

Sapelo Island (SAP) NERR Water Quality Metadata
January-December 2000
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1. Principal investigator & contact persons:

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

2. Entry Verification:

The data are reviewed using the YSI computer program Ecowatch that accompanies the YSI 6000/6600 data logger. After the file is uploaded from the datalogger, Ecowatch 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 Excel macros provided by CDMO. The CDMO macros will allow the user to automatically format column widths to the correct number of decimal places based on YSI sensor specifications. It also allows the user to QA/QC each data logger generated file for missing data points, fill all cells that do not contain data with periods, and find all data points that fall outside the range of what the data logger is designed to measure (i.e. outliers). The CDMO import.xls macro will allow PC users with 30 minute data to automatically create a monthly Excel file from a two-week deployment and insert periods for missing data. In addition, in November 1999 a graphing capability was added to this macro allowing users to produce single parameter and missing data point graphs on a monthly basis. 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. 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 the submitted with the data file to the CDMO. Jane Garbisch was responsible for all 2000 data collection and management.

3. Research Objectives:

Hydrological studies (Ragotskie and Bryson, 1955; Imberger et al., 1983) have shown that there are three tidal excursions along the length of the Duplin River, resulting in three distinct water masses. The two monitoring sites in the Duplin River, called the Lower Duplin site and the Hunt Camp site, are located within the lower and upper water masses, respectively. Water passing the Lower Duplin site during flood tide has come from Doboy Sound, which receives input from the Altamaha River via the Intra-Coastal Waterway and from the Atlantic Ocean. The water in the lower water mass is pushed further up the Duplin 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 water in the upper water mass, which passes the Hunt Camp station, is pushed up small creek channels and onto the marsh at each high tide. Thus the two stations monitor conditions in two hydrologically separate water masses, one of which is heavily influenced by exchanges with Doboy Sound and the other, which is influenced by its twice daily contact with the marsh surface.

Sapelo Island is only accessible by passenger ferry. Due to its isolation, the salt marsh and tidal waters of the SAP NERR show relatively little evidence of

human impact. Thus the Marsh Landing (ML) dock, where the Lower Duplin site is located, 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 SAP NERR. The University of Georgia Marine Institute has used this as a monitoring site for years and SAP NERR continues to do so. The Hunt Dock (HD) 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. The University of Georgia-Athens continues to monitor further up the Duplin and the Flume Dock site.

4. Research Methods:

The SAP NERR Water Quality Monitoring began in October of 1999, at the Marsh Landing (ML) 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 lessen 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.

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 and a purchased 100 NTU certified standard. 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.

When deployed 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 steal cable and run down a PVC pipe to rest 0.5m above the surface bottom. The Hunt Dock (HD) 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. Because of the large tidal range, water is continually flushed through the pvc pipes, thus eliminating the problem of creating a stagnate column of water with in the pipe with data logger. 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 run QA/QC standards for pH, and conductivity, and dissolved oxygen, the data is uploaded, and the sonde is cleaned. Data is removed if postcalibration standards fail or if technical problems are noted. All data removed is noted for the metadata.

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.

The Hunt Dock (HD) 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. During the fall, the Hunt dock and Moses Hammock is the camping and docking site for deer hunters traveling to the island. These are controlled hunts and dates are available from the SAP NERR

office if needed.

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

Lower Duplin (LD):

12/17/99 1500 -1/1/2000 1200
1/1/00 1230-1/19/00 1730
1/19/00 1800 - 1/30/00 1100
2/5/00 1500 -2/16/00 1800
2/16/00 1830- 3/6/00 0600
3/9/00 1230- 3/23/00 1600
3/23/00 1630- 4/8/00 0800
4/8/00 0830 - 4/26/00 1430
4/26/00 1530 - 5/7/00 1700
5/7/00 1730 - 5/27/00 1430
5/27/00 1530 - 6/12/00 0630
6/12/00 0700 - 7/5/00 1300
7/5/00 1330 - 7/27/00 1530
7/27/00 1600 - 8/9/00 1430
8/9/00 1500 - 8/25/00 1800
8/25/00 1830 -9/16/00 1100
9/16/00 1130 - 10/6/00 1000
10/6/00 1030 - 10/31/00 1400
10/31/00 1500 - 11/20/00 1500
11/20/00 1530 - 12/13/00 1630
12/13/00 1700 - 12/26/00 1430
12/26/00 1500 - 1/1 01 000 (battery failure 1/1/01)

Hunt Dock (HD):

1/20/00 1600 - 2/5/00 1330
2/5/00 1400 - 2/22/00 1030
2/22/00 1100 - 3/11/00 1200
3/11/00 1230 - 4/1/00 1000
4/1/00 1100 - 4/17/00 1430
4/17/00 1530 - 5/7/1500
5/7/00 1830 - 5/27/00 1400
5/27/00 1500 - 6/12/00 0600
6/12/00 0630 - 6/21/00 0630
6/21/00 - 7/10/00 (data lost, sonde sensor went bad)
7/10/00 1600 - 7/31/00 1230
7/31/00 1300 - 8/21/00 1430
8/21/00 1500 - 9/11/00 1630
9/11/00 1700 - 9/25/00 1030
9/25/00 1400 - 10/11/00 0830
10/11/00 0900 - 11/6/00 0730
11/30 /00 1100 - 12/12/00 1030
12/12/00 1100 - 12/26/00 1500
12/26/00 1600-01/18/01 1500

7. Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy

for the NERRS System-wide Monitoring Program,
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 the 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 it subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient of third persons, not 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.

8. 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 SAP NERR and UGAMI creating a unique partnership with much of the current research being done facilitated by SAP NERR 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>).

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

YSI 6000/6600 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.

10. Coded variable code definitions:

LD = Lower Duplin HD = Hunt Dock

11. Data anomalies:

Lower Duplin:

January 2000

The following times turbidity reported a negative value and/or a zero value:

1/1 1730, 1830

1/1 2000 -1/2 0100

1/2 530, 600, 830-1000, 1100-1300, 1400, 1430, 1730 -2330

1/3 000-0200, 0630, 0700, 1030-1330, 1500, 1830, 1900, 2100, 2200, 2230, 2330

1/4 00-0230, 700, 0730, 1400, 1830-1930, 2130, 2300

1/5 200, 400, 800, 1330-1430, 1930 2000

1/6 000, 130, 200, 330, 1330, 1530, 1600

1/7 030-330, 1400-1600, 2100

1/8 0100, 0130, 0230-0330,1000,1500,1530, 1700, 2200
1/9 0130-0430, 1630,1700,2230
1/10 0200, 0330, 0400, 0500, 1430, 2300
1/11 0200 - 0600, 1130, 1200, 1600, 1700, 1730, 1830, 1900, 2100
1/12 0230-0430,0600-0700, 1230, 1300, 1530,1600, 1700,1730, 1830-2000
1/13 0030-0100, 400-630, 730-830, 1300, 1330, 1600-1730, 1900-2200
1/14 000-200, 300, 400-530, 700, 830, 1330-1600, 1730, 1830-2300
1/15 630-1030, 1430, 1530, 1800-1900, 2000-2230
1/16 400, 430, 730-930, 1030-1200, 1530-1630, 1730-2330
1/17 000, 500, 900-1130, 1700-1800, 2030-2330
1/18 000 1300 1830, 2300 2330
1/19 000 0100, 1230-1330

- b.1/19 0400-0600 turbidity spike, cause unknown
- c. 1/20 1330-1500 data removed, exposed during low tide
- d. 1/21 100-230 data removed, exposed during low tide

February 2000

- a. The following times turbidity reported a negative value and/or a zero value:

2/16 2230, 2330
2/17 00, 030
2/18 100, 130
2/20 1600
2/21 300, 400, 1630
2/22 500
2/24 600, 630
2/26 1030, 1930, 2200, 2230, 2330
2/27 800, 830, 1100, 1400, 2130, 2300
2/28 930, 1000, 1100, 1200, 2130-2230
2/29 000, 030,1000-1300, 1530, 2300, 2330

- b. 2/17 0400 Turbidity spike, cause unknown
- c. Turbidity cycling low to high values 2/17 0400 - 2/24 0300
- d. 2/24 330-400 data removed, exposed at low tide

March 2000

- a. The following times turbidity reported a negative value and/or a zero value:

3/1 430
3/2 300, 600, 1730, 2330
3/3 000, 030, 200, 1300-1400
3/4 300
3/5 230
3/6 300
3/25 1200, 1730, 1830, 2330
3/26 000, 030, 730, 900, 1200, 1230, 1600
3/27 730-830, 1000, 1330, 2300, 2330
3/28 000, 100-230, 700, 730, 830, 900, 1130, 1430, 2100, 2330
3/29 030 100, 200, 400, 1030-1130, 1330, 1430,1830-2000, 2130-2230
3/30 000, 100, 130, 300-330, 1000, 1100, 1130, 1600, 2230
3/31 030, 100, 200, 400, 500, 1230, 1300, 2300, 2330

April 2000

a. The following times turbidity reported a negative value:

4/1 030, 130, 200
4/27 130-230, 1400, 2100, 2300
4/28 030, 200-300, 1100, 1330, 1500-1600, 2300, 2330
4/29 000, 030, 330, 400, 1130, 1200, 1630, 2230-2330
4/30 0100

b. 4/8 1630-1730 data removed, exposed at low tide

May 2000

a. The following times turbidity reported a negative value:

5/1 600, 1200, 1300
5/2 100, 130, 700, 1330
5/3 230
5/4 230, 300
5/5 400
5/27 1900-2000, 2100-2330
5/28 000, 130, 330-430, 700, 730, 1030, 1600, 1930-2230, 2330
5/29 030, 130, 400, 430, 830-930, 2130-2330
5/30 000, 1030, 2330
5/31 000-100
b. 5/3 1330-1400 all data removed, exposed at low tide.
c. 5/5 1500-1530 all data removed, exposed at low tide.
d. 5/6 1530-1600 all data removed, exposed at low tide.

June 2000

a. The following times turbidity reported a negative value:

6/1 030-130, 2000
6/2 130-230, 2100
6/3 330, 400
6/5 1730
6/6 1830
6/7/ 030, 500, 1800, 1830
6/8 630-730
6/9 230, 700, 730, 930, 1930, 2000, 2130, 2200
6/10 300, 330, 800, 1000, 1030, 2030, 2130, 2230, 2300
6/11 1630, 2100-2330
6/12 000, 030, 130, 200, 400, 500

b. 6/3 1930-2000 all data removed, exposed at low tide

c. 6/12 700 - 6/30 2330 DO very high (>100%) but all lab tests confirm DO working properly.

d. 6/12 700- 7/5/1300 noted increase in data values from last deployment. Calibration verifications within acceptable range. It is possible that summer fouling degraded probes over last deployment and cleaner probes are reading higher values.

July 2000

a. 6/12 700- 7/5/1300 noted increase in data values from last deployment.

Calibration verifications within acceptable range. It is possible that summer fouling degraded probes over last deployment and cleaner probes are reading higher values. New sonde put in 7/5, DO still reading high, though not as high, other parameters drop a bit in value also.

- b. 7/1 000-7/5 1300, DO very high (>100%), all lab tests confirm DO working properly. Yet possible that membrane is faulty.
- c. 7/28 1000, 1600 Turbidity spike, cause unknown

August 2000

- a. 8/25 1830 - 8/31 2330 Due to breakage of the pH probe, sonde was deployed without pH probe. The sonde was not reprogrammed for this change and continued to output numbers for pH, though there was no probe. All of this erroneous data was removed.
- b. 8/2 1830 turbidity spike, cause unknown
- c. 8/28 1300 Turbidity spike, cause unknown

September 2000

- a. 9/8 1700 Turbidity spike, cause unknown
- b. 9/10 630 DO %, mg/L negative values, cause unknown
- c. 9/11 630 Turbidity spike, cause unknown
- d. 9/14 1400 Turbidity spike, cause unknown
- e. 9/22 1500 Turbidity spike, cause unknown
- f. 9/24 1330 Turbidity spike, cause unknown
- g. 9/29 830 Turbidity spike, cause unknown
- h. The following times turbidity reported a negative value and/or a zero value:
 - 9/16 1600-1730, 1830, 2300
 - 9/17 400-600, 1800, 1830
 - 9/18 430-630, 1130, 1630, 1730-1900, 2000, 2130, 2330
 - 9/19 000, 030, 400, 600-730, 1730, 1830-1930, 2030-2130, 2230
 - 9/20 000-100, 430-730, 830, 1930, 2100, -2200, 2300
 - 9/21 200, 630, 730, 800, 1430, 1930-2200, 2300
 - 9/22 300, 730, 1030, 2000
 - 9/23 2230
 - 9/24 1330, 2330
 - 9/25 1900
 - 9/26 100
 - 9/27 130, 200
 - 9/29 830, 1630
 - 9/30 430

October 2000

- a. 10/1 930 Turbidity spike, cause unknown
- b. 10/02 1100 Turbidity spike, cause unknown
- c. 10/03 1330 Turbidity spike, cause unknown
- b. The following times turbidity reported a negative value.

10/1 700
10/2 430, 730
10/3 000, 330-530, 700, 1800, 1900-2100
10/4 030, 100, 200, 400, 500-600, 700-930, 1030, 1130, 1800-2030, 2130-2230
10/5 100-300, 400, 430, 530-830, 930, 1000, 1400, 1430, 1800-2130, 2230-2330
10/6 000, 030, 100, 200-800, 900-1000
c. 10/6 1030 - 10/10 2330 depth reporting unusually low values. Data concurs with tide readings taken from UGA Marine Institute's weather station.
d. 10/06 1030 -10/31 2330 turbidity data removed due to failure of post deployment control standard.
November 2000
a. 11/1 000- 11/20 1500 turbidity data removed due to failure of post deployment control standard.
December 2000
a. 12/19 2200 all data removed, exposed at low tide.

HUNT DOCK:
Data anomalies:

January 2000
a. The following times data was removed because the sonde was exposed at low tide:
1/1 1030-1100 2230-2330
1/2 1130-1200, 1430-1530
1/3 000-100, 1230-1300
1/4 0300-130, 1330-1400
1/5 000-330, 1330-1500
1/7 230-330 1500-1630
1/8 300-400
1/9 1630-1730
1/10 1700-1830
1/11 430-530 1730-1900
1/12 530-630 1800-1900
1/13 730 1830-2030
1/15 2130-2230
1/16 0930-1030 2130-2330
1/17 000 1030-1200 2300-2330
1/18 000-030 1200-1330 2330
1/19 000-200 1330-1400
1/20 030-300 1300-1530
1/21 030-300 1400-1600
1/22 200-400 1430-1630
1/23 300-430 1530-1730
1/24 400-500 1800
1/25 600 1730-1830
1/26 600-630 1800-1900
1/30 2130-2330
1/31 2230-2330

b. Negative turbidity data recorded throughout entire month. Data was not deleted.

February 2000

a. The following times data was removed because the sonde was exposed at low tide:

2/1 000 1130-1200 2300-2330
2/2 000-100
2/3 000-130 1300-1400
2/4 030-230 1300-1500
2/5 030-300 1400-1530
2/6 130-330 1430-1600
2/7 200-430 1500-1700
2/8 300-500 15300-1730
2/9 1700
2/10 1730-1830
2/11 1730-1930
2/12 700-730 1830- 2000
2/14 2030-2300
2/15 930-1100 2200-2330
2/16 000 1100-1230 2230-2330
2/17 000-130 1130-1330
2/18 000-130 1300-1430
2/19 030-330 1330-1600
2/20 100-430 1430-1630
2/21 230-500 1500-1700
2/22 330-500 1600-1730
2/23 430-530 1630-1800
2/24 530-600 1700-1830
2/25 1800-1900

b. The following times turbidity reported a negative value and/or a zero value:

2/1 030-930 1330-2230
2/2 130-1130 1400-2330
2/3 200-800 900-1230 1530-2330
2/4 0000, 330-1230, 1600, 1800, 1830, 2000, 2130, 2200-2330
2/6 030
2/8 130
2/12 600, 1130, 1330-1400, 1600, 1630, 2300
2/13 900, 1000, 1100, 1300

c. 2/5 330-1330 Turbidity spike, cause unknown

d. 2/13 1630 Turbidity spike, cause unknown

March 2000

a. The following times data was removed because the sonde was exposed at low tide:

3/1 2300-2330
3/2 1130-1300 2330
3/3 000-030

3/4 1300-1430
3/5 030-200 1330-1500
3/6 100-330 1330-1600
3/7 130-400 1430-1630
3/8 230-430 1500-1700
3/9 300-530 1530-1800
3/10 330, 630, 1600-1830
3/11 430-700 1700-1900
3/12 530-900 1700-2030
3/13 2000-2100
3/14 2200
3/15 1000-1100 2200-2330
3/16 1030-1200 2230-2330
3/17 000-100 1100-1330 2300-2330
3/18 000-200
3/19 130-230 1330-1430
3/20 200-330 1400-1530
3/21 230-400 1500-1630
3/22 330-430 1530-1700

- b. 3/20 1130 Turbidity spike, cause unknown
- c. 3/30 1000-1200 Turbidity spike, cause unknown

April 2000

- a. The following times data was removed because the sonde was exposed at low tide.

4/2 1200-1330
4/3 000-200 1230-1430
4/4 030-300 1230-1600
4/5 0300-400 1330-1600
4/6 200-500 1400-1700
4/7 230-530 1430-1730
4/8 330-600 1530-1900
4/9 500-700 1630-1900
4/10 530-730 1800-2000
4/11 700-830 1900-2100
4/12 800-930 2030-2230
4/13 900-1030
4/14 2300-2330
4/15 000, 1100-1300 2330
4/16 000-130 1130-1400
4/17 000-230 1230-1500
4/18 100-330 1300-1530
4/19 200-330 1430-1530
4/20 300-400 1500-1600
4/21 330-500 1530-1630
4/22 400-530
4/23 530
4/28 1030
4/30 1130-1200

- b. 4/23 2030 Turbidity spike, cause unknown

May 2000

a. The following times data was removed because sonde was exposed at low tide

5/1 000 1130-1300
5/2 000-130 1130-1400
5/3 000-300 1200-1500
5/4 100-300 1330-1530
5/5 200-430 1400-1630
5/6 230-500 1430-1730
5/7 330-600 1530-1800
5/8 430-630 1630-1900
5/9 530-730 1800-1930
5/10 630-830 1900-2100
5/11 730-930 2100-2130
5/12 900-1000 2200-2230
5/13 930-1130 2230-2330
5/14 000 1030-1230
5/17 1300-1430
5/18 200-300 1330-1530
5/19 230-400 1400-1600
5/20 230-430 1430-1600
5/21 330-530 1500-1630
5/22 400-530 1600-1700
5/25 700
5/28 900-1030
5/29 100-1130
5/30 1130-1200
5/31 1200-1300

b. The following times turbidity reported a negative value and/or a zero value:

5/27 2030-2130
5/29 500
5/31 000, 030

c. 5/29 300 Turbidity spike cause unknown

June 2000

a. The following times data was removed because sonde was exposed at low tide:

6/1 100-130 1200-1430
6/2 100-300 1300-1530
6/3 200-400 1330-1630
6/4 230-500 1430-1700
6/5 400-530 1530-1800
6/6 430-630 1630-1900
6/7 600-700 1900
6/8 700-800
6/9 800-900 2100
6/10 830-1000 2200-2230
6/11 930-1100 2230-2330
6/12 1000-1200 2300-2330
6/13 000-030 1030-1230
6/14 000-130 1130-1330

6/15 030-200 1230-1330
6/16 130-230 1300-1430
6/17 200-300 1330-1500
6/18 230-400 1430-1600
6/19 300-430 1500-1630
6/20 330-530 1600-1700
6/21 500
b. 6/1 030 negative turbidity value reported
c. 6/19 500 DO%, mg/L removed, negative value reported
d. 6/21 700-6/30 2330 sonde sensor failed during deployment, all data removed
e. 6/18 2030 - 06/21 630, DO increase, cause unknown

July 2000

a. 7/1 000-7/10 1530 no data reported, sonde sensor failed during deployment
b. The following times data was removed because the sonde was exposed at low tide:
7/11 930-1100 2230-2330
7/12 000 1000-1200
7/17 200-330
7/20 400-500 1600-1630
7/21 430-530
7/24 700-800
7/25 730-900
7/26 830-930 2230
7/27 930-1100 2300-2330
7/28 1030-1230 2330
7/29 000-100 1100-1330
7/30 000-200 1200-1430
7/31 100-330 1300-1600
c. 7/13 1600-2030 DO increase, cause unknown.
d. 7/17 1630 DO increase, cause unknown.

August 2000

a. The following times data was removed because sonde was exposed at low tide:
8/1 200-430 1400-1700
8/2 300-500 1500-1730
8/3 330-600 1600-1830
8/4 430-630 1700-2000
8/5 530-730 1830-1930
8/6 700-730
8/15 1430
8/16 1500-1530
8/17 300-430 1500-1630
8/18 330-500 1600-1630
8/19 400-600 1730
8/20 530
8/24 830-930
8/25 930-1100 2300-2330
8/26 1030-1230
8/27 000-100 1130-1330
8/28 000-200 1200-1430

8/29 100-300 1300-1530

8/30 230-300 1430-1600

8/31 300-430 1530-1700

b. The following times turbidity reported a negative value and/or a zero value:

8/22 130, 630, 1430

8/23 130-300, 800-900, 2030

8/24 100, 230-400, 1130, 1630, 2130-2200

8/25 400, 700-730, 830, 2230

8/26 200,300 400, 530, 600, 900, 2330

8/27 230-330, 630-730, 2000

8/28 330, 430, 700-800 2100

8/29 900, 2100

8/31 2230

c. 8/4 730 Turbidity spike cause unknown

d. 8/5 2130 Turbidity spike cause unknown

e. 8/12 2300 Turbidity spike cause unknown

f. 8/20 0700 Turbidity spike cause unknown

g. 8/31 1300 Turbidity spike cause unknown

h. 8/21 1500-8/31 2330, pH data removed, probe shattered during deployment.

September 2000

a. The following times data was removed, sonde was exposed at low tide:

9/1 330-500 1630-1730

9/2 430-530 1730-1800

9/19 500-630

9/20 630

9/21 730-800

9/22 800-930 2130-2200

9/23 900-1100 2200-2330

9/24 1000-1200 2230-2330

9/25 000-030 1030-1330 2330

9/26 000-200 1130-1430

9/27 030-200 1330-1500

9/28 200-300 1430-1530

b. The following times turbidity reported a negative value and/or a zero value:

9/1 1100-1200 1600 2300-2330

9/2 000, 330, 400, 700, 730, 900, 1100, 1200, 1230

9/3 000-100, 330, 430, 530-630, 900, 1230-1330, 1830, 2030

9/4 530-630, 1330, 1900-2200

9/5 100-200, 430-600, 700-1000, 1400-1500, 1900-19030, 2100, 2330

9/6 200-400, 800-930, 1530, 2100, 2230

9/7 330-430, 800, 900, 1600, 1630, 2130-2230, 2330

9/8 000-030, 400-530, 930, 1200, 1700-1800, 2300-2330

9/9 000-100, 530-630, 900, 1000, 1100-1200, 1300-1400, 1800-1900, 2230-2330

9/10 000-230, 600, 630, 930-1230, 1400, 1430, 1900-2000, 2300, 2330

9/11 000, 030, 200, 300-330, 630-700, 1030-1330, 1500

c. 9/1 000- 9/11 1630, no DO recorded, programming error.

d. 9/9 1530 - 9/11 1630 pH probe broken during deployment, data removed.

e. 9/25 1400 - 9/30 2330 no pH probe deployed.

October 2000

Special note: Hunt season starts at camp, increased boat traffic

a. The following times data was removed because sonde was exposed at low tide:

10/12 100-130 1330

10/13 130-230

10/14 230-300 1500-1530

10/15 300-400, 1530-1630

10/16 330-430 1630-1700

10/17 500

10/28 230-330 1530

10/29 330

b. 10/7 1400 Turbidity spike, cause unknown.

November 2000

Special note: Hunt season starts at camp, increased boat traffic

a. 11/4 630 turbidity reported a negative value

b. 11/5 1300 Turbidity spike, cause unknown

c. The following times data was removed because sonde was exposed at low tide:

11/10 00-100 1230-1330

11/11 030-200

11/12 130-230 1500

11/30 1330-2200 This is an unusually long exposure, strong northern winds possible cause.

December 2000

Special note: Hunt season starts at camp, increased boat traffic

a. The following times data was removed because sonde exposed at low tide:

12/1 030-1000 1430-2300

12/2 200-1030 1530-2300

12/3 400-1100 1630-2330

12/4 000 430-1200 1630-2330

12/5 000-100 530-1300 1730-2330

12/6 000-200 630-1400 1830-2330

12/7 000-230 700-1500 1930-2330

12/8 000-330 800-1600 2000-2330

12/9 000-400 900-1700 2130-2330

12/10 000-430 1100-1730 2230-2330

12/11 000-530 1130-1830 2230-2330

12/12 000-630 1400-1630

12/13 200-430 1630-1700

12/14 330-530 1600-1800

12/15 400-630 1700-1830

12/16 630-700

12/17 630-900 1830-2130

12/18 730-930 2000-2200

12/19 830-1030, 2030-2330

12/20 000 930-1130 2200-2330

12/21 000 1100-1200 2230-2330

12/22 000-030 1130-1330 2300-2330

12/23 000-130 1330

12/24 030-200 1330-1430

12/25 100-230

12/27 230-330, 1530-1630
12/28 300-400
12/30 430-500, 1630-1830
12/31 1730-1900
b. 12/20 1130 turbidity spike, cause unknown

11. Missing Data

Lower Duplin:

January 2000

- a. 1/1 000-1200 No turbidity probe deployed
- b. 1/19 1800-1/30 1100 no turbidity probe deployed
- c. 1/30 1130-1/31 2330 no data reported, batteries died during deployment
- d. 1/20 1330-1500 data removed, sonde exposed at low tide
- e. 1/21 100-230 data removed, sonde exposed at low tide

February 2000

- a. 2/1 000-2/5 1430 no data, batteries died during deployment
- b. 2/5 1500-2/16 1800 no turbidity probe deployed
- c. 2/24 330-400 no data, sonde did not take samples, reason unknown

March 2000

- a. 3/6 630-3/9 1200 sonde not deployed, all data missing
- b. 3/9 1230-3/23 1600 no turbidity probe deployed

April 2000

- a. 4/8 1630-1730, all data removed, sonde exposed at low tide
- b. 4/26 1500 no data taken, sonde not deployed
- c. 4/8 830-4/26 1430 no turbidity probe deployed

May 2000

- a. 5/3 1330 - 1400 all data removed, sonde exposed at low tide.
- b. 5/5 1500-1530 all data removed sonde exposed at low tide
- c. 5/6 1530 - 1600 all data removed, sonde exposed at low tide
- d. 5/7 1730-5/27 1430 no turbidity probe deployed
- e. 5/27 1500 no sonde deployed, all data missing

June 2000

- a. 6/3 1930-2000 all data removed, sonde exposed at low tide
- b. 6/12 700-6/30 2330 no turbidity probe deployed

July 2000

- a. 7/1 000-7/27 1530 no turbidity probe deployed
- b. 7/27 1600-7/31 2330 no DO(mg/L)sonde did not report it

August 2000

- a. 8/1 000-8/9 1430 DO mg/L not reported by sonde
- b. 8/9 1500-8/25 1800 no turbidity probe deployed
- c. 8/25 1830 - 8/31 2330 Due to breakage of the pH probe, sonde was deployed without pH probe. The sonde was not reprogrammed for this change and continued to output numbers for pH, though there was no probe. All of this erroneous data was removed.

September 2000

- a. 9/16 1130-9/30 2330 no DO mg/L reported by sonde
- b. 9/1 000-9/30 2330 no pH probe deployed

October 2000

- a. 10/1 000-10/6 1000 no DO mg/L reported by sonde
- b. 10/1 000-10/6 1000 no pH probe deployed
- c. 10/06 1030 - 10/31 2330 Turbidity data removed due to failure of post deployment control standard.
- d. 10/31 1430 all missing, sonde not deployed
- e. 10/31 1500-2330 no pH probe deployed

November 2000

- a. 11/1 000-11/20 1500 no pH probe deployed
- b. 11/1 000 - 11/20 1500 turbidity data removed due to failure of post deployment control standard.
- c. 11/20 1530- 11/30 2330 no turbidity probe deployed

December 2000

- a. 12/1 000- 12/31 2330 no turbidity probe deployed
- b. 12/19 2200 all data removed, sonde exposed at low tide

HUNT DOCK:

Missing Data:

January 2000

- a. The following times data was removed because the sonde was exposed at low

tide:

1/1 1030-1100 2230-2330
1/2 1130-1200, 1430-1530
1/3 000-100, 1230-1300
1/4 030-130, 1330-1400
1/5 000-330, 1330-1500
1/7 230-330 1500-1630
1/8 300-400
1/9 1630-1730
1/10 1700-1830
1/11 430-530 1730-1900
1/12 530-630 1800-1900
1/13 730 1830-2030
1/15 2130-2230
1/16 0930-1030 2130-2330
1/17 000 1030-1200 2300-2330
1/18 000-030 1200-1330 2330
1/19 000-200 1330-1400
1/20 030-300 1300-1530
1/21 030-300 1400-1600
1/22 200-400 1430-1630
1/23 300-430 1530-1730
1/24 400-500 1800
1/25 600 1730-1830
1/26 600-630 1800-1900
1/27 1900-1930
1/30 2130-2330
1/31 2300-2330

- b. 1/1 000-1/2 1600 no turbidity probe deployed

c. The following times turbidity was removed, sonde did not take samples,
reason

unknown:

1/19 1800 - 1/20 1300
1/20 1530 - 1/21 0030
1/21 0300 - 1/22 0230
1/22 400 - 1/30 1100

February 2000

a. The following times data was removed because the sonde was exposed at
low

tide:

2/1 000 1130-1200 2300-2330
2/2 000-100
2/3 000-130 1300-1400
2/4 030-230 1300-1500
2/5 030-300 1400-1530
2/6 130-330 1430-1600
2/7 200-430 1500-1700
2/8 300-500 15300-1730
2/9 1700
2/10 1730-1830
2/11 1730-1930
2/12 700-730 1830- 2000
2/14 2030-2300
2/15 930-1100 2200-2330
2/16 000 1100-1230 2230-2330
2/17 000-130 1130-1330
2/18 000-130 1300-1430
2/19 030-330 1330-1600
2/20 100-430 1430-1630
2/21 230-500 1500-1700
2/22 330-500 1600-1730
2/23 430-530 1630-1800
2/24 530-600 1700-1830
2/25 1800-1900

b. 2/22 1100-2/29 2330 no turbidity probe deployed

March 2000

a. 3/1 000-3/11 1200 no turbidity probe deployed

b. The following times data was removed because the sonde was exposed at
low

tide:

3/1 2300-2330
3/2 1130-1300 2330
3/3 000-030
3/4 1300-1430
3/5 030-200 1330-1500
3/6 100-330 1330-1600
3/7 130-400 1430-1630
3/8 230-430 1500-1700
3/9 300-530 1530-1800
3/10 330, 630, 1600-1830
3/11 430-700 1700-1900
3/12 530-900 1700-2030

3/13 2000-2100
3/14 2200
3/15 1000-1100 2200-2330
3/16 1030-1200 2230-2330
3/17 000-100 1100-1330 2300-2330
3/18 000-200
3/19 130-230 1330-1430
3/20 200-330 1400-1530
3/21 230-400 1500-1630
3/22 330-430 1530-1700

April 2000

a. The following times data was removed because the sonde was exposed at low

tide.

4/2 1200-1330
4/3 000-200 1230-1430
4/4 030-300 1230-1600
4/5 0300-400 1330-1600
4/6 200-500 1400-1700
4/7 230-530 1430-1730
4/8 330-600 1530-1900
4/9 500-700 1630-1900
4/10 530-730 1800-2000
4/11 700-830 1900-2100
4/12 800-930 2030-2230
4/13 900-1030
4/14 2300-2330
4/15 000, 1100-1300 2330
4/16 000-130 1130-1400
4/17 000-230 1230-1500
4/18 100-330 1300-1530
4/19 200-330 1430-1530
4/20 300-400 1500-1600
4/21 330-500 1530-1630
4/22 400-530
4/23 530
4/28 1030
4/30 1130-1200

b. 4/1 1100-4/17 1200 no turbidity probe deployed

c. 4/1 1030 no data, sonde not deployed

May 2000

a. The following times data was removed because sonde was exposed at low tide

5/1 000 1130-1300
5/2 000-130 1130-1400
5/3 000-300 1200-1500
5/4 100-300 1330-1530
5/5 200-430 1400-1630
5/6 230-500 1430-1730
5/7 330-600 1530-1800
5/8 430-630 1630-1900
5/9 530-730 1800-1930
5/10 630-830 1900-2100

5/11 730-930 2100-2130
5/12 900-1000 2200-2230
5/13 930-1130 2230-2330
5/14 000 1030-1230
5/17 1300-1430
5/18 200-300 1330-1530
5/19 230-400 1400-1600
5/20 230-430 1430-1600
5/21 330-530 1500-1630
5/22 400-530 1600-1700
5/25 700
5/28 900-1030
5/29 1000-1130
5/30 1130-1200
5/31 1200-1300

b. 5/27 1430 no data sonde not deployed

c. 5/7 1830 -5/27 1400 no turbidity probe deployed

June 2000

a. The following times data was removed because sonde was exposed at low tide:

6/1 100-130 1200-1430
6/2 100-300 1300-1530
6/3 200-400 1330-1630
6/4 230-500 1430-1700
6/5 400-530 1530-1800
6/6 430-630 1630-1900
6/7 600-700 1900
6/8 700-800
6/9 800-900 2100
6/10 830-1000 2200-2230
6/11 930-1100 2230-2330
6/12 1000-1200 2300-2330
6/13 000-030 1030-1230
6/14 000-130 1130-1300
6/15 030-200 1230-1330
6/16 130-230 1300-1430
6/17 200-300 1330-1500
6/18 230-400 1430-1600
6/19 300-430 1500-1630
6/20 330-530 1600-1700
6/21 500

b. 6/12 630 - 6/21 630 turbidity probe not deployed

b. 6/19 500 DO% & mg/L removed, negative reading

c. 6/21 700-6/30 2330 no data, sonde sensor failed

July 2000

a. The following times data was removed because the sonde was exposed at low tide:

7/11 930-1100 2230-2330
7/12 000 1000-1200
7/17 200-330
7/20 400-500 1600-1630
7/21 430-530
7/24 700-800

7/25 730-900
7/26 830-930 2230
7/27 930-1100 2300-2330
7/28 1030-1230 2330
7/29 000-100 1100-1330
7/30 000-200 1200-1430
7/31 100-330 1300-1600
b. 7/1 000-7/10 1530 no data, sonde sensor failure
c. 7/10 1600 - 7/31 1230 no turbidity

August 2000

a. The following times data was removed because sonde was exposed at low tide:

8/1 200-430 1400-1700
8/2 300-500 1500-1730
8/3 330-600 1600-1830
8/4 430-630 1700-2000
8/5 530-730 1830-1930
8/6 700-730
8/15 1430
8/16 1500-1530
8/17 300-430 1500-1630
8/18 330-500 1600-1630
8/19 400-600 1730
8/20 530
8/24 830-930
8/25 930-1100 2300-2330
8/26 1030-1230
8/27 000-100 1130-1330
8/28 000-200 1200-1430
8/29 100-300 1300-1530
8/30 230-300 1430-1600
8/31 300-430 1530-1700

c. 8/21 1500-8/31 2330 no DO mg/L reported, sonde misprogrammed.

d. 8/21 1500-8/31 2330, pH data removed, probe shattered during deployment.

September 2000

a. The following times data was removed, sonde was exposed at low tide:

9/1 330-500 1630-1730
9/2 430-530 1730-1800
9/19 500-630
9/20 630
9/21 730-800
9/22 800-930 2130-2200
9/23 900-1100 2200-2330
9/24 1000-1200 2230-2330
9/25 000-030 1030-1330 2330
9/26 000-200 1130-1430
9/27 030-200 1330-1500
9/28 200-300 1430-1530

b. 9/11 1700-9/25 1330 no turbidity probe deployed

c. 9/1 000- 9/11 1630 no DO recorded, programming error.

d. 9/9 1530 - 9/11 1630 pH probe broken during deployment.

e. 9/25 1400 - 9/30 2330 pH probe not deployed.

October 2000

a. The following times data was removed because sonde was exposed at low tide:

10/12 100-130 1330

10/13 130-230

10/14 230-300 1500-1530

10/15 300-400, 1530-1630

10/16 330-430 1630-1700

10/17 500

10/28 230-330 1530

10/29 330

b. 10/1 000-10/31 2330 no pH probe deployed

November 2000

a. 11/1 000-11/6 730 no pH probe deployed

b. 11/6 800-11/30 2330 no turbidity probe deployed

c. the following times data was removed because sonde was exposed at low tide:

11/10 000-100 1230-1330

11/11 030-200

11/12 130-230 1500

11/30 1330-2200

d. 11/12 1800-11/30 1030 no data reported, sonde batteries died

December 2000

a. The following times data was removed because sonde exposed at low tide:

12/1 030-1000 1430-2300

12/2 200-1030 1530-2300

12/3 400-1100 1630-2330

12/4 000 430-1200 1630-2330

12/5 000-100 530-1300 1730-2330

12/6 000-200 630-1400 1830-2330

12/7 000-230 700-1500 1930-2330

12/8 000-330 800-1600 2000-2330

12/9 000-400 900-1700 2130-2330

12/10 000-430 1100-1730 2230-2330

12/11 000-530 1130-1830 2230-2330

12/12 000-630 1400-1630

12/13 200-430 1630-1700

12/14 330-530 1600-1800

12/15 400-630 1700-1830

12/16 630-700

12/17 630-900 1830-2130

12/18 730-930 2000-2200

12/19 830-1030, 2030-2330

12/20 000 930-1130 2200-2330

12/21 000 1100-1200 2230-2330

12/22 000-030 1130-1330 2300-2330

12/23 000-130 1330

12/24 030-200 1330-1430

12/25 100-230

12/27 230-330, 1530-1630

12/28 300-400

12/30 430-500, 1630-1830

12/31 1730-1900

- b. 12/1 000-12/12 1030 no turbidity probe deployed
- c. 12/1 000-12/26 1530 no pH probe deployed
- d. 12/26 1600 - 12/31 2330 no turbidity probe deployed

12. Other Remarks:

On 07/01/2021 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2006, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

Any time a reference is made to turbidity data being negative and/or zero, it was recorded as a negative in the raw data file and a zero in the edited data file due to the formatting of Excel. The technician edited none of these data points by hand nor did he/she delete any of them.