

Jacques Cousteau (JAC) NERR Water Quality Metadata
(formerly known as Mullica River (MUL) NERR)
January through December 2000
Latest update: February 05, 2022

I. DATA SET AND RESEARCH DESCRIPTION

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2. Entry verification

The data were uploaded to the PC from the YSI data loggers in the PC6000 and comma delimited format and saved with .dat and .csv extensions respectively. Both of these data file formats are archived on site. Graphs were created from this data using the EcoWatch software. The graphs were evaluated for suspect data, which may have resulted from probe failure or the data logger being out of water. Pre-deployment and post-retrieval readings were identified by unusual depth and salinity data (depths and salinity values near zero). First and last readings were then compared with pre-deployment and post-retrieval readings taken with a YSI 600 unit. All irregular data observed from graphs were documented on deployment records. The appropriate files were then merged to form complete monthly data sets and were saved as separate EXCEL files. Missing data are denoted by periods (.) and documented in section 11 (Missing Data) of this document. Any erroneous data that were identified as being caused by probe failures, as determined upon examination of the data plots, were deleted and replaced with periods and noted in section 11 (Missing Data). Symptoms of probe failure were extreme noise in the record, unrealistically high or negative data, and noisy or negative readings in standard solutions. Examples of many such failures are given in the CDMO Manual (Version 3). Sensor readings that greatly deviate from known values of standards after deployments were not necessarily believed to be the result of probe failure. These erroneous readings may have been the result of biofouling. If biofouling was believed to be the reason for these data, the data were retained and noted in section 10 (Data Anomalies) of this document. Finally, the CDMO Excel 5.0 macros (update version February 2000) were then run on these newly created monthly files to identify missing times and /or dates, to format column width and decimal places of each column, and to identify outliers and other erroneous data. When all the macros were run and the data was checked and formatted properly, the monthly data files were saved as text files and then uploaded to the CDMO server. Sharon O'Donnell is responsible for data management and transferring data files to CDMO.

3. Research Objectives

The water quality of the Mullica River and Great Bay has traditionally been very 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 which 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, five to nine meters in the section that is monitored. Great Bay averages about two meters 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 which enter 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 prevent 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 data loggers. Because of the close proximity of the lower station 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 colder ocean waters can have dramatic effects on the growth rates of many different species living in the area. Data loggers 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 Data Loggers)

The data loggers are programmed to record water quality parameters every 30 minutes. Presently, three instruments are located in the Jacques Cousteau 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 data loggers cover a total of 33 kilometers in this estuarine system.

At all three sites, YSI data loggers are deployed in the following manner. A 10 - 20 foot length of schedule 40 PVC pipe is used. Slots one inch wide and eight inches long are cut three inches above the bottom and encircled the pipe. A one half-inch bolt is placed below the pipe slots to keep the YSI from falling through the pipe. A PVC cap is placed over the pipe with a slot for a locking mechanism to the pipe. A rope is attached to the cap with the other end fastened to the bail of the data logger for the retrieval of the YSI.

Every thirty minutes (eastern standard time EST) during each sampling period measurements of specific conductance, salinity, temperature, dissolved oxygen, (percent saturation and mg/L), water level, pH, and turbidity are recorded. After approximately 14 days the data logger is removed from the PVC pipe. A YSI 600 data logger attached to a YSI 610-DM handheld unit is then lowered into the pipe and samples in-situ water conditions at the same depth which data is recorded. A different calibrated and programmed YSI data logger is then switched with the data logger being replaced. The data logger is brought back to the laboratory for downloading, re-calibration and reprogramming to be exchanged at a different location. The beginning and end of each data

file is compared to the YSI 600 readings and the data is checked for probe failure and fouling. The data loggers are programmed to start recording data a few hours before they are deployed in the field. Records are kept indicating which data loggers are used at each location and if there are any specific problems with the data loggers or probes on the data loggers.

Uploading, cleaning, maintenance, and calibration are conducted as described in the YSI Operating Manual (section 3, 4, and 7). Calibration standards required for pH and conductivity are purchased from a scientific supply house. A two point calibration is used for pH, the first being pH 7 followed by pH 4. The lower pH standard is used because of the more acetic properties of the Mullica River. A standard of 20,000 us/cm is used to calibrate for conductivity. The membrane on the oxygen probe is changed with every deployment. The membrane is stretched over the face of the probe and is burned in by allowing the data logger to run in an unattended sampling mode sampling every 30 minutes for at least eight hours. Dissolved oxygen is calibrated using a calibration cup filled with about 1/4 inch tap water, which creates a 100% water-saturated air environment for the sensor when the data logger is placed in the cup. The sensors are allowed to equilibrate in the cup before DO (% saturation) is calibrated. DO calibrations are performed immediately before deployment. Data loggers are allowed to sample inside the calibration cup at least one hour following retrieval to assure the membrane functioned properly during deployment. The standard for calibrating turbidity is purchased from a supply house and diluted to give a reading of 100 NTU (National Turbidity Units). Turbidity wipers are replaced after every deployment. Used conductivity, pH, and turbidity standards are stored for rinsing probes and post-deployment calibrations which are performed immediately after data loggers return from the field and before data loggers are cleaned. These standards are then discarded after their second use. Servicing an instrument generally takes about two hours for each data logger plus the time involved with retrieval and deployment.

5. Site Location and Character

The Jacques Cousteau National Estuarine Research Reserve (JACNERR) 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. All three locations can be characterized by having no macro algae and fast moving tidal currents. All sites are in an undisturbed area with little impact from development or pollution. There are three sampling stations:

1) Buoy 126 (B126) - 39 30.478' N, 74 20.308' W- located three kilometers from Little Egg Inlet on the eastern side of Great Bay and is 100 meters from the nearest land which is a natural marsh island. This is a naturally deep area which has never been dredged. It is located about 0.5 kilometer from an area in the intracoastal waterway which is dredged regularly. The dredged material is a coarse sand. The data logger at this location is attached to Intracoastal Waterway Buoy 126 and is the closest monitoring station to Little Egg Inlet. In 2000, Buoy 126 was the only SWMP site accessed by boat. This site can be characterized by having strong tidal currents, 2-3 knots, fine to coarse sand bottom with an extensive blue mussel bed surrounding the area. The 2000 averages for this site are as follows: the depth is 3.1 meters with a range of 1.6 to 4.3 meters. Salinity averages 29.57 ppt with a maximum of 33.3 and a minimum of 22.5 ppt. Temperatures at this site ranged from -1.7 to 27.1 degrees Celsius. Values for pH at this site were highly variable between data logger deployments in 2000, possibly due to fouling of the original pin-hole-style pH probe on the YSI 6000 units.

2) Chestnut Neck (NECK) - 39 32.872' N, 74 27.676' 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 data logger 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 average depth at this location is 1.7 meters with a range of from 0.3 to 2.6 meters. The depth in the middle of the Mullica River at this location is about six meters. The pH averages 7.2 for the year with a range of from 6.6 to 8.1. The average salinity here is 14.9 ppt with a range of 4.1 to 27.3 ppt. The site is characterized by having tidal currents of less than one knot, during both ebb and flood tide, and has a sandy bottom.

3) Lower Bank (BANK) - 39 35.618' N, 74 33.091' W - located 13 kilometers upriver of the Chestnut Neck location. The Mullica River at this site is about two hundred meters wide. The data logger is attached to a bridge going over the Mullica River and is located in the center of the 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 sand sediment. The average depth is 1.7 meters with a range of 0.60 to 2.60 meters. The pH for 2000 is variable after several storm events. pH ranges from 4.5 to 7.7. The salinity averages 2.1 ppt with a range of from 0 to 14.6 ppt.

6. Data Collection Period

Data collection at Buoy 126 and Chestnut Neck began August 1996, Lower Bank started October 1996. All three sites have been continuously in service since that time. The following are the beginning and ending date and time for each logging run over the year:

Lower Bank

Logging Run	Started	Logging Run	Ended
2/16/99	1600	1/4/00	1500
1/4/00	1530	1/26/00	230
2/16/00	1130	3/1/00	1000
3/1/00	1100	3/14/00	1630
3/14/00	1700	3/28/00	1100
3/28/00	1130	4/11/00	730
4/11/00	800	4/25/00	730
4/25/00	730	5/11/00	730
5/11/00	800	5/24/00	1500
5/24/00	1530	6/9/00	1000
6/9/00	1030	6/22/00	700
6/22/00	800	7/10/00	1030
7/10/00	1100	7/27/00	1500
7/27/00	1530	8/9/00	1530
8/9/00	1600	8/26/00	730
8/23/00	800	9/7/00	1530
9/7/00	1600	9/21/00	1000
9/21/00	1100	10/11/00	1000
10/11/00	1030	10/30/00	1630
10/30/00	1700	11/15/00	830
11/15/00	900	11/29/00	1800
11/29/00	1830	12/6/00	500
12/11/00	1630	1/5/01	1330

Chestnut Neck

Logging Run Started		Logging Run Ended	
12/21/99	900	1/7/00	930
1/14/00	1630	1/28/00	1330
2/16/00	1300	3/2/00	1000
3/3/00	1430	3/20/00	1230
3/21/00	1100	4/11/00	000
4/14/00	900	5/8/00	1000
5/8/00	1430	5/25/00	900
5/25/00	1200	6/14/00	1330
6/15/00	900	7/5/00	1700
7/5/00	1730	7/20/00	1400
7/20/00	1400	8/2/00	1500
8/2/00	1530	8/21/00	900
9/7/00	900	9/25/00	730
9/25/00	1000	10/11/00	1430
10/13/00	900	10/26/00	900
10/26/00	1600	11/9/00	1100
11/16/00	1200	11/30/00	930
11/30/00	1500	12/19/00	900
12/20/00	1130	12/27/00	1400

Buoy 126

Logging Run Started		Logging Run Ended	
12/15/99	1130	1/5/00	1600
1/5/00	1630	1/19/00	1400
1/19/00	1430	2/6/00	2300
2/24/00	1300	3/15/00	1030
3/15/00	1100	3/30/00	830
3/30/00	900	4/13/00	1000
4/13/00	1030	4/28/00	730
4/28/00	800	5/10/00	930
5/10/00	1000	5/24/00	1330
5/24/00	1400	6/6/00	1300
6/6/00	1330	6/20/00	900
6/20/00	930	7/6/00	1430
7/6/00	1500	7/20/00	1430
7/20/00	1530	8/2/00	1600
8/2/00	1600	8/15/00	1630
8/15/00	1700	8/30/00	800
8/30/00	830	9/14/00	1000
9/14/00	1000	9/27/00	1530
9/27/00	1600	10/10/00	1230
10/10/00	1300	10/26/00	1330
10/26/00	1400	11/8/00	1300
11/8/00	1330	11/21/00	1300
11/21/00	1400	12/14/00	1330
12/14/00	1400	1/10/01	930

7. Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy of 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 Principal Investigator retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any

part of the data are used. Manuscripts resulting from the NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, and 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 in the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see section 1. Principal Investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under general information link on CDMO homepage) and online at the CDMO homepage <http://inlet.geol.sc.edu/cdmohome.html>. Data are available in text tab-delimited format, Microsoft Excel spreadsheet format and comma-delimited format.

8. Associated Researchers and Projects

NERR Graduate Research Fellow Ed Martino continues work on his Masters Thesis, tentatively titled "Spatial and temporal trends in the structure of an estuarine fish assemblage: observations from the tidal creek and adjacent open waters." Ed plans to defend his thesis in the spring of 2001.

During 2000, weekly ichthyoplankton sampling at Little Sheepshead Creek Bridge (LSCB) continued as part of the long-term sampling conducted by Rutgers University in the 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 NERR. Killifish trapping conducted in the Rutgers boat basin, and system-wide otter trawling also continued in 2000 as part of long-term sampling within the Reserve.

Dr. Kenneth Able and Dr. Peter Rowe continued comparing habitat use by young-of-the-year (YOY) bluefish (*Pomatomus saltatrix*) on estuarine and ocean beaches in the JCNERR. Field crews of 4-6 people collected YOY bluefish in the surf zone of both habitats with a 30 m beach seine. The investigators tagged YOY bluefish in both habitats with a 1.1 mm long, stainless steel, sequential coded wire tags inserted in front of the dorsal fin. Tagged fish were released and YOY bluefish collected in subsequent beach seine hauls were scanned for tags.

Blue crab (*Callinectes sapidus*) reproductive behavior was studied by Dr. Paul Jivoff in the JCNERR throughout the spring and summer of 2000. Dr. Kenneth Able and Stacy Hagan continued research on the effect of common reed (*Phragmites australis*) invasion on marsh surface macrofauna in 2000. Pit traps were placed in *Phragmites* and *Spartina* marshes at Hog Islands, 13 km upstream from the mouth of the Mullica River, to assess abundance and distribution of larval and juvenile fish and decapod crustaceans on the marsh surface. Reproduction of *Fundulus heteroclitus* in these two habitats was also assessed. Significant results were that *F. heteroclitus* reproduce in both habitat types, however larval and small juveniles of this species occurred in much greater numbers in *Spartina*.

During 2000 Dr. Paul Bologna and Dr. Kenneth Able wrapped up studies assessing eelgrass (*Zostera marina*) as essential habitat. Research was conducted in Little Egg harbor, New Jersey to determine trophic interactions between juvenile winter flounder (*Pseudopleuronectes americanus*) and edge and interior

portions of eelgrass. Research assessing the growth and reproduction of bay scallops (*Argopecten irradians*) was continued as part of a project initiated in 1998. Scallop growth, mortality and production were estimated from field collected, marked, and recaptured scallops. Reproduction was assessed through collections and dissections of individuals during the spring, summer, and fall.

Roger Hoden continued long-term monitoring and evaluation of diamondback terrapin (*Malaclemys terrapin terrapin*) habitat utilization along Great Bay Boulevard, within the JCNERR. The Boulevard, which bisects a seven-mile long peninsula within the Reserve, offers valuable insight into juvenile and adult terrapin behavior. Samples for mortality studies are collected daily along the boulevard by staff of the Rutgers field station on their way to and from the field station, located at the end of this road.

II. PHYSICAL STRUCTURE DESCRIPTIONS

9. Variable Sequence, Range of Measurements, Units, Resolution, and Accuracy:

YSI 6000 datalogger

Variable	Range of Measurements	Resolution	Accuracy
Date	1-12, 1-31, 00-99 (Mo,Day,Yr)	1 mo, 1 day, 1 yr	NA
Time	0-24, 0-60, 0-60 (Hr,Min,Sec)	1 hr, 1 min, 1 s	NA
Temp	-5 to 45 (c)	0.01 C	+/-0.15C
Sp COND	0-100 (mS/cm)	0.01mS/cm	+/-0.5% Of
reading + 0.001mS/Cm			
Salinity	0-70 Parts per thousand (ppt)	0.01 ppt	+/- 1% of
Reading or 0.1 ppt, (whichever is greater)			
DO	0-200 (% air saturation)	0.1% @air sat	+/-2% @air
Saturation			
DO	200-500 (% air saturation	0.1% @ air sat	+/- 6% @
Saturation			
DO	0-20 (mg/l)	0.01 mg/l	+/- 0.2mg/l
DO	20-50 (mg/l)	0.01 mg/l	+/- 0.6mg/l
Depth (shallow)	0-9.1 (m)	0.001m	+/- 0.018m
PH	2-14 units	0.01 units	+/- 0.2units
Turb	0-1000 NTU	0.1 NTU	+/- 5% of
Reading or 2 NTU (whichever is greater)			

Data columns are separated by tabs. Each file contains a two line column header at the top of the page which identifies measurements and units for each column.

10. Coded Variable Indicator and Variable Code Definitions:

BANK ba = Lower Bank
 NECK ne = Chestnut Neck
 B126 b6 = Buoy 126

11. Data Anomalies:

Included in this section are the month and year of data collection, the location and the file name for that month, along with all anomalous data points.

LOWER BANK

January ba0100

1/4/00 1530 DO values lower than previous deployment

1/14/00 400 increase in DO values (see 1/16/00 at Chestnut Neck)

1/18/00 430 - 1/26/00 230 negative temperature values

1/18/00 1030 pH values jump (6.8) and stay high for 3 days
1/25/00 1630 salinity value spike (14.6 ppt)

February ba0200

2/27/00 1630 pH drops (5.3 highest value)

March ba0300

April ba0400

May ba0500

5/1/00 000 - 5/11/00 730 turbidity probe broken, data deleted
5/22/00 330, 1130 DO readings elevated (101.3%, 113.7%)

June ba0600

6/9/00 1030-6/22/00 700 DO data deleted, hole in membrane
6/15/00 230, 1100 turbidity spikes and values out of range (1314.2, 318.4 NTU)
6/18/00 1700, 1730 turbidity spikes and values out of range (1314.3, 540.7 NTU)
6/19/00 100 turbidity spike (929.4 NTU)
6/20/00 1300 turbidity spike (215.7 NTU)
6/26/00 500 DO value drop (from 83.5% to 43.8%)

July ba0700

7/1/00 1130 turbidity value out of range (1374 NTU)
7/2/00 2130 turbidity spike (274 NTU)
7/4/00 2330 turbidity spike (240 NTU)
7/5/00 930 turbidity value out of range (1380 NTU)
7/10/00 1100-7/27/00 1500 pH values elevated due to fouling in probe holes
7/12/00 1200 turbidity value out of range (1125 NTU)
7/16/00 500 turbidity value out of range (1118 NTU)
7/27/00 1530 DO values elevated at beginning of deployment

August ba0800

8/7/00 400, 430 turbidity spike (438, 194 NTU), may be due to loose wiper
8/23/00 800 - 1200 DO values indicate logger out of water, all data deleted

September ba0900

9/14/00 1100 turbidity value out of range (1747 NTU)

October ba1000

10/6/00 1200 turbidity spike (123 NTU)
10/11/00 1030 - 10/30/00 1600 DO data deleted due to post-deployment readings
10/11/00 1530 depth readings unusually low for October, gradual change (.8 meters)
10/17/00 1400 - 10/30/00 100 intermittent negative turbidity values
10/21/00 1230 turbidity spike (146 NTU)

November ba1100

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

11/1/00 1500
11/2/00 130-330, 530, 1430-1530, 2300
11/3/00 000, 100, 130, 330-430, 700, 1030, 1130, 1300, 1400, 1500-1600, 1700
11/4/00 030, 200-400, 500, 700, 830, 1100, 1300, 1500, 1600-1700, 1800, 2000
11/5/00 430
11/6/00 600
11/7/00 1830, 1900-2000
11/8/00 730-830, 1930-2030

11/9/00 800
11/10/00 730, 800
11/12/00 2230
11/13/00 1100, 1130

11/7/00 1700 turbidity value out of range (1683 NTU)
11/19/00 830 turbidity value out of range (1075.1 NTU)
11/20/00 1200, 1300, 1330 (1071.4, 1072.5, 1072.9 NTU)
11/27/00 030 pH values drop
11/29/00 1830-11/30/00 2330 DO data deleted due to post-deployment readings

December ba1200

12/1/00 000-12/6/00 430 DO data deleted due to post-deployment readings
12/11/00 1630-12/31/00 2330 DO data corrupt (negative values) data deleted
12/11/00 1630 - 12/31/00 2330 turbidity probe failure, data deleted
12/17/00 1630 depth and pH values drop and stay low throughout the entire month as river freezes
12/22/00 930 temperature drops suddenly as river freezes

CHESTNUT NECK

January ne0100

1/1/00 000-1/7/00 930 DO data deleted, probe failure
1/16/00 1530 increase in DO readings 2 days after same observation at Lower Bank
1/17/00 2200-1/28/00 1330 negative temperature readings
1/25/00 1500 salinity value spike (27.3 ppt)
1/26/00 400 pH values decline rapidly

February ne0200

None to report

March ne0300

3/10/00 1430 DO spike (122%)
3/19/00 530 - 3/22/00 1500 peak depth values at Chestnut Neck for 2000, followed by rapid drop ending on
3/29/00 1630

April ne0400

4/9/00 1800-2000 depth values shallow (< .70 meters)
4/14/00 900 - 4/30 23:30 pH values higher than previous deployment

May ne0500

5/6/00 000 turbidity spike (189 NTU)

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

5/25/00 1930, 2130-2230
5/26/00 230-330, 1630, 1930-2330
5/27/00 000, 200, 330, 400, 500, 530, 1730, 1800, 1930, 2030, 2130-2330
5/28/00 030, 100, 430-700, 1230, 1930
5/29/00 030, 100

June ne0600

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

6/1/00 830-930, 1600, 2200
6/2/00 930-1100
6/7/00 2200
6/8/00 1500-1600, 2130-2330
6/9/00 100-200, 330, 400, 1230, 1600-1700, 1800, 2300

6/10/00 000, 030, 200-600, 700, 1700, 1730
6/11/00 200, 300-630, 730, 1900, 2000-2030
6/12/00 700, 730, 900, 1900, 2000, 2030
6/13/00 600, 800-900, 1000, 1530, 2000-2100
6/14/00 300, 830

6/14/000 1330 DO values low at end of deployment, drift/fouling(last reading 59%, next deployment 85%)
6/24/00 330-6/30/00 2330 pH values become noisy
6/25/00 2130 - 6/30 2330 DO values decline rapidly drift or fouling (see 7/5)
6/26/00 0:00 - 6/30/00 2330 (to end of deployment) pH irregular, drifts

July ne0700

7/1/00 00:00 - 7/5/00 1700 DO values low at end of deployment, drift or fouling (last reading 55%, next deployment 112%)
7/17/00 400 turbidity value out of range (1601 NTU)
7/20/001430 DO values low at end of deployment, drift or fouling (last reading 47%, next deployment 73%)

August ne0800

8/1 00:00 - 8/2/00 1500 DO values low at end of deployment, drift or fouling (last reading 53%, next deployment 71%)
8/11/00 130 - 8/21/00 900 DO values low, possible drift or fouling
8/14/00 1200-8/21/00 900 salinity decreases rapidly, 2.24" rainfall on 8/12
8/21/00 900 DO values low at end of deployment, drift or fouling (last reading 55%, next deployment 76%)

September ne0900

9/25/00 1000 DO, depth, pH, and Sp. Cond. values all elevated at beginning of deployment, no indicators
9/25/00 730 DO values low at end of deployment, drift or fouling (last reading 65%, next deployment 77%)
9/26/00 1030 salinity spikes (23.8 ppt) then drops to 5.8 ppt on 10/1/00 700
9/25/00 1000 - 9/30/00 2330 turbidity values elevated, no indicators.

October ne1000

None to report

November ne1100

11/5/00 500 turbidity value out of range (-.1 NTU)in raw data file, however it was recorded as a zero in the edited data file due to the formatting of Excel. The technician edited none of these data points by hand nor did he/she delete any of them.
11/16/00 1200 pH values lower than previous deployment
11/24/00 500-630 turbidity spikes (697, 184, 41, 343 NTU)
11/26/00 500 turbidity value out of range (1213.7 NTU)
11/26/00 1230 salinity spike (24.5 ppt)
11/27/00 430 - 530 decline in pH and salinity values, 1.73" rain on 11/26
11/30/00 1500-2330 DO values elevated (>130%) with new deployment

December ne1200

12/1/00 000-12/19/00 900 DO values elevated (>130%) for entire deployment
12/12/00 1030 turbidity value out of range (1186 NTU)
12/17/00 1800 salinity and depth values decline rapidly as estuary freezes
12/25/00 930-1030, 1500 - 12/27/00 1400 temperature values negative

BUOY 126

January b60100

1/1/00 000 - 1/5/00 1600 DO data deleted, hole in membrane
1/17/00 1100-1230 turbidity spike (205-323 NTU)
1/17/00 1100-1/31/00 2330 temperature values negative
1/19/00 1430 pH drops to 7.4
1/19/00 1430-1500 DO spikes (149.4%, 126.3%)
1/31/00 2100 specific conductance, salinity, and DO data irregular, removed,
internal error suspected

February b60200

2/1/00-2/4/00 300 temperature values negative
2/4/00 2300 DO value spike (234.6%), data deleted, internal error suspected
2/3/00 1030 depth values drop dramatically
2/5/00 830 depth value spike (3.93 meters)

March b60300

3/15/00 1100 - 3/30/00 830 turbidity values offset (up to 96 NTU) for entire
deployment, suspect miscalibration
3/30/00 900 - 3/31/00 2330 pH values lower than previous deployment

April b60400

4/1/00 000 - 4/13/00 1000 pH values lower than previous deployment
4/9/00 2000 turbidity values spike (235 NTU)
4/13/00 1030 - 4/28/00 730 pH values deleted, blue mussel larvae fouled probes
4/13/00 900 DO readings jump, not deleted because consistent with following
deployments
4/29/00 1700 - 1800 DO values spike
4/30/00 100 turbidity spike (82 NTU)

May b60500

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

5/7/00 1200, 2330 (-.2, -.5)
5/8/00 000, 0030, 1300, 1830 (-.2, -.1, -.2, -.1)
5/9/00 0030, 130, 1830 (-.2, -.3, -.3)
5/10/00 830 (-.1)
5/15/00 730, 1930, 2000 (all -.1)

5/9/00 1930 DO value low (52.6%)
5/10/00 1000 DO values elevated with beginning of deployment
5/17/00 000 turbidity value out of range (1520.7 NTU)
5/19/00 1700 temperature data drops suddenly
5/24/00 1400 pH values higher than previous deployment

June b60600

6/6/00 1330 - 6/20/00 900 pH values elevated for entire deployment

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

6/6/00 1330-1400, 1800-1830
6/7/00 000-200, 730-800, 1300-1500, 1800-2000
6/8/00 030-400, 730-900, 1330-1700, 2000-2100
6/9/00 100-500, 830-930, 1430-1800, 2030-2200
6/10/00 230-630, 800-1030, 1500-1900, 2100-2300
6/11/00 300-600, 830-1130, 1600-1830, 1930, 2000, 2200-2330
6/12/00 000, 030, 430-1230, 1630-2330
6/13/00 000-100, 530-1300, 1800-2100, 2200, 2330
6/14/00 000-300, 500-1430, 1800-2230

6/15/00 100-330, 530-1430, 1900-2300
6/16/00 730-1000, 1430-1500, 2000-2330
6/17/00 330-400, 830-1000, 1300, 1400-1530, 2030-2330
6/18/00 000, 330-500, 900-1230, 1400-1630, 2030-2330
6/19/00 000-030, 430-530, 1000-1730, 2130-2330
6/20/00 000-130, 500-600

6/20/00 1400 - 6/20/00 1830 DO values spike 5.5 hours after beginning of deployment

6/21/00 1630 turbidity spike (43 NTU)
6/25/00 1930, 2300 turbidity spikes (20 & 24 NTU)
6/27/00 000 turbidity spikes (27 NTU)

July b60700

7/5/00 200-7/6/00 1430 turbidity wiper frayed, data deleted
7/6/00 1530 DO values elevated at beginning of deployment (from 99.6% to 114.1%)

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

7/7/00 1430 (-.1 NTU)
7/8/00 230, 900, 1500 (-.2, -.1, -.1 NTU)
7/12/00 1200, 1830 (-.1, -.2 NTU)
7/13/00 1930 (-.2 NTU)

7/19/00 230 turbidity spike (169 NTU)
7/28/00 800 turbidity value out of range (1435 NTU)

August b60800

DO data very noisy all month
8/5/00 1730 DO spike (126%)
8/11/00 1600 turbidity spike (156 NTU)
8/15/00 1700 - 8/31 2330 DO values noisy, negative, data deleted
8/15/00 1700-8/30/00 800 pH readings low, noisy, then jump dramatically mid-deployment 8/24 1000 and stay high for rest of deployment. DO data reflected this change, but the DO data was deleted because of noise and negative values. See raw files for comparison
8/23/00 2000 turbidity spike (127 NTU)
8/24/00 1030 pH readings elevated (7.0 to 7.3)
8/30/00 830 pH readings elevated at beginning of deployment (7.54 to 8.04)

September b60900

9/1/00 000-9/14/00 930 DO noisy, indicating puncture (19%-200%), data deleted
9/12/00 1700- 9/14/00 1000 turbidity values out of range, siltation around sonde
9/14/00 1000 pH values drop with deployment (8.1 to 7.9)
9/14/00 1000 - 1300 DO values high at beginning of deployment (141.1% - 155.8%)
9/27/00 1530 increase in pH values at beginning of deployment
9/27/00 1530 DO readings elevated at beginning of deployment (94.2% to 102.1%)

October b61000

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

10/7/00 1600-1630
10/8/00 500, 1630-1800
10/9/00 530-630
10/10/00 1830 - 10/10/00 1930
10/11/00 1930-2000
10/12/00 700-830, 1900-2100
10/13/00 730-900, 1930-2130

10/14/00 800-900, 1000, 2000-2230
10/15/00 900-1030, 2100-2130, 2230-2300
10/16/00 930-1300, 2300-2330
10/19/00 1300
10/20/00 130-200, 1330-1400, 1500
10/21/00 1500, 1600-1630
10/22/00 330-400, 500, 1600-1700
10/23/00 430-530, 1730-1800
10/24/00 600-630, 1900
10/25/00 730
10/26/00 800

10/10/00 1300 DO values elevated with beginning of deployment (103.6% to 135.9%)
10/11/00 1500 turbidity value out of range (140 NTU)
10/26/00 1400 DO values lower than previous deployment (changed from 130.1% to 113.9%)
10/26/00 1400 pH values elevated with beginning of deployment (7.9 to 8.2)
10/28/00 1700 turbidity spike (216 NTU)
10/31/00 0030 turbidity spike (460 NTU)

November b61100

11/1/00 000 - 11/8/00 1300 pH values elevated with deployment (on 10/26/00 1400)
11/8/00 1330 pH values drop with new deployment
11/21/00 1400 initial pH reading lower at deployment (7.9)

December b61200

12/13/00 400 pH values drop (8.0)
12/17/00 2030 depth values drop noticeably (1.97) as the estuary freezes
12/12/00 1000 turbidity values erratic for rest of month, sediment found on probe at retrieval
12/13/00 2030 - 12/14/00 630 turbidity values out of range (>1000NTU)
12/14/00 800, 830, 1000-1130 turbidity values out of range (>1000NTU)
12/18/00 1030 turbidity values out of range (>1000NTU)
12/23/00 1030 negative temperature values start, intermittent for rest of month, estuary freezes.

12. Missing Data:

Included in this section are the month and year of data collection, the location, and the file name for that month along with all missing data points.

LOWER BANK

January ba0100

1/26/00 300 - 1/31/00 2330 No data. Data logger under ice, batteries died
1/28/00 - 2/16/00 Estuary frozen

February ba0200

2/1/00 000 - 2/16/00 1100 No data. Data logger trapped under ice, batteries died.
2/10/00 - 2/16/00 1100 Calibration testing

March ba0300

3/1/00 1030 Data logger down for service

April ba0400

4/25/00 730 - 4/30/00 2330 Turbidity probe broken, data deleted
4/25/00 730 this sample appears twice, deleted first occurrence, Bank600 (see

Section 12 Additional Comments)

May ba0500

5/1/00 000 - 5/11/00 730 turbidity probe broken, data deleted

June ba0600

6/9/00 1030 - 6/22/00 700 DO data deleted, hole in membrane

6/22/00 730 Data logger down for service

July ba0700

None to report

August ba0800

8/23/00 800 - 1200 all data deleted, DO values indicate logger out of water

September ba0900

9/21/00 1030 Data logger down for service

October ba1000

10/11/00 1030 - 10/30/00 1700 DO data deleted, post-deployment readings indicate corrupt data

November ba1100

11/29/00 1830 - 11/30/00 2330 DO data deleted, post-deployment readings indicate corrupt data

December ba1200

12/1/00 000 - 12/6/00 430 DO elevated, deleted due to post-deployment data

12/6/00 500 - 12/11/00 1600 no data collected, batteries dead

12/11/00 1630 - 12/31/00 2330 DO data negative, data deleted

12/11/00 1630 - 12/31/00 2330 Turbidity probe failure, data deleted

CHESTNUT NECK

January ne0100

1/1/00 000 - 1/7/00 930 No DO data, probe failure

1/7/00 1000 - 1/14/00 1600 No data. Data logger down for service

1/28/00 - 2/16/00 Estuary frozen

1/28/00 1400 - 1/31/00 2330 No data. Data logger down for service while estuary frozen

February ne0200

2/1/00 000 - 2/16/00 1230 Data logger down for service while estuary frozen

2/10/00 - 2/16/00 Calibration testing

March ne0300

3/2/00 1030 - 3/3/00 1400 Data logger down for service

3/20/00 1300 - 3/21/00 1030 Data logger down for service

April ne0400

4/11/00 0030 - 4/14/00 830 Data logger down for service

May ne0500

5/8/00 1030-1400 Data logger down for service

5/25/00 930-1130 Data logger down for service

June ne0600

6/14/00 1400 - 6/15/00 830 Data logger down for service

July ne0700

7/20/00 1400 this sample appears in two deployments, deleted first occurrence,
NECK0900 (See Section 12 Additional Comments)

August ne0800

8/21/00 930 - 8/31/00 2330 data logger down for service

September ne0900

9/1/00 000 - 9/7/00 830 data logger down for service

9/25/00 800-930 data logger down for service

October ne1000

10/11/00 1500 - 10/13/00 830 data logger down for service

10/26/00 930-1530 data logger down for service

November ne1100

11/9/00 1130 - 11/16/00 1130 data logger down for service

11/30/00 1000-1430 data logger down for service

December ne1200

12/19/00 930 - 12/20/00 1100 data logger down for service

12/27/00 1430 - 12/31/00 2330 data logger down for service

BUOY 126

January b60100

1/1/00 000 - 1/5/00 1600 DO data deleted, membrane punctured

1/14/00 1630-1700, 1800, 1900, 2000-2200, 2300-2330 No data. Internal error

1/15/00 000 - 130, 500, 600, 700 - 1200, 1300 - 1400, 1800 - 1900, 2000 - 2330
No data. Internal error

1/16/00 000 - 030, 130, 800 - 1430, 1530, 1630, 2000 - 2030, 2130, 2230 - 2330
No data. Internal error

1/17/00 000 - 200, 330, 600 - 630, 730 - 1030, 1200, 1400, 1530 - 1700, 1800,
1900 - 2130 No data. Internal
error

1/18/00 200 - 230, 330 - 500, 900, 1000 - 1130, 1230, 1330, 1430 - 1530, 1630 -
2330 No data. Internal error

1/19/00 200, 300 - 530, 630 - 1130, 1230 - 1330 No data. Internal error

1/22/00 000 - 030, 1230 - 1330 No data. Internal error

1/28/00 - 2/16/00 Estuary frozen

1/28/00 430 - 500 No data. Internal error

1/29/00 730 No data. Internal error

1/31/00 2100 Specific conductance (-1.2), salinity (-1.0), DO (238.4%, 36.2
mg/L) removed, internal error probable cause

February b60200

2/4/00 2300 DO value spike (234.6%), data deleted, internal error suspected

2/5/00 030, 2230, 2330 No data. Internal error. All prior times in this
deployment off by 6 seconds.

2/6/00 000-130, 1230-1400 No data. Internal error. All times off by 2 minutes,
18 seconds.

2/6/00 2330 - 2/10/00 No data. Internal error.

2/10/00 - 2/16/00 Calibration testing

2/16/00 - 2/24/00 1230 could not access Buoy 126 to deploy data logger, Rutgers
boat basin frozen

March b60300

None to report

April b60400

4/13/00 1030 - 4/28/00 730 pH values deleted, blue mussels fouled probe

May b60500

None to report

June b60600

None to report

July b60700

7/5/00 200 - 7/6/00 1430 turbidity wiper frayed, data deleted

7/20/00 1500 data logger down for service

August b60800

8/2/00 1600 this sample appears in two deployments, deleted first occurrence, B1261400

8/15/00 1700 - 8/31/00 2330 DO data noisy (62% to 221%), data deleted

September b60900

9/1/00 000-9/14/00 930 DO noisy, indicating puncture (19%-200%), data deleted

9/14/00 1000 this sample appears in two deployments, deleted first occurrence, B1261700

October b61000

None to report

November b61100

11/21/00 1330 data logger down for service

December b61200

12/31/00 530 internal data logger error

13. Additional Comments

On 02/05/2022 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2006, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

** "offset" refers to values not aligning with deployments both before and after deployment in question.**

**"miscalibration" may be the result of diluted standards, caused by dust particles or excess water on probes during calibration, most notable is turbidity calibration in de-ionized water. All calibration readings are recorded on tracking sheet to prevent errors. It is possible that slightly

inaccurate calibrations may still occur.

When a particular sample appears twice, at the end of one deployment and at the beginning of another, the file that most closely resembles the existing trend is the one kept.

Additional sites sampled in the JCNERR in 2000 include Tuckerton Creek, Lake Pohatcong, Mill Run, Little Sheepshead Creek. Tuckerton Creek has been sampled since December of 1998 and it is anticipated that the data logger at this site will provide real time data to the visitors of the historic Tuckerton Seaport when the JCNERR opens its education center in the Seaport during the summer of 2001. Tuckerton Creek is a tidally influenced creek receiving freshwater outflow from nearby Lake Pohatcong, which, much like the Mullica River, is characterized by tannic acids leaching from the surrounding Pine Barrens.

Lake Pohatcong and Mill Run were sampled with YSI data loggers in the spring of 2000 in order to provide additional data for a potential fish stocking program and installation of a fish ladder on Lake Pohatcong. Both sites are fresh water sites having low pH. Results of this study found that in 2000 pH was more favorable for only one of the two anticipated species of stocked river herring. The study also indicated that the 1.4 inches of rain which fell on the watershed over a 5 day period were influential in lowering pH. Additionally, Little Sheepshead Creek has been sampled since 1997 and provides water quality data to compliment long-term ichthyoplankton sampling which has taken place on this creek for the last decade.

The estuary was frozen from January 28, 2000 through February 16, 2000. Data loggers were in the water at the beginning of this weather event. On December 30, 2000, a blizzard affected the JCNERR and all data loggers became inaccessible due to ice. Both times, the ice did not appear to penetrate the depth of the PVC bulkheads securing the data loggers, but did temporarily prevent access to the data loggers. The only suspect data resulting from this event appeared at Lower Bank where negative dissolved oxygen values were recorded. Data is noted as anomalous and was removed from monthly files. Freezing events are reflected in changes in temperature, depth, pH, and at Lower Bank, salinity. The Mullica River and Great Bay thawed before the shallower Rutgers boat basin. The basin remained frozen until February 24 of 2000 and up to that time, prevented access to the Buoy 126 and Little Sheepshead Creek sites.

All data logging units underwent calibration tests February 10-16, 2000 to efficiently make use of the down-time during freezing events. All loggers were placed in the same fiberglass holding tank with flow through circulation of ambient water from the estuary. One unit failed tests (unit #9), and was sent back to YSI for microprocessor replacement. This unit was upgraded in 2000 to PC6600 software. Data from this unit is recorded 52 seconds after each half hour sampling interval

pH values were problematic at Buoy 126 for the year 2000. Three out of four deployments with data logger #6 had pH readings higher than previous and following deployments. The dates for the three problematic deployments are: 3/16-3/29, 6/6-6/20, 8/31-9/14. These observed values may also be the result of sensor drift and/or fouling on pH probes deployed prior to the #6 unit. Inspection of this probe provided no evidence of probe failure. All pH values remain in the monthly files.

On September 25, there was a temporary increase in values of all parameters

measure at Chestnut Neck . The cause of this anomaly undetermined.

From June to November, dissolved oxygen readings at Chestnut Neck appear to drift at the end of all 6 deployments.

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

Lower Bank

3/22/00 200 - 3/31/00 2330 sp. Cond., salinity and pH decline, 3.24" rain on 3/21 and 3/22

4/1/00 000 - 4/17/00 1600 salinity values low, 3.24" rain on 3/21 and 3/22

9/27/00 130 - 9/30/00 23:30 pH, Sp. Cond., and salinity drop dramatically, 3.09 inches of rainfall on 9/25 & 9/26

10/1/00 000 - 10/11/00 1930 salinity, pH, and Sp. Cond. values low due to rain event, 3.09 inches 9/25 & 9/26

Chestnut Neck

3/22/00 300 salinity and pH values decrease, 3.24" rain on 3/21 and 3/22