

Sapelo Island (SAP) NERR Water Quality Metadata
January-December 1999
Latest update: September 14, 2000

1. Principal investigator & contact persons:

Dorset Hurley, Research Coordinator	Georgia Department of
Natural	
Resources	
E-mail: dhurley@darientel.net (912) 485-2251	P.O. Box 15
Jane Garbisch, Reserve Technician	Sapelo Island, GA
31327	
(912) 485-2296	

2. Entry Verification:

The data are reviewed using the YSI computer program PC6000 that accompanies the YSI 6000 data logger. After the file is uploaded from the datalogger, PC6000 is used to plot the data and perform basic statistical analysis (i.e., min., max., mean, std. dev.) The information obtained from this is used during file review to detect any gross outliers such as data taken when the datalogger 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 using the CDMO Excel 5.0 macro so that the parameter columns are in the correct order and the data has the correct number of decimal place holders as specified by the NERR CDMO. Secondly, the Excel macro is used to determine if there are any dates and times that data was 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. The reason for the missing data is recorded on the metadata document. Next, the data are filtered using the Excel macro to find readings outside the instrument measurement range and the "normal" range for the site in question. Data outside the instrument range is/are removed from the file and a period is inserted to the cell(s). An explanation for the

missing dates and times are recorded onto the metadata document. Data that was outside the "normal" range of water quality for a particular site is investigated for validity based on weather data, field observations, QC checks, PC6000 printouts, and instrument diagnostics. If the data is/are rejected from the file a period is inserted to the cell(s) and an explanation for the missing dates and times are recorded onto metadata document. The completed Metadata form is submitted with the data file to the CDMO. Jane Garbisch was responsible for all 1999 data management.

3. Research Objectives:

Sapelo Island is only accessible by passenger ferry. Due to its isolation, the salt marsh and tidal waters of the SINERR show little evidence of human impact. Thus the Marsh Landing dock, the primary access point for the approximately 200-300 residents, commuters and daily visitors plus barge off loading was chosen as the most directly impacted site. The lower Duplin site is also readily accessible and centrally located within the SINERR. The University of Georgia Marine Institute has used this site for years and SINERR continues to do so. The Hunt Dock site was selected in July 1999 for monitoring. It is a dock only used for transporting hunters during the fall season. It is further up the Duplin, where the primary usage of the river is for pleasure boating and crabbing. Therefore it is the unimpacted site.

4. Research Methods:

The Water Quality Monitoring began in October of 1999, at the Marsh Landing Dock on the lower Duplin River. At this time we are only performing long term water quality monitoring and not a specific experiment. Prior to April 15, 1999 the sampling was done by the University of Georgia-Athens Marine Institute (UGAMI). When SAP NERR took over the NERR monitoring from the University of GA, a second site was set up at the Marsh Landing site to be the NERR monitoring station. In order to lesson the confusion between the 2 sites, the SAP NERR site is referred to as the Lower Duplin site (LD) and is monitored at a fixed depth from the bottom (0.5m). The University continues to monitor at

a fixed depth just below the surface (Marsh Landing) but this site is no longer considered a NERR monitoring station. The Flume Dock (FD) is also monitored by the University, but data is not reported to the SAP NERR anymore. Therefore the Hunt Dock (HD) site was established just south of the Flume Dock site as the new upper duplin site and also measures at 0.5m above the surface bottom. At the time of changing over the monitoring program, some changes were made and are noted at the end of this section.

Before each YSI PC6000 datalogger is deployed, calibration and maintenance is performed following the manufacturer's instructions. Calibration standards are only required for pH, conductivity, and turbidity, all other parameters are done as described in the manual. Buffer solutions for 2 point calibration (pH 7 and 10) are purchased from a scientific supply house. The conductivity standard is made using a 0.2 M solution of KCl ($24.82\text{mS/cm} = 14.92\text{ g/L}$) or from serial dilution of a certified conductivity standard. The turbidity calibration uses distilled water made by the University of Georgia-Athens Marine Institute. The dissolved oxygen membranes are replaced before deployment and are allowed to sit at least 24 hours prior to deployment. Calibration is then verified by running a standard as a sample after each calibration.*

During deployment the weather conditions and tide stage are recorded in the field observation log.* The datalogger is placed inside a length of PVC pipe attached to the dock. The Lower Duplin datalogger is attached to the north side of a fixed height dock by a steel cable and run down a PVC pipe to rest 0.5m above the surface bottom. The Hunt Dock data logger is attached to the south side of a fixed dock by steel cable and run down a PVC pipe to take measurements 0.5m above the surface bottom. Every 30 minutes during the sampling period measurements are taken for temperature, specific conductance, salinity, pH, dissolved oxygen concentration, percent saturation, depth and turbidity.

During the stage of deployment the datalogger is checked for fouling and cleaned. This can be one to three times a week depending on the time of year. At the end of the sample period the datalogger is retrieved and immediately replaced by another calibrated datalogger. The datalogger is then taken to the lab and runs QA/QC standards for pH, and conductivity, and dissolved oxygen, the data is uploaded, and the probe is cleaned.

* all the aforementioned were incorporated into the procedure April 15, 1999. Before this date, no QA/QC samples were run, nor was there any field log kept.

5. Site Location and character:

The monitoring site is located on the Marsh Landing Dock in the Duplin River on Sapelo Island. Water passing the Marsh landing site during flood tide originates from the Doboy Sound. The Doboy receives input from the Atlantic Ocean, and the Altamaha River via the Intra-Coastal Waterway. The water is pushed up the river or up smaller tidal creeks and some is pushed onto the marsh surface by the flood tide and recedes into the main channel during ebb tide.

The dock itself is used as the main dock to the island where the ferry makes several daily runs. There are also several small boats that are docked there. The surrounding area vegetation is dominated by salt marsh with *Spartina* being the predominate flora. Latitude and longitude for Lower Duplin site is as follows: 31 deg 25' 4" N, 81 deg 17' 46" W); Latitude and longitude for Hunt Camp site is as follows: (31 deg 28' 43", 81 deg 16' 23" W); Tidal range maximum for both sites is 14 feet and the salinity range is 5-35 ppt. Because the previous data from 1995-1998 was measured at a fixed depth closer to the surface, a base line range has not been established for parameters in the 1999 data.

The Hunt Dock monitoring site is located on the Duplin River, off of Moses Hammock, which is separated by Sapelo Island by a small tidal channel. The

primary runoff at the site is from tidal creeks flowing through Spartina marsh and through the mud. There is little human traffic this far up the Duplin and it is north of the people living on Sapelo.

6. Data collection period: (listed by each deployment)

Lower Duplin:

BEGAN:	ENDED:
12/17/98 16:00	-1/8/99 14:00
1/8 14:30	-1/25 15:30
1/25 16:00	-2/4 15:00
2/4 15:30	-2/18 16:00
2/18 16:30	-3/5 14:00
3/5 14:30	- 3/18 14:30
3/18 15:00	-3/31 11:00
3/31 12:00	-4/15 15:00
4/15 16:30	-4/28 10:30
4/28 11:00	-5/13 19:00
5/13 19:30	-5/27 7:00
5/27 8:00	-6/8 19:30
6/8 20:00	-6/23 14:30
6/23 15:30	-7/8 18:30
7/8 19:00	-7/21 10:00
7/21 11:00	-8/3 15:30
8/3 16:00	-8/16 7:00
8/16 7:30	-8/30 13:30
8/30 14:00	-9/10 19:30
9/10 20:00	-9/26 11:30
9/28 13:30	-10/11 14:30
10/11 17:30	-10/23 10:30
10/27 17:00	-11/15 16:00
11/15 15:30	-11/30 17:30
11/30 18:30	-12/16 8:00
12/17 15:00	-1/1/00 12:00

Hunt Dock:

Began:	Ended:
7/3 10:00	-7/19 7:00
7/19 7:30	-8/2 10:30
8/2 11:00	-8/14 9:00
8/14 9:30	-8/22 13:30
8/22 14:00	-8/29 12:30
8/29 13:30	-9/10 15:30
9/11 10:30	- 9/25 8:30
9/26 11:00	-10/12 13:00
10/13 17:00	-10/26 14:30
10/28 13:00	-11/16 14:30
11/16 15:00	-11/30 16:30
11/30 18:30	-12/16 8:00
12/19 14:00	-1/2/00 14:00

7. Associated researchers and projects:

Sapelo Island has a long history of maintaining research. In 1953, the University of Georgia Marine Institute (UGAMI) was formed and the island became a working laboratory for many. The research continues today with SINERR and UGAMI creating a unique partnership with much of the current research being done facilitated by SINERR and UGAMI together. Given UGAMI's long history on Sapelo, a bibliographic list of over 800 articles of current and previous research can be found on the UGAMI website. (<http://www.uga.edu/UGAMI>). Examples of current research facilitated by SINERR are:

NERR sponsored fellowships:

Gregory Schultz-graduate student, Georgia Institute of Technology, Earth and Atmospheric Sciences.

Characterization of a barrier island surficial aquifer.

Stacey Webb-graduate student, The University of Georgia-Athens, Department of Marine Science

Investigation of juvenile white shrimp (*Penaeus setiferus*) residence time, growth, and movement within the tidal marsh nursery.

Proposed Research:

Dr. Randall Walker (UGA Marine Extension Service) and Dorset Hurley- (SINERR)

long term monitoring of both living and dead oyster beds and monthly monitoring of spat recruitment.

8. Variable sequence, range of measurements, units, resolution, and accuracy:

YSI 6000 datalogger

variable	Range of measurement (units)	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			
SpCond	0-100 (mS/cm)	0.01 mS/cm	+/-
0.5% of			
reading + 0.001 mS/cm			
Salinity	0-70 (ppt)	0.01 ppt	+/-
1.0% of			
reading or 0.1ppt (which ever is greater)			
DO	0-200 (% air saturation)	0.1% @ air sat.	+/-
2%@air sat			
DO	200-500 (% air sat.)	0.1% @ air sat.	+/-
6%@air sat			
DO	0-20 (mg/L)	0.01 mg/L	+/-0.
2mg/L			
DO	20-50 (mg/L)	0.01 mg/L	+/-0.6
mg/L			
Depth (shallow)	0-9.1 (m)	0.001 m	+/-
0.018 m			
PH	2-14 units	0.01 units	+/-0.2
units			
Turb	0-1000 (NTU)	0.1 NTU	+/-5%
of			
reading or 2 NTU (which ever is greater)			

Data columns are separated by tabs.

9. Coded variable indicator and variable code definitions:

LD = Lower Duplin HD = Hunt Dock

10. Data anomalies:

Lower Duplin:

January 1-31, 1999 sampling period

a.) 1 January 1999 00:00-8 January 13:30 No turbidity data reported, calibration incorrect

b.) 8 January 1999 14:30:00 - 25 January 1999 15:30:00 There appears to be a DO

membrane problem where DO drastically drops. Data retained.

c.) 8 January 1999 14:00:00 sonde was out of the water

February 1-28, 1999 sampling period

a.) 20 February 1999 04:00:00 - 26 February 1999 09:30:00 the pH dramatically drops during this time. Data retained.

March 1-31, 1999 sampling period

a.) 16 March 1999 00:30:00 Dissolved Oxygen data removed. Discovered fish living in probe compartment

April 1-30, 1999

a.) 15 April 1999 16:30 - 28 April 1999 10:30 all pH data missing. Data rejected after failing post deployment QA/QC standard run as a sample.

May 1-31, 1999
none

June 1-30, 1999
none

July 1-31, 1999
a.) 8 July 1999 19:00:00-21 July 1999 10:00:00 Dissolved oxygen data not reported due to post deployment check standard failure. Membrane heavily fouled; data removed.

August 1-31, 1999
a) 3 August 1999 16:30 DO% and mg/L removed, reading negative
b) 4 August 1999 3:30-6:00, 8:30 DO% and mg/L removed, reading negative
c) 5 August 1999 6:30 DO% and mg/L removed, reading negative
d) 14 August 1999 15:30- 16 August 1999 7:00, DO% and mg/L removed, reading negative
negative fish found living in probe guard
e.) 26 August 1999 0:00- 30 August 1999 13:30, no Sp cond, or salinity. Post calibration verification failed. Heavy barnacle growth on probe. Removed data where data began to drop.
f.) 28 August 1999 23:30-30 August 1999 13:30, DO% and mg/L removed. Fish found living in probe guard.
g.) 30 August 1999 14:00-31 August 23:30 no DO reported due to DO probe failure.

September 1-30, 1999
a.) 1 September 0:00 - 10 September 1999, 19:30, no DO reported due to DO probe failure; data removed.
b.) 6 September 16:30 - 10 September 1999, No turbidity data. Removed after anomaly.
c.) Negative turbidity outliers for the following times were noted and left in file:

Date	Time	Turb
09/02/99	08:00:00	-0002
09/02/99	08:30:00	-0002
09/02/99	09:00:00	-0002
09/03/99	08:30:00	-0002
09/03/99	22:00:00	-0001
09/03/99	22:30:00	-0002
09/04/99	11:00:00	-0003
09/04/99	23:00:00	-0001
09/05/99	10:30:00	-0001
09/05/99	11:00:00	-0001
09/05/99	11:30:00	-0002

09/05/99	18:30:00	-0001
09/06/99	06:30:00	-0001

October 1-31 1999
none

November 1-30 1999

a.) Negative turbidity values for the following dates and times were noted and left in the file:

Date	Time	Turb
11/30/99	18:30:00	-0001
11/30/99	19:00:00	-0001
11/30/99	19:30:00	-0004
11/30/99	20:00:00	-0004
11/30/99	20:30:00	-0005
11/30/99	21:00:00	-0004
11/30/99	21:30:00	-0004
11/30/99	22:00:00	-0005
11/30/99	22:30:00	-0005
11/30/99	23:00:00	-0005
11/30/99	23:30:00	-0003

December 1-31 1999

a.) 22 December 1999 1:00-2:30, 14:00-15:00, no data reported, exposed at low tide

b.) 23 December 1999 2:00-2:30, 15:00-15:30, no data reported, exposed at low tide

c.) 24 December 1999 2:30-4:00, 15:30-16:30, no data reported, exposed at low tide.

d.) 25 December 1999 3:30-4:30, no data reported exposed at low tide

e.) 26 December 1999 17:30-18:00, no data reported, exposed at low tide

f.) 27 December 1999 5:30-6:00, no data reported, exposed at low tide

g.) Turbidity often reading negative, believed to be because value so close to

zero. Negative turbidity outliers for the following times were noted and were

left in data file:

Date	Time	Turb
12/01/99	00:00:00	-0003
12/01/99	00:30:00	-0002
12/01/99	04:00:00	-0001
12/01/99	07:30:00	-0002
12/01/99	08:00:00	-0001
12/01/99	11:00:00	-0004
12/01/99	19:30:00	-0002
12/01/99	20:00:00	-0002
12/01/99	20:30:00	-0004
12/01/99	21:00:00	-0004
12/01/99	21:30:00	-0005
12/01/99	22:00:00	-0003

12/01/99	22:30:00	-0003
12/01/99	23:00:00	-0001
12/01/99	23:30:00	-0001
12/02/99	01:00:00	-0001
12/02/99	01:30:00	-0001
12/02/99	09:30:00	-0002
12/02/99	10:00:00	-0003
12/02/99	10:30:00	-0003
12/02/99	11:00:00	-0004
12/02/99	11:30:00	-0004
12/02/99	12:00:00	-0005
12/02/99	13:30:00	-0001
12/02/99	17:00:00	-0001
12/02/99	20:30:00	-0001
12/02/99	21:00:00	-0003
12/02/99	21:30:00	-0002
12/02/99	22:00:00	-0004
12/02/99	22:30:00	-0001
12/02/99	23:00:00	-0002
12/02/99	23:30:00	-0003
12/03/99	00:00:00	-0002
12/03/99	09:30:00	-0001
12/03/99	10:30:00	-0001
12/03/99	11:00:00	-0002
12/03/99	11:30:00	-0002
12/03/99	12:00:00	-0003
12/03/99	12:30:00	-0003
12/03/99	22:00:00	-0003
12/03/99	22:30:00	-0001
12/03/99	23:00:00	-0003
12/03/99	23:30:00	-0002
12/04/99	00:30:00	-0003
12/04/99	01:00:00	-0002
12/04/99	01:30:00	-0002
12/04/99	10:00:00	-0001
12/04/99	11:00:00	-0001
12/04/99	12:30:00	-0004
12/04/99	18:30:00	-0002
12/04/99	22:30:00	-0002
12/04/99	23:00:00	-0004
12/04/99	23:30:00	-0002
12/05/99	00:00:00	-0004
12/05/99	00:30:00	-0002
12/05/99	01:00:00	-0002
12/05/99	01:30:00	-0001
12/05/99	02:30:00	-0001
12/05/99	12:00:00	-0001
12/05/99	12:30:00	-0002
12/05/99	13:00:00	-0004
12/05/99	13:30:00	-0002
12/05/99	14:00:00	-0001
12/05/99	14:30:00	-0003
12/05/99	19:00:00	-0003
12/05/99	23:30:00	-0002

12/06/99	00:00:00	-0002
12/06/99	00:30:00	-0004
12/06/99	13:30:00	-0003
12/06/99	17:00:00	-0001
12/06/99	18:30:00	-0001
12/06/99	19:00:00	-0003
12/06/99	19:30:00	-0003
12/06/99	23:30:00	-0001
12/07/99	00:00:00	-0001
12/07/99	00:30:00	-0002
12/07/99	01:30:00	-0001
12/07/99	02:00:00	-0003
12/07/99	02:30:00	-0001
12/07/99	04:00:00	-0002
12/08/99	00:30:00	-0001
12/08/99	01:00:00	-0003
12/08/99	03:00:00	-0003
12/08/99	14:00:00	-0001
12/08/99	14:30:00	-0001
12/08/99	15:30:00	-0002
12/08/99	21:00:00	-0002
12/09/99	01:30:00	-0004
12/09/99	02:00:00	-0003
12/09/99	02:30:00	-0004
12/09/99	03:00:00	-0001
12/09/99	03:30:00	-0002
12/09/99	04:00:00	-0002
12/09/99	04:30:00	-0001
12/09/99	21:30:00	-0001
12/10/99	01:30:00	-0001
12/10/99	03:00:00	-0001
12/10/99	04:00:00	-0002
12/10/99	05:00:00	-0001
12/10/99	10:00:00	-0003
12/10/99	22:00:00	-0003
12/11/99	01:30:00	-0003
12/11/99	02:30:00	-0004
12/11/99	03:00:00	-0002
12/11/99	03:30:00	-0002
12/11/99	04:30:00	-0002
12/11/99	05:00:00	-0001
12/11/99	05:30:00	-0001
12/11/99	17:00:00	-0001
12/11/99	17:30:00	-0003
12/11/99	22:30:00	-0003
12/12/99	02:30:00	-0002
12/12/99	03:00:00	-0003
12/12/99	03:30:00	-0001
12/12/99	04:00:00	-0003
12/12/99	04:30:00	-0002
12/12/99	05:00:00	-0004
12/12/99	05:30:00	-0001
12/12/99	06:00:00	-0001
12/12/99	18:30:00	-0001

12/13/99	03:30:00	-0002
12/13/99	04:00:00	-0001
12/13/99	04:30:00	-0002
12/13/99	05:00:00	-0002
12/13/99	05:30:00	-0003
12/13/99	06:00:00	-0004
12/13/99	06:30:00	-0004
12/13/99	11:00:00	-0001
12/13/99	11:30:00	-0001
12/13/99	12:00:00	-0004
12/13/99	18:00:00	-0002
12/13/99	19:00:00	-0002
12/13/99	21:00:00	-0003
12/13/99	23:30:00	-0002
12/14/99	00:00:00	-0001
12/14/99	04:00:00	-0003
12/14/99	04:30:00	-0002
12/14/99	05:00:00	-0002
12/14/99	05:30:00	-0003
12/14/99	12:00:00	-0001
12/14/99	12:30:00	-0001
12/14/99	13:00:00	-0002
12/14/99	21:30:00	-0002
12/14/99	22:00:00	-0001
12/15/99	00:00:00	-0002
12/15/99	01:00:00	-0001
12/15/99	05:00:00	-0003
12/15/99	05:30:00	-0004
12/15/99	06:00:00	-0003
12/15/99	06:30:00	-0002
12/15/99	08:00:00	-0002
12/15/99	09:00:00	-0002
12/16/99	01:30:00	-0002
12/16/99	02:00:00	-0003
12/16/99	05:30:00	-0002
12/16/99	08:30:00	-0001
12/16/99	19:00:00	-0002
12/16/99	19:30:00	-0003
12/16/99	20:00:00	-0004
12/16/99	20:30:00	-0003
12/16/99	21:00:00	-0001
12/16/99	22:00:00	-0003
12/16/99	22:30:00	-0002
12/16/99	23:00:00	-0002
12/17/99	03:00:00	-0002
12/17/99	07:00:00	-0002
12/17/99	07:30:00	-0002
12/17/99	08:00:00	-0001
12/17/99	08:30:00	-0001
12/17/99	10:00:00	-0002
12/17/99	10:30:00	-0002
12/17/99	11:30:00	-0002

HUNT DOCK:
Data anomalies:

July 1-31, 1999

a.) Following data removed due to sonde being exposed at low tide:

6 July 1999 8:30-9:30
7 July 1999 9:00-10:30
8 July 1999 9:30-12:00
8 July 1999 23:00- 9 July 00:00
9 July 1999 10:00-13:00
9 July 1999 23:30- 10 July 2:30
10 July 1999 11:00-14:00
11 July 1999 0:00-2:30
11 July 1999 12:00-15:00
12 July 1999 1:30-3:30
12 July 1999 13:30-15:30
13 July 1999 2:30-4:30
13 July 1999 14:30-16:30
14 July 1999 3:30-5:00
14 July 1999 15:30-17:00
15 July 1999 4:30-5:30
15 July 1999 17:00-17:30
16 July 1999 5:30-6:30
17 July 1999 6:30-7:00
18 July 1999 7:00:00 - 7:30:00
20 July 1999 8:00:00 - 8:30:00
27 July 1999 2:00:00 - 3:00:00
29 July 1999 4:00:00
30 July 1999 4:00:00
31 July 1999 5:00:00 - 5:30
31 July 1999 17:00:00 17:30:00

b.) 13 July 1999 21:30:00 - 14 July 1999 20:00:00 DO%, DO mg/L reading very high,

cause unknown; data left in file.

c.) 26 July 1999 0:30:00, 2:30:00-3:30:00 DO% removed, negative reading

d.) 26 July 1999 13:30:00 - 16:30:00 DO% and mg/L reading very high; data not

removed

e.) 27 July 1999 14:00:00, 17:30:00, 23:00:00 DO removed negative reading.

f.) 28 July 1999 2:00:00 - 3:30:00, DO removed, negative reading

g.) 29 July 2:30:00 - 3:30:00 DO removed, negative reading.

h.) 30 July 3:00:00- 3:30:00, DO removed, negative reading

i.) 31 July 1999 3:30:00 - 4:30:00, 11:30:00 - 12:00:00 DO removed, negative

reading

j.) Negative depths occurred at the following times and remain in the file:

Date	Time	Depth
07/06/99	08:00:00	-0.04
07/06/99	10:00:00	-0.04
07/06/99	20:30:00	-0.06
07/06/99	21:00:00	-0.07
07/06/99	21:30:00	-0.02

07/07/99	08:30:00	-0.03
07/07/99	21:30:00	-0.02
07/07/99	22:00:00	-0.05
07/07/99	22:30:00	-0.07
07/07/99	23:00:00	-0.05
07/08/99	22:30:00	-0.03
07/12/99	01:00:00	-0.05
07/14/99	03:00:00	-0.03
07/14/99	17:30:00	-0.03
07/15/99	04:00:00	-0.03
07/15/99	06:00:00	-0.06
07/15/99	16:30:00	-0.02
07/15/99	18:00:00	-0.05
07/16/99	05:00:00	-0.02
07/17/99	06:00:00	-0.02
07/18/99	08:00:00	-0.02

August 1-30, 1999

a.) Following data removed due to sonde being exposed at low tide:

8/1/99 5:30-6:30
 8/2/99 6:30-7:30
 8/6/99 10:00-10:30
 8/7/99 11:00-12:00
 8/8/99 00:30, 11:30-13:30
 8/9/99 0:00-2:00, 12:30-14:30
 8/10/99 1:00-3:00, 13:30-15:00
 8/11/99 2:30-4:00, 14:30-16:00
 8/12/99 3:00-4:30, 15:30-16:30
 8/13/99 4:30-5:00, 16:30-17:30
 8/14/99 5:00-6:00
 8/16/99 6:30
 8/26/99 3:00, 14:30-15:30
 8/27/99 3:00-4:00, 15:00-16:30
 8/28/99 4:00-5:00, 16:00-16:30

b.) 1 August 0:00 - 2 August 10:00, DO data removed, DO reading negative

c.) 10 August 1999 22:00 - 14 August 1999 9:00, DO spike, all data removed from

time of spike to new deployment.

d.) 10 August 1999 03:30, DO data was removed due to negative readings

e.) 28 August 1999 3:30, DO negative DO data removed.

f.) 8/28/99-8/29/99 Special note- Hurricane Dennis offshore of Sapelo.

September 1999

The following data not reported due to sonde being exposed at low tide:

9/6/99 12:00-13:00
 9/7/99 1:00-1:30, 13:00-14:00
 9/8/99 2:00, 14:00-15:00
 9/9/99 15:00-15:30
 9/19/99 10:30
 9/26/99 16:00 - 16:30
 9/27/99 4:00 - 5:00, 17:00 - 17:30
 9/28/99 4:30 - 5:30
 9/29/99 6:00

9/30/99 6:30 - 7:30

a.) 11 September 1999 11:00 - 17:00, 18:00- 12 September 1999 14:00 DO removed

negative reading

b.) 12 September 1999 10:00, Turbidity spike (data remains), 16:30 DO

negative-

DO data removed.

c.) 13 September 1999 3:00 - 13:00, DO negative data removed

d.) 14 September 1999 5:00-8:30, DO negative data removed

e.) 15 September 1999 17:30 - 21:00 Turbidity increase; data not removed

f.) 19 September 1999 8:00 - 10:00, 23:30 - 20 September 00:00 DO negative data

removed.

g.) 20 September 1999 11:30, 23:30 - 9/21/99 0:30, DO negative data removed.

h.) 21 September 1999 1:30, DO negative data removed

i.) 22 September 1999 1:30, 16:30 - 22:00, 23:30 DO negative data removed

j.) 23 September 1999 0:00 - 3:30 DO negative data removed

k.) 24 September 1999 1:30 - 2:00 DO negative data removed

l.) 25 September 1999 3:00, DO negative data removed

m.) Special Note: Hurricane Floyd and Harvey off shore during September.

n.) 27 September 1999 3:00 - 3:30, 6:00 - 7:00 DO negative data removed

o.) 28 September 1999 3:30 - 4:00, 6:30 - 8:00 DO negative data removed

p.) 29 September 1999 4:30 - 5:30, 6:30 - 9:00, DO negative data removed

q.) 30 September 1999 5:30, DO negative data removed

October 1999

During the month of October there are several hunts on the island. The sonde is

deployed at the dock used by the deer hunters that come and go by small boat.

This could explain the turbidity fluctuations.

a.) 10/11/99 14:30 - 17:00, 21:00 Turbidity readings high.

b.) 10/12/99 2:00, 6:00, 8:00 - 11:00, 12:30 Turbidity readings high

c.) 10/13/99 16:30 turbidity reading high, removed from data

d.) Turbidity data for the following times are greater than 1000 NTU and negative but remain in the database.

Date	Time	Turb
10/12/99	02:00:00	1188
10/12/99	11:00:00	1550
10/14/99	06:30:00	1032
10/24/99	02:30:00	-0002
10/24/99	03:00:00	-0003
10/25/99	03:00:00	-0002
10/25/99	03:30:00	-0003
10/25/99	04:00:00	-0003
10/25/99	15:30:00	-0004
10/25/99	16:00:00	-0003
10/25/99	16:30:00	-0003
10/26/99	03:30:00	-0003
10/26/99	04:00:00	-0003
10/26/99	04:30:00	-0003
10/26/99	05:00:00	-0003
10/28/99	13:00:00	-0001

10/30/99	15:00:00	-0001
10/31/99	00:30:00	-0001
10/31/99	02:00:00	-0001
10/31/99	03:00:00	-0002
10/31/99	03:30:00	-0001
10/31/99	06:30:00	-0001
10/31/99	12:30:00	-0001
10/31/99	15:30:00	-0002
10/31/99	16:00:00	-0002

e.) 10/13 17:00 - 10/26 14:30 due to broken probe, only depth, pH and turbidity are reported

f.) 10/14/99 4:30 - 13:30, Turbidity readings high

g.) 10/24/99 2:30 - 3:00 Turbidity reading negative

h.) 10/25/99 3:00 - 4:00, 15:30 - 16:30, Turbidity negative

i.) 10/25/99 8:00, turbidity reading high

j.) 10/26/99 3:30 - 5:00 turbidity negative.

k.) 10/28/99 13:00, turbidity negative

l.) 10/30/99 15:00 turbidity negative

m.) 10/31/99 00:30, 2:00, 3:00 - 3:30, 6:30, 12:30, 15:30-16:00 Turbidity reading negative

n.) 10/6/99 00:00:00 DO removed due to negative values

November 1999

a.) Turbidity reading negative often through month, believed to be because the readings are typically very close to 0.

Date Time Turb

11/30/99	18:30:00	-0001
11/30/99	19:00:00	-0001
11/30/99	19:30:00	-0004
11/30/99	20:00:00	-0004
11/30/99	20:30:00	-0005
11/30/99	21:00:00	-0004
11/30/99	21:30:00	-0004
11/30/99	22:00:00	-0005
11/30/99	22:30:00	-0005
11/30/99	23:00:00	-0005
11/30/99	23:30:00	-0003

b.) 11/4/99 21:00-21:30, sonde for unexplained reason did not take samples during these times.

c.) Exposed at low tide during the following times, all data removed

11/2/99 22:30 - 11/3/99 0:30

11/3/99 11:00-12:30

11/3/99 23:30-11/4/99 1:00

11/4/99 12:30-13:00

11/4/99 21:00-21:30

11/5/99 0:30-1:30, 13:30-14:00

11/6/99 1:00-2:30, 13:30 - 15:00

11/7/99 1:30-3:30, 14:30-15:30

11/8/99 2:00-3:30, 15:30 - 16:00

11/9/99 3:00-3:30, 16:30

11/10/99 17:00

11/19/99 22:30-23:30
11/20/99 11:00-12:00, 23:00- 11/21/99 1:00
11/21/99 12:00-13:00
11/22/99 0:00-2:00, 13:00-14:30
11/23/99 1:00-2:30, 14:00-15:30
11/24/99 1:30-3:30, 15:00-16:30
11/25/99 2:30-4:30, 15:30-17:00
11/26/99 3:30-5:00, 16:30-18:00
11/27/99 4:30-6:00, 17:30-18:30
11/28/99 19:00
11/30/99 17:00-18:00
d.) 24 November 04:30:00 DO negative reading, data removed
e.) 24 November 05:30:00 there is a large DO spike following a negative value. Data retained.

December 1999

a.) The following times data has been removed because the sonde was exposed at low tide.
12/4/99 0:30 - 1:00
12/5/99 1:00-2:00
12/6/99 1:30-2:30, 14:30-16:00
12/7/99 1:30-3:30
12/10/99 17:00-17:30
12/11/99 4:00-5:30
12/14/99 19:30-20:00
12/19/99 23:00-12/20 0:30
12/20/99 11:30 - 13:00
12/20/99 23:00 - 12/21/99 1:30
12/21/99 12:30-14:00
12/22/99 0:00-3:00, 13:00-15:30
12/23/99 1:00-3:30, 14:00-16:00
12/24/99 2:00-4:30, 15:00-17:00
12/25/99 2:30-5:00, 16:00-17:30
12/26/99 4:00-6:00, 16:30-19:00
12/27/99 4:30-7:00, 17:30-19:00
12/28/99 18:30-20:00
12/29/99 20:30
12/30/99 20:30 21:30
12/31/99 10:00-11:00 21:30-22:30
b.) Turbidity at the following time was greater than 1500 NTU: 12/01/99 08:00
but remains in the file.

11. Missing Data

Lower Duplin:

January 1-31, 1999 sampling period

a.) 1 January 00:00:00 - 8 January 13:30:00 no turbidity reported, problem with calibration standard.

- b.) 8 January 14:00:00 sonde out of water.
- c.) 25 January 1999 16:00 all data missing. The probe was out of the water for cleaning
- d.) 25 January 16:30-31 January 23:30, no turbidity probe deployed

February 1-28, 1999 sampling period

No Turbidity probe deployed for entire month.

- a.) 4 February 15:30 data removed. Probe was out of the water for cleaning
- b.) 18 February 12:00 data removed. Probe was out of the water for cleaning.
- c.) 18 February 16:00, no sonde deployed.

March 1-31, 1999 sampling period

No turbidity probe deployed for the month.

- a.) 16 March 1999 00:30:00 Dissolved Oxygen data missing. Discovered fish living in probe compartment; data removed
- b.) 16 March 10:00 all data removed. Probe was out of the water for cleaning
- c.) 25 March 15:30 all data removed. Probe was out of the water for cleaning.
- d.) 31 March 11:30 all data removed. Probe was out of the water for cleaning.

April 1-30, 1999

No Turbidity probe deployed for the month.

- a.) 11 April 1999 18:30 all data removed. Probe was out of the water for cleaning.
- b.) 15 April 1999 15:30 and 16:00 all data missing. The previous probe was in the water when the time change occurred 4 April 1999. Time adjustments were not able to be made until deployment on the 15th.
- c.) 15 April 1999 16:30 - 28 April 1999 10:30 all pH data missing. Data rejected after failing post deployment QA/QC standard run as a sample.

May 1-31, 1999

- a.) 27 May 7:30 No data, sonde not deployed
- b.) No Turbidity probe deployed for the month

June 1-30, 1999

- a.) 23 June 1999 15:00 all data missing, took sample while being switched to new probe

July 1-31, 1999

- a.) 8 July 1999 19:00:00-21 July 1999 10:00:00 Dissolved oxygen data not reported due to post deployment check standard failure. Membrane heavily fouled; data removed
- b.) 17 July 1999 15:30:00 all data missing. Sonde out of water for cleaning.

- c.) 21 July 1999 10:30, sonde not deployed, all data missing
- d.) No Turbidity probe deployed for the month

August 1-31, 1999

- a.) No turbidity probe deployed until 8/30 14:00
- b) 3 August 1999 16:30 DO% and mg/L removed, reading negative
- c) 4 August 1999 3:30-6:00, 8:30 DO% and mg/L removed, reading negative
- d) 5 August 1999 6:30 DO% and mg/L removed, reading negative
- e) 14 August 1999 15:30- 16 August 1999 7:00, DO% and mg/L removed, reading negative fishh found living in probe guard
- f.) 26 August 1999 0:00- 30 August 1999 13:30, no Sp cond, or salinity. Post calibration verification failed. Heavy barnacle growth o probe. Removed data where data began to drop.
- g.) 28 August 1999 23:30-30 August 1999 13:30, DO% and mg/L removed. Fish found living in probe guard.
- h.) 30 August 1999 14:00-31 August 23:30 no DO reported due to DO probe failure.

September 1-30, 1999

- a.) 1 September 0:00 - 10 September 1999, 19:30, no DO reported due to DO probe failure; data removed
- b.) 6 September 16:30 - 10 September 19:30, No turbidity data. Removed after anamoly
- c.) 10 September 20:00 - 30 September 23:30, no turbidity probe deployed.
- d.) 26 September 1999 12:00 - 28 September 1999 13:00 no sonde deployed, all data missing.

October 1-31 1999

- a.) 1 October 0:00-31 October 23:30, no turbidity probe deployed
- b.) 11 October 1999 15:00-17:00 all data missiing, no sonde in the water
- c.) 23 October 1999 11:00-27 October 16:30 all data missing, no sonde deployed
- d.) 27 October 1999 17:00- 31 October 23:30 no salinity data, due to programming error

November 1-30 1999

- a.) 1 November 0:00- 15 November 16:00 no salinity data due to programming error
- c.) 1 November 0:00-30 November 17:30, no turbidity probe deployed
- d.)

December 1-31 1999

- a.) 17 December 1999 15:30-31 December 23:30 no turbidity probe deployed
- b.) 22 December 1999 1:00-2:30, 14:00-15:00, no data reported, exposed at low tide

- c.) 23 December 1999 2:00-2:30, 15:00-15:30, no data reported, exposed at low tide
- d.) 24 December 1999 2:30-4:00, 15:30-16:30, no data reported, exposed at low tide.
- e.) 25 December 1999 3:30-4:30, no data reported exposed at low tide
- f.) 26 December 1999 17:30-18:00, no data reported, exposed at low tide
- g.) 27 December 1999 5:30-6:00, no data reported, exposed at low tide.

HUNT DOCK:

Missing Data:

July 1-31, 1999

- a.) 1 July 1999 00:00:00-3 July 1999 9:30:00 no data taken, sonde not deployed at this time

- b.) Following data removed due to sonde being exposed at low tide:

6 July 1999 8:30-9:30
7 July 1999 9:00-10:30
8 July 1999 9:30-12:00
8 July 1999 23:00- 9 July 00:00
9 July 1999 10:00-13:00
9 July 1999 23:30- 10 July 2:30
10 July 1999 11:00-14:00
11 July 1999 0:00-2:30
11 July 1999 12:00-15:00
12 July 1999 1:30-3:30
12 July 1999 13:30-15:30
13 July 1999 2:30-4:30
13 July 1999 14:30-16:30
14 July 1999 3:30-5:00
14 July 1999 15:30-17:00
15 July 1999 4:30-5:30
15 July 1999 17:00-17:30
16 July 1999 5:30-6:30
17 July 1999 6:30-7:00
18 July 1999 7:00:00 - 7:30:00
20 July 1999 8:00:00 - 8:30:00
27 July 1999 2:00:00 - 3:00:00
29 July 1999 4:00:00
30 July 1999 4:00:00 - 5:00:00
31 July 1999 5:00:00 - 5:30:00
31 July 1999 17:00:00 17:30:00

- c.) No turbidity probe deployed for the month.

- d.) 26 July 1999 0:30, 2:30-3:30, DO data removed, negative reading
- e.) 27 July 1999 14:00, 17:30, 23:00 DO data removed, negative reading
- f.) 28 July 1999 2:00-3:30 DO data removed, negative reading
- g.) 29 July 1999 2:30-3:30 DO data removed, negative reading,
- h.) 30 July 1999 3:00-3:30 DO data removed, negative reading
- i.) 31 July 1999 3:30-4:30, 11:30-12:00 DO data removed, negative reading

August 1-30, 1999

- a.) Following data removed due to sonde being exposed at low tide:

8/1/99 5:30-6:30
8/2/99 6:30-7:30
8/6/99 10:00-10:30
8/7/99 11:00-12:00
8/8/99 00:30, 11:30-13:30
8/9/99 0:00-2:00, 12:30-14:30
8/10/99 1:00-3:00, 13:30-15:00
8/11/99 2:30-4:00, 14:30-16:00
8/12/99 3:00-4:30, 15:30-16:30
8/13/99 4:30-5:00, 16:30-17:30
8/14/99 5:00-6:00
8/16/99 6:30
8/26/99 3:00, 14:30-15:30
8/27/99 3:00-4:00, 15:00-16:30
8/28/99 4:00-5:00, 16:00-16:30

b.) No turbidity probe deployed for month.

c.) 8/1/99 0:00-8/2/99 10:00, DO data removed, negative reading

d.) 8/10/99 3:30 DO data removed, negative reading

e.) 8/10/99 22:00-8/14 9:00 DO spike, all data removed from time of spike to new

deployment.

f.) 8/28/99 03:30 DO negative; data removed

September 1999

a.) 25 September 1999 9:00 - 26 September 1999 10:30, no sonde deployed during this time.

The following data not reported due to sonde being exposed at low tide:

9/6/99 12:00-13:00

9/7/99 1:00-1:30, 13:00-14:00

9/8/99 2:00, 14:00-15:00

9/9/99 15:00-15:30

9/19/99 10:30

9/26/99 16:00 - 16:30

9/27/99 4:00 - 5:00, 17:00 - 17:30

9/28/99 4:30 - 5:30

9/29/99 6:00

9/30/99 6:30 - 7:30

b.) 1 September 1999 0:00- 10 September 1999 15:30, no turbidity probe deployed

c.) 10 September 1999 16:00- 11 September 1999 10:00 all missing, no sonde deployed

d.) 11 September 1999 11:00 - 17:00, 18:00- 12 September 14:00, DO removed negative reading

e.) 12 September 1999 16:30 DO negative-DO data removed.

f.) 13 September 1999 3:00 - 13:00, DO negative data removed

g.) 14 September 1999 5:00-8:30, DO negative data removed

h.) 19 September 1999 8:00 - 10:00, 23:30 - 20 September 0:00 DO negative data removed.

i.) 20 September 1999 11:30, 23:30 - 9/21/99 0:30, DO negative data removed.

j.) 21 September 1999 1:30, DO negative data removed

- k.) 22 September 1999 1:30, 16:30 - 22:00, 23:30 DO negative data removed
- l.) 23 September 1999 0:00 - 3:30 DO negative data removed
- m.) 24 September 1999 1:30 - 2:00 DO negative data removed
- n.) 25 September 1999 3:00, DO negative data removed
- o.) Special Note: Hurricane Floyd and Harvey off shore during September.
- p.) 27 September 1999 3:00 - 3:30, 6:00 - 7:00 DO negative data removed
- q.) 28 September 1999 3:30 - 4:00, 6:30 - 8:00 DO negative data removed
- r.) 29 September 1999 4:30 - 5:30, 6:30 - 9:00, DO negative data removed
- s.) 30 September 1999 5:30, DO negative data removed

October 1999

- a.) 10/06/99 00:00 DO removed due to negative values
- b.) 10/12/99 13:30 - 10/13/99 16:30, no sonde deployed
- c.) 10/13/99 17:00 - 10/26/99 14:30, due to broken probe only depth, pH and Turbidity are reported
- d.) 10/26/99 15:00 - 10/28/99 12:30 no sonde deployed

November 1999

- a.) 11/4/99 21:00-21:30, sonde for unexplained reason did not take samples during these times.
- b.) 11/16/99 15:00-11/30/99 16:30 No turbidity probe deployed
- c.) Exposed at low tide during the following times, all data removed
 - 11/2/99 22:30 - 11/3/99 0:30
 - 11/3/99 11:00-12:30
 - 11/3/99 23:30-11/4/99 1:00
 - 11/4/99 12:30-13:00
 - 11/5/99 0:30-1:30, 13:30-14:00
 - 11/6/99 1:00-2:30, 13:30 - 15:00
 - 11/7/99 1:30-3:30, 14:30-15:30
 - 11/8/99 2:00-3:30, 15:30 - 16:00
 - 11/9/99 3:00-3:30, 16:30
 - 11/10/99 17:00
 - 11/19/99 22:30-23:30
 - 11/20/99 0:00, 11:00-12:00, 23:00- 11/21/99 1:00
 - 11/21/99 12:00-13:00
 - 11/22/99 0:00-2:00, 13:00-14:30
 - 11/23/99 1:00-2:30, 14:00-15:30
 - 11/24/99 1:30-3:30, 15:00-16:30
 - 11/25/99 2:30-4:30, 15:30-17:00
 - 11/26/99 3:30-5:00, 16:30-18:00
 - 11/27/99 4:30-6:00, 17:30-18:30
 - 11/28/99 19:00
 - 11/30/99 17:00-18:00
- d.) 11/24/99 4:30 DO data removed, reading negative
- e.) Turbidity data for the following dates and times are negative but remain in the data file:

Date	Time	Turb
11/01/99	00:00:00	-0001
11/01/99	03:00:00	-0001
11/01/99	03:30:00	-0001
11/01/99	04:00:00	-0001

11/01/99	04:30:00	-0002
11/01/99	05:00:00	-0001
11/01/99	08:00:00	-0001
11/01/99	08:30:00	-0002
11/01/99	09:00:00	-0002
11/01/99	12:30:00	-0001
11/01/99	13:00:00	-0001
11/01/99	13:30:00	-0002
11/01/99	15:30:00	-0001
11/01/99	16:00:00	-0001
11/01/99	16:30:00	-0003
11/01/99	17:00:00	-0002
11/01/99	23:30:00	-0001
11/02/99	09:30:00	-0001
11/02/99	15:30:00	-0001
11/02/99	16:00:00	-0001
11/02/99	16:30:00	-0001
11/02/99	17:00:00	-0001
11/02/99	17:30:00	-0002
11/02/99	18:00:00	-0001
11/03/99	06:00:00	-0001
11/03/99	15:30:00	-0001
11/03/99	16:00:00	-0001
11/03/99	16:30:00	-0001
11/03/99	17:00:00	-0002
11/03/99	17:30:00	-0002
11/03/99	18:00:00	-0002
11/03/99	18:30:00	-0002
11/03/99	19:00:00	-0002
11/03/99	19:30:00	-0001
11/03/99	22:30:00	-0001
11/04/99	03:00:00	-0001
11/04/99	03:30:00	-0001
11/04/99	04:00:00	-0001
11/04/99	06:00:00	-0002
11/04/99	06:30:00	-0001
11/04/99	07:00:00	-0001
11/04/99	07:30:00	-0003
11/04/99	08:00:00	-0001
11/04/99	10:00:00	-0001
11/04/99	10:30:00	-0001
11/04/99	13:30:00	-0001
11/04/99	15:00:00	-0002
11/04/99	15:30:00	-0001
11/04/99	16:00:00	-0001
11/04/99	16:30:00	-0002
11/04/99	17:00:00	-0001
11/04/99	18:00:00	-0001
11/04/99	18:30:00	-0002
11/04/99	19:00:00	-0002
11/04/99	19:30:00	-0001
11/04/99	20:00:00	-0002
11/05/99	02:00:00	-0001
11/05/99	02:30:00	-0001

11/05/99	03:00:00	-0001
11/05/99	03:30:00	-0001
11/05/99	04:00:00	-0002
11/05/99	04:30:00	-0002
11/05/99	05:00:00	-0001
11/05/99	05:30:00	-0001
11/05/99	06:00:00	-0001
11/05/99	06:30:00	-0002
11/05/99	07:00:00	-0002
11/05/99	07:30:00	-0001
11/05/99	08:00:00	-0002
11/05/99	08:30:00	-0002
11/05/99	11:30:00	-0001
11/05/99	17:00:00	-0001
11/05/99	17:30:00	-0001
11/05/99	20:00:00	-0001
11/05/99	20:30:00	-0002
11/06/99	00:00:00	-0001
11/06/99	03:00:00	-0001
11/06/99	04:00:00	-0001
11/06/99	04:30:00	-0001
11/06/99	05:00:00	-0001
11/06/99	05:30:00	-0002
11/06/99	06:00:00	-0001
11/06/99	07:00:00	-0001
11/06/99	07:30:00	-0002
11/06/99	08:00:00	-0002
11/06/99	08:30:00	-0003
11/06/99	09:00:00	-0003
11/06/99	09:30:00	-0001
11/06/99	11:30:00	-0001
11/06/99	17:30:00	-0001
11/06/99	18:00:00	-0001
11/06/99	18:30:00	-0002
11/06/99	19:30:00	-0001
11/06/99	20:00:00	-0001
11/06/99	21:00:00	-0002
11/06/99	21:30:00	-0001
11/07/99	05:00:00	-0001
11/07/99	05:30:00	-0001
11/07/99	06:30:00	-0002
11/07/99	07:00:00	-0002
11/07/99	07:30:00	-0001
11/07/99	08:00:00	-0002
11/07/99	08:30:00	-0002
11/07/99	09:00:00	-0004
11/07/99	09:30:00	-0001
11/07/99	10:00:00	-0002
11/07/99	12:00:00	-0001
11/07/99	12:30:00	-0002
11/07/99	17:00:00	-0001
11/07/99	17:30:00	-0001
11/07/99	18:30:00	-0001
11/07/99	20:00:00	-0001

11/07/99	20:30:00	-0001
11/07/99	21:00:00	-0002
11/07/99	21:30:00	-0002
11/07/99	22:00:00	-0002
11/08/99	05:00:00	-0001
11/08/99	05:30:00	-0001
11/08/99	06:30:00	-0002
11/08/99	07:00:00	-0001
11/08/99	07:30:00	-0001
11/08/99	08:30:00	-0002
11/08/99	09:00:00	-0002
11/08/99	09:30:00	-0002
11/08/99	10:00:00	-0003
11/08/99	10:30:00	-0003
11/08/99	11:00:00	-0001
11/08/99	14:00:00	-0003
11/08/99	15:00:00	-0001
11/08/99	19:00:00	-0001
11/08/99	21:00:00	-0002
11/08/99	21:30:00	-0001
11/08/99	22:00:00	-0003
11/08/99	22:30:00	-0002
11/08/99	23:00:00	-0001
11/09/99	01:30:00	-0001
11/09/99	04:00:00	-0001
11/09/99	04:30:00	-0001
11/09/99	05:30:00	-0001
11/09/99	06:00:00	-0002
11/09/99	06:30:00	-0001
11/09/99	07:00:00	-0001
11/09/99	07:30:00	-0002
11/09/99	08:00:00	-0001
11/09/99	08:30:00	-0001
11/09/99	09:00:00	-0002
11/09/99	09:30:00	-0002
11/09/99	10:00:00	-0003
11/09/99	10:30:00	-0004
11/09/99	11:00:00	-0003
11/09/99	11:30:00	-0002
11/09/99	19:30:00	-0001
11/09/99	20:00:00	-0001
11/09/99	20:30:00	-0001
11/09/99	21:30:00	-0002
11/09/99	22:00:00	-0001
11/09/99	22:30:00	-0002
11/09/99	23:00:00	-0002
11/09/99	23:30:00	-0001
11/10/99	05:30:00	-0001
11/10/99	06:00:00	-0001
11/10/99	06:30:00	-0001
11/10/99	07:00:00	-0001
11/10/99	07:30:00	-0001
11/10/99	08:00:00	-0001
11/10/99	08:30:00	-0002

11/10/99	09:00:00	-0002
11/10/99	09:30:00	-0002
11/10/99	10:00:00	-0002
11/10/99	10:30:00	-0002
11/10/99	11:00:00	-0001
11/10/99	11:30:00	-0003
11/10/99	12:00:00	-0002
11/10/99	15:00:00	-0001
11/10/99	20:00:00	-0001
11/10/99	20:30:00	-0001
11/10/99	21:00:00	-0002
11/10/99	21:30:00	-0001
11/10/99	22:00:00	-0002
11/10/99	22:30:00	-0001
11/10/99	23:00:00	-0002
11/10/99	23:30:00	-0003
11/11/99	01:30:00	-0001
11/11/99	02:00:00	-0001
11/11/99	02:30:00	-0001
11/11/99	03:00:00	-0002
11/11/99	06:00:00	-0001
11/11/99	06:30:00	-0001
11/11/99	07:00:00	-0001
11/11/99	08:00:00	-0002
11/11/99	08:30:00	-0003
11/11/99	09:00:00	-0002
11/11/99	09:30:00	-0002
11/11/99	10:00:00	-0003
11/11/99	10:30:00	-0003
11/11/99	11:00:00	-0003
11/11/99	12:00:00	-0003
11/11/99	12:30:00	-0002
11/11/99	21:30:00	-0002
11/11/99	22:00:00	-0002
11/11/99	22:30:00	-0002
11/11/99	23:00:00	-0002
11/11/99	23:30:00	-0002
11/12/99	00:00:00	-0002
11/12/99	00:30:00	-0002
11/12/99	01:30:00	-0001
11/12/99	02:00:00	-0001
11/12/99	02:30:00	-0001
11/12/99	04:00:00	-0001
11/12/99	09:00:00	-0001
11/12/99	09:30:00	-0001
11/12/99	11:00:00	-0002
11/12/99	11:30:00	-0003
11/12/99	12:00:00	-0002
11/12/99	12:30:00	-0002
11/12/99	13:00:00	-0002
11/12/99	13:30:00	-0001
11/12/99	21:00:00	-0003
11/12/99	23:30:00	-0001
11/13/99	00:00:00	-0001

11/13/99	01:00:00	-0002
11/13/99	01:30:00	-0002
11/13/99	04:30:00	-0001
11/13/99	06:30:00	-0001
11/13/99	08:00:00	-0001
11/13/99	09:00:00	-0001
11/13/99	09:30:00	-0001
11/13/99	11:30:00	-0002
11/13/99	12:00:00	-0002
11/13/99	12:30:00	-0002
11/13/99	13:00:00	-0002
11/13/99	13:30:00	-0003
11/13/99	14:00:00	-0002
11/13/99	14:30:00	-0001
11/13/99	23:30:00	-0001
11/14/99	00:00:00	-0002
11/14/99	00:30:00	-0002
11/14/99	01:30:00	-0002
11/14/99	02:00:00	-0002
11/14/99	04:00:00	-0001
11/14/99	05:00:00	-0001
11/14/99	07:30:00	-0001
11/14/99	08:30:00	-0001
11/14/99	09:30:00	-0001
11/14/99	10:00:00	-0001
11/14/99	10:30:00	-0001
11/14/99	11:00:00	-0002
11/14/99	11:30:00	-0001
11/14/99	12:00:00	-0002
11/14/99	12:30:00	-0002
11/14/99	13:00:00	-0002
11/14/99	13:30:00	-0002
11/14/99	14:00:00	-0001
11/14/99	21:00:00	-0001
11/14/99	22:00:00	-0001
11/14/99	23:30:00	-0001
11/15/99	00:00:00	-0001
11/15/99	00:30:00	-0001
11/15/99	01:00:00	-0002
11/15/99	02:00:00	-0001
11/15/99	02:30:00	-0002
11/15/99	03:00:00	-0001
11/15/99	03:30:00	-0001
11/15/99	04:00:00	-0001
11/15/99	04:30:00	-0001
11/15/99	05:00:00	-0001
11/15/99	07:30:00	-0001
11/15/99	08:00:00	-0001
11/15/99	08:30:00	-0001
11/15/99	14:30:00	-0001
11/15/99	15:00:00	-0001
11/15/99	23:30:00	-0001
11/16/99	01:00:00	-0001
11/16/99	01:30:00	-0001

11/16/99	02:00:00	-0001
11/16/99	03:30:00	-0002
11/16/99	04:00:00	-0001
11/16/99	14:30:00	-0001

December 1999

- a.) 12/16/99 10:00- 12/19/99 13:30, no sonde deployed
- b.) 12/19/99 14:00 - 12/31/99 23:30 no turbidity probe deployed
- c.) The following times data has been removed because the sonde was exposed at low tide.

12/4/99 0:30 - 1:00
12/5/99 1:00-2:00
12/6/99 1:30-2:30, 14:30-16:00
12/7/99 1:30-3:30
12/10/99 17:00-17:30
12/11/99 4:00-5:30
12/14/99 19:30-20:00
12/19/99 23:00-12/20 0:30
12/20/99 11:30 - 13:00
12/20/99 23:00 - 12/21/99 1:30
12/21/99 12:30-14:00
12/22/99 0:00-3:00, 13:00-15:30
12/23/99 1:00-3:30, 14:00-16:00
12/24/99 2:00-4:30, 15:00-17:00
12/25/99 2:30-5:00, 16:00-17:30
12/26/99 4:00-6:00, 16:30-19:00
12/27/99 4:30-7:00, 17:30-19:00
12/28/99 18:30-20:00
12/29/99 20:30
12/30/99 20:30 21:30
12/31/99 10:00-11:00, 21:30-22:30