

NOC NERR Metadata Form
January - December 1998
Revised January 11, 2011

I. Data Set & Research Descriptors

1) Principal Investigator(s) and Contacts:

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2) Entry Verification Process:

The data are reviewed using the computer program PC6000 that accompanies the YSI 6000 datalogger. After the file is uploaded from the water quality instrument, PC6000 is used to plot the data and perform basic statistical analysis (i.e., min., max., mean, std. dev.). This information is printed out and attached to the Field Log for the particular deployment. This printout is used during file review to detect any gross outliers such as data taken when the water quality instrument was removed from the water or those caused by instrument failure. The data are imported into a Microsoft Excel file that contains the current month's cumulative recordings. When a complete month of data has been recorded the file is ready for review. The data review includes several steps. The first step is to format the data so that the parameter columns are in the correct order and the data have the correct number of decimal place holders. The CDMO 5.0 Excel macro is used to check for any dates and times that data were not recorded due to maintenance, battery failure, or other causes. Missing dates and times are inserted into the file and a period is inserted into the cells where data would normally be. An explanation for

the missing data is recorded onto the Water Quality Editing Log. Next, the data are filtered using an Excel macro to find readings outside the instrument measurement range and the "normal" range for the site in question. Data outside the instrument range are removed from the file and a period is inserted into the cell(s). An explanation for the missing dates and times are recorded onto the Water Quality Editing Log. Data outside the "normal" range of water quality for a particular site were investigated for validity based on weather data, field observations, QC checks, PC6000 printouts, and instrument diagnostics. If the data are rejected from the file a period is inserted into the cell(s) and an explanation for the missing dates and times are recorded onto the Water Quality Editing Log. The information recorded on the Water Quality Editing Log is transferred to the metadata form. The metadata form is then submitted with the data file to the CDMO. William Thompson, Research Technician, was responsible for data management during 1998.

3) Research Objectives:

Water quality instruments are deployed at the Masonboro Island and Zeke's Island components of North Carolina's National Estuarine Research Reserve and are anchored to the bottom of the selected sites. Measurements are taken at 30 minute intervals for approximately two week periods. These sites are relatively unimpacted by manmade perturbations and are considered long term monitoring locations.

4) Research Methods:

The Estuarine Water Quality Monitoring Program began on 2 March 1992 at the Masonboro Island component, and 19 May 1994 at the Zeke's Island component. The procedures described below were instituted in June 1995 and thus do not cover data recorded previously. At this time we are only performing long term water quality monitoring and not a specific experiment.

Before each YSI 6000 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 only required for pH, turbidity and salinity; all other parameters are done as described in the manual. Buffer solutions for 3 point pH calibration (pH 4,7 and 10) are purchased premade from a scientific supply house. The salinity standard is obtained from filtered seawater taken from Masonboro Sound and analyzed at the Center for Marine Science Research (CMSR) in Wilmington, NC using an osmometer. The dissolved oxygen membranes are replaced before deployment and are allowed to sit at least 24 hrs prior to deployment.

During deployment the weather conditions and tide stage are

recorded in the field observation log. Measurements of DO, pH, salinity, specific conductance, and temperature are taken with a calibrated YSI 6000 or other field instruments to check the accuracy of the instrumentation before deployment (as of October 1995). The water quality instrument is placed inside a locked steel cage, then anchored approximately 10cm off the bottom, and chained to a post at the monitoring site. Every 30 minutes during the sampling period measurements are taken for temperature, specific conductance, salinity, dissolved oxygen saturation, dissolved oxygen concentration, depth, pH, and turbidity.

At the end of the sample period the water quality instrument is either brought back to the laboratory or serviced in the field. If the water quality instrument is serviced in the field, the DO sensor is either replaced with one that has a new membrane or the old membrane is wiped with lens paper moistened with tap water to remove biofouling. 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 or against a recently calibrated YSI 6000. The water quality data are then uploaded, and the instrument is cleaned and calibrated as noted previously. The water quality instrument is then ready for deployment.

5) Site Location and Character:

The four 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 southeastern coast of the United States in the Atlantic Ocean. Currently, only data from Masonboro and Zeke's Island components are transferred to the CDMO. The two sites are:

1. Research Creek, Masonboro Island

The Masonboro Island site 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 deg 09'21.7" latitude and 77 deg 50'59.9" longitude (GPS position). The site has a salinity range of 18-35 ppt and a tidal range that averages 1.2 meters.

2. East Cribbing, Zeke's Island

The Zeke's Island site is located 1.8 km south of Federal Point boat launch in a tidal basin estuary at 33 deg 56'23.5" latitude and 77 deg 56'28.1" longitude (GPS position). This site receives minimal freshwater input from leakage of the Cape Fear River through the 5.6 km rock jetty that separate the two bodies of water. Thus, the ocean tidal input through New Inlet is a major factor in maintaining the high salinity; however, during rainy periods major drops in salinity may occur. The site has a salinity range of 15-35 ppt and a tidal range that averages 2 meters.

6) Data Collection Period

Research Creek data collection began on 2 March 1992, while East Cribbing data collection commenced on 19 May 1994. All monitoring is considered long term.

7) Associated Researchers and Projects

Lancaster, J./UNC Chapel Hill

Ross, S./NOC NERR

Masonboro Island surf zone fish survey

NOC NERR

Climatological monitoring

Ross, S./NOC NERR

Grimshaw, P./NOC NERR

Effects of non-point source pollution on estuarine water quality

Ross, S./NOC NERR

Grimshaw, P./NOC NERR

Bichy, J./NOC NERR

Water quality & nekton monitoring

Ross, S./NOC NERR

Stokesbury, K./NOC NERR

EMAP - Estuaries

Mallin, M./UNC-Wilmington

Tidal creek survey

II. Physical Structure Descriptors

8) Sensor specifications, range of measurements, units, resolution, and accuracy:

YSI 6000 datalogger

Variable	Range of Measurements	Resolution	
Accuracy			
Date	1-12, 1-31, 00-99 (Mo,Day,Yr)	1 mo, 1 day, 1 yr	NA
Time	0-24, 0-60, 0-60 (Hr,Min,Sec)	1 hr, 1 min, 1 s	NA
Temp	-5 to 45 (c)	0.01 C	+/-
0.15C			
Sp COND	0-100 (mS/cm)	0.01mS/cm	+/-0.5%
Of			
reading + 0.001mS/Cm			
Salinity	0-70 Parts per thousand (ppt)	0.01 ppt	+/- 1%
of			
Reading or 0.1 ppt, (whichever is greater)			

DO	0-200 (% air saturation)	0.1% @air sat	+/-2%
@air			
Saturation			
DO	200-500 (% air saturation	0.1% @ air sat	+/- 6%
@			
Saturation			
DO	0-20 (mg/l)	0.01 mg/l	+/-
0.2mg/l			
DO	20-50 (mg/l)	0.01 mg/l	+/-
0.6mg/l			
Depth (shallow)	0-9.1 (m)	0.001m	+/-
0.018m			
PH	2-14 units	0.01 units	+/-
0.2units			
Turb	0-1000 NTU	0.1 NTU	+/- 5%
of			
Reading or 2 NTU (whichever is greater)			

Data columns are separated by tabs. Each file contains a two line column header at the top of the page which identifies measurements and units for each column.

9) Coded variable indicator and variable code definitions:

Site definitions: RC= South Research Creek, Masonboro Island*
EC= East Crib, Zeke's Island*

File definitions: site/month/year (ex.: ZI0895 = Zeke's Island data from August of 1995).

*The RC site was formerly designated as Masonboro Island (MS) and EC was formerly designated as Zeke's Island (ZI). Name changes were made on 1/11/2011 to be consistent with later station designations made necessary by the addition of an additional station in each component, and to clearly indicate that the station location throughout the North Carolina Reserve's historical data set. Raw file names were not changed. Please contact the Reserve directly or the NERRS Centralized Data Management Office for more information on this update.

10) Data anomalies (suspect data):

This section list data that are extreme for the aquatic system being monitored or are outside the measurement range of the instrument. The cause of such anomalies maybe a bad calibration, boat traffic disturbances, or a malfunction of the instrument.

Research Creek, January
1/1 1600-1630 Instrument out of water.

1/1 0330-0500	Instrument out of water.
1/2 1600-1800	Instrument out of water.
1/3 0400-0600	Instrument out of water.
1/3 1700-1800	Instrument out of water.
1/4 0600-0630	Instrument out of water.
1/4 1830	Instrument out of water.

Research Creek, February

2/11 1730	Low DO, unexplained.
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Research Creek, March

3/22 0300,0400,1700	High turbidity event.
3/23 1900-1930	High turbidity event.
3/25 0130-3/31 2330	Battery failure.

Research Creek, April

4/1 0000-4/7 1530	Battery failure.
4/19 0530-4/22 1530	Battery failure.

Research Creek, May

5/4 2000	High turbidity event.
5/4 2100-5/8 1400	DO probe failure.
5/5 0130	High turbidity event.
5/15 0230-5/25 1400	Turbidity probe failure.
5/25 1530-5/26 0800	Turbidity probe failure.
5/26 0330-0400	Instrument out of water.
5/26 0830-5/31 2330	Battery failure.

Research Creek, June

6/1 0000-6/2 1230	Battery failure.
6/3 0630-6/16 1230	DO probe failure.
6/6 1130-1200	Instrument out of water.
6/7 1130-1330	Instrument out of water.
6/8 0030-0200	Instrument out of water.
6/8 1200-1400	Instrument out of water.
6/9 0100-0330	Instrument out of water.
6/9 1200-1530	Instrument out of water.
6/10 0130-0400	Instrument out of water.
6/10 1300-1600	Instrument out of water.
6/11 0230-0400	Instrument out of water.
6/11 1430-1600	Instrument out of water.
6/12 1730	High turbidity event.
6/13 1700-6/15 2100	Turbidity probe failure.

Research Creek, July

7/16 1630-7/22 1530	Low DO, unexplained.
7/28 1800	High turbidity event.

Research Creek, August

8/18 1030-1130	Low DO, unexplained.
8/16 1900	High turbidity event.
8/27 1430	High turbidity event.
8/30 0000,1830	High turbidity event.

Research Creek, September

9/2 1700	High turbidity event.
9/4 0000-9/11 1900	Occasional high turbidity events.
9/23 2100	High turbidity event.
9/25 1630-2030	Instrument out of water.
9/26 0130-0830	Instrument out of water.
9/26 1430-2130	Instrument out of water.
9/27 0200-0900	Instrument out of water.
9/27 1530-2200	Instrument out of water.
9/28 0300-1000	Instrument out of water.
9/28 1630-2230	Instrument out of water.
9/29 0330-1030	Instrument out of water.
9/29 1730-2330	Instrument out of water.
9/30 0500-1000	Instrument out of water.

Research Creek, October

10/8 1600-10/9 1730	Occasional high turbidity events.
10/16 1100-10/20 0930	Battery failure.

Research Creek, November

11/6 1130-11/20 1130	Conductivity cell blocked.
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Research Creek, December

12/20 1030-12/21 1130	Battery failure.
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East Cribbing, January

1/21 1600-1/30 1030	Battery failure.
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East Cribbing, February

2/10 2230	High turbidity event.
2/11 0700-0930	Occasional high turbidity events.
2/12 0630-2/13 1000	DO probe failure.
2/12 0730-2/13 1000	Turbidity probe failure.
2/13 1030-2/19 1230	Battery failure.

East Cribbing, March

3/5 1730-3/20 1400	No salinity or DO% due to improper sonde programming.
3/28 0700	High turbidity event.
3/29 0730	High turbidity event.

East Cribbing, April

4/9 1530-4/11 0530	Low DO, unexplained.
4/17 1930- 4/30 2330	Low DO, unexplained.

East Cribbing, May

5/1 0000-5/4 1200	Low DO, unexplained.
5/10 0500-5/14 1200	Battery failure.
5/29 0930-5/31 2330	Battery failure.

East Cribbing, June

6/1 0000-6/3 1500 Battery failure.
6/20 1330 Sonde skipped sample.

East Cribbing, August

8/21 1730-8/22 0030 Low DO, unexplained.
8/26 2130-2200 High turbidity event.

East Cribbing, September

9/11 0400-9/18 1730 DO probe failure.
9/29 1300-9/30 2330 Battery failure.

East Cribbing, October

10/1 0000-10/2 0830 Battery failure.

East Cribbing, November

11/18 0630-11/20 1430 Battery failure.
11/20 1500-11/30 2330 DO probe failure.

Zeke's Island, December

12/01 0000-12/20 1000 DO probe failure

11) Missing data:

This section lists any missing data within the corresponding data files. Missing data maybe caused by many reasons including maintenance periods, power loss, and data that have been removed because of instrument malfunction. Approximately every 2-3 weeks, there is a period of between 1 to 24 hrs (occasionally longer) of missing data due to maintenance and calibration. During the maintenance period all parameters will be missing.

A record and explanation of missing data that are not related to routine maintenance is kept in the Field Log for the particular deployment. All parameters recorded when the water quality instrument is exposed to air during a sample, either by an extremely low tide or physical displacement from its original location, are removed. Special note should be made regarding missing dissolved oxygen (DO) saturation (%), DO concentration (mg/l), specific conductance, salinity, and temperature measurements. If the DO saturation (%) data are removed, due to sensor malfunction or other circumstances, the DO concentration (mg/l) will also be missing. The DO concentration (mg/l) is calculated from DO saturation (%) and temperature data. This is also true for specific conductance and salinity data. Salinity (ppt) is determined by the YSI 6000 using specific conductance and temperature data. If the temperature sensor malfunctions and the corresponding data are removed, all parameters requiring

these data (DO saturation, DO concentration, specific conductance, salinity, and pH) for calculation or temperature compensation will also be removed.

Research Creek, January

1/1 0230-0430	Maintenance.
1/1 1600-1630	Instrument out of water.
1/1 0330-0500	Instrument out of water.
1/2 1600-1800	Instrument out of water.
1/3 0400-0600	Instrument out of water.
1/3 1700-1800	Instrument out of water.
1/4 0600-0630	Instrument out of water.
1/4 1830	Instrument out of water.
1/6 0930-1130	Maintenance.
1/15 1600	Maintenance.

Research Creek, March

3/5 1030-1330	Maintenance.
3/18 1530	Maintenance.
3/25 0130-3/31 2330	Battery failure.

Research Creek, April

4/1 0000-4/7 1530	Battery failure.
4/19 0530-4/22 1530	Battery failure.

Research Creek, May

5/4 2100-5/8 1400	DO probe failure.
5/8 1430-1500	Maintenance.
5/15 0230-5/25 1400	Turbidity probe failure.
5/25 1430-1500	Maintenance.
5/25 1530-5/26 0800	Turbidity probe failure.
5/26 0330-0400	Instrument out of water.
5/26 0830-5/31 2330	Battery failure.

Research Creek, June

6/1 0000-6/2 1230	Battery failure.
6/3 0630-6/16 1230	DO probe failure.
6/6 1130-1200	Instrument out of water.
6/7 1130-1330	Instrument out of water.
6/8 0030-0200	Instrument out of water.
6/8 1200-1400	Instrument out of water.
6/9 0100-0330	Instrument out of water.
6/9 1200-1530	Instrument out of water.
6/10 0130-0400	Instrument out of water.
6/10 1300-1600	Instrument out of water.
6/11 0230-0400	Instrument out of water.
6/11 1430-1600	Instrument out of water.
6/13 1700-6/15 2100	Turbidity probe failure.
6/16 1300	Maintenance.
6/30 1400	Maintenance.

Research Creek, July

7/17 1430 Maintenance.
7/21 2130 Maintenance.

Research Creek, August

8/18 1430-1500 Maintenance.

Research Creek, September

9/25 1630-2030 Instrument out of water.
9/26 0130-0830 Instrument out of water.
9/26 1430-2130 Instrument out of water.
9/27 0200-0900 Instrument out of water.
9/27 1530-2200 Instrument out of water.
9/28 0300-1000 Instrument out of water.
9/28 1630-2230 Instrument out of water.
9/29 0330-1030 Instrument out of water.
9/29 1730-2330 Instrument out of water.
9/30 0500-1000 Instrument out of water.

Research Creek, October

10/16 1100-10/20 0930 Battery failure.

Research Creek, November

11/6 1130-11/20 1130 Conductivity cell blocked.
11/6 1100 Maintenance.

Research Creek, December

12/20 1030-12/21 1130 Battery failure.

East Cribbing, January

1/15 1030 Maintenance.
1/21 1600-1/30 1030 Battery failure.

East Cribbing, February

2/12 0630-2/13 1000 DO probe failure.
2/12 0730-2/13 1000 Turbidity probe failure.
2/13 1030-2/19 1230 Battery failure.

East Cribbing, March

3/05 1530-1700 Maintenance.
3/5 1730-3/20 1400 No salinity or DO% due to improper sonde programming.
3/20 1430 Maintenance.

East Cribbing, May

5/10 0500-5/14 1200 Battery failure.
5/29 0930-5/31 2330 Battery failure.

East Cribbing, June

6/1 0000-6/03 1500 Battery failure.
6/19 1430-1600 Maintenance.
6/20 1330 Sonde skipped sample.

East Cribbing, July

7/6 1030 Maintenance.
7/31 1300-1600 Maintenance.

East Cribbing, September

9/11 0400-9/18 1730 DO probe failure.
9/29 1300-9/30 2330 Battery failure.

Zeke's Island, October

10/1 0000-10/2 0830 Battery failure.

East Cribbing, November

11/9 1000 Maintenance.
11/18 0630-11/20 1430 Battery failure.
11/20 1500-11/30 2330 DO probe failure.

East Cribbing, December

12/1 0000 -12/20 1000 DO probe failure.
12/20 1030-12/21 1030 No data due to improper sonde programming.

12) Notes:

High turbidity values above instruments top range (1000 NTU), caused by blockage of light transmittance by an obstruction are left in the file.

Hurricane Bonnie passed over the research area on September 25.