North Inlet-Winyah Bay (NIW) NERR Water Quality Metadata
January - December 2004
Latest Update: August 13, 2020

I. Data Set & Research Descriptors

1) Principal investigator(s) & contact persons

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2) Entry verification
Deployment data are uploaded from the YSI 6600-EDS data logger to a Personal Computer (IBM compatible). Data plots are produced and examined and erroneous data are detected using the PC6000 or EcoWatch software from YSI. Notes are made of any unusual data during that deployment. Files are exported from EcoWatch in a comma-delimited format (.CSV) and opened in Microsoft Excel for pre-processing with the EQWin format macro that was developed by the CDMO to reformat the header columns, insert station codes, insert a corrected time column and allow the technician to remove any pre- and post-deployment data from the file. Where deployment overlap occurs between files, the data produced by the newly calibrated sonde is accepted as being the most accurate. The pre-processed file is then ready to be copied into the EQWin water.eqi file where the data are QA/QC checked and archived in a database. EQWin queries, reports and graphs are used to discover data set outliers (values which fall outside the range that the instrument is designed to measure) and large changes in the data. If the data were determined to be bad, they were deleted from the final edited .txt file and then documented in the metadata. If it could not be determined whether or not suspect data were bad (as was often the case with turbidity) the data were left in the final edited .txt file and noted in the metadata as anomalous. The dissolved oxygen (DO) and Turbidity (Turb) probes were the most problematic. In instances where data values increased or decreased in an exponential fashion and or intermittently went outside the accepted range for that instrument and never returned to normal, the data were considered suspect, noted in the metadata, and removed from the final edited data file. EQWin is also used to generate statistics, view graphs, create customized queries and reports of the data, cross query the water, weather and nutrient data and finally export the data to the CDMO. Research Specialist, Tracy Buck edited and archived the 2004 data for Thousand Acre, Debidue Creek, Oyster Landing, and Clambank Creek.

3) Research Objectives
The principal objective of this study is to record long-term water quality data for North Inlet/Winyah Bay in order to observe any physical changes or trends in water quality over time. Four sites were chosen; two to represent pristine sites and the other two to represent impacted sites. The Oyster Landing site is located near the center of the Reserve and is considered pristine. The Clambank

site is located on a waterway that receives run-off from the undeveloped area of the reserve and is considered a pristine site. Debidue Creek and Thousand Acre are both located in waterways that receive run-off from heavily developed areas. Measurements were taken every 30 minutes over roughly two week collecting periods at the Oyster Landing, Debidue Creek, Clambank and Thousand Acre sites.

4) Research methods (YSI 6600-EDS dataloggers)
YSI dataloggers are currently mounted in a 4" diameter PVC pipe which is strapped to a treated 2" X 6" board; and then attached via stainless steel bands to a piling at the Thousand Acre, Debidue Creek, Clambank, and Oyster Landing sites. The PVC pipe that houses the data loggers has two 4x8" holes cut adjacent to the sonde probes to allow for unimpeded tidal water flow over the probes. A stop bolt placed through the PVC pipe below these holes keeps the datalogger exactly one foot (30 cm) above the creek bottom. Every 30 minutes measurements of specific conductivity, salinity, percent saturation, dissolved oxygen, water temperature, pH, turbidity, and water level are recorded. The two-week sampling interval has been selected due to biofouling of the individual probes and expected battery life. At the end of each sampling interval, the dataloggers were brought back to the laboratory to be downloaded, cleaned and recalibrated following procedures in the YSI Service Manual and the Standard Operating Procedures V3.0 provided by NERR SWMP. Before the instruments were cleaned and recalibrated a post calibration reading was taken from each instrument in fresh standard to see if any of the instruments exhibited drift (see Section II-14). Calibrations conducted prior to deployment of the instruments include a pH calibration using a two-point method with 7 and 10 unit standards. The turbidity calibration also used a two-point method using 0 and 123 NTU standards. Specific Conductivity was calibrated using a one-point method with a 10 mS/cm standard that was purchased through YSI, Inc. The turbidity wiper and DO membrane were changed after each deployment. After approximately 24 hours of down time for cleaning and overnight burn-in of the DO membrane, the YSI dataloggers were re-deployed. Sondes are switched out the same day at each site to avoid excessive periods of data loss.

5) Site location and character
The North Inlet-Winyah Bay National Estuarine Research Reserve is located on the Southeastern Atlantic coast of the United States in two tidal estuaries, North Inlet and Winyah Bay, near Georgetown, South Carolina. The North Inlet estuary, located approximately 10 km east of Georgetown, is a bar-built Class C type estuary (Pritchard, 1955). The North Inlet estuary is composed of numerous winding tidal creeks, and is considered a pristine tidal estuary due to minimal anthropogenic impacts. The watershed drains a 24.8 km2 area of mostly pine forest and a moderately developed residential watershed to the north. The Winyah Bay estuary, classified as a Class B type estuary by Pritchard (1955), which originates in the Blue Ridge Mountains of North Carolina, is one of the largest river-estuary ecosystems on the Eastern Seaboard. It is located 14.4 km south of North Inlet. Winyah Bay drains the sub-basins of 6 major rivers, which are heavily impacted by agriculture, mining, and industry. The rivers drain approximately 46,736 km2 of uplands and marshes. Descriptions of the four sampling stations are as follows:

A) Debidue Creek (DC) - (lat 33:21:37, long 79:10:05). The Debidue Creek monitoring site is considered an impacted site that is located approximately 1 km south of the Debidue Colony. The Colony is a large development built on man-made canals that directly drain into the northern portion of Debidue Creek. The DC site is also located in an ocean-dominated Spartina marsh that was formerly surrounded by pine-dominated uplands. Salinity can range from 0 to full strength seawater and an

average tidal flux of approximately 2 m. The approximate depth and width at MHW at the site is 2.2 and 70 m respectively. The bottom is comprised mostly of oyster shell hash with some fine sediment and detritus.

B) Oyster Landing (OL) - (lat. 33:20:58, long. 79:11:34). The Oyster Landing monitoring site is considered a fairly pristine and undisturbed area located at the end of the Oyster Landing pier, which is also where the NI-WB Bay NERR weather station site is located. The pier stretches into the upper reaches of Crabhaul Creek in the mid western portion of North Inlet. The sampling site is located approximately 2.8 km from the headwaters of Crabhaul Creek. The creek directly drains pine-forested uplands and wetlands. Salinity can range from 0-32 ppt. and average tidal flux is approximately 1.44 m. The creek has an average depth of 2 m MHW and average width of 150 m MHW. The bottom is comprised mostly of oyster shell hash with some fine sediment and detritus.

C) Thousand Acre (TA) - (lat. 33:17:57, long. 79:15:36) The Thousand Acre monitoring site is located in Thousand Acre marsh tidal creek and is on the NW corner of the west bridge of Thousand Acre marsh (this site was relocated 07-19-99 to the current location due to heavy siltation and degrading data quality). The present site is about 15 m from the mouth of the creek. At the sampling site, creek depth is approximately 2 m MHW and creek width is approximately 10 m. The creek empties into the northeastern side of the mid portion of Winyah Bay and directly drains pine forested upland and wetlands. Salinity ranges from 0 to 15 ppt. and tidal flux is approximately 1m. The bottom is composed mostly of fine sediments and detritus. Georgetown, 5 km upstream from the Thousand Acre site and on the southern side of Winyah Bay, is the homeport for a number of heavy industries including a steel plant, paper mill, chemical plant, and a coal fired power plant. A public sewage treatment plant, which discharges into the bay, is also located in Georgetown.

D) Clambank Creek (CB) - (lat 33:20:02, long 79:11:34). The Clambank Creek monitoring site is located roughly in the center of the reserve property. This site is surrounded by a Spartina marsh and drains associated uplands. Salinity can range from near fresh water concentrations following large rainfall events, to full strength seawater during most of the year. The creek width and depth at NHW at the sampling site are 40 m and 2.4 m respectively. The average depth of the creek at MHW is 2.0 m. The bottom is comprised mostly of oyster shell hash and some fine sediment. This site is considered a pristine site and is influenced by its close proximity to North Inlet.

6) Data collection period

Thousand Acre data collection began January 1, 1995. Debidue Creek sampling began March 5, 1998. Oyster Landing data collection began in 1995; however, it was not considered a SWMP site until 1996 when the collection site was switched from Caledonia to Oyster Landing. Clambank sampling began in February 1981 through June 1995; however, it was not considered a SWMP site until sampling resumed on August 17, 2001. All sampling is ongoing.

Deployment dates and times (in Eastern Standard Time) for 2004 follow:

BEGAN		ENDED	
Site: Debidue Creek			
Deploy Date	Time	Retrieve Date	Time
12/15/03	13:30	01/07/04	10:00

01/07/04	10:30	01/23/04	09:00
01/23/04	09:30	02/09/04	10:00
02/09/04	11:00	02/24/04	12:00
02/24/04	12:30	03/11/04	11:00
03/11/04	11:30	03/24/04	11:00
03/24/04	11:30	04/09/04	11:00
04/09/04	12:00	04/22/04	10:00
04/22/04	10:30	05/06/04	10:00
05/06/04	10:30	05/19/04	09:30
05/19/04	10:00	06/04/04	10:00
06/04/04	10:30	06/17/04	09:00
06/17/04	09:30	07/02/04	09:30
07/02/04	10:00	07/07/04	12:00
07/07/04	12:30	07/20/04	13:00
07/20/04	13:30	08/03/04	10:30
08/03/04	11:00	08/19/04	10:00
08/19/04	10:30	09/02/04	10:30
09/02/04	11:00	09/15/04	09:00
09/15/04	09:30	09/30/04	10:00
09/30/04	10:30	10/14/04	09:30
10/14/04	10:00	10/28/04	08:30
10/28/04	09:00	11/17/04	12:00*
11/17/04	12:30	12/01/04	10:30
12/01/04	11:00	12/16/04	12:00
12/16/04	12:30	01/12/05	10:00

* no data collected due to sonde failure.

Site: Oyster Landing

Deploy Date	Time	Retrieve Date	Time
12/15/03	14:00	01/07/04	13:00
01/07/04	13:30	01/23/04	09:30
01/23/04	10:00	02/10/04	10:00
02/10/04	10:30	02/27/04	13:00
02/27/04	13:30	03/11/04	11:00
03/11/04	11:30	03/30/04	10:00
03/30/04	10:30	04/09/04	11:30
04/09/04	12:00	04/22/04	10:00
04/22/04	10:30	05/06/04	10:30
05/06/04	11:00	05/10/04	09:00
05/10/04	10:00	05/11/04	09:00
05/11/04	09:30	05/19/04	09:30
05/19/04	10:00	05/31/04	11:00
05/31/04	11:30	06/08/04	09:30
06/08/04	10:00	06/17/04	09:00
06/17/04	09:30	07/02/04	09:30
07/02/04	10:00	07/21/04	10:00
07/21/04	10:30	08/03/04	11:00
08/03/04	11:30	08/13/04	14:00
08/13/04	15:00	09/02/04	11:00
09/02/04	11:30	09/15/04	09:30
09/15/04	10:00	09/30/04	10:30
09/30/04	11:30	10/15/04	09:00
10/15/04	09:30	10/29/04	09:00
10/29/04	09:30	11/18/04	13:00
11/18/04	13:30	12/01/04	11:30
12/01/04	12:00	12/16/04	12:30
12/16/04	13:00	01/12/05	10:00

Site: Thousand Acre

Deploy Date	Time	Retrieve Date	Time
12/16/03	13:30	01/06/04	11:30
01/06/04	12:00	01/22/04	13:00
01/22/04	13:30	02/12/04	10:30
02/12/04	11:00	02/26/04	11:30
02/26/04	12:00	03/10/04	09:30
03/10/04	10:00	03/23/04	13:30
03/23/04	14:00	04/12/04	10:00
04/12/04	11:00	04/26/04	08:30
04/26/04	09:00	05/07/04	09:00
05/07/04	09:30	05/19/04	08:30
05/19/04	09:30	06/04/04	09:00
06/04/04	09:30	06/17/04	10:30
06/17/04	11:00	07/02/04	08:30
07/02/04	09:00	07/21/04	10:30
07/21/04	11:00	08/03/04	10:00
08/03/04	10:30	08/19/04	10:00
08/19/04	10:00	09/02/04	10:00
09/02/04	10:30	09/16/04	10:00
09/16/04	10:30	10/01/04	08:30
10/01/04	09:00	10/14/04	08:30
10/14/04	09:00	10/28/04	10:30
10/28/04	11:00	11/17/04	13:00
11/17/04	13:30	12/03/04	13:00
12/03/04	13:30	12/17/04	13:30
12/17/04	14:00	01/12/05	11:30

Site: Clambank Creek

Deploy Date	Time	Retrieve Date	Time
12/16/03	13:00	01/06/04	11:00
01/06/04	11:30	01/22/04	12:30
01/22/04	13:00	02/11/04	10:30
02/11/04	11:00	02/26/04	11:00
02/26/04	11:30	03/10/04	09:00
03/10/04	09:30	03/25/04	09:00
03/25/04	09:30	04/12/04	10:00
04/12/04	10:30	04/26/04	09:00
04/26/04	09:30	05/06/04	10:00
05/06/04	10:30	05/19/04	09:00
05/19/04	09:30	06/04/04	09:30
06/04/04	10:00	06/17/04	08:30
06/17/04	09:00	07/02/04	09:00
07/02/04	09:30	07/20/04	12:30
07/20/04	13:00	08/04/04	14:00
08/04/04	14:30	08/19/04	10:00
08/19/04	10:30	09/03/04	08:30
09/03/04	09:00	09/16/04	09:30
09/16/04	10:00	09/30/04	09:30
09/30/04	10:00	10/14/04	09:00
10/14/04	09:30	10/28/04	09:00
10/28/04	09:30	11/17/04	12:30
11/17/04	13:00	12/01/04	11:00
12/01/04	11:30	12/16/04	11:30
12/16/04	12:00	01/12/05	09:30

7) Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program, 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 the 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/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 of 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 section 1. 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 CDMO homepage) and online at the CDMO homepage http://cdmo.baruch.sc.edu. Data are available in text tab-delimited format.

8) Associated researchers and projects

A water chemistry program is associated with the NIW core-monitoring program. Variables sampled include: chlorophyll, dissolved organic carbon, nitrate-nitrite, orthophosphate, and ammonia. (See documentation on the NIW WWW home page http://www.northinlet.sc.edu/ for further details). Thousand Acre is our permanent monitoring station for the NERR monitoring program, but Oyster Landing and Debidue Creek were also sampled beginning in 1998. Clambank Landing was added as a sampling station in August of 2001. These stations are also included in our NIW core-monitoring program. Bill Johnson (Senior Research Specialist) is responsible for the collection of this data. Jennifer Keesee (Research Specialist) is responsible for the management of this data.

A long-term fish survey is also done at the Oyster Landing site bi-weekly. Species present, total weight, individual weights and standard lengths of fish that utilize the marsh at high tide are recorded. In the winter months (November through February), this sampling is done only once monthly. Dr. Dennis Allen (Director, Baruch Marine Lab) is the Principal Investigator on this project.

The NERR weather station is also located at the Oyster Landing site. Air temperature and humidity, barometric pressure, solar radiation (total and PAR), wind speed and direction, and precipitation are measured. Amy Cook (Research Specialist) is responsible for the collection and management of this data.

Real-time web display of water quality and weather parameters from the Oyster Landing NERR station can be found on our website at http://www.baruch.sc.edu/weather/.

II. Physical Structure Descriptors

9) Sensor Specifications

YSI 6600 EDS-S Multi-parameter Water Quality Logger

Parameter: Non-vented Level-Shallow (Depth)
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: Temperature
Model #: 6560
Sensor Type: Thermistor
Range: -5 to 45 oC
Accuracy: +/- 0.15 oC
Resolution: 0.01 oC

Parameter: Dissolved Oxygen, Percent Saturation
Model #: 6562
Sensor Type: Rapid Pulse - Clark type, polarographic
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 reading
Resolution: 0.1 % air saturation

Parameter: Dissolved Oxygen, mg/L (calculated from % air saturation, temperature & salinity)
Model #: 6562
Sensor Type: Rapid Pulse - Clark type, polarographic
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: Conductivity
Model #: 6560
Sensor Type: 4 electrode cell with autoranging
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
Model #: 6560
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: pH
Model #: 6561 or 6561FG (flat glass)
Sensor Type: Glass combination electrode
Range: 0 to 14 units

Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Model #: 6136
Sensor Type: Optical, 90o scatter, with mechanical cleaning
Range: 0 to 1000 NTU
Accuracy: +/- 5% reading or 2 NTU (whichever is greater), relative to calibration standards
Resolution: 0.1 NTU

Dissolved Oxygen qualifier: The reliability of the dissolved oxygen (DO) data after 96 hours post-deployment for non-EDS (Extended Deployment System) data sondes may be problematic due to fouling which forms on the DO probe membrane during some deployments (Wenner et al. 2001). Many reserves have upgraded to the YSI 6600 EDS data sondes, which increases DO accuracy and longevity by reducing the environmental effects of fouling. The user is therefore advised to consult the metadata and to exercise caution when utilizing the DO data beyond the initial 96-hour time period. However, this potential drift is not always problematic for some uses of the data, i.e. periodicity analysis. It should also be noted that the amount of fouling is very site specific and that not all data are affected. The Research Coordinator at the specific NERR site should be contacted concerning the reliability of the DO data because of the site and seasonal variation in the fouling of the DO sensor.

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. Standard calibration protocols for the non-vented sensor use the atmospheric pressure at the time of calibration. Therefore, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.03cm for every 1 millibar change in atmospheric pressure. This error is eliminated for level sensors because they are vented to the atmosphere throughout the deployment time interval. If proper atmospheric pressure data is available, non-vented sensor depth measurements can be corrected for deployments between calibrations. Readings for both vented and non-vented are automatically compensated for water density changes due to variations in temperature and salinity. The Research Coordinator at the specific NERR site should be contacted in order to obtain information regarding atmospheric pressure data availability.

10) Coded variable indicator and variable code definitions

Sampling Station:	Sampling Site Code	Station Code
Debidue Creek	DC	niwdcwq
Oyster Landing	OL	niwolwq
Thousand Acre	TA	niwtawq
Clambank Creek	CB	niwcbwq

11) Anomalous/Suspect Data

JANUARY 1-31, 2004

CLAMBANK CREEK
a. pH data for the following deployment should be considered suspect due to internal malfunction affecting pH data. Sonde was sent to YSI for repair in March. (Note: this sonde was used for several deployments at all four sampling stations)
01/22/04 13:00 – 02/11/04 10:30

OYSTER LANDING

a. For the following dates and times, depth data were negative. The remaining parameters indicate the sonde was not out of the water during these periods, so suspect slight calibration error. Data were retained.

01/18/04 23:00, 23:30
01/19/04 00:00, 00:30
01/23/04 03:30

b. For the following dates and times, dissolved oxygen data should be considered suspect due to possible damage to membrane.
01/14/04 15:00 – 01/23/04 09:30.

THOUSAND ACRE

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

01/05/04 17:00

DEBIDUE CREEK
a. pH data for the following deployment should be considered suspect due to internal malfunction affecting pH data. Sonde was sent to YSI for repair in March. (Note: this sonde was used for several deployments at all four sampling stations)
01/01/04 00:00 – 01/07/04 10:00

FEBRUARY 1-29, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were negative. Suspect a calibration error for the zero standard. Turbidity at this site is typically low during this time of year (see deployment data prior to and following this period) and the turbidity probe checked out in post calibration. Data were retained.

02/24/04 12:30 - 23:30
02/25/04 00:00 - 5:30, 6:30 - 22:00
02/26/04 02:30 - 12:00, 15:30 - 23:30
02/27/04 0:00, 3:30 - 23:30
02/28/04 5:00 - 23:30
02/29/04 0:00 - 23:30

b. For the following dates and times, pH should be considered suspect due to out-of-range pre-deployment calibration readings.
02/09/04 11:00 – 02/24/04 12:00

OYSTER LANDING

a. For the following dates and times, depth data were negative. The remaining parameters indicate the sonde was not out of the water during these periods, so suspect slight calibration error. Data were retained.

02/21/04 02:30, 15:30, 16:00

b. pH data for the following deployment should be considered suspect due to internal malfunction affecting pH data. Sonde was sent to YSI for repair in March. (Note: this sonde was used for several deployments at all four sampling stations)
02/27/04 13:30 – 03/11/04 11:30

THOUSAND ACRE
a. pH data for the following deployment should be considered suspect due to internal malfunction affecting pH data. Sonde was sent to YSI for repair in March. (Note: this sonde was used for several deployments at all four sampling stations)
02/12/04 11:00 – 02/26/04 11:30

MARCH 1-31, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were negative. Suspect a calibration error for the zero standard. Turbidity at this site is typically low during this time of year (see deployment data prior to and following this period) and the turbidity probe checked out in post calibration. Data were retained. (See also February Anomalous Data for Debidue Creek.)

03/01/04 00:00 - 23:30
03/02/04 00:00 - 23:30
03/03/04 00:00 - 3:00, 04:00 - 23:30
03/04/04 00:00 - 23:30
03/05/04 00:00 - 16:00, 19:00 - 23:30
03/06/04 00:00 - 04:00, 09:30 - 11:00, 17:00, 21:00 - 23:30
03/07/04 00:00 - 05:30, 10:00 - 12:00, 22:30 - 23:00
03/08/04 03:30 - 05:00, 11:00 - 15:00, 16:00, 17:00 - 18:30, 21:30 - 23:30
03/09/04 00:00 - 08:00, 12:00 - 20:30, 23:30
03/10/04 00:00 - 09:30, 12:30 - 21:00
03/11/04 01:30 - 11:00

OYSTER LANDING

a. For the following dates and times, depth data were negative. The remaining parameters indicate the sonde was not out of the water during these periods, so suspect slight calibration error. Data were retained.

03/07/04 2:30
03/08/04 3:00, 3:30, 4:00

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

03/01/04 10:00

APRIL 1-30, 2004

OYSTER LANDING

a. For the following dates and times, depth data were negative. The remaining parameters indicate the sonde was not out of the water during these periods, so suspect slight calibration error. Data were retained.

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

THOUSAND ACRE

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

04/28/04 04:00

MAY 1-31, 2004

OYSTER LANDING

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

05/19/04 16:00

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

05/20/04 16:30

THOUSAND ACRE

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

05/03/04 22:00

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

05/16/04 02:00

JUNE 1-30, 2004

THOUSAND ACRE

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

06/17/04 05:30
06/28/04 03:00
06/30/04 08:30, 14:30

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

06/26/04 20:00
06/28/04 18:30

JULY 1-31, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

07/04/04 06:00

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

07/06/04 01:30, 14:00, 18:30
07/07/04 07:00

c. For the following dates and times, depth data are more shallow than normal at Debidue Creek due to fouling preventing the sonde from settling correctly in its PVC casing.

07/07/04 12:30 - 07/20/04 13:00

THOUSAND ACRE

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

07/02/04 15:30-17:30
07/17/04 00:00, 02:00, 02:30, 10:30, 13:30, 15:30
07/18/04 15:00, 15:30

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

07/14/04 11:00
07/16/04 05:00
07/20/04 10:30, 13:30

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

07/13/04 07:00
07/14/04 19:30

b. For the following dates, high turbidity values should be considered suspect. The turbidity wiper was intermittently parking incorrectly due to heavy fouling during this period. Turbidity values greater than 1000 NTU during this time period were deleted (see Section 12).

07/20/04

AUGUST 1-31, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

08/15/04 13:30

OYSTER LANDING

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

08/04/04 23:00
08/08/04 06:30

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

08/13/04 10:00
08/31/04 15:30, 17:30, 19:30, 20:00

THOUSAND ACRE

a. For the following dates and times, dissolved oxygen data dropped suddenly from 4.1 to 0.1 mg/L, remained low for ~5 hours and then recovered as suddenly from 0.1 mg/L to 2.9 mg/L. No other parameters showed dramatic changes during this period except for turbidity, which spiked from 290 to 2050 NTU immediately before the dissolved oxygen readings dropped. If turbidity had remained high during the same period, it would suggest that something such as a mud deposit had occluded the sensors and affected the readings. However, turbidity readings during the time of the low DO readings, read between 0 & 76 NTU, which is lower than normal for this site. It is possible that whatever caused the spike in turbidity was freed from the turbidity probe but remained over the DO membrane despite the EDS wiper. Since DO data recovered during the deployment, and there was no discernible damage to the DO membrane at retrieval, the data were retained but should be considered suspect.

08/15/04 04:30 - 09:00

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

08/15/04 04:00, 12:00, 12:30, 14:30, 15:00
08/31/04 15:30, 16:00

c. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

08/21/04 06:30
08/25/04 14:00

CLAMBANK CREEK

a. For the following dates and times, depth data were negative due to shallow depth. The remaining parameters indicate the sonde was not out of the water during these periods. Data were retained.

08/22/04 06:00
08/30/04 02:00 - 03:00, 13:30, 14:00, 15:30
08/31/04 02:30 - 03:30

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

08/02/04 07:30, 12:00
08/03/04 03:00, 11:00
08/17/04 20:00

c. For the following dates, high turbidity values should be considered suspect. The turbidity wiper was intermittently parking incorrectly due to heavy fouling during this period. Turbidity values greater than 1000 NTU during this time period were deleted (see Section 12).

08/25/04 - 08/31/04

d. For the following dates and times, all data were recorded at a shallower depth due to someone tampering with the sonde during its deployment.

08/04/04 08:00 - 14:00

e. For the following dates and times, all data were recorded at a more shallow depth than normal due to the temporary movement of the sampling station (~40' east of previous location).

08/04/04 13:00 - 11/09/04 13:00

SEPTEMBER 1-30, 2004

DEBIDUE CREEK

a. For the following dates, high turbidity values should be considered suspect. The turbidity wiper was intermittently parking incorrectly due to heavy fouling during this period. Turbidity values greater than 1000 NTU during this time period were deleted (see Section 12).

09/28/04 - 09/30/04

OYSTER LANDING

a. For the following dates and times, depth data were negative due to shallow depth. The remaining parameters indicate the sonde was not out of the water during these periods. Data were retained.

09/18/04 04:00, 04:30

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

09/01/04 08:00, 08:30, 10:30, 12:00, 15:00

THOUSAND ACRE

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect fouling due to rain events. Data were retained.

09/05/04 17:30
09/17/04 07:00

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect something passed in front of optics during sampling. Data were retained.

09/18/04 03:00

CLAMBANK CREEK

a. For the following dates and times, depth data were negative due to shallow depth. The remaining parameters indicate the sonde was not out of the water during these periods. Data were retained.

09/18/04 03:00 - 05:00, 17:00
09/28/04 14:00 - 15:30
09/29/04 02:00 - 03:00

b. For the following dates, high turbidity values should be considered suspect. The turbidity wiper was intermittently parking incorrectly due to heavy fouling during this period. Turbidity values greater than 1000 NTU during this time period were deleted (see Section 12).

09/01/04 - 09/16/04

OCTOBER 1-31, 2004

NOVEMBER 1-30, 2004

OYSTER LANDING

a. For the following dates and times, depth data were negative due to shallow depth. The remaining parameters indicate the sonde was not out of the water during these periods. Data were retained.

11/25/04 14:00

DECEMBER 1-31, 2004

OYSTER LANDING

a. For the following dates and times, depth data were negative due to shallow depth. The remaining parameters indicate the sonde was not out of the water during these periods. Data were retained.

12/08/04 23:00
12/09/04 23:30
12/10/04 00:00, 00:30, 13:00 - 14:00
12/11/04 00:00 - 01:00, 02:00, 02:30, 13:00 - 14:00, 15:00
12/12/04 00:00, 00:30, 03:00, 15:00
12/13/04 01:30 - 04:00, 15:30 - 16:30
12/14/04 03:00, 03:30
12/19/04 21:00
12/24/04 00:00

12) Deleted Data

JANUARY 1 – 31, 2004

OYSTER LANDING
a. For the following dates and times, all data were deleted. The sonde was out of the water for repair/reprogramming due to erroneous RTDM display.
01/14/04 14:30

MARCH 1-31, 2004

DEBIDUE CREEK

a. For the following dates and times, dissolved oxygen data (% & mg/L) were deleted due to a punctured membrane during deployment.

03/24/04 12:30 - 03/31/04 23:30

APRIL 1-30, 2004

DEBIDUE CREEK

a. For the following dates and times, dissolved oxygen data (% & mg/L) were deleted due to a punctured membrane during deployment.

04/01/04 00:00 - 04/09/04 11:00

MAY 1-31, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted.

05/18/04 13:00, 15:30
05/31/04 20:00

b. For the following dates and times, turbidity data were deleted. Suspect the turbidity wiper was intermittently parking incorrectly during this period due to fouling on the wiper brush. All other turbidity readings during this deployment were less than 25 NTU, so this high value was deleted.

05/18/04 03:30

OYSTER LANDING

a. For the following dates and times, dissolved oxygen data (% & mg/L) were deleted due to a punctured membrane during deployment.

05/07/04 23:30 - 05/11/04 09:00

JUNE 1-30, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted.

06/01/04 00:30, 13:00, 15:30
06/02/04 00:30
06/03/04 21:30, 23:30
06/04/04 02:00, 03:00, 04:00, 05:30, 06:30, 10:00
06/14/04 18:00, 19:00
06/15/04 00:30, 01:30, 02:30 - 06/17/04 09:00

b. For the following dates and times, all turbidity data were deleted due to excessive fouling on the instrument, probes and turbidity wiper upon retrieval.

06/23/04 08:00 - 06/30/04 23:30

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted.

06/09/04 19:30, 21:00
06/10/04 15:30, 18:00
06/11/04 11:00, 18:00
06/12/04 02:00, 03:30, 04:30 - 06/17/04 08:30

JULY 1-31, 2004

OYSTER LANDING
a. For the following dates and times, all data were deleted. The sonde was out of the water for repair/reprogramming due to erroneous RTDM display.
07/21/04 13:00

DEBIDUE CREEK

a. For the following dates and times, all turbidity data were deleted due to excessive fouling on the instrument, probes and turbidity wiper upon retrieval.

07/01/04 00:00 - 07/02/04 09:30

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted. All other extremely high values during these periods should be considered suspect (see Anomalous Data Section 11).

07/20/04 01:00, 02:30, 03:30, 05:30, 10:00, 12:00

AUGUST 1-31, 2004

CLAMBANK CREEK

a. For the following dates and times, the probes were exposed due to shallow depth. All data were deleted.

08/30/04 14:30, 15:00

b. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted. All other extremely high values during these periods should be considered suspect (see Anomalous Data Section 11).

08/25/04 17:00, 20:30, 21:30, 23:00
08/26/04 00:30, 01:30, 03:30, 04:30, 06:00, 07:00, 07:30, 08:30, 09:30, 11:00, 12:00, 13:30, 16:00, 17:30, 20:00, 21:00, 22:30 - 23:30
08/27/04 01:00, 02:00, 03:30, 04:30, 06:00, 07:00, 08:30, 09:30, 11:00, 12:00, 13:30, 14:30, 16:00, 18:30, 19:30, 20:30, 22:00, 23:00
08/28/04 00:30, 01:30, 03:00, 04:00, 04:30, 05:30, 06:30, 08:00, 09:00, 11:30, 12:00, 13:30 - 14:30, 17:00, 18:00, 19:30, 20:30, 22:00, 23:00
08/29/04 00:30 - 03:00, 04:30, 05:30, 06:00, 07:30 - 09:00, 10:00, 11:00, 12:00, 14:30 - 16:00, 18:00, 19:00, 20:00, 21:30, 22:30 - 23:30
08/30/04 00:00, 00:30, 01:30, 02:30, 03:00, 04:00 - 05:30, 07:30, 08:30 - 10:30, 11:30 - 12:30, 16:00, 17:00, 18:30, 19:30, 21:00, 22:00, 23:30
08/31/04 00:30, 01:00, 02:00, 03:30 - 04:30, 06:00, 07:00, 08:30 - 09:30, 11:00, 11:30, 12:30, 13:30, 14:30, 16:00 - 17:00, 20:00, 21:00, 22:00 - 23:00

SEPTEMBER 1-30, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted. All other extremely high values during these periods should be considered suspect (see Anomalous Data Section 11).

09/28/04	15:00, 20:00, 23:30
09/29/04	01:30, 07:30, 09:00, 10:30, 12:00, 13:00, 17:00, 17:30, 20:00
09/30/04	03:30 - 05:00, 06:30, 08:00, 09:00, 09:30

CLAMBANK CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted. All other extremely high values during these periods should be considered suspect (see Anomalous Data Section 11).

09/01/04	01:30, 02:30, 03:30, 05:00, 06:00, 06:30, 07:30, 09:00, 10:00, 11:30, 12:00, 13:00, 14:00, 15:00, 15:30, 16:30, 17:30, 18:00, 19:00, 22:00 - 23:00
09/02/04	00:30, 01:30 - 03:00, 04:30, 07:00, 08:30, 09:30 - 10:30, 11:30 - 12:30, 13:30, 16:00, 16:30, 17:30, 19:00, 20:30 - 21:30, 22:30, 23:30
09/03/04	00:00, 00:30, 02:00, 03:00, 03:30, 04:30, 06:00, 06:30, 07:30, 08:30
09/15/04	05:30, 10:00, 11:30, 13:30, 15:30, 17:30,
09/16/04	03:00, 09:30

OCTOBER 1-31, 2004

DEBIDUE CREEK

a. For the following dates and times, turbidity data were greater than 1000 NTU. Suspect the wiper was parking incorrectly due to heavy fouling during this period. Data were deleted. All other extremely high values during these periods should be considered suspect.

10/08/04	17:00, 17:30
10/09/04	2:30, 4:00, 8:30, 17:30, 19:30, 21:00
10/10/04	2:30, 4:00, 6:00, 8:00, 9:30, 13:00, 13:30, 20:30
10/11/04	0:30, 2:00, 7:00, 9:00, 12:00, 14:00, 17:30, 18:00, 19:30, 23:30
10/12/04	6:30, 7:30, 8:30, 13:00, 15:00
10/13/04	0:30, 14:00

DECEMBER 1-31, 2004

OYSTER LANDING

a. For the following dates and times, the probes were exposed due to shallow depth. All data were deleted.

12/11/04	01:30, 14:30

12/12/04 01:00 - 02:30

13) Missing Data

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. For more details on deleted data, see the Deleted Data Section (12.). If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

DEBIDUE CREEK
a. For the following dates and times, data was not collected from Debidue Creek due to a sonde malfunction.
10/28/04 09:00 - 11/17/04 12:00

b. For the following dates and times, data were not collected due to cold water temperatures intermittently draining sonde batteries during deployment.
11/26/04 23:30 - 11/29/04 07:30
11/29/04 08:30, 09:30, 10:00, 11:00 - 12:30, 14:00, 17:30 - 18:30, 20:30 - 23:30
11/30/04 00:30, 01:30, 02:30, 03:30, 04:30, 05:30 - 06:30, 07:30, 08:30, 13:30, 14:30

THOUSAND ACRE
a. For the following dates and times, data from Thousand Acre was only collected on a 4-hour interval due to a programming error during pre-deployment.
03/23/04 14:00 - 04/12/04 08:00

Oyster Landing
a. Data missing 05/29/04 03:30 – 05/31/04 11:00 due to possible lightening/electrical interference with sonde and battery failure.

b. Data missing 07/05/05 20:30 – 07/21/05 10:00 due to battery failure.

14) Post Deployment Information

End of Deployment Post-calibration Readings in Standard Solutions:
NA = no data available for that particular standard

Debidue Creek

Date	Sp. Cond. (0 mS/cm)	Salinity (0 ppt)	DO % (% air sat.)	pH (7.0)	Depth (air sat.)	Turbidity (0 NTU)
01/07/03	1.409	0.71	100.7	6.41	0.105	0.9*
01/23/04	0.019	0.01	97.2	6.89	-0.047	-0.5
02/09/04	0.035	0.02	100.0	7.03	0.167	0.5
02/24/04	0.112	0.05	81.8	7.07	-0.241	0.7
03/11/04	0.006	0.00	98.6	7.05	0.018	-8.2
03/24/04	0.013	0.00	101.8	7.03	0.084	0.0
04/09/04	0.030	0.01	84.1	7.08	-0.247	0.2
04/22/04	0.029	0.01	100.4	7.17	0.172	-0.4
05/06/04	0.044	0.02	96.6	6.95	0.015	0.6
05/19/04	0.011	0.00	100.1	7.03	0.021	0.0
06/04/04	0.072	0.03	98.6	7.07	-0.092	0.1
06/17/04	0.038	0.02	83.6	6.98	0.143	-0.2
07/02/04	0.085	0.04	84.9	NA	-0.012	0.0**

07/07/04	0.024	0.01	99.5	7.12	-0.065	-1.3
07/20/04	0.088	0.04	107.5	7.15	0.000	0.1
08/03/04	0.042	0.02	106.3	6.98	-0.021	0.2
08/19/04	0.032	0.01	29.0	7.02	0.123	-0.1***
09/02/04	0.061	0.02	59.5	6.93	0.014	1.0****
09/15/04	0.058	0.03	99.1	6.93	0.003	0.1
09/30/04	0.051	0.02	54.1	7.08	-0.037	0.2****
10/14/04	0.034	0.01	99.1	6.89	-0.064	-0.7
10/28/04	0.112	0.05	100.7	7.06	0.199	1.3
11/17/04	not available-sonde malfunction					
12/01/04	0.061	0.03	100.1	7.13	-0.172	0.4
12/16/04	0.206	0.10	100.7	7.09	0.076	1.6
01/12/05	0.048	0.02	91.5	7.56	-0.082	0.2

* Tap water rather than deionized water was used for post-cal, so turbidity and salinity/conductivity were higher than normal.
** pH bulb broken while cleaning
*** barnacle on DO membrane
**** heavy fouling on probes

Oyster Landing

Date	Sp. Cond. (0 mS/cm)	Salinity (0 ppt)	DO % (% air sat.)	pH (7.0)	Depth (air sat.)	Turbidity (0 NTU)
01/17/03	1.396	0.70	96.3	7.09	0.072	2.1*
01/23/04	not available-sonde malfunction					
02/10/04	0.048	0.02	99.5	7.04	0.090	0.0
02/27/04	0.021	0.01	100.1	7.05	-0.055	-0.5
03/11/04	not available-sonde malfunction					
03/30/04	0.046	0.02	87.1	7.13	-0.073	0.1
04/09/04	0.037	0.02	100.2	7.10	-0.224	1.0
04/22/04	0.013	0.00	91.5	6.98	0.138	-0.1
05/06/04	0.059	0.03	99.0	7.04	0.016	0.8
05/11/04	0.051	0.02	107.8	7.09	0.040	0.4**
05/19/04	0.062	0.03	100.7	7.14	-0.011	1.0
05/31/04	0.126	0.06	100.7	7.11	-0.156	0.3
06/08/04	0.048	0.02	103.0	6.97	0.137	-0.3
06/17/04	0.071	0.03	48.9	7.08	0.038	0.3***
07/02/04	0.057	0.03	100.1	7.08	-0.020	-0.1
07/21/04	0.029	0.01	92.6	6.95	-0.047	-0.1
08/03/04	0.040	0.02	107.6	7.02	-0.017	0.1
08/13/04	0.102	0.05	97.4	7.00	0.097	-0.1
09/02/04	0.068	0.03	101.4	7.00	0.014	0.6
09/15/04	0.069	0.03	97.9	6.95	0.008	0.0
09/30/04	0.073	0.03	101.9	7.14	-0.042	0.1
10/15/04	0.073	0.03	105.0	7.01	-0.118	0.4
10/29/04	0.029	0.01	103.9	7.05	0.178	0.1
11/18/04	0.056	0.03	100.3	7.00	0.009	0.1
12/01/04	0.071	0.03	96.9	7.13	-0.111	-0.1
12/16/04	0.119	0.06	103.8	7.19	0.085	2.2
01/12/05	0.041	0.02	99.8	7.13	-0.096	-0.1

* Tap water rather than deionized water was used for post-cal, so turbidity and salinity/conductivity were higher than normal.
** hole in DO membrane
*** probes heavily fouled

Thousand Acre

Date	Sp. Cond. (0 mS/cm)	Salinity (0 ppt)	DO % (% air sat.)	pH (7.0)	Depth (air sat.)	Turbidity (0 NTU)
01/06/04	0.028	0.01	99.4	7.09	-0.026	-0.1
01/22/04	0.030	0.01	98.6	6.97	-0.095	1.1
02/12/04	4.112	2.20	101.2	7.02	-0.023	0.5*
02/26/04	0.030	0.01	99.3	6.82	-0.086	0.3
03/10/04	0.107	0.05	100.2	7.15	-0.050	0.5
03/23/04	0.017	0.04	104.6	7.02	0.155	0.3
04/12/04	0.018	0.01	104.1	7.08	-0.158	0.0
04/26/04	0.018	0.01	103.5	6.96	0.074	-0.1
05/07/04	0.019	0.01	100.5	7.15	-0.005	0.2
05/19/04	0.014	0.00	103.6	6.93	0.016	0.0
06/04/04	0.034	0.01	104.1	6.95	-0.089	-0.3
06/17/04	0.031	0.01	82.3	6.95	0.153	0.0
07/02/04	0.148	0.07	99.7	6.95	-0.043	0.0
07/21/04	0.051	0.02	112.1	7.01	-0.044	-0.1
08/03/04	0.033	0.01	100.9	7.08	-0.051	0.0
08/19/04	0.016	0.01	98.9	7.01	0.116	0.1
09/02/04	0.034	0.01	102.0	6.96	0.024	1.7
09/16/04	0.029	0.01	104.1	6.99	-0.047	0.0
10/01/04	0.014	0.01	100.8	7.02	0.005	0.4
10/14/04	0.024	0.01	99.3	6.94	-0.099	0.2
10/28/04	0.033	0.01	100.7	7.01	0.188	0.6
11/17/04	0.046	0.02	103.3	7.12	0.020	0.3
12/03/04	0.011	0.00	106.8	7.04	-0.149	0.2
12/17/04	0.014	0.01	101.8	7.11	-0.035	0.3
01/12/05	0.036	0.02	104.1	6.93	-0.005	1.2

* conductivity readings high due to moisture in probe connection. After cleaned, readings for sp. cond & salinity in deionized water were 0.071 and 0.03, respectively.

Clambank Creek

Date	Sp. Cond. (0 mS/cm)	Salinity (0 ppt)	DO % (% air sat.)	pH (7.0)	Depth (air sat.)	Turbidity (0 NTU)
01/06/04	0.054	0.02	99.0	7.03	-0.015	0.8
01/22/04	0.023	0.01	95.6	7.12	-0.096	0.1
02/11/04	0.041	0.02	99.4	6.16	0.030	0.8
02/26/04	0.038	0.02	99.5	7.00	-0.107	-1.5
03/10/04	0.047	0.02	96.0	7.08	0.025	-0.1
03/25/04	0.068	0.03	102.4	7.07	0.191	0.2
04/12/04	0.017	0.01	99.1	7.12	-0.258	0.0
04/26/04	0.029	0.01	103.2	7.08	0.079	-0.5
05/06/04	0.086	0.04	71.4	7.05	-0.001	-0.5*
05/19/04	0.009	0.00	101.1	7.02	0.023	0.0
06/04/04	0.076	0.03	96.4	7.09	-0.094	0.0
06/17/04	0.042	0.02	104.7	6.97	0.150	0.2
07/02/04	0.049	0.02	103.5	7.06	-0.029	0.0
07/20/04	0.024	0.01	84.3	7.05	-0.042	-0.5**
08/04/04	0.021	0.01	109.0	7.02	-0.011	0.1
08/19/04	0.063	0.03	101.8	7.10	0.085	0.4
09/03/04	0.048	0.02	98.8	7.01	0.013	786.9***
09/16/04	0.037	0.02	100.7	6.90	-0.030	0.0
09/30/04	0.070	0.03	100.9	6.89	-0.028	0.0
10/14/04	0.024	0.01	94.1	7.05	-0.087	1.0

10/28/04	0.021	0.01	106.7	7.01	0.180	0.3
11/17/04	0.054	0.02	111.7	6.95	0.022	0.5
12/01/04	0.054	0.02	105.9	7.07	-0.137	0.3
12/16/04	0.039	0.02	102.8	7.04	0.153	0.4
01/12/05	0.057	0.03	105.0	7.08	-0.095	0.1

* film of mud on DO membrane
** DO membrane torn during cleaning
*** fouling on wiper causing it to park incorrectly. Turbidity in deionized water read 0.0 when wiper was removed.

15) Other Remarks/Notes

On 08/13/2020 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2006, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

a. NIWB began use of anti-fouling paint (Interlux Micron Extra) on all YSI probes in July of 2004. Prior to this date, no anti-fouling measures were allowed at this reserve due to environmental concerns.

b. Beginning on the first deployment of August 2004, rigid 1/2 cm black Vexar mesh was used to cover all probe guards during sonde deployment. Prior to this date, all sonde guards were covered with 1/2 cm white flexible nylon mesh bags. These bags were frequently compromised by crabs and fish, so a more rigid material was chosen.

c. The following are daily rainfall totals > 2.54 mm for the year of 2004. Note that significant rainfall amounts can affect all measured parameters, most noticeably salinity, turbidity and pH. Please note that Tropical events are associated with heavy winds that may also affect tidal depth.

DATE	PRECIPITATION (mm)
01/09/04	09.4
01/18/04	03.0
01/26/04	29.0
02/03/04	06.6
02/06/04	06.4
02/12/04	30.2
02/14/04	09.4
02/15/04	07.9
02/17/04	18.0
02/26/04	17.0
02/27/04	05.8
03/09/04	05.8
03/30/04	03.8

03/31/04	04.8	
04/08/04	08.9	
04/12/04	14.5	
04/13/04	13.7	
04/26/04	03.3	
04/27/04	15.0	
05/01/04	32.0	
05/02/04	25.4	
05/03/04	11.4	
05/19/04	13.0	
05/29/04	08.4	
06/03/04	09.7	
06/04/04	04.6	
06/17/04	04.8	
06/27/04	30.0	
06/28/04	03.0	
06/29/04	13.2	
06/30/04	19.1	
07/01/04	07.6	
07/03/04	07.4	
07/05/04	11.2	
07/10/04	06.4	
07/11/04	03.0	
07/17/04	13.5	
07/18/04	25.7	
07/19/04	04.1	
07/23/04	11.4	
07/30/04	02.5	
08/02/04	06.4	Tropical Storm Alex
08/03/04	09.9	Tropical Storm Alex
08/12/04	122.7	Tropical Storm Bonnie
08/13/04	19.1	Tropical Storm Bonnie
08/14/04	58.9	Hurricane Charley
08/15/04	48.0	Hurricane Charley
08/26/04	17.8	
08/27/04	10.9	
08/28/04	20.8	Tropical Storm Gaston
08/29/04	43.7	Tropical Storm Gaston
08/31/04	19.8	
09/01/04	06.4	
09/06/04	09.1	Hurricane Frances
09/08/04	05.6	Hurricane Frances
09/11/04	13.7	
09/17/04	06.4	
09/26/04	13.2	Hurricane Jeanne
09/27/04	05.8	Hurricane Jeanne
10/03/04	36.6	
10/15/04	11.9	
10/20/04	09.1	
10/28/04	02.8	

11/04/04	03.6
11/11/04	07.4
11/12/04	07.9
11/27/04	29.2
11/28/04	02.5
12/09/04	03.0
12/10/04	06.6
12/25/04	06.4
12/26/04	31.8