Sapelo Island NERR Water Quality Metadata
January – December 2013
Latest Update: March 3rd 2014

Note: This is a provisional metadata document; it has not been authenticated as of its download date. Contents of this document are subject to change throughout the QAQC process and it should not be considered a final record of data documentation until that process is complete. Contact the CDMO (cdmosupport@belle.baruch.sc.edu) or Reserve with any additional questions.

I. Data Set and Research Descriptors

1) Principal investigator(s) and contact persons

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2) Entry verification -Deployment data are uploaded from the YSI data logger to a Personal Computer (IBM compatible). Files are exported from EcoWatch in a comma-delimited format (.CDF) and uploaded to the CDMO where they undergo automated primary QAQC; automated depth/level corrections for changes in barometric pressure (cDepth or cLevel parameters); and become part of the CDMO's online provisional database. All pre- and post-deployment data are removed from the file prior to upload. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the Reserve for secondary QAQC where it is opened in Microsoft Excel and processed using the CDMO's NERRQAQC Excel macro. The macro inserts station codes, creates metadata worksheets for flagged data and summary statistics, and graphs the data for review. It allows the user to apply QAQC flags and codes to the data, remove any overlapping deployment data, append files, and export the resulting data file for upload to the CDMO. Upload after secondary QAQC results in ingestion into the database as provisional plus data, recalculation of cDepth or cLevel parameters, and finally tertiary QAQC by the CDMO and assimilation into the CDMO's authoritative online database. Where deployment overlap occurs between files, the data produced by the newly calibrated sonde is generally accepted as being the most accurate. For more information on QAQC flags and codes, see Sections 11 and 12. Patrick Hagan is primarily responsible for all data acquisition and management with consultations and assistance from Dorset Hurley.

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 Dock 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 hydrological 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.

4) Research methods – A Sutron Sat-Link2 transmitter was installed at the Lower Duplin station on March 18, 2007 and transmits data to the NOAA GOES satellite, NESDIS ID # 01 00 51 DE. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The "real-time" telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation in the CDMO's authoritative online database. Provisional and authoritative data are available at http://cdmo.baruch.sc.edu.
Before each YSI 6600 data logger 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. The conductivity, pH, and turbidity calibrations use a YSI produced traceable solution.

When deployed, the weather conditions and tidal stage are recorded in the field observation log. The datalogger is placed inside a length of PVC pipe attached to the dock. The data logger is attached to a non-floating dock by a monofilament cable and run down a PVC pipe to rest 0.5m above the surface bottom. Because of the large tidal range, water is continually flushed through 2" holes in the PVC pipes at the sonde location, thus eliminating the problem of creating a stagnant column of water with in the pipe with data logger. Every 15 minutes during the sampling period measurements are taken for temperature, specific conductance, salinity, pH, dissolved oxygen concentration, percent saturation, depth and turbidity. At the end of the sample period the data logger is retrieved and immediately replaced by another calibrated data logger. The data logger is then taken to the lab and runs QA/QC standards for pH, and conductivity, and dissolved oxygen, the data are uploaded, and the sonde is cleaned. Data are removed if the post calibration standards fail or if technical problems are noted. All data removed is noted in the metadata.

5) Site location and character – The Lower Duplin (LD) monitoring site (31 deg 25' 4" N, 81 deg 17' 46" W) is located on the Marsh Landing Dock in the Duplin River on Sapelo Island and consists of a muddy bottom habitat. Water passing the dock during flood tide originates from the Doboy Sound. The Doboy Sound receives input from the Atlantic Ocean, and the freshwater 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. Primary freshwater input consists of rainwater runoff. The Marsh Landing dock is used as the main dock to the island where the ferry makes several daily runs, with several small boats that are docked there. The surrounding area vegetation is dominated by salt marsh with Spartina being the predominate flora. Normal tidal range for the site is 3meters and the salinity range is 5-35 ppt. The depth at this sampling station ranges from 2.5 meters to 6.0 meters depending on tide.

The Hunt Dock (HD) monitoring site (31 deg 28' 43", 81 deg 16' 23" W) is located on the Duplin River, off of Moses Hammock, which is separated from 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. Bottom habitat at this site includes soft mud and some oyster bed building along the shoreline with an average tidal range of 3meters and a salinity range of 5-35 ppt. Primary freshwater input consists of rainwater runoff. 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. The maximum depth at the Hunt Dock site is 4.27 meters.

Dean Creek (DC), (N 31 23 22.5W 81 16 44.2) is located on a small wooden
bridge spanning Dean Creek, in close proximity to the adjacent Nannygoat Beach causeway. Dean Creek is a small tidal basin fed from the waters of Doboy Sound, which is located on Sapelo Island's south end. The creeks' salinity normally ranges between 5 and 30 ppt. Primary freshwater input consists of rainwater runoff. The benthic community consists of a sandy-mud substrate with occasional, small, intertidal oyster reef community and mean tidal amplitude of approximately 3meters. The small creek feeds approximately 150 acres of Spartina alterniflora dominated salt marsh, which is interspersed with small 0.5-1 acre hammocks and saltpans. Fringe community components range from Loblolly pine forests with a sub-canopy of Yaupon holly to Wax myrtle and Sable Palm.

The Cabretta Creek (CA) site coordinates are N 31 26 37.3W 81 14 23.7. The station is located on a small (one-lane), wooden, roadway bridge spanning Cabretta creek located on the island's extreme eastern side, bordering the Atlantic Ocean. The creek is fed directly from waters of the Atlantic Ocean. Cabretta experiences an average tidal range of approximately 3 meters. Salinity ranges with exception to major, long-term precipitation events, varies from 15-36 ppt., seasonally. Primary freshwater input consists of rainwater runoff. The benthos is composed primarily of sand substrate with small, intertidal oyster reef conglomerate communities. Adjacent to the site is extensive, intertidal, bank stabilization (armoring) in the form of woven rip-rap fencing and granite rocks. This manipulation is slowly becoming stabilized via oyster reef community colonization. The adjacent marshes are dominated by Spartina alterniflora with occasional Juncus romerianus in the nearby fringe community habitat. The creek has very little adjacent uplands due to: 1) the low elevational gradient and 2) the areas geologically recent accretion genesis (Holocene) resulting in sandy soils; of which neither conditions allow for extensive floral colonization or stabilization.

There are no current studies on pollutants in this area. Sapelo Island is typically considered a pristine environment, with minimal pollutant input.

6) Data collection period –

Cabretta:

Deployment Date/Time	**Retrieval Date/Time**
12/19/2012 11:00	1/3/2013 12:00
1/3/2013 11:30	1/17/2013 9:30
1/15/2013 15:45	1/30/2013 9:15
1/29/2013 14:45	2/21/2013 9:15
2/8/2013 9:45	2/18/2013 11:15
2/19/2013 13:00	3/6/2013 13:15
3/6/2013 12:30	3/26/2013 9:45
3/19/2013 8:45	4/4/2013 8:15
4/3/2013 12:30	4/17/2013 11:30
4/16/2013 13:45	5/2/2013 13:00
5/2/2013 9:00	5/15/2013 8:15
5/14/2013 12:00	5/29/2013 11:30
5/28/2013 9:00	6/10/2013 11:30
6/10/2013 11:00	6/26/2013 11:30
5/25/2013 11:30	7/10/2013 12:15
7/10/2013 9:30	7/25/2013 8:15
7/23/2013 10:30	8/5/2013 13:30
8/5/2013 11:30	8/21/2013 11:45
8/19/2013 13:00	8/27/2013 11:30
8/27/2013 10:45	9/16/2013 8:30
9/12/2013 10:30	10/7/2013 12:15
10/2/2013 10:15	10/21/2013 11:00
10/16/2013 12:45	10/29/2013 11:30
10/29/2013 11:45	11/18/2013 9:45
11/12/2013 14:30	11/27/2013 9:45
11/26/2013 10:15	12/11/2013 13:00
12/10/2013 14:45	1/2/2014 12:45
12/23/2013 10:00	1/8/2014 9:30

Dean Creek:

Deployment Date/Time	Retrieval Date/Time
12/19/2012 10:30	1/3/2013 11:30
1/3/2013 10:30	1/15/2013 9:00
1/14/2013 15:00	1/30/2013 10:00
1/29/2013 13:45	2/18/2013 11:45
2/8/2013 10:15	2/21/2013 10:00
2/19/2013 12:15	3/6/2013 13:45
3/6/2013 13:00	3/26/2013 10:30
3/19/2013 9:15	3/26/2013 19:30
4/3/2013 12:45	4/17/2031 12:30
4/17/2013 10:00	5/2/2013 9:15
5/1/2013 11:45	5/15/2013 10:45
5/14/2013 11:30	5/28/2013 9:15
5/28/2013 8:45	6/11/2013 11:00
6/10/2013 14:45	6/25/2013 8:15
6/24/2013 13:00	7/10/2013 11:45
7/10/2013 8:45	7/24/2013 8:00
7/23/2013 10:00	8/7/2013 9:45
8/6/2013 11:15	8/23/2013 8:00
8/19/2013 10:45	8/29/2013 8:30
8/29/2013 8:30	9/26/2013 9:15
9/12/2013 9:45	10/7/2013 13:30
10/2/2013 9:00	10/21/2013 12:30
10/16/2013 13:15	10/29/2013 10:45
10/29/2013 10:45	11/18/2013 10:15
11/12/2013 13:45	11/27/2013 10:15
11/25/2013 13:30	12/11/2013 14:15
12/23/2013 15:00	1/2/2014 11:45

Hunt Dock:

Deployment Date/Time	Retrieval Date/Time
12/19/2012 11:00	1/3/2013 10:00
1/3/2013 11:00	1/17/2013 9:00
1/15/2013 15:30	1/30/2013 9:30
1/29/2013 14:15	2/18/2013 10:45
2/19/2013 12:45	3/6/2013 13:00
3/6/2013 12:15	3/26/2013 9:30
3/19/2013 8:30	4/4/2013 8:00
4/3/2013 12:15	4/17/2013 11:00
4/16/2013 13:15	5/5/2013 12:45
5/2/2013 8:45	5/15/2013 8:30
5/15/2013 10:30	5/29/2013 11:15
5/28/2013 11:00	6/11/2013 8:15
6/10/2013 11:15	6/26/2013 11:45
6/25/2013 12:00	7/6/2013 3:15
7/10/2013 9:15	7/25/2013 8:00
7/24/2013 10:15	8/6/2013 9:30
8/5/2013 13:15	8/21/2013 9:00
8/19/2013 12:15	8/27/2013 11:30
8/27/2013 11:15	9/16/2013 8:00
9/12/2013 10:15	10/7/2013 12:30
10/2/2013 10:00	10/16/2013 12:00

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10/16/2013 12:15	10/29/2013 11:00
10/29/2013 11:30	11/18/2013 9:15
11/12/2013 14:15	11/27/2013 9:15
11/26/2013 9:45	12/11/2013 11:45
12/10/2013 14:15	1/2/2014 12:15
12/23/2013 10:15	1/8/2014 9:15

Lower Duplin:

Deployment Date/Time	**Retrieval Date/Time**
12/19/2012 10:45	1/3/2013 12:30
1/3/2013 10:45	1/17/2013 9:45
1/15/2013 13:15	1/30/2013 9:45
1/29/2013 14:00	2/18/2013 11:30
2/8/2013 10:00	2/21/2013 9:45
2/19/2013 12:30	3/6/2013 13:30
3/6/2013 12:45	3/26/2013 10:15
3/19/2013 9:00	3/21/2013 11:45
3/21/2013 12:30	4/4/2013 8:45
4/3/2013 12:00	4/17/2013 11:45
4/17/2013 10:30	5/2/2013 13:30
5/2/2013 9:15	5/15/2013 11:00
5/14/2013 11:45	5/29/2013 12:30
5/28/2013 9:15	6/11/2013 8:30
6/10/2013 12:00	6/25/2013 8:30
6/24/2013 13:15	7/10/2013 12:45
7/10/2013 9:00	7/25/2013 8:45
7/23/2013 10:15	8/6/2013 10:00
8/5/2013 15:00	8/19/2013 8:45
8/19/2013 12:45	8/29/2013 8:45
8/29/2013 9:00	9/16/2013 8:45
9/12/2013 10:00	10/7/2013 13:00
10/2/2013 10:30	10/21/2013 11:30
10/16/2013 12:00	10/29/2013 11:00
10/29/2013 11:15	11/18/2013 10:00
11/12/2013 14:00	11/27/2013 10:00
11/25/2013 14:30	12/11/2013 13:15
12/10/2013 14:00	1/3/2014 13:15
12/19/2013 10:45	1/3/2013 12:30
12/23/2013 10:45	1/8/2014 10:00

7) Distribution – NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from this NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Principal Investigators and Contact Persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page http://cdmo.baruch.sc.edu/. Data are available in text tab-delimited format.

8) Associated researchers and projects- The SWMP program in place on Sapelo also includes meteorological and nutrient datasets collected along with this water quality data. Furthermore 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 and on the Sapelo Island NERR site: http://www.sapelonerr.org .

II. Physical Structure Descriptors

9) Sensor specifications – Sapelo Island NERR only deployed YSI 6600EDS sondes in 2013. They were all equipped identically.

YSI 6600EDS data sonde:

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model#: 6560
Range: -5 to 50 C
Accuracy: +/- 0.15
Resolution: 0.01 C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: 4-electrode cell with autoranging
Model#: 6560
Range: 0 to 100 mS/cm
Accuracy: +/- 0.5% of reading + 0.001 mS/cm
Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependant)

Parameter: Salinity
Units: parts per thousand (ppt)
Sensor Type: Calculated from conductivity and temperature
Range: 0 to 70 ppt
Accuracy: +/- 1.0% of reading pr 0.1 ppt, whichever is greater
Resolution: 0.01 ppt

Parameter: Dissolved Oxygen % saturation
Units: percent air saturation (%)
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 6150 ROX
Range: 0 to 500% air saturation

Accuracy: 0-200% air saturation: +/- 1% of the reading or 1% air saturation, whichever is greater 200-500% air saturation: +/- 15% or reading
Resolution: 0.1% air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature, and salinity)
Units: milligrams/Liter (mg/L)
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 6150 ROX
Range: 0 to 50 mg/L
Accuracy: 0-20 mg/L: +/-0.1 mg/l or 1% of the reading, whichever is greater
20 to 50 mg/L: +/- 15% of the reading
Resolution: 0.01 mg/L

Parameter: Non-vented Level - Shallow (Depth)
Units: feet or meters (ft or m)
Sensor Type: Stainless steel strain gauge
Range: 0 to 30 ft (9.1 m)
Accuracy: +/- 0.06 ft (0.018 m)
Resolution: 0.001 ft (0.001 m)

Parameter: pH – bulb probe
Units: pH units
Sensor Type: Glass combination electrode
Model#: 6561 or 6561FG
Range: 0 to 14 units
Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Units: nephelometric turbidity units (NTU)
Sensor Type: Optical, 90 degree scatter, with mechanical cleaning
Model#: 6136
Range: 0 to 1000 NTU
Accuracy: +/- 2% of reading or 0.3 NTU (whichever is greater)
Resolution: 0.1 NTU

Depth Qualifier:
The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either vented or non-vented depth/level sensors. Readings for both vented and non-vented sensors are automatically compensated for water density change due to variations in temperature and salinity; but for all non-vented depth measurements, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.03 cm for every 1 millibar change in atmospheric pressure, and is eliminated for vented sensors because they are vented to the atmosphere throughout the deployment time interval.

Beginning in 2006, NERR SWMP standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg). To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in the SWMP calibration sheet or digital calibration log. This offset procedure standardizes each depth calibration for the entire NERR System. If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR can be corrected.

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

10) Coded variable definitions

Sampling station:	Sampling site code:	Station code:
Cabretta Creek	CA	sapcawq
Dean Creek	DC	sapdcwq
Hunt Dock	HD	saphdwq
Lower Duplin	LD	sapldwq

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

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

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

General Errors

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

Corrected Depth/Level Data Codes

GCC	Calculated with data that were corrected during QA/QC

GCM	Calculated value could not be determined due to missing data
GCR	Calculated value could not be determined due to rejected data
GCS	Calculated value suspect due to questionable data
GCU	Calculated value could not be determined due to unavailable data

Sensor Errors

SBO	Blocked optic
SCF	Conductivity sensor failure
SCS	Chlorophyll spike
SDF	Depth port frozen
SDG	Suspect due to sensor diagnostics
SDO	DO suspect
SDP	DO membrane puncture
SIC	Incorrect calibration / contaminated standard
SNV	Negative value
SOW	Sensor out of water
SPC	Post calibration out of range
SQR	Data rejected due to QAQC checks
SSD	Sensor drift
SSM	Sensor malfunction
SSR	Sensor removed / not deployed
STF	Catastrophic temperature sensor failure
STS	Turbidity spike
SWM	Wiper malfunction / loss

Comments

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

13) Post deployment information

Cabretta

Deployment Date	SpCond	ROX DO	pH	pH	Turb	Turb	Depth
m/d/y	(50ms/cm)	(100%)	(7)	(10)	(0)	(126)	(m)
1/03/13	50.03	100.9	7.05	10.12	-.2	121.9	0.023
1/15/13	50.72	99.2	7.19	10.35	0.5	122.3	0.032

1/29/13	51.5	100.2	7.12	10.02	-.2	122.9	0.035
2/07/13	50.44	100.7	7.24	10.26	5.1	127.6	0.164
2/19/13	49.23	100.2	6.96	9.85	1	120.3	0.119
3/05/13	51.77	94.7	7.16	10.17	1.7	126	0.064
3/18/13	48.58	100.9	7.28	10.25	0.1	118.3	0.033
4/02/13	50.17	100.4	7.18	10.15	-1.6	127.7	0.152
4/16/13	50.41	100.7	7.11	10.11	1.7	134.2	0.133
5/14/13	49.97	98.1	6.97	9.88	6.9	119.6	0.103
5/24/13	49.75	100	7.3	10.22	-1.2	126.4	0.109
6/10/13	48.99	99	7.23	10.19	1.4	120.6	0.047
6/25/13	50.56	100.2	7.07	10.08	2.4	127.7	-0.072
7/09/13	50.37	99.8	7.16	10.05	0.7	109.3	0.000
7/22/13	50.23	101.1	7.21	10.25	-1.1	126.5	0.051
8/05/13	51.09	97.9	7.07	10.09	4.9	133	0.052
8/19/13	50.47	100.8	7.08	10.03	-2.1	117.6	0.157
8/27/13	49.1	100.9	n/a	n/a	-1.9	121.1	0.058
9/10/13	50.23	99.7	7.17	9.92	6	123	0.046
10/01/13	50.52	99.7	7.86	9.09	-4.4	128.1	-0.023
10/15/13	49.97	102.3	7.04	10.07	1.2	120.7	0.333
10/29/13	49.14	98.7	6.88	9.94	-3.6	116.6	0.114
11/12/13	49.59	98.8	7.05	10.03	-2	119	-0.119
11/25/13	51.63	102.4	7.09	10.07	-0.2	124.7	0.16
12/10/13	50.06	100.6	7.06	10.06	123.5	-0.5	-0.155
12/19/13	50.34	100.9	7.27	10.15	1.3	122.3	0.174

Dean Creek

Deployment Date m/d/y	SpCond (50ms/cm)	ROX DO (100% sat)	pH (7)	pH (10)	Turb (0)	Turb (126)	Depth (m)
12/17/12	49.24	101.6	6.97	9.71	-0.1	124.8	0.494
1/02/13	49.99	99.2	6.99	9.95	2.6	121.4	0
1/14/13	51.59	98.8	7.32	10.39	0.2	124	-0.109
1/29/13	49.13	101.5	7.67	10.71	8.2	128.3	0.19
2/07/13	50.98	98.5	7.12	10.39	0.9	127	0.291
2/19/13	47.82	99	5.84	8.66	3.4	118.3	0.114
3/05/13	51.17	96.3	7.13	10.6	-0.7	129	0.07
3/18/13	48.07	101.2	7.85	10.91			0.011
4/02/13	49.68	99.6	7.08	10.05	0.2	129.5	0.182
4/17/13	50.27	98.6	7.08	10.12	0.6	122.1	0.005
5/01/13	50.94	100	7.11	10.15	1.8	109.6	0.338
5/14/13	50.22	100.2	7.44	9.45	-0.4	121.6	0.105
5/21/13	49.75	98.7	7.24	10.18	-3.8	94.7	-0.001
6/10/13	49.72	100.9	7.13	9.96	-4.2	125.7	0.19
6/24/13	50.41	101.6	7.51	10.47	1	132.9	-0.104
7/10/13	52.14	98.9	7.14	10.19	2.1	116.6	-0.031
7/22/13	50.25	101.1	7.35	10.12	0.25	126.3	-0.023
8/06/13	50.36	99.4	7.3	10.25	6.1	134.4	0.027
8/19/13	49.48	95.1	7.09	10	-0.2	125.6	-0.113
8/26/13	49.17	100	7	9.95	-1	119.7	0.058
9/10/13	50.65	100.6	7.15	10.12	2.3	123.6	-0.034
10/01/13	49.81	99.7	6.9	9.85	0.6	121.9	-0.017
10/15/13	50.93	100.3	7.09	10.06	4.2	122.6	0.298
10/29/13	50.68	100.7	6.87	9.78	-3.7	118.8	0.12
11/12/13	50.63	94.8	7.09	10.07	-3.7	120.1	0.115
11/25/13	49.6	102.9	7.12	10.1	1.6	122.3	0.146

12/10/13	50.71	100.4	7.18	10	0.7	124.9	0.007
12/19/13	50.32	101.1	7.21	10.09	0.5	119.3	0.174

Hunt Dock

Deployment Date m/d/y	SpCond (50ms/cm)	ROX DO (100% sat)	pH (7)	pH (10)	Turb (0)	Turb (126)	Depth (m)
12/17/12	49.58	101.1	7.09	10.11	-0.2	125.7	0.153
1/02/13	49.33	97.7	7.12	10.12	0.7	121.8	-0.001
1/15/13	50.04	100.7	7.35	10.36	-0.1	126.7	0.026
1/29/13	48.47	100.1	7.25	10.43	0.8	125.5	0.157
2/07/13	50.39	101.2	6.92	10.04	n/a	n/a	0.088
2/16/13	50.26	101.7	7.04	10.06	-1	120.8	0.123
3/05/13	51.27	95	7.22	10.12	0.1	129.2	0.076
3/18/13	48.36	100.2	7.5	10	-0.3	119.6	0.044
4/02/13	79.02	100.9	7.23	10.29	-1.9	129	0.094
4/16/13	49.9	m/a	3.95	6.88	630	630	0.024
5/01/13	50.62	101	7.25	10.06	0.3	134.7	0.122
5/15/13	49.18	100.1	6.9	9.78	7.9	122.2	0.088
5/28/13	50.65	100.8	6.99	9.96	2.6	124.4	0.055
6/10/13	49.03	98.1	7.16	10.14	1	116.6	0.045
6/25/13	49.58	101.4	6.64	7.67	51.8	151.1	0.054
7/09/13	51.3	99.6	7.09	9.79	-2.2	146.5	-0.01
7/24/13	50.65	95.9	7.11	10.1	2.9	129.5	0.114
8/05/13	49.22	100.4	7.09	10.05	4.7	136.2	0.065
8/19/13	53.46	101.4	7.14	10.22	25.2	132.9	-0.016
8/26/13	50.41	101	7.07	10.05	-1.4	120.9	0.05
9/10/13	50.96	99.6	6.99	10.15	-13	113	0.057
10/01/13	49.58	99.8	6.92	9.85	-2.3	123.1	-0.039
10/16/13	51.09	101.3	6.94	10.01	2	122.9	0.243
10/29/13	49.83	99.4	7	9.91	-4.5	117.2	0.091
11/12/13	49.05	96.2	7.07	10.12	-1.4	119.2	0.071
11/25/13	51.03	101.6	7.05	10.03	-0.7	130.5	0.069
12/10/13	49.58	100	6.98	9.88	-2.7	125.6	0.08
12/19/13	50.98	101	7.55	10.56	0.1	123.7	0.188

Lower Duplin

Deployment Date m/d/y	SpCond (50ms/cm)	ROX DO (100% sat)	pH (7)	pH (10)	Turb (0)	Turb (126)	Depth (m)
12/17/12	49.6	102.5	7.08	10.12	-0.8	127.4	0.162
1/02/13	49.5	99	7.11	10.07	1.6	117.9	-0.009
1/15/13	51.26	100.4	7.13	10.15	-0.5	123	0.024
1/28/13	47.79	101	7.15	10.18	9	125.3	0.166
2/07/13	50.52	101.2	7.06	10.13	1.2	126.4	0.136
2/19/13	50.63	101.7	7.07	10.09	-0.4	120.8	0.126
3/05/13	50.44	96.2	7.04	10.02	0.2	134.7	0.092
3/18/13	49.4	101.4	7.58	10.61	-0.7	118.6	0.03
4/02/13	55.58	101.3	7.07	10.09	101	129.7	0.099
4/17/13	51.22	99.6	7.09	10.03	3.7	125	0.006
5/01/13	50.08	101	7.08	10.06	4.1	133.3	0.083
5/14/13	49.92	99.8	6.95	9.86	5	115.9	0.101
5/24/13	50.89	99.8	7.1	10.04	-3.2	114.5	0.057
6/10/13	49.02	99.8	7.05	10.05	-1.3	118	0.051
6/24/13	51.17	101	7.58	9.56	1.7	127.9	0.038

7/09/13	50.9	98.9	7.35	10.03	-0.3	119.7	0.011
7/22/13	51.1	98.9	7.05	10.13	1235	1235	0.112
8/05/13	49.7	100.2	7.11	10.16	-0.2	124.8	0.049
9/10/13	50.29	101.2	7.23	9.85	8	124.6	0.061
10/01/13	50.56	99.9	7	9.99	-2.5	125.3	0.007
10/15/13	50.7	100.2	7.2	10.28	3.3	120.1	0.131
10/29/13	49.44	100.5	6.98	9.89	-2.1	118	0.116
11/12/13	49.13	100.5	7.08	10.03	-1.7	117.9	0.065
11/25/13	50.7	101.5	7.05	10.06	3.3	123	0.148
12/10/13	51.6	102.4	7.05	10.07	-2.8	153	0.03
12/19/13	49.47	101.7	7.2	10.19	3.2	122.3	0.176

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