Jacques Cousteau (JAC) NERR Water Quality Metadata
1 January 2016 – 31 December 2016
Latest Update: 24 January 2018

## I. Data set and Research Descriptors

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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 separated file (CSV) or KOR Software in an Excel File (.XLS) 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. Data management is handled by the JCNERR's SWMP Technician, Gregg P. Sakowicz.

**3) Research Objectives**

The water quality of the Mullica River and Great Bay has traditionally been relatively clean and free of excessive nutrient loading from anthropogenic sources. This is due to the fact that there is very little development or industry within the drainage basin of the Mullica River and its tributaries. Great Bay had a large source of nutrient loading coming from a menhaden fish processing factory that was in operation from the early 1930's to the early 1960's and affected the lower portion of the bay. The river is relatively deep, three to nine meters in the section that is monitored. Great Bay averages about two meters in depth. The river also has a dark color due to tannins and humic compounds that are a natural product coming from the Pine Barrens and are present in large amounts within the river. It is believed that nutrients entering the river upstream do not get utilized within the river because of the lack of light penetration. The great depth of the river and the dark color from the tannins flowing down the river from the Pine Barrens hinders the utilization of these nutrients by planktonic organisms. Where the river empties into the bay, light penetration reaches the bottom of the bay and allows the utilization of the nutrients by phytoplankton, making this region more productive (Durand 1979). Water circulation questions within this unique estuary can be addressed by the use of datasondes. Because of the close proximity of the lower station (site name: B6) to Little Egg Inlet, the effects of an influx of ocean water can have dramatic effects on both the water quality and on the biological aspect of the region. Upwelling along the coast is a common occurrence during the summer months. The influx of this water into the bay can and does affect larval fish transport into and out of the bay. The cooler ocean waters can have dramatic effects on the growth rates of many different species living in the area. Datasondes have been useful in tracking the physical changes within the estuary due to occurrences such as upwelling and storm events and will be helpful in translating the resulting biological events.

**4) Research Methods**

YSI datasondes (a.k.a. "dataloggers") are programmed to record temperature, specific conductance, salinity, dissolved oxygen, depth, pH, and turbidity every 15 minutes. Two types/series of datasondes were utilized at the JCNERR in 2016; what are referred to as 6-series (represented by 6600EDS and V2-4 sondes) and EXO sondes. Presently, four SWMP monitoring stations are established in the Mullica River/Great Bay Reserve. These monitoring sites extend from the fresh water/salt water interface at Lower Bank, approximately 25 kilometers up the Mullica River from the point where it joins Great

Bay to the mouth of Great Bay, a distance of eight kilometers. Thus the datasondes cover a total of 33 kilometers in this estuarine system.

Calibration standards required for pH were purchased from Y.S.I. (p/n 003822 (pH 7) and 003823(pH 10)). A two-point calibration was employed for pH, the first being pH 7 followed by pH 10. Calibration of the pH probe was performed via immersion in the standard and using the calibration feature of the EcoWatch (for 6-series sondes) or KOR (for EXO sondes) software and accepting the set-point after stable readings were obtained.

Calibration standards required for conductivity were purchased from Y.S.I.. A standard of 10 mS/cm (p/n 060911) was used to calibrate for conductivity. Calibration of the conductivity probe was performed via immersion in the standard and using the calibration feature of the EcoWatch or KOR software and accepting the set-point after stable readings were obtained.

Dissolved oxygen was calibrated via immersion in a bucket of oxygen-saturated tap water and utilizing the dissolved oxygen calibration function of the datasonde(s). Oxygenation of the water was accomplished via aeration with an aquarium pump and air-stone for a minimum of 2 hours to saturate tap water prior to calibration. The sensor was then allowed to “rest” overnight prior to calibration. Y.S.I. ROX optical D.O. probes were utilized through the entire 2016 period on 6-series sondes (notable because the previous-generation membrane-style polargraphic D.O. probes were less stable and more prone to fouling), and model number 599100-01 dissolved oxygen probes were utilized on EXO sondes. Calibration of the dissolved oxygen probe was performed via immersion in the aerated water and using the calibration feature of the EcoWatch or Kor software and accepting the set-point after stable readings were obtained.

Calibration of the turbidity probe was performed with a 0 NTU (Nephelometric Turbidity Units) solution (de-ionized water) and a 124/126 NTU standard (supplied by YSI, inc., p/n 607300). Calibration of the Turbidity probe was performed via immersion in each standard and using the calibration feature of the EcoWatch (for 6-series sondes) or KOR (for EXO sondes) software and accepting the set-point after stable readings were obtained.

Used conductivity and pH standards were stored for rinsing probes and performing post-deployment calibration-checks after retrieval and prior to cleaning loggers. Great care was taken to clean the datasondes before calibration, and each used standard was used once as a post-calibration solution and once as a rinse solution before being discarded (unless contamination or dilution was observed or suspected).

Datasondes were deployed by inserting them in PVC pipes that are affixed to a permanent structure (i.e. two US Coast Guard channel markers (jacb6wq and jacb9wq), one commercial dock (jacnewq), and one bridge (jacbawq). The bottoms of the pipes were situated between approximately 0.5 and 1m above the sediment (the variability is the result of currents and shoaling leading to variability of the relative level of sediment below the sonde tubes). A line was used to lower and recover the datasondes within the pipes. A cross-pin (stainless steel or brass bolt) was inserted across the bottom of the pipe and served as an end-stop for the datasonde during its descent, assuring a maximum fixed depth and retaining the datasonde if the line parted. Two-inch vent holes were drilled every 6 inches of the pipe and four two- by ten-inch-wide slots were cut in the bottom of the pipe to allow for circulation of water in the pipe and across the probes. An antifouling paint (Petit Trinidad SLR) was used to coat the last few meters of the PVC pipes, both inside and out, to retard biofouling and subsequent blockage of the holes/vents. An 18" section of 4" copper pipe, vented as described above, was coupled to the lower end of some pipes, serving as an additional antifouling measure. A locking cap provided security.

In 2016, two methods of deployment and data collection were employed. The first being a stand-alone deployment during which a datasonde autonomously collected data on 15-minute intervals on Eastern Standard Time (EST) and record these data internally, to later be downloaded onto a desktop/laptop computer post-retrieval. This method was employed at stations jacb9wq, jacnewq, and jacbawq. The second method employed was the pairing of datasondes with telemetry equipment that received data from the datasondes and broadcast it to the GOES satellite for receipt by the NOAA Hydrometeorological Automated Data System (HADS) as well as an independent array at the NERRS CDMO. These data were also recorded independently every 15 minutes in Eastern Standard Time (EST) by the datasondes for redundancy and to continue with the pre-existing NERRS SOP. Such telemetry was employed at jacb6wq. For more detail concerning these telemetered datasonde stations, see below:

The Sutron Sat-Link2 transmitter was installed at this Buoy 126 (B6) on 06/22/06 and transmits data to the NOAA GOES satellite, NESDIS ID #3B00C264. 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.

The Sutron Sat-Link2 transmitter was installed at Chestnut Neck (NE) on 09/19/06 and transmits data to the NOAA GOES satellite, NESDIS ID #3B03E386. Telemetry was, however, not active at Chestnut Neck for this reporting period due to ongoing rebuilding of infrastructure destroyed by Superstorm Sandy. 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.

During each sampling period, measurements of specific conductance, salinity, temperature, dissolved oxygen, (percent saturation and concentration measured in mg/L), water level (depth), pH, and turbidity were recorded. After approximately 28 days datasondes were retrieved from the PVC pipe. Deployment periods were occasionally extended because of weather-related restrictions of access. A YSI 600 datasonde attached to a hand-held YSI 650-MDS display was then lowered to depth in order to sample in-situ water conditions at approximately the same depth at which data was recorded. A different calibrated and programmed YSI datasonde was then deployed to replace the datasonde being recovered. The recovered datasonde was brought back to the laboratory for downloading, post-deployment calibration checking, cleaning, and re-calibration. For some retrievals (due to spare datasondes being out for repairs or a desire to keep the same datasonde at the same SWMP site for consistency), the datasonde was not replaced but rather brought back to the field station, cleaned and recalibrated as described above, and re-deployed or replaced later that day or the following day.

Upon retrieval, datasondes were wrapped in a white towel and placed in a towel or short section of PVC pipe for transport back to the laboratory. Datasondes were then placed in an aerated bucket of tap water overnight before post-processing according to SWMP standard operating procedures. Post-processing involves the placing of the un-cleaned datasonde in standards and recording of the displayed values, to judge how well the probes maintained calibration, determine the effect of bio-fouling (if any), and judge whether probe failure occurred during the deployment. After this post-deployment calibration check, probes were cleaned as per SWMP standard operating procedures and either re-calibrated for the next deployment or capped for storage for later calibration and deployment.

Datasondes were programmed to start recording data (ranging from one sample period to a few hours) before they were deployed in the field and allowed to run in either a wet, enclosed environment or an aerated water-filled bucket, so these deployment files often contained "tail ends" of non-deployment data, which were used to diagnose the probes but deleted before the data were processed for import into the yearly datasets. The beginning and end of each in-situ data file was compared to the 600/650MDS handheld unit values and the data were checked for probe failure and fouling.

**5) Site Location and Character**

The Jacques Cousteau National Estuarine Research Reserve (JCNERR) at Mullica River/Great Bay is located on the northeast coast of the United States on the Atlantic Ocean. The estuary is near Tuckerton, New Jersey about 14 kilometers north of Atlantic City. There were four active sampling stations in 2016. All four locations can be characterized by having little macroalgae (few to no established beds in the immediate locale; only occasional seasonal and structurally-dependent fouling-type macroalgal communities), fast moving tidal currents, and tidal ranges of approximately 1m (although this can vary significantly depending on moon state, storm events, and coastal wind conditions (e.g.- "blow out tides" associated with strong offshore winds). All sites are in a relatively undisturbed area with minimal impact from development or pollution.

1) Buoy 126 (B6) - 39deg 30'28.44"N, 74 deg 20'18.67"W- located three kilometers from Little Egg Inlet on the eastern side of Great Bay and is 100 meters from the nearest land that is a natural marsh island. This is a naturally deep area that has never been dredged, but it is located about 0.5 kilometers from an area in the Intracoastal Waterway that is dredged regularly. The datasonde at this location is attached to Intracoastal Waterway Buoy 126 and is the closest monitoring station to Little Egg Inlet. This site can be characterized by having strong tidal currents, 2-3 knots, fine to course sand bottom with an extensive blue mussel bed surrounding the area. Groundwater inputs from margins of the estuary as well as surface flow from Mullica River account for the majority of freshwater coming into the system at this site, followed by input from rainwater from the marsh surface. Monitoring at this station began on 08/06/1996. In 2016, the reported temperature at this station ranged from -1.6°C to 29.1°C, with an average of 14.0°C. The reported salinity at this station ranged from 20.7psu to 33.0psu, with an average of 29.6psu. It is important to note that fouling may have occasionally depressed some salinity readings and are “flagged” as such in the dataset, so the aforementioned average and range may not be accurate. The maximum tidal range (including storm surge and drought-level data), as recorded by the datasonde, was 2.73m. It has been some time since the actual depth at this station has been surveyed (sediment deposition and erosion around the structure has substantial effect on the actual depth of the water column at this station), but the results of a sonar depth-survey of reserve waters by the USGS are anticipated, and we (the JCNERR) plan to independently survey the area in 2017 as well.

2) Buoy 139 (B9) – 39deg 29'52.59"N, 74deg 22'52.07"W*- is located 4 kilometers from Buoy 126 on the western side of Great Bay and is located about one to one and one-half kilometers from land. The datasonde at this location is attached to Intracoastal Waterway Buoy 139. The closest landform is an extensive salt marsh approximately 1.5 kilometers wide, which borders the upland area. This area is dredged by the U.S. Army Corp of Engineers approximately every five to six years to maintain the channel at a depth of approximately 2.5 meters. The surrounding depth of the bay is approximately 1.5 to 2 meters. This site is characterized by having maximum currents of about 1.5 knots with a muddy sand bottom and with little structure or shell. Groundwater inputs from margins of the estuary as well as surface flow from Mullica River account for the majority of freshwater coming into the system at this site, followed by input from rainwater from the marsh surface and above. Monitoring at this station began on 08/02/1996. In 2016, the reported temperature at this station ranged from –1.6°C to 30.5°C, with an average of 14.5°C. The reported salinity at this station ranged from 20.4psu to 32.9psu, with an average of 28.6psu. It is important to note that fouling may have occasionally depressed some salinity readings and are “flagged” as such in the dataset, so the aforementioned average and range may not be accurate. The maximum tidal range (including storm surge and drought-level data), as recorded by the datasonde, was 2.48m. It has been some time since the actual depth at this station has been surveyed (sediment deposition and erosion around the structure has effect on the actual depth of the water column at this station), but the results of a sonar depth-survey of reserve waters by the USGS are anticipated, and we (the JCNERR) plan to independently survey the area in 2017 as well.

*= these coordinates are a correction to the location reported in past years' metadata reports; the coordinates (39deg 29'24.65"N, 74 deg 22'53.83"W) of the #141 channel marker were attributed to this (#139) channel marker.

3) Chestnut Neck (NE) - 39deg 32'52.37"N, 74deg 27'38.77"W - located 12 kilometers up the Mullica River from the mouth of the river. The river begins at a line drawn between Graveling Point and Oysterbed Point on the northwestern side of Great Bay. The Mullica River at this location is quite wide, about 250 meters. The datasonde is attached to the dock of a small marina along the southern shore of the river adjacent to the main channel. This location has never been dredged. The site is characterized by having tidal currents of less then one knot, during both ebb and flood tide, and has a mixed organic mud/sand bottom. Freshwater input is primarily from groundwater and watershed runoff. Monitoring at this station began on 08/01/1996. In 2016, the reported temperature at this station ranged from -1.2°C to 30.8°C, with an average of 15.1°C. The reported salinity at this station ranged from 3.5psu to 29.0psu, with an average of 17.5psu. It is important to note that fouling may have occasionally depressed some salinity readings and are "flagged" as such in the dataset, so the aforementioned average and range may not be accurate. The maximum tidal range (including storm surge and drought-level data), as recorded by the datasonde, was 2.36m. It has been some time since the actual depth at this station has been surveyed but the results of a sonar depth-survey of reserve waters by the USGS are anticipated, and we (the JCNERR) plan to independently survey the area in 2017 as well.

4) Lower Bank (BA) - 39deg 35'37.18"N, 74 deg 33'05.44"W- located 13 kilometers upriver of the Chestnut Neck location. The Mullica River at this site is about two hundred meters wide. The datasonde is located at the center of a bridge spanning the Mullica River. The northern bank of the river is sparsely developed with single-family houses and has a steep bank about five meters high. The southern shore has an extensive marsh and fresh water wetland area about three kilometers wide. This site can be characterized by having fast tidal currents, just over one knot, deep water, and fine mixed organic mud and sandy sediment. Freshwater input is primarily from groundwater and watershed runoff. Monitoring at this station began on 10/10/1996. In 2016, the reported temperature at this station ranged from -0.2°C to 35.0°C, with an average of 15.5°C. The reported salinity at this station ranged from 0.0psu to 19.0psu, with an average of 4.7psu. It is important to note that fouling may have occasionally depressed some salinity readings and are "flagged" as such in the dataset, so the aforementioned average and range may not be accurate. The maximum tidal range (including storm surge and drought-level data), as recorded by the datasonde, was 2.45m. It has been some time since the actual depth at this station has been surveyed but the results of a sonar depth-survey of reserve waters by the USGS are anticipated, and we (the JCNERR) plan to independently survey the area in 2017 as well.

SWMP Station Timeline

| Station Code | SWMP Status | Station Name | Location | Active Dates | Reason Decommissioned | Notes |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| jacb6wq | P | Buoy 126 | 39° 30' 28.44 N, 74° 20' 18.67 W | 08/01/1996 00:00 - current | NA | NA |
| jacb9wq | P | Buoy 139 | 39° 29' 52.59 N, 74° 22' 52.07 W | 05/01/2002 00:00 - current | NA | NA |
| jacbawq | P | Lower Bank | 39° 35' 37.18 N, 74° 33' 5.44 W | 10/01/1996 00:00 - current | NA | NA |
| jacnewq | P | Chestnut Neck | 39° 32' 52.37 N, 74° 27' 38.77 W | 08/01/1996 00:00 - current | NA | NA |

**6) Data Collection Period**

Data collection at the JCNERR is often performed on a seasonal (rather than year-round) basis due to ice-over conditions in local waters and the damages associated with ice formation and movement. Typically, the target date for redeployment after the winter is mid-March, but is often earlier if conditions permit or later if winter conditions linger and/or stations are significantly damaged post-thaw. Datasondes are pulled and stations deactivated when ice-over conditions are anticipated (typically in early- or mid-December) in an attempt to avoid damage and/or loss of equipment due to the destructive nature of ice movements. In 2016, the JC NERR did not employ this seasonal approach due to the general lack of ice.

| Site | Filename | Deploy Date | Time | Retrieve Date | Time |
|---|---|---|---|---|---|
| B6 | | | | | |
| | jacb6wq120415 | 12/04/2015 | 15:45 | 01/14/2016 | 14:00 |
| | jacb6wq011416 | 01/14/2016 | 14:30 | 03/01/2016 | 11:00 |
| | jacb6wq030116 | 03/01/2016 | 11:30 | 04/06/2016 | 08:45 |
| | jacb6wq040616 | 04/06/2016 | 09:15 | 05/02/2016 | 14:15 |
| | jacb6wq050216 | 05/02/2016 | 14:30 | 05/25/2016 | 10:45 |
| | jacb6wq052516 | 05/25/2016 | 11:00 | 06/22/2016 | 11:00 |
| | jacb6wq062216 | 06/22/2016 | 11:15 | 07/13/2016 | 10:15 |
| | jacb6wq071316 | 07/13/2016 | 10:30 | 08/08/2016 | 14:30 |
| | jacb6wq080816 | 08/08/2016 | 14:45 | 08/30/2016 | 12:30 |
| | jacb6wq083016 | 08/30/2016 | 12:45 | 09/26/2016 | 11:15 |
| | jacb6wq092616 | 09/26/2016 | 11:30 | 10/26/2016 | 13:15 |
| | jacb6wq102616 | 10/26/2016 | 13:45 | 11/23/2016 | 14:00 |
| | jacb6wq112316 | 11/23/2016 | 14:30 | 12/19/2016 | 14:15 |
| | jacb6wq121916 | 12/19/2016 | 14:30 | 01/18/2017 | 11:00 |
| B9 | | | | | |
| | jacb9wq121015 | 12/10/2015 | 14:00 | 01/15/2016 | 11:30 |

| | | | | |
|---|---|---|---|---|
| jacb9wq011516 | 01/15/2016 | 12:00 | 03/01/2016 | 11:45 |
| jacb9wq030116 | 03/01/2016 | 12:00 | 04/06/2016 | 11:45 |
| jacb9wq040616 | 04/06/2016 | 12:00 | 05/10/2016 | 12:30 |
| jacb9wq051016 | 05/10/2016 | 13:00 | 06/22/2016 | 09:45 |
| jacb9wq062216 | 06/22/2016 | 10:00 | 07/13/2016 | 10:00 |
| jacb9wq071316 | 07/13/2016 | 10:15 | 08/11/2016 | 10:30 |
| jacb9wq081116 | 08/11/2016 | 11:00 | 09/08/2016 | 10:00 |
| jacb9wq090816 | 09/08/2016 | 10:15 | 10/03/2016 | 13:45 |
| jacb9wq100316 | 10/03/2016 | 14:00 | 11/01/2016 | 13:00 |
| jacb9wq110116 | 11/01/2016 | 13:15 | 11/28/2016 | 11:15 |
| jacb9wq112816 | 11/28/2016 | 11:30 | 12/20/2016 | 12:00 |
| jacb9wq122016 | 12/20/2016 | 12:15 | 01/19/2017 | 11:45 |

NE

| | | | | |
|---|---|---|---|---|
| jacnewq120315 | 12/03/2015 | 16:15 | 01/22/2016 | 14:30 |
| jacnewq012216 | 01/22/2016 | 14:45 | 03/09/2016 | 18:30 |
| jacnewq030916 | 03/09/2016 | 19:00 | 04/20/2016 | 12:15 |
| jacnewq042016 | 04/20/2016 | 12:30 | 06/02/2016 | 13:15 |
| jacnewq060216 | 06/02/2016 | 13:30 | 07/07/2016 | 11:00 |
| jacnewq070716 | 07/07/2016 | 11:15 | 08/02/2016 | 15:15 |
| jacnewq080216 | 08/02/2016 | 15:30 | 08/31/2016 | 19:15 |
| jacnewq083116 | 08/31/2016 | 19:30 | 10/06/2016 | 10:45 |
| jacnewq100616 | 10/06/2016 | 11:00 | 11/15/2016 | 12:30 |
| jacnewq111516 | 11/15/2016 | 12:45 | 12/31/2016 | 14:30 |
| jacnewq123117 | 12/31/2016 | 14:45 | 01/27/2017 | 10:00 |

BA

| | | | | |
|---|---|---|---|---|
| jacbawq120315 | 12/03/2015 | 11:45 | 01/22/2016 | 15:00 |
| jacbawq012216 | 01/22/2016 | 15:15 | 03/09/2016 | 18:00 |
| jacbawq030916 | 03/09/2016 | 18:30 | 04/20/2016 | 11:45 |
| jacbawq042016 | 04/20/2016 | 12:00 | 06/02/2016 | 14:00 |
| jacbawq060216 | 06/02/2016 | 14:15 | 07/07/2016 | 09:30 |
| jacbawq070716 | 07/07/2016 | 09:45 | 08/03/2016 | 15:15 |
| jacbawq080316 | 08/03/2016 | 15:30 | 08/31/2016 | 19:45 |
| jacbawq083116 | 08/31/2016 | 20:00 | 10/25/2016 | 07:45 |
| jacbawq102516 | 10/25/2016 | 08:15 | 12/04/2016 | 11:45 |
| jacbawq120416 | 12/04/2016 | 12:15 | 12/31/2016 | 13:45 |
| jacbawq123117 | 12/31/2016 | 14:00 | 01/26/2016 | 16:15 |

## 7) Distribution

NOAA retains the right to analyze, synthesize and publish summaries of the 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:
NOAA National Estuarine Research Reserve System (NERRS). System-wide Monitoring Program. Data accessed from the NOAA NERRS Centralized Data Management Office website: http://www.nerrsdata.org/; *accessed* 12 October 2012.

Also include the following excerpt in the metadata which will address how and where the data can be obtained.

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 www.nerrsdata.org. Data are available in comma delimited format.

## 8) Associated Researchers and Projects

As per the requisites of the national SWMP program, the JCNERR performs nutrient sampling and meteorological monitoring correlated with the water-quality data addressed in this report. Data can be accessed by visiting www.nerrsdata.org

During 2016, weekly ichthyoplankton sampling at Little Sheepshead Creek Bridge (LSCB) continued as part of the long-term sampling conducted by the Rutgers University Marine Field Station (RUMFS) in the Jacques Cousteau National Estuarine Research Reserve (JCNERR). Presence and abundance of larval fishes are determined with a plankton net (1 m, 1 mm mesh) deployed during night flood tides from a bridge near Little Egg Inlet (New Jersey) in the Great Bay/Little Egg harbor portion of the JCNERR.

RUMFS conducts annual trawl survey at numerous sites from offshore of Little Egg Inlet to the freshwater interface up the Mullica River. SWMP data are regularly used in the analysis of community composition and species assemblage.

A wire-mesh trapping survey of fish and crustaceans conducted by RUMFS within the RUMFS boat basin also continued in 2016 as part of long-term sampling within the Reserve.

Dr. Mark Sullivan's class at Stockton College has extensively utilized the JCNERR's SWMP dataset, including WQ data, in their curriculum.

Dr. Paul Jivoff of Rider University conducts regular surveys of local crab populations and utilizes the SWMP dataset.

Over-wintering populations of seals near the B6 site were observed/studied over the winter of 2015-2016 amd 2016-2017 as a joint Rutgers University/Stockton College program; SWMP data from B6 are utilized in these observations/study.

Data synthesis in the form of an "app-style" R-code was created using the JC NERR's SWMP data by Dr. Thomas Grothues and presented/distributed to a number of Mid-Atlantic NERRS at a transfer workshop hosted by the JC NERR 17-18 February 2016.

**II. Physical Structure Descriptors**

9) Sensor Specifications

JC NERR utilized three datasonde types during this reporting period: YSI non-vented V2-4 datasondes were utilized at the Buoy 126 (jacb6wq) station. Exo2 sondes were used exclusively at the Buoy 139 (jacb9wq), Chestnut Neck (jacnewq), and Lower Bank (jacbawq) stations in 2016.

**B9 (jacb9wq)**

Because of differences in the ranges, accuracies, and resolutions of the two Temperature/Conductivity probes (CT2 (p/n 599871-01) and WCT (p/n 599827)), as well as the resistance of the sensors to fouling (the latter more so than the former), users of the data may wish to incorporate the following information (see Sensor Specification section) in their use and analysis of the data:

| Deployment | sensor type | data range |
|---|---|---|
| jacb9wq121015 | CT2 | 12/10/2015 14:00 - 01/15/2015 11:30 |
| jacb9wq011516 | WCT | 01/15/2016 12:00 - 03/01/2016 11:45 |
| jacb9wq030116 | WCT | 03/01/2016 12:00 - 04/06/2016 11:45 |
| jacb9wq040616 | WCT | 04/06/2016 12:00 - 05/10/2016 12:30 |
| jacb9wq051016 | WCT | 05/10/2016 13:00 - 06/22/2016 09:45 |
| jacb9wq062216 | WCT | 06/22/2016 10:00 - 07/13/2016 10:00 |
| jacb9wq071316 | WCT | 07/13/2016 10:15 - 08/11/2016 10:30 |
| jacb9wq081116 | CT2 | 08/11/2016 11:00 - 09/08/2016 10:00 |
| jacb9wq090816 | WCT | 09/08/2016 10:15 - 10/03/2016 13:45 |
| jacb9wq100316 | WCT | 10/03/2016 14:00 - 11/01/2016 13:00 |
| jacb9wq110116 | CT2 | 11/01/2016 13:15 - 11/28/2016 11:15 |
| jacb9wq112816 | WCT | 11/28/2016 11:30 - 12/21/2016 12:00 |
| jacb9wq122016 | CT2 | 12/20/2016 12:15 – 01/19/2017 11:45 |

**NE (jacnewq)**

Because of differences in the ranges, accuracies, and resolutions of the two Temperature/Conductivity probes (CT2 (p/n 599871-01) and WCT (p/n 599827)), as well as the resistance of the sensors to fouling (the latter more so than the former), users of the data may wish to incorporate the following information (see Sensor Specification section) in their use and analysis of the data:

| Deployment | sensor type | data range |
|---|---|---|
| jacnewq120315 | CT2 | 12/03/2015 16:15 - 01/22/2016 14:30 |
| jacnewq012216 | CT2 | 01/22/2016 14:45 - 03/09/2016 18:30 |
| jacnewq030916 | WCT | 03/09/2016 19:00 - 04/20/2016 12:15 |
| jacnewq042016 | WCT | 04/20/2016 12:30 - 06/02/2016 13:15 |
| jacnewq060216 | WCT | 06/02/2016 13:30 - 07/07/2016 11:00 |
| jacnewq070716 | WCT | 07/07/2016 11:15 - 08/02/2016 15:15 |
| jacnewq080216 | CT2 | 08/02/2016 15:30 - 08/31/2016 19:15 |
| jacnewq083116 | CT2 | 08/31/2016 19:30 - 10/06/2016 10:45 |
| jacnewq100616 | WCT | 10/06/2016 11:00 - 11/15/2016 12:30 |
| jacnewq111516 | CT2 | 11/15/2016 12:45 - 12/31/2016 14:30 |
| jacnewq123116 | CT2 | 12/31/2016 14:45 - 01/27/2017 10:00 |

**BA (jacbawq)**

Because of differences in the ranges, accuracies, and resolutions of the two Temperature/Conductivity probes (CT2 (p/n 599871-01) and WCT (p/n 599827)), as well as the resistance of the sensors to fouling (the latter more so than the former), users of the data may wish to incorporate the following information (see Sensor Specification section) in their use and analysis of the data:

| Deployment | sensor type | data range |
|---|---|---|
| jacbawq120315 | CT2 | 12/03/2015 11:45 -01/22/2016 15:00 |
| jacbawq012216 | CT2 | 01/22/2016 15:15 -03/09/2016 18:00 |
| jacbawq030916 | WCT | 03/09/2016 18:30 -04/20/2016 11:45 |
| jacbawq042016 | WCT | 04/20/2016 12:00 -06/02/2016 14:00 |
| jacbawq060216 | WCT | 06/02/2016 14:15 -07/07/2016 09:30 |
| jacbawq070716 | WCT | 07/07/2016 09:45 - 08/03/2016 15:15 |
| jacbawq080316 | WCT | 08/03/2016 15:30 - 08/31/2016 19:45 |
| jacbawq083116 | WCT | 08/31/2016 20:00 - 10/25/2016 07:45 |
| jacbawq102516 | CT2 | 10/25/2016 08:15 - 12/04/2016 11:45 |
| jacbawq120416 | WCT | 12/04/2016 12:15 - 12/31/2016 13:45 |
| jacbawq123116 | CT2 | 12/31/2016 14:00 - 01/26/2016 16:15 |

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: Rapid Pulse - Clark type, polargraphic
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 to 500% air saturation: +/- 6% of the reading
Resolution: 0.1% air saturation

or

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: Rapid Pulse - Clark type, polargraphic
Model#: 6562
Range: 0 to 50 mg/L

Accuracy: 0-20 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

or

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 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

Parameter: Chlorophyll Fluorescence
Units: micrograms/Liter
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 6025
Range: 0 to 400 ug/Liter
Accuracy: Dependent on methodology
Resolution: 0.1 ug/L chl a, 0.1% FS

YSI EXO Sonde:

Parameter: Temperature
Units: Celsius (C)
Sensor Type: CT2 Probe, Thermistor
Model#: 599870
Range: -5 to 50 C
Accuracy: -5 to 35: +/- 0.01, 35 to 50: +/- .005
Resolution: 0.01 C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: CT2 Probe, 4-electrode cell with autoranging
Model#: 599870
Range: 0 to 200 mS/cm
Accuracy: 0 to 100: +/- 0.5% of reading or 0.001 mS/cm; 100 to 200: +/- 1% of reading
Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependant)

Parameter: Salinity
Units: practical salinity units (psu)/parts per thousand (ppt)
Sensor Type: CT2 probe, Calculated from conductivity and temperature
Range: 0 to 70 psu
Accuracy: +/- 1.0% of reading pr 0.1 ppt, whichever is greater
Resolution: 0.01 psu

OR

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Wiped probe; Thermistor
Model#: 599827
Range: -5 to 50 C
Accuracy: ±0.2 C
Resolution: 0.001 C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: Wiped probe; 4-electrode cell with autoranging
Model#: 599827
Range: 0 to 100 mS/cm
Accuracy: ±1% of the reading or 0.002 mS/cm, whichever is greater
Resolution: 0.0001 to 0.01 mS/cm (range dependent)

Parameter: Salinity
Units: practical salinity units (psu)/parts per thousand (ppt)

Model#: 599827
Sensor Type: Wiped probe; Calculated from conductivity and temperature
Range: 0 to 70 ppt
Accuracy: ±2% of the reading or 0.2 ppt, whichever is greater
Resolution: 0.01 psu

Parameter: Dissolved Oxygen % saturation
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 599100-01
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: +/- 5% 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#: 599100-01
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: +/- 5% 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 33 ft (10 m)
Accuracy: +/- 0.013 ft (0.004 m)
Resolution: 0.001 ft (0.001 m)

Parameter: pH
Units: pH units
Sensor Type: Glass combination electrode
Model#: 599701(guarded) or 599702(wiped)
Range: 0 to 14 units
Accuracy: +/- 0.01 units within +/- 10° of calibration temperature, +/- 0.02 units for entire temperature range
Resolution: 0.01 units

Parameter: Turbidity
Units: formazin nephelometric units (FNU)
Sensor Type: Optical, 90 degree scatter
Model#: 599101-01
Range: 0 to 4000 FNU

Accuracy: 0 to 999 FNU: 0.3 FNU or +/-2% of reading (whichever is greater); 1000 to 4000 FNU +/-5% of reading
Resolution: 0 to 999 FNU: 0.01 FNU, 1000 to 4000 FNU: 0.1 FNU

Parameter: Chlorophyll
Units: micrograms/Liter
Sensor Type: Optical probe
Model#: 599102-01
Range: 0 to 400 ug/Liter
Accuracy: Dependent on methodology
Resolution: 0.1 ug/L chl a, 0.1% FS

**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 1.02 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.

**NOTE:** older depth data cannot be corrected without verifying that the depth offset was in place and whether a vented or non-vented depth sensor was in use. No SWMP data prior to 2006 can be corrected using this method. The following equation is used for corrected depth/level data provided by the CDMO beginning in 2010: ((1013-BP)*0.0102)+Depth/Level = cDepth/cLevel.

**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.

**Chlorophyll Fluorescence Disclaimer:**

YSI chlorophyll sensors (6025 or 599102-01) are designed to serve as a proxy for chlorophyll concentrations in the field for monitoring applications and complement traditional lab extraction methods; therefore, there are accuracy limitations associated with the data that are detailed in the YSI manual including interference from other fluorescent species, differences in calibration method, and effects of cell structure, particle size, organism type, temperature, and light on sensor measurements.

## 10) Coded Variable Definitions

| Sampling Station: | Sampling Site Code | Station Code |
|---|---|---|
| Buoy 126 | B6 | jacb6wq |
| Buoy 139 | B9 | jacb9wq |
| Lower Bank | BA | jacbawq |
| Chestnut Neck | NE | jacnewq |

jac = three-letter abbreviation for the Jacques Cousteau National Estuarine Research Reserve

wq = water quality data

example 1: jacb6wq030916= this demonstrates the naming convention for deployment files. This denotes a deployment at the Jacques Cousteau National Estuarine Research Reserve's (jac) Buoy 126 (b6) water quality (wq) station starting on 03/09/2016.

example 2: jacb6wq2016= water quality dataset from the JCNERR's Buoy 126 station for the year 2016

## 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**

Deployment filename Datasonde ID#, Dissolved Oxygen #1 depth measured/expected offset, Specific Conductivity, pH7, pH10, Turbidity0

| Deployment Name | Sonde Name | DO 100% | Depth m (measured/ expected) | SpCond 10mS/cm3 | pH (7) | pH (10) | Turb 0NTU |
|---|---|---|---|---|---|---|---|
| jacb6wq120415 | 13 | 97.2 | -0.073/-0.057 | 10.07 | 6.97 | 10.02 | 3.4 |
| jacb6wq011416 | Loaner | 98.6 | 0.021/0.022 | 10.00 | 6.99 | 10.00 | 0.9 |
| jacb6wq030116 | V2B | 97.0 | -0.193/-0/160 | 10.11 | 7.12 | 10.10 | 0.4 |
| jacb6wq040616 | V2A | 98.8 | -0.015/-0.008 | 9.789 | 7.02 | 10.05 | 3.1 |
| jacb6wq050216 | Loaner | 96.7 | 0.063/0.067 | 9.948 | 7.34 | 10.34 | 1256.0 |
| jacb6wq052516 | V2A | 96.9 | -0.024/-0.025 | 9.422 | 7.13 | 10.09 | 2.5 |
| jacb6wq062216 | V2B | 91.5 | -0.034/0.007 | 9.845 | 7.12 | 10.12 | 8.3 |
| jacb6wq071316 | V2A | 95.3 | -0.033/0.09 | 8.523 | 7.6 | 9.12 | 2.2 |
| jacb6wq080816 | V2B | 100.9 | 0.012/0.012 | 9.877 | 7.17 | 9.91 | 4.9 |
| jacb6wq083016 | Loaner | 96.3 | 0.088/0.069 | 9.745 | 7.30 | 10.21 | 1515.2 |
| jacb6wq092616 | V2B | 96.8 | 0.100/0.144 | 9.976 | 7.07 | 10.10 | 0.7 |
| jacb6wq102616 | loaner | 97.4 | 0.123/0.106 | 9.922 | 6.97 | 9.99 | 1.2 |
| jacb6wq112316 | V2B | 98.8 | 0.255/0.252 | 10.01 | 7.01 | 10.04 | 10.6 |
| | | | | | | | |
| jacb9wq121015 | Mr. Blonde | 97.3 | -0.064/-0.057 | 9.94 | 6.98 | 10.02 | 1.51 |
| jacb9wq011516 | Mr. Pink | 100.4 | 0.022/0.022 | 9.8661 | 7.05 | 10.09 | 1.22 |
| jacb9wq030116 | Mr. Blue | 97.5 | -0.168/-0.160 | 9.9580 | 6.92 | 9.86 | 0.28 |
| jacb9wq040616 | Mr. Pink | 99.3 | 0.091/0.016 | 10.1007 | 7.10 | 10.13 | 0.74 |
| jacb9wq051016 | Mr. Brown | 96.6 | -0.023-0.024 | 9.9845 | 7.07 | 10.06 | 1.09 |
| jacb9wq062216 | Mr. Blue | 94.2 | 0.005/0.007 | 9.8306 | 7.06 | 10.04 | 0.65 |
| jacb9wq071316 | Mr. White | 103.5 | 0.053/0.057 | 10.4058 | 7.09 | 10.08 | 0.28 |
| jacb9wq081116 | Mr. Blue | 100.2 | -0.014/-0.024 | 9.9284 | 7.05 | 10.05 | 0.8 |
| jacb9wq090816 | Mr. Orange | 98.7 | 0.015/0.010 | 9.9941 | 7.09 | 10.13 | 1.22 |
| jacb9wq100316 | Mr. Blonde | 99.6 | 0.137/0.137 | 10.0170 | 7.07 | 10.08 | 1.12 |
| jacb9wq110116 | Mr. Brown | 100.2 | 0.082/0.092 | 9.8586 | 7.06 | 10.09 | 1.20 |
| jacb9wq112816 | Mr. Blonde | 96.9 | 0.174/0.164 | 9.9930 | 7.09 | 10.11 | 1.48 |
| jacb9wq122016 | Mr. Pink | 100.6 | 0.016/0.057 | 9.9454 | 7.03 | 10.1 | 1.1 |
| | | | | | | | |
| jacnewq120315 | Mr. Orange | 102.7 | 0.007/0.007 | 10.14 | 7.14 | 10.01 | 1.91 |
| jacnewq012216 | Mr. Blonde | 99.5 | 0.053/0.033 | 10.64 | 7.12 | 10.08 | 2.71 |
| jacnewq030916 | Mr. Orange | 100.0 | 0.117/0.121 | 10.03 | 7.07 | 9.96 | 0.15 |
| jacnewq042016 | Mr. Blue | 94.4 | 0.050/0.014 | 10.30 | 7.20 | 10.05 | 1.3 |
| jacnewq060216 | Mr. Pink | 98.3 | -0.083/-0.056 | 10.88 | 7.15 | 10.11 | 0.80 |
| jacnewq070716 | Mr. Blonde | 100.1 | 0.053/0.037 | 9.1191 | 7.04 | 10.0 | 1.21 |
| jacnewq080216 | Mr. Pink | 96.5 | -0.003/-0.005 | 9.62 | 7.55 | 10.52 | 8.6 |
| jacnewq083116 | Mr. White | 102.1 | 0.111/0.107 | 9.91 | 7.08 | 10.14 | 0.75 |
| jacnewq100616 | Mr. Orange | 100.1 | -0.034/-0.030 | 11.21 | 7.14 | 10.15 | 2.54 |
| jacnewq111516 | Mr. Blue | 100.0 | 0.044/0.048 | 10.46 | 7.08 | 10.05 | 0.50 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| jacnewq123116 | Mr.. Blonde | 96.3 | -0.084/-0.089 | 10.3522 | 7.05 | 10.03 | 1.92 |
| jacbawq120315 | Mr. White | 100.7 | 0.065/0.072 | 9.94 | 7.11 | 10.08 | 0.68 |
| jacbawq012216 | Mr. Brown | 97.5 | 0.50/0.033 | 10.37 | 7.02 | 9.93 | -2.9 |
| jacbawq030916 | Mr. White | 100.0 | 0.97/0.121 | 9.94 | 7.10 | 10.10 | 0.87 |
| jacbawq042016 | Mr. Blonde | 100.3 | 0.051/0.041 | 10.47 | 7.10 | 10.20 | 1.20 |
| jacbawq060216 | Mr. White | 98.4 | -0.078/-0.033 | 10.76 | 7.09 | 10.09 | 0.03 |
| jacnewq070716 | Mr. Brown | 92.0 | 0.057/0.037 | 10.122 | 7.00 | 10.00 | 27.7 |
| jacbawq080316 | Mr. Orange | 97.0 | -0.013/-0/007 | 9.92 | 7.21 | 10.22 | 8.48 |
| jacbawq083116 | Mr. Brown | 101.8 | 0.123/0.109 | 10.02 | 7.09 | 10.15 | 0.60 |
| jacbawq102516 | Mr. Pink | 100.1 | 0.092/0.086 | 11.31 | 7.08 | 10.10 | 4.13 |
| jacbawq120416 | Mr. Orange | 98.1 | 0.005/0.048 | 11.38 | 7.06 | 10.05 | 0.12 |
| jacbawq123116 | Mr. Brown | 94/4 | -0.064/-0.089 | 10.3029 | 7.00 | 10.00 | 1.91 |

## 14) Other Remarks/Notes

This section details comments concerning data in the data set that are not adequately described by the coding convention or require additional comment/qualification.

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. Occasionally, supplementary data are available from proximal non-SWMP stations. If additional information and/or missing data are needed, contact the Research Coordinator at the reserve submitting the data.

Occasionally negative turbidity values between -0001 and -0002 NTU's/FNU's are recorded. Because such values fall within the range of accuracy (+/-2 NTU/FNU) of the 6-series turbidity probes, these data are considered suspect but not rejected.

Occasionally negative turbidity values less than -0002NTU's/FNU's are recorded. Because such values fall outside the range of accuracy (+/-2 NTU/FNU) of the 6-series turbidity probes, these data were rejected and flagged with a <-3> <SNV> (negative value) designation in the dataset.

Note to users: When utilizing these data, it is always best to also review the SWMP Meteorological (MET) dataset from this reserve to provide weather conditions that may affect the SWMP Water Quality (WQ) data from this reserve. For example, strong precipitation and strong sustained winds may cause elevations in turbidity and alter dissolved oxygen levels. Periods of drought may alter salinity patterns and lead to anoxic conditions in poorly-circulated regions of reserve waters. Hurricane and Nor'easter events may alter WQ parameters in the above, and other, manners. Provisional MET data from the JCNERR's MET station (station code: jacncmet) are available at the CDMO website: http://nerrsdata.org/

**All stations:**

Overall, the JC NERR watershed experienced a relatively dry spring and intermittent minor drought warnings through the summer months into the early fall.

Site-specific comments:

**B6 (jacb6wq)**

A failing temperature/conductivity probe (as detected via telemetry) during the jacb6wq030116 deployment was replaced and re-calibrated mid-deployment on 03/08/2016 09:45

The deployment pipe broke (a broken below-water tether caused undue leverage on the pipe in the current) on 03/12/2016 between 02:45 and 03:00. The sonde then laid on the bottom (apparently in the channel or a hole some distance from the structure as this station is equipped with a 50-foot cable) until a replacement pipe was installed on 03/23/2016 at approximately 15:20. It appears that the sensors spent at least some of their time obscured or clogged by sediment while lying on the bottom; all but temperature (which itself is labeled suspect) were rejected from this period as they deviated far outside the expected ranges for this station and mismatched the pre-failure and post-repair trends.

While biofouling of the sonde was not excessive at time of retrieval, there appears to have been intermittent blockage of the turbidity sensor optics during the entire jacb6052516 deployment; the sensor post-calibrated acceptably. While the cause is unknown, it may have been a long strand of filamentous alga or a fish or crustacean that established residency in the sonde guard end. The vast majority of turbidity data from this deployment were labeled suspect with cause unknown.

**B (jacb9wq)**

Because of differences in the ranges, accuracies, and resolutions of the two Temperature/Conductivity probes (CT2 (p/n 599871-01) and WCT (p/n 599827)), as well as the resistance of the sensors to fouling (the latter more so than the former), users of the data may wish to incorporate the following information (see Sensor Specification section) in their use and analysis of the data. During the deployment listed below the CT2 probe was used to collected data, instead of the WCT probe used during other deployments.

| | | |
|---|---|---|
| jacb9wq081116 | CT2 | 08/11/2016 11:00 - 09/08/2016 10:00 |

**BA (jacbawq)**

The wiper fell off during the jacbawq070716 deployment. Probe sensors were found to have moderate algal growth upon retrieval. Most notably, dissolved oxygen values were depressed and turbidity values were elevated during post-deployment calibration check. Dissolved oxygen data were flagged as suspect from 07/21/2016 until 07/26/2016 and rejected from 07/26/2016 until the end of the deployment on 08/03/2016 15:15 and turbidity values were rejected from 07/21/2016 until the end of the deployment on 08/03/2016 15:15.

**NE (jacnewq)**

Because of differences in the ranges, accuracies, and resolutions of the two Temperature/Conductivity probes (CT2 (p/n 599871-01) and WCT (p/n 599827)), as well as the resistance of the sensors to fouling (the latter more so than the former), users of the data may wish to incorporate the following information (see Sensor Specification section) in their use and analysis of the data. During the deployment listed below the CT2 probe was used to collected data, instead of the WCT probe used during other deployments.

| | | |
|---|---|---|
| jacnewq080216 | CT2 | 08/02/2016 15:30 - 08/31/2016 19:15 |
| jacnewq083116 | CT2 | 08/31/2016 19:30 - 10/06/2016 10:45 |