Chesapeake Bay Maryland (CBM) NERR Water Quality Metadata
January – December, 2024
Latest Update: April 21, 2025

Note: This is a provisional metadata document; it has not been authenticated as of its download date. Contents of this document are subject to change throughout the QAQC process and it should not be considered a final record of data documentation until that process is complete. Contact the CDMO (cdmosupport@baruch.sc.edu) or reserve with any additional questions.

I. Data Set and Research Descriptors

1) Principal investigator(s) and contact persons –

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2) Entry verification –

Deployment data are uploaded from the YSI data logger to a personal computer with Windows 7 or newer operating system. Files are exported from KOR Software in a comma separated file (CSV) 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. CBM NERR applies codes to data that are out of water due to low water depth, data obtained from sensors that malfunctioned/broke/post-calibrated out of range, data skewed by heavy biofouling, and data that appear as anomalous "spikes." To objectify what qualifies as a spiked data point and decrease the inherent subjectivity of such determinations, a data point is coded

as a blocked optic or turbidity/chlorophyll spike if it is at least three times greater than both its preceding and following values. Other anomalous data are coded with the appropriate code as well as a "see metadata" code to further explain their exclusion from the dataset. 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. Lauren Cunningham is responsible for data management at CBM NERR.

3) Research objectives –

One of the objectives of the monitoring program at CBM NERR is to conform to the NERR System Wide Monitoring Program (SWMP) where the overall goal is a long-term dataset providing baseline water quality information capable of tracking trends and identifying changes in water quality over temporal and spatial scales. In addition to the aforementioned NERR-wide research objectives, reserve-specific objectives include understanding how anthropogenic activities affect water quality and examining the effects of submerged macrophyte communities on water quality. To accomplish this, monitoring sites were selected that characterize the variety of habitat and water quality conditions existing at two of the three components that make up the CBM NERR, the Jug Bay and Otter Point Creek components. At the Jug Bay component, three sites were selected that span the range of conditions thought to be typical of this site. These sites include a reference site, an impaired site and a mainstem site; where the reference site is thought to have little anthropogenic-induced effect on water quality, an impaired site where anthropogenic activities strongly influence local water quality, and a mainstem site thought to be highly representative of mainstem water quality conditions at the Jug Bay component. The fourth site is located at the Otter Point Creek component, a much smaller component, and is thought to represent typical water quality conditions at this site. All four sites span the range of habitat conditions at these components to include varying abundances of submerged macrophyte communities as well as varying depth and energy regimes from shallow tidal creeks to proportionately deep tidal river systems to shallow open water embayments. Additional monitoring, outside the scope of this effort, is being done at all three components: Jug Bay, Otter Point Creek, and Monie Bay. These efforts use comparable field sampling methods, with high spatial resolution, to better understand the spatial variability between and around the sites monitored in this effort.

4) Research methods –

Water quality measurements were taken every 15 minutes from January through June 2024 at each station, weather permitting. One YSI EXO2 data logger is deployed at each station. All data are recorded in Eastern Standard Time. When a datasonde is retrieved, another datasonde is deployed at the same time to ensure a continuous dataset. During transport to and from the sampling sites, dataloggers are placed horizontally in a cooler with a damp towel. The cooler lid is kept slightly ajar, allowing the datalogger to be in equilibrium with the ambient barometric pressure.

Deployment apparatuses are constructed out of 4" diameter PVC pipe and suspended vertically in the water column. 2" diameter holes are cut into the PVC pipes at 2" intervals to guarantee free flow of water through the PVC pipe. The pipes are painted with Trinidad SR antifouling paint. The pipe is attached to a 2x4, also painted with antifouling paint, using two copper plated clevis hangers, one above the surface of the water and another towards the bottom of the 2x4 where it is submerged in the water. The 2x4 is bolted to a piling with the bottom of the PVC pipe just resting on the bottom of the riverbed. A stop bolt is inserted horizontally through the PVC pipe at a height of 0.25 meters from the bottom of the pipe to keep the YSI instrument at a constant depth above bottom.

Measurements for temperature, specific conductance, salinity, percent oxygen saturation, dissolved oxygen concentration, water depth, pH, turbidity, and chlorophyll fluorescence are recorded every 15 minutes. Deployments range from two to four weeks, depending on biofouling intensity (temperature dependent) and availability of field personnel. When a deployment concludes, YSI dataloggers are replaced with newly serviced and calibrated instruments. At the time of replacement, one (1) or two (2) simultaneous 15-minute overlapping readings are taken between the old and new YSI instruments, as well as an in situ reading with a YSI EXO1 sonde in order to provide a QA/QC check of the old and new instruments. All simultaneous overlapping readings are taken prior to

the previously deployed sonde being disturbed in any way. Once retrieved, the sondes are placed in a cooler with a damp towel for transport back to the lab. The sondes are then placed in a bucket with 100% air-saturated water, continuing to log data every 15 minutes. DO post-calibration record is taken from this logged data either the same day or within the following three days, using the current barometric pressure reading from a mercury barometer. Logging is then stopped, and YSI sondes are post calibrated using the same standards as used in the calibration.

Deployment data are collected, and data are uploaded onto a PC, archived, and then put through a QA/QC process. Efforts are made to relate sensor conditions to any apparent outliers or anomalies (e.g., any biofouling present, wiper malfunctions, optical shorts, etc.). Data are reviewed and edited according to the YSI Data Review and Editing Protocol in Appendix B of the CDMO manual. Data loggers and sensors are cleaned, serviced, calibrated, and post-calibrated according to the methods described in the YSI Operating Manual and SWMP Operating Procedures. Laboratory calibration procedures are carried out in accordance with the YSI Operating Manual methods. A polymer-based turbidity standard is purchased from YSI (part #607300). Standards for pH (7 and 10 buffers) and Chlorophyll (Rhodamine WT) are purchased from Fisher Scientific, a YSI approved vendor. Specific conductance standards are prepared in-house, from A.C.S. certified KCl and reverse osmosis deionized water. The pH, specific conductance, depth, turbidity, and chlorophyll sensors are calibrated using the following methods: 2-point pH 7 and 10, specific conductance standard to the nearest concentration of river (with the following standards 6.668 mS/cm and 24.82 mS/cm), pressure-dependent depth in the air, 2-point turbidity standards of 0 (deionized water) and 124 NTUs, 2-point chlorophyll standards of 0 (deionized water) and temperature-dependent Rhodamine WT standard. The DO sensor is calibrated using the YSI recommended aerated water in a bucket method. Sensors are immersed in the appropriate standard solutions (e.g., pH) and readings recorded using discrete sampling. As a quality assurance check, YSI datalogger records during sonde deployment and retrieval are compared to the YSI EXO1 instrument. Post-deployment measurements of all the parameters are recorded before cleaning the data loggers.

Because chlorophyll fluorescence data is collected *in vivo* there is an inherent loss of accuracy due to lack of disruption of the cells and subsequent extraction of chlorophyll, possible interference from other fluorescent organisms, and the inverse effects of temperature and light. Chlorophyll data should be used only as estimates of chlorophyll activity, not as accurate quantitative measurements. These limitations are reduced by following calibration and Rhodamine WT standard protocol according to the YSI Operating Manual. Chlorophyll data are considered as accurate as possible when matchup readings correlate and post-calibration is within range of the temperature-dependent standard, suggesting there was no sensor drift in readings during the deployment. For more accurate chlorophyll measurements contact the Research Coordinator for the extractive analysis data obtained from field grab samples.

A Storm3 logger and GOES V2 satellite transmitter unit was installed at the Railroad Bridge (RR) station on 9/22/2022 that transmits data to the NOAA GOES satellite, NESDIS ID # 3B00629C. A Storm3 logger and GOES V2 satellite transmitter unit was installed at the Otter Point Creek (OC) station on 8/4/2022 that transmits data to the NOAA GOES satellite, NESDIS ID # 3B03D61C. The transmissions are scheduled hourly and contain four (4) datasets 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 www.nerrsdata.org.

5) Site location and character –

[Instructions/Remove: Describe your NERR site in general and the sampling sites associated with each YSI data logger. If you have a surface station, include whether this is a floating or fixed sonde deployment and what the depth from this station represents. If it is a fixed depth, note the approximate offset that can be applied to convert to a depth from the bottom. Include the following table, one for *each site,* to describe the sampling locations.]

The Chesapeake Bay Maryland NERR is comprised of three components, Otter Point Creek, Jug Bay, and Monie Bay, which are scattered throughout the Maryland portion of the Chesapeake Bay. All three components are thought to represent the diverse semi-diurnal estuarine environments of the Maryland portion of the Chesapeake Bay.

Otter Point Creek is a shallow, open water embayment located in the tidal headwaters of the Bush River on the Upper Western Shore of the Chesapeake Bay. Otter Point Creek is the smallest and proportionately shallowest of the three components 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. The watershed draining into Otter Point Creek is rapidly being developed and urbanized. As a result, sediments are rapidly accreting into the marsh and are very fine and flocculent resulting in typically high turbidity when submerged macrophytes are not present. The non-native *Hydrilla verticillata* submerged macrophyte invaded the marsh in 2002 and has colonized most bottom substrates less than one half meter depth at low tide. There is one station (OC) located at the Otter Point Creek component.

Jug Bay is located in the upper tidal reaches of the Patuxent River and represents a river dominated by tidal freshwater marsh with expansive emergent vegetation communities. The Patuxent River is located on the western shore of the Chesapeake Bay and drains highly urbanized areas of the Washington Metropolitan area. 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. Emergent and submerged vegetation crowd the river channel and form an interlaced pattern of tidal and nontidal marshes, swamps and forested wetlands surrounded by upland woods and fields. The component has deep water river dominated areas (>10m depth) as well as an extensive shallow water (<1m depth) network of tidal creeks and flooded mud flats. Submerged macrophytes are persistent along the shoreline of these creeks and are extensive within the flooded mud flats and the emergent marshes. There are three stations (MC, RR, IP) located at the Jug Bay Component.

Monie Bay is located on the lower Eastern Shore of the Chesapeake Bay at the mouth of the Wicomico River. The Monie Bay Component represents a mesohaline bay with primarily three tidal creeks representing a variety of agricultural input. The local area is largely undeveloped with varying agriculture and rural residential land use. The component is dominated by salt marshes with tidal fresh marshes in the upper tidal reaches of the tributaries. Shallow water habitats give way to fringing submerged macrophyte communities. One monitoring site (MB) is located within this component. MB is a secondary site, established effective January 1, 2020. Non SWMP compliant data had been collected starting 2006 but not submitted to the CDMO and may be obtained directly from the reserve.

The following are tables for each of the 5 sites with site characteristics:

Site name	**Railroad Bridge (RR)**
Latitude and longitude	38° 46.877'N, 76° 42.822'W (NAD 83) 38.78128333, -76.7137 (GIS format)
Tidal range *(meters)*	Mean tidal fluctuation is approximately 0.6 m.
Salinity range *(psu)*	Salinities are typically less than 1 ppt at this site throughout the year.
Type and amount of freshwater input	USGS streamflow for the closest gauge (Latitude 38°57'21.3"N, Longitude 76°41'37.3"W NAD83): yearly mean of approximately 350 – 430 cfs.
Water depth (*meters, MLW*)	Estimate: 1.2m
Sonde distance from bottom (*meters*)	The YSI is deployed 0.25 m off of the river bottom.
Bottom habitat or type	Bottom habitat is soft sediment, and grassbeds are evident in the area during summer months.
Pollutants in area	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 the Western Branch. A large wastewater treatment

	plant (averaging 20 mgd) discharges directly into the Western Branch tributary of the Patuxent River just upstream of IP.
Description of watershed	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 2002). This section of the Patuxent River is approximately 70m wide and average depth at the site is 1.4m. 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. 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.

Site name	**Iron Pot Landing (IP)**
Latitude and longitude	38° 47.760'N, 76° 43.248' W (NAD 83) 38.796, -76.7208 (GIS Format)
Tidal range *(meters)*	Mean tidal fluctuation is approximately 0.6m
Salinity range *(psu)*	Salinity at this site is generally 0.1 ppt.
Type and amount of freshwater input	USGS streamflow closest gauge (Latitude 38°48'51.2"N, Longitude 76°44'55.4"W NAD83): yearly mean of approximately 100 – 130 cfs
Water depth (*meters, MLW*)	Estimate: 1.2m
Sonde distance from bottom (*meters*)	The YSI is deployed 0.25 m off the river bottom.
Bottom habitat or type	The bottom habitat is soft sediment, and grassbeds are evident during the summer months.
Pollutants in area	The site is roughly 1km downstream of a large (20 mgd) wastewater treatment plant effluent. The treatment plant discharges about 15-30 cfs.
Description of watershed	Site IP is located 2.09km from the mouth of Western Branch. The river is approximately 15m wide and flows through extensive riparian buffers. Both banks of the river are flanked by hardwood flora.

Site name	**Mataponi Creek (MC)**
Latitude and longitude	38° 44.599'N, 76° 42.446'W (NAD83) 38.74331667, -76.70743333 (GIS format)
Tidal range *(meters)*	Mean tidal fluctuation of approximately 0.6 m
Salinity range *(psu)*	Salinities at this site rarely exceed 0.1 ppt
Type and amount of freshwater input	Freshwater inputs are not quantified. No USGS gauge for streamflow is available.
Water depth (*meters, MLW*)	Estimate: 0.2m
Sonde distance from bottom (*meters*)	The YSI is deployed 0.25m off the creek bottom.

Bottom habitat or type	The bottom habitat is soft sediment. Grassbeds of SAV were historically abundant during the summer months, but coverage has declined drastically in the past 3-4 years. The SAV community at this site was seasonally very dense and thus water quality was thought to be strongly influenced by the presence of SAV during the summer months.
Pollutants in area	Any pollutants would most likely be due to agricultural runoff.
Description of watershed	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. Because this site is located along the main channel of Mataponi Creek, water quality is reflective of the general quality of water flowing along the main portion of the creek.

Site name	**Otter Point Creek (OC)**
Latitude and longitude	39° 27.047'N, 76° 16.474'W (NAD 83) 39.45078333, -76.27456667 (GIS Format)
Tidal range *(meters)*	Mean tidal fluctuation is 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.
Salinity range *(psu)*	Salinity at this station rarely rises above 0.1 ppt.
Type and amount of freshwater input	USGS streamflow for the closest gauge (Latitude 39°26'21.4"N, Longitude 76°18'21.7"W NAD83): yearly mean of approximately 90cfs.
Water depth (*meters, MLW*)	Estimate: 0.3m
Sonde distance from bottom (*meters*)	The YSI is deployed 0.25 m off the creek bottom
Bottom habitat or type	The bottom habitat is extremely soft sediment, and grass beds inundate the site during summer months. The sonde is periodically exposed to very low tides, especially in the winter, 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 present many problems. These problems include periodic exposure of the sonde, very high turbidity, sedimentation rates associated with tidal infiltration, and wind and wave generated resuspension that causes severe fouling of the probes.
Pollutants in area	Pollutants are mostly urban run-off, with some industrial discharge possible.
Description of watershed	Site OC is located approximately 0.3km from the Anita C. Leight Estuary Center. Water quality at the site represents 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 is seasonally dominated by dense SAV communities from June-October and thus water quality conditions during this time are likely

	influenced by the presence of these macrophytes. Site is in substantially urban environment which accounts for its flashiness.

Site name	**Monie Bay (MB) (Secondary SWMP Station)**
Latitude and longitude	38 12.513' N, 75 48.275' W (NAD83) 38.20855, -75.80458333 (GIS Format)
Tidal range *(meters)*	The semi-diurnal tidal fluctuation is approximately 0.8m. Due to the tidal nature of this station, large variation of the data, both seasonally and daily is observed.
Salinity range *(psu)*	Salinity at this site rarely falls below 4 ppt or above 15 ppt., except during exceptional events.
Type and amount of freshwater input	No USGS streamflow gauge is available.
Water depth (*meters, MLW*)	Estimate: 0.7m
Sonde distance from bottom (*meters*)	The YSI is deployed 0.25 m off the creek bottom
Bottom habitat or type	soft unconsolidated sediments
Pollutants in area	Agricultural
Description of watershed	Site MB is located on Little Monie Creek, a tidal creek draining into Monie Bay. Monie Bay is a small embayment of the Chesapeake Bay of Maryland's Eastern Shore. MB is located approximately 4km upstream of the mouth of Little Monie Creek. Much of the creek is flanked on both sides by emergent brackish tidal marsh, however upstream of the station agricultural areas comprise most of the watershed, with a small woodland buffer between the agricultural areas and the fringing tidal marsh.

SWMP Station Timeline

Station Code	SWMP Status	Station Name	Location	Active Dates	Reason Decommissioned	Notes
RR	P	Railroad Bridge	38°57'21.3"N 76°41'37.3"W	04/04/03 – present	NA	NA
IP	P	Iron Pot Landing	38°48'51.2"N 76°44'55.4"W	04/04/03 – present	NA	NA
MC	P	Mataponi Creek	38° 44.599'N, 76° 42.446'W	04/22/03 – present	NA	NA
OC	P	Otter Point Creek	39°26'21.4"N 76°18'21.7"W	04/15/03 - present	NA	NA
MB	S	Monie Bay	38 12.513' N 75 48.275' W	07/18/06 - present	NA	NA

JB	P	Jug Bay	38° 46' 45.12 N, 76° 42' 27.72 W	7/1/95 - 12/1/02	Inadequate deployment structure, poor representation of river	NA
PR	P	Patuxent River	38° 46' 23.52 N, 76° 42' 32.76 W	7/1/95 - 12/1/02	Inadequate deployment structure, poor representation of river	NA

6) Data collection period –

Long-term data collection using sondes at Railroad Bridge (Jug Bay Wetlands Sanctuary) (RR) began on April 4, 2003; Mataponi Creek (MC) began April 22, 2003; Iron Pot Landing (IP) began April 4, 2003; Otter Point Creek (OC) began April 15, 2003; and Monie Bay (MB) began July 18, 2006.

2024 deployment dates and times are as follows. All times are in Eastern Standard Time (EST).

Railroad Bridge (RR)- EXO2

Deployment Date	**/ Time**	**Retrieval Date/**	**Time**
12/12/2023	10:45	1/24/2024	08:45
1/24/2024	9:00	2/21/2024	9:15
2/21/2024	9:30	3/14/2024	8:15
3/14/2024	8:30	4/9/2024	8:30
4/9/2024	8:45	4/23/2024	7:30
4/23/2024	7:45	5/7/2024	8:00
5/7/2024	8:15	5/21/2024	9:15
5/21/2024	9:30	6/4/2024	7:45
6/4/2024	8:00	6/18/2024	7:45
6/18/2024	8:00	7/3/2024	9:30
7/3/2024	9:45	7/18/2024	7:45
7/18/2024	8:00	8/6/2024	7:45
8/6/2024	8:00	8/21/2024	8:45
8/21/2024	9:00	9/4/2024	8:45
9/4/2024	9:00	9/16/2024	8:15
9/16/2024	8:30	10/1/2024	7:15
10/1/2024	7:30	10/16/2024	10:00
10/16/2024	10:15	10/29/2024	10:45
10/29/2024	11:00	11/19/2024	9:00
11/19/2024	9:15	12/10/2024	18:45
12/10/2024	9:00	1/14/2025	13:15

Iron Pot Landing (IP) – EXO2

Deployment Date	**/ Time**	**Retrieval Date/**	**Time**
12/12/2023	12:30	1/30/2024	08:30
1/30/2024	8:45	2/21/2024	12:00

2/21/2024	12:15	3/12/2024	9:00
3/12/2024	9:15	4/9/2024	11:15
4/9/2024	11:30	4/23/2024	8:45
4/23/2024	9:00	5/7/2024	9:45
5/7/2024	10:00	5/21/2024	10:45
5/21/2024	11:00	6/4/2024	9:00
6/4/2024	9:15	6/18/2024	10:15
6/18/2024	10:30	7/3/2024	11:15
7/3/2024	11:30	7/18/2024	9:30
7/18/2024	9:45	8/6/2024	9:15
8/6/2024	9:30	8/21/2024	11:30
8/21/2024	11:45	9/4/2024	10:30
9/4/2024	10:45	9/16/2024	9:30
9/16/2024	9:45	10/1/2024	8:45
10/1/2024	9:00	10/16/2024	8:45
10/16/2024	9:00	10/29/2024	9:00
10/29/2024	9:15	11/19/2024	10:15
11/19/2024	10:30	12/10/2024	10:00
12/10/2024	10:15	1/14/2025	10:00

Mataponi Creek (MC) - EXO2

Deployment Date / Time		**Retrieval Date/ Time**	
12/12/2023	13:30	1/11/2024	09:30
2/21/2024	10:45	3/12/2024	8:00
3/12/2024	8:15	4/9/2024	10:15
4/9/2024	10:30	4/23/2024	9:45
4/23/2024	10:00	5/7/2024	12:00
5/7/2024	12:15	5/21/2024	10:15
5/21/2024	12:30	6/4/2024	9:45
6/4/2024	10:00	6/18/2024	9:15
6/18/2024	9:30	7/3/2024	13:45
7/3/2024	13:30	7/18/2024	10:45
7/18/2024	11:00	8/6/2024	10:30
8/6/2024	10:45	8/21/2024	10:30
8/21/2024	10:45	9/4/2024	12:15
9/4/2024	12:30	9/16/2024	11:00
9/16/2024	11:15	10/2/2024	9:30
10/2/2024	9:45	10/16/2024	7:30
10/16/2024	7:45	10/29/2024	8:00
10/29/2024	8:15	11/19/2024	11:30
11/19/2024	11:45	11/26/2024	10:15

Otter Point Creek (OC) – EXO2

Deployment Date / Time		**Retrieval Date/ Time**	
12/15/2023	08:45	1/4/2024	09:15
2/7/2024	9:00	3/6/2024	9:30

3/6/2024	9:45	3/26/2024	10:00
3/26/2024	10:15	4/10/2024	8:00
4/10/2024	8:15	4/24/2024	7:45
4/24/2024	8:00	5/8/2024	8:15
5/8/2024	8:30	5/22/2024	9:15
5/22/2024	9:30	6/5/2024	8:15
6/5/2024	8:30	6/20/2024	9:15
6/20/2024	9:30	7/3/2024	8:00
7/3/2024	8:15	7/17/2024	10:00
7/17/2024	10:15	7/30/2024	8:30
7/30/2024	8:45	8/15/2024	9:00
8/15/2024	9:15	8/29/2024	8:00
8/29/2024	8:15	8/30/2024	9:00
8/30/2024	9:15	9/10/2024	9:45
9/10/2024	10:00	9/26/2024	8:30
9/26/2024	8:45	10/10/2024	9:45
10/10/2024	10:00	10/24/2024	8:15
10/24/2024	8:30	11/6/2024	11:15
11/6/2024	11:30	11/26/2024	9:15

Monie Bay (MB) – EXO2

Deployment Date / Time		**Retrieval Date/ Time**	
12/5/2023	11:30	1/2/2024	11:15
1/2/2024	11:30	2/6/2024	10:45
2/6/2024	11:00	3/5/2024	11:15
3/5/2024	11:30	4/5/2024	11:00
4/5/2024	11:15	5/2/2024	11:30
5/2/2024	11:45	6/3/2024	9:30
6/3/2024	9:45	7/2/2024	10:00
7/2/2024	10:15	8/1/2024	11:00
8/1/2024	11:15	9/5/2024	11:00
9/5/2024	11:15	10/3/2024	10:15
10/3/2024	10:30	10/9/2024	11:45
10/9/2024	12:45	11/6/2024	11:45
11/6/2024	12:00	12/5/2024	10:00
12/5/2024	12:15	12/11/2024	10:15
12/11/2024	10:30	1/17/2025	12:00

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 processed 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 2023.

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 part of the SWMP long-term monitoring program, CBM NERR also monitors 15-minute meteorological data along with monthly grab samples and diel sampling for nutrient data which may be correlated with this water quality dataset. These data are available at www.nerrsdata.org. The weather station is maintained by the Maryland Department of Natural Resources Continuous Monitoring Program. The principal objectives are to record meteorological information for the Chesapeake Bay National Estuarine Research Reserve in Maryland. This information is available for the following: 1) to track and record atmospheric and meteorological conditions useful to help understand and explain additional data collected concurrently 2) to create a database capable of detecting long-term changes in weather patterns 3) to record and identify the impact of storms, hurricanes, heavy rain and other episodic weather events capable of influencing other environmental conditions such as water quality (as monitored by the SWMP effort) and to collect ancillary data in support of other research efforts. The weather station records temperature, relative humidity, barometric pressure, wind speed, wind direction, light as measured by a LI-COR Quantum Sensor, and precipitation.

The Jug Bay Wetlands Sanctuary staff has been collecting weekly to monthly temperature, salinity, dissolved oxygen, and nutrient samples at various tidal and non-tidal sites throughout the Jug Bay marsh since 1989. One of their historic sites includes the current (RR) site as well as the historic (1995-2002) (JB) site. Sampling for their sites is done monthly throughout the year (when ice is not present) and includes parameters such as nitrate/nitrite, ammonium and chlorophyll a. Additionally, the staff samples at other sites throughout the Jug Bay marsh, which provide additional similar data at a larger spatial scale.

Staff at the Anita C. Leight Estuary Center at Otter Point Creek, in conjunction with CBNERR/MD staff, have also been collecting bi-weekly to monthly temperature, salinity, dissolved oxygen, total suspended solids, chlorophyll a, and nutrient samples (to include nitrate/nitrite, ammonium, ortho-phosphate, total nitrogen and total phosphorus) at the same location as datalogger OC and 5 other sites in the Otter Point Creek marsh since 2002. For more information on either the Jug Bay Wetlands Sanctuary or Otter Point Creek monitoring, contact Kyle Derby, the Reserve's Research Coordinator.

An additional ten stations throughout the Monie Bay Component are monitored for water quality by reserve staff and data can be obtained by contacting the Reserve's Research Coordinator. Reserve staff also monitor sediment accretion or erosion using surface elevation tables in the Monie Bay marshes. The Maryland Department of the Environment collects information on fecal coliform contamination at different shellfish sampling stations located within the Monie Bay system. Routine and specialized habitat, wildlife monitoring studies have been conducted in the Monie Bay system by various units of Maryland Department of Natural Resources.

Additional discrete nutrient data and semi-continuous water quality data is also available through the Department of Natural Resources Continuous Monitoring Program (see http://eyesonthebay.dnr.maryland.gov/) that provides

increased spatial coverage of many of the same parameters for 2024. This monitoring program included as many as 12 additional continuous monitoring sites (similar to the CBM NERR effort) throughout Maryland tidal waters sampled semi-continuously (every 15 minutes) either from April-October or year round. In addition to the high temporal resolution of water quality at these sites, Maryland Department of Natural Resources also conducts water quality cruises between and amongst many of these same sites which are used to create interpolated water quality maps, providing a high degree of spatial resolution around their permanent continuous monitoring (YSI sonde) sites. Interpolated water quality maps are available for all three Chesapeake Bay Components through the Maryland Department of Natural Resources or CBM NERR. The Maryland Department of Natural Resources Continuous Monitoring Program began in 1999. For more information on this program and the water quality monitoring cruises see http://eyesonthebay.dnr.maryland.gov/.

II. Physical Structure Descriptors

9) Sensor specifications –
In 2024, CBM NERR deployed YSI EXO2 sondes at all five sites.

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: +/- 0.05
Resolution: 0.001 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: +/- 0.1 units within +/- 10° of calibration temperature, +/- 0.2 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: 0.01 ug/L chl a, 0.1% FS

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 –

Water Quality Sampling station:	Sampling Site code:	Station code:
Railroad Bridge	RR	cbmrrwq
Mataponi Creek	MC	cbmmcwq
Iron Pot Landing	IP	cbmipwq
Otter Point Creek.	OC	cbmocwq
Monie Bay	MB	cbmmbwq

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 Depth collected from surface or near surface sonde
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
SFD Depth from a surface or near surface sonde deployed from a floating platform, does not reflect the depth of the water column or tidal change
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
SXD Depth from a surface or near surface sonde deployed at a fixed depth, offset to substrate may be applied

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 –

Railroad Bridge (RR)- EXO2

Deployment Date	SpCond ms/cm	DO %sat	pH	Turb NTU	Depth m	Chl µg/L

	6.668	100%	7	10	0	124	Sonde	Pressure-determined Offset	0	Meter in Rhodo Sol'n	Temp-determined Stnd
1/24/2024	6.877	102.5	7	10	2.1	123.3	0.112	0.122	0.45	76.6	66.10
2/21/2024	6.617	97.4	7.04	10.07	1.7	122.7	-0.042	-0.054	0.5	77.2	67.20
3/14/2024	6.697	99.5	7.05	9.99	2.31	126.8	0.018	0.014	0.36	68.9	66.80
4/9/2024	6.719	101.6	7.07	10.07	0.64	121.73	-0.016	-0.027	0.01	76.65	67.60
4/23/2024	6.659	96.8	7.04	10.03	0.1	121.92	-0.112	-0.109	-0.35	66.33	65.70
5/7/2024	6.495	99.4	7.07	10.01	-0.1	117.8	-0.018	-0.027	-0.1	67.4	65.60
5/21/2024	6.598	99.2	7.01	10.04	1.3	124.08	-0.001	0.014	0.06	66.98	65.90
6/4/2024	6.604	96.3	7.1	9.99	0.06	122.4	0.117	0.109	0.01	69.18	66.50
6/18/2024	6.63	97.8	6.98	10	1.12	136.65	0.192	-0.054	-0.09	69.49	66.80
7/3/2024	6.528	98.5	7.06	10	2.3	121.8	0.052	0.041	1.11	67.09	66.80
7/18/2024	6.806	99	7.16	10.11	0.6	122.6	-0.022	-0.027	0.03	68.16	66.80
8/6/2024	6.67	101	7.03	10	0.34	124.36	0.100	0.095	0.41	68.24	66.80
8/21/2024	6.63	99.6	7.04	10.02	-0.14	120.7	0.098	0.122	0.33	69.78	66.00
9/4/2024	6.618	96.1	7.03	9.96	0.7	123.8	-0.013	-0.014	0.2	68.1	65.10
9/16/2024	6.701	98.7	7.01	9.98	1.55	120.77	-0.003	0.000	0.25	65.45	64.60
10/1/2024	6.641	98.1	7.01	9.98	1.1	126.3	0.038	0.041	0.2	67.54	67.10
10/16/2024	6.675	96	6.98	10.01	0.42	122.24	0.140	0.136	-0.25	67.72	66.90
10/29/2024	6.612	97.9	7.02	9.96	-0.2	133.4	-0.025	-0.027	0.12	72.6	67.50
11/19/2024	6.702	99.7	6.96	9.96	0.8	120.3	0.003	0.014	0.4	69.8	67.00
12/10/2024	6.634	99.3	7.04	9.9	1.2	120.2	-0.038	-0.014	0.1	61.7	65.80

Iron Pot Landing (IP) – EXO2

Deployment Date	SpCond ms/cm	DO %sat	pH		Turb NTU		Depth m		Chl µg/L		
	6.668	100%	7	10	0	124	Sonde	Pressure-determined Offset	0	Meter in Rhodo Sol'n	Temp-determined Stnd
1/30/2024	6.761	102.3	7.00	9.92	5.40	125.70	0.213	0.122	0.13	72.50	66.10
2/21/2024	6.664	99.6	7.03	10.01	2.40	126.50	-0.015	-0.014	0.90	72.04	66.70
3/12/2024	6.775	100.6	7.04	9.97	1.19	128.63	0.136	0.014	-0.02	69.57	66.90
4/9/2024	6.723	98.9	7.07	10.07	0.25	122.22	0.076	-0.027	0.06	68.25	67.50
4/23/2024	6.679	98.8	7.01	9.96	0.70	123.40	-0.140	-0.122	-0.07	64.46	65.70
5/7/2024	6.563	101.2	7.05	9.97	0.52	116.40	-0.018	-0.027	0.07	64.10	65.70
5/21/2024	6.584	99.7	7.08	10.03	1.67	129.02	0.023	0.014	0.08	66.01	65.80
6/4/2024	6.633	96.9	7.03	10.03	2.92	120.30	0.123	0.109	0.50	69.10	66.80
6/18/2024	6.646	98.5	6.99	9.98	0.12	139.30	-0.037	-0.054	0.09	70.21	67.00
7/3/2024	6.363	99.1	7.01	9.92	0.80	118.10	0.045	0.041	0.04	67.40	66.90
7/18/2024	6.795	97.0	6.97	9.95	-0.20	123.52	-0.039	-0.027	-0.01	66.33	66.80
8/6/2024	6.185	102.5	7.09	10.06	0.38	126.60	0.069	0.095	0.37	67.70	67.00
8/21/2024	6.599	99.6	7.01	9.96	-1.00	118.00	0.112	0.122	-0.20	68.90	66.10
9/4/2024	6.575	100.1	7.04	9.96	0.02	124.95		-0.068	-0.02	67.75	64.60

9/16/2024	6.706	98.7	6.99	9.96	1.24	119.38	-0.002	0.000	-0.22	65.98	64.80
10/1/2024	6.519	98.5	7.07	10.04	2.30	131.30	0.041	0.041	0.60	67.90	67.20
10/16/2024	6.671	99.0	7.00	10.01	-0.01	124.60	0.150	0.136	0.08	68.28	67.00
10/29/2024	6.670	98.8	7.03	9.99	0.05	110.10	-0.023	-0.027	-0.08	36.90	67.60
11/19/2024	6.643	99.3	7.11	10.08	1.80	121.30	0.013	0.014	0.20	65.74	66.90
12/10/2024	6.639	101.9	7.06	9.95	0.40	123.60	0.157	0.122	-0.20	73.20	66.50

Mataponi Creek (MC) – EXO2

Deployment Date	SpCond ms/cm	DO %sat	pH		Turb NTU		Depth m		Chl µg/L		
	6.668	100%	7	10	0	124	Sonde	Pressure-determined Offset	0	Meter in Rhodo Sol'n	Temp-determined Stnd
2/21/2024	6.678	100.4	7.08	10.18	0.69	142.4	0.008	-0.014	0.12	71.58	66.70
3/12/2024	6.662	99.6	7.12	10	0.63	126.9	0.012	0.014	0.09	69.61	66.60
4/9/2024	6.69	98.9	7.06	10.09	0.06	122.48	-0.014	-0.027	-0.25	69.07	67.50
4/23/2024	6.678	97.7	7.07	10.03	0.4	123.4	-0.112	-0.109	-0.1	63.84	65.80
5/7/2024	6.531	22.33	7.05	9.97	2.9	114.4	-0.018	-0.027	0.8	64.34	65.70
5/21/2024	6.569	99.4	7.09	10.08	1.72	128.4	-0.004	0.014	0.12	65.54	65.80
6/4/2024	6.603	96.4	7.07	10.06	3.7	121.2	0.112	0.109	0.72	68.55	66.60
6/18/2024	6.613	97.9	7.03	10	0.55	131.42	-0.032	-0.054	0.01	68.97	66.90
7/3/2024	6.582	97.2	7.02	9.97	-0.52	119.9	0.042	0.000	0.44	69.9	66.70
7/18/2024	6.789	97.1	7.05	10.05	1.54	124.38	-0.008	-0.027	0.31	65.81	66.80
8/6/2024	6.681	101.5	7.03	9.94	0.75	123.3	0.087	0.095	0.18	68.15	66.90
8/21/2024	6.578	98.9	7.11	10.07	0.8	120.9	0.130	0.150	0.5	71.7	66.00
9/4/2024	6.632	99.7	7.04	9.99	-0.2	124.7	0.098	0.068	-0.2	66.93	64.70
9/16/2024	6.727	97.1	6.97	9.94	0.03	120.15	0.074	0.068	-0.09	65.75	64.80
10/2/2024	6.595	98.3	7.01	10.08	2.9	127.5	0.046	0.054	0.3	66.9	67.30
10/16/2024	6.753	98.5	7.02	9.99	0.66	123.85	0.142	0.136	-0.95	71.76	67.10
10/29/2024	6.67	98.6	7.03	9.96	3.2	128.7	-0.031	-0.027	0.8	69.8	67.30
11/19/2024	6.684	98.1	7.02	9.95	-0.03	121.34	-0.025	-0.041	0.06	69.58	67.30

Otter Point Creek (OC) – EXO2

Deployment Date	SpCond ms/cm	DO %sat	pH		Turb NTU		Depth m		Chl µg/L		
	6.668	100%	7	10	0	124	Sonde	Pressure-determined Offset	0	Meter in Rhodo Sol'n	Temp-determined Stnd
2/7/2024	6.719	98.5	6.98	9.89	-0.14	125.7	-0.026	-0.041	0.16	67.9	65.8
3/6/2024	6.704	111.6	7.02	10.03	1.78	124.8	0.057	0.054	0.05	69.3	66.6
3/26/2024	6.727	102.4	7.11	10.11	0.33	124	-0.008	0	-0.64	67.7	66.9
4/10/2024	6.682	102.8	7.09	10.03	2.54	131.1	0.093	0.095	0.09	74.2	67.6
4/24/2024	6.69	97.4	7.08	10.03	2.64	124.3	-0.114	-0.122	1.2	69.5	65.8
5/8/2024	6.507	87	7.06	10	47.8	95.6	-0.022	-0.027	0.2	37.5	65.6

5/22/2024	6.618	95.5	6.99	10.08	0.2	127.6	-0.04	-0.041	-0.01	67.23	64.9
6/5/2024	6.603	100.1	7.03	9.98	2.03	120.6	0.114	0.109	0.15	68.45	66.6
6/20/2024	6.664	100.6	7	10.04	2.8	128.4	0.056	0.068	0.35	69.5	66.9
7/3/2024	6.68	98.3	7.02	10	0.34	128.4	-0.044	-0.027	0.51	64.51	67
7/17/2024	6.776	97.7	7.02	10.02	-0.13	117.5	-0.054	-0.027	-0.2	68	66.9
7/30/2024	6.708	100.1	7	9.93	0.71	129.86	0.037	0.027	-0.09	64.16	66.8
8/15/2024	6.297	99.3	7.09	10.06	0.57	120.33	0.074	0.068	0.5	64.53	62.7
8/29/2024	6.691	99.7	6.91	9.93	0.54	124.41	0.135	0.122	0.04	66.17	66.1
8/30/2024	6.609	98.6	7.04	9.99	0.63	118.4	0.067	0.082	0.5	65.7	65.3
9/10/2024	6.526	100.2	6.99	9.99	3.95	123		-0.014	0.9	66.4	64.8
9/26/2024	6.693	99.1	7.02	9.96	0.1	131.38	0.031	0.041	-0.68	76.6	66.3
10/10/2024	6.667	100.4	7.08	10.03	0.32	124.64	0.017	0.014	-0.38	67.35	66.9
10/24/2024	6.677	102.7	6.99	9.97	1.3	121.2	0.02	0.027	0.05	66.02	66.1
11/6/2024	6.632	99.8	7.03	10.07	0.48	123	-0.04	-0.027	-0.01	69.4	67.8

Monie Bay (MB) – EXO2

Deployment Date	SpCond ms/cm	DO %sat	pH		Turb NTU		Depth m		Chl µg/L		
	24.82	100%	7	10	0	124	Sonde	Pressure-determined Offset	0	Meter in Rhodo Sol'n	Temp-determined Stnd
2/6/2024	24.71	98.4	7.1	10.11	0.65	122.1	-0.036	-0.041	0.1	68	66.30
3/5/2024	24.614	101.1	7	9.98	1.6	134	0.083	0.082	0.2	66.33	66.80
4/5/2024	25.304	99.4	7.03	10.09	0.67	129.6	0.026	0.027	-0.05	63.82	66.00
5/2/2024	24.772	99.5	7.01	10	3.47	137.2	-0.011	0.014	1.49	67.55	66.90
6/3/2024	24.008	100.6	7.07	9.93	1.57	128.4	0.048	0.068	1.31	72.9	67.50
7/2/2024	24.408	97.2	8.86	10.87	-0.28	128.4	-0.035	-0.027	0.07	67.72	67.00
8/1/2024	24.536	97.1	7.08	10.01	1.59	120.31	0.067	0.054	0.2	67.01	66.10
9/5/2024	24.75	98.6	7.1	10.07	0.98	115.41	0.086	0.068	0.21	67.87	65.00
10/3/2024	23.981	98.3	6.97	10.02	-1.72	145.45	0.048	0.054	-0.1	75.52	67.50
10/9/2024	24.686	93.1	6.97	9.97	0.22	120.04	0.029	0.027	-0.52	65.07	65.30
11/6/2024	24.427	101	6.94	9.89	2.28	124.5	0.094	0.082	0.5	72.22	67.40
12/5/2024	25.156	100.2	7.05	10.03	-0.39	121.39	0.089	0.082	-0.44	68.67	66.50
12/11/2024	24.594	98.6	7.2	10.2	0.01	119	0.029	0.054	-0.25	71.6	68.80

*Note: pH post-deployment readings are temperature dependent and minor variations are expected as a result.

14) Other remarks/notes –

Data are missing due to equipment or associated specific probes not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. Any NANs in the dataset stand for "not a number" and are the result of low power, disconnected wires, or out of range readings. If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

In addition to the sampling described above, several other data sets were collected. Photosynthetically Active Radiation (PAR) was also collected using a LiCor 1500 display with two sensors: one underwater quantum sensor and one ambient quantum sensor along with Secchi depth. Additional nutrient samples were also collected during the months of April through October. These data are available through the Maryland Department of Natural Resources. Visit www.eyesonthebay.net for more information.

Because the CBM NERR services other stations outside of the five NERR sites, some of which get incredibly fouled, it is very difficult to keep all of the post-cal standards clean. It is not feasible for the technicians to make or use a new standard for each sonde, especially not the turbidity standard solution, as it is very expensive. Conductivity and pH standards are swapped if they seem to be impacted by fouling since the reserve has those in larger quantities. This is often not the case with standards for chlorophyll and turbidity. Due to this, turbidity and chlorophyll posts were most impacted by these fouled standards causing often artificially low or high posts. However, data do not appear to be impacted by fouling or drift when viewing the data.

Railroad Bridge (RR)

All depth data are missing <-2> [SSM] (CSM) for the entire 2/21/2024 deployment from 2/21/2024 at 09:30 to 3/14/2024 at 08:15 and for the entire 8/21/24 deployment from 8/21/24 at 09:00 to 9/4/24 at 08:45. The sonde dropped depth after being unplugged from the laptop after doing a dissolved oxygen check the morning of the deployments.

An instrument recording malfunction occurred on 10/21/2024 from 08:30 – 09:30 that is noted in the data by the record comment {CSM}. The timestamps recorded by the instrument were incorrect and had to be adjusted in the file (the QA'd file will not match the raw file). Parameter values were clearly incorrect at both the 08:30 and 09:30 timestamps. All data from 08:30 to 09:30 are rejected due to lack of confidence in values.

Iron Pot Landing (IP)

The 12/12/2023 deployment that spanned into 2024 exceeded the maximum allowed length of a 45 day deployment. The data file began on 12/11/2023 at 10:30. The maximum allowed length of 45 days was reached on 1/25/2024 at 10:30. A record comment of {CSM} from 1/25/24 at 10:45 until the end of the deployment on 1/30/2024 at 08:30 is used to indicate this in the dataset. Exceeding the maximum deployment length did not seem to affect any of the sensor values.

The site received several inches of snow on both January 15, 2024 and January 19, 2024. The effects of the road salt runoff on the specific conductance and salinity can be seen beginning around January 17 through to the end of the deployment. <0>(CSM) from 1/17/2024 at 00:00 to 1/30/2024 at 08:30

All depth data are missing <-2> [SSM] (CSM) for the entire 9/4/2024 deployment from 9/4/2024 at 10:45 to 9/16/2024 at 09:30. The sonde dropped depth after being unplugged from the laptop after doing a dissolved oxygen check the morning of the deployment.

Mataponi Creek (MC)

Intermittent algal blooms were seen from 06/18/2024 through 06/30/2024. A record comment of {CAB} was added for that entire time period.

Otter Point Creek (OC)

The central wiper fell off during the cmboc050824 deployment. It appears that only dissolved oxygen, turbidity, and chlorophyll were affected towards the end of the deployment. Affected data were coded with <-3> [SWM] (CSM)

There was a significant rain event from 06/05/2024-06/06/2024. The effects can be seen in specific conductance, salinity, and turbidity. Specific conductance and salinity were coded <0> (CSM) from 06/05/2024 at 21:30 to 06/14/2024 at 02:00. Turbidity was coded <0> (CSM) from 06/05/2024 at 21:30 to 06/07/2024 at 08:00.

No data is recorded for 8/30/24 from 08:45 – 09:00. Record comment {CSM}. Technicians were troubleshooting the telemetry system and did not have a sonde deployed.

Sonde from cbmocwq083024 was set up to log incorrectly. Was set to log every 15 minutes at 00:10, 00:25, 00:40, and 00:55 minutes after the hour instead of the quarter hours. Sonde from cbmoc082924 deployment was pulled from the water after the 08:30 reading on 08/30/2024 (sonde only deployed one day because of telemetry issues). The sonde from cbmocwq083024 was not deployed until 09:10 on 08/30/24. Each timestamp of the 083024 deployment was advanced ahead by 5 minutes in order to line them up to the quarter hours. For example, the first timestamp of the 083024 deployment was changed from 09:10 to 09:15. The discrete matchup reading was done at 08:45. The entire deployment is marked with a record comment {CSM}.

All depth data are missing <-2> [SSM] (CSM) for the entire 9/10/2024 deployment from 9/10/2024 at 10:00 to 9/26/2024 at 08:30. The sonde dropped depth after being unplugged from the laptop after doing a dissolved oxygen check the morning of the deployment.

Monie Bay (MB)

All depth data are missing <-2> [SSM] (CSM) for the entire 04/05/2024 deployment from 04/05/2024 at 11:15 to 05/02/2024 at 11:30. The sonde dropped depth after being unplugged from the laptop after doing a dissolved oxygen check in the morning of the deployment.

There was a significant rain event from 06/26/2024-06/27/2024. The effects can be seen in specific conductance and salinity. Specific conductance and salinity were coded <0> (CSM) from 06/26/2024 at 23:00 to 07/02/2024 at 10:00