

Jobos Bay (JOB) NERR Water Quality Metadata
January to December 2007
Latest Update: August 5, 2013

I. Data Set & 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 and become part of the CDMO's online provisional database. Excessive pre- and post-deployment data are removed from the file prior to upload with up to 2 hours of pre- and post-deployment data retained to assist in data management. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the Reserve 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 graphs the data for review. It allows

the user to apply QAQC flags and codes to the data, remove remaining pre- and post-deployment data, append files, and export the resulting data file to the CDMO for tertiary QAQC 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.

After retrieving and carefully cleaning the data loggers, they are examined to detect any structural damage to the body or to the probes. The DO membrane is checked for ruptures and then replaced if needed. The turbidity probe is examined to assure that no obstruction affects the wiper and that the sensor is clean. Manipulation and observations are registered in the field log for each deployment respectively

The anomalous data are evaluated to determine whether to flag as suspect or rejected. Data are flagged if the values are: 1) outside the range expected for the site (see Site Location and Character, Section 5), 2) outside the range of measurements and accuracy established for the sensors (see Section 9), or 3) outside the range established for good water quality conditions (e.g., parameters spikes, negative values, out of water events, etc.). Data outside the acceptable range of water quality for a particular site are investigated for validity based on weather data, field observations, QC checks, data printouts, and instrument diagnostics. Data is rejected if the anomalies are attributed to: 1) sensor malfunction - if the voltage reading of the sensor is outside the range established for the sensor or the sensor will not calibrate, 2) exposure of sensors during low tide - identified by unusual Depth, Temperature, and Specific Conductivity data, or 3) fouling of sensors by aquatic organisms, debris or sediment - detected by comparing in situ sensor with measurements (see Section 4). Turbidity readings > 900 NTU are rejected. In addition, sensor readings that differ significantly (>10%) from standard solutions (e.g., Conductivity) suggest that the sensor was fouled during deployment. The person responsible for the data QA/QC is Angel Dieppa.

3. Research Objectives:

Four data loggers are deployed in Jobos Bay. Two are deployed in inner lagoons of the Mar Negro Component and the other two in the Bay of the Jobos Bay National Estuarine Research Reserve. The instruments are suspended from a pole at approximately 0.5 meters from the surface at each selected site. Data from stations 9, 10, 19 and 20 are being submitted to the Centralized Data Management Office as part of the System-Wide Monitoring Program. Measurements are taken at fifteen-minute intervals for approximately two-week periods. The sites are identified as representative of areas within the reserve and comparable to the sites that may be receiving impact from human activities from surroundings areas or may act as a habitat gradient in the Bay.

Station number nine (9), the impacted site, collects water quality data in a site associated with runoff from littoral and basin mangrove areas. This sampling station is located in the most inland lagoon, closest to the Thermoelectric Power Plant and farming activities north of the Reserve. It is subjected to runoff, which may include potential oil spill contamination from this industrial facility and agrochemicals. Information compiled from historical environmental documents, indicate that station nine (9) was used as a disposal site for residues of the previously operating sugar mill operation, and therefore might have high organic input into the sediments.

Station number ten (10), located in a mangrove lagoon area towards the southwestern section of Mar Negro is considered the reference or non-impacted site.

Station number (19) is located over a sea grass bed (*Thalassia testudinum*) in the inner western part of the bay just northeast of Cayo Colchones. This station is located near the thermal outfall and operating piers of the Aguirre Power Plant Complex, both activities may have significant effects on sea grass communities. This area is exposed to barge standings, sediment re-suspension and oil spills.

Station number (20) is located on the eastern inner bay section of the Cayos Caribe cays. This station is just south of the mangrove islets associated with the Reserve's coral reefs. Water streams coming through the coral platform may help characterize water conditions of the main marine currents reaching Jobos Bay, as well as, possible effects of industrial and chemical activities associated with Phillips Core, AES Coal Energy Plant and Pharmaceuticals located just east to this system.

4. Research methods:

The National Estuarine Research Reserve Water Quality Monitoring Program began sampling at Station nine (9) on December 20, 1995 and Station ten (10) on February 1, 1996. Monitoring at station 19 began in April 2004 and at station 20 in June 2004. Long term water quality monitoring is being performed at these stations.

Before each YSI 6600 data logger is deployed, calibration and maintenance is performed following the manufacturer's instruction. Calibration standards are only required for pH, salinity, and turbidity, all other parameters are done as described in the manual. Buffer solutions for two-point calibration (pH 7 and pH 10) are purchased from a scientific supply company. Salinity is calibrated with a specific conductance standard 123 mS/cm and is purchased from a scientific supply company.

The two-point turbidity calibration is performed using a 0 NTU (DI water) and 11.2 NTU standard purchased from a scientific company. The dissolved oxygen membranes are replaced before deployment and are allowed to sit at least 24 hours prior to deployment. Weather conditions and tide stage are recorded in the field observation log during deployment. Measurements of DO, pH, salinity, specific conductance, and temperature, are taken with other calibrated field instruments to check the accuracy of the instrumentation.

Each YSI data logger is tied with steel cable to a wrought iron galvanized pole, which is plunged into the sediments at each sampling area. The instruments are suspended from a pole at approximately 0.5 meters from the surface at each selected site. Every 15 minutes during the sampling period, the following measurements are recorded: date, time, temperature, specific conductance, salinity, dissolved oxygen percentage of saturation, dissolved oxygen concentration, depth, pH, and turbidity. Every two weeks the data loggers are retrieved, data uploaded, cleaned, inspected, and calibrated as noted previously. The data logger is then ready to be deployed again.

5. Site location and character:

The Jobos Bay National Estuarine Research Reserve (JBNERR) is located on the southern coastal plain of the island of Puerto Rico, a reserve within the West Indies geographical area. JBNERR is composed of two major areas: (1) Mar Negro, located on the western margin of the Bay, and (2) Cayos Caribe, a chain of 15 tear-shaped islets located to the southeast. The Mar Negro area comprises the bulk of the Reserve, and consists of mangrove forests and a complex system of lagoons and channels interspersed with salt and mud flats. Coral reefs and sea grass beds, with small beach deposits and upland areas fringe Cayos Caribe mangrove islands.

Station 9 is an impacted site and is located on the northeastern section of the Mar Negro component. This sampling station is associated with mangrove lagoon areas and receives runoff from mudflats, the Thermoelectric Power Plant, and adjacent areas. The tidal range varies from 12 to 18 inches near the monitoring station. The salinity at the vicinity of the monitoring station varies from 26.0 ppt to 41.1 ppt. The average depth at station 09 is 1 meter. The bottom is covered by a thick layer of thin sediments with a high content of organic material. Brown and green algae are also present but it is dominated by the blue-green algae *Microcoleus* sp. at this site, a better assessment is needed. The station pole is located at 17° 56' 36.8" N and 66° 14' 18.5" W. Fresh water input to the station comes only from runoff and rain. There is not any direct source of fresh water.

Station 10 is located in a mangrove lagoon not impacted directly by any upland or marine activities. It provides a reference for comparison of data obtained in other stations, especially to the station in Mar Negro lagoon. The tidal range varies from 12 to 18 inches. The salinity at the vicinity of the monitoring station varies from 27.0 ppt to 41.7 ppt. The average depth at station 10 is 1 meter. The bottom is covered with a layer of fine sediments with organic material, followed by a layer of calcareous material mainly from shells and oysters. At this site, we can find sea grass (*Thalassia*), calcareous algae (*Halimeda* sp.), green algae (*Caulerpa* sp.) and brown algae (*Dictyota* sp.) among others. The pole is located at 17° 56' 19.00 N, 66° 15' 27.85" W. Fresh water input to the station comes only from runoff and rain. There is not any direct source of fresh water.

Station 19 is located on the western inner section of the bay at a distance of 233 meters from Cayo Colchones Mangroves over sea grass beds (*Thalassia testudinum*). Tidal ranges in this area vary from 12 to 18 inches. The salinity at the vicinity of the monitoring station varies from 30.0 ppt to 36.0 ppt. The average depth at this station is of 2 meters. The YSI sonde is deployed at about 1 foot from the bottom. The bottom is of sandy composition. Sea grass, algae, echinoderms and other related organisms could be found in the area. The pole is located at 17° 56' 34.49 N and 66° 13' 43.77 W. There is no freshwater input to this area.

Station 20 is located in the inner eastern section at about 190 meters of Cayos Caribe Mangrove islets and at about 688 meters from the coral reef barrier. This station is the closest to Mar Caribe. It has a sandy bottom, with calcareous and coral fragments, sea grass (*Thalassia*) communities, echinoderms and other associated organisms. Tidal ranges in this area vary from 12 to 18 inches. The salinity at the vicinity of the monitoring station varies from 30.0 ppt to 36.0 ppt. The average depth of the site is 2 meters. There is no freshwater input to this area. The pole is located at 17° 55' 49.14258" N and 66° 12' 41.29771" W.

A Sutron Sat-Link2 transmitter was installed at this station on 07/20/2006 and transmits data to the NOAA GOES satellite, NESDIS ID #3B0297EC. (Where 3B0297EC is the GOES ID for that particular station.) The transmissions are scheduled hourly and contain four (4) datasets reflecting fifteen minute data sampling intervals. The telemetry data is “Provisional” data and not the “Authentic” dataset used for long term monitoring and study. This data can be viewed by going to <http://cdmo.baruch.sc.edu>.

Data from stations 9, 10, 19 and 20 is being submitted to the CDMO. Eight sondes are permanently devoted to taking readings from these two sites, to assure continuous readings while sondes are taken out of the water for data upload and maintenance. This will avoid data gaps for the stations between sonde maintenance procedures. All monitoring is considered long term.

6. Data collection period:

Station nine (9) sampling with the YSI began on December 20, 1995.

Station ten (10) sampling with the YSI began on February 1, 1996.

Station nineteen (19) sampling with the YSI began on April 1, 2004.

Station twenty (20) sampling with the YSI began on May 13, 2004. Deployment and Retrieval Dates 2007:

Station 09			
IN date	In hour	Out date	Out hour
12/7/2006	10:15	1/12/2007	12:00
1/12/2007	12:15	2/15/2007	9:30
2/15/2007	No data	3/14/2007	No data
3/14/2007	9:00	4/2/2007	09:30
4/2/2007	10:00	4/24/2007	9:45
4/24/2007	10:00	6/5/2007	10:00
6/5/2007	10:15	6/14/2007	11:45
6/14/2007	12:15	8/1/2007	8:45
8/1/2007	9:00	8/7/2007	9:15
8/7/2007	9:30	8/20/2007	10:00
8/20/2007	10:15	8/21/2007	10:00
8/21/2007	10:15	9/19/2007	12:15
9/19/2007	12:45	10/16/2007	10:00
10/16/2007	10:15	11/7/2007	10:30
11/7/2007	10:30	12/12/2007	10:15
12/12/2007	10:45	1/16/2008	9:15

Station 10			
IN date	In hour	Out date	Out hour

12/7/2006	10:00	1/12/2007	11:30
1/12/2007	11:45	2/15/2007	10:00
2/15/2007	10:15	3/21/2007	10:30
3/21/2007	10:45	4/13/2007	09:30
4/13/2007	10:00	5/8/2007	9:15
5/9/2007	9:30	6/14/2007	12:45
6/14/2007	13:00	6/20/2007	10:45
6/20/2007	11:00	8/7/2007	9:45
8/7/2007	10:00	8/14/2007	13:45
8/14/2007	14:00	10/17/2007	9:30
10/17/2007	9:45	11/27/2007	10:30
11/27/2007	11:00	1/9/2008	11:15

Station 19

IN date	In hour	Out date	Out hour
12/15/2006	8:00	1/22/2007	9:45
1/22/2007	10:00	3/6/2007	9:15
3/6/2007	No data	5/1/2007	No data
5/1/2007	No data	5/17/2007	No data
5/21/2007	11:15	6/3/2007	5:45
6/26/2007	10:45	7/02/007	14:15
7/2/2007	14:30	8/22/2007	8:30
8/22/2007	9:00	8/29/2007	9:00
8/29/2007	9:30	10/11/2007	10:30
10/11/2007	10:45	12/4/2007	8:30
12/4/2007	9:00	1/22/2008	9:30

Station 20

IN date	In hour	Out date	Out hour
12/13/2006	9:15	1/23/2007	9:45
1/23/2007	10:15	3/7/2007	09:45
3/7/2007	10:15	4/17/2007	9:45
4/23/2007	9:45	5/17/2007	9:30
5/17/2007	10:00	5/21/2007	1115
5/21/2007	11:45	7/11/2007	11:15
7/11/2007	11:30	7/17/2007	14:00
7/17/2007	14:15	9/5/2007	10:00

9/5/2007	10:30	9/25/2007	14:15
9/25/2007	14:31	11/2/2007	10:15
11/2/2007	10:45	12/17/2007	9:45
12/17/2007	10:15	1/30/2008	11:15

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 the NERR site where the data is collected will be contacted and fully acknowledged in any subsequent publication 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 referenced scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resources 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 analysis 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 section 1. Principal Investigator and contact persons), from the Data Manager at the Central Data Management Office, (please see personnel directory under general information link on CDMO homepage (<http://cdmo.baruch.sc.edu>)). Data are available in text tab-delimited format. Microsoft Excel spreadsheet format and comma-delimited format.

8. Associated researchers and projects:

As part of the NERRS System-wide Monitoring Program, monthly samples for nutrients and chlorophyll were conducted from January to December 2007. Nutrient Sampling at Station 9 is conducted using an ISCO sampler, which collects samples every two hours during a twenty-four hour period. Grab samples are also collected in all four YSI monitoring stations. Analysis of the samples is being performed by the Virginia Institute of Marine Science, VIMS, in Virginia. Meteorological data were also collected at the Reserve. Both nutrient and meteorological data are available through the CDMO website (<http://cdmo.baruch.sc.edu/>) or by contacting the Jobos Bay Research Coordinator.

Another project is the water monitoring program for Ammonium, nitrate, nitrite, ortho-phosphate, chlorophyll and pheophytin. For this, an ISCO 6712 Portable Sampler is used. The sample is an automatic instrument that can be easily moved from site to site. Constructed from durable, corrosion-resistant materials, the sampler withstands the hostile environments of industrial and municipal monitoring sites. It is located at one of our four principal, long-term stations and it is programmed to take samples every two hours. The samples are collected every month following an established protocol and sent to the Virginia Institute of Marine Sciences Lab for further analysis.

II. Physical Structure Descriptors

9. Sensor specifications:

YSI 6600/YSI 6600EDS data logger

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

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 (specify whether EDS probe or not)

Units: units

Sensor Type: Glass combination electrode

Model #: 6561

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

The reliability of the dissolved oxygen (DO) data 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. 200*). Many reserves have upgraded to YSI 6600 EDS data sondes, which increase DO accuracy and longevity by reducing the environmental effects of fouling. The user is therefore advised to consult the metadata and to exercise caution when utilizing the DO data beyond the initial 96-hour time period. However, this potential drift is not always problematic for some uses of the data, ie. periodicity analysis. It should be noted that the amount of fouling is site specific and that not all data are affected. The Research Coordinator at the specific NERR site should be contacted concerning the reliability of the DO data because of the site and seasonal variation in the fouling of the DO sensor. Only EDS non-vented data sonde models were used at JBNERR sites in 2007.

The NERRS System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either depth or water level sensors. Both sensors measure water depth, but by convention, level sensors refer to atmospherically vented measurements and depth refers to non-vented measurements. Standard calibration protocols for the non-vented sensor use the atmosphere pressure at the time of calibration. Therefore, 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. This error is eliminated for level sensors because they are vented to the atmosphere throughout the deployment time interval. If proper atmospheric pressure data are available, non-vented sensor depth measurements can be corrected for deployments between calibrations. Readings for both vented and non-vented sensors are automatically compensated for water density changes due to variations in temperature and salinity. The Research Coordinator at the specific NERR site should be contacted in order to obtain information regarding atmospheric pressure data availability. All data sondes used at the JBNERR sites in 2007 were non-vented models.

10. Coded variable indicator and variable code definitions:

Site definitions: job09wq = Water Quality for Station 9 in Mar Negro/Las Mareas
Site definitions: job10wq = Water Quality for Station 10 in Mar Negro/Las Mareas
Site definitions: job19wq = Water Quality for Station 19 in Jobos Bay
Site definitions: job20wq = Water Quality for Station 20 in Jobos Bay

File definitions: site/file definition/month/year (ex: job10wq = Jobos Station 10 water quality data).

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 *Open - reserved for later flag*
- 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.

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

Sensor Errors

SBO	Blocked Optic
SCF	Conductivity Sensor Failure
SDF	Depth Port Frozen
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
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

13. Post deployment information:

End of deployment Post-calibration Readings in Standard Solution:

POST- DEPLOYMENT 2007

Site ID	Date (mm/dd/yy)	DO Air sat. std: 100%	pH std:7	pH10 std:10	Depth m	Conductivity (ms/cm) std. 50	Turbidity (NTU) std. 0	Turbidity (NTU) std. 11.2
St 9	1/12/2007	95.6	7.12	9.96	0.028	52.9	-0.5	13
St 9	2/15/2007	19.6	6.92	8.6	0.008	42.5	140.1	140.6
St 9	3/14/2007	98.1	6.89	9.6	0.025	47.3	2.2	9.6
St 9	4/2/2007	101.2	6.42	9.17	-0.006	50.4	0.4	9.17
St 9	4/24/2007	75.1	6.91	9.82	0.004	50.26	1.6	14.4
St 9	6/5/2007	86.4	6.8	9.42	0.028	47.33	25.1	26.7
St 9	6/14/2007	No data						
St 9	8/1/2007	100.4	7.87	10.62	-0.037	48.3	7.87	10.62
St 9	8/7/2007	94.7	*	*	0.01	61.69	0.7	
St 9	8/20/2007	76	6.82	9.63	-0.036	49.48	0.9	10.8
St 9	8/21/2007	96.4	*	*	-0.023	52.1	-2.3	11.2
St 9	9/19/2007	90.4	6.76	9.72	0.006	47.83	19.4	28
St 9	10/16/2007	100.4	7.87	10.62	-0.037	48.3	0	12
St 9	11/7/2007	72.1	7.12	9.89	-0.013	53.4	0.8	13
St 9	12/12/2007	109.2	6.66	9.68	0.015	50	*	*
St 9	1/16/2008	98.2	6.68	9.47	-0.057	47.05	0.4	12.6

Site	Date	DO Air	ph7	pH10	Depth	Conductivity	Turbidity	Turbidity
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ID	(mm/dd/yy)	sat. std: 100%	std:7	std:10	m	(ms/cm) std. 50	(NTU) std. 0	(NTU) std. 11.2
St 10	1/12/2007	102.8	6.99	9.82	-0.08	50.09	1	8.8
St 10	2/15/2007	28.4	6.72	9.66	-0.006	47.27	3	13.1
St 10	3/21/2007	93.8	6.9	9.67	-0.054	48.88	346	1136.7
St 10	4/13/2007	98.2	6.7	9.6	-0.371	49	0.5	10.7
St 10	5/8/2007	99.3	6.85	9.96	-0.053	50.1	5.3	12
St 10	6/14/2007	92.5	7.04	9.93	0.053	49.02	-1.2	10.8
St 10	6/20/2007	90.7	*	*	0.011	50.39	-0.1	11.3
St 10	8/7/2007	89.2	7.74	9.79	-0.032	49.73	2	12
St 10	8/14/2007	68.9	*	*	0.006	52.66	-0.4	9
St 10	10/17/2007	81.5	5.24	9.39	0.021	47.66	4.9	16.6
St 10	11/27/2007	92.5	7.15	10.05	0.022	50.9	-0.2	12.3
St 10	1/9/2008	56.7	*	*	-0.004	46.04	2.4	10.1

Site ID	Date	DO Air sat.	ph7	pH10	Depth	Conductivity	Turbidity	Turbidity
	(mm/dd/yy)	std: 100%	std:7	std:10	m	(ms/cm) std. 50	(NTU) std. 0	(NTU) std. 11.2
St 19	1/22/2007	98.2	6.96	9.85	0.023	50.02	-3.4	11.7
St 19	3/6/2007	101.7	7.08	9.99	0.022	49.53	1.2	10.4
St 19	5/1/2007	113.2	6.73	9.41	0.015	54.8	104.6	89.5
St 19	5/17/2007	No data	*	*	*	*	*	*
St 19	6/26/2007	92.5	6.67	9.64	0.004	50.81	0.6	11.6
St 19	7/2/2007	73.1	*	*	0.005	50.8	1.7	11.2
St 19	8/22/2007	84.6	6.35	9.04	-0.036	47.96	1	12.8
St 19	8/29/2007	90.6			-0.022	50.15	-1.8	12.4
St 19	10/11/2007	86.9	6.99	9.9	-0.046	46.5	0.3	12.3
St 19	12/4/2007	95.8	6.81	9.71	-0.043	48.6	475	946
St 19	1/22/2008	67	6.8	9.7	0.019	48.25	2.8	12.1

Site ID	Date	DO Air sat.	ph7	pH10	Depth	Conductivity	Turbidity	Turbidity
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	(mm/dd/yy)	std: 100%	std:7	std:10	m	(ms/cm) std. 50	(NTU) std. 0	(NTU) std. 11.2
St 20	1/23/2007	103.7	6.98	9.91	-0.037	50.01	3.6	11.5
St 20	3/7/2007	58.2	7.1	10.04	-0.014	47.02	0.1	11
St 20	4/17/2007	73.2	6.85	9.64	-0.075	50.11	-1.7	11.8
St 20	5/17/2007	No data						
St 20	5/21/2007	70.2	*	*	0.079	49.66	0.1	10.7
St 20	7/11/2007	69.8	6.69	9.2	0.005	51.5	8.3	22.7
St 20	7/17/2007	71.7	*	*	-0.044	50.83	2.6	11.3
St 20	9/5/2007	94.2	6.37	9.16	-0.019	49	-2.4	16.8
St 20	9/25/2007	99.5	7.15	10.03	-0.003	46.85	3.2	15.2
St 20	11/2/2007	105.7	7.08	9.98	-0.009	49.8	-1.3	5.8
St 20	1/30/2008	75.9	6.75	9.87	-0.028	50.31	0.5	12

***NO DATA**

14. Other remarks:

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.

All four sites had longer than normal deployments (at times 2 months) during the 2007 Field Season. These longer than usual deployments caused drift, fouling, and other problems in the data. The turbidity was especially affected by these longer deployments. The probes were often severely impacted by fouling, which in turn impacted data.

At Station 10 There was an issue with the station deployment chain used to deploy the sonde and the bolt that it rests on within the deployment tube. The problem was repaired on 06/20/2007 but the repair resulted in a change in the deployment depth of about 0.2 meters that can be seen on the data on 06/26/2007 11:15 –the sonde was deployed 0.2 meters higher in the water column and the resulting depth data appear to indicate that the station is 0.2 meters more shallow. Sonde deployment depth after the repair at this station remained the same throughout 2007 and beyond. No other parameters appear to be affected by this change in deployment depth.

For Station 09 all data at 4/3/2007 10:00 is marked 1 GSM CWD. Data is being collected at the wrong depth here. The cause of this is unknown but may be from boaters in the area ‘looking’ at the instrument. Data appears to fit conditions and looks in line with data around it.

For Station 09 turbidity data from 6/23 22:00 to 8/1 08:45 is marked -3 SWM CSM. There was a wiper malfunction that impacted data during this time.

At Station 10 from 1/1 00:15 to 1/12 11:30 there was a wiper malfunction that affected turbidity data, causing it to be elevated.

At Station 20 for the deployments starting on 7/11 11:30 and 12/17 10:15 the depth does not match up for the beginning of the deployments. Eventually the depth seems to recover somewhat but in both cases they are significantly lower than deployments around them. We believe that the chain the sonde hangs from got hung up and caused this difference in depth. Other parameters do not appear to be affected by this issue, only the depth.

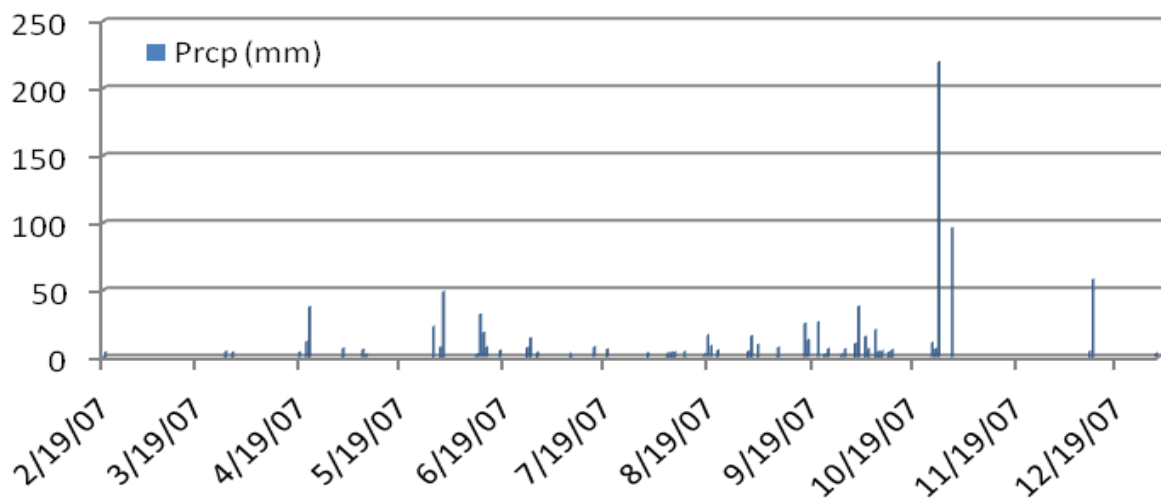
Station 09		Issue
2/13/2007	3/14/2007	No data, disconnection issues.
6/5/2007	6/14/2007	No pH data. Sensor not deployed.
8/1/2007	8/7/2007	No pH data. Sensor not deployed.
8/20/2007	8/21/2007	No pH data. Sensor not deployed.
11/7/2007	12/12/2007	Turbidity sensor malfunction.

Station 10		Issue
5/8/2007	5/9/2007	No sonde deployed.
6/14/2007	6/20/2007	No pH data. Sensor failure.
8/7/2007	8/14/2007	No pH data. Sensor not deployed.
10/13/2007	10/17/2007	No data, disconnection issues.
12/12/2007	12/31/2007	No data, disconnection issues.

Station 19		Issue
1/21/2006	1/22/2007	No data, disconnection issues.
3/6/2007	5/1/2007	No data, disconnection issues.
5/1/2007	5/21/2007	No data, disconnection issues.
6/3/2007	6/26/2007	No data, disconnection issues.
6/26/2007	7/02/007	No pH data. Sensor not deployed.
7/2/2007	8/7/2007	No data, disconnection issues.
8/22/2007	8/29/2007	No pH data. Sensor not deployed.

Station 20		Issue
4/17/2007	4/23/2007	No data, disconnection issues.
5/17/2007	5/21/2007	No pH data. Sensor not deployed.
12/4/2007	12/17/2007	No data, disconnection issues.

Significant (>2.5 mm) Precipitation Events During 2007



Significant (>2.5 mm) Precipitation Events During 2007

Data for 10/26 (219.5mm) & 10/30 (96.5mm) excluded for display purpose only

