* **Assessment of Microbiological Quality of Water in Selected Grand Bay NERR Ecosystems** - Stephen Kishinhi (Ph.D. Candidate, Jackson State University – Environmental Cooperative Science Center);
* **Ecotoxicity and Risk Assessment of Mercury in the Grand Bay National Estuarine Research Reserve –** Melanie McHenry (Ph.D. Candidate, Jackson State University – Environmental Cooperative Science Center);
* **Modeling Seagrass Community Change Using Remote Sensing and Real-time Instrument Packages to Monitor Multiple Stressors** - collaborators: Dr. Anne Boettcher (University of South Alabama), Dr. Deb Gochfeld (University of Mississippi), Marc Slattery (University of Mississippi), Christopher May (Grand Bay NERR);
* **Tidal Creek Ecosystems: Are they sentinel habitats for assessing the consequences of rapid development in the Gulf of Mexico?** – collaborators: Dr. Guy DiDonato and Dr. Susan White (Hollings Marine Lab, NOAA), Denise Sanger (SC Sea Grant), Scott Phipps (Weeks Bay NERR), Gretchen Grammer (Grand Bay NERR), Christina Watters (Florida A&M University/Grand bay NERR), and Dr. Mark Woodrey (Mississippi State University/Grand Bay NERR);
* **Collaborative Research: Effects of global climate change on estuarine-upland transitions in vegetation along the northern Gulf of Mexico coastline –** collaborators: Dr. Bill Platt (Louisiana State University), Dr. Loretta Battaglia (Southern Illinois University-Carbondale), Dr. Mark Woodrey (Mississippi State University/Grand Bay NERR); and
* **Nesting ecology of the diamondback terrapin (*Malaclemys* *terrapin pileata*) at the Grand Bay National Estuarine Research Reserve, Mississippi –** Collaborators – Christina Watters (Florida A&M University/Grand Bay NERR), Chris May (Grand Bay NERR), and Dr. Mark Woodrey (Mississippi State University/Grand Bay NERR)**.**

In addition to water quality data, the NERR SWMP program also generates meteorological and nutrient data sets that are available for use.

II. Physical Structure Descriptors

9) Sensor Specifications:

GND NERR deployed only 6600EDS sondes in 2010. Rapid pulse DO sensors were deployed at Point Aux Chenes Bay (PC), Bayou Cumbest (BC), and Bangs Lake (BL) for all of 2010. ROX DO sensors were deployed at Bayou Heron (BH) due to hypoxic conditions.

YSI 6600EDS 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: Dissolved Oxygen % saturation

Units: percent air saturation (%)

Sensor Type: Optical probe w/ mechanical cleaning

Model #: 6150 ROX

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, +/- 15 % 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: Optical probe w/ mechanical cleaning

Model #: 6150 ROX

Range: 0 to 50 mg/L

Accuracy: 0 to 20 mg/L, +/- 1 % of the reading or +/- 0.1 mg/L, whichever is greater; 20 to 50 mg/L, +/- 15 % 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 – EDS flat glass and bulb style probes

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

Depth qualifier: The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either depth or water level sensors.  Both sensors measure water depth, but by convention, level sensors refer to atmospherically vented measurements and depth refers to non-vented measurements.  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 1.03 cm for every 1 millibar change in atmospheric pressure, and is eliminated for level sensors because they are vented to the atmosphere throughout the deployment time interval.

Beginning in 2006, NERR SWMP 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 SWMP calibration sheet or Digital Calibration Log.  This offset procedure standardizes each depth calibration for the entire NERR System.  If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR site can be corrected.  The Research Coordinator at the specific NERR site should be contacted in order to obtain information regarding atmospheric pressure data availability. All data sondes used at the GND NERR sites in 2010 were non-vented models.

10) Coded variable definitions:

Sampling station: Sampling site code: Station Code:

Bayou Heron BH gndbhwq

Point Aux Chenes PC gndpcwq

Bayou Cumbest BC gndbcwq

Bangs Lake BL gndblwq

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

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:

End of deployment post-calibration readings in standard solutions prior to probe cleaning.

The following variable codes are used to explain missing post-calibration readings:

PA probe absent/not functioning

NA reading not available

**Bayou Heron**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | DO% Air Sat | pH (7.00) | pH (10.00) | Turbidity  0 | Turbidity 123 | Sp Cond 50 |
| 01/04/10 | 103.5 | 7.16 | 10.35 | 2.0 | 124.4 | 49.67 |
| 02/18/10 | 99.1 | 7.18 | 10.17 | -0.3 | 119.7 | 48.81 |
| 03/23/10 | 99.9 | 7.21 | 9.93 | 1.2 | 123.8 | 49.58 |
| 04/20/10 | 97.1 | 7.00 | 9.98 | 1.8 | 125.3 | 50.02 |
| 05/25/10 | 103.0 | 7.12 | 9.99 | 0.1 | 120.3 | 52.02 |
| 07/16/10 | 99.8 | 7.08 | 9.98 | 0.4 | 119.8 | 50.63 |
| 08/12/10 | 99.3 | 7.05 | 9.95 | 0.9 | 128.2 | 50.07 |
| 09/09/10 | 99.4 | 6.97 | 9.76 | 1.1 | 138.0 | 49.80 |
| 10/07/10 | 100.8 | 6.95 | 9.89 | 0.3 | 124.4 | 58.04 |
| 11/18/10 | 103.4 | 7.52 | 9.68 | -0.6 | 119.9 | 51.58 |
| 12/21/10 | 98.1 | 7.15 | 9.62 | -0.5 | 120.3 | 49.15 |

**Point Aux Chenes**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | DO% Air Sat | pH (7.00) | pH (10.00) | Turbidity  0 | Turbidity 123 | Sp Cond 50 |
| 01/04/10 | 117.6 | 7.07 | 10.04 | 3.6 | 122.9 | 50.16 |
| 02/18/10 | 113.5 | 7.22 | 10.12 | -7.3 | 118.7 | 50.64 |
| 03/17/10 | 110.1 | 7.12 | 8.69 | 11.8 | 116.4 | 20.80 |
| 04/20/10 | 96.1 | 7.19 | 10.02 | 0.2 | 123.9 | 47.37 |
| 05/25/10 | \* | \* | \* | \* | \* | \* |
| 06/17/10 | NA | 6.07 | 7.66 | -2.5 | 117.2 | 50.60 |
| 07/16/10 | 107.8 | 7.18 | 10.05 | 2.0 | 111.4 | 49.99 |
| 08/12/10 | 55.0 | 7.30 | 8.98 | -1.3 | 122.8 | 44.88 |
| 09/09/10 | NA | NA | NA | -2.0 | 122.4 | 44.35 |
| 10/07/10 | 67.1 | NA | NA | -2.0 | 118.0 | 46.75 |
| 11/18/10 | 99.3 | 7.23 | 10.33 | -0.6 | 121.5 | 49.63 |
| 12/21/10 | 94.4 | 7.15 | 10.19 | -0.1 | 120.0 | NA |

\*Could not obtain post-calibration readings. Sonde damaged by vandals.

**Bayou Cumbest**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | DO% Air Sat | pH (7.00) | pH (10.00) | Turbidity  0 | Turbidity 123 | Sp Cond 50 |
| 01/04/10 | 116.8 | 7.19 | 10.19 | 4.9 | 121.3 | 51.74 |
| 02/18/10 | 105.3 | 7.20 | 10.02 | -0.3 | 124.5 | 48.81 |
| 03/17/10 | 106.6 | 7.24 | 9.90 | 1.3 | 115.8 | 46.07 |
| 04/20/10 | 108.9 | 7.33 | 10.26 | -0.5 | 87.8 | 50.95 |
| 05/25/10 | NA | 7.18 | 9.93 | 1.8 | 119.0 | 47.80 |
| 07/16/10 | 102.1 | 6.69 | 9.66 | 3.0 | 120.6 | 50.15 |
| 08/12/10 | 99.6 | 7.20 | 10.06 | 0.0 | 122.0 | 54.60 |
| 09/09/10 | NA | 6.79 | 9.49 | -0.5 | 119.8 | 42.24 |
| 10/07/10 | 83.5 | 7.19 | 10.01 | -2.1 | 119.8 | 45.64 |
| 11/18/10 | 104.8 | 6.65 | 9.35 | -0.6 | 119.8 | 48.99 |
| 12/21/10 | 76.1 | 7.00 | 9.89 | 2.1 | 123.3 | 50.38 |

**Bangs Lake**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | DO% Air Sat | pH (7.00) | pH (10.00) | Turbidity  0 | Turbidity 123 | Sp Cond 50 |
| 01/04/10 | NA | 7.11 | 10.06 | 4.3 | 123.3 | 44.62 |
| 02/18/10 | 105.4 | 7.19 | 9.22 | -3.1 | 121.9 | 47.53 |
| 03/17/10 | 70.7 | 7.40 | 8.86 | 4.7 | 79.0 | 38.62 |
| 04/20/10 | 13.8 | 7.40 | 7.45 | -1.4 | 126.5 | 31.60 |
| 05/25/10 | 20.3 | 7.21 | 8.70 | 1.3 | 126.1 | 42.12 |
| 07/16/10 | 2.4 | 7.47 | 10.16 | 1.0 | 117.2 | 48.77 |
| 08/12/10 | 107.0 | 7.15 | 9.96 | 1.2 | 122.0 | 44.64 |
| 09/09/10 | 114.9 | 7.02 | 10.02 | -0.7 | 119.9 | 45.14 |
| 10/07/10 | 94.4 | 7.01 | 9.98 | 48.8 | 127.2 | 48.01 |
| 11/18/10 | 110.4 | 7.15 | 10.16 | -0.3 | 120.9 | 48.53 |
| 12/21/10 | 55.6 | 6.86 | 10.14 | 4.5 | 125.7 | 50.56 |

14) Other remarks/notes:

Data are missing due to equipment or associated specific probes not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. Any NANs in the dataset stand for “not a number” and are the result of low power, disconnected wires, or out of range readings. If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

Point Aux Chenes

01/04/10 12:15 - 02/18/10 13:45 During this deployment data was collected at the wrong depth. However, we’re not sure what exactly was going on. Based on the fact that PC is a well mixed site we do not think other parameters were affected.

06/06/10 2100 – 06/17/10 1015 Believe sonde was removed from the sleeve. Believe the guard was removed and then both the sonde and guard were returned to the sleeve. The pH bulb broke and the dissolved oxygen crashed a few days later. The sonde depth is suspected to be higher than normal due to the detached guard in the bottom of the sleeve. The turbidity probe shaft is bent and the brush stops brushing causing bio-fouling.

06/17/10 11:00 – 07/16/10 0900 Data during this time was collected on the field sonde that was out that day. It was not set to log so the data was recovered via telemetry from EcoNet. Rather than logging the data internally the sonde was prompted by EcoNet to collect data at every 15 minute interval.Data were also collected at the wrong depth. The detached guard was still in the bottom of the sleeve. Because, PC is a well mixed site we do not believe that the change in depth affected the data. The pH bulb broke during the deployment causing data to be lost.

08/10/10 11:45 - 12:15 Sonde sleeve was replaced and instrument was out of the water.

08/16/10 4:30 – 09/08/10 12:45 pH data is marked -3 GQR CSM. The pH bulb was broken.

09/29/10 4:15 - 10/07/10 16:15 pH data is marked -3 GQR CSM. The pH bulb was broken.

Bayou Cumbest

01/04/10 13:15 – 02/18/10 13:00 pH data is marked 1 GSM CCU. The pH seems higher than it should be during this deployment, we believe the patterns are correct and something odd was happening in the water.

01/04/10 13:15 – 02/18/10 13:00 DO data is marked 1 GSM CCU. DO readings during this deployment were high throughout (around some of the high pH points, it was reading close to 200% saturation). The readings from the fresh sonde after this switch-out were in the same high range, so we are inclined to believe that this is ‘real’ data. However, DO post-cal values were 116.8 and 116.6% - that’s higher than we would like to see. In the cooler pre-deployment it was reading around 104%. Therefore we’ve marked the deployment suspect, although the high readings may correspond to something going on in the water and are also reflected in the pH data.

Data from 7/16 10:45 to 8/10 7:45 appears to have been collected at the wrong depth. We’re not sure what the issue was other than potentially the sonde was stuck in the tube. On 8/10 8:00 the sonde tube was replaced and depth seems to start reading more normally after that with the 8/12 switch-out matching up well.

08/10/10 08:00 data marked -3 GMC CSM. Sonde sleeve was replaced and instrument was out of the water. When the new sleeve was put in, the depth was changed to be about 0.17 meters deeper than before. Due to the fact that PC is a well mixed site we do not believe this affected other parameters.

Bayou Heron

08/10/10 13:45 Data is marked -3 GMC CSM. The station tube was switched. When this happened the depth of the sonde was affected as well, moving up about 0.14 meters. We do not believe this affected other parameters as BH is a well mixed site.

10/07/10 17:45 - 11/18/10 16:15 SpCond and salinity data is marked 1 SPC CSM. The post calibration value was 58.04. Data appears to fit conditions, however based on the post cal value data is suspect. \

Bangs Lake

There are no calibration or field logs for the Bangs Lake site after the 09/09/10 deployment.

08/10/10 08:45 Sonde was removed from tube for station maintenance.

12/21/10 10:30 - 12/31/10 23:45 DO data during this time is marked -3 SDP CSM. The membrane was ripped off of the probe during this deployment and the post calibration was 55.5%.