North Carolina (NOC) NERR Water Quality Metadata
January - December 1999
Last Update: 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 uploaded using the computer program EcoWatch that accompanies the YSI 6000 datalogger. After the file is uploaded from the water quality instrument, EcoWatch 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 then reviewed. 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 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 1999.

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. The goal is to establish long-term water quality monitoring at relatively unimpacted sites by collecting data for each day of the year.

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 pre-made 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 settle 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 brought back to the laboratory. 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 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. The site has a salinity range of 18-35 ppt and a tidal range that averages 1.2 meters. Depth varies, but typically it can be found to range from 0.38 to 2.11 meters. Bottom type substratum consists of sand and detritus based sediment. There are no major pollutants from the land. The site is removed from the shoreline, in a creek surrounded by salt marsh that has minimal to no boat traffic.

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. 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. Depth varies, but typically it can be found to range from 0.11 to 2.30 meters. Bottom type substratum consists of sand and detritus based sediment. There are no pollutants from land. The site is surrounded by marsh and dunes not accessible to road traffic and minimal boat traffic.

6) Data Collection Period

Research Creek data collection began on 2 March 1992, while East Cribbing data collection commenced on 19 May 1994. Both continue through
December 31 of this year.

Deployment and Retrieval Dates for 1999

Began	Ended
Research Creek:	
12/21/98, 12:00	01/18/99, 10:00
01/18/99, 10:00	02/15/99, 13:30
02/15/99, 13:30	03/11/00, 13:30
03/11/99, 13:30	04/09/99, 13:30
04/09/99, 13:30	05/09/99, 12:00
05/09/99, 12:00	06/23/99, 11:30
06/23/99, 11:30	07/28/99, 16:30
07/28/99, 16:30	08/13/99, 13:00
08/13/99, 13:00	09/21/99, 09:00
09/21/99, 09:00	11/09/99, 09:30
11/09/99, 09:30	12/03/99, 10:30
12/03/99, 10:30	01/10/00, 13:00
East Cribbing:	
12/21/98, 10:30	01/18/99, 14:00
01/14/99, 14:00	02/11/99, 14:30
02/11/99, 14:30	03/10/99, 14:00
03/10/99, 14:00	04/12/00, 15:00
04/12/99, 15:00	05/20/99, 11:00
05/20/99, 11:00	06/21/99, 14:30
06/21/99, 14:30	07/20/99, 15:00
07/20/99, 15:00	08/26/99, 12:00
08/26/99, 12:00	09/16/99, 16:00
09/17/99, 10:00	11/08/99, 11:00
11/08/99, 11:00	12/10/99, 12:00
12/10/99, 12:00	12/22/99, 11:00
12/22/99, 11:00	01/10/00, 13:00

7) Associated Researchers and Projects

Lancaster, J./UNC Chapel Hill
Ross, S./NOC NERR
Masonboro Island surf zone fish survey

Ross, S./NOC NERR
Grimshaw, P./NOC NERR
Effects of non-point source pollution on estuarine water quality

Ross, S./NOC NERR
Stokesbury, K./NOC NERR
EMAP - Estuaries

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.: zi0899 = Zeke's Island data from August of 1999).

*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 is 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, malfunction of the
instrument, or the measurements may be correct.

Research Creek, January

01/02/99 03:30:00-01/03/99 23:30:00 Turbidity data removed, probable probe
blockage
01/16/99 05:30:00 High turbidity event.
01/16/99 19:30:00 High turbidity event.
01/16/99 20:00:00 High turbidity event.
01/17/99 08:00:00 High turbidity event.
01/24/99 10:30:00-19:30:00 High turbidity event.
01/25/99 00:30:00 High turbidity event.
01/25/99 02:30:00-07:00:00 High turbidity event.
01/26/99 03:30:00 High turbidity event.
01/30/99 04:30:00-09:00:00 High turbidity event.
01/30/99 11:00:00 High turbidity event.
01/31/99 16:30:00 High turbidity event.
01/31/99 17:00:00 High turbidity event.
01/31/99 22:30:00 High turbidity event.
01/31/99 23:30:00 High turbidity event.

Research Creek, February

02/01/99 00:00:00-04:30:00 High turbidity event.
02/01/99 05:30:00 High turbidity event.
02/01/99 15:30:00 High turbidity event.
02/02/99 01:00:00 High turbidity event.
02/02/99 01:30:00 High turbidity event.
02/02/99 10:30:00 High turbidity event.
02/02/99 14:00:00 High turbidity event.
02/02/99 14:30:00 High turbidity event.
02/02/99 16:00:00-17:00:00 High turbidity event.
02/02/99 22:30:00 High turbidity event.
02/03/99 00:00:00 High turbidity event.
02/03/99 00:30:00 High turbidity event.
02/03/99 11:30:00 High turbidity event.
02/03/99 12:00:00 High turbidity event.
02/03/99 18:30:00 High turbidity event.

02/03/99	19:00:00	High turbidity event.
02/04/99	08:00:00	High turbidity event.
02/04/99	17:30:00	High turbidity event.
02/04/99	19:00:00	High turbidity event.
02/05/99	03:30:00	High turbidity event.
02/05/99	12:30:00	High turbidity event.
02/06/99	15:30:00-16:30:00	High turbidity event.
02/06/99	19:00:00	High turbidity event.
02/06/99	20:00:00	High turbidity event.
02/06/99	21:30:00	High turbidity event.
02/06/99	23:00:00	High turbidity event.
02/07/99	03:00:00	High turbidity event.
02/07/99	03:30:00	High turbidity event.
02/10/99	00:30:00	High turbidity event.
02/11/99	19:30:00	High turbidity event.
02/11/99	20:00:00	High turbidity event.
02/11/99	21:00:00	High turbidity event.
02/12/99	15:30:00	High turbidity event.
02/12/99	17:00:00	High turbidity event.

Research Creek, March

03/07/99	01:30:00	High turbidity event.
03/18/99	20:00:00	High turbidity event.
03/18/99	22:30:00	High turbidity event.
03/21/99	17:00:00	High turbidity event.
03/25/99	21:00:00	High turbidity event.
03/25/99	23:30:00	High turbidity event

Research Creek, April

04/16/99	01:00:00-02:30:00	High turbidity event.
04/16/99	10:30:00	High turbidity event.
04/16/99	13:00:00	High turbidity event.
04/16/99	13:30:00	High turbidity event.
04/16/99	14:30:00	High turbidity event.
04/16/99	15:30:00	High turbidity event.
04/16/99	19:30:00	High turbidity event.
04/16/99	20:30:00	High turbidity event.
04/16/99	22:00:00	High turbidity event.
04/16/99	22:30:00	High turbidity event.
04/17/99	00:30:00	High turbidity event.
04/19/99	04:30:00	Negative Turbidity, data removed.
04/19/99	12:00:00	Negative Turbidity, data removed.
04/23/99	03:00:00	High turbidity event.
04/23/99	04:00:00	High turbidity event.
04/30/99	20:30:00-22:00:00	High turbidity event.

Research Creek, May

05/01/99	16:30:00	High turbidity event.

05/01/99 17:00:00 High turbidity event.
05/08/99 13:30:00 High turbidity event.
05/16/99 01:00:00-06:00:00 High turbidity event.
05/16/99 07:30:00-08:30:00 High turbidity event.
05/16/99 11:00:00 High turbidity event.
05/16/99 13:00:00 High turbidity event.
05/16/99 14:00:00 High turbidity event.
05/17/99 13:00:00 High turbidity event.
05/17/99 23:30:00 High turbidity event.
05/19/99 00:00:00 High turbidity event.
05/19/99 01:30:00 High turbidity event.
05/30/99 03:30:00 Negative DO, data removed.

Research Creek, June

06/01/99 through 06/30/99 DO data appears abnormally high and should be considered suspect. Upon retrieval of the sonde it was noted that the sonde was buried in the sediment and that the DO electrodes were corroded. Data retained.
06/10/99 14:00:00 High turbidity event.
06/12/99 13:30:00 High turbidity event.
06/12/99 23:00:00 High turbidity event.
06/12/99 23:30:00 High turbidity event.
06/13/99 00:00:00-23:30:00 High turbidity event.
06/14/99 00:00:00-16:00:00 High turbidity event.
06/27/99 21:00:00 Negative DO, data removed.

Research Creek, July

07/03/99 23:00:00 Negative turbidity values, data deleted.
07/10/99 09:00:00-09:30:00 Negative turbidity values, data deleted.
07/15/99 18:00:00-07/16/99 05:00:00 Temp data erratic suggesting sonde failure, all data removed.
07/19/99 17:30:00 Negative turbidity values, data deleted.
07/21/99 16:00:00-07/28/99 15:00:00 Negative DO values, data deleted.
07/26/99 07:00:00-07/28/99 10:30:00 Negative turbidity values, data deleted.

Research Creek, August

08/29/99 23:30:00 Negative turbidity value, deleted.
08/21/99 through 08/31/99 Anomalous specific conductivity, DO and pH; data appear to be responding to a real event. Data retained.

Research Creek, September

09/01/99 through 9/21/99 Anomalous specific conductivity, DO and pH;
data appear to be responding to a real event. Data retained.
09/01/99 20:30:00-09/09/99 13:30:00 DO failure, data deleted.
09/07/99 03:00:00 Negative turbidity, deleted.
09/14/99 01:30:00 Negative turbidity, deleted.
09/15/99 through 09/16/99 Depth data was anomalously high, but it is possible it was documenting a real event.
09/16/00 05:30:00-09/21/99 06:30:00 Turbidity probe failure, data deleted.
09/21/99 07:00:00-16:00:00 Sonde failure, no data.
09/22/99 04:30:00 High turbidity event.
09/26/99 02:30:00 High turbidity event.

Research Creek, December

12/26/99 17:00:00 High turbidity event.
12/27/99 10:30:00 High turbidity event.
12/27/99 13:00:00 High turbidity event.

East Cribbing, January

01/08/99 20:00:00-21:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/08/99 23:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/09/99 00:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/09/99 11:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/09/99 21:00:00-22:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/09/99 23:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/09/99 23:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/12/99 22:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/12/99 23:00:00 Turbidity -1, possible calibration stray, value
changed to 0.

01/13/99 00:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/13/99 15:30:00-16:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/13/99 21:30:00-23:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 01:00:00-04:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 15:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 17:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 17:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 19:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 20:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 21:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/14/99 22:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/15/99 00:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/15/99 03:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/15/99 17:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/16/99 00:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/16/99 03:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/16/99 17:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/16/99 18:00:00 Turbidity -1, possible calibration stray, value
changed to 0.

01/17/99 02:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/17/99 03:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/17/99 04:00:00-05:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/17/99 14:30:00-15:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/17/99 16:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/17/99 17:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/17/99 18:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/18/99 01:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/18/99 02:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/18/99 03:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/18/99 05:00:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/18/99 05:30:00 Turbidity -1, possible calibration stray, value
changed to 0.
01/23/99 19:30:00-01/23/99 21:30:00 Sonde possibly exposed at low tide, all data
removed.
01/24/99 07:30:00-01/24/99 10:00:00 Sonde possibly exposed at low tide, all data
removed.
01/24/99 21:00:00-01/25/99 00:00:00 Sonde possibly exposed at low tide, all data
removed.
01/25/99 09:30:00-01/25/99 11:00:00 Sonde possibly exposed at low tide, all data
removed.
01/25/99 22:00:00-01/25/99 23:30:00 Sonde possibly exposed at low tide, all data
removed.
01/26/99 10:30:00-01/26/99 12:00:00 Sonde possibly exposed at low tide, all data
removed.

01/26/99 22:30:00-01/27/99 01:00:00 Sonde possibly exposed at low tide, all data
removed.
01/27/99 12:30:00-01/27/99 13:00:00 Sonde possibly exposed at low tide, all data
removed.
01/29/99 01:30:00-01/29/99 02:00:00 Sonde possibly exposed at low tide, all data
removed.
01/30/99 02:00:00-01/30/99 03:00:00 Sonde possibly exposed at low tide, all data
removed.
01/30/99 15:30:00-01/31/99 16:00:00 Sonde possibly exposed at low tide, all data
removed.
01/31/99 16:30:00-01/31/99 17:30:00 Sonde possibly exposed at low tide, all data
removed.

East Cribbing, March

03/06/99 01:30:00 High turbidity event.
03/09/99 17:00:00 High turbidity event.

East Cribbing, May

05/13/99 00:00:00 High turbidity event.
05/13/99 02:30:00 High turbidity event.
05/20/99 19:00:00-20:30:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/21/99 07:30:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/21/99 20:00:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/21/99 20:30:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/22/99 02:30:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/25/99 23:00:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/26/99 01:00:00 Turbidity negative, possible sensor blockage. Data removed.
05/27/99 07:00:00 Turbidity negative, possible calibration stray.
Changed to 0.

05/29/99 04:00:00 Turbidity negative, possible calibration stray.
Changed to 0.
05/26/99 through 05/31/99 DO data should e considered suspect and used with
caution. Data retained.

East Cribbing, June

06/01/99 through 06/17/99 DO data should e considered suspect and used with
caution. Data retained.
06/03/99 09:30:00 Turbidity negative 1, changed to 0
06/07/99 00:00:00-06/10/99 04:30:00 Turbidity negative, possible probe blockage.
Data removed.
06/13/99 11:00:00 High turbidity event.
06/13/99 23:30:00 High turbidity event.
06/14/99 07:30:00 Turbidity negative, possible probe blockage.
06/14/99 15:30:00 Turbidity negative, possible probe blockage.
06/15/99 08:00:00 Turbidity negative, possible probe blockage.
06/21/99 15:30:00 High turbidity event.

East Cribbing, July

07/04/99 00:30:00-01:30:00 High turbidity event.
07/13/99 10:30:00 High turbidity event.
07/19/99 19:00:00 High turbidity event.
07/19/99 19:30:00 High turbidity event.
07/20/99 11:30:00 High turbidity event.
07/20/99 13:30:00 High turbidity event.
07/31/99 02:00:00 High turbidity event.
07/31/99 02:30:00 High turbidity event.
07/31/99 08:00:00 High turbidity event.
07/31/99 11:00:00-17:30:00 High turbidity event.
07/31/99 18:30:00 High turbidity event.
07/31/99 22:00:00-23:00:00 High turbidity event.

East Cribbing, August

08/01/99 00:30:00-01:30:00 High turbidity event.
08/01/99 02:30:00 High turbidity event.
08/01/99 03:00:00 High turbidity event.
08/01/99 04:00:00-23:30:00 High turbidity event.
08/02/99 00:00:00-23:30:00 High turbidity event.
08/03/99 00:00:00-23:30:00 High turbidity event.
08/04/99 00:00:00-04:30:00 High turbidity event.

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 may be 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

01/02/99 03:30:00-01/03/99 23:30:00 Turbidity data removed, probable probe blockage.

Research Creek, February

02/15/99 15:30:00 Maintenance.

Research Creek, March

03/11/99 13:30:00 Maintenance.

03/26/99 11:30:00-03/31/99 23:30:00 Instrument failure, no data collected.

Research Creek, April

04/01/99 00:00:00-04/09/99 13:30:00 Instrument failure.
04/19/99 04:30:00 Negative Turbidity, data removed.
04/19/99 12:00:00 Negative Turbidity, data removed.

Research Creek, May

05/30/99 01:30:00-05/30/99 03:30:00 Negative DO data, removed.

Research Creek, June

06/27/99 21:00:00 Negative DO, data removed.

Research Creek, July

07/03/99 23:00:00 Negative turbidity values, data deleted.
07/10/99 09:00:00 Negative turbidity values, data deleted.
07/10/99 09:30:00 Negative turbidity values, data deleted.
07/15/99 18:00:00-07/16/99 05:00:00 Temp data erratic suggesting sonde failure,
data removed.
07/19/99 17:30:00 Negative turbidity values, data deleted.
07/21/99 16:00:00-07/28/99 15:00:00 Negative DO values, data deleted.
07/26/99 07:00:00-07/28/99 10:30:00 Negative turbidity values, data deleted.
07/28/99 15:30:00-07/31/99 23:30:00 Sonde vandalized, no data.

Research Creek, August

08/01/99 00:00:00-08/13/99 13:00:00 Sonde vandalized, no data.
08/29/99 23:30:00 Negative turbidity value, deleted.

Research Creek, September
09/01/99 20:30:00-09/09/99 10:30:00 DO failure, data deleted.
09/07/99 03:00:00 Negative turbidity, deleted
09/14/99 01:30:00 Negative turbidity, deleted
09/16/99 05:30:00-09/21/99 06:30:00 Turbidity probe failure, data deleted.
09/21/99 07:00:00-09/21/99 16:00:00 Sonde failure, no data.
09/24/99 13:30:00 Maintenance.

Research Creek, November

11/08/99 14:30:00-11/09/99 11:00:00 Maintenance.

East Cribbing, January

01/23/99 19:30:00-01/23/99 21:30:00 Sonde possibly exposed at low tide, all data removed.
01/24/99 07:30:00-01/24/99 10:00:00 Sonde possibly exposed at low tide, all data removed.
01/24/99 21:00:00-01/25/99 00:00:00 Sonde possibly exposed at low tide, all data removed.
01/25/99 09:30:00-01/25/99 11:00:00 Sonde possibly exposed at low tide, all data removed.
01/25/99 22:00:00-01/25/99 22:00:00 Sonde possibly exposed at low tide, all data removed.
01/26/99 10:30:00-01/26/99 12:00:00 Sonde possibly exposed at low tide, all data removed.
01/26/99 22:30:00-01/27/99 01:00:00 Sonde possibly exposed at low tide, all data removed.
01/27/99 12:30:00-01/27/99 13:00:00 Sonde possibly exposed at low tide, all data removed.
01/29/99 01:30:00-01/29/99 02:00:00 Sonde possibly exposed at low tide, all data removed.
01/30/99 02:00:00-01/30/99 03:00:00 Sonde possibly exposed at low tide, all data removed.
01/30/99 15:30:00-01/30/99 16:00:00 Sonde possibly exposed at low tide, all data removed.
01/31/99 16:30:00-01/31/99 17:30:00 Sonde possibly exposed at low tide, all data removed.

East Cribbing, March

03/30/99 02:30:00-03/31/99 23:30:00 Instrument power failure.

East Cribbing, April

04/01/99 00:00:00-01/12/99 14:00:00 Sonde power failure.

East Cribbing, May

05/26/99 01:00:00 Turbidity negative, possible sensor blockage. Data removed

East Cribbing, June

06/07/99 00:00:00-06/10/99 04:30:00 Turbidity negative, possible probe blockage.
Data removed.
06/14/99 07:30:00 Turbidity negative, possible probe blockage. Data removed
06/14/99 15:30:00 Turbidity negative, possible probe blockage. Data removed
06/15/99 08:00:00 Turbidity negative, possible probe blockage. Data removed
06/17/99 16:30:00-06/21/99 13:30:00 Maintenance.

East Cribbing, August

08/04/99 05:00:00-08/26/99 11:00:00 Internal sonde failure. No data collected.

East Cribbing, September

09/20/99 13:30:00-09/21/99 16:30:00 Maintenance, no data collected.

East Cribbing, October

10/21/99 08:00:00-10/31/99 23:30:00 Battery failure.

East Cribbing, November

11/01/99 00:00:00-11/08/99 10:30:00 Battery Failure

East Cribbing, December

12/10/99 12:00:00-12/10/99 13:00:00 Maintenance.

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.

Start of each sample was delayed in the ms0899 file by from 9 to 5 minutes after
the hour and half hour. Time was corrected in the file to the hour and half
hour.