North Carolina (NOC) National Estuarine Research Reserve Water Quality Metadata
January - December 2006
Last Update: October 2, 2019

I. Data Set & Research Descriptors

1) Principal investigator(s) and contact persons:

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2) Entry Verification:

Deployment data are uploaded from the YSI 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. 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. 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 CDMO. Paula Murray and Heather Wells, Research Associates, were responsible for data management during 2006.

3) Research Objectives:

Four long-term water quality monitoring stations have been established within the estuaries bordering Masonboro and Zeke's Islands of North Carolina's National Estuarine Research Reserve. Instruments are anchored to the bottom of the selected sites and measurements are taken at 30 or 15-minute intervals for approximately two to four week periods continuously throughout the year. Parameters measured include Depth, Temperature, Salinity, Specific Conductivity, pH, Dissolved Oxygen, and Turbidity. The goal is to assess short-term variability and long-term changes (i.e., localized impacts of seasonal storm events, inter-annual differences from rainfall, magnitude of climatic influence from El Nino/La Nina events, etc.) in estuarine water parameters within relatively pristine sites.

4) Research Methods:

The Estuarine Water Quality Monitoring Program began on 2 March 1992 at the Research Creek site of the Masonboro Island component. A second Masonboro Island site (Loosin Creek) was added on 26 February 2002. Data collection started on 19 May 1994 at the Zeke's Island component (East Cribbings) and an additional site (Zeke's Basin) was added 1 March 2002. The procedures described below were instituted in June 1995 and thus do not cover data recorded previously.

Two data loggers are assigned to each of the four permanent monitoring stations and are generally not interchanged among sites. Before each YSI 6600EDS is deployed, calibration and maintenance is performed following the manufacturer's instructions (YSI Manual addendum 7/94, sections 3, 4, and 7). Calibration standards are required for pH, turbidity and salinity; all other parameter calibrations are performed as described in the manual. Buffer solutions for a two-point pH calibration (pH 7 and 10) are purchased pre-made from a scientific supply house. The conductivity and turbidity standards are obtained from YSI. The dissolved oxygen membranes are replaced and allowed to settle at least 24 hrs prior to deployment.

Data sondes are wrapped in a wet, white towel and placed in a cooler for transport to the site. Monitoring stations are accessed using a small boat equipped with an outboard motor. During deployment the weather conditions and tide stage are recorded in the field observation log. The water quality instrument is placed inside a locked steel cage and anchored horizontally approximately 15cm off the bottom. Every 30 minutes (15 minutes beginning late summer 2006) during the sampling period measurements are taken for Temperature, Specific Conductance, Salinity, Dissolved oxygen saturation, Dissolved oxygen concentration, Depth, pH, and Turbidity. All data are recorded in Eastern Standard Time.

At the end of the sample period the water quality instrument is exchanged with a freshly calibrated instrument and transported back to the laboratory wrapped in a wet, white towel. The weather and water quality measurements are again noted in the field observation log. The calibration drift and the effect of biofouling on the water quality instrument are checked by comparing data readings in calibration standards. The water quality data are then uploaded, and the instrument is cleaned and calibrated as noted previously.

5) Site Location and Character:

The components of North Carolina's National Estuarine Research Reserve (from north to south) are: Currituck Banks, Rachel Carson, Masonboro Island, and Zeke's Island. They are located along the southeast Atlantic coast of the United States. Currently, only data from Masonboro Island and Zeke's Island components are transferred to the CDMO. The four monitoring sites are:

A. Research Creek, Masonboro Island
The first Masonboro Island site (formerly called Masonboro Island (MS)) is 0.72 km north east from the mouth of Whiskey Creek, and east of the Intracoastal Waterway (ICW), in a small navigable channel called Research Creek at 34°09'21.7" latitude and 77° 50'59.9" longitude. The site typically has a salinity range of 20-35 ppt and a tidal range that averages around 1.2 meters. The sole source of freshwater is rain and salinity values as little as 10 ppt have been recorded during periods of heavy rain. The creek bottom is characterized by sand and detritus based sediment with areas of soft mud with a depth ranging from 0.2 to 2.6 m. Spartina spp. marsh and dunes surround the site, which is relatively unimpacted by manmade perturbations and it is not accessible to road traffic. The site does experience minimal boat traffic.

A Sutron Sat-Link2 transmitter was installed at this station on 08/07/06 and transmits data to the NOAA GOES satellite, NESDIS ID # 3B032698. The transmissions are scheduled hourly and contain four (4) datasets reflecting fifteen minute data sampling intervals. The telemetry data is “Provisional” data and not the “Authentic” dataset used for long term monitoring and study. This data can be viewed by going to http://cdmo.baruch.sc.edu.

B. Loosin Creek, Masonboro Island
The second Masonboro Island site (added in 2002) is 1.2 km east of the ICW, and 2.5 km south west of Masonboro Inlet, in a small navigable channel called Loosin Creek at 34° 10'20.0" latitude and 77° 49'58.1" longitude. The site generally has a salinity range of 22-35 ppt and a tidal range that averages 1.2 meters. The sole source of freshwater is rain and salinity values as little as 15 ppt have been recorded during periods of heavy rain. The creek bottom is characterized by sand and detritus based sediment with areas of soft mud with a depth ranging from 0.1 to 2.5 m. Spartina spp. marsh and dunes surround the site, which is relatively unimpacted by manmade perturbations and it is not accessible to road traffic. The site does experience minimal boat traffic.

C. East Cribbings, Zeke's Island
The first Zeke's Island site (formerly called Zeke's Island (ZI)) is located 1.8 km south of Federal Point boat launch in a tidal basin estuary at 33° 56'23.5" latitude and 77° 56'28.1" longitude. This site receives minimal freshwater input from leakage of the Cape Fear River through the 5.6 km rock jetty that separates the two bodies of water. The site typically has a salinity range of 15-33 ppt, although values as little as 10 ppt have been recorded. Tidal range averages 1.2 meters. Depth varies, but usually can be found to range from 0.5 to 2.7 meters. Bottom type substratum consists of large rocks (the cribbings) with sand and detritus based sediment. There are no pollutants from land. Marsh and dunes surround the site. It is not accessible to road traffic but experiences minimal boat traffic.

D. Zeke's Basin, Zeke's Island
The second Zeke's Island site (added in 2002) is located 0.8 km south east of the Federal Point boat launch in a tidal basin estuary at 33° 57'17.0" latitude and 77° 56'6.0" longitude. This site receives minimal freshwater input from leakage of the Cape Fear River through the 5.6 km rock jetty that separates the two bodies of water The site has a characteristic salinity range of 12-30 ppt, but values below 10 ppt have been observed and are often associated with periods of heavy rainfall. Tidal range averages 1.2 meters. Depth varies, but typically it can be found to range from 0.1 to 1.8 meters. Bottom type substratum consists of sand and detritus based sediment with a layer of soft sulfuric mud. There are no pollutants from land. Marsh and dunes surround the site. It is not accessible to road traffic but experiences minimal boat traffic.

6) Data Collection Period:

Research Creek data collection began on 2 March 1992 while monitoring of Loosin Creek started on 26 February 2002. East Cribbing data collection commenced on 19 May 1994 and Zeke's Basin data collection began on 1 March 2002. All monitoring is considered long term.

Deployment and Retrieval Dates for 2006

| Deployment Date and Time | Retrieval Date and Time |
|---|---|
| Research Creek, Masonboro Island: | |
| 12/19/05, 12:00 | 01/12/06, 12:00 |
| 01/12/06, 12:30 | 02/14/06, 13:30 |
| 02/14/06, 14:00 | 03/16/06, 13:00 |
| 03/16/06, 13:30 | 04/11/06, 12:00 |
| 04/11/06, 12:30 | 05/17/06, 15:00 |
| 05/17/06, 15:30 | 06/18/06, 17:00 |
| 06/18/06, 17:30 | 07/07/06, 11:30 |
| 07/07/06, 12:00 | 08/04/06, 09:00 |
| 08/04/06, 09:30 | 08/21/06, 11:00 |
| 08/21/06, 11:15 | 08/28/06, 08:30 |

| | |
|---|---|
| 08/28/06, 08:45 | 09/11/06, 14:30 |
| 09/11/06, 15:00 | 10/10/06, 14:30 |
| 10/10/06, 15:00 | 11/09/06, 14:30 |
| 11/09/06, 15:00 | 12/05/06, 14:15 |
| 12/05/06, 14:45 | 01/04/07, 15:30 |

Loosin Creek, Masonboro Island:

| | |
|---|---|
| 12/19/05, 11:30 | 01/12/06, 13:00 |
| 01/12/06, 13:30 | 02/14/06, 14:30 |
| 02/14/06, 15:00 | 03/16/06, 12:30 |
| 03/16/06, 13:00 | 04/11/06, 11:00 |
| 04/11/06, 11:30 | 05/17/06, 13:30 |
| 05/17/06, 14:00 | 05/26/06, 10:30 |
| 05/30/06, 15:00 | 06/18/06, 17:30 |
| 06/18/06, 18:00 | 07/07/06, 10:30 |
| 07/07/06, 11:00 | 08/04/06, 08:30 |
| 08/04/06, 09:00 | 08/21/06, 11:30 |
| 08/21/06, 11:45 | 09/11/06, 15:15 |
| 09/11/06, 15:30 | 10/10/06, 15:15 |
| 10/10/06, 15:30 | 11/09/06, 15:15 |
| 11/09/06, 15:30 | 12/05/06, 13:45 |
| 12/05/06, 14:00 | 01/04/07, 14:30 |

East Cribbings, Zeke's Island:

| | |
|---|---|
| 12/20/05, 13:00 | 01/12/06, 09:00 |
| 01/12/06, 10:00 | 02/15/06, 11:00 |
| 02/15/06, 11:30 | 03/16/06, 10:00 |
| 03/16/06, 10:30 | 04/11/06, 08:00 |
| 04/11/06, 08:30 | 05/17/06, 10:00 |
| 05/17/06, 10:30 | 06/16/06, 11:00 |
| 06/16/06, 11:30 | 07/11/06, 10:00 |
| 07/11/06, 10:30 | 08/02/06, 14:30 |
| 08/02/06, 15:00 | 08/21/06, 09:00 |
| 08/21/06, 09:15 | 09/11/06, 12:45 |
| 09/11/06, 13:00 | 10/10/06, 12:30 |
| 10/10/06, 13:00 | 11/09/06, 12:45 |
| 11/09/06, 13:00 | 12/05/06, 10:15 |
| 12/05/06, 10:30 | 01/04/07, 10:45 |

Zeke's Basin, Zeke's Island:

| | |
|---|---|
| 12/20/05, 13:30 | 01/12/06, 10:00 |
| 01/12/06, 10:30 | 02/15/06, 11:30 |
| 02/15/06, 12:00 | 02/24/06, 16:30 |
| 03/16/06, 11:00 | 04/11/06, 08:30 |
| 04/11/06, 09:00 | 05/17/06, 10:30 |
| 05/17/06, 11:00 | 06/16/06, 11:30 |

| | |
|---|---|
| 06/16/06, 12:00 | 07/11/06, 09:30 |
| 07/11/06, 10:00 | 08/02/06, 15:00 |
| 08/02/06, 15:30 | 08/21/06, 09:00 |
| 08/21/06, 09:45 | 09/11/06, 13:00 |
| 09/11/06, 13:30 | 10/10/06, 12:45 |
| 10/10/06, 13:15 | 11/09/06, 13:00 |
| 11/09/06, 13:15 | 12/05/06, 10:30 |
| 12/05/06, 10:45 | 01/04/07, 11:00 |

7) Distribution:

NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from this NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

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

8) Associated Researchers and Projects:
As part of the SWMP core monitoring program, the North Carolina Reserve also collects weather data from a meteorological station located at the Research Creek monitoring site and water chemistry/nutrient data from all 4 of the water quality monitoring sites. These data may be correlated with the water quality data.

Additional research projects are ongoing and continually changing. Check with the Research Coordinator or other contact person for an updated list of research.

II. Physical Structure Descriptors

9) Sensor specifications:

YSI 6600 EDS models were utilized for all deployments. Each sonde is equipped with a non-vented depth probe and identical sensor models.

YSI 6600 EDS 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; 20-50 mg/L, +/- 6 % of the reading
Resolution: 0.0001 ft (0.001 m)

Parameter: Non-Vented Level- Shallow (Depth)
Units: feet or meters (ft or m)
Sensor Type: Stainless steel strain gauge
Range: 0 to 30 ft (9.1 m)
Accuracy: +/- 0.06 ft (0.018 m)
Resolution: 0.001 ft (0.001 m)

Parameter: pH
Units: units
Sensor Type: Glass combination electrode
Model #: 6561 EDS and 6561FG (flat glass)
Range: 0 to 14 units
Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Units: nephelometric turbidity units (NTU)
Sensor Type: Optical, 90°
Model #: 6136
Range: 0 to 1000 NTU
Accuracy: +/- 5% reading or 2 NTU (whichever is greater
Resolution: 0.1 NTU

Depth Qualifier: The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either depth or water level sensors. Both sensors measure water depth, but by convention, level sensors refer to atmospherically vented measurements and depth refers to non-vented measurements. 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. Beginning in 2006, NERR SWMP standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg). To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in the SWMP calibration sheet or Digital Calibration Log. This offset procedure standardizes each depth calibration for the entire NERR System. If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR site can be corrected. The Research Coordinator at the specific NERR site should be contacted in order to obtain information regarding atmospheric pressure data availability.

10) Coded variable definitions:

| Sampling station: | Sampling site code: | Station code: |
|---|---|---|
| Research Creek | RC | nocrcwq |
| Loosin Creek | LC | noclcwq |
| East Cribbings | EC | nocecwq |
| Zeke's Basin | ZB | noczbwq |

11) Anomalous/Suspect Data:

This section lists and explains all anomalous (suspect) data that still remains in the data set. The data are generally extreme for the aquatic system being monitored. The cause of such anomalies may be a bad calibration, fouling of the sensors, boat traffic disturbances, malfunction of the instrument, or the measurements may be correct.

In general, large positive Turbidity spikes (>150 NTU, but < 1000) occurring for unknown reasons were retained. The high value may reflect the turbid conditions that occur during heavy rainfall and high wind events, when the probe is covered by sediment, or if fauna gets caught in the probe guard. In addition, slightly negative Turbidity values that were within range of the probe were also retained.

Dips in Sp. Cond. and Salinity data that were generally due to fouling drift between deployments or periods of heavy rainfall were retained.

Research Creek

Dissolved oxygen data (% and mg/l) exhibited declining values towards the end of the deployment from 12 January through 14 February possibly due to a puncture in the DO membrane. Post deployment calibration readings for dissolved oxygen were outside the acceptable range. Data were retained, but DO values from early February through 14 February at 13:30 are suspect.

Dissolved oxygen data (% and mg/l) were unusually low in late July and the first few days of August. However, post deployment calibration readings were normal for the deployment ending 4 August. Data were retained but are considered suspect.

All parameters except depth collected from 7 November through 9 November at 14:30 should be considered suspect due to sediment trapped inside the probe guard.

The post deployment calibration value for Sp.Cond. was low (44.9 mS/cm) for 9 November through 5 December most likely due to fouling of the probe. Specific conductivity and salinity data for this deployment were retained.

Sp. Cond. and Salinity data are suspect for the 8/21/06 11:15 – 9/11/06 14:30 deployment. Post-cal readings appear normal, but readings are markedly lower than surrounding deployments. Lower readings could be partially attributed to rain received in late August/early September.

Turbidity data are suspect from 10/3/2006 00:00 – 10/10/2006 14:30. Readings are elevated, there was a dead carb in the probe guard and high readings may be a result of crab activity. Post-cal reading was fine.

In general, some deployments exhibited erratic pH data including strange dips or spikes in the values for unknown reasons (see comments in Section 15). Retained data are suspect.

Loosin Creek

Values for pH from 00:00 on 1 January through 11:30 on 11 April were elevated and unusually high compared to the rest of the year for unknown reasons. However, the post deployment calibration values for pH were normal. The probes used during these deployments were flat glass probes (see comments in section 15). Data were retained but are suspect.

Values for pH for the deployment beginning 14:00 on 17 May are suspect due to probe failure late in the deployment.

Sp. Cond. and Salinity data are suspect for the entire 9/11/06 15:30 – 10/10/06 15:15 deployment. Readings are markedly higher than surrounding deployments and post-cal reading was high at 54.11. It is possible that previous deployment readings were depressed due to late August / early September rains.

Elevated Turbidity data are suspect for the following dates and times:

5/6/2006 00:00 – 5/17/2006 13:30: Heavy fouling noted in field log.
7/18/2006 00:00 –8/4/2006 08:30: Fish and crabs inside probe guard, noted in field log.
9/6/2006 00:00 – 9/11/2006 15:15: Potential fouling or animal activity.
10/7/2006 00:00 – 10/10/2006 15:15: Heavy fouling noted in field log.

In general, some deployments exhibited erratic pH data including strange dips or spikes in the values for unknown reasons (see comments in Section 15). Retained data are suspect.

East Cribbings

Values for pH were elevated in several deployments and erratic pH measurements were documented in some cases. Below are the date and time ranges, with descriptions regarding reason for suspect and post deployment calibration findings. The probes used during these deployments were flat glass probes (see comments in section 15). All the following data were retained, but should be considered suspect:

02/15/06, 11:30 through 03/16/06, 10:00
pH elevated, post deployment calibration values were within acceptable range
03/16/06, 10:30 through 04/11/06, 08:00
pH elevated, post deployment calibration values were out of acceptable range
07/11/06, 10:30 through 08/02/06, 14:30
deployment calibration values were out of acceptable range
08/14/06, 09:30 through 08/28/06, 09:00
Erractic pH values, deployment calibration values were within acceptable range
08/28/06, 18:15 through 08/31/06, 22:15
pH elevated and erratic, data deleted following this time period. pH probe malfunction may have been due to other probe failures during this deployment. Post deployment calibration values were normal

The following data were considered suspect for Specific Conductivity, Salinity, Depth, and Dissolved Oxygen (% and mg/L). Reason for suspect is listed following data range. Data were retained but should be considered suspect.

04/28/06, 03:00 through 05/17/06, 10:00
Possible Sp. Cond. probe failure, during post deployment calibration probe was reading low in 50mS solution, technician wiggled the probe and reading jumped to acceptable range. After further discussion with Mike Lizotte at YSI, it is believed the cause of the Sp. Cond. dips is most likely interference from an object such as debris, an air bubble, or an organism due to the horizontal position of the probe during deployment.

06/04/06, 15:30 through 06/16/06, 11:00
Drift observed during end of deployment, post deployment calibration values were below acceptable range (41.97 mS)
06/16/06, 11:30 through 07/11/06, 10:00
Low values for entire deployment, post deployment calibration values were below acceptable range (46.29 mS)

Elevated Turbidity readings are suspect for the following dates and times:
5/6/2006 00:00 – 5/17/2006 10:00: Heavy fouling, tunicate attached to turbidity probe, and the wiper not parking properly noted in the field log.
6/30/2006 00:00 – 7/11/2006 10:00: Wiper not parking properly noted in field log.

Turbidity values from 02 August 15:00 through 21 August 09:00 are considered suspect due to possible contamination of the 123 NTU standard used during calibration.

The sonde experienced repeated out of water events from 13 August 20:30 through 21 August 09:00 most likely due to extreme low tides and all data that were retained for this deployment should be considered suspect.

There is a consistent problem with the position of the East Cribbings sonde. The sonde is located in a deep area between a sandbar and a bank. At high tide, it is difficult to tell if the sonde is positioned correctly and as a result, the sonde is sometimes positioned on the

incline from the sandbar, which accounts for the various depths depicted in the data and the graphs.

Zeke's Basin

DO data from several deployments should be considered suspect due to a puncture in the DO membrane discovered during post deployment calibration. It is unknown when the punctures occurred. Data were retained but considered suspect for the following dates and times:
02/15/06 12:00 – 02/24/06 16:30 probe failure later in the deployment
06/11/06 13:30 – 06/16/06 11:30 values could be a result of rain associated with Tropical Depression Alberto that passed over South Carolina during this time period; post deployment calibration value normal
06/25/06 12:00 – 07/11/06 09:30 low post deployment calibration value
11/06/06 04:30 – 11/09/06 13:15 low post deployment calibration value

Data from 10:30 to 15:30 on 05 August should be considered suspect for dissolved oxygen (% and mg/L). The readings were unusually high, and the cause(s) of these peaks are unknown though it is speculated that low total depth and windy conditions may be factors contributing to super saturated conditions.

During several instances, the depth sensor recorded negative values while other parameters indicated that the sonde was submerged in the water. All data were retained, but should be considered suspect. The instances were:
01/01/06 05:00 – 06:00
01/03/06 06:30 – 08:00
01/05/06 20:30 – 21:00
01/06/06 09:30
01/12/06 03:00
01/13/06 04:00 and 16:30 – 17:00
01/14/06 03:00 – 04:00 and 17:00 – 18:00
01/15/06 03:30 – 06:30
01/23/06 23:00 – 23:30
01/24/06 23:30 – 01/25/06 00:30
01/30/06 05:00 – 05:30 and 17:30 – 18:00
01/31/06 05:30 – 06:00
02/12/06 04:00

Turbidity data from 15:30 August 02 through 09:00 August 21 were considered suspect due to possible contamination of the 123 NTU standard used during calibration.

Specific dips in Sp. Cond and Salinity data (likely due to fouling between deployments or periods of heavy rainfall) that were retained but considered suspect include the following dates and times:
01/31/06 06:00
04/17/06 19:30

08/03/06 17:00

There were several out of water events for Zeke's Basin during 2006. The data retained following these out of water events should be considered suspect for all parameters. These data were:
08/20/06 03:30 – 08/21/06 09:00
09/11/06 20:15 – 10/10/06 12:45

12) Deleted Data:

Research Creek

Data for pH were deleted from 16 April at 17:30 through 17 May at 15:00 due to probe failure during deployment.

Dissolved oxygen data (% and mg/l) were deleted from 1:00 on 8 November through 14:30 on 9 November due to sediment trapped inside the probe guard that caused a significant drop in the values.

Negative turbidity data were deleted for the following dates and times as they were out of sensor range:
1/1/2006 00:00 through 1/2/2006 18:00
4/27/2006 04:30 through 5/6/2006 07:30
6/18/2006 18:30 through 6/27/06 12:00

Turbidity data greater than or equal to 1000 were deleted for the following dates and times as they were out of sensor range:

| Date | Time | |
|---|---|---|
| 04/13/2006 | 20:30 | |
| 04/24/2006 | 23:30 | |
| 04/26/2006 | 15:30 | |
| 05/12/2006 | 15:30 | |
| 05/14/2006 | 18:00 | |
| 05/14/2006 | 20:00 | |
| 05/15/2006 | 01:00 | through 02:00 |
| 05/15/2006 | 03:30 | |
| 05/15/2006 | 04:00 | |
| 05/15/2006 | 05:30 | |
| 05/15/2006 | 07:00 | |
| 05/15/2006 | 08:30 | |
| 05/15/2006 | 10:00 | |
| 05/15/2006 | 10:30 | |
| 05/15/2006 | 11:30 | |
| 05/15/2006 | 12:00 | |
| 05/15/2006 | 13:00 | |
| 05/15/2006 | 13:30 | |
| 05/15/2006 | 14:30 | |

| | | |
|---|---|---|
| 05/15/2006 | 16:00 | |
| 05/15/2006 | 16:30 | |
| 05/15/2006 | 17:30 | |
| 05/15/2006 | 18:00 | |
| 05/15/2006 | 19:00 | |
| 05/15/2006 | 20:30 | |
| 05/15/2006 | 21:00 | |
| 05/15/2006 | 22:00 | |
| 05/15/2006 | 22:30 | |
| 05/15/2006 | 23:30 | |
| 05/16/2006 | 00:00 | |
| 05/16/2006 | 01:00 | |
| 05/16/2006 | 01:30 | |
| 05/16/2006 | 02:30 | |
| 05/16/2006 | 04:00 | |
| 05/16/2006 | 05:30 | |
| 05/16/2006 | 06:00 | |
| 05/16/2006 | 07:00 | |
| 05/16/2006 | 07:30 | |
| 05/16/2006 | 08:30 | |
| 05/16/2006 | 09:00 | |
| 05/16/2006 | 10:00 | |
| 05/16/2006 | 10:30 | |
| 05/16/2006 | 11:30 | |
| 05/16/2006 | 12:00 | |
| 05/16/2006 | 13:00 | |
| 05/16/2006 | 14:30 | |
| 05/16/2006 | 16:00 | |
| 05/16/2006 | 17:30 | |
| 05/16/2006 | 19:00 | |
| 05/16/2006 | 19:30 | |
| 05/16/2006 | 20:30 | |
| 05/16/2006 | 21:00 | |
| 05/16/2006 | 22:00 | |
| 05/16/2006 | 22:30 | |
| 05/16/2006 | 23:30 | |
| 05/17/2006 | 00:00 | through 01:30 |
| 05/17/2006 | 02:30 | |
| 05/17/2006 | 04:00 | |
| 05/17/2006 | 05:30 | |
| 05/17/2006 | 06:00 | |
| 05/17/2006 | 07:00 | |
| 05/17/2006 | 08:30 | |
| 05/17/2006 | 09:00 | |
| 05/17/2006 | 10:00 | |
| 05/17/2006 | 10:30 | |
| 05/17/2006 | 11:30 | |
| 05/17/2006 | 12:00 | |
| 05/17/2006 | 13:00 | |
| 05/17/2006 | 13:30 | |

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|---|---|
| 05/17/2006 | 14:30 |
| 05/17/2006 | 15:00 |
| 06/26/2006 | 22:30 |
| 06/26/2006 | 23:00 |
| 06/27/2006 | 12:30 |
| 07/03/2006 | 08:00 |
| 07/03/2006 | 10:30 |
| 07/04/2006 | 00:30 |
| 07/04/2006 | 14:30 |
| 07/04/2006 | 20:30 |
| 07/04/2006 | 21:00 |
| 07/04/2006 | 22:30 |
| 07/13/2006 | 21:30 |
| 07/14/2006 | 15:30 |
| 07/22/2006 | 19:30 |
| 07/29/2006 | 05:00 |
| 07/29/2006 | 07:00 |
| 07/29/2006 | 08:00 |
| 07/29/2006 | 09:00 |
| 07/29/2006 | 17:00 |
| 07/29/2006 | 18:30 |
| 07/29/2006 | 19:00 |
| 07/29/2006 | 22:00 |
| 08/02/2006 | 06:00 |
| 08/02/2006 | 08:00 |
| 08/02/2006 | 18:00 |
| 08/02/2006 | 21:30 |
| 08/02/2006 | 23:00 |
| 08/03/2006 | 00:00 |
| 08/03/2006 | 01:00 |
| 08/03/2006 | 03:30 |
| 08/03/2006 | 06:30 |
| 08/03/2006 | 11:30 |
| 08/03/2006 | 14:00 |
| 08/03/2006 | 17:30 |
| 08/03/2006 | 19:00 |
| 08/03/2006 | 21:30 |
| 08/03/2006 | 22:00 |
| 08/03/2006 | 23:00 |
| 08/04/2006 | 01:30 |
| 08/04/2006 | 02:00 |
| 08/04/2006 | 06:30 |
| 08/04/2006 | 07:00 |
| 08/11/2006 | 13:00 |
| 08/13/2006 | 04:00 |
| 08/20/2006 | 18:45 |
| 08/21/2006 | 08:00 |
| 08/21/2006 | 09:00 |
| 08/22/2006 | 14:45 |
| 09/19/2006 | 18:00 |

| | | |
|---|---|---|
| 10/03/2006 | 23:00 | |
| 10/04/2006 | 06:00 | |
| 10/04/2006 | 07:00 | |
| 10/04/2006 | 08:45 | |
| 10/04/2006 | 11:00 | |
| 10/04/2006 | 12:45 | |
| 10/04/2006 | 14:30 | |
| 10/04/2006 | 16:15 | |
| 10/04/2006 | 16:45 | |
| 10/04/2006 | 18:00 | |
| 10/04/2006 | 18:15 | |
| 10/04/2006 | 20:15 | |
| 10/04/2006 | 23:00 | |
| 10/05/2006 | 00:45 | |
| 10/05/2006 | 01:00 | |
| 10/05/2006 | 01:15 | |
| 10/05/2006 | 03:00 | |
| 10/05/2006 | 03:15 | |
| 10/05/2006 | 04:30 | through 05:00 |
| 10/05/2006 | 08:45 | |
| 10/05/2006 | 11:30 | |
| 10/05/2006 | 12:15 | |
| 10/05/2006 | 14:30 | |
| 10/05/2006 | 17:00 | |
| 10/05/2006 | 17:45 | |
| 10/05/2006 | 18:15 | |
| 10/05/2006 | 19:00 | |
| 10/05/2006 | 19:45 | |
| 10/05/2006 | 21:30 | |
| 10/06/2006 | 12:30 | |
| 10/06/2006 | 12:45 | |
| 10/06/2006 | 14:30 | |
| 10/06/2006 | 16:15 | |
| 10/06/2006 | 16:30 | |
| 10/06/2006 | 17:45 | |
| 10/06/2006 | 18:00 | |
| 10/06/2006 | 19:15 | |
| 10/06/2006 | 19:30 | |
| 10/06/2006 | 20:45 | |
| 10/06/2006 | 21:15 | |
| 10/06/2006 | 23:15 | |
| 10/07/2006 | 01:00 | |
| 10/07/2006 | 01:30 | |
| 10/07/2006 | 02:45 | |
| 10/07/2006 | 03:00 | |
| 10/07/2006 | 04:00 | through 04:30 |
| 10/07/2006 | 05:45 | |
| 10/07/2006 | 06:00 | |
| 10/07/2006 | 07:00 | through 07:45 |
| 10/07/2006 | 09:15 | through 09:45 |

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|---|---|---|
| 10/07/2006 | 11:45 | |
| 10/07/2006 | 12:00 | |
| 10/07/2006 | 14:45 | |
| 10/07/2006 | 15:00 | |
| 10/07/2006 | 16:00 | |
| 10/07/2006 | 16:45 | |
| 10/07/2006 | 17:45 | |
| 10/07/2006 | 19:15 | |
| 10/07/2006 | 22:30 | |
| 10/07/2006 | 23:15 | |
| 10/07/2006 | 23:30 | |
| 10/08/2006 | 00:00 | through 00:30 |
| 10/08/2006 | 03:15 | |
| 10/08/2006 | 05:15 | |
| 10/08/2006 | 08:45 | |
| 10/08/2006 | 09:30 | |
| 10/08/2006 | 10:15 | |
| 10/08/2006 | 15:00 | through 15:30 |
| 10/08/2006 | 16:45 | |
| 10/08/2006 | 18:00 | through 18:45 |
| 10/08/2006 | 19:30 | |
| 10/08/2006 | 20:00 | |
| 10/08/2006 | 21:30 | |
| 10/08/2006 | 22:00 | |
| 10/08/2006 | 23:00 | through 23:30 |
| 10/09/2006 | 00:15 | |
| 10/09/2006 | 10:30 | |
| 10/10/2006 | 06:30 | |
| 10/30/2006 | 14:45 | |
| 11/04/2006 | 08:30 | |
| 11/04/2006 | 08:45 | |
| 11/06/2006 | 16:30 | |
| 11/06/2006 | 16:45 | |
| 11/07/2006 | 08:15 | |
| 11/07/2006 | 13:00 | |
| 11/07/2006 | 18:30 | |
| 11/08/2006 | 00:00 | |
| 11/08/2006 | 04:00 | |
| 11/08/2006 | 07:45 | |
| 11/08/2006 | 08:30 | |
| 11/08/2006 | 09:15 | |
| 11/08/2006 | 13:45 | |
| 11/21/2006 | 18:00 | |

Loosin Creek

Values for pH were deleted from 16:00 on 25 May through 10:30 on 26 May due to probe failure during deployment.

Turbidity data greater than or equal to 1000 were deleted for the following dates and times as they were out of sensor range:

| Date | Time |
|---|---|
| 02/06/2006 | 13:00 |
| 03/09/2006 | 22:00 |
| 03/10/2006 | 03:30 |
| 03/10/2006 | 11:00 |
| 03/10/2006 | 16:30 |
| 03/11/2006 | 15:00 |
| 03/11/2006 | 16:30 |
| 03/12/2006 | 01:30 |
| 03/12/2006 | 06:30 |
| 03/13/2006 | 10:00 |
| 03/14/2006 | 05:30 |
| 03/16/2006 | 06:00 |
| 05/05/2006 | 16:30 |
| 05/05/2006 | 18:30 |
| 05/05/2006 | 20:00 |
| 05/06/2006 | 00:00 |
| 05/06/2006 | 01:30 |
| 05/06/2006 | 03:00 |
| 05/06/2006 | 11:30 |
| 05/06/2006 | 20:00 |
| 05/07/2006 | 01:30 |
| 05/07/2006 | 03:00 |
| 05/07/2006 | 04:30 |
| 05/07/2006 | 06:00 |
| 05/07/2006 | 14:30 |
| 05/07/2006 | 16:00 |
| 05/07/2006 | 17:30 |
| 05/07/2006 | 19:00 |
| 05/07/2006 | 20:30 |
| 05/07/2006 | 22:00 |
| 05/08/2006 | 04:00 |
| 05/08/2006 | 05:30 |
| 05/08/2006 | 07:00 |
| 05/08/2006 | 08:30 |
| 05/08/2006 | 10:00 |
| 05/08/2006 | 11:30 |
| 05/08/2006 | 17:30 |
| 05/08/2006 | 19:00 |
| 05/08/2006 | 20:30 |
| 05/08/2006 | 22:00 |
| 05/08/2006 | 23:30 |
| 05/09/2006 | 01:00 |
| 05/09/2006 | 02:30 |
| 05/09/2006 | 04:00 |
| 05/09/2006 | 06:30 |
| 05/09/2006 | 10:00 |
| 05/09/2006 | 13:00 |

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|---|---|---|
| 05/11/2006 | 10:00 | |
| 05/11/2006 | 11:30 | |
| 05/11/2006 | 12:30 | |
| 05/11/2006 | 19:30 | |
| 05/12/2006 | 00:30 | |
| 05/12/2006 | 01:30 | |
| 05/12/2006 | 02:00 | |
| 05/12/2006 | 03:00 | |
| 05/12/2006 | 03:30 | |
| 05/12/2006 | 05:00 | |
| 05/12/2006 | 06:30 | |
| 05/12/2006 | 07:30 | |
| 05/12/2006 | 10:30 | |
| 05/12/2006 | 11:00 | |
| 05/12/2006 | 12:30 | |
| 05/12/2006 | 14:30 | |
| 05/12/2006 | 15:00 | |
| 05/12/2006 | 17:30 | |
| 05/12/2006 | 19:30 | |
| 05/12/2006 | 20:30 | |
| 05/12/2006 | 22:00 | |
| 05/12/2006 | 23:30 | |
| 05/13/2006 | 02:30 | |
| 05/13/2006 | 03:00 | |
| 05/13/2006 | 07:00 | |
| 05/13/2006 | 08:30 | |
| 05/13/2006 | 10:00 | |
| 05/13/2006 | 10:30 | |
| 05/13/2006 | 12:00 | |
| 05/13/2006 | 14:30 | |
| 05/13/2006 | 16:00 | |
| 05/13/2006 | 17:30 | |
| 05/13/2006 | 19:00 | |
| 05/13/2006 | 20:30 | |
| 05/13/2006 | 21:00 | |
| 05/13/2006 | 22:00 | through 23:30 |
| 05/14/2006 | 00:00 | |
| 05/14/2006 | 01:00 | |
| 05/14/2006 | 02:30 | |
| 05/14/2006 | 04:00 | |
| 05/14/2006 | 04:30 | |
| 05/14/2006 | 05:30 | |
| 05/14/2006 | 07:00 | |
| 05/14/2006 | 08:30 | |
| 05/14/2006 | 09:00 | |
| 05/14/2006 | 10:00 | |
| 05/14/2006 | 10:30 | |
| 05/14/2006 | 11:30 | |
| 05/14/2006 | 13:00 | |
| 05/14/2006 | 13:30 | |

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|---|---|
| 05/14/2006 | 14:30 |
| 05/14/2006 | 15:00 |
| 05/14/2006 | 16:00 |
| 05/14/2006 | 16:30 |
| 05/14/2006 | 17:30 |
| 05/14/2006 | 19:00 |
| 05/14/2006 | 20:30 |
| 05/14/2006 | 22:00 |
| 05/14/2006 | 23:30 |
| 05/15/2006 | 00:00 |
| 05/15/2006 | 01:00 |
| 05/15/2006 | 02:30 |
| 05/15/2006 | 04:00 |
| 05/15/2006 | 05:30 |
| 05/15/2006 | 07:00 |
| 05/15/2006 | 08:30 |
| 05/15/2006 | 10:00 |
| 05/15/2006 | 10:30 |
| 05/15/2006 | 11:30 |
| 05/15/2006 | 12:00 |
| 05/15/2006 | 13:00 |
| 05/15/2006 | 14:30 |
| 05/15/2006 | 16:30 |
| 05/15/2006 | 17:30 |
| 05/15/2006 | 19:00 |
| 05/15/2006 | 19:30 |
| 05/15/2006 | 20:30 |
| 05/15/2006 | 21:00 |
| 05/15/2006 | 22:00 |
| 05/15/2006 | 22:30 |
| 05/15/2006 | 23:30 |
| 05/16/2006 | 00:00 |
| 05/16/2006 | 01:00 |
| 05/16/2006 | 01:30 |
| 05/16/2006 | 02:30 |
| 05/16/2006 | 03:00 |
| 05/16/2006 | 04:00 |
| 05/16/2006 | 04:30 |
| 05/16/2006 | 05:30 |
| 05/16/2006 | 06:00 |
| 05/16/2006 | 07:00 |
| 05/16/2006 | 07:30 |
| 05/16/2006 | 08:30 |
| 05/16/2006 | 09:00 |
| 05/16/2006 | 10:00 |
| 05/16/2006 | 10:30 |
| 05/16/2006 | 11:30 |
| 05/16/2006 | 12:00 |
| 05/16/2006 | 13:00 |
| 05/16/2006 | 14:00 |

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|---|---|---|
| 05/16/2006 | 14:30 | |
| 05/16/2006 | 15:30 | |
| 05/16/2006 | 16:00 | |
| 05/16/2006 | 17:00 | |
| 05/16/2006 | 17:30 | |
| 05/16/2006 | 18:30 | |
| 05/16/2006 | 19:00 | |
| 05/16/2006 | 20:00 | |
| 05/16/2006 | 20:30 | |
| 05/16/2006 | 21:30 | |
| 05/16/2006 | 22:00 | |
| 05/16/2006 | 23:00 | |
| 05/16/2006 | 23:30 | |
| 05/17/2006 | 00:30 | |
| 05/17/2006 | 01:00 | |
| 05/17/2006 | 02:00 | |
| 05/17/2006 | 02:30 | |
| 05/17/2006 | 03:30 | |
| 05/17/2006 | 04:00 | |
| 05/17/2006 | 05:30 | |
| 05/17/2006 | 06:00 | |
| 05/17/2006 | 07:30 | |
| 05/17/2006 | 09:00 | |
| 05/17/2006 | 10:30 | |
| 05/17/2006 | 12:00 | |
| 05/17/2006 | 13:30 | |
| 06/27/2006 | 12:30 | |
| 09/05/2006 | 14:45 | |
| 09/10/2006 | 06:30 | |
| 09/10/2006 | 21:00 | |
| 09/10/2006 | 22:45 | |
| 09/10/2006 | 23:30 | |
| 09/11/2006 | 00:15 | |
| 09/11/2006 | 01:00 | |
| 09/11/2006 | 01:45 | |
| 09/11/2006 | 02:15 | |
| 09/11/2006 | 14:30 | |
| 10/03/2006 | 03:15 | |
| 10/07/2006 | 17:00 | |
| 10/07/2006 | 21:15 | |
| 10/07/2006 | 21:30 | |
| 10/08/2006 | 02:00 | |
| 10/08/2006 | 02:30 | |
| 10/08/2006 | 03:00 | through 03:30 |
| 10/09/2006 | 01:00 | |
| 10/09/2006 | 07:45 | through 10:45 |
| 10/09/2006 | 12:00 | through 12:45 |
| 10/09/2006 | 14:45 | |
| 10/09/2006 | 15:45 | through 16:45 |
| 10/09/2006 | 17:45 | |

| | | |
|---|---|---|
| 10/09/2006 | 18:00 | |
| 10/09/2006 | 18:30 | |
| 10/09/2006 | 19:00 | |
| 10/09/2006 | 19:15 | |
| 10/09/2006 | 19:30 | |
| 10/09/2006 | 20:15 | |
| 10/09/2006 | 20:30 | |
| 10/09/2006 | 21:15 | |
| 10/09/2006 | 21:45 | |
| 10/09/2006 | 22:00 | through 22:30 |
| 10/09/2006 | 23:15 | |
| 10/09/2006 | 23:30 | |
| 10/10/2006 | 00:15 | |
| 10/10/2006 | 01:30 | |
| 10/10/2006 | 02:30 | |
| 10/10/2006 | 03:15 | |
| 10/10/2006 | 03:30 | |
| 10/10/2006 | 04:00 | |
| 10/10/2006 | 04:15 | |
| 10/10/2006 | 05:15 | |
| 10/10/2006 | 05:30 | |
| 10/10/2006 | 06:30 | |
| 10/10/2006 | 06:45 | |
| 10/10/2006 | 08:00 | |
| 10/10/2006 | 09:00 | |
| 10/10/2006 | 10:00 | |
| 10/10/2006 | 11:00 | |
| 10/10/2006 | 11:15 | |
| 10/10/2006 | 13:15 | |
| 10/10/2006 | 14:00 | |
| 10/10/2006 | 14:15 | |
| 10/10/2006 | 15:00 | |
| 10/10/2006 | 15:15 | |
| 11/01/2006 | 11:15 | |
| 11/01/2006 | 18:00 | |
| 12/02/2006 | 08:15 | |
| 12/02/2006 | 08:30 | |
| 12/04/2006 | 03:15 | |
| 12/04/2006 | 03:30 | |
| 12/04/2006 | 04:30 | |
| 12/04/2006 | 05:00 | |

East Cribbings

The pH data from 01/01/06, 00:00 to 01/12/06, 09:00 were deleted due to a pH probe failure.

For the following dates and times all parameters were deleted due to the sonde being out of the water:
04/24/06 12:30

08/13/06 17:30 – 20:00
08/14/06 05:30 – 09:00 and 18:30 – 21:00
08/15/06 06:00 – 09:30 and 19:30 – 22:00
08/16/06 07:00 – 10:30 and 20:30 – 23:00
08/17/06 08:00 – 11:30 and 22:00 – 8/18/06 0:00
08/18/06 09:00 – 12:30 and 23:00 – 8/19/06 01:00
08/19/06 10:00 – 13:30
08/20/06 00:00 – 02:00 and 11:30 – 14:00
08/21/06 01:30 – 03:00

Turbidity data were removed from 18:15 on 28 August through 12:45 on 11 September due to a crack in the turbidity probe. The crack in the turbidity probe may have affected all other parameters except temperature and are described below.

Dissolved Oxygen data (% and mg/L) were removed from 19:15 on 08/28/06 through 12:45 on 09/11/06 due to a DO probe failure, possibly due to Turbidity probe failure.

The following data was deleted for pH, Sp. Cond., Salinity and Depth due to erratic and low measurements, possibly probe failures resulting from the Turbidity probe failure:
08/31/06 22:30 – 09/11/06 12:45

Turbidity data greater than or equal to 1000 were deleted for the following dates and times as they were out of sensor range:

| | | |
|---|---|---|
| 02/01/2006 | 11:00 | |
| 05/05/2006 | 22:00 | |
| 05/05/2006 | 22:30 | |
| 05/06/2006 | 09:00 | through 10:30 |
| 05/06/2006 | 12:30 | |
| 05/06/2006 | 14:00 | |
| 05/06/2006 | 14:30 | |
| 05/06/2006 | 16:30 | |
| 05/06/2006 | 17:00 | |
| 05/06/2006 | 19:00 | |
| 05/06/2006 | 19:30 | |
| 05/06/2006 | 21:00 | |
| 05/06/2006 | 21:30 | |
| 05/06/2006 | 23:30 | |
| 05/07/2006 | 00:00 | |
| 05/07/2006 | 00:30 | |
| 05/07/2006 | 02:00 | |
| 05/07/2006 | 02:30 | |
| 05/07/2006 | 04:00 | through 05:00 |
| 05/07/2006 | 06:30 | |
| 05/07/2006 | 07:00 | |
| 05/07/2006 | 09:00 | |
| 05/07/2006 | 11:00 | through 12:00 |
| 05/07/2006 | 13:30 | through 14:30 |
| 05/07/2006 | 16:00 | through 17:30 |

| | | |
|---|---|---|
| 05/07/2006 | 18:30 | through 19:30 |
| 05/07/2006 | 21:00 | through 22:00 |
| 05/07/2006 | 23:30 | |
| 05/08/2006 | 00:00 | |
| 05/08/2006 | 01:30 | |
| 05/08/2006 | 02:00 | through 03:00 |
| 05/08/2006 | 04:30 | through 05:30 |
| 05/08/2006 | 07:30 | through 08:30 |
| 05/08/2006 | 10:00 | through 12:00 |
| 05/08/2006 | 13:00 | through 14:30 |
| 05/08/2006 | 15:30 | through 16:30 |
| 05/08/2006 | 17:30 | |
| 05/08/2006 | 18:30 | |
| 05/08/2006 | 19:00 | |
| 05/08/2006 | 20:30 | through 22:00 |
| 05/09/2006 | 00:00 | |
| 05/09/2006 | 00:30 | |
| 05/09/2006 | 02:30 | |
| 05/09/2006 | 03:00 | |
| 05/09/2006 | 05:00 | |
| 05/09/2006 | 05:30 | |
| 05/09/2006 | 07:30 | |
| 05/09/2006 | 08:00 | |
| 05/09/2006 | 08:30 | |
| 05/09/2006 | 10:00 | through 11:00 |
| 05/09/2006 | 12:30 | through 13:30 |
| 05/09/2006 | 15:30 | |
| 05/09/2006 | 16:00 | |
| 05/09/2006 | 18:00 | through 19:00 |
| 05/09/2006 | 20:30 | |
| 05/09/2006 | 21:00 | through 22:00 |
| 05/09/2006 | 23:30 | |
| 05/10/2006 | 00:00 | |
| 05/10/2006 | 00:30 | |
| 05/10/2006 | 01:30 | |
| 05/10/2006 | 02:30 | through 03:30 |
| 05/10/2006 | 05:30 | through 06:30 |
| 05/10/2006 | 08:00 | through 09:30 |
| 05/10/2006 | 10:30 | through 11:30 |
| 05/10/2006 | 13:30 | through 14:30 |
| 05/10/2006 | 15:30 | through 17:00 |
| 05/10/2006 | 18:30 | through 19:30 |
| 05/10/2006 | 21:30 | through 22:30 |
| 05/11/2006 | 00:30 | through 01:30 |
| 05/11/2006 | 02:30 | through 04:00 |
| 05/11/2006 | 06:00 | through 07:00 |
| 05/11/2006 | 09:00 | through 12:30 |
| 05/11/2006 | 14:00 | through 16:00 |
| 05/11/2006 | 17:00 | |
| 05/11/2006 | 17:30 | |

| | | |
|---|---|---|
| 05/11/2006 | 19:00 | through 20:30 |
| 05/11/2006 | 21:30 | |
| 05/11/2006 | 22:00 | |
| 05/11/2006 | 23:00 | |
| 05/12/2006 | 01:00 | through 02:00 |
| 05/12/2006 | 03:00 | through 04:30 |
| 05/12/2006 | 06:00 | |
| 05/12/2006 | 06:30 | |
| 05/12/2006 | 08:30 | |
| 05/12/2006 | 09:00 | |
| 05/12/2006 | 10:30 | through 12:00 |
| 05/12/2006 | 14:00 | |
| 05/12/2006 | 14:30 | |
| 05/12/2006 | 16:00 | through 17:00 |
| 05/12/2006 | 19:00 | through 20:00 |
| 05/12/2006 | 21:00 | through 22:30 |
| 05/12/2006 | 23:30 | |
| 05/13/2006 | 00:00 | through 01:00 |
| 05/13/2006 | 02:30 | |
| 05/13/2006 | 03:30 | |
| 05/13/2006 | 05:30 | through 06:30 |
| 05/13/2006 | 08:30 | through 09:30 |
| 05/13/2006 | 11:00 | through 12:00 |
| 05/13/2006 | 13:30 | through 15:30 |
| 05/13/2006 | 16:30 | through 18:00 |
| 05/13/2006 | 19:30 | through 23:00 |
| 05/14/2006 | 01:00 | through 02:00 |
| 05/14/2006 | 04:00 | through 05:00 |
| 05/14/2006 | 06:30 | through 07:30 |
| 05/14/2006 | 09:00 | through 10:00 |
| 05/14/2006 | 11:30 | through 15:00 |
| 05/14/2006 | 16:30 | through 18:30 |
| 05/14/2006 | 19:30 | |
| 05/14/2006 | 20:30 | |
| 05/14/2006 | 21:30 | through 23:30 |
| 05/15/2006 | 00:00 | through 09:00 |
| 05/15/2006 | 10:00 | |
| 05/15/2006 | 10:30 | |
| 05/15/2006 | 13:00 | |
| 05/15/2006 | 13:30 | |
| 05/15/2006 | 14:30 | |
| 05/15/2006 | 15:30 | |
| 05/15/2006 | 16:00 | |
| 05/15/2006 | 16:30 | |
| 05/15/2006 | 18:00 | through 19:30 |
| 05/15/2006 | 20:30 | through 22:30 |
| 05/15/2006 | 23:30 | |
| 05/16/2006 | 00:00 | through 01:00 |
| 05/16/2006 | 02:30 | through 04:00 |
| 05/16/2006 | 05:00 | through 09:30 |

| | | |
|---|---|---|
| 05/16/2006 | 10:30 | through 12:30 |
| 05/16/2006 | 13:30 | through 15:30 |
| 05/16/2006 | 16:30 | through 18:00 |
| 05/16/2006 | 19:30 | |
| 05/16/2006 | 20:00 | |
| 05/16/2006 | 20:30 | |
| 05/16/2006 | 22:30 | |
| 05/16/2006 | 23:00 | |
| 05/17/2006 | 00:30 | through 01:30 |
| 05/17/2006 | 03:30 | through 04:30 |
| 05/17/2006 | 06:00 | through 07:00 |
| 05/17/2006 | 08:30 | through 09:30 |
| 06/16/2006 | 00:30 | |
| 06/16/2006 | 04:00 | |
| 06/16/2006 | 07:00 | |
| 06/28/2006 | 06:00 | |
| 07/01/2006 | 03:30 | through 08:00 |
| 07/01/2006 | 09:00 | through 16:00 |
| 07/01/2006 | 17:00 | |
| 07/01/2006 | 19:30 | through 20:30 |
| 07/01/2006 | 22:00 | |
| 07/02/2006 | 01:00 | |
| 07/02/2006 | 02:00 | |
| 07/02/2006 | 02:30 | |
| 07/02/2006 | 04:00 | |
| 07/02/2006 | 06:30 | |
| 07/02/2006 | 10:00 | |
| 07/03/2006 | 11:30 | |
| 07/03/2006 | 12:00 | |
| 07/03/2006 | 13:30 | |
| 07/03/2006 | 14:30 | |
| 07/04/2006 | 05:30 | |
| 07/06/2006 | 03:00 | |
| 07/06/2006 | 13:00 | |
| 07/07/2006 | 00:30 | |
| 07/07/2006 | 03:00 | |
| 07/07/2006 | 03:30 | |
| 07/07/2006 | 17:30 | |
| 07/07/2006 | 18:30 | |
| 07/08/2006 | 05:30 | |
| 07/08/2006 | 13:00 | through 14:00 |
| 07/08/2006 | 15:00 | |
| 07/08/2006 | 16:00 | through 17:00 |
| 07/08/2006 | 18:00 | |
| 07/08/2006 | 20:30 | |
| 07/08/2006 | 22:30 | |
| 07/10/2006 | 19:30 | |
| 07/19/2006 | 00:00 | |
| 07/19/2006 | 05:00 | |
| 08/20/2006 | 05:30 | |

| | | |
|---|---|---|
| 08/20/2006 | 17:00 | |
| 08/20/2006 | 20:00 | |
| 08/28/2006 | 16:45 | through 17:30 |
| 12/30/2006 | 16:45 | |

Zeke's Basin

There were several out of water events at Zeke's Basin during 2006. Data were deleted for all parameters for the following dates and times:
01/26/06 02:00
08/19/06 23:30 – 08/20/06 03:00
08/20/06 12:00 – 15:30
08/21/06 00:30 – 04:30
08/21/06 09:45 – 09/11/06 13:00
09/11/06 18:30 – 20:15
09/12/06 06:15 – 08:30 and 19:45 – 20:15
09/13/06 07:15 – 08:30
09/15/06 09:30 – 10:00
09/16/06 10:30 – 11:30
09/18/06 12:00 – 14:00
09/19/06 01:30 – 02:15 and 13:00 – 15:00
09/20/06 01:30 – 04:15 and 13:00 – 15:45

Turbidity data greater than or equal to 1000 were deleted for the following dates and times as they were out of sensor range:

| Date | Time | |
|---|---|---|
| 04/09/2006 | 17:30 | |
| 04/14/2006 | 08:00 | |
| 05/03/2006 | 01:30 | |
| 05/03/2006 | 02:00 | |
| 05/16/2006 | 01:00 | |
| 05/16/2006 | 01:30 | |
| 05/16/2006 | 08:30 | |
| 05/18/2006 | 15:00 | through 21:30 |
| 05/18/2006 | 23:00 | |
| 05/27/2006 | 20:00 | |
| 06/08/2006 | 07:30 | |
| 06/08/2006 | 08:30 | |
| 06/08/2006 | 23:30 | |
| 06/12/2006 | 17:00 | |
| 06/12/2006 | 23:30 | |
| 07/02/2006 | 07:30 | |
| 07/08/2006 | 16:30 | |
| 07/13/2006 | 22:00 | |
| 07/14/2006 | 22:30 | |
| 08/02/2006 | 03:00 | |
| 08/02/2006 | 04:00 | |
| 08/02/2006 | 04:30 | |
| 08/02/2006 | 07:30 | |

| | | |
|---|---|---|
| 08/02/2006 | 08:00 | |
| 08/02/2006 | 09:30 | |
| 08/15/2006 | 15:30 | |
| 10/28/2006 | 10:45 | |
| 10/28/2006 | 11:15 | through 11:45 |
| 10/28/2006 | 13:00 | through 13:30 |
| 10/28/2006 | 14:00 | |
| 11/07/2006 | 17:30 | |
| 11/07/2006 | 21:45 | |
| 11/12/2006 | 11:00 | |

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.

14) Post Deployment Information:

End of Deployment Post-calibration Readings in Standard Solutions prior to probe cleaning.
[Standards used: DO = 100%; pH = 7.00; Specific conductivity = 50.00 mS/cm; Turbidity = 0.0 NTU]

Site RC

Date; DO (%Sat.); pH 7; Specific Conductivity 50.00mS/cm; Turbidity 0NTU; Depth 0.000m

01/12/06; 102.0; 7.21; 51.37; 0.4; -0.081
02/14/06; 70.4; 7.16; 49.48; 0.4; 0.058
03/16/06; 101.2; 6.93; 51.35; 0.3; 0.002
04/11/06; 101.8; 7.09; 51.10; 5.0; 0.113
05/17/06; 97.4; 8.4; 50.55; 0.1; -0.040
06/18/06; 99.7; 7.36; 50.57; 0.2; 0.062
07/07/06; 100.7; 7.25; 48.4; 0.9; 0.043
08/04/06; 98.6; 6.77; 50.60; 1.7; 0.072
08/21/06; 103.9; 7.01; 48.90; 2.8; 0.020
08/28/06; 101.2; 7.32; 49.80; 0.0; 0.014
09/11/06; 100.6; 6.84; 49.82; 3.2; 0.087
10/10/06; 107.6; 6.86; 50.62; -0.2; -0.080
11/09/06; 99.9; 6.85; 47.93; -0.2; -0.090
12/05/06; 94.9; 6.93; 44.90; -0.6; 0.093
01/04/07; 92.6; 7.29; 48.87; 1.6; 0.069

Site LC

Date; DO (%Sat.); pH 7; Specific Conductivity 50.00; Turbidity 0; Depth 0.000m

01/12/06; 101.4; 7.09; 51.87; 0.2; -0.076
02/14/06; 102.5; 7.12; 47.00; 0.7; 0.020
03/16/06; 99.8; 7.20; 51.66; 0.2; 0.014
04/11/06; 101.5; 7.37; 51.47; 2.1; 0.098
05/17/06; 105.1; 7.19; 49.09; -0.1; -0.029
05/26/06; 99.0; 7.63; 49.50; -1.6; 0.040
06/18/06; 99.0; 7.15; 49.42; 0.9; 0.072
07/07/06; 101.8; 7.32; 49.12; -0.3; 0.054
08/04/06; 100.6; 7.03; 52.70; 0.5; 0.054
08/21/06; 101.5; 7.01; 45.00; 0.9; 0.027
09/11/06; 100.2; 6.99; 49.08; 1.8; 0.099
10/10/06; 100.0; 6.98; 54.11; 0.5; -0.075
11/09/06; 98.7; 7.09; 48.24; 0.3; -0.063
12/05/06; 102.9; 6.94; 52.90; 0.1; 0.117
01/04/07; 96.1; 6.99; 49.11; 0.1; 0.093

Site EC

Date; DO (%Sat.); pH 7; Specific Conductivity 50.00; Turbidity 0; Depth 0.000m

01/12/06; 100.2; 5.05; 49.73; -0.6; -0.087
02/15/06; 86.6; 7.16; 51.08; 0.2; 0.001
03/16/06; 103.2; 7.44, 50.86, 1.7; 0.119
04/11/06; 101.3; 7.01; 51.50; 0.9; -0.048
05/17/06; 100.1; 6.75; 41.97; 0.3; 0.084
06/16/06; 80.6; 7.04; 46.29; -1.0; 0.010
07/11/06; 102.4; 7.48; 50.60; 0.1; 0.047
08/02/06; 93.8; 6.81; 51.06; 0.3; 0.052
08/21/06; -50.0; 7.14; 53.27; -6.6; 0.095
09/11/06; 102.0; 6.96; 46.46; 1.9; -0.073
10/10/06; 96.6; 7.15; 49.05; 0.1; -0.007
11/09/06; 100.1; 6.79; 49.31; 0.4; 0.132
12/05/06; 108.6; 6.91; 49.16; 0.2; 0.089
01/04/07; 100.4; 7.13; 49.50; -0.1; 0.132

Site ZB

Date; DO (%Sat.); pH 7; Specific Conductivity 50.00; Turbidity 0; Depth 0.000m

01/12/06; 103.20; 7.04; 51.52; 0.0; -0.269
02/15/06; -99.9; 9.59; 50.78; -3.7; -0.104
03/16/06; 99.8; 7.44; 49.40; 2.1; 0.123

04/11/06; 100.2; 7.02; 51.02; 0.0; -0.045
05/17/06; 102.1; 7.10; 50.69; -0.2; 0.045
06/16/06; 77.3; 7.23; 50.19; 0.7; 0.036
07/11/06; 102.9; 7.10; 50.30; 0.3; 0.039
08/02/06; 109.1; 6.90; 49.64; 0.7; 0.036
08/21/06; 94.3; 6.70; 47.76; 1.2; 0.113
09/11/06; 106.8; 7.03; 50.21; 1.6; -0.272
10/10/06; 91.4; 6.99; 48.39; 0.2; -0.122
11/09/06; 108.7; 6.63; 49.02; 0.9; 0.308
12/05/06; 104.6; 7.29; 48.78; 0.2; 0.062
01/04/07; 209.1; 6.95; 49.10; -0.1; -0.006

15) Other remarks:

**On 10/02/2019 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.

Editing of data followed CDMO protocol. Data outside the range specifications of the instrument were rejected, except for Depth. Negative or zero Depth values were not rejected unless they corresponded to Specific Conductivity data indicating that the sonde was out of the water. Large positive Turbidity spikes (>150 NTU, but < 1000) occurring for unknown reasons were retained. The high value may reflect the turbid conditions that occur during heavy rainfall and high wind events, when the probe is covered by sediment, or if fauna gets caught in the probe guard cup.
In general, if no probe failure could be documented from the pre- and post-deployment calibration data, the data were retained but reported in the anomalous data section.

Whenever specific conductivity or salinity data (referred to as conductivity data) were suspect, consider DO data in mg/l and depth suspect as well, since specific conductivity is used to calculate depth and DO data in mg/l.

Tropical Storm Ernesto passed over the area on 31 August 2006.

An estimated 60,000 gallons of sewage spilled into Hewlett's creek due to a leaking sewer pipe on February 25, 2006. The pipe may have been leaking for months and the total amount of sewage spilled is unknown. Spills also occurred in July and November.

We experienced problems with the flat glass pH probe model 6561FG. We used this model probe for the majority of deployments throughout the year. For some deployments, the values recorded by this model probe seemed higher than values recorded by previous models. Sometimes, readings were erratic and strange dips in the values were recorded for unknown reasons. In addition, the lifespan of the probes seemed to be shorter than models we had used in the past.

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 delete these values in any way.

A Sutron Sat-Link2 transmitter was installed at Research Creek on 08/07/06 and transmits data to the NOAA GOES satellite, NESDIS ID # 3B032698. The transmissions are scheduled hourly and contain four (4) datasets reflecting fifteen minute data sampling intervals. The telemetry data is "Provisional" data and not the "Authentic" dataset used for long term monitoring and study. This data can be viewed by going to http://cdmo.baruch.sc.edu.

Fifteen minute data collection began on 08/04/06 at Research Creek and 08/21/06 at Loosin Creek, East Cribbings, and Zeke's Basin.

Sp. Cond. and Salinity data were unusually elevated occasionally during the months of July, August, September, and November at Research Creek. However, these higher values were also observed at a second Masonboro Island site, Loosin Creek, and were likely true events. The data were retained but are suspect.

Sp. Cond. and Salinity data were unusually elevated occasionally during the months of July through December at Loosin Creek. However, these higher values were also observed during many of the same time periods at a second Masonboro Island site, Research Creek, and were likely true events. The data were retained but are suspect.

During late November and early December 2006, East Cribbings and Zeke's Basin experienced a gradual decline in Salinity and Specific Conductivity. The lowest values recorded for this period for Salinity were 1.9 (on Dec 3) and 4.6 (on Dec 1) for East Cribbings and Zeke's Basin, respectively. Since this event occurred at both sites, it was probably a true event versus an effect of sonde drift or probe malfunction. Heavy rainfall occurred within the Cape Fear River Basin on several days during November 2006. For example, rainfall in the Raleigh/Durham, NC area was 2.40" on November 7, 1.48" on November 12, 2.38" on November 16, 1.24" on November 21, and 1.46" on November 22 (Source - Weather Underground Website: http://www.wunderground.com). Rainfall totals for November 2006 were 6.01" for Wilmington, and in excess of 8-9" for several inland areas. The extremely low values for Salinity may have been a result of increased river flow associated with heavy rainfall throughout the river basin.