

Jobos Bay (JOB) NERR Water Quality Metadata
January to December 2004
Latest Update: August 12, 2020

I. Data Set & Research Descriptors

1. Principal investigator(s) and contact persons

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2. Entry verification:

After retrieving and carefully cleaning the data loggers, they are examined to detect any structural damage to the body or to the probes. The DO membrane is checked for ruptures and then replaced if needed. The turbidity probe is examined to assure that no obstruction affects the wiper and that the sensor is clean. Manipulation and observations are registered in the field log for each deployment respectively.

The YSI is connected to a Pentium IV 3.2 MHz IBM compatible computer and the data is reviewed using the YSI computer program Ecowatch for Windows that accompanies the YSI 6600

data logger. The file is uploaded in two formats, one in YSI PC6000 format and the other in Comma Delimited format, then the file is renamed to have a ".csv" extension. The YSI Ecowatch for Windows program is used to plot the data and delete the pre and post deployment data that are not in range of the other readings. 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. Data files are revised using the EQWinformat.xls macro that: 1) ensure parameters are in the correct order; 2) convert depth in feet to depth in meters; 3) format the data to the correct number of decimal points; 4) inserts an identifying station code; 5) insert a corrected time column; and 6) allows the user 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 data are then copied into EQWin where: 1) the station and parameters are verified against the database; 2) the file configurations are checked; 3) the date and time formats are verified; 4) data are checked for duplication; 5) the data are checked for outliers (data outside the acceptable range for the sensors) and outlier reports produced; and 6) graphs are generated. The reports and graphs are printed and the data reviewed. Data at the beginning and end of each data record when the instrument was out of the water are deleted. These data are identified by field notes that document the times of deployment and retrieval and by the sudden change in Specific Conductivity and Depth records. Data in the remainder of the record are not deleted unless supporting reasons can be documented. 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.

The anomalous data are evaluated to determine whether to flag or delete the suspect data. Data are flagged if the values are: 1) outside the range expected for the site (see Site Location and Character, Section 5), 2) outside the range of measurements and accuracy established for the sensors (see Section 9), or 3) outside the range established for good water quality conditions (e.g., Turbidity >150 NTU, negative Turbidity, variable DO, or sudden data spikes). Data outside the acceptable range of water quality for a particular site are investigated for validity based on weather data, field observations, QC checks, data printouts, and instrument diagnostics. Data are deleted if the anomalies are attributed to: 1) sensor malfunction - if the voltage reading of the sensor is outside the range established for the sensor or the sensor will not calibrate, 2) exposure of sensors during low tide - identified by unusual Depth, Temperature, and Specific Conductivity data, or 3) fouling of sensors by aquatic organisms, debris or sediment - detected by comparing in situ sensor with measurements (see Section 4). Turbidity readings > 900 NTU are deleted. In addition, sensor readings that differ significantly (>10%) from standard solutions (e.g., Conductivity) suggest that the sensor was fouled during deployment. After corrections are made to the pre-processed data in Excel, it is imported into the EQWin database and text files are submitted to the CDMO. All raw .csv files are also sent to the CDMO via FTP for archival. The data is stored in Zip and CD disks. The person responsible for the data QA/QC is Luis A. Encarnación.

3. Research Objectives:

Four data loggers are deployed in Jobos Bay. Two are deployed in inner lagoons of the Mar Negro Component and the other two in the Bay of the Jobos Bay National Estuarine Research Reserve. The instruments are suspended from a pole at a distance of 0.3 meters from the bottom at each selected site. Data from stations 9, 10, 19 and 20 are being submitted to the Centralized Data Management Office as part of the System-Wide Monitoring Program. Measurements are taken at thirty-minute intervals for approximately two-week periods. The sites are identified as representative of areas within the reserve and comparable to the sites that may be receiving impact from human activities from surroundings areas or may act as a habitat gradient in the Bay.

Station number nine (9), the impacted site, collects water quality data in a site associated with runoff from littoral and basin mangrove areas. This sampling station is located in the most inland lagoon, closest to the Thermoelectric Power Plant. It is subjected to runoff, which may include potential oil spill contamination from this industrial facility. Information compiled from historical environmental documents, indicate that station nine (9) was used as a disposal site for residues of the previously operating sugar mill operation, and therefore might have high organic input into the sediments.

Station number ten (10), located in a mangrove lagoon area towards the southwestern section of Mar Negro is considered the reference or non-impacted site.

Station number (19) is located over a sea grass bed (*Thalassia testudinum*) in the inner western part of the bay just northeast of Cayo Colchones. This station is located near the thermal outfall and operating piers of the Aguirre Power Plant Complex, both activities may have significant effects on sea grass communities. This area is exposed to barge standings, sediment re-suspension and oil spills.

Station number (20) is located on the eastern inner bay section of the Cayos Caribe cays. This station is just south of the mangrove islets associated with the Reserve's coral reefs. Water streams coming through the coral platform may help characterize water conditions of the main marine currents reaching Jobos Bay, as well as, possible effects of industrial and chemical activities associated with Phillips Core, AES Coal Energy Plant and Pharmaceuticals located just east to this system.

4. Research methods:

The National Estuarine Research Reserve Water Quality Monitoring Program began sampling at Station nine (9) on December 20, 1995 and Station ten (10) on February 1, 1996. Monitoring at station 19 began in April 2002 and at station 20 in May 2002. Long term water quality monitoring is being performed at these stations.

Before each YSI 6600 data logger is deployed, calibration and maintenance is performed following the manufacturer's instruction (YSI Manual addendum 7/94, sections 3, 4 and 7). Calibration standards are only required for pH, salinity, and turbidity, all other parameters are done as described in the YSI manual. Buffer solutions for two-point calibration (pH 7 and pH 10) are purchased from a scientific supply company. Salinity is calibrated with a specific conductance standard 100 mS/cm and is purchased from a scientific supply company.

The two-point turbidity calibration is performed using a 0 NTU (DI water) and 100 NTU standard purchased from a scientific company. The dissolved oxygen membranes are replaced before deployment and are allowed to sit at least 24 hours prior to deployment. Weather

conditions and tide stage are recorded in the field observation log during deployment. Measurements of DO, pH, salinity, specific conductance, and temperature, are taken with other calibrated field instruments to check the accuracy of the instrumentation.

Each YSI data logger is tied with steel cable to a wrought iron galvanized pole, which is plunged into the sediments at each sampling area. Data loggers are suspended from a pole at 0.3 meter from the bottom of the selected site. Every 30 minutes during the sampling period, the following measurements are recorded: date, time, temperature, specific conductance, salinity, dissolved oxygen saturation, dissolved oxygen concentration, depth, pH, and turbidity. Every two weeks the data loggers are retrieved, uploaded, cleaned, inspected, and calibrated as noted previously. The data logger is then ready to be deployed again.

5. Site location and character:

The Jobos Bay National Estuarine Research Reserve (JBNERR) is located on the southern coastal plain of the island of Puerto Rico, a reserve within the West Indies geographical area. JBNERR is composed of two major areas: (1) Mar Negro, located on the western margin of the Bay, and (2) Cayos Caribe, a chain of 15 tear-shaped islets located to the southeast. The Mar Negro area comprises the bulk of the Reserve, and consists of mangrove forests and a complex system of lagoons and channels interspersed with salt and mud flats. Coral reefs and sea grass beds, with small beach deposits and upland areas fringe Cayos Caribe mangrove islands.

Station 9 is an impacted site and is located on the northeastern section of the Mar Negro component. This sampling station is associated with mangrove lagoon areas and receives runoff from mudflats, the Thermoelectric Power Plant, and adjacent areas. The tidal range varies from 12 to 14 inches near the monitoring station. The salinity at the vicinity of the monitoring station varies from 26.0 ppt to 41.1 ppt. The average depth at station 09 is 1 meter. The bottom is covered by a thick layer of thin sediments with a high content of organic material. Brown and green algae are also present at this site, but a better assessment is needed. The station pole is located at 17° 56' 36.8" N and 66° 14' 18.5" W. Fresh water input to the station comes only from runoff and rain. There is not any direct source of fresh water.

Station 10 is located in a mangrove lagoon not impacted directly by any upland or marine activities. It provides a reference for comparison of data obtained in other stations, especially to the station in Mar Negro lagoon. The tidal range varies from 12 to 14 inches. The salinity at the vicinity of the monitoring station varies from 27.0 ppt to 41.7 ppt. The average depth at station 10 is 1 meter. The bottom is covered with a layer of fine sediments with organic material, followed by a layer of calcareous material mainly from shells and oysters. At this site, we can find sea grass (*Thalassia*), calcareous algae (*Halimeda* sp.), green algae (*Caulerpa* sp.) and brown algae (*Dictyota* sp.) among others. The pole is located at 17° 56' 20.3" N and 66° 45' 26.7" W. Fresh water input to the station comes only from runoff and rain. There is not any direct source of fresh water.

Station 19 is located on the western inner section of the bay at a distance of 233 meters from Cayo Colchones Mangroves over sea grass beds (*Thalassia testudinum*). Tidal ranges in this area vary from 12 to 14 inches. The salinity at the vicinity of the monitoring station varies from 30.0 ppt to 36.0 ppt. The average depth at this station is of 2 meters. The YSI' sonde is deployed

at about 1 foot from the bottom. The bottom is of sandy composition. Sea grass, algae, echinoderms and other related organisms could be found in the area. The pole is located at 17° 56' 28.15885" N and 66° 13' 45.28784" W. There is no freshwater input to this area.

Station 20 is located in the inner eastern section at about 190 meters of Cayos Caribe Mangrove islets and at about 688 meters from the coral reef barrier. This station is the closest to Mar Caribe. It has a sandy bottom, with calcareous and coral fragments, sea grass (*Thalassia*) communities, echinoderms and other associated organisms. Tidal ranges in this area vary from 12 to 14 inches. The salinity at the vicinity of the monitoring station varies from 30.0 ppt to 36.0 ppt. The average depth of the site is 2 meters. There is no freshwater input to this area. The pole is located at 17° 55' 49.14258" N and 66° 12' 41.29771" W.

Data from stations 9, 10, 19 and 20 is being submitted to the CDMO. Eight sondes are permanently devoted to taking readings from these four sites, to assure continuous readings while sondes are taken out of the water for data upload and maintenance. This will avoid data gaps for the stations between sonde maintenance procedures. All monitoring is considered long term.

6. Data collection period:

Station nine (9) sampling with the YSI began on December 20, 1995.

Station ten (10) sampling with the YSI began on February 1, 1996.

Station nineteen (19) sampling with the YSI began on April 1, 2002.

Station twenty (20) sampling with the YSI began on May 13, 2002.

Began	Ended		
Station 09			
23-Dec-03	10:30	21-Jan-04	9:00
21-Jan-04	9:30	3-Feb-04	9:00
3-Feb-04	9:30	18-Feb-04	8:00
18-Feb-04	8:30	2-Mar-04	8:00
2-Mar-04	8:30	16-Mar-04	8:00
16-Mar-04	8:30	31-Mar-04	8:30
31-Mar-04	9:00	13-Apr-04	8:30
13-Apr-04	9:00	27-Apr-04	9:00
27-Apr-04	9:30	10-May-04	22:00
11-May-04	9:00	25-May-04	8:30
25-May-04	9:00	9-Jun-04	9:00
9-Jun-04	10:00	29-Jun-04	9:30
29-Jun-04	10:00	14-Jul-04	8:30
14-Jul-04	9:00	30-Jul-04	9:30
30-Jul-04	10:00	18-Ago-04	8:00
18-Ago-04	8:30	7-Sept-04	9:00

7-Sept-04	9:30	28-Sept-04	8:30
28-Sept-04	9:00	26-Oct-04	9:30
26-Oct-04	10:00	9-Nov-04	10:00
9-Nov-04	10:30	23-Nov-04	9:30
23-Nov-04	10:00	7-Dec-04	9:30
7-Dec-04	10:00	22-Dec-04	13:30
22-Dec-04	14:00	1-Jan-05	11:00

Station 10

23-Dec-03	10:30	21-Jan-04	9:00
21-Jan-04	9:30	3-Feb-04	8:30
3-Feb-04	9:00	18-Feb-04	8:30
18-Feb-04	9:00	2-Mar-04	8:00
2-Mar-04	9:00	16-Mar-04	8:30
16-Mar-04	9:30	31-Mar-04	9:00
31-Mar-04	9:30	13-Apr-04	9:00
13-Apr-04	9:30	27-Apr-04	9:30
27-Apr-04	10:00	11-May-04	9:30
11-May-04	10:00	25-May-04	9:00
25-May-04	9:30	9-Jun-04	9:00
9-Jun-04	9:30	29-Jun-04	9:00
29-Jun-04	9:30	14-Jul-04	9:00
14-Jul-04	9:30	29-Jul-04	10:00
30-Jul-04	10:30	18-Ago-04	8:00
18-Ago-04	8:30	7-Sept-04	10:00
7-Sept-04	10:30	28-Sept-04	9:00
28-Sept-04	9:30	26-Oct-04	9:00
26-Oct-04	9:30	9-Nov-04	9:30
9-Nov-04	10:00	23-Nov-04	10:00
23-Nov-04	10:30	7-Dec-04	10:00
7-Dec-04	10:30	22-Dec-04	14:00
22-Dec-04	14:30	14-Jan-05	10:30

Station 19

16-Dec-03	9:00	14-Jan-04	9:30
14-Jan-04	10:00	27-Jan-04	8:30
27-Jan-04	9:00	10-Feb-04	8:00
10-Feb-04	8:30	24-Feb-04	10:30
24-Feb-04	11:30	9-Mar-04	8:00
9-Mar-04	8:30	25-Mar-04	8:00
25-Mar-04	8:30	6-Apr-04	8:30
6-Apr-04	9:00	20-Apr-04	9:00
20-Apr-04	9:30	4-May-04	8:30
4-May-04	9:00	19-May-04	7:30

19-May-04	8:30	3-Jun-04	9:00
3-Jun-04	9:30	15-Jun-04	8:30
15-Jun-04	9:00	9-Jul-04	9:00
9-Jul-04	9:30	21-Jul-04	8:00
21-Jul-04	8:30	3-Aug-04	8:00
3-Aug-04	8:30	26-Aug-04	9:00
26-Aug-04	9:30	14-Sep-04	8:30
14-Sep-04	9:00	13-Oct-04	8:30
13-Oct-04	9:00	4-Nov-04	8:30
4-Nov-04	9:30	17-Nov-04	8:00
17-Nov-04	8:30	30-Nov-04	9:00
30-Nov-04	9:30	15-Dec-04	9:30
12-Dec-04	10:00	29-Dec-04	8:30
29-Dec-04	9:00	20-Jan-05	9:00

Station 20

16-Dec-03	9:30	14-Jan-04	11:30
14-Jan-04	12:00	27-Jan-04	9:00
27-Jan-04	9:30	10-Feb-04	9:30
10-Feb-04	10:00	24-Feb-04	10:30
24-Feb-04	11:00	9-Mar-04	9:30
9-Mar-04	10:00	25-Mar-04	9:30
25-Mar-04	10:00	6-Apr-04	9:30
6-Apr-04	10:00	20-Apr-04	9:30
20-Apr-04	10:00	4-May-04	9:30
4-May-04	10:00	19-May-04	8:00
19-May-04	8:30	3-Jun-04	8:30
3-Jun-04	9:00	15-Jun-04	8:30
15-Jun-04	9:00	9-Jul-04	9:00
9-Jul-04	9:30	21-Jul-04	8:30
21-Jul-04	9:00	3-Aug-04	9:30
3-Aug-04	10:00	26-Aug-04	9:30
26-Aug-04	10:00	14-Sep-04	8:00
14-Sep-04	8:30	13-Oct-04	9:30
13-Oct-04	10:00	4-Nov-04	10:00
4-Nov-04	10:30	17-Nov-04	11:30
17-Nov-04	12:00	30-Nov-04	10:30
30-Nov-04	11:00	15-Dec-04	10:00
15-Dec-04	10:30	29-Dec-04	8:30
29-Dec-04	9:00	20-Jan-05	10:00

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 the NERR site where the data is collected will be contacted and fully acknowledged in any subsequent publication 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 referenced scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resources 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 analysis 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 section 1. Principal Investigator and contact persons), from the Data Manager at the Central Data Management Office, (please see personnel directory under general information link on CDMO homepage (<http://cdmo.baruch.sc.edu>)). Data are available in text tab-delimited format, Microsoft Excel spreadsheet format and comma-delimited format.

8. Associated researchers and projects:

As part of the NERRS System-wide Monitoring Program, monthly samples for nutrients and chlorophyll were conducted from January to December 2004. Nutrient Sampling at Station 9 is conducted using an ISCO sampler, which collects samples every two hours during a twenty-four hour period. Grab samples are also collected in all four YSI monitoring stations. Analysis of the samples is being performed by the Virginia Institute of Marine Science, VIMS, in Virginia.

Another project is the water monitoring program for Ammonium, nitrate, nitrite, orthophosphate, chlorophyll and pheophytin. For this, an ISCO 6712 Portable Sampler is used. The sampler is an automatic instrument that can be easily moved from site to site. Constructed from durable, corrosion-resistant materials, the sampler withstands the hostile environments of industrial and municipal monitoring sites. It is located at one of our four principal, long-term stations and it is programmed to take samples every two hours. The samples are collected every month following an established protocol and sent to the Virginia Institute of Marine Sciences Lab for further analysis.

II. Physical Structure Descriptors

9. Sensor Specifications:
YSI 6600/YSI 6600EDS data logger

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model #: 6560
Range: -5 to 45 °C
Accuracy: +/-0.15 °C
Resolution: 0.01 °C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: 4-electrode cell with autoranging
Model #: 6560
Range: 0 to 100 mS/cm
Accuracy: +/-0.5% of reading + 0.001 mS/cm
Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependent)

Parameter: Salinity
Units: parts per thousand (ppt)
Sensor Type: Calculated from conductivity and temperature
Range: 0 to 70 ppt
Accuracy: +/- 1.0% of reading or 0.1 ppt, whichever is greater
Resolution: 0.01 ppt

Parameter: Dissolved Oxygen % saturation
Units: percent air saturation (%)
Sensor Type: Rapid Pulse – Clark type, polarographic
Model #: 6562
Range: 0 to 500 % air saturation
Accuracy: 0-200 % air saturation, +/- 2 % of the reading or 2 % air saturation, whichever is greater; 200-500 % air saturation, +/- 6 % of the reading
Resolution: 0.1 % air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature and salinity)
Units: milligrams per Liter (mg/L)
Sensor Type: Rapid Pulse – Clark type, polarographic
Model #: 6562
Range: 0 to 50 mg/L
Accuracy: 0 to 20 mg/L, +/- 2 % of the reading or 0.2 mg/L, whichever is greater; 20 to 50 mg/L, +/- 6 % of the reading
Resolution: 0.01 mg/L

Parameter: Non-Vented Level – Shallow (Depth)

Units: feet or meters (ft or m)

Sensor Type: Stainless steel strain gauge

Range: 0 to 30 ft (9.1 m)

Accuracy: +/- 0.06 ft (0.018 m)

Resolution: 0.001 ft (0.001 m)

Parameter: 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 0-10 ft: +/- 0.01 ft (0.003 m)

Accuracy 10-30 ft: +/- 0.06 ft (0.018 m)

Resolution: 0.001 ft (0.001 m)

Parameter: Vented Level – Deep (Depth)

Units: feet or meters (ft or m)

Sensor Type: Stainless steel strain gauge

Range: 0 to 656 ft (200 m)

Accuracy: +/- 1 ft (0.3 m)

Resolution: 0.001 ft (0.001 m)

Parameter: pH (specify whether EDS probe or not)

Units: units

Sensor Type: Glass combination electrode

Model #: 6561

Range: 0 to 14 units

Accuracy: +/- 0.2 units

Resolution: 0.01 units

Parameter: Turbidity

Units: nephelometric turbidity units (NTU)

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

Model #: 6136

Range: 0 to 1000 NTU

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

Resolution: 0.1 NTU

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. 200*). Many reserves have upgraded to YSI 6600 EDS data sondes, which increase 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, ie. periodicity analysis. It should be noted that the amount of fouling is 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. All data sondes used at JBNERR sites in 2004 were non-EDS models.

The NERRS 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 atmosphere 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 1.03 cm for every 1millibar 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 are available, non-vented sensor depth measurements can be corrected for deployments between calibrations. Readings for both vented and non-vented sensors 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. All data sondes used at the JBNERR sites in 2004 were non-vented models.

10. Coded variable indicator and variable code definitions:

Sampling Station	Sampling Site Code	Station Code
Station 9	09	job09wq
Station 10	10	job10wq
Station 19	19	job19wq
Station 20	20	job20wq

File definitions: 3 letter NERR site code (JOB); 2 letter YSI deployment site code (see above); data type code (WQ for water quality), year of deployment. Ex: job09wq2004 = Station 9 water quality data for 2004.

11. Anomalous Data/Suspected Data:

Note: Due to errors in calibration, turbidity data for all sites are considered inadequate. During this year we had unusual data in many of turbidity readings with negative values between -18 and -0.1 NTU. In the secchi readings taken between the stations 09, 10, 19 and 20 has always been able to read to the bottom. We attribute these negative values to the proximity of the turbidity sensor to the marine bottom (about six (6) inches from the bottom). These values should be considered suspect.

September 1 – 30, 2004

Station 09

The first pH reading of the 09/07 – 09/28 deployment suspect (6.5 NTU). Reason for low reading unknown.

09/07/04 09:30

December 1 – 31, 2004

Station 20

All data for deployment 12/16/03 09:30 – 01/14/04 11:30 suspect due to biological fouling of sensors.

12. Deleted Data:

January 1-31, 2004

Station 09

Turbidity data deleted because it was out of the detection limit of the sensor.

1/12/04 6:00 2330.4 NTU

Station 10

Turbidity data deleted because it was out of the detection limit of the sensor.

1/6/04 3:30 1882.5 NTU

Turbidity data deleted because algae and tubular worms growth in the sensor brush causing high turbidity values.

1/13/04 1:30 - 1/21/04 9:00

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

1/11/04 7:30 1991.5 NTU

1/12/04 7:30 1995 NTU

1/12/04 8:30 1575.1 NTU

Dissolved oxygen (% and mg/L) deleted due to calibration error.

1/27/04 09:00 – 2/10/04 08:00

Station 20

Turbidity data deleted because algae and tubular worms growth in the sensor brush causing high turbidity values.

1/13/04 20:30 - 1/14/04 11:30

February 1-28, 2004

Station 19

Dissolved oxygen (% and mg/L) deleted due to calibration error.

1/27/04 09:00 – 2/10/04 08:00

Station 20

Turbidity data deleted because it was out of the detection limit of the sensor.

2/8/04 19:30 1217.4 NTU

2/8/04 22:30 1273.7 NTU

March 1-31, 2004

Station 10

Dissolved oxygen (% and mg/L) deleted due to calibration error.

3/31/04 09:30 – 4/13/04 09:00

April 1-30, 2004

Station 09

pH Data deleted due to sensor problems.

4/30/04 2:30 - 4/30/04 23:30

Station 10

Dissolved oxygen (% and mg/L) deleted due to calibration error.

3/31/04 09:30 – 4/13/04 09:00

May 1-31, 2004

Station 09

pH Data deleted due to sensor problems.

5/1/04 00:00 - 5/10/04 22:00

Depth data deleted because of sensor problems, maybe some kind of organism enter inside it.

5/26/04 18:30 - 5/31/04 23:30

Station 19

Turbidity data deleted because algae and tubular worms growth in the sensor brush causing high turbidity values.

5/19/04 17:00 - 5/31/04 23:30

June 1-30, 2004

Station 09

Depth data deleted because of sensor problems, maybe some kind of organism enter inside it.

6/1/04 0:00 - 6/9/04 9:00

Station 10

Turbidity data deleted because algae and tubular worms growth in the sensor brush causing high turbidity values.

6/5/04 18:00 - 6/9/04 9:00

Dissolved oxygen (% and mg/L) deleted due to calibration error.

6/29/04 09:30 - 7/14/04 09:00

Station 19

Turbidity data deleted because the brush was stoping over the sensor causing high turbidity values.

6/1/04 0:00 - 6/3/04 9:00

July 1-31, 2004

Station 09

Turbidity data deleted because it was out of the detection limit of the sensor.

7/28/04 6:30 1022.4 NTU

7/28/04 8:00 1266.3 NTU

Station 10

Dissolved oxygen (% and mg/L) deleted due to calibration error.

6/29/04 09:30 - 7/14/04 09:00

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

7/24/04 12:00 2124.2 NTU

August 1-30, 2004

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

8/11/04 2:00 2154.4 NTU

September 1-31, 2004

Station 09

Turbidity data deleted because it was out of the detection limit of the sensor.

09/22/04 10:30 1436 NTU

9/23/04 2:00 1424.9 NTU

9/23/04 11:30 1564.1 NTU

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

9/4/04 12:00 1007.2 NTU

9/5/04 19:30 1954.2 NTU

9/7/04 14:00 1304.8 NTU
9/7/04 14:30 3799.9 NTU

Station 20

DO%, DO mg/L, SpCond, salinity, and depth data was deleted because of malfunctioning of the specific conductivity sensor.

9/15/04 16:00 - 9/30/04 23:30

October 1-30, 2004

Station 09

Turbidity data deleted because it was out of the detection limit of the sensor.

10/9/04 2:00 1035 NTU
10/13/04 0:00 1155.9
10/13/04 2:00 1047.4
10/13/04 4:30 1036
10/13/04 12:00 1170.1
10/16/04 1:00 1058.8

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

10/12/04 9:30 1102.4 NTU

Station 20

DO%, DO mg/L, SpCond, salinity, and depth data was deleted because of malfunctioning of the specific conductivity sensor.

10/1/04 0:00 - 10/13/04 9:30

November 1-30, 2004

Station 09

Turbidity data deleted because it was out of the detection limit of the sensor.

11/7/04 3:00 1279.7 NTU

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

11/9/04	13:30	2968.8 NTU
11/12/04	1:30	2850.6
11/12/04	2:30	2438.9
11/12/04	3:30	3682.8
11/12/04	4:00	2419.8
11/13/04	7:00	1062.4

December 1-31, 2004

Station 19

Turbidity data deleted because it was out of the detection limit of the sensor.

12/4/04	5:00	1504.1 NTU
12/4/04	6:30	1782.2
12/4/04	7:30	2009.4
12/4/04	8:30	2097.2
12/13/04	22:00	1253.1

13. Missing data:

Stations 19 and 20 are located in areas that receive strong waves. The movement caused by the strong waves caused the sonde to stop taking data during short time periods and sporadically.

Stations 9 and 10 are more protected and receive less wave impact.

January 1-31, 2004

Station 20

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

1/1/04	1:00	
1/1/04	2:00	
1/1/04	7:30	
1/1/04	11:30	
1/2/04	23:30	
1/5/04	22:30	
1/6/04	16:00	
1/11/04	18:00 - 1/11/04	20:30
1/11/04	22:00	

1/13/04 15:30

February 1-28, 2004

Station 19

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

2/24/04	11:00		
2/24/04	14:30		
2/24/04	15:30	-	2/24/04 18:30
2/25/04	10:30	-	2/25/04 12:00
2/25/04	13:30	-	2/25/04 14:00
2/25/04	15:30		
2/26/04	11:00		
2/27/04	2:30		
2/27/04	12:30		
2/27/04	14:30		
2/28/04	16:00	-	2/28/04 17:00
2/29/04	18:30		

Station 20

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

2/7/04	0:00	
2/10/04	7:00	
2/29/04	19:00	

March 1-31, 2004

Station 19

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

3/1/04	20:30	
3/2/04	9:30	- 3/2/04 11:00
3/1/04	19:30	- 3/1/04 21:00
3/2/04	23:30	
3/3/04	10:30	- 3/3/04 12:30
3/3/04	14:00	- 3/3/04 14:30

3/3/04 15:30	-	3/3/04 16:30	
3/4/04 12:00	-	3/4/04 13:00	
3/5/04 11:30			
3/5/04 14:00			
3/5/04 15:00			
3/5/04 23:30			
3/6/04 0:30			
3/6/04 04:00			
3/6/04 10:00			
3/6/04 11:00	-	11:30	
3/6/04 12:30	-	13:00	
3/6/04 14:00	-	16:00	
3/6/04 17:30			
3/6/04 19:00			
3/6/04 21:00			
3/7/04 02:00			
3/7/04 03:30			
3/7/04 08:30			
3/7/04 09:30	-	10:00	
3/7/04 12:00	-	18:30	
3/8/04 10:30	-	3/8/04 13:00	
3/8/04 14:00	-	3/8/04 14:30	
3/8/04 15:30	-	3/8/04 16:00	
3/8/04 17:00			
3/8/04 18:00			
3/10/04		17:30	
3/11/04	11:00 -	3/11/04	11:30
3/11/04	12:30		
3/11/04	14:00 -	3/11/04	15:30
3/11/04	16:30 -	3/11/04	17:00
3/12/04	8:30		
3/12/04	10:00 -	3/12/04	13:00
3/12/04	15:00 -	3/12/04	18:00
3/12/04	19:30		
3/12/04	21:00		
3/13/04	4:00		
3/13/04	5:00		
3/13/04	6:00 -	3/13/04	6:30
3/13/04	9:00 -	3/13/04	11:00
3/13/04	12:00 -	3/13/04	13:00
3/13/04	14:00 -	3/13/04	18:00
3/13/04	19:00		
3/13/04	20:00 -	3/13/04	20:30
3/13/04	21:30		
3/13/04	22:30		
3/14/04	00:00		

3/14/04	03:30 – 04:00		
3/14/04	11:30		
3/14/04	12:30 – 18:00		
3/14/04	23:00		
3/15/04	0:00 -	3/15/04	0:30
3/15/04	3:30		
3/15/04	8:00		
3/15/04	10:30 -	3/15/04	19:30
3/15/04	20:30		
3/15/04	23:00		
3/16/04	1:00		
3/16/04	3:30 -	3/16/04	5:30
3/16/04	10:00		
3/16/04	11:00 -	3/16/04	14:30
3/16/04	15:30 -	3/16/04	19:30
3/17/04	2:00		
3/17/04	6:00		
3/17/04	9:30		
3/17/04	10:30 -	3/17/04	11:00
3/17/04	13:30 -	3/17/04	14:00
3/17/04	15:00 -	3/17/04	15:30
3/17/04	17:30 -	3/17/04	18:30
3/17/04	20:00		
3/18/04	1:30 -	3/18/04	2:30
3/18/04	03:30		
3/18/04	11:30 -	3/18/04	13:00
3/18/04	14:30		
3/18/04	15:00 -	3/18/04	18:30
3/18/04	20:30		
3/19/04	6:30		
3/19/04	8:30 -	3/19/04	10:30
3/19/04	11:30		
3/19/04	12:30 -	3/19/04	15:30
3/19/04	18:00		
3/20/04	9:00 -	3/20/04	9:30
3/20/04	11:00		
3/20/04	13:30 -	3/20/04	18:30
3/20/04	23:00		
3/21/04	0:00		
3/21/04	2:30		
3/21/04	5:00		
3/21/04	6:30		
3/21/04	8:30		
3/21/04	9:30		
3/21/04	10:00 -	3/21/04	13:00
3/21/04	14:00 -	3/21/04	16:30

3/21/04	17:30	-	3/21/04	19:00
3/21/04	20:00			
3/22/04	5:30			
3/22/04	8:00			
3/22/04	10:00	-	3/22/04	10:30
3/22/04	11:30	-	3/22/04	12:30
3/22/04	17:00	-	3/22/04	18:00
3/23/04	10:30	-	3/23/04	11:00
3/23/04	12:00			
3/23/04	13:30	-	3/23/04	14:30
3/23/04	15:30			
3/23/04	16:30	-	3/23/04	17:00
3/23/04	18:00	-	19:00	
3/24/04	10:00	-	3/24/04	11:00
3/24/04	12:30	-	3/24/04	13:30
3/24/04	14:30	-	3/24/04	18:00
3/24/04	19:00			
3/25/04	15:30			

Station 20

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

3/2/04	10:00		
3/2/04	18:30		
3/2/04	19:00		
3/3/04	21:00	-	3/3/04 21:30
3/3/04	22:30	-	3/3/04 23:30
3/4/04	0:00	-	3/4/04 0:30
3/4/04	10:00	-	3/4/04 11:00
3/4/04	12:00		
3/4/04	15:00	-	3/4/04 17:00
3/4/04	18:30		
3/4/04	20:30	-	3/4/04 22:30
3/4/04	23:30		
3/5/04	0:00	-	3/5/04 1:30
3/5/04	2:30		
3/5/04	4:00		
3/5/04	5:00		
3/5/04	6:30		
3/5/04	7:00		
3/5/04	8:00		
3/5/04	12:00	-	3/5/04 14:30
3/5/04	15:30		
3/5/04	16:30	-	3/5/04 17:00

3/5/04 19:00
3/5/04 23:00
3/6/04 17:00
3/6/04 19:30
3/7/04 9:30
3/7/04 14:00 - 3/7/04 16:00
3/7/04 17:30
3/27/04 20:30
3/28/04 13:00
3/29/04 14:00
3/29/04 17:30

April 1-30, 2004

Station 19

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

4/13/04 12:00
4/16/04 14:00
4/17/04 16:30
4/17/04 17:30
4/18/04 10:30
4/18/04 11:30
4/18/04 12:30
4/18/04 15:00
4/18/04 16:00
4/19/04 12:00

Station 20

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

4/12/04 15:30 - 4/12/04 16:00
4/22/04 14:00
4/22/04 15:30 - 4/22/04 16:30

May 1-31, 2004

Station 09

Sonde disconnected and stop taking data.

5/10/04 22:30 - 5/10/04 8:30

Station 19

Sonde on maintenance.

5/19/04 8:00

No data due to sonde malfunction (the sonde it's auto disconnecting intermittent)(view section 15)

5/4/04 12:00	-	5/4/04 12:30	
5/5/04 10:00			
5/5/04 15:30			
5/5/04 16:30			
5/6/04 10:30			
5/8/04 11:30			
5/8/04 15:00			
5/9/04 10:30			
5/9/04 11:30			
5/9/04 12:30			
5/9/04 13:30			
5/9/04 14:00	-	5/9/04 15:30	
5/9/04 16:30	-	5/9/04 17:30	
5/9/04 19:00			
5/10/04 11:30			
5/10/04 12:30	-	5/10/04 16:00	
5/10/04 17:30	-	5/10/04 18:30	
5/10/04 19:30			
5/10/04 21:30			
5/10/04 22:30	-	5/10/04 23:30	
5/11/04 0:00	-	5/11/04 0:30	
5/11/04 12:00	-	5/11/04 18:30	
5/11/04 19:30	-	5/11/04 20:00	
5/11/04 22:30	-	5/11/04 23:00	
5/12/04 0:00	-	5/12/04 3:30	
5/12/04 6:30			
5/12/04 7:00	-	5/12/04 8:00	
5/12/04 9:00	-	5/12/04 17:30	
5/12/04 19:00	-	5/12/04 20:00	
5/12/04 22:00	-	5/12/04 23:00	
5/13/04 0:00	-	5/13/04 0:30	
5/13/04 8:30	-	5/13/04 14:00	
5/13/04 15:30			
5/14/04 12:00			

5/14/04	13:30		
5/14/04	14:30		
5/14/04	17:30		
5/15/04	11:30		
5/16/04	10:00 -	5/16/04	10:30
5/16/04	11:30		
5/16/04	15:30		
5/16/04	18:00		
5/17/04	7:30		
5/17/04	8:30		
5/17/04	11:30		
5/17/04	12:30		
5/17/04	14:00		
5/18/04	13:00		
5/18/04	15:30		
5/18/04	17:30		
5/19/04	08:00		

June 1-30, 2004

Station 09

Sonde on maintenance.

6/9/04 9:30

November 1-30, 2004

Station 19

Sonde on maintenance.

11/4/04 9:00

Data are missing due to equipment failure where no probes deployed, maintenance/calibration of equipment, elimination of obvious outliers, or elimination of data due to calibration (both pre and post) problems. For more details on deleted data, see Deleted Data Section (12.) If additional information on missing data are needed, contact the Research Coordinator at the reserve submitting the data.

14. Post deployment information:

End of deployment Post-calibration Readings in Standard Solution:

Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	pH std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 102.5	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 9	01/21/04	20.6	6.94	9.87	-0.005	96.5	8	119.5
St 9	02/03/04	88.1	6.97	10.05	0.728	102.6	0.8	122.6
St 9	02/18/04	109.3	6.99	10.03	0.007	101.4	3.4	123.6
St 9	03/02/04	101.2	6.96	10.03	-0.021	102	2.3	124.6
St 9	03/16/04	99.5	6.99	9.8	-0.035	102.1	1.7	125.2
St 9	03/31/04	100.8	6.97	9.92	-0.041	103	1	124.1
St 9	04/13/04	92.5	7.03	9.97	-0.016	103	4.5	120.7
St 9	04/27/04	82.4	6.8	9.74	0.0017	103.8	-0.1	123.2
St 9	05/11/04	61.1	36.43	36.8	-3.365	103.5	7	122.3
St 9	05/25/04	89	7.01	9.89	-0.015	102	2.5	125.5
St 9	06/09/04	101.8	7.35	10.19	0.027	102.4	1.5	119.9
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 86.1	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 9	06/29/04	31.6	6.96	9.77	-0.025	40.96	2.7	122.7
St 9	07/14/04	98.6	6.87	9.9	-0.024	85.06	3.2	122.5
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 83.40	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 9	07/30/04	95.3	7.19	10.16	-0.033	76.61	0.8	130.7
St 9	08/18/04	98.4	7.18	10.09	-0.002	82.65	-2.8	123.5
St 9	09/07/04	101.3	6.91	10.05	-0.019	80.1	-0.2	124.3
St 9	09/28/04	104.3	6.5	10.05	0.003	80.73	-3.2	133.4
St 9	10/26/04	93.7	7.18	10.4	-0.011	71.88	1.9	125.1
St 9	11/09/04	92.6	6.89	9.66	0.025	77.42	1.5	130.7
St 9	11/23/04	94.8	7.26	9.8	-0.026	97.3	8.5	124
St 9	12/07/04	114.5	7.01	10.03	0.018	79.2	2.5	140.3
St 9	12/22/04	104.6	7.07	10.17	0.021	89.38	-4.6	110.9

Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 102.5	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
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St 10	01/21/04	6.8	6.91	9.5	-0.005	99.66	34.9	2319.1
St 10	02/03/04	102.1	6.97	9.3	0.042	103	12.8	129.9
St 10	02/18/04	92.2	6.96	10	0.013	102.6	0.3	124.2
St 10	03/02/04	84.5	6.61	9.6	-0.018	102.3	1	122.3
St 10	03/16/04	75	7.02	9.81	-0.015	103.8	0.8	125.3
St 10	03/31/04	72.6	7.06	9.84	-0.056	102.2	3.3	125.5
St 10	04/13/04	97.6	7.25	10.07	-0.009	103.4	4.2	124
St 10	04/27/04	88.3	7.18	9.84	0.008	102.9	1.3	123.6
St 10	05/11/04	41.8	7.03	9.93	-0.009	105.3	4	143.3
St 10	05/25/04	94.6	7.25	10.23	-0.007	103.4	3.6	124.3
St 10	06/09/04	98.7	6.89	9.84	0.013	100.9	6.7	126.9
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 86.1	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 10	06/29/04	100	6.96	9.76	-0.034	41.56	2.9	123.1
St 10	07/14/04	76	6.76	9.82	-0.024	45.83	6.2	129
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 83.40	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 10	07/30/04	97	7.05	9.91	-0.039	73.85	3.4	130.1
St 10	08/18/04	100.3	7.16	10.49	0.002	80.03	0.6	125.3
St 10	09/07/04	96.1	6.75	9.96	-0.012	80.48	-0.8	128
St 10	09/28/04	98.2	6.74	10.06	0.011	84.31	-3.1	120.7
St 10	10/26/04	96.4	7.11	10.22	0.012	98.71	3.1	124.6
St 10	11/09/04	96.6	7.13	9.56	0.023	77.84	0.3	136.5
St 10	11/23/04	104.3	7.09	10.05	-0.035	80.02	10.3	123.6
St 10	12/07/04	100.8	6.77	10.12	0.025	79.65	0.9	128
St 10	12/22/04	96.8	7.01	10.14	0.023	89.72	-4.4	108.5

Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 102.5	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 19	01/14/04	94.7	6.94	9.88	-0.041	100.1	7.8	134
St 19	01/27/04	95.6	7.22	10.25	0.003	103.2	2	125.6
St 19	02/10/04	83.5	7.11	10.15	-0.026	102.9	1.4	123.1
St 19	02/24/04	87.8	6.97	9.97	-0.082	104.5	0.3	123.2
St 19	03/09/04	92.4	7	9.89	-0.01	102.1	1.9	122.4
St 19	03/25/04	90	7.15	10	-0.015	102.4	1.7	123.7

St 19	04/06/04	99	7.01	9.9	0.006	102.1	4.2	121.4
St 19	04/20/04	75.2	7.08	10.04	-0.034	103.3	0.9	124.4
St 19	05/04/04	84.5	7.15	10.03	0.009	102.5	0.3	123.2
St 19	05/19/04	89.8	7.01	10..03	-0.04	101.1	0.3	124.5
St 19	06/03/04	74.4	7.12	10.2	0.006	102.1	7.5	48
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 86.1	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 19	06/15/04	98.7	7.18	9.91	-0.002	81.97	5.3	125.9
St 19	07/09/04	104.4	6.89	9.8	0.016	81.21	0.5	130.1
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 83.40	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 19	07/21/04	106.9	6.9	9.75	-0.018	158.4	6.2	125.7
St 19	08/03/04	101.2	7.02	9.89	-0.001	150.5	10	129.2
St 19	08/26/04	102.6	6.42	9.58	0.008	82.56	-0.3	131.8
St 19	09/14/04	93.4	6.95	10.37	-5.2	82.04	-5.2	125.9
St 19	10/13/04	99.8	7.04	9.98	-0.034	78.61	3.6	114
St 19	11/04/04	97	7.25	10.02	-0.014	72.44	10.1	130.5
St 19	11/17/04	72.9	7.16	10.02	-0.015	97.54	1.1	121.6
St 19	11/30/04	92.6	6.89	9.66	0.024	77.42	1.5	130.7
St 19	12/15/04	100.4	6.66	10.35	0.031	88.35	-4.8	123.1
St 19	12/29/04	122.1	6.8	9.95	-0.015	89.35	-4.3	106.8

Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 102.5	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 20	01/14/04	81.9	7.29	10.53	-0.018	100.9	3.4	114.1
St 20	01/27/04	82.3	7.12	10.03	-0.018	101	3.3	124.7
St 20	02/10/04	90	6.97	9.97	0.003	103.7	7.1	123.5
St 20	02/24/04	95	6.98	10.06	-0.088	102.9	2.6	123.7
St 20	03/09/04	86.1	7.03	9.98	-0.012	101.7	4	126.2
St 20	03/25/04	87	7.17	10.11	-0.016	100.2	4.8	125.2
St 20	04/06/04	88.9	7	9.91	0.013	101.9	0.6	124
St 20	04/20/04	72.3	7.07	10	-0.03	101.9	4.8	125
St 20	05/04/04	88.1	6.88	9.97	0.014	101.7	0.7	123.3
St 20	05/19/04	60.9	7.35	10.22	-0.033	101	4.6	124.2
St 20	06/03/04	102	7.05	9.98	0.005	105.3	0.6	122

Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 86.1	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 20	06/15/04	101.6	6.96	9.64	0	79.09	5.6	129.3
St 20	07/09/04	107	7.09	9.99	0.011	92.18	2.5	122.2
Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	ph7 std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 83.40	Turbidity (NTU) std. 0	Turbidity (NTU) std. 123
St 20	07/21/04	107.6	6.92	10.08	-0.017	83.72	9.1	133.3
St 20	08/03/04	120	6.8	9.92	-0.008	150.7	11.1	131.2
St 20	08/26/04	93.2	7.03	9.88	-0.003	83.44	2.4	126.9
St 20	09/14/04	99.3	6.89	10.72	-0.012	78.87	-4.1	123.9
St 20	10/13/04	98.3	7.11	10.2	-0.033	79.15	10.4	129.1
St 20	11/04/04	92.6	7.05	9.85	-0.033	72.32	8.5	127.5
St 20	11/17/04	94	7.19	9.99	-0.005	96.73	2.2	127
St 20	11/30/04	96.6	7.13	9.56	0.023	77.84	0.3	136.5
St 20	12/15/04	106.3	6.73	10.15	0.038	89.98	-8.6	115.6
St 20	12/29/04	100.2	7.04	9.89	-0.017	88.38	-5.5	104

15. Other remarks:

A) On 08/12/2020 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.

B) During year 2004 eight (8) important rainfall events occur that had effects in the measurements of the different parameters of the sondes. These events occur:

- 1) april 8 to 20 with 172.47mm of rainfall
- 2) may 20 to 25 with 78.23mm of rainfall
- 3) august 16 to 29 with 89.66mm of rainfall
- 4) september 16 to 21 with 164.3mm of rainfall
- 5) october 5 to 11 with 145.04mm of rainfall
- 6) october 21 to 23 with 90.68mm of rainfall

- 7) the most important november 6 to 19 with 564.64mm of rainfall, equal to the mean anual rainfall.
- 8) december 5 to 7 with 100.58mm of rainfall

C) There were a few instances at this NERR site where turbidity recorded small negative values (-0001 and -0002). Because turbidity has a range of accuracy of +/-2 NTU, the technician did not edit or deleted these values in any way.