

North Carolina (NOC) National Estuarine Research Reserve Water Quality Metadata  
January 1 – December 31, 2008  
Last Update: September 10, 2021

## I. Data Set & Research Descriptors

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### 2) Entry Verification:

Deployment data are uploaded from the YSI data logger to a Personal Computer (IBM compatible). Files are exported from EcoWatch in a comma-delimited format (.CDF) and uploaded to the CDMO where they undergo automated primary QAQC; automated depth/level corrections for changes in barometric pressure (cDepth or cLevel parameters); and become part of the CDMO's online provisional database. All pre- and post-deployment data are removed from the file prior to upload. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the Reserve for secondary QAQC where it is opened in Microsoft Excel and processed using the CDMO's NERRQAQC Excel macro. The macro inserts station codes, creates metadata worksheets for flagged data and summary statistics, and graphs the data for review. It allows the user to apply QAQC flags and codes to the data, remove any overlapping deployment data, append files, and export the resulting

data file for upload to the CDMO. Upload after secondary QAQC results in ingestion into the database as provisional plus data, recalculation of cDepth or cLevel parameters, and finally tertiary QAQC by the CDMO and assimilation into the CDMO's authoritative online database. Where deployment overlap occurs between files, the data produced by the newly calibrated sonde is generally accepted as being the most accurate. For more information on QAQC flags and codes, see Sections 11 and 12. Byron Toothman and Heather Wells, Research Associates, were responsible for data management during 2008.

### 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 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. 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 unless deploying the optical dissolved oxygen probes, which require membrane changes yearly.

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 with a buoy and cinder block.

Every 15 minutes 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 documented by post-calibration protocols. The water quality data are then uploaded, and sent to CDMO for primary QAQC, and the instrument is cleaned and calibrated as noted previously.

A Sutron Sat-Link2 transmitter was installed at the Research Creek station on mm/dd/yy and transmits data to the NOAA GOES satellite, NESDIS ID #3B032698. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The “real-time” telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation in the CDMO’s authoritative online database. Provisional and authoritative data are available at <http://cdmo.baruch.sc.edu>.

## 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.

### 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 2008

##### Deployment Date and Time / Retrieval Date and Time

##### Research Creek, Masonboro Island:

|          |       |        |       |
|----------|-------|--------|-------|
| 12/12/07 | 12:15 | 1/9/08 | 10:00 |
|----------|-------|--------|-------|

|          |       |          |       |
|----------|-------|----------|-------|
| 1/9/08   | 10:30 | 2/19/08  | 11:15 |
| 2/19/08  | 11:30 | 3/10/08  | 13:00 |
| 3/10/08  | 13:30 | 4/7/08   | 11:15 |
| 4/7/08   | 11:30 | 5/5/08   | 10:30 |
| 5/5/08   | 11:00 | 5/21/08  | 11:30 |
| 5/21/08  | 11:45 | 6/3/08   | 11:15 |
| 6/3/08   | 11:45 | 7/8/08   | 10:30 |
| 7/8/08   | 10:45 | 7/22/08  | 9:45  |
| 7/22/08  | 10:00 | 8/6/08   | 14:30 |
| 8/6/08   | 14:45 | 8/19/08  | 11:00 |
| 8/19/08  | 11:15 | 9/2/08   | 12:30 |
| 9/2/08   | 13:00 | 9/18/08  | 12:00 |
| 9/18/08  | 12:15 | 10/1/08  | 11:45 |
| 10/1/08  | 12:00 | 10/31/08 | 12:00 |
| 10/31/08 | 12:30 | 11/18/08 | 13:30 |
| 11/18/08 | 14:00 | 12/18/08 | 12:45 |
| 12/18/08 | 13:00 | 1/26/09  | 10:30 |

Loosin Creek, Masonboro Island:

|          |       |          |       |
|----------|-------|----------|-------|
| 12/12/07 | 12:45 | 1/8/08   | 12:25 |
| 1/8/08   | 12:30 | 2/19/08  | 11:45 |
| 2/19/08  | 12:00 | 3/10/08  | 13:45 |
| 3/10/08  | 14:00 | 4/7/08   | 11:15 |
| 4/7/08   | 11:30 | 5/5/08   | 11:00 |
| 5/5/08   | 11:30 | 5/21/08  | 11:15 |
| 5/21/08  | 11:30 | 6/4/08   | 9:30  |
| 6/4/08   | 9:45  | 7/8/08   | 11:00 |
| 7/8/08   | 11:15 | 7/22/08  | 9:15  |
| 7/22/08  | 9:30  | 8/6/08   | 14:45 |
| 8/6/08   | 15:15 | 8/19/08  | 12:00 |
| 8/19/08  | 12:15 | 9/2/08   | 13:00 |
| 9/2/08   | 13:15 | 9/18/08  | 12:15 |
| 9/18/08  | 12:30 | 10/1/08  | 12:00 |
| 10/1/08  | 12:15 | 10/31/08 | 12:30 |
| 10/31/08 | 12:45 | 11/18/08 | 14:00 |
| 11/18/08 | 14:30 | 12/18/08 | 13:30 |
| 12/18/08 | 13:45 | 1/26/09  | 10:45 |

East Cribbings, Zeke's Island:

|          |       |         |       |
|----------|-------|---------|-------|
| 12/12/07 | 10:30 | 1/8/08  | 10:00 |
| 1/8/08   | 10:30 | 2/19/08 | 9:00  |
| 2/19/08  | 9:15  | 3/10/08 | 9:45  |
| 3/10/08  | 10:15 | 4/7/08  | 9:30  |
| 4/7/08   | 9:45  | 5/5/08  | 8:30  |
| 5/5/08   | 8:45  | 5/21/08 | 9:15  |
| 5/21/08  | 9:30  | 6/3/08  | 9:15  |

|          |       |          |       |
|----------|-------|----------|-------|
| 6/3/08   | 9:30  | 7/7/08   | 13:00 |
| 7/7/08   | 13:15 | 7/22/08  | 11:00 |
| 7/22/08  | 11:15 | 8/6/08   | 12:15 |
| 8/6/08   | 11:30 | 8/20/08  | 10:00 |
| 8/20/08  | 10:15 | 9/2/08   | 11:00 |
| 9/2/08   | 11:15 | 9/18/08  | 10:15 |
| 9/18/08  | 10:30 | 10/1/08  | 10:00 |
| 10/1/08  | 10:15 | 10/31/08 | 9:45  |
| 10/31/08 | 10:00 | 11/17/08 | 13:00 |
| 11/17/08 | 13:15 | 12/17/08 | 13:00 |
| 12/17/08 | 13:15 | 1/12/09  | 13:00 |

Zeke's Basin, Zeke's Island:

|          |       |          |       |
|----------|-------|----------|-------|
| 12/12/07 | 10:45 | 1/8/08   | 10:45 |
| 1/8/08   | 11:00 | 2/19/08  | 9:30  |
| 2/19/08  | 9:45  | 3/10/08  | 10:15 |
| 3/10/08  | 10:30 | 4/7/08   | 9:45  |
| 4/7/08   | 10:00 | 5/5/08   | 9:00  |
| 5/5/08   | 9:15  | 5/21/08  | 9:30  |
| 5/21/08  | 9:45  | 6/3/08   | 10:15 |
| 6/3/08   | 10:30 | 7/7/08   | 12:30 |
| 7/7/08   | 12:45 | 7/22/08  | 12:00 |
| 7/22/08  | 12:15 | 8/6/08   | 12:30 |
| 8/6/08   | 12:45 | 8/20/08  | 10:15 |
| 8/20/08  | 10:30 | 9/2/08   | 10:45 |
| 9/2/08   | 11:00 | 9/18/08  | 10:30 |
| 9/18/08  | 10:45 | 10/1/08  | 10:15 |
| 10/1/08  | 10:30 | 10/31/08 | 10:00 |
| 10/31/08 | 10:15 | 11/17/08 | 13:15 |
| 11/17/08 | 13:30 | 12/17/08 | 13:00 |
| 12/17/08 | 13:30 | 1/12/09  | 11:45 |

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. Rapid pulse dissolved oxygen sensors were deployed at Research Creek and Loosin Creek. Optical dissolved oxygen probes (ROX) were utilized every other deployment at the East Cribbings and Zeke's Basin sites.

#### 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

Or

Sensor Type: Optical probe w/ mechanical cleaning  
Model#: 6150 ROX  
Range: 0 to 500% air saturation  
Accuracy: 0-200% air saturation: +/-1% of the reading or 1% air saturation, whichever is greater 200-500% air saturation: +/- 15% or 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 mg/L (0.001 mg/L)

Or

Units: milligrams/Liter (mg/L)  
Sensor Type: Optical probe w/ mechanical cleaning  
Model#: 6150 ROX  
Range: 0 to 50 mg/L  
Accuracy: 0-20 mg/L: +/-0.1 mg/L or 1% of the reading, whichever is greater

20 to 50 mg/L: +/-15% of the reading  
Resolution: 0.01 mg/L

Parameter: 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

#### **Dissolved Oxygen Qualifier:**

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

#### **Depth Qualifier:**

The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either vented or non-vented depth/level sensors. Readings for both vented and non-vented sensors are automatically compensated for water density change due to variations in temperature and salinity; but for all non-

vented depth measurements, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.03 cm for every 1 millibar change in atmospheric pressure, and is eliminated for vented sensors because they are vented to the atmosphere throughout the deployment time interval.

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 can be corrected.

In 2010, the CDMO began automatically correcting depth/level data for changes in barometric pressure as measured by the Reserve's associated meteorological station during data ingestion. These corrected depth/level data are reported as cDepth and cLevel, and are assigned QAQC flags and codes based on QAQC protocols. Please see sections 11 and 12 for QAQC flag and code definitions.

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) QAQC flag definitions** – This section details the automated and secondary QAQC flag definitions.

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

- 5 Outside High Sensor Range
- 4 Outside Low Sensor Range
- 3 Data Rejected due to QAQC
- 2 Missing Data

- 1 Optional SWMP Supported Parameter
- 0 Data Passed Initial QAQC Checks
- 1 Suspect Data
- 2 *Open - reserved for later flag*
- 3 Calculated data: non-vented depth/level sensor correction for changes in barometric pressure
- 4 Historical Data: Pre-Auto QAQC
- 5 Corrected Data

**12) QAQC code definitions** – This section details the secondary QAQC Code definitions used in combination with the flags above.

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

#### General Errors

|     |                                                       |
|-----|-------------------------------------------------------|
| GIC | No instrument deployed due to ice                     |
| GIM | Instrument malfunction                                |
| GIT | Instrument recording error; recovered telemetry data  |
| GMC | No instrument deployed due to maintenance/calibration |
| GNF | Deployment tube clogged / no flow                     |
| GOW | Out of water event                                    |
| GPF | Power failure / low battery                           |
| GQR | Data rejected due to QA/QC checks                     |
| GSM | See metadata                                          |

#### Corrected Depth/Level Data Codes

|     |                                                                  |
|-----|------------------------------------------------------------------|
| GCC | Calculated with data that were corrected during QA/QC            |
| GCM | Calculated value could not be determined due to missing data     |
| GCR | Calculated value could not be determined due to rejected data    |
| GCS | Calculated value suspect due to questionable data                |
| GCU | Calculated value could not be determined due to unavailable data |

#### Sensor Errors

|     |                                   |
|-----|-----------------------------------|
| SBO | Blocked optic                     |
| SCF | Conductivity sensor failure       |
| SDF | Depth port frozen                 |
| SDG | Suspect due to sensor diagnostics |
| SDO | DO suspect                        |
| SDP | DO membrane puncture              |

SIC Incorrect calibration / contaminated standard  
 SNV Negative value  
 SOW Sensor out of water  
 SPC Post calibration out of range  
 SQR Data rejected due to QAQC checks  
 SSD Sensor drift  
 SSM Sensor malfunction  
 SSR Sensor removed / not deployed  
 STF Catastrophic temperature sensor failure  
 STS Turbidity spike  
 SWM Wiper malfunction / loss

Comments

CAB\* Algal bloom  
 CAF Acceptable calibration/accuracy error of sensor  
 CAP Depth sensor in water, affected by atmospheric pressure  
 CBF Biofouling  
 CCU Cause unknown  
 CDA\* DO hypoxia (<3 mg/L)  
 CDB\* Disturbed bottom  
 CDF Data appear to fit conditions  
 CFK\* Fish kill  
 CIP\* Surface ice present at sample station  
 CLT\* Low tide  
 CMC\* In field maintenance/cleaning  
 CMD\* Mud in probe guard  
 CND New deployment begins  
 CRE\* Significant rain event  
 CSM\* See metadata  
 CTS Turbidity spike  
 CVT\* Possible vandalism/tampering  
 CWD\* Data collected at wrong depth  
 CWE\* Significant weather event

13) Post Deployment information

Research Creek

| Deployment start | Dissolved oxygen (%) | Specific Conductance | pH 7 | pH 10 | Turbidity | Battery voltage |
|------------------|----------------------|----------------------|------|-------|-----------|-----------------|
| 12/12/2007       | 102.4                | 50.74                | 6.97 | 10.00 | 0.5       | 9.9             |
| 1/8/2008         | 96.7*                | 48.27                | 7.10 | 10.18 | -2.4      | battery failure |
| 2/19/2008        | X                    | X                    | X    | X     | X         | X               |
| 3/10/2008        | 99.9                 | 25.9*                | 7.04 | 9.96  | 0.0       | 11.8            |
| 4/7/2008         | 105.5                | 31.0*                | 7.08 | 10.05 | 3.8       | 10.0            |
| 5/5/2008         | 104.5                | 50.76                | 7.13 | 9.95  | 0.4       | 11.6            |

|            |        |                |       |       |      |      |
|------------|--------|----------------|-------|-------|------|------|
| 5/21/2008  | 102.3  | 48.64          | 7.09  | 10.18 | 0.8  | 9.5  |
| 6/3/2008   | 83.2*  | 50.21          | 7.16  | 9.31* | 0.8  | 10.9 |
| 7/8/2008   | 94.5*  | 49.32          | 8.87* | 9.42* | 0.3  | 11.8 |
| 7/22/2008  | 100.4  | 49.18          | 7.06  | 9.99  | 0.2  | 12.3 |
| 8/6/2008   | 100.4  | 49.94          | 7.16  | 10.16 | 0.1  | 11.5 |
| 8/19/2008  | 102.6  | 50.45          | 7.02  | 9.97  | 0.3  | 12.0 |
| 9/2/2008   | 103.4  | 27.24(c)*      | 7.00  | 9.87  | 0.0  | 11.3 |
| 9/18/2008  | 92.9*  | 49.83          | 6.92  | 9.91  | -0.2 | 4.0  |
| 10/1/2008  | 106.4* | 5.93/48.88(c)* | 7.05  | 10.09 | 0.9  | 10.7 |
| 10/31/2008 | 99.5   | 49.19          | 7.09  | 10.13 | 0.8  | 12.2 |
| 11/18/2008 | 103.5  | 49.05          | 6.86  | 9.72  | 0.8  | 7.1  |
| 12/18/2008 | 90.4*  | 49.73          | 7.09  | 10.04 | 0.3  | 10.2 |

\* = outside of acceptable range for post calibration

X= Unable to communicate with the sonde for post calibration procedures

(c)= conductivity hole was clogged

#### Loosin Creek

| Deployment start | Dissolved oxygen (%) | Specific Conductance | pH 7 | pH 10 | Turbidity | Battery voltage |
|------------------|----------------------|----------------------|------|-------|-----------|-----------------|
| 12/12/2007       | 100.9                | 51.51                | 7.01 | 9.99  | -0.1      | 12.3            |
| 1/8/2008         | 98.9                 | 50.21                | 7.15 | 9.92  | 0.3       | 10.9            |
| 2/19/2008        | 102.2                | 50.19                | 7.12 | 10.29 | 1.4       | 11.7            |
| 3/10/2008        | 97.5                 | 49.01                | 6.97 | 9.97  | 0.5       | battery failure |
| 4/7/2008         | 103.3                | 25.65*               | 7.14 | 9.91  | 6.9*      | 11.0            |
| 5/5/2008         | 97.2*                | 48.65                | 7.17 | 9.97  | 0.5       | 11.6            |
| 5/21/2008        | 100.8                | 49.80                | 7.01 | 10.06 | 0.7       | 10.1            |
| 6/4/2008         | 102.1                | 49.02                | 7.15 | 9.98  | 0.0       | 11.7            |
| 7/8/2008         | 102.0                | 50.10                | 7.01 | 10.00 | 0.8       | 12.4            |
| 7/22/2008        | 103.0                | 50.70                | 7.04 | 9.95  | 0.9       | 11.0            |
| 8/6/2008         | 98.2                 | 49.29                | 6.99 | 9.93  | -0.2      | 12.3            |
| 8/19/2008        | 97.3*                | 50.62                | 6.98 | 9.99  | 0.5       | 10.7            |
| 9/2/2008         | 104.8*               | 49.37                | 7.20 | 10.17 | 0.3       | 11.8            |
| 9/18/2008        | 96.4*                | 49.48                | 7.09 | 10.06 | 0.1       | 12.0            |
| 10/1/2008        | 99.0                 | 48.95                | 6.86 | 9.89  | 1.5       | 11.4            |
| 10/31/2008       | 98.8                 | 47.71                | 7.11 | 10.10 | 4.9*      | 11.5            |
| 11/18/2008       | 99.3                 | 49.01                | 7.11 | 10.06 | 0.6       | 10.0            |
| 12/18/2008       | 70.2*                | 51.10                | 7.23 | 10.16 | -0.4      | 10.7            |

\* = outside of acceptable range for post calibration

#### East Cribbings

| Deployment start | Dissolved oxygen (%) | Specific Conductance | pH 7 | pH 10  | Turbidity | Battery voltage |
|------------------|----------------------|----------------------|------|--------|-----------|-----------------|
| 12/12/2007       | 91.8*                | 56.23                | 6.92 | 9.89   | 0.0       | 11.7            |
| 1/8/2008         | 54.6*                | 28.56*               | 6.95 | 9.57   | 0.4       | 11.4            |
| 2/19/2008        | 103.8                | 48.10                | 7.14 | 10.65* | 0.4       | 11.4            |
| 3/10/2008        | 96.0*                | 45.49                | 7.01 | 10.02  | 1.0       | 9.8             |
| 4/7/2008         | 102.3                | 51.17                | 7.07 | 10.08  | -0.9      | 10.3            |

|            |       |       |      |       |      |      |
|------------|-------|-------|------|-------|------|------|
| 5/5/2008   | 97.7  | 51.82 | 7.05 | 10.07 | 2.1  | 9.8  |
| 5/21/2008  | 101.9 | 49.94 | 6.95 | 10.20 | 2.7  | 9.3  |
| 6/3/2008   | 99.4  | 48.44 | 7.00 | 9.94  | 1.4  | 8.2  |
| 7/7/2008   | 100.1 | 49.30 | 7.15 | 10.12 | 0.6  | 12.3 |
| 7/21/2008  | 100.2 | 49.27 | 7.02 | 10.04 | 1.1  | 12.0 |
| 8/6/2008   | 102.3 | 50.30 | 6.97 | 9.99  | 0.8  | 11.9 |
| 8/20/2008  | 99.8  | 50.66 | 6.92 | 9.91  | 0.7  | 11.7 |
| 9/02/2008  | 72.6* | 50.07 | 7.03 | 9.99  | 3.2  | 11.4 |
| 9/18/2008  | 98.8  | 50.66 | 6.84 | 9.98  | -0.4 | 11.3 |
| 10/1/2008  | 103.2 | 49.73 | 7.05 | 10.18 | 0.2  | 11.0 |
| 10/31/2008 | 100.4 | 49.27 | 7.09 | 10.11 | 1.0  | 10.6 |
| 11/17/2008 | 100.1 | 50.08 | 7.17 | 10.13 | -1.5 | 6.9  |
| 12/17/2008 | 100.8 | 50.63 | 7.05 | 10.00 | -0.2 | 11.4 |

\* = outside of acceptable range for post calibration

#### Zeke's Basin

| Deployment start | Dissolved oxygen (%) | Specific Conductance | pH 7  | pH 10  | Turbidity | Battery voltage |
|------------------|----------------------|----------------------|-------|--------|-----------|-----------------|
| 12/12/2007       | 62.7*                | 51.57                | 7.02  | 9.87   | -0.5      | 9.9             |
| 1/8/2008         | 99.9                 | 51.24                | 6.97  | 10.02  | 0.5       | 11.6            |
| 2/19/2008        | 103.8*               | 47.72*               | 7.10  | 10.31  | 0.6       | 11.6            |
| 3/10/2008        | 99.0                 | 49.09                | 6.98  | 9.93   | 1.6       | 11.0            |
| 4/7/2008         | 101.5                | 49.46                | 7.06  | 9.98   | 4.9*      | 10.9            |
| 5/5/2008         | 98.0                 | 50.09                | 6.88  | 9.86   | 1.0       | 8.7             |
| 5/21/2008        | 103.5                | 49.42                | 7.06  | 10.21* | 0.3       | 10.7            |
| 6/3/2008         | 14.2*                | 48.09                | 6.70* | 9.56*  | 1.1       | 12.0            |
| 7/07/2008        | 96.1*                | 48.88                | 7.03  | 9.94   | 0.9       | 10.3            |
| 7/22/2008        | 102.7*               | 50.1                 | 7.07  | 10.10  | 0.5       | 12.0            |
| 8/06/2008        | 102.2*               | 50.37                | 7.03  | 9.95   | 1.0       | 11.6            |
| 8/20/2008        | 99.5                 | 57.7*                | 7.01  | 9.88   | -0.2      | 11.5            |
| 9/02/2008        | 5.0*                 | 50.23                | 7.19  | 10.2   | 0         | 11.2            |
| 09/18/2008       | 99.1                 | 49.86                | 6.96  | 9.96   | 0.4       | 10.9            |
| 10/01/2008       | 106.9                | 49.58                | 7.14  | 10.14  | 1.4       | 10.1            |
| 10/31/2008       | 99.9                 | 50.54                | 6.91  | 9.92   | 1.1       | 8.5             |
| 11/12/2008       | 102.3*               | 49.03                | 7.01  | 9.95   | 0.2       | 11.0            |
| 12/17/2008       | 99.9                 | 49.41                | 6.95  | 9.99   | 1.3       | 11.7            |

\* = outside of acceptable range for post calibration

#### 14) Other remarks/notes:

This section lists and explains all anomalous (and 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 and outside the range of standard seasonal variability.

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

In general, large positive turbidity spikes ( $>200$  NTU, but  $< 1000$ ) occurring for unknown reasons were retained and marked as suspect. 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 may reflect fauna caught within the probe guard or fouling covering the optics. Turbidity values above 1000 NTU were rejected due to being outside the sensor range, and elevated values below 200 NTU were retained.

Dips in specific conductivity and salinity data that were generally due to fouling drift between deployments or periods of heavy rainfall were retained. Values were highly variable and were retained even if outside two or three standard deviations from seasonal norms.

In 2008 there was temperature variability seen across the four sites. This occurred across multiple sonde and probe combinations. Temperature is not a calibrated parameter but temperature checks are performed. When the temperature variation was significant data has been marked suspect.

### **Research Creek**

Missing data due to sonde swaps occurred on January 9, 2008 at 10:15, March 10, 2008 at 13:15, May 5, 2008 at 10:45, October 31, 2008 at 12:15, and November 18, 2008 at 13:45.

Data was missing from February 17 through February 19, 2008 due to battery failure. The sonde batteries also failed at the end of the September 18, 2008 deployment. Again data was missing from September 28 through October 1, 2008.

An instrument malfunction occurred on February 19, 2008 at 11:30 that resulted in missing data. It may have been a lightening strike or problem with the sutron telemetry equipment. The sonde began recording data again on February 24 at 4:30. Upon retrieval, the sonde was unable to communicate with EcoWatch and had to be sent to YSI for repairs. The data recorded from February 24, 2008 through the end of the deployment seems to fit average conditions and was retained and marked as suspect since no post calibration checks were done.

There was considerable drift of conductivity/salinity during the March 10 deployment. Heavy fouling was present and post calibration values were unacceptable. Data was marked as suspect from March 16 through the end of the deployment.

Dissolved oxygen for the April 7, 2008 deployment should be considered suspect. The dissolved oxygen calibrated properly initially, then was recalibrated prior to deployment due to drift. Drift is suspected for the entire deployment and post calibration values were elevated.

Data was rejected due to an out of the water event on April 8, 2008 at 10:30. An out of water event occurred on June 15 and data collected after this time should be considered suspect. Data was rejected due to another out of water event which occurred on November 19, 2008.

During the May 5, 2008 deployment, there was a puncture in the dissolved oxygen membrane. Negative values were reported on May 14. Initial data (including negative values) was rejected and subsequent data should be considered suspect throughout the rest of the deployment. The post calibration value was not far outside the acceptable range.

Dissolved oxygen drift occurred during the June 3, 2008 deployment. No puncture was observed in the membrane, but post calibration values were not within the acceptable range. Data for this deployment was flagged as suspect.

Turbidity values were noisy and data was rejected between June 29<sup>th</sup> 8:30am to July 8<sup>th</sup> 10:30am. There were consistently readings outside of sensor range. There was moderate fouling noted in the log which we believe impacted these values.

pH post cal was unacceptable during the July 8<sup>th</sup> deployment and was flagged as suspect. All data appear to be within seasonal norms.

Turbidity was noisy between Aug 4 - 5 and Aug 31 - Sept 2 was flagged as suspect. Values outside sensor range were rejected.

An out of water reading was taken during the ISCO deployments for 09/03/2008 12:15 and 11/19/2008 14:45.

Conductivity data was flagged as suspect from 09/06/2008 21:30 to the rest of the deployment, 09/18/2008 12:00 due to unacceptable post cal. This was likely due to fouling from sediment accumulation.

Dissolved oxygen post calibration was unacceptable and values seemed slightly low for the September 18<sup>th</sup> deployment. All DO records were flagged as suspect.

Dissolved oxygen post calibration values were high following the October 1, 2008 deployment and data was marked as suspect due to sensor drift.

Dissolved oxygen post calibration values were low following the December 18, 2008 deployment. Data appear normal through the end of the year but data was marked as suspect due to sensor drift.

Turbidity values were noisy and should be considered suspect for the duration of the October 1, 2008 Deployment (October 1-31, 2008). There were numerous turbidity spikes over 1000 NTU during the December 18, 2008 deployment and questionable data was rejected.

### **Loosin Creek**

High turbidity readings are occasionally observed at Loosin Creek and are often due to the shallow depth combined with high winds. These data were retained, and some marked as suspect, due to high values though they may accurately reflect the conditions. All out of range data is rejected.

Variability in depth values were also retained unless an out of water event was suspected.

From 2/1 22:00 to 2/2 22:30 low conductivity and salinity values were retained and marked as data that fit conditions. The post calibration check values were within acceptable range and there was rain in the area on February 1, 2008.

Due to an error in programming, no data was recorded for the February 19 through March 10, 2008 deployment.

An out of water event occurred on 03/10/2008 14:30-16:00 and 03/11/2008 16:00-15. Data is marked -3 GOW CSM.

There was considerable dissolved oxygen variability in the March 10, 2008 dataset. The post calibration values were acceptable and these data were retained since they seem to fit normal conditions for this site.

Battery failure occurred on April 1, 2008 through the end of the deployment (April 7, 2008). During this period, much of the data is missing and data that was recorded during this period should be treated as suspect.

Temperature and conductivity probe failure occurred during the April 7, 2008 deployment. All data for this deployment was rejected.

A reading was missed due to a sonde swap on May 5, 2008 at 11:15.

During summer 2008 elevated temperature data during periods of low total depth and/or low dissolved oxygen data were all retained. The post calibration values were acceptable following these events.

Turbidity data was high with some spikes out of range in the beginning of July through the rest of the deployment. Data coincides with high winds and falling tide and field notes documented lots of fauna within the deployment structure. Out of range data was rejected. Abnormally high values were retained and flagged as suspect. Negative turbidity values from July 5 - 8, 2008 were rejected.

There was a dip in specific conductivity and salinity on July 16, from 9:15 to 19:30, cause unknown. Data was retained and not flagged.

There was a missing reading due to a sonde swap on August 6, 2008 at 15:00.

There was considerable noise in the turbidity data from October 25 through October 28, 2008. The data within this time frame should be considered suspect, possibly due to fauna within the guard area or variable windy conditions.

On November 16, 2008, negative depth values were rejected, potentially due to a low total depth and a change in barometric pressure. Again on December 12, 2008 negative depth values were rejected, probes seem to still be in the water.

All data were missing due to a sonde swap on November 18, 2008 at 14:15.

Turbidity post calibration values were not acceptable following the November 18, 2008 deployment. Negative turbidity values were observed November 19 - 24, 2008 and December 3 - 4, December 7 - 8, and December 13 - 14, 2008 and were rejected. The entire deployment should be considered suspect for turbidity due to incorrect calibration or contaminated standard.

### **East Cribbings**

The East Cribbing deployment structure was set up using a buoy and cinder block. Shifts in the cinder block on the bottom may cause changes in depth. When this occurred the depth data is marked 1 GSM CWD and other parameters are marked 0 GSM CWD. EC is well-mixed so unless otherwise noted other parameters do not appear to be impacted.

5/21 deployment

7/7 deployment

9/2 deployment

9/18 deployment

The deployment site at East Cribbings has experienced some shoaling. The sonde was historically placed in a deep area between a bank and a sand bar. The sand bar area is

encroaching and the total depth of this site is decreasing. There were several instances that the depth readings were less than seasonal norms and it is most likely due to the dynamic natural processes occurring. Also several out of water (OOW) events occurred due to the decrease in overall depth at this site.

Some variability in depth, pH, dissolved oxygen and temperature was considered normal and these data were retained with the comment that data fit conditions. Elevated dissolved oxygen concentrations were observed through the data set, especially during mid day or during periods of low depth reading/low overall depth.

For the dataset from January 1, 2008 through January 8, 2008 10:15, several parameters were considered suspect. Specific conductance and salinity did not meet the acceptable range for post calibration values. Dissolved oxygen post calibration values were below the acceptable range. pH passed the post calibration ranges, but was elevated for the entire deployment compared to the rest of the dataset and should be considered suspect.

One reading was missed when sondes were swapped on January 8, 2008 at 10:15.

During the January 8, 2008 deployment, temperature probe failure occurred and all data from this period (January 8, 2008 – February 19, 2008 9:00) were rejected.

pH for the dataset from February 19, 2008 9:15 through March 10, 2008 10:00 was rejected due to elevated post calibration readings and the slope out of acceptable range.

During the February 19, 2008 deployment, dissolved oxygen concentrations gradually declined. Data should be considered suspect from February 19, 2008 through the end of the deployment (March 10, 2008) even though the post calibrations values were acceptable. Data appears to have stopped cycling normally after February 29, 2008 and data are rejected until the end of the deployment.

The conductivity cell constant was on the edge of acceptable during the February 19, 2008 deployment. The data doesn't match up well at the end of the deployment on March 10, 2008. The data has been marked suspect.

There are a few deployments at East Cribbings where the depth is off compared to that around it. We believe that the deployment structure which consisted of a metal cage attached to a buoy and cinder block was not re-deployed in exactly the right spot. This caused slight deviations in depth. Depth data are marked suspect during these deployments. Other parameters do not appear to be impacted.

March 10, 2008

June 3, 2008

July 20, 2008

September 2, 2008

Dissolved oxygen for the data set from March 10, 2008 through April 7, 2008 should be considered suspect due to low values during post calibration. However, these data seem to fit conditions.

SpCond/salinity data for the March 10, 2008 deployment had a low post calibration and sand in the conductivity port. This impacted data from April 5, 2008 to April 7, 2008. Data are marked suspect during this time.

Low dissolved oxygen values observed during the June 3, 2008 deployment were retained and should be considered suspect from June 11, 2008 through the end of the deployment. Dissolved oxygen values were acceptable during the post calibration, but values do not seem to fit conditions of the site. There was moderate fouling that impacted data and values are marked suspect from June 11, 2008 until the end of the deployment on July 7, 2008.

Turbidity data from June 19, 2008 through the end of the deployment July 7, 2008 was elevated. These values do not reflect the typical conditions of the site. Though some values may be due to fouling, the entire section was rejected.

On July 20, 2008, data was collected at the wrong depth and should be considered suspect. No maintenance occurred at that time and a curious boater may have pulled the sonde out of the water.

Turbidity values during the July 22nd deployment were elevated. From 08/05/2008 22:00 - 08/06/2008 07:00 turbidity fluctuated between anomalously high readings and typical values. Since this is not typical for this site, all data from this period was rejected.

Unacceptable Turbidity post-calibration was recorded for the following deployment: 09/02/08 11:15 – 09/18/08 10:15 Turbidity post-cal for 0 NTU std = 3.2. There could possibly have been some turbidity drift but could not pick it out from the surrounding data. Windy and rough conditions combined with shallow waters during this time likely made the water more turbid than usual and would easily account for the ‘noisy’ data surrounding the end of this deployment.

Out of water (OOW) events occurred during the September 2nd deployment though September 18, 2008. Data should be rejected. Turbidity data seems unaffected but was still rejected. Dissolved oxygen values following the OOWs should be considered suspect, as the post calibration values were out of acceptable range. All other data following the OOWs seems to fit conditions.

Out of water (OOW) events occurred throughout the September 18, 2008 deployment. Data during these events was rejected and subsequent data retained. Low tide/Low water period (possibly due to misplaced sonde deployment on slightly higher bottom elevation) caused some probes to become exposed. Where Temp, Cond, Sal indicated exposure

data for Temp, SpCond, Sal, DO %, DO mg/L, Depth, pH and turbidity were rejected and coded as: <-3> [GOW] (CLT)

During the September 18, 2008 deployment, elevated turbidity values during 10/24-10/26 may have been due to a storm event and were retained.

Additional out of water events occurred throughout the October 1, 2008 deployment. These data were rejected and subsequent data retained.

Negative turbidity values 11/18/08 through 11/24/08, the cause unknown and data was rejected.

Unacceptable post-calibration recorded for the following deployments:  
09/02/2008 11:15 - 09/18/2008 10:15 DO data looks OK. Only a slight jump in DO values between deployments.

There was a voltage drop and data should be considered suspect from December 8 through December 10, 2008. Batteries failed on December 8 and data was missing through December 17, 2008.

### **Zeke's Basin**

High turbidity readings are frequently observed at Zeke's Basin due to the shallow depth and large fetch combined with high winds, particularly from the westerly and southerly directions. These data were retained, and some marked as suspect, due to high values though they may accurately reflect the conditions.

Super saturated dissolved oxygen concentrations were retained and occurred frequently throughout 2008. Often these instances occurred during mid day and/or with low depth readings. Low total depth and windy conditions may have been factors in these super saturated conditions.

DO Saturation values <27% were flagged with CDA comment code to indicate hypoxic conditions.

Temperature values are also highly variable at this site. Due to the shallow nature of this site, high temperatures were often observed during mid day readings. These values were retained. Negative temperature values were recorded on January 3, 2008 due to exposure of the sonde and some probes out of the water. When the probes were out of the water with negative depth readings data was rejected.

Data was retained and marked as suspect during an out of water event on January 3, 2008 and March 29, 2008. Negative depth readings and drops in salinity and conductivity were recorded and some other probes may have been exposed.

Dissolved oxygen values from January 1 through January 8, 2008 10:45 were considered suspect due to the post calibration value being low and out of acceptable range.

Turbidity post calibration values exceeded the acceptable range after the April 7, 2008 deployment. These values for April 7, 2008 9:45 through May 5, 2008 8:30 were retained and marked as suspect. There may have been a small amount of drift which occurred throughout the deployment, potentially a post calibration standard contamination, or a probe malfunction.

Values for pH were highly variable at this site. During the May 5, 2008 deployment, some drift was documented for pH during the post calibration procedures however the post cal values were within acceptable range. These were often observed as high pH and high dissolved oxygen concentrations or as low pH and low dissolved oxygen concentrations.

pH values during the June 3<sup>rd</sup> deployment were low during post cal. Data were marked as suspect due to sensor drift from June 16<sup>th</sup> through the end of the deployment.

After retrieval of the sonde from the June 3, 2008 deployment, barnacles were observed on the ROX dissolved oxygen optics. Dissolved oxygen values were retained and marked as suspect from June 6, 2008 through June 15, 2008 and rejected from June 15, 2008 through June 30, 2008.

During the September 2<sup>nd</sup> 2008 deployment the Turbidity wiper fell off resulting in extensive fouling on the probes. DO data likely suspect after 9-14-08.

Sustained winds (>45mph/72kmh) and storm conditions were documented on 9/25/08 – 9/26/08 likely producing elevated turbidity in and around Zeke's Basin. Data >1000NTU were rejected for being outside sensor range. All other data were retained as good and flagged as turbidity spike though they may reflect actual conditions.

Depth data from November 17, 2008 13:30-45 is odd. It appears as if the structure which consisted of a cage attached to a buoy and cinder block did not get re-deployed to quite the right spot. This impacted depth data. Other parameters appear unimpacted.

Data from 12/26/2008 02:30 to 12/26/2008 05:00, and 12/27/2008 04:15 to 12/27/2008 04:30 were rejected due to out of water events during very low tides.

All records for 12/17/2008 13:15 were missed during routine sonde maintenance.