Tijuana River (TJR) NERR Water Quality Metadata
January to December 2024
Latest Update: April 15, 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

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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 EcoWatch in a comma-delimited format (.CDF) , EcoWatch Lite in a comma separated file (CSV) or 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. 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. Monica Almeida is responsible for data management.

2) Research objectives –

The Tijuana River National Estuarine Research Reserve (TRNERR) represents the largest, most intact coastal marsh system remaining in Southern California. It has contiguous beach, dune, tidal channel, mudflat, marsh, transitional, and upland habitat. It is also home to numerous threatened and endangered species. TRNERR experiences a Mediterranean climate, with warm, dry summers and cool, wet winters. The majority of rainfall occurs between the months of October and March. Because of its highly urbanized setting, situated between the cities of Tijuana, Baja California, Mexico, and San Diego, California, USA, it is heavily impacted. A primary management concern is transboundary flows of the Tijuana River, which convey anthropogenic pollutants (primarily associated with partially-treated and untreated wastewater), nutrients, and sediment. About a quarter of the reserve's 2,531 acres are tidally influenced and few channels are deep enough for datalogger deployment. Currently, there are two SWMP stations located within the TRNERR boundaries, and two SWMP stations are located nearby in south San Diego Bay. Station locations are designed to investigate spatial patterns of water quality parameters, with comparisons between the Tijuana Estuary and San Diego Bay. In addition, telemetry of Tijuana Estuary water quality stations informs management action, particularly related to potential closure of the tidal inlet by wave-driven accumulation of sediment. Mouth closures (detected by cessation of tidal action as indicated with the water level sensors on the dataloggers) can cause anoxia, mortality of fish and shellfish, and flooding.

Two stations were originally set up: a "control" station Oneonta Slough (OS), which is still in place, was established on the northern end of Oneonta Slough, relatively far away from the main source of river-borne pollution. Another station, River Channel (RC), was situated in a site most affected by sewage outflow. Datalogger deployment at RC, however, was continually interrupted by both shifting sediment and massive wracks of kelp (*Macrocystis pyrifera*), which would often bury the deployment set-up on incoming tides. After a number of different deployment designs were implemented without success, data collection at the RC site was terminated in 2004. Another station was located at the inlet to the Model Marsh (MM), a constructed 20-acre restoration site in the southern arm of the estuary. The Model Marsh was opened to tidal flushing in February 2000 and datalogging at the station began in October 2000**.** The site was discontinued in January 2008, again due to heavy sedimentation. The Boca Rio (BR) site is located near the mouth of the Tijuana River, although the mouth has migrated south in recent years. The BR station was established in December 2004 to replace the RC station, and remains active and is the site closest to the interface of the river and ocean.

The South Bay (SB) station was established in January 2008 and is located at the mouth of Otay River, which flows into South San Diego Bay. It is within the San Diego National Wildlife Refuge Complex, which also includes portions of the TRNERR. It was established to document conditions in the south bay, particularly associated with a marsh restoration in the adjacent salt ponds. The Pond Eleven (PE) station was located in a non-tidal salt pond adjacent to the South Bay logger. A tide gate was the only source of water into the pond, which was one of the first in a series of ponds with increasing salinities. The PE sonde was deployed from July 2008 to September 2010. The US Fish and Wildlife Service began restoration of this area, including Pond Eleven, from September 2010 to its completion in October 2011. A levee was breached to open Pond Eleven to the bay, which made the area tidal, and channels were excavated to further enhance circulation. Due to extensive restoration, the site had to be relocated. Datasonde deployments and nutrient data collection began in January 2012 at a new location site named Pond Restored (PR) (the name change was warranted because of the different location and profound differences in the pond before and after restoration). The Pond Restored datalogger is located approximately 560 meters southwest from where the Pond Eleven datalogger was originally. The images below show pre- and post-restoration of the salt ponds and the station locations. The post restoration photo includes the PE site as a reference to the new PR site. No sampling currently occurs at the PE site.

4) Research methods –

Each datalogger deployment site is comprised of a 4-inch diameter PVC/ABS pipe strapped vertically to either two "rail" style fence posts or a 2-inch diameter galvanized steel pole (depending on the channel substrate - i.e. sand/cobble or silty/clayey sediment) that have been driven into the sediment. Multiple 1.5-inch diameter holes have been drilled around the bottom length of the PVC pipe to permit unrestricted water flow to the sensors. Upon deployment, the datalogger is placed into and rests on a bolt fixed across the bottom of the pipe.

The sampling period is between four to six weeks, with measurements taken every 15 minutes. Measurements for specific conductivity, salinity, dissolved oxygen (percent saturation and mg/l), temperature, turbidity, pH and water level are recorded. Prior to deployment, each sensor is calibrated with its associated calibration standard(s)/method in the laboratory. At the end of each sampling period, the YSI dataloggers are brought back to the laboratory for sensor data post-check, data downloading, cleaning and recalibration. These procedures are carried out according to the methods described in the YSI Operations Manual (see sections 3 and 7). Calibration standards for specific conductivity (50mS/cm) and turbidity (124 FNU) are purchased from YSI, and pH standards (7 and 10) are manufactured by Ricca Chemical Company and purchased from Fisher Scientific. On January 18, we started to report Chlorophyll data collected at the Oneonta Slough site. The Total Algae sensor goes through a two-point calibration, using DI water and Rhodamine WT dye, which is purchased from Kingscote Chemicals. The QA/QC procedures for the collected data are followed from the CDMO Operations Manual version 6.8 – March 2024.

In the field, concurrent with the datalogger's deployment, the YSI ProDSS multiparameter water quality meter is used to collect data for comparison. Parameters such as specific conductivity, salinity, DO (percent saturation and mg/l), temperature and barometric pressure, are measured and recorded. Once a month, the handheld meter is calibrated in the YSI specific conductivity standard (50mS/cm) and 100% oxygen saturated water before each use.

In 2015, TRNERR started to report level data. In January and February, datalogger holders were surveyed using the Spectra Precision Epoch50 real-time kinematic (RTK) GPS and calculations were done to find the correct depth offset. In December of 2017, Boca Rio and Oneonta Slough datasondes were resurveyed after cleaning the logger holder and switching from YSI 6-series datasondes to YSI EXO2. In these surveys, RTK GPS data used the NAD_1983_2011_StatePlane_California_VI_FIPS_0406 (meters) projected coordinate system, NAVD88 vertical datum (meters), and GEOID 12A model.

In late November and early December of 2021, all stations were re-surveyed with Spectra Precision SP80 RTK GPS. Surveys were set to NAD_1983_2011_StatePlane_California_VI_FIPS_0406 (meters) projected coordinate system, NAVD88 vertical datum (meters), and GEOID 18 model.

Site Name	**Boca Rio**
Site infrastructure description	Datalogger is deployed in a PVC/ABS holder strapped vertically to two "rail" style fence posts driven into a sand (with some silt and clay) substrate
Surveying equipment	Spectra Precision Epoch50 real-time kinematic (RTK) GPS
Survey monument used	TJR NERR local benchmarks installed by a contractor company and leveled to the NGS reference benchmark U 1305 (PID - DC1330)
Survey occupation date	January 27, 2015
Survey occupation duration	Approx. 10 minutes
Ellipsoid height	-35.028 (from top of battery cap)
"Quick Check" marker for deployment tube	Sonde rests on a bolt
"Quick Check" for sonde being deployed at the same location	Sonde rests on a bolt
Annual resurveying	November 15, 2021 **-0.065m** NAVD88 -35.164 Ellipsoid height (from top of battery cap) Spectra Precision SP80 real-time kinematic (RTK) GPS
Elevation of sonde's depth port over time	January 27, 2015 - December 12, 2017: **0.053m** NAVD88, approximately 0.5m above the channel bottom. December 12, 2017 - November 15, 2021: **-0.056m** NAVD88, approximately 0.5m above the channel bottom.

Site Name	**Oneonta Slough**
Site infrastructure description	Datalogger is deployed in a PVC/ABS holder strapped vertically to a 2-inch diameter galvanized steel pole driven into a silty clay substrate
Surveying equipment	Spectra Precision Epoch50 real-time kinematic (RTK) GPS
Survey monument used	TJR NERR local benchmarks installed by a contractor company and leveled to the NGS reference benchmark U 1305 (PID - DC1330)
Survey occupation date	January 23, 2015

Survey occupation duration	Approx. 10 minutes
Ellipsoid height	-34.677 (from top of battery cap)
"Quick Check" marker for deployment tube	Mark on the pole
"Quick Check" for sonde being deployed at the same location	Sonde rests on a bolt
Annual resurveying	November 2, 2021 **0.263m** NAVD88 -34.544 Ellipsoid height (from top of holder) Spectra Precision SP80 real-time kinematic (RTK) GPS
Elevation of sonde's depth port over time	<u>January 23, 2015 - December 5, 2017</u>: **0.332m** NAVD88, approximately 0.5m above the channel bottom. <u>December 5, 2017 - November 2, 2021</u>: **0.295m** NAVD88, approximately 0.5m above the channel bottom.

Site Name	**Pond Restored**
Site infrastructure description	Datalogger is deployed in a PVC/ABS holder strapped vertically to a 2-inch diameter galvanized steel pole driven into a silty clay substrate
Surveying equipment	Spectra Precision Epoch50 real-time kinematic (RTK) GPS
Survey monument used	Local benchmarks installed by a contractor company and leveled to the NGS reference benchmark U 1305 (PID - DC1330)
Survey occupation date	February 25, 2015
Survey occupation duration	Approx. 10 minutes
Ellipsoid height	-34.678 (from top of holder)
"Quick Check" marker for deployment tube	Mark on the pole
"Quick Check" for sonde being deployed at the same location	Sonde rests on a bolt
Annual resurveying	November 30, 2021 **-0.397m** NAVD88 -34.763 Ellipsoid height (from top of holder) Spectra Precision SP80 real-time kinematic (RTK) GPS
Elevation of sonde's depth port over time	<u>February 25, 2015 - January 7, 2021</u>: **-0.310m** NAVD88, approximately 0.5m above the channel bottom. <u>January 7, 2021 - November 30, 2021</u>**: -0.381m** NAVD88, approximately 0.5m above the channel bottom.

Site Name	**South Bay**
Site infrastructure description	Datalogger is deployed in a PVC/ABS holder strapped vertically to a 2-inch diameter galvanized steel pole driven into a silt and clay substrate

Surveying equipment	Spectra Precision Epoch50 real-time kinematic (RTK) GPS
Survey monument used	Local benchmarks installed by a contractor company and leveled to the NGS reference benchmark U 1305 (PID - DC1330)
Survey occupation date	February 25, 2015
Survey occupation duration	Approx. 10 minutes
Ellipsoid height	-35.276 (from top of holder)
"Quick Check" marker for deployment tube	Mark on the pole
"Quick Check" for sonde being deployed at the same location	Sonde rests on a bolt
Annual resurveying	December 1, 2021 **-0.629m** NAVD88 -35.450 Ellipsoid height (from top of battery cap) Spectra Precision SP80 real-time kinematic (RTK) GPS
Elevation of sonde's depth port over time	February 25, 2015 – January 7, 2021: **-0.379m** NAVD88, approximately 0.5m above the channel bottom. January 7, 2021 – December 1, 2021: **-0.471m** NAVD88 (EXO2) or -0.350m NAVD88 (EXO3), approximately 0.5m above the channel bottom.

A Sutron Sat-Link2 transmitter was installed at the Oneonta Slough station on 12/20/2006 and was replaced by a newer YSI WaterLog Storm 3 transmitter on 06/08/2021. The station data is transmitted to the NOAA GOES satellite, NESDIS ID #3B0252F2. A YSI WaterLog Storm 3 transmitter was installed at the South Bay station on 10/11/2023, and the data is transmitted to the NOAA GOES satellite, NESDIS ID # 3B05762A. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen-minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The "real-time" telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation into the CDMO's authoritative online database. Provisional and authoritative data are available at http://cdmo.baruch.sc.edu.

5) Site location and character –

General site Characteristics

The four SWMP sites sit in the southwest corner of San Diego County, just north of the US / Mexico border. Two are located in the Tijuana River Estuary, at the terminus of the multinational (US, Mexico, and indigenous Kumeyaay) Tijuana River watershed. Two are associated with the adjacent watershed of the Otay River in the southern end of San Diego Bay, which has been highly modified by channelization of the river and creation of a salt production facility in the bay, which dates back to the 1870's. The Tijuana River Estuary and San Diego Bay are both in the Silver Strand Littoral Cell, with their barrier beaches formed by sediment input from the Tijuana River. Historically, the Tijuana River Estuary and San Diego Bay were part of a large costal wetland complex, separated by non-tidal wetland in what is now the City of Imperial Beach.

All estuaries in the region reside in a Mediterranean-climate, and are characterized as low-inflow estuaries, with natural freshwater input largely confined to the rainy season (October – March). Urbanization of watersheds have led to perennialization of many formerly ephemeral streams. In the Tijuana River, flows are typically contaminated with sewage, and infrastructure in the US and Mexico has been built to try and manage these flows. The South Bay International Wastewater Plant began operation in 1999, and was designed to capture dry-weather flows. Any rain or infrastructure failures Mexico typically exceed the capacity of the plant and result in transboundary flows of contaminated water. Persistent transboundary flows in to the Tijuana River Estuary have been especially problematic since 2022.

Tidal exchange at the inlet of the Tijuana Estuary is limited by an intertidal sill, with occasional mouth closures. Excessive sedimentation in the Tijuana River Estuary has greatly decreased tidal prism, which has exacerbated mouth closures. The South San Diego Bay sites are fully tidal. Both the Tijuana River Estuary and south San Diego Bay are characterized by coastal salt marsh, including cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia pacifica*). Both are also sites of ongoing restoration programs aimed at recovering lost salt marsh habitat.

Site name	**Boca Rio (BR)**
Latitude and longitude	32º 33’ 33.7” N, 117º 7’ 44.3” W
Tidal range *(meters)*	Approx. 1.6, but variable depending on the height of the intertidal sill at the inlet, which limits the extent of low tides in the estuary compared to the open coast.
Salinity range *(psu)*	1(extreme rain events) to 36 (average of 33)
Type and amount of freshwater input	The Tijuana River Estuary is low-inflow, and the dominant freshwater source is the Tijuana River. Stream flows in the river vary considerably from season to season and year to year. The naturally-ephemeral Tijuana River now has year-round flow upstream in Tijuana, Mexico, although wastewater infrastructure (when operational) diverts low flows (less than 1 m^3/s) and prevents anthropogenic surface flows from reaching the estuary. Additional freshwater sources are storm drains located mostly in the northern arm of the estuary from runoff from the adjacent military airfield and residential area.
Water depth (*meters, MLW*)	1.3 (estimated)
Sonde distance from bottom (*meters*)	Approx. 0.25
Bottom habitat or type	Silt and clay, some sand
Pollutants in area	Freshwater discharge with sewage
Description of watershed	The Tijuana River watershed is one of the largest in the region, at 4500 km^2, approx. 75% of which is in Mexico. The lower portion is heavily urbanized, with the channelized river flowing through the city of Tijuana, Mexico, before entering the United States.

Site name	**Oneonta Slough (OS)**
Latitude and longitude	32º 34’ 6.0” N, 117º 7’ 52.6” W
Tidal range *(meters)*	Approx. 1.6, but variable depending on the height of the intertidal sill at the inlet, which limits the extent of low tides in the estuary compared to the open coast.

Salinity range *(psu)*	1 (extreme rain events) to 39 (average of 32 ppt)
Type and amount of freshwater input	The Tijuana River Estuary is low-inflow, and the dominant freshwater source is the Tijuana River. Stream flows in the river vary considerably from season to season and year to year. The naturally-ephemeral Tijuana River now has year-round flow upstream in Tijuana, Mexico, although wastewater infrastructure (when operational) diverts low flows (less than 1 m^3/s) and prevents anthropogenic surface flows from reaching the estuary. Additional freshwater sources are storm drains located mostly in the northern arm of the estuary from runoff from the adjacent military airfield and residential area.
Water depth (*meters, MLW*)	1.1 (estimated)
Sonde distance from bottom (*meters*)	Approx. 0.25
Bottom habitat or type	Silt and clay
Pollutants in area	Freshwater discharge with sewage, runoff from streets.
Description of watershed	The Tijuana River watershed is one of the largest in the region, at 4500 km^2, approx. 75% of which is in Mexico. The lower portion is heavily urbanized, with the channelized river flowing through the city of Tijuana, Mexico, before entering the United States.

Site name	**Pond Restored (PR)**
Latitude and longitude	32º 35' 45.9", 117º 7' 5.5" W
Tidal range *(meters)*	Approx. 2.7
Salinity range *(psu)*	4 (extreme rain event) to 39 (average of 35)
Type and amount of freshwater input	Highly seasonal flows from the Otay River, which enters into the extreme south end of San Diego Bay. Salinity can also be affected by occasional leakage from high-salinity ponds of the South Bay Salt Works.
Water depth (*meters, MLW*)	1.6 (estimated)
Sonde distance from bottom (*meters*)	Approx. 0.25
Bottom habitat or type	Silt and clay
Pollutants in area	Legacy metal and synthetic organics in San Diego Bay.
Description of watershed	The 40 km-long Otay River originates in the mountains of southern San Diego County, and is dammed at the Otay Reservoir. The watershed is 410km^2, and the lower watershed includes the City of Chula Vista, California.

Site name	**South Bay (SB)**
Latitude and longitude	32º 36' 3.6" N, 117º 06' 57.0" W
Tidal range *(meters)*	Approx. 2.7
Salinity range *(psu)*	4 (extreme rain event) to 39 (average of 35)
Type and amount of freshwater input	Highly seasonal flows from the Otay River, which enters into the extreme south end of San Diego Bay. Salinity can also be affected by occasional leakage from high-salinity ponds of the South Bay Salt Works.
Water depth (*meters, MLW*)	1.8 (estimated)
Sonde distance from bottom (*meters*)	Approx. 0.25
Bottom habitat or type	Silt and clay
Pollutants in area	Legacy metal and synthetic organics in San Diego Bay.
Description of watershed	The 40 km-long Otay River originates in the mountains of southern San Diego County, and is dammed at the Otay Reservoir. The watershed is 410km^2, and the lower watershed includes the City of Chula Vista, California.

SWMP station timeline:

Station Code	SWMP Status	Station Name	Location	Active Dates	Reason Decommissioned	Notes
BR (tjrbrwq)	P	Boca Rio	32° 33' 33.70 N, 117° 7' 44.30 W	12/23/2004 15:30	NA	NA
OS (tjroswq)	P	Oneonta Slough	32° 34' 6.00 N, 117° 7' 52.60 W	01/01/1996 00:00 -	NA	NA
PR (tjrprwq)	P	Pond Eleven Restored	32° 35' 45.90 N, 117° 07' 5.59 W	02/16/2012 11:00	NA	NA
SB (tjrsbwq)	P	South Bay	32° 36' 3.60 N, 117° 6' 57.00 W	01/02/2008 00:00 -	NA	NA

MM (tjrmmwq)	P	Model Marsh	32° 32' 52.08 N, 117° 7' 22.80 W	10/01/2000 00:00 - 01/17/2008 00:00	Heavy sedimentation compromised the station	
PE (tjrpewq)	P	Pond Eleven	32° 36' 3.54 N, 117° 06' 58.46 W	07/25/2008 00:00 - 09/29/2010 00:00	Deployments at this site were interrupted due to an extensive Restoration project	Restoration project was concluded in October 2011. Datalogger was relocated and renamed – Pond Eleven Restored, and deployments resumed in January 2012.
RC (tjrrcwq)	P	River Channel	32° 33' 28.08 N, 117° 6' 21.96 W	08/01/2002 00:00 - 11/11/2004 14:00	Heavy sedimentation compromised the station	Replaced by Boca Rio site
TL (tjrtlwq)	P	Tidal Linkage	32° 34' 27.84 N, 117° 7' 37.92 W	05/01/1997 00:00 - 10/08/2007 00:00	Heavy sedimentation compromised the station	

6) Data collection period –
[Also note when data collection began initially for your reserve or sample sites.]

Boca Rio

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time
12/19/2023	10:30	1/24/2024	13:30
1/24/2024	13:45	2/22/2024	14:30
2/22/2024	14:45	3/20/2024	13:30
3/20/2024	13:45	4/16/2024	10:30
4/16/2024	10:45	5/15/2024	12:15
5/15/2024	12:30	6/18/2024	10:00
6/18/2024	10:15	7/25/2024	7:45
7/25/2024	8:00	8/19/2024	14:00
8/19/2024	14:15	9/16/2024	13:30
9/16/2024	13:45	10/15/2024	13:30
10/15/2024	13:45	11/12/2024	13:00
11/12/2024	13:15	12/10/2024	11:45
12/10/2024	12:00	1/7/2025	10:30

Oneonta Slough

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time
12/19/2023	12:15	1/23/2024	13:00
1/23/2024	13:15	2/22/2024	15:00
2/22/2024	15:15	3/19/2024	14:30
3/19/2024	14:45	4/16/2024	11:45
4/16/2024	12:15	5/15/2024	11:00

5/15/2024	11:15	6/18/2024	11:30
6/18/2024	11:45	7/24/2024	8:30
7/24/2024	8:45	8/19/2024	13:00
8/19/2024	13:15	9/16/2024	12:15
9/16/2024	12:30	10/15/2024	11:45
10/15/2024	14:30	11/12/2024	12:45
11/12/2024	13:00	12/10/2024	11:45
12/10/2024		1/7/2025	

Pond Restored

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time
12/19/2023	11:00	1/24/2024	13:30
1/24/2024	13:45	2/21/2024	12:30
2/21/2024	12:45	3/19/2024	11:45
3/19/2024	12:00	4/17/2024	11:30
4/17/2024	11:45	5/16/2024	8:15
5/16/2024	8:30	6/19/2024	12:00
6/19/2024	12:15	7/23/2024	14:30
7/23/2024	14:45	8/20/2024	13:45
8/20/2024	14:00	9/17/2024	12:45
9/17/2024	13:00	10/16/2024	12:15
10/16/2024	12:30	11/13/2024	12:00
11/13/2024	12:15	12/11/2024	11:30
12/11/2024	11:45	1/8/2025	10:00

South Bay

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time
12/19/2023	11:00	1/24/2024	12:45
1/24/2024	13:00	2/21/2024	11:45
2/21/2024	12:00	3/19/2024	12:15
3/19/2024	12:30	4/17/2024	10:30
4/17/2024	10:45	5/16/2024	9:00
5/16/2024	9:15	6/19/2024	11:15
6/19/2024	11:30	7/23/2024	14:00
7/23/2024	14:15	8/20/2024	13:15
8/20/2024	13:30	9/17/2024	13:15
9/17/2024	13:30	10/16/2024	12:45
10/16/2024	13:00	11/13/2024	12:30
11/13/2024	12:45	12/11/2024	11:00
12/11/2024	11:15	1/8/2025	9:45

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 2024.

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 –

The research program at the TRNERR focuses on adaptive approaches to wetlands management, which involves coupling scientific investigation with management action. One focal area of research continues to be adaptive restoration, and the TRNERR has a long history of science-based restoration efforts. These programs incorporate descriptive and experimental approaches to investigate biotic and abiotic responses to marsh restoration, including ways to better achieve desired ecosystem responses. Two SWMP sites, based in South San Diego Bay, are associated with planned restoration of salt ponds in that area. Another active area of research is invasive species ecology and management. Although estuaries are typically invaded by a broad suite of species from many habitat types, current research is focusing on terrestrial and riparian invaders able to cross ecotones and invade salt marsh habitats. Researchers at the TRNERR are investigating mechanisms of invasions, impacts of invaders, and ecosystem recovery after exotic species control.

NERR SWMP water quality and weather data are used in a variety of reserve-based and external research and education programs. Water quality data from the Tijuana River, which rarely experienced mouth closure prior to 2016, provided an interesting contrast to data from other regional systems, which experience frequent closure events. During the 2016 El Niño and until recently, the river mouth experienced few closures, and therefore the water quality and nutrient data were crucial to detect the imminent closures as well as to identify the effects on the system. Besides the importance of the SWMP data for Research and Stewardship purposes, SWMP water quality data are incorporated into a high school curriculum developed at the reserve, serving as a great tool for the Education and Outreach programs.
Tier 1 nutrient sampling is being conducted monthly at all water quality datalogger stations. NERR SWMP meteorological data is collected at 15-minutes intervals at 1 station which is located near the former Tidal Linkage water quality station. These data are available at www.nerrsdata.org.

II. Physical Structure Descriptors

9) Sensor specifications –

TJR NERR deployed YSI EXO2 and YSI EXO3 sondes with depth, temperature/conductivity, Optical DO, pH and turbidity probes. At one of the sites (Oneonta Slough) Chlorophyll sensors were deployed.

YSI EXO Sonde:

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 –

Sampling station:	Sampling site code:	Station code:
Boca Rio	BR	tjrbrwq
Oneonta Slough	OS	tjroswq
Pond Restored	PR	tjrprwq
South Bay	SB	tjrsbwq

11) QAQC flag definitions –

QAQC flags provide documentation of the data and are applied to individual data points by insertion into the parameter's associated flag column (header preceded by an F_). During primary automated QAQC (performed by the CDMO), -5, -4, and -2 flags are applied automatically to indicate data that is missing and above or below sensor range. All remaining data are then flagged 0, passing initial QAQC checks. During secondary and tertiary QAQC 1, -3, and 5 flags may be used to note data as suspect, rejected due to QAQC, or corrected.

-5 Outside High Sensor Range
-4 Outside Low Sensor Range
-3 Data Rejected due to QAQC
-2 Missing Data
-1 Optional SWMP Supported Parameter
0 Data Passed Initial QAQC Checks
1 Suspect Data
2 *Open - reserved for later flag*
3 Calculated data: non-vented depth/level sensor correction for changes in barometric pressure
4 Historical Data: Pre-Auto QAQC

5 Corrected Data

12) QAQC code definitions –

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QAQC codes are used in conjunction with QAQC flags to provide further documentation of the data and are also applied by insertion into the associated flag column. There are three (3) different code categories, general, sensor, and comment. General errors document general problems with the deployment or YSI datasonde, sensor errors are sensor specific, and comment codes are used to further document conditions or a problem with the data. Only one general or sensor error and one comment code can be applied to a particular data point, but some comment codes (marked with an * below) can be applied to the entire record in the F_Record column.

General Errors

GIC	No instrument deployed due to ice
GIM	Instrument malfunction
GIT	Instrument recording error; recovered telemetry data
GMC	No instrument deployed due to maintenance/calibration
GNF	Deployment tube clogged / no flow
GOW	Out of water event
GPF	Power failure / low battery
GQR	Data rejected due to QA/QC checks
GSM	See metadata

Corrected Depth/Level Data Codes

GCC	Calculated with data that were corrected during QA/QC
GCM	Calculated value could not be determined due to missing data
GCR	Calculated value could not be determined due to rejected data
GCS	Calculated value suspect due to questionable data
GCU	Calculated value could not be determined due to unavailable data

Sensor Errors

SBO	Blocked optic
SCF	Conductivity sensor failure
SCS	Chlorophyll spike
SDF	Depth port frozen
SDG	Suspect due to sensor diagnostics
SDO	DO suspect
SDP	DO membrane puncture
SIC	Incorrect calibration / contaminated standard
SNV	Negative value
SOW	Sensor out of water
SPC	Post calibration out of range
SQR	Data rejected due to QAQC checks
SSD	Sensor drift
SSM	Sensor malfunction
SSR	Sensor removed / not deployed
STF	Catastrophic temperature sensor failure
STS	Turbidity spike
SWM	Wiper malfunction / loss

Comments

CAB*	Algal bloom
CAF	Acceptable calibration/accuracy error of sensor
CAP	Depth sensor in water, affected by atmospheric pressure
CBF	Biofouling
CCU	Cause unknown

CDA* DO hypoxia (<3 mg/L)
CDB* Disturbed bottom
CDF Data appear to fit conditions
CFK* Fish kill
CIP* Surface ice present at sample station
CLT* Low tide
CMC* In field maintenance/cleaning
CMD* Mud in probe guard
CND New deployment begins
CRE* Significant rain event
CSM* See metadata
CTS Turbidity spike
CVT* Possible vandalism/tampering
CWD* Data collected at wrong depth
CWE* Significant weather event

13) Post deployment information –

Boca Rio (non-vented EXO2)

Deploy Date	Sonde Model	SpCond	ROXDO1	ROXDO2	pH7	pH10	Turb	Turb	Level
1/24/2024	EXO2 (BR exo)	49.84(50.0)	99.5	96.7	6.99	10.05	0.49(0.0)	123.86(124.0)	-0.02(-0.036)
2/22/2024	EXO2 (BR2 exo)	50.68(50.0)	103.8	103.8	7.92	10.72	0.07(0.0)	123.96(124.0)	0.009(-0.005)
3/20/2024	EXO2 (BR exo)	51.45(50.0)	95.8	95.2	6.88	9.86	NA	NA	-0.06(-0.039)
4/16/2024	EXO2 (BR2 exo)	49.5(50.0)	91.8	91.9	6.87	9.87	NA	NA	-0.05(-0.049)
5/15/2024	EXO2 (BR exo)	50.02(50.0)	86.6	89.8	6.83	9.79	NA	NA	-0.12(-0.119)
6/18/2024	EXO2 (BR2 exo)	48.149(50.0)	92.9	91.8	6.93	9.91	2.72(0.0)	107.58(124.0)	-0.047(-0.065)
7/25/2024	EXO2 (BR exo)	49.77(50.0)	98.8	98.6	7.08	10.04	0.01(0.0)	114.54(124.0)	-0.043(-0.049)
8/19/2024	EXO2 (BR2 exo)	49.37(50.0)	99.3	99.2	7.09	10.08	0.21(0.0)	112.03(124.0)	-0.072(-0.055)
9/16/2024	EXO2 (BR exo)	4.35(50.0)	97.1	95	7.16	10.08	0.43(0.0)	109.4(124.0)	-0.018(-0.053)
10/15/2024	EXO2 (BR2 exo)	49.79(50.0)	99.6	99.6	7.12	10.1	0.19(0.0)	113.04(124.0)	-0.013(-0.02)
11/12/2024	EXO2 (BR exo)	48.26(50.0)	101.8	101.6	7.17	10.11	0.5(0.0)	113.0(124.0)	0.013(0.037)
12/10/2024	EXO2 (BR2 exo)	49.02(50.0)	99.9	99.9	7.17	10.02	0.21(0.0)	113.7(124.0)	-0.071(-0.077)

Oneonta Slough **(non-vented EXO2)**

Deploy Date	Sonde Model	SpCond	ROXDO1	ROXDO2	pH7	pH10	Turb	Turb	Level
1/23/2024	EXO2 (OS exo)	50.91(50.0)	77.1	79.3	7.02	10.07	0.87(0.0)	126.96(124.0)	0.298(0.32)
2/22/2024	EXO2 (OS2 exo)	50.86(50.0)	91.3	91.7	7.11	10.12	0.33(0.0)	125.55(124.0)	0.328(0.286)
3/19/2024	EXO2 (OS exo)	51.44(50.0)	91.2	89.2	7.06	10.05	0.0(0.0)	-124	0.271(0.294)
4/16/2024	EXO2 (OS2 exo)	49.9(50.0)	95	93.9	7.79	10.6	()	()	0.293(0.273)
5/15/2024	EXO2 (OS exo)	50.07(50.0)	106.7	105.7	7.05	10.01	-0.03(0.0)	112.84(124.0)	0.212(0.213)
6/18/2024	EXO2 (OS2 exo)	48.82(50.0)	94.8	94.6	7.15	10.13	2.2(0.0)	105.8(124.0)	0.281(0.279)
7/24/2024	EXO2 (OS exo)	44.5(50.0)	98.6	98.6	7.14	10.09	0.02(0.0)	111.11(124.0)	0.263(0.279)
8/19/2024	EXO2 (OS2 exo)	48.21(50.0)	100.7	100.9	7.07	10.04	1.95(0.0)	112.17(124.0)	0.273(0.273)
9/16/2024	EXO2 (OS EXO)	49.91(50.0)	108.5	108.3	7.1	10.12	-0.13(0.0)	126.4(124.0)	0.297(0.277)
10/15/2024	EXO2 (OS2 exo)	49.18(50.0)	106.6	106.6	7.2	10.12	112.75(124	0.47(0.0)	0.305(0.307)
11/12/2024	EXO2 (OS exo)	49.04(50.0)	101.1	100.9	7.18	10.17	125.34(124	0.01(0.0)	0.37(0.364)
12/10/2024	EXO2 (OS2 exo)	49.702(50.0)	97.6	97.6	7.17	10.1	114.02(124	0.08(0.0)	0.255(0.256)

Pond Restored (non-vented EXO3)

Deploy Date	Sonde Model	SpCond	ROXDO1	ROXDO2	pH7	pH10	Turb	Turb	Level
1/24/2024	EXO3 (PR2 exo)	49.87(50.0)	105.1	105.1	6.95	10.02	0.6(0.0)	124.06(124.0)	-0.307(-0.281)
2/21/2024	EXO3 (PR exo)	51.18(50.0)	97.5	96.7	7.07	10.4	0.12(0.0)	126.31(124.0)	-0.325(-0.344)
3/19/2024	EXO3 (PR2 exo)	52.29(50.0)	83	82.5	7.02	9.99	NA	NA	-0.421(-0.36)
4/17/2024	EXO3 (PR exo)	49.03(50.0)	101.2	101.1	7.1	9.95	NA	NA	-0.391(-0.364)
5/16/2024	EXO3 (PR2 exo)	50.0(50.0)	95.9	95.9	6.84	9.9	NA	NA	-0.485(-0.441)
6/19/2024	EXO3 (PR exo)	49.75(50.0)	102.2	102.2	7.16	10.02	1.38(0.0)	120.2(124.0)	-0.387(-0.381)
7/23/2024	EXO3 (PR2 exo)	48.616(50.0)	99.3	99.2	6.97	10.04	0.31(0.0)	115.65(121.0)	-0.369(-0.374)
8/20/2024	EXO3 (PR exo)	48.08(50.0)	111.7	111.8	7.06	10.05	0.01(0.0)	118.74(124.0)	-0.411(-0.412)
9/17/2024	EXO3 (PR2 exo)	45.55(50.0)	99.1	100.1	7.05	10.05	3.45(0.0)	122.07(124.0)	-0.387(-0.412)
10/16/2024	EXO3 (PR exo)	48.85(50.0)	101.5	101.5	7.15	10.08	0.02(0.0)	120.95(124.0)	-0.317(-0.369)
11/13/2024	EXO3 (PR2 exo)	47.55(50.0)	101.2	101.3	7.15	10.08	0.43(0.0)	117.1(124.0)	-0.37(-0.386)
12/11/2024	EXO3 (PR exo)	48.38(50.0)	100.2	100.2	7.19	10.05	0.15(0.0)	123.92(124.0)	-0.363(-0.36)

South Bay (non-vented EXO3 and EXO2)

Deploy Date	Sonde Model	SpCond	ROXDO1	ROXDO2	pH7	pH10	Turb	Turb	Level
1/24/2024	EXO3 (SB2 exo)	48.74(50.0)	105.1	105.1	6.97	10.05	0.26(0.0)	120.74(124.0)	-0.624(-0.603)
2/21/2024	EXO3 (SB exo)	50.82(50.0)	96.6	96.4	7.12	10.07	0.07(0.0)	122.92(124.0)	-0.584(-0.603)
3/19/2024	EXO3 (SB2 exo)	51.7(50.0)	100.2	100.8	6.98	10.02	0.05(0.0)	125.7(124.0)	-0.609(-0.584)
3/27/2024	EXO3 (SB exo)	51.25(50.0)	95	93.9	7.04	10.03	NA	NA	-0.619(-0.603)
4/17/2024	EXO2 (TETRP)	49.6(50.0)	103.3	103.4	7.27	10.14	NA	NA	-0.6(-0.596)
5/16/2024	EXO3 (SB exo)	49.63(50.0)	106.5	106.7	7.05	10	NA	NA	-0.676(-0.671)
6/19/2024	EXO3 (SB2 exo)	50.06(50.0)	102.3	102.3	7.22	10.15	0.16(0.0)	121.77(124.0)	-0.655(-0.636)
7/3/2024	EXO3 (SB exo)	50.23(50.0)	102	102.4	7.14	10.09	-0.13(0.0)	114.5(121.0)	0.727(-0.61)
7/23/2024	EXO3 (SB2 exo)	48.906(50.0)	118.5	118.4	7.12	10.09	0.17(0.0)	120.13(124.0)	-0.606(-0.606)
8/20/2024	EXO3 (SB exo)	47.54(50.0)	121.7	121.7	7.09	10.05	0.0(0.0)	116.16(124.0)	-0.641(-0.644)
9/17/2024	EXO3 (SB2 exo)	48.01(50.0)	102.2	102.2	7.09	10.05	0.31(0.0)	124.61(124.0)	-0.629(-0.643)
10/16/2024	EXO3 (SB exo)	48.56(50.0)	100.5	100.6	7.29	10.19	-0.3(0.0)	115.5(124.0)	-0.61(-0.601)
11/13/2024	EXO3 (SB2 exo)	46.92(50.0)	101.8	101.8	7.11	10.02	0.73(0.0)	118.94(124.0)	-0.596(-0.618)
12/11/2024	EXO3 (SB exo)	48.31(50.0)	99.9	99.9	7.2	10.08	0.4(0.0)	118.58(124.0)	-0.596(-0.594)

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.

Precipitation

The rain data below were recorded by a tipping bucket in the TJR NERR Tidal Link meteorological station except where otherwise noted.

Date	.in
01/03	0.4
01/07 – 08	0.06
01/11 – 12	0.04

01/20 - 22	1.83
02/01 -03	0.5
02/05 – 06	2.4
02/19	0.02
02/21	0.4
03/02 – 04	0.2
03/06 – 07	0.5
03/12 – 15	0.14
03/23 – 24	0.32
03/30 – 31	1.0
04/05	0.04
04/13 – 14	0.03
05/04 – 05	0.09
08/01	0.01
11/02	0.08

Site specific issues

Two of our sites are considerably affected by transboundary flows of the Tijuana River that consist of partially treated and untreated wastewater. Data showing both recorded and nearly real-time daily discharge of the Tijuana River, measured by the U.S. International Boundary & Water Commission (IBWC) stream gauge, can be obtained at the IBWC water data dashboard. During such flows, staff is oriented to avoid contact with the water.

Boca Rio and Oneonta Slough

Anoxic conditions are frequently observed at the Boca Rio and Oneonta Slough sites. In recent years, these events have become more frequent and prolonged due to more constant polluted flows entering the estuary, resulting from failures in the wastewater infrastructure. The dissolved oxygen (DO) data has reflected this by showing longer periods of low DO, including zero and below zero values. Per protocol, we typically reject the negative (below-zero) values because they are beyond the sensor's specified limits.
To address the issue of negative values and ensure we capture the most accurate data possible with our equipment, we calibrated the dissolved oxygen (DO) sensor using a two-point method with both a zero percent solution and 100% saturated water over several months. However, changing the calibration did not yield significant improvements.
Considering that small negative values are still within the sensor's accuracy range, and recognizing that rejecting these values would result in the loss of important information for users researching anoxia, we have decided to flag all negative values at or above -5% DO as "suspect" instead of rejecting them. This change has been applied to the data starting from mid-July.

Boca Rio

03/20 – 06/18 Turbidity standard was not delivered on time for these deployments due to supply chain issues. Turbidity sensor was not calibrated, but it held the calibration from February 20, 2024.

Oneonta Slough

03/20 –– 06/18 Turbidity standard was not delivered on time for these deployments due to supply chain issues. Turbidity sensor was not calibrated, but it held the calibration from March 18, 2024.

09/26 - 10/01 Chlorophyll data above 400 mg/L were rejected because they exceeded sensor limits. However, data seem to fit conditions.

09/28 – 09/30 Dissolved oxygen data above 500 mg/L were rejected because they exceeded sensor limits.

11/08 – 11/09 Negative Chlorophyll data were rejected because they exceeded the lower sensor limits.

Pond Restored

3/19 – 4/17 Level was calibrated incorrectly. It was calibrated to -0.394m instead of -0.359m. To correct this, I subtracted the two numbers (-0.360 - (-0.394) = 0.034) and then added that difference to the data.

04/17 – 06/19 Turbidity standard was not delivered on time for this deployment due to supply chain issues. Turbidity sensor was not calibrated, but it held the calibration from March 18, 2024.

10/16 12:30 – 11/13 12:00 The level was calibrated incorrectly for this deployment. It was calibrated to -0.327m instead of -0.390m. To correct this, I subtracted the two numbers (-0.327 - (-0.390) = 0.063) and then subtracted that difference from the data.

12/11 11:30 The sonde was pulled just moments before it could take a reading. The recorded level is inaccurate because the sonde was not positioned at the bottom of the tube. However, the rest of the data appears to be fine and indicates that the sonde was still fully submerged in the water.

South Bay

03/19 12:30 – 03/27 13:45 Sonde was deployed in Local Daylight Savings Time and timestamp was fixed to align with the Local Standard Time. The timestamp from the .csv file will differ from the raw file by one hour.

04/17– 06/19 Turbidity standard was not delivered on time for this deployment due to supply chain issues. Turbidity sensor was not calibrated, but it held the calibration from March 18, 2024.

07/03 11:45 – 07/23 14:00 The level was calibrated incorrectly for this deployment. It was calibrated to 0.670m instead of -0.670m. To correct this, I subtracted the two numbers (0.670 - (-0.670) = 1.34) and then subtracted that difference from the data.

07/03 11:45 – 08/20 13:15 Turbidity calibrated incorrectly to 121.0 NFU instead of 124.0 NFU due to a mistaken while switching between standards.

12/11 11:00 The sonde was pulled just moments before it could take a reading. The recorded level is inaccurate because the sonde was not positioned at the bottom of the tube. However, the rest of the data appears to be fine and indicates that the sonde was still fully submerged in the water.