Chesapeake Bay Maryland (CBM) NERR Water Quality Metadata
March 2003-December 2003
Latest Update: June 30, 2021

I. Data Set and Research Descriptors

1. Principle investigator(s) and contact persons

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2. Entry verification

Raw data were uploaded from the YSI 6600EDS data loggers to a PC, graphs were produced and data were visually examined after each deployment using the EcoWatch software. Data files were then exported from the EcoWatch format into Excel (for Windows 2000) files, where the headers, footers, and inappropriate spaces were removed. Raw data was archived, plotted and suspect data (outliers) or trends noted initially to verify accurate instrument operation for service as needed prior to redeployment. John Zimmerelli and Chris Trumbauer were responsible for these tasks.

Data from each deployment was processed initially using macros in the CDMO cdmomac3.xls program. Steps in the program include procedures which allow users

to automatically format column widths to the correct number of decimal places based on YSI sensor specifications. It also allows users to QA/QC each data logger generated file for missing data points, fill all cells that do not contain data with periods, and find all data points that fall outside the range of what the data logger is designed to measure (outliers). The CDMO import.xls macro allows PC users with 30-minute data to automatically create a monthly Excel file from a two-week deployment and insert periods for missing data. Periods were later removed for data dissemination purposes and left blank. In 2004, John Zimmerelli with the help of Mark Trice at the Department of Natural Resources changed the import macro to allow PC users to import 15-minute data into this form. In addition, in November 1999 a graphing capability was added to this macro allowing users to produce single parameter and missing data point graphs on a monthly basis.

Raw data from successive deployments were merged using the CDMO import.xls macros to produce monthly files. Resulting monthly Excel files at each site (eg. JB0302.xls) consist of continuous data for all variables measured, with a period (.) to denote any missing data. At this point, these data have not been modified except for replacement of missing entries with a period. Data were then processed using the CDMO cdmomac3.xls macros as an initial step in QA/QC procedures to identify outliers, defined simply as values outside the respective sensor specifications. Results are retained as monthly Excel files for each site (eg. JB0302outliers.xls).

The final data processing involved identification and documentation of data points judged to be anomalous (suspect) or erroneous due to extreme natural events or equipment malfunctions using various procedures including recommendations from CDMO Operations Manual Appendix B, YSI 6000 Data Review and Editing Protocol. Anomalous data were retained in cases where no definite reason for deletion was found. Periods during which data were found to result

from equipment malfunctions, failure, tampering or exposure to air by low tides
were identified, times with causes or related observations documented below and
respective data removed or deleted. These resulting edited data and
documentation (metadata) were archived, formatted in comma delimited file format
and submitted to the CDMO for further QA/QC. John Zimmerelli and Katie Diblasi
were responsible for these tasks.

3. Research Objectives
The purpose of the monitoring program at CBM NERR is to conform to the NERR SWMP
monitoring program looking at trends in water quality over both temporal and
spatial scales. Observed effects of water quality, habitats and living resources
in the river channel site and the nearby emergent tidal fresh marshes are being
studied using various comparative field sampling methods with the backdrop of
long term high resolution data from four representative fixed monitoring sites.
Water quality measurements were taken every 15 minutes from April through
December 2003 at the Jug Bay Wetlands Sanctuary (RR) site that conform to
seasonal measurements collected each year since 1995. In 2003, the Patuxent
River Park (PR)site was moved to Mataponi Creek (MC), and the CBM NERR expanded
its water quality component by two (2) stations. These new stations were
installed at Otter Point Creek (OC) and Ironpot Landing (IP), and measurements
were taken every 15 minutes from April through December of 2003.

4. Research methods (YSI dataloggers)

Dataloggers and methods of deployments were replaced and upgraded during 2003
after tests of existing YSI 6000 data loggers and consultation with YSI
technicians determined new dataloggers with upgraded sensor packages to be
more cost effective. Deployment methods were changed considerably in 2003 to
ensure a better quality of data. New deployment apparatus' were constructed out
of 4" diameter PVC pipe and suspended vertically in the water column. 2"
diameter holes were cut into the PVC pipes at 2" intervals to guarantee free
flow of water through the PVC pipe. The pipe was painted with Interlux Micron
Extra w/ Biolux antifouling paint. The pipe was then attached to a 2X4 using

copper plated clevis hangers. The 2X4 was then bolted to a piling with the bottom of the PVC pipe resting on the bottom of the river. A stop bolt was placed 0.25 meters from the bottom of the pipe to keep the YSI instrument at a constant depth. Measurements for temperature, specific conductance, salinity, percent oxygen saturation, dissolved oxygen concentration, water depth, pH, turbidity, and Chlorophyll were recorded every 15 minutes. Deployments ranged from one to three weeks, depending on biofouling intensity (temperature dependent). When a deployment concluded, dataloggers were replaced with newly serviced and calibrated instruments. At the time of replacement two (2) simultaneous overlapping readings were taken between the old and new YSI instruments, as well as an in situ reading with a series 3 Hydrolab sonde. All simultaneous overlapping readings were taken prior to the previously deployed sonde being disturbed in any way. Once retrieved, the sondes are wrapped in a damp towel and placed in a cooler for transport back to the lab. The sondes are then stored in the cooler overnight at the lab, continuing to log data every 15 minutes. DO post-calibration record is taken from this logged data the following morning. Logging is then stopped, and YSI sondes are post calibrated using the same standards as used in the calibration. Deployment data was collected, data was downloaded, archived, and then visually examined. Efforts were made to relate sensor conditions to any apparent outliers or anomalies (eg. battery charge status, or normal DO data at the beginning of a deployment may be distinguished from erroneous data resulting from a known malfunction, such as a punctured DO membrane due to crabs). Data loggers and sensors were cleaned, serviced and calibrated according to the methods described in the YSI Operating Manual and SWMP Operating Procedures. Laboratory calibration procedures were carried out in accordance with the YSI operating manual methods. Standards for turbidity were purchased from YSI. Standards for pH and Chlorophyll were purchased from Fisher Scientific, a YSI approved vendor. Specific conductance standards were prepared in-house, from A.C.S. certified KCl. Data were reviewed

and edited according to the YSI Data Review and Editing Protocol in Appendix B
of the CDMO manual. After cleaning the data loggers, the dissolved oxygen (DO)
membrane were replaced and allowed to stretch for at least 24 hours before
calibration. The pH, specific conductance, depth, turbidity, and chlorophyll
sensors were calibrated using the following methods: 2-point pH 7 and 10,
specific conductance standard of the nearest concentration of river (ranging
from 0.294 mS/cm to 58.64 mS/cm), zeroed depth in the air, 2-point turbidity
standards of 0 (deionized water) and 123 NTUs for the 6136 turbidity sensor, and
2-point chlorophyll standards of 0 (deionized water) and temperature dependant
Rhodamine WT fluorescense standard typically at or near 118 ug/l as Chlorophyll.
The DO sensor was calibrated using the YSI reccommended wet towel method. As a
quality insurance check, YSI datalogger records during sonde deployment and
retrieval are compared to the series 3 Hydrolab instrument. Post-deployment
measurements of all the parameters were recorded before cleaning the data
loggers. Sensors were immersed in the appropriate standard solutions (i.e., pH)
and readings recorded using discreet sampling.

5. Site location and character
The Chesapeake Bay Maryland NERR has three components in Maryland's portion of
Chesapeake Bay. Monie Bay is a mesohaline region on the lower Eastern Shore;
Otter Point Creek is a tidal freshwater tributary of the Bush River; and Jug Bay
is part of the freshwater portion of the Patuxent River. Three (3) of the data
loggers during 2003 were within the Jug Bay component and one (1) logger was in
the Otter Point Creek component.

Mataponi Creek (MC) 38° 44.599'N, 76° 42.446'W (NAD83) or 38.74331667,
-76.70743333 (GIS format)

Site MC is located in a small tributary off the upper tidal headwaters of the
Patuxent River, Maryland. MC is 2.4 km upstream of the mouth, midchannel in
the creek, which is approximately 7m wide. The southern bank is steep and

covered mainly with hardwood trees while the Northern bank is tidal marsh. The sonde was deployed vertically in a perforated PVC pipe. Average depth at this site is roughly 0.7 meters with a mean tidal fluctuation of approximately 0.6 m.. The YSI is deployed 0.25 m off of the creek bottom. Salinities at this site rarely exceed 0.1 ppt. The bottom habitat is soft sediment, and SAV grassbeds are abundant during the summer months. Because this site is located along the main channel of the Mataponi Creek, water quality is reflective of the general quality of water flowing along the main portion of the creek. The SAV community as this site is seasonally very dense and thus water quality is thought to be strongly influenced by the presence of SAV during the summer months.

Railroad Bridge (RR) 38° 46.877'N, 76° 42.822'W (NAD 83) or 38.78128333, -76.7137 (GIS format)

Jug Bay is a 722-acre tidal estuary providing a narrow transition zone between brackish marshes and upland freshwater wetlands. The broad, shallow waters of Jug Bay support a profusion of freshwater plants and animals. Vegetation crowds the river channel and forms an interlaced pattern of tidal and nontidal marshes, swamps and forested wetlands surrounded by upland woods and fields. Site RR is located in the mainstem of the upper tidal headwaters of the Patuxent River, Maryland. The site is slightly upstream (roughly 0.3km) from Jackson's Landing at the Patuxent River Park (previous PR site). This section of the Patuxent river is approximately 70m wide and average depth at the site is 1.4m. The YSI is deployed 0.25 m off of the river bottom. Bottom habitat is soft sediment, and grassbeds are evident in the area during summer months. Mean tidal fluctuation is approximately 0.6 m. Salinity in 2003 ranged from 0.05 - 0.4 ppt. In 2003 this site was moved from 38° 46' 50.6" N, 76° 42' 29.1" W (Jug Bay) to its present location because of the shallow nature of the old site. The new site location (RR) is at the end of the old railroad bed and is deployed

vertically in a perforated PVC pipe near midchannel of the Patuxent River.
Because this site is located along the main channel of the Patuxent River, water
quality is reflective of the general quality of water flowing along the main
portion of the river. The site is roughly 1km downstream of the confluence of
the Western Branch tributary and the Patuxent River Mainstem, thus water quality
is influenced by Western Branch. A large wastewater treatment plant (averaging
10-20 mgd) discharges directly into the Western Branch tributary of the
Patuxent River just upstream of IP.

Iron Pot Landing (IP) 38° 47.760'N, 76° 43.248' W (NAD 83)
or 38.796, -76.7208 (GIS Format)

Site IP is located 2.09km from the mouth of Western Branch. IP is attached
vertically off of a small pier near midchannel of the river and has an average
depth of 1.6m. The YSI is deployed 0.25 m off of the river bottom. The site is
roughly 1km downstream of a large (10-20 mgd) wastewater treatment plant
effluent. The river is approximately 15m wide and flows through extensive
riparian buffers. Both banks of the river are flanked by hardwood flora. Tides
are semi-diurnal and mean tidal fluctuation is approximately 0.6 m. Salinity at
this site is generally 0.1 ppt. Bottom habitat is soft sediment, and grassbeds
are evident during the summer months. This site is part of the NERR build out
and is new for 2003.

Otter Point Creek (OC) 39° 27.047'N, 76° 16.474'W (NAD 83)
or 39.45078333, -76.27456667 (GIS Format)

Otter Point Creek is a tributary of the Bush River in the upper Chesapeake Bay
and consists of 672 acres of open water, tidal marshes, forested wetlands and
upland hardwood forests, surrounded by major highways, large residential
communities, and heavy commercial and industrial development. Site OC is
located approximately 0.3km from the Anita C. Leight Estuary Center. OC is
deployed vertically in a perforated PVC pipe and has an average depth of 0.7m.
The YSI is deployed 0.25 m off of the creek bottom. Bottom habitat is extremely
soft sediment, and grass beds inundate the site during summer months. Salinity

at this station rarely rises above 0.1 ppt. Tides in Otter Point Creek are semi-diurnal and have a mean range of about 0.3 m. The average water levels are generally lower in the winter due to north and northwest winds that increase the egress from Chesapeake Bay. The sonde was periodically exposed to very low tides, and sediments at the site are extremely fine and flocculent. Because of the shallowness of the tidal marsh, coupled with the dramatic daily changes in the depth and width of the stream, deployments at the site presented many problems. These problems included periodic exposure of the sonde, very high turbidity and sedimentation rates associated with tidal infiltration and wind and wave generated resuspension which caused severe fouling of the probes.
Water quality at the site represented extreme shallow water habitats. Thus it is not uncommon to see very large fluctuations in temperature and dissolved oxygen at this site ranging from complete anoxia to full saturation, due in part to the shallow nature of the site and the effects of marsh processes on water quality. Additionally, the site was dominated by dense SAV communities from June-October 2003 and thus water quality conditions were likely influenced by the presence of these macrophytes.

6. Data collection period
Data collection using sondes at Railroad Bridge (Jug Bay Wetlands Sanctuary) (RR) began on April 4, 2003 and continued through December 31, 2003; Mataponi Creek (MTI) began April 22,2003 and continued through December 31, 2003; Iron Pot Landing (IP) began April 4, 2003 and continued through December 31, 2003; and Otter Point Creek (OC) began April 15, 2003 and continued through December 23, 2003.

*Deployment/retrieval times were off by an hour due to data collected in Daylight Savings Times.

Datalogger deployments:

BEGAN	ENDED

(RR) Railroad

04/04/03	13:00:00	04/15/03	10:30:00
04/15/03	10:45:00	04/29/03	07:30:00
04/29/03	07:45:00	05/20/03	08:00:00
05/20/03	08:15:00	06/03/03	10:30:00
06/03/03	10:45:00	06/17/03	08:15:00
06/17/03	08:30:00	07/01/03	06:30:00
07/01/03	06:45:00	07/15/03	07:30:00
07/15/03	07:45:00	07/29/03	08:00:00
07/29/03	08:15:00	08/12/03	08:30:00
08/12/03	08:45:00	08/26/03	09:30:00
08/26/03	09:45:00	09/10/03	07:15:00
09/10/03	07:30:00	09/23/03	08:00:00
09/23/03	08:15:00	10/07/03	08:15:00
10/07/03	08:30:00	10/22/03	08:45:00
10/22/03	09:00:00	11/04/03	10:15:00
11/04/03	10:30:00	11/26/03	09:30:00
11/26/03	09:45:00	12/11/03	10:00:00
12/11/03	10:15:00	12/23/03	09:45:00
12/23/03	10:00:00	12/31/03	23:45:00

(MC) Mataponi Creek

04/22/03	09:30:00	05/06/03	13:15:00
05/06/03	13:30:00	05/28/03	11:15:00
05/28/03	11:30:00	06/10/03	15:15:00
06/10/03	15:30:00	06/24/03	11:00:00
06/24/03	11:15:00	07/08/03	10:45:00
07/08/03	11:00:00	07/22/03	09:45:00
07/22/03	10:00:00	08/05/03	10:00:00
08/05/03	10:15:00	08/19/03	10:45:00
08/19/03	11:00:00	09/02/03	14:00:00
09/02/03	14:15:00	09/23/03	12:00:00
09/23/03	12:15:00	10/07/03	10:30:00
10/07/03	10:45:00	10/22/03	11:15:00
10/22/03	11:30:00	11/04/03	11:45:00
11/04/03	12:00:00	11/13/03	11:30:00
11/13/03	11:45:00	11/26/03	12:30:00
11/26/03	12:45:00	12/11/03	12:00:00
12/11/03	12:15:00	12/23/03	07:45:00
12/23/03	08:00:00	12/31/03	23:45:00

(IP) Iron Pot Landing

04/04/03	14:00:00	04/15/03	12:15:00
04/15/03	12:30:00	04/29/03	08:45:00
04/29/03	09:00:00	05/13/03	09:30:00
05/13/03	09:45:00	05/28/03	10:00:00
05/28/03	10:15:00	06/10/03	12:45:00
06/10/03	13:00:00	06/24/03	09:30:00
06/24/03	09:45:00	07/08/03	09:30:00
07/08/03	09:45:00	07/22/03	08:30:00

07/22/03 08:45:00 08/05/03 09:00:00
08/05/03 09:15:00 08/19/03 09:45:00
08/19/03 10:00:00 09/02/03 13:15:00
09/02/03 13:30:00 09/23/03 10:15:00
09/23/03 10:30:00 10/07/03 09:15:00
10/07/03 09:30:00 10/14/03 09:45:00
10/14/03 10:00:00 10/22/03 09:45:00
10/22/03 10:00:00 11/04/03 11:00:00
11/04/03 11:15:00 11/26/03 11:30:00
11/26/03 11:45:00 12/11/03 11:00:00
12/11/03 11:15:00 12/23/03 08:45:00
12/23/03 09:00:00 12/31/03 23:45:00

(OC) Otter Point Creek

04/15/03 13:30:00 05/08/03 12:15:00
05/08/03 12:30:00 05/21/03 09:45:00
05/21/03 10:00:00 06/04/03 08:30:00
06/04/03 08:45:00 06/18/03 11:45:00
06/18/03 12:00:00 07/02/03 11:30:00
07/02/03 11:45:00 07/16/03 09:00:00
07/16/03 09:15:00 07/30/03 09:45:00
07/30/03 10:00:00 08/13/03 10:15:00
08/13/03 10:30:00 08/27/03 12:00:00
08/27/03 12:15:00 09/02/03 11:00:00
Station pulled for pier reconstruction from 9/2/03 - 10/14/03.
10/14/03 09:00:00 10/29/03 10:45:00
10/29/03 11:00:00 11/12/03 11:15:00
11/12/03 11:30:00 11/25/03 12:00:00
11/25/03 12:15:00 12/09/03 11:15:00
12/09/03 11:30:00 12/23/03 12:30:00
Meter pulled for ice and lack of depth.

7. Distribution

NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from this NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. The data set enclosed within this

package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Section 2.2-1 Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page http://cdmo.baruch.sc.edu/. Data are available in text tab-delimited format, Microsoft Excel spreadsheet format and comma-delimited format.

8. Associated researchers and projects

The Jug Bay Wetlands Sanctuary staff has been collecting weekly to monthly temperature, salinity, dissolved oxygen, and nutrient samples at the same location as the data logger at JB until 2003. The Anita C. Leight Estuary Center at Otter Point Creek, in conjunction with CBNERR/MD staff has also been collecting bi-weekly to monthly temperature, salinity, dissolved oxygen, total suspended solids, chlorophyll a, and nutrient samples at the same location as datalogger OC for 2003. Additional discrete data is also available that provides increased spatial coverage of many of the same parameters around both RR and OC sites for 2003.

II. Physical Structure Descriptors

9. Variable name, range of measurements,

YSI 6600 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
Site definitions: RR = Railroad Bridge (Jug Bay Wetlands Sanctuary); MC = Mattaponi Creek; IP =Iron Pot Landing; OC = Otter Point Creek.

11. Data anomalies (suspect data)
Any data outliers detected using CDMO macros and any data deletions are detailed below. Suspect and outlier data were detected and considered for deletion from the edited data using combination of methods, including ECOWATCH graphical software and CDMO macros. All outliers are detailed below. Any data determined to be due to instrument errors or malfunctions were retained in raw data. Missing data and any intended deletions from edited data were replaced with a period (.) in accordance with CDMO QA/QC guidelines and detailed below. According to the CDMO Operations Manual Version 4.0, depth measurements taken with the non-vented level probe can be influenced by up to 0.39 m (1.3 ft) during some low-pressure hurricane events. Specific dates and time ranges of potentially influenced data are listed with each respective month.

Railroad Bridge
Sonde deployment at RR began 4/4/03 at 13:00:00.

April 2003
Turbidity spikes deleted due to transient material blocking optic.
04/21/2003 00:15:00
04/23/2003 00:45:00
04/27/2003 01:45:00 - 02:00:00

May 2003
Erratic Turbidity data deleted, possibly due to Wiper Malfunction.
05/09/2003 11:45:00 - 05/14/2003 22:15:00

Turbidity spikes deleted due to transient material blocking optic.
05/08/2003 18:15:00
05/08/2003 18:45:00
05/09/2003 05:00:00 - 5:15:00
05/15/2003 03:30:00 - 04:15:00
05/15/2003 12:15:00
05/15/2003 13:00:00
05/15/2003 16:00:00
05/17/2003 09:30:00
05/17/2003 13:00:00
05/17/2003 20:15:00
05/17/2003 22:30:00
05/17/2003 23:00:00
05/18/2003 00:00:00
05/18/2003 01:00:00
05/18/2003 01:30:00
05/18/2003 02:15:00
05/18/2003 07:45:00
05/18/2003 11:00:00
05/18/2003 13:30:00
05/18/2003 21:30:00
05/18/2003 22:15:00
05/19/2003 01:15:00
05/19/2003 08:45:00 - 05/20/2003 08:15:00

Removed the following Turbidity data because wiper fell off during deployment
and fouling interfered with readings.
05/26/2003 08:15:00 - 05/28/2003 09:00:00

Turbidity spike deleted due to transient material blocking optic.
05/31/2003 04:30:00

June 2003

Turbidity spikes deleted due to transient material blocking optic.
06/02/2003 17:30:00
06/02/2003 21:30:00
06/03/2003 06:15:00

Erratic Turbidity data removed, wiper may be blocking optic sensor.
06/14/2003 18:45:00 - 06/17/2003 08:15:00

July 2003
Turbidity spike deleted due to transient material blocking optic.
07/11/2003 20:45:00

August 2003
The following reading was taken with the check sonde, "Cindy." The deployed
meter was out of the water for data retrieval. There is no depth reading for
this data point because the check sonde does not have a depth sensor.
08/19/2003 08:45:00

September 2003
Turbidity spikes deleted due to transient material blocking optic.
09/07/2003 16:45:00

October 2003
The following reading was logged by the check sonde, "Ophelia." The deployed
sonde was out of the water for data retrieval. There is no depth reading for
this data point because the check sonde does not have a depth sensor.
10/01/2003 08:30:00

The pH read 0.25 units high on post-cal on 10/08, and read high by 0.45 units on
the 10/9 in-situ match-up with Hydrolab instrument. Consider pH for this
deployment as suspect.
10/01/2003 08:15:00 - 10/07/2003 08:30:00.

The following readings were logged by the check sonde, "Babs." The deployed
sonde was out of the water for data retrieval. There is no depth reading for
these data points because the check sonde does not have a depth sensor.
10/14/2003 08:15:00 - 08:30:00

The pH in situ matchup on 10/28/2003 is off by 0.4 units from "check" meter and
off 0.3 from Hydrolab. Deleted pH data for entire deployment.
10/22/2003 09:00:00 - 10/28/2003 09:30:00

The following readings were logged with check meter "Babs." The deployed meter
was out of the water for data retrieval. However, the readings are inconsistent
with the rest of the data set and were deleted.
10/28/2003 09:45:00 - 10:00:00

November 2003

DO post-calibration and in-situ matchup reading low by more than 1.0 mg/l. All
DO data deleted for this deployment.
11/04/2003 10:30:00 - 11/13/2003 09:30:00

December 2003
Turbidity spikes deleted due to transient material blocking optic.
12/27/2003 14:00:00

MATAPONI CREEK
Sonde deployment at MC began 4/22/03 at 09:30:00.

April 2003
Instrument out of water for following periods due to extreme low tide.

04/23/2003 16:00:00 - 04/23/2003 19:00:00
04/24/2003 04:45:00 - 04/24/2003 06:00:00
04/24/2003 17:00:00 - 04/24/2003 19:00:00
04/28/2003 21:30:00 - 04/28/2003 22:00:00
04/29/2003 21:45:00 - 04/29/2003 23:30:00

Turbidity spikes deleted due to transient material blocking optic.
04/23/2003 16:30:00
04/23/2003 18:45:00

May 2003
Negative depths retained in data set for month of May because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.
(Depth Not Vented)

DO probe malfunction at 09:15 on 5/6. Deleted DO data after this date.

5/6/2003 9:15:00 - 5/6/2003 12:45:00

Sonde logged no data due to software error (version "pre-2.20.")
5/6/2003 13:00:00 - 5/13/2003 11:00:00

Instrument out of water for following periods due to low water.

5/13/2003 18:30:00 - 5/13/2003 22:15:00
5/14/2003 8:30:00 - 5/14/2003 11:00:00
5/14/2003 20:45:00 - 5/14/2003 22:30:00

Turbidity spikes deleted due to transient material blocking optic.
5/26/2003 09:15:00

June 2003
Negative depths retained in data set for month of June because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.

(Depth Not Vented)

Meter was out of water for period of time due to extreme low tide

6/1/2003 22:00:00 - 6/2/2003 1:00:00

Turbidity spikes deleted due to transient material blocking optic.
6/14/2003 0:15:00

July 2003
Negative depths retained in data set for month of June because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.
(Depth Not Vented)

August 2003
Following record taken from check meter, check meter does not have depth sensor.
8/12/2003 11:15:00

pH outlier removed
8/12/2003 11:15:00

September 2003
Instrument appears to be out of water during following interval

9/18/2003 08:45:00 - 9/18/2003 22:30:00

Anomalous DO spike in data on 09/02/2003 14:30:00 was deleted. Reason for spike
unknown.

October 2003
Negative depths retained in data set for month of October because salinity
showed meter to be in water, possibly changes in pressure caused negative readings. (Depth Not Vented)

In-situ match-up readings on 10/14/03 exhibit high deviation from check meter
and Hydrolab instrument. It is likely due to variation in depth rather than
instrument malfunction. SAV beds at sight make it difficult to put YSI, check
YSI, and Hydrolab at same depth. Data retained but should be considered suspect.
10/14/03 12:30:00

Following record logged by check meter (Babs), meter does not have depth sensor.
10/14/2003 11:30:00

pH reading low in post-cal and in-situ matchups. pH data deleted for the

following dates and times.
10/14/2003 11:30:00 - 10/22/2003 11:45:00

Instrument out of water, data deleted:
10/28/2003 11:30:00

November 2003
Negative depths retained in data set for month of November because salinity
showed meter to be in water, possibly changes in pressure caused negative readings. (Depth Not Vented)

December 2003
Negative depths retained in data set for month of December because salinity
showed meter to be in water, possibly changes in pressure caused negative readings. (Depth Not Vented)

Turbidity spikes deleted due to transient material blocking optic.
12/2/2003 20:00:00 - 20:15:00
12/17/2003 20:30:01

turbidity post-cal was reading low by >10% - data deleted.
12/11/2003 12:30:00 - 12/23/2003 8:00:00

IRON POT LANDING
Sonde deployment at IP began 4/4/03 at 14:00:00. Step changes in depth were evident
throughout the deployment year because depth was not calibrated to zero and a non-
vented depth probe was in use as opposed to a vented depth probe which was unavailable.

April 2003
None

May 2003
Turbidity spikes deleted due to transient material blocking optic.
05/12/2003 09:00:00 - 05/12/2003 11:45:00

Turbidity matchup for retrieval of the sonde on 5/28/03 is off. Determined the
approximate point where upward drift started and deleted all subsequent data for
that deployment.
05/23/2003 11:00:00 - 05/28/2003 10:15:00

Depth measurements were lower than normal after deployment on 5/28 10:30 through 6/3 1230.
Sonde appeared to be in the water during this time.

June 2003
Depth measurements were lower than normal after deployment on 5/28 10:30 through 6/3 1230.
Sonde appeared to be in the water during this time.

The following negative depth readings were removed. The data recorded at these
times was not deleted because the meter was not out of the water. There may
have been something blocking the depth sensor.
06/03/2003 12:30:00 - 12:45:00

Depth measurements suddenly spiked after deployment on 6/3 12:45 through 6/3 1415 but
returned. Sonde appeared to be in the water during this time.

Turbidity spikes deleted due to transient material blocking optic.
06/14/2003 08:45:00
06/16/2003 00:45:00 - 06/17/2003 09:45:00
06/20/2003 04:45:00
06/20/2003 10:00:00

July 2003
Erratic Turbidity data removed, likely due to wiper malfunttion.
07/01/2003 11:00:00
07/07/2003 00:30:00 - 07/07/2003 23:45:00

Turbidity spikes deleted due to transient material blocking optic.
07/20/2003 14:30:00 - 07/22/2003 08:45:00

August 2003
Erratic Turbidity data deleted. Could be wiper malfunction or something caught
on probe or wiper.
08/04/2003 15:15:00 - 08/05/2003 09:30:00

The following reading was taken from check sonde. The deployed meter was out of
the water for data retrieval. The check sonde used was "CINDY," which does not
have a depth sensor. Therefore, we do not have a depth reading for this data
point.
08/12/2003 10:00:00

Turbidity spikes deleted due to transient material blocking optic.
08/22/2003 02:30:00
08/30/2003 01:15:00

Datalogger out of the water for the following dates and times. Data deleted.
08/26/2003 11:30:00

September 2003
Erratic Turbidity data removed. Likely something caught on probe or wiper is
blocking optic.
09/22/2003 00:00:00 - 09/23/2003 10:30:00

October 2003
The following reading was logged with check meter "Ophelia." The deployed meter
was out of the water for data retrieval. No Depth recorded for this data point.
10/01/2003 10:00:00

DO membrane punctured. The following DO data set deleted.
10/07/2003 09:30:00 - 10/14/2003 09:45:00

Drop in dissolved oxygen on 10/20/2003 18:30:00 (13.7%). Data suspect, but
retained.

Check sonde (BABS) in water for the following 2 readings. The deployed sonde
was out of the water for data retrieval. "Babs" does not have a depth sensor,
so there are no depth readings for these intervals.
10/14/2003 10:00:00 - 10:15:00

The deployed sonde, "HeMan," had a bad DO membrane, so it was not redeployed.
The check sonde could not be deployed immediately because it was needed for
other sites. "Babs" was returned at Iron Pot Landing at the end of the field
day. It was re-deployed at 12:30:00. Thus there is no data for the following
period:
10/14/2003 10:00:00 - 12:15:00

Turbidity spikes deleted due to transient material blocking optic.
10/16/2003 00:15:00
10/16/2003 01:30:00
10/17/2003 04:30:00
10/18/2003 01:15:00
10/18/2003 18:00:00
10/19/2003 17:30:00
10/30/2003 05:00:00

Sonde was out of water for the following reading. Data was recorded with check
sonde, but determined to be anomolous. All parameters were removed for the
following sates/times:
10/28/2003 12:45:00

No Depth data recorded for the following period because we had to deploy a
backup sonde because the DO membrane was punctured on the deployed meter. The
backup sonde ("Babs") had no depth sensor.
10/14/03 12:30:00 - 10/22/03 10:00:00.

November 2003
No data logged for the following intervals. Sonde not set to log.
11/13/2003 11:00:00 - 11:15:00

December 2003
Turbidity spikes deleted due to transient material blocking optic.
12/11/2003 08:45:00
12/12/2003 00:30:00
12/14/2003 00:00:00

OTTER POINT CREEK
Sonde deployment at OC began 4/15/03 at 13:30:00.

April 2003
Instrument out of water for following periods due to extreme low tide.

4/17/2003 01:30:00 - 04:00:00
4/17/2003 14:30:00 - 16:45:00
4/23/2003 08:00:00 – 09:15:00
4/23/2003 21:30:00 - 21:45:00

Turbidity spikes deleted due to transient material blocking optic.
4/15/2003 16:15:00

Turbidity spikes deleted due to transient material blocking optic.
04/30/2003 02:00:00

May 2003
Negative depths retained in data set for month of May because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.
(Depth Not Vented)

Instrument out of the water for following readings due to extreme low tide
5/13/2003 22:45:00 - 5/14/2003 1:15:00
5/22/2003 07:00:00 - 5/22/2003 08:30:00

June 2003
Negative depths retained in data set for month of June because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.
(Depth Not Vented)

Instrument out of the water for following readings due to extreme low tide
6/1/2003 14:30:00 - 6/2/2003 0:15:00

Erratic Turbidity data removed. Likely something caught on probe or wiper is
blocking optic.
6/20/2003 13:30:00 - 6/28/2003 01:15:00
6/29/2003 01:45:00 - 03:15:00
06/30/2003 18:00:00

July 2003
Negative depths retained in data set for month of July because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.
(Depth Not Vented)

Erratic Turbidity data removed. Likely something caught on probe or wiper is
blocking optic.
7/1/2003 16:30:00 - 17:30:00

August 2003
Negative depths retained in data set for month of August because salinity showed
meter to be in water, possibly changes in pressure caused negative readings.
(Depth Not Vented)

Turbidity spikes deleted due to transient material blocking optic.
8/10/2003 05:15:00

Instrument out of water due to extreme low tide.
8/20/2003 12:30:00

September 2003
Station pulled for pier reconstruction. No data during following period:
9/2/2003 10:15:00 - 09/30/2003 23:45:00

October 2003
Negative depths retained in data set for month of October because salinity
showed meter to be in water, possibly changes in pressure caused negative readings. (Depth Not Vented)

Station pulled for pier reconstruction. No data during following period:
10/01/2003 00:00:00 - 10/14/2003 08:45:00

Instrument out of water during extreme low tides. Following records removed.
10/17/2003 06:30:00 - 11:00:00

10/17/2003 16:45:00 - 21:30:00
10/18/2003 07:45:00 - 10:30:00
10/22/2003 09:15:00 - 16:00:00
10/22/2003 20:00:00 - 10/23/2003 02:45:00
10/23/2003 11:15:00 - 13:30:00

Sonde out of water for data retrieval, data inserted from check sonde "Cindy."
10/21/2003 09:30:00

November 2003
Negative depths retained in data set for month of November because salinity
showed meter to be in water, possibly changes in pressure caused negative readings. (Depth Not Vented)

Data deleted during extreme low tides when sonde was out of the water.

11/8/2003 12:45:00 - 16:30:00
11/9/2003 01:15:00 - 5:00:00
11/13/2003 16:45:00 - 11/14/2003 21:45:00
11/15/2003 04:00:00 - 11/15/2003 21:30:00
11/16/2003 07:30:00 - 08:45:00
11/20/2003 11:00:00 - 13:15:00
11/29/2003 15:45:00 - 21:45:00
11/30/2003 06:15:00 - 10:15:00
11/30/2003 18:30:00 - 22:30:00

December 2003
Negative depths retained in data set for month of December because salinity
showed meter to be in water, possibly changes in pressure caused negative readings. (Depth Not Vented)

Turbidity spikes deleted due to transient material blocking optic.
12/8/2003 20:15:00
12/05/2003 12:00:00 - 13:00:00
12/05/2003 13:30:00
12/06/2003 01:00:00 - 01:15:00

Following data deleted - instrument out of water during extreme low tides.
12/1/2003 07:30:00 - 13:45:00
12/1/2003 16:15:00 - 12/2/2003 3:00:00
12/2/2003 06:45:00 - 12/3/2003 14:30:00
12/5/2003 10:45:00 - 11:00:00
12/6/2003 02:00:00 - 14:30:00
12/7/2003 00:45:00 - 16:45:00
12/13/2003 05:15:00 - 08:00:00
12/13/2003 13:45:00 - 18:15:00
12/17/2003 08:15:00 - 10:00:00
12/19/2003 09:15:00 - 12:00:00
12/19/2003 23:15:00 - 12/20/2003 00:15:00
12/20/2003 10:30:00 - 12:30:00

12/23/2003 01:15:00 - 04:45:00

Depth data deleted due to possible influence of freezing temperatures resulting
in ice formation on depth sensor.
12/21/2003 01:45:00 – 04:30:00

Turbidity spikes deleted due to transient material blocking optic.
12/13/2003 04:30:00 - 05:00:00

12) Missing data
Missing data are denoted by a period in the data set. Periods were later removed
for data dissemination purposes and left blank. Data are missing due to equipment failure where no probes were deployed, maintenance/calibration of
equipment, elimination of obvious outliers or elimination of data due to calibration problems (both pre and post). For more details on deleted data, see
the Data Anomalies Section. To find out more details about missing data, contact the Research Coordinator at the site submitting the data.

For the following deployments, the dataloggers were not equipped with depth
sensors, therefore depth data was not collected:
Site MC 11/04/2003 12:15:00 – 11/13/2003 11:45:00
Site IP 04/08/2003 10:00:00 – 04/15/2003 12:30:00

13) Post Deployment Information
End of deployment Post-calibration Readings in Standard Solutions:
na = no data available for that particular standard

RR:

Date	SpCond	DO	pH	Turb	Depth
mm/dd/yy	ms/cm	Air Sat		NTU	m
`	Std:0.294	Std: 100%	Std:7.0/10.0	Std:0/123.0	Std:0(air)
4/16/03	0.298	101.2	7.09/10.00	0.3/121.9	na
5/1/03	0.290	99.4	7.07/10.05	0.7/122.0	na
5/21/03	0.500	104.9	6.98/9.94	-0.5/111.5	na
6/4/03	0.305	101.0	7.00/9.95	0.2/125.6	na
6/20/03	0.287	104.7	7.05/10.09	0.8/128.0	na
7/2/03	0.297	100.1	7.03/10.03	0.3/109.3	na
7/17/03	0.288	100.4	7.00/10.06	1.7/124.1	na
8/01/03	0.301	100.9	7.05/10.01	-.07/105.4	na
8/15/03	0.302	110.3	7.07/9.95	0.4/127.8	na
	Std:0.720				
8/28/03	0.704	101.8	6.96/10.04	0.9/127.6	na
9/11/03	0.743	108.4	7.03/9.98	2.0/126.3	na
	Std:0.294				
9/24/03	0.293	103.2	7.04/10.01	2.6/119.4	na

10/8/03	0.295	101.5	7.19/10.18	-1.0/119.1	na
10/23/03	0.288	93.6	7.06/10.04	1.1/88.4	na
11/5/03	0.298	101.7	7.05/10.01	0.2/123.4	na
11/27/03	0.306	100.8	7.05/10.10	1.4/123.2	na
12/12/03	0.279	101.3	7.08/10.04	0.0/117.8	na
12/30/03	0.296	103.7	7.02/10.01	0.6/116.0	na
1/8/04	0.292	100.9	7.01/10.03	-0.2/113.5	na

MC:

Date mm/dd/yy	SpCond ms/cm Std:0.294	DO Air Sat Std: 100%	pH Std:7.0/10.0	Turb NTU Std:0/123.0	Depth ` Std:0(air) m
5/14/03	0.292	122.5	7.06/10.06	-0.2/118.0	na
5/30/03	0.306	94.4	7.02/9.99	0.1/121.2	na
6/12/03	0.292	98.2	7.05/10.01	4.0/126.0	na
6/27/03	0.302	103.8	6.96/9.96	1.0/123.0	na
7/10/03	0.284	101.7	7.03/10.04	2.1/125.3	na
7/25/03	0.367	100.7	7.00/10.07	-0.9/120.3	na
8/7/03	0.290	100.5	6.98/9.99	0.1/125.4	na
8/21/03	0.302	106.2	7.00/9.87	0.8/126.0	na
9/3/03	0.300	102.3	7.02/9.93	3.3/123.3	na
9/24/03	0.292	103.5	6.90/9.55	-0.6/123.2	na
10/8/03	0.301	99.4	7.04/10.06	1.5/128.4	na
10/23/03	0.290	101.4	6.75/9.35	2.1/113.4	na
11/05/03	0.303	98.8	7.02/10.02	-2.5/120.7	na
11/13/03	0.296	103.5	7.00/10.00	0.1/124.4	na
11/27/03	0.319	105.9	7.08/10.04	1.2/123.2	na
12/12/03	0.299	101.9	6.99/9.97	-0.4/117.8	na
12/31/03	0.291	103.8	7.03/10.02	-0.4/104.9	na
1/8/04	0.298	103.8	7.07/10.08	-0.2/112.2	na

IP:

Date mm/dd/yy	SpCond ms/cm Std:0.294	DO Air Sat Std: 100%	pH Std:7.0/10.0	Turb NTU Std:0/123.0	Depth ` Std:0(air) m
4/16/03	0.300	116.5	7.13/10.03	0.7/123.2	na
5/1/03	0.290	97.7	7.06/10.05	0.5/122.7	na
5/14/03	0.300	105.6	7.01/10.00	0.2/122.8	na
5/30/03	0.300	101.4	7.03/10.00	0.6/121.8	na
6/12/03	0.310	80.5	7.10/10.10	4.6/124.6	na
6/27/03	0.291	100.6	6.99/10.02	1.1/123.3	na
7/10/03	0.287	99.7	6.99/10.01	6.9/125.6	na
7/25/03	0.313	99.2	na (probe broken)	0.7/121.0	na
8/08/03	0.284	100.5	7.02/9.99	0.6/123.9	na
8/21/03	0.302	96.3	6.99/9.97	0.5/126.3	na
9/3/03	0.296	99.5	7.07/10.10	0.9/123.7	na
9/24/03	0.287	101.8	7.02/9.96	0.2/122.8	na
10/8/03	0.298	104.0	7.02/10.03	0.4/127.4	na
10/17/03	0.295	-4.9	7.04/10.06	0.2/120.6	na

Std:6.668

10/23/03	6.607	100.4	6.98/10.101	4.1/121.9	na
	Std:0.294				
11/5/03	0.293	99.4	7.04/10.06	1.1/123.9	na
11/27/03	0.304	105.6	7.01/10.03	1.5/123.4	na
12/12/03	0.303	103.1	7.00/9.97	0.4/116.7	na
12/31/03	0.297	102.8	na (probe broken)	2.0/117.0	na
1/8/03	0.295	104.7	7.00/10.00	1.0/113.3	na

OC:

Date	SpCond	DO	pH	Turb	Depth
mm/dd/yy	ms/cm	Air Sat		NTU	m
`	Std:0.294	Std: 100%	Std:7.0/10.0	Std:0/123.0	
	Std:0(air)				
5/9/03	0.289	98.4	7.07/10.06	0.3/121.7	na
5/22/03	0.293	100.6	7.00/10.00	0.2/122.0	na
6/6/03	0.302	99.6	7.05/9.98	0.7/123.8	na
6/19/03	0.282	101.4	6.98/10.07	3.2/122.8	na
7/3/03	0.300	103.8	7.03/10.00	1.7/119.2	na
7/17/03	0.290	102.6	7.05/10.05	1.0/123.7	na
8/01/03	0.301	101.4	7.00/10.03	0.2/123.7	na
8/14/03	0.299	101.5	7.05/10.06	0.8/126.5	na
8/28/03	0.295	107.3	6.97/10.02	-0.2/133.4	na
9/3/03	0.289	101.5	7.06/10.00	0.3/122.3	na
10/30/03	0.292	98.5	7.06/10.10	0.4/131.7	na
11/13/03	0.298	101.7	7.04/10.01	-0.3/122.2	na
11/27/03	0.304	101.3	6.94/9.93	1.9/122.8	na
12/10/03	0.307	102.8	7.00/10.01	-0.4/120.1	na
12/31/03	0.287	99.4	7.01/9.98	2.0/118.2	na

14) Other Remarks/Notes

On 06/30/2021 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.

Hurricane Isabel swept through the area on September 19, 2003 influencing water

quality data, especially depth, for all sites.

Iron Pot Landing:
The following turbidity data point was found as an outlier by the NERR macro,
but was not deleted. The high turbidity value was a result of a rain event.
There may have been a sewage overflow upstream. Turbidity values did not return
to under 50 NTU until 6/28/2003 at about 14:00:00.
6/27/2003 19:45:00