Sapelo Island (SAP) NERR Water Quality Metadata
January-December 2009
Latest update: **October 6 2014**

I Data Set and Research Descriptions

1. Principal investigator & 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.

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 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 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 considered the least impacted site.

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. 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 (24.82mS/cm = 14.92 g/L) or from serial dilution of a certified conductivity standard. The turbidity calibration uses a YSI produced solution. 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 tidal stage are recorded in the field observation log. The data logger 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 rejected 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 25'4.59"N 81 deg 17'45.77"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 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 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 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. 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. 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. 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 Periods (1st and last lines of data collected in the water)

Cabretta Creek:

Deployed	Retrieved
12/17/2008 15:30	01/13/2009 13:15
01/13/2009 13:30	01/26/2009 13:45
01/26/2009 16:00	02/17/2009 23:00
02/19/2009 14:15	03/03/2009 12:00
03/03/2009 12:30	03/18/2009 14:15
03/18/2009 14:30	03/30/2009 12:00
03/30/2009 12:30	04/10/2009 12:00
04/10/2009 12:15	04/29/2009 12:45
04/29/2009 13:00	05/11/2009 12:45
05/11/2009 13:00	05/28/2009 11:30
05/28/2009 11:45	06/09/2009 10:30
06/09/2009 10:45	06/25/2009 10:30
07/02/2009 14:15	07/07/2009 11:15
07/09/2009 09:15	07/22/2009 11:45
07/22/2009 12:15	08/05/2009 12:15
08/05/2009 12:30	08/17/2009 12:15
08/17/2009 12:30	09/01/2009 12:30
09/01/2009 12:45	09/17/2009 11:15
09/17/2009 11:30	09/24/2009 09:30
09/24/2009 09:45	10/06/2009 10:30
10/06/2009 10:45	10/13/2009 00:15
10/21/2009 10:30	11/06/2009 13:00
11/06/2009 13:30	11/16/2009 10:30
11/16/2009 10:45	11/30/2009 11:45
11/30/2009 12:00	12/16/2009 10:45
12/16/2009 11:00	12/28/2009 10:15
12/28/2009 10:45	01/06/2010 09:15

Dean Creek:

Deployed	Retrieved
12/17/2008 12:00	01/12/2009 14:30
01/13/2009 15:00	01/28/2009 12:30
01/28/2009 12:45	02/19/2009 11:00
02/19/2009 11:15	03/03/2009 11:45

03/03/2009 12:00	03/12/2009 21:30
03/18/2009 11:00	03/30/2009 09:45
03/30/2009 10:00	04/10/2009 10:00
04/10/2009 10:15	04/28/2009 13:00
04/28/2009 13:15	05/10/2009 13:00
05/12/2009 11:30	05/21/2009 20:45
05/27/2009 10:15	06/08/2009 10:00
07/07/2009 12:00	07/22/2009 08:30
07/22/2009 08:45	08/06/2009 11:00
08/06/2009 11:30	08/17/2009 14:00
08/17/2009 14:15	09/01/2009 09:30
09/01/2009 08:45	09/15/2009 12:15
09/15/2009 12:30	09/24/2009 10:45
09/24/2009 11:00	10/06/2009 08:45
10/06/2009 09:00	10/21/2009 09:45
10/21/2009 10:15	11/06/2009 12:00
11/06/2009 12:15	11/16/2009 10:15
11/16/2009 10:30	11/30/2009 10:00
11/30/2009 10:15	12/15/2009 09:45
12/15/2009 10:00	12/28/2009 09:15
12/28/2009 10:00	01/04/2010 14:00

Hunt Dock:

Deployed	Retrieved
01/13/2009 15:00	01/26/2009 15:30
01/26/2009 15:45	02/19/2009 14:15
02/19/2009 14:30	03/04/2009 10:15
03/04/2009 10:30	03/18/2009 14:00
03/18/2009 14:15	03/30/2009 12:30
03/31/2009 12:45	04/11/2009 12:30
04/11/2009 12:45	04/29/2009 13:00
04/29/2009 13:15	05/11/2009 13:00
05/28/2009 13:15	06/09/2009 11:15
06/09/2009 11:30	06/23/2009 11:30
06/23/2009 11:45	07/07/2009 11:15
07/07/2009 11:30	07/22/2009 12:00
07/22/2009 12:15	08/05/2009 12:30
08/05/2009 12:45	08/17/2009 11:00
08/17/2009 11:15	09/03/2009 10:00
09/03/2009 10:30	09/17/2009 10:45
09/17/2009 11:00	09/24/2009 09:30
09/24/2009 10:00	10/06/2009 10:45
10/06/2009 11:00	10/21/2009 11:30
10/21/2009 12:00	11/06/2009 10:45
11/06/2009 11:00	11/16/2009 12:00
11/16/2009 12:15	11/30/2009 13:30
11/30/2009 13:45	12/16/2009 12:15
12/16/2009 12:30	12/28/2009 10:45
12/28/2009 11:00	01/06/2009 09:30

Lower Duplin:

Deployed	Retrieved
12/17/2008 13:00	01/13/2009 14:45

01/13/2009 15:00	01/27/2009 12:45
01/27/2009 13:00	02/19/2009 10:45
02/20/2009 11:00	03/03/2009 13:15
03/04/2009 11:15	03/18/2009 11:00
03/19/2009 11:15	03/31/2009 09:30
09/21/2009 09:45	04/10/2009 10:15
04/10/2009 10:30	04/28/2009 13:00
04/28/2009 13:30	05/11/2009 09:00
05/11/2009 09:15	05/28/2009 10:15
05/28/2009 10:30	06/09/2009 11:45
06/09/2009 12:30	06/25/2009 12:15
06/25/2009 12:30	07/09/2009 11:15
07/09/2009 11:30	07/21/2009 13:15
07/21/2009 13:30	07/29/2009 05:15
08/06/2009 12:30	08/17/2009 09:00
08/17/2009 09:30	09/03/2009 12:00
09/03/2009 12:15	09/15/2009 10:45
09/15/2009 11:00	09/24/2009 12:00
09/24/2009 12:15	10/05/2009 09:30
10/05/2009 09:45	10/21/2009 12:00
10/21/2009 12:15	11/06/2009 13:45
11/06/2009 14:00	11/16/2009 12:00
11/16/2009 12:45	11/30/2009 14:15
11/30/2009 15:00	12/16/2009 13:00
12/16/2009 14:00	12/28/2009 11:00
12/28/2009 11:15	01/04/2010 13:00

7) Distribution

NERRS System-wide Monitoring Program data. The NERRS retains the right to be fully credited for having collected and process the data. Following academic courtesy standards, the NERR site where the data were collected should be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. 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.

Requested citation format:
National Estuarine Research Reserve System (NERRS). 2012. System-wide Monitoring Program. Data accessed from the NOAA NERRS Centralized Data Management Office website: http://cdmo.baruch.sc.edu/; *accessed* 12 October 2012.

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 comma delimited format.

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 and on the Sapelo Island NERR site: http://www.sapelonerr.org .

II. Physical Structure Descriptors

9) Sensor specifications:

YSI 6600EDS datasonde

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model #: 6560
Range: -5 to 45 °C
Accuracy: +/-0.15 °C
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 dependent)

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

Parameter: Dissolved Oxygen % saturation
Units: percent air saturation (%)
Sensor Type: Rapid Pulse - Clark type, polarographic
Model #: 6562
Range: 0 to 500 % air saturation
Accuracy: 0-200 % air saturation, +/- 2 % of the reading or 2 % air saturation, whichever
is greater; 200-500 % air saturation, +/- 6 % of the reading
Resolution: 0.1 % air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature and
salinity)
Units: milligrams per Liter (mg/L)
Sensor Type: Rapid Pulse - Clark type, polarographic
Model #: 6562

Range: 0 to 50 mg/L
Accuracy: 0 to 20 mg/L, +/- 2 % of the reading or 0.2 mg/L, whichever is greater; 20 to
50 mg/L, +/- 6 % of the reading
Resolution: 0.01 mg/L

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

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 or EDS flat glass 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 ° scatter, with mechanical cleaning
Model #: 6136
Range: 0 to 1000 NTU
Accuracy: +/- 5 % reading or 2 NTU (whichever is greater)
Resolution: 0.1 NTU

Dissolved Oxygen Qualifier (Rapid Pulse / Clark type sensor):
The reliability of dissolved oxygen (DO) data collected with the rapid pulse / Clark type sensor after 96 hours post-deployment for non-EDS (Extended Deployment System) data sondes may be problematic due to fouling which forms on the DO probe membrane during some deployments (Wenner et al. 2001). Some Reserves utilize the YSI 6600 EDS data sondes, which increase DO accuracy and longevity by reducing the environmental effects of fouling. Optical DO probes have further improved data reliability. The user is therefore advised to consult the metadata for sensor type information and to exercise caution when utilizing rapid pulse / Clark type sensor DO data beyond the initial 96-

hour time period. Potential drift is not always problematic for some uses of the data, i.e. periodicity analysis. It should also be noted that the amount of fouling is very site specific and that not all data are affected. If there are concerns about fouling impacts on DO data beyond any information documented in the metadata and/or QAQC flags/codes, please contact the Research Coordinator at the specific NERR site regarding site and seasonal variation in fouling of the DO sensor.

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.

Salinity Units Qualifier:

In 2013, EXO sondes were approved for SWMP use and began to be utilized by Reserves. While the 6600 series sondes report salinity in parts per thousand (ppt) units, the EXO sondes report practical salinity units (psu). These units are essentially the same and for SWMP purposes are understood to be equivalent, however psu is considered the more appropriate designation. Moving forward the NERR System will assign psu salinity units for all data regardless of sonde type.

Turbidity Qualifier:

In 2013, EXO sondes were approved for SWMP use and began to be utilized by Reserves. While the 6600 series sondes report turbidity in nephelometric turbidity units (NTU), the EXO sondes use formazin nephelometric units (FNU). These units are essentially the same but indicate a difference in sensor methodology, for SWMP purposes they will be considered equivalent. Moving forward, the NERR System will use

FNU/NTU as the designated units for all turbidity data regardless of sonde type. If turbidity units and sensor methodology are of concern, please see the Sensor Specifications portion of the metadata.

10) Coded variable definitions

SAPLDWQ = Sapelo Island Lower Duplin water quality site
SAPHDWQ = Sapelo Island Hunt Dock water quality site
SAPDCWQ = Sapelo Island Dean Creek water quality site
SAPCAWQ = Sapelo Island Cabretta Creek water quality site

11) **QAQC flag definitions –** This section details the automated and secondary QAQC flag definitions. Include the following excerpt:

-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 – This section details the secondary QAQC Code definitions used in combination with the flags above. Include the following excerpt:

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 records 2009
Cabretta Creek:

Deployment Date	SpCond(24.82)	DO%	Ph (7.00)	Turbidity (0)
12/17/08	24.7	105.3	7.05	-1.5
11/13/09	24.74	100.5	7.11	1.2
1/26/09	25.89	95.6	7.06	4.5
2/19/09	24.83	112.1	7.01	7.7
3/3/09	24.04	77	6.99	2
3/18/09	24.59	100.5	7.12	.5
3/30/09	24.05	101.1	7.07	-1.5
4/10/09	25.54	92.4	7.02	-.5
4/29/09	24.52	116.1	7.1	7.8
5/11/09	24.5	83	6.96	2.6
5/28/08	24.2	97.7	7.07	2.9
6/9/09	24.75	96.5	7.01	89
7/2/09	24.87	98.8	7.3	2.2
7/9/09	24.18	99.5	7.11	5.5

7/22/09	23.66	90.6	7.13	-1.2
8/5/09	22.33	89	7.15	2
8/17/09	24.31	96.2	6.96	5.6
9/1/09	27.36	n/a	7.1	.4
9/17/09	24.71	81.5	7.11	.2
9/24/09	25.32	98.7	7.17	3.3
10/6/09	24.64	107.3	7.15	-1.7
10/21/09	22.59	96.3	7.02	-8.5
11/6/09	25.5	101.7	7.02	-.4
11/16/09	24.77	n/a	7.76	-4.5
11/30/05	24.82	107	7.03	-3.7
12/16/09	25.11	71.8	7	-4.8
12/28/09	25.23	116.6	6.94	-1.2

Dean Creek:

Deployment Date	SpCond(24.82)	DO%	Ph (7.00)	Turbidity (0)
12/17/08	24.39	85.7	7.17	.8
1/12/09	24.23	94.3	7.1	1.3
1/27/09	24.97	98.7	7.07	.9
2/19/09	24.92	102.3	7.05	1
3/3/09	25.75	n/a	7.02	1.7
3/18/09	25.59	89.5	7	-2.9
3/30/09	23.94	93.6	7	2.5
4/10/09	24.71	101.2	7.1	1
4/28/09	24.18	98.8	7.06	2.2
5/12/09	24.93	n/a	7.05	4.5
5/27/09	25.86	n/a	7.14	2.7
6/8/09	station lost			
7/2/09	26.45	53.7	7.15	1.2
7/21/09	25.1	98.8	7.25	2.1
8/6/09	24.55	85.9	7.16	.9
8/17/09	23.83	92	7.11	-4.1
9/1/09	22.78	83.2	7.09	.8
9/15/09	25.34	101	6.94	15
9/24/09	24.85	81.1	7.13	-1.5
10/6/09	24.35	100.3	7.15	19.3
10/21/09	24.25	102.1	7.28	-11
11/6/09	23.71	101.2	6.98	1.8
11/16/09	25.1	95.9	6.95	1.3
11/30/09	24.21	108.9	7.12	4
12/15/09	24.34	89.8	7.76	-1
12/28/09	24.47	103.5	7.08	-3.1

Hunt Dock:

Deployment Date	SpCond(24.82)	DO%	Ph (7.00)	Turbidity (0)
12/17/08	24.49	94.1	7.2	7.6
1/13/09	24.89	100.6	6.93	3
1/26/09	23.6	86.4	7.04	1
2/19/09	24.8	102.5	7.04	-2.8
3/3/09	24.7	104.6	7	1
3/18/09	22.9	79	7.7	2.2
3/30/09	23.73	100.2	7.07	-3.1
4/10/09	24.99	103.1	7.04	9.3
4/29/09	24.67	98.4	7.03	6.3
5/11/09	sonde fail…no data			
5/28/09	23.89	90.1	6.98	1.1
6/9/09	24.72	100.2	6.93	2.2

6/23/09	25.68	69.7	7.16	-5.4
7/9/09	23.03	85.5	6.89	-3
7/22/09	24.49	99.2	7.13	-3.3
8/5/09	24.31	91	7.13	9.7
8/17/09	24.39	n/a	6.98	-1.2
9/3/09	25.12	106.6	7.14	4.6
9/17/09	26.61	100.9	6.78	-1
9/24/09	24.89	99.2	7.2	-.3
10/6/09	25	99	6.8	1.1
10/21/09	24.5	93.2	6.92	-21.6
11/6/09	24.5	93	6.9	-5.9
11/16/09	24.2	98.1	7.03	.2
11/30/09	24.54	89.9	6.64	2.8
12/16/09	24.55	107	7.18	-1.7
12/28/09	25.05	96.4	7	-.1

Lower Duplin:

Deployment Date	SpCond(24.82)	DO%	Ph (7.00)	Turbidity (0)
12/17/08	24.7	102.2	7.02	.5
1/13/09	23.87	95.3	7.06	2.4
1/27/09	25.35	93	7.04	-.1
2/19/00	23.34	103.6	7.1	-2.3
3/3/09	24.23	98.8	6.88	.9
3/18/09	23.85	99.9	7.09	-3.5
3/30/09	24	100.7	7.15	2.2
4/10/09	24.97	96.2	7.17	-.6
4/28/09	24.48	93.9	7.01	-.01
5/11/09	25.21	99.2	7.27	4.6
5/28/09	24.55	99.8	7.09	5.1
6/9/09	24.98	99.4	7.1	1.1
6/25/09	22.95	99.7	7.02	3.7
7/9/09	23.58	98.4	7.14	-1.6
7/21/09	23.99	100	7.21	2.2
8/6/09	25.49	76.7	7.04	.5
8/17/09	24.25	101.1	6.98	-1.5
9/1/09	23.9	89.7	7.1	1
9/15/09	23.87	97.7	7.4	.9
9/24/09	25.66	99.2	7.08	12
10/5/09	file corrupted, no post cal performed			
10/21/09	24.44	100.1	7.13	-11.1
11/6/09	24.28	98.6	7.02	-2.7
11/16/09	24.89	103.1	6.94	-7.9
11/30/09	24.03	101.9	7.08	1.1
12/16/09	24.97	100.5	7.11	-3.4
12/28/09	24.72	97	7.01	3.6

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.

Turbidity calibrations and post calibrations were often out of range in 2009. However, these results are not seen in the data. There were no obvious sensor malfunctions or issues outside of those already noted in the data. We believe this may be due to the age of the probes or perhaps issues with the calibrations or calibration cup.

The Cabretta site was damaged by floating debris on 6/22 @ 20:15 and was disabled until 6/25 @10:15.

The Cabretta site was collecting data at the wrong depth from 7/9 9:15 to 7/22 11:45. We believe this was due to sea grapes growing in the tube preventing the sonde from reaching the bottom.

The Dean Creek site sustained damage at some point during the 6/9 deployment and was lost, therefore there is no data for the period beginning on 6/9 @09:00 to 7/2 @14:45.

Dean Creek data during the 4/10 deployment was about 0.4 m higher in the water column that deployments surrounding it. We believe that there was something in the tube preventing the sonde from getting to the bottom.

During the following dates/times the Hunt Dock sonde seems to have gotten stuck in the tube when it was deployed. Because HD is a well-mixed site we do not believe other parameters were affected.

7/7 11:30 to 7/22 12:00
9/17 11:15 to 14:15
11/6 11:00 to 11/7 7:00
11/16 12:15 to 15:00
12/6 12:30 to 12/28 10:45

The Lower Duplin site sometimes had the sonde get hung up in the telemetry cable during deployment. We believe slight differences in depth at the 1/13 and 11/6 deployments are due to this.

The Lower Duplin site had a few odd SpCond readings throughout the year. These occurred at the beginning of deployments and were typically very depressed compared to data around it. We are not entirely sure what caused this issue. Although, bubbles in the conductivity cells may be to blame, we have marked this data suspect.

2/20 11:00
3/19 11:15-30
8/6 12:30