

Tijuana River (TJR) NERR Water Quality Metadata
January to December 2016
Last Revised: April 9, 2018

I. Data Set and Research Descriptors

1) Principal Investigators and contact persons

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2) Entry Verification

Deployment data are uploaded from the YSI datasonde to a Personal Computer (IBM compatible). Files are exported from EcoWatch Lite in a comma separated file (.CSV) and uploaded to the CDMO where they undergo automated primary QAQC 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 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 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 to the CDMO for tertiary QAQC and assimilation into the CDMO's authoritative online database. Where deployment overlap occurs between files, the data produced by the newly calibrated datasonde is generally accepted as being the most accurate. For more information on QAQC flags and codes, see Sections 11 and 12. The person responsible for data management from January to June 2015 was Holly Bellringer, after that is Monica Almeida.

3) Research Objectives

The Tijuana River National Estuarine Research Reserve (TRNERR) is impacted heavily by periodic raw sewage outflows and urban development. About a quarter of the reserve's 2,531 acres are tidally influenced and few channels are deep enough for datalogger deployment. Two stations were originally set up: a treatment station (RC) was set up close to the river mouth on the southern end of the Oneonta Slough, while a control station (OS) was set up on the northern end of Oneonta Slough. The treatment station location was chosen because it would be the site most affected by sewage outflow. Deployment at the treatment station, however, was continually halted 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 equipment designs were implemented, without success, logging at this site was terminated in 2004.

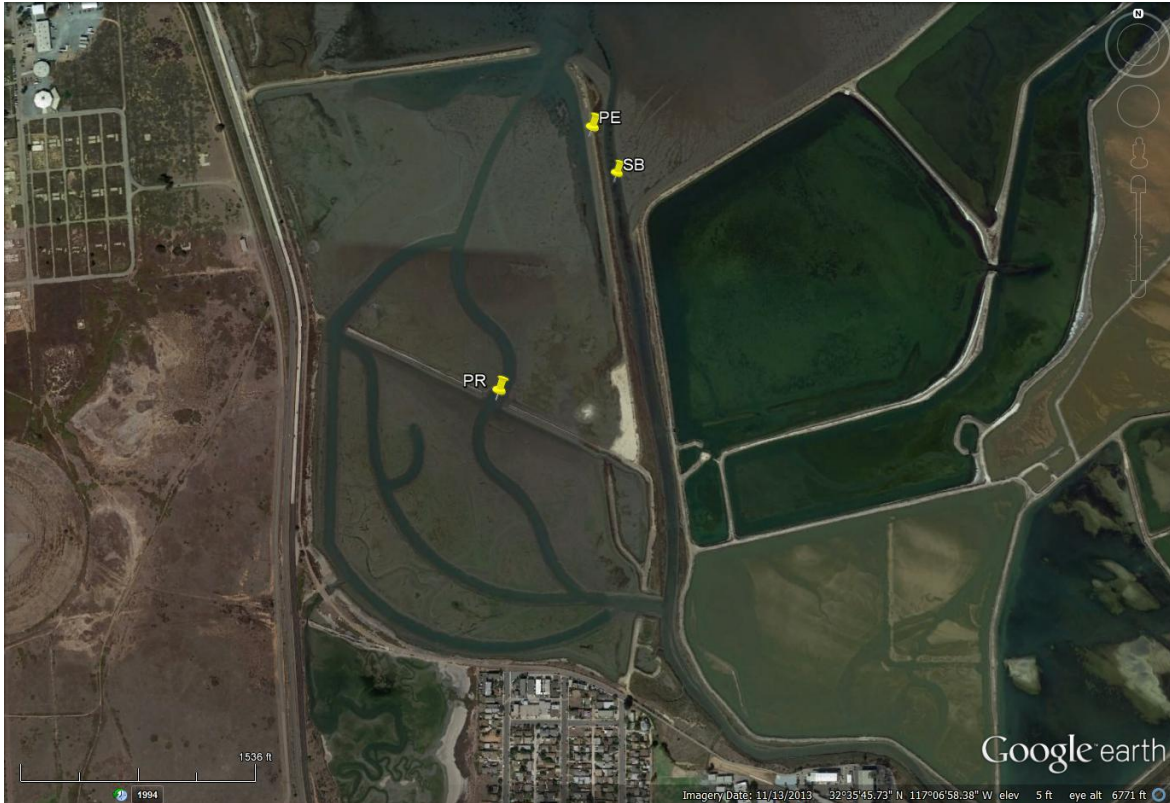
Currently, there are two YSI datalogger stations installed at the TRNERR and two datalogger stations are located off the reserve. Station locations are designed to investigate spatial gradients of water quality parameters across the reserve, as well as document the water quality changes over time to areas in the reserve that have been restored to increase tidal flushing. The original control station (OS) in the northern end of Oneonta Slough is still in place. 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 data logging at the station began in October 2000. The site was discontinued in January 2008 due to heavy sedimentation. The second active datalogger site, Boca Rio (BR), was established in December 2004 and is located near the mouth of the Tijuana River. This station replaces the River Channel station (RC), which was established in August 2002 to monitor the Tijuana River, the largest source of freshwater to the reserve.

The South Bay (SB) datalogger was established in January 2008 and is located at the mouth of Otay River, which flows into South San Diego Bay. The fourth sonde location, Pond Eleven (PE), was a non-tidal salt pond adjacent to the South Bay logger. A flood gate was the only source of water into the pond. The Pond Eleven 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. Channels were dredged near the Pond Eleven site, the surrounding ponds and the adjacent Otay River. A levee was breached to open Pond Eleven to the bay, which made the area tidal. Due to extensive restoration, the datalogger site was relocated. Sonde deployments began in January 2012 at a new location site named Pond Restored (PR). The Pond Restored datalogger is located approximately 560 meters southwest from where the Pond Eleven datalogger was originally. The South Bay and Pond Restored sites are located within the San Diego National Wildlife Refuge Complex. The images below show pre- and post-restoration of the salt ponds and the datalogger sites. The post restoration photo includes the PE datalogger site as a reference to the new PR datalogger site. No sampling occurs at the PE site.

Pre Restoration



Post Restoration



4) Research Methods (Dataloggers)

Dataloggers at the Oneonta Slough, Boca Rio, South Bay, and Pond Restored stations are deployed using a 4-inch diameter PVC pipe that is strapped vertically to two "rail" style fence posts driven into the sediment. Multiple 1.5 inch holes have been drilled around the bottom of the tube to permit unrestricted water flow to the sensors. During deployment the datalogger units are then placed into and rest on a bolt fixed across the bottom of the tubes. The sampling period is between two and four weeks, with measurements taken every 15 minutes. Measurements for specific conductivity, salinity, dissolved oxygen (percent saturation), dissolved oxygen (mg/l), temperature, turbidity, pH, chlorophyll (except at Boca Rio) and water level are recorded.

At the end of each sampling period, the YSI dataloggers are brought back to the laboratory for 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 (50) and turbidity (0 and 126) are purchased from YSI, and pH standards (7 and 10) are purchased from Fisher Scientific. The QA/QC procedures for the collected data are followed from the CDMO Operations Manual version 6.6 – February 2015.

On the field, concurrently to the datalogger's deployment, the YSI Professional Plus handheld multiparameter 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. The handheld meter is calibrated in the specific conductivity standard (50) and once a month its membrane is changed.

In 2015, Tijuana River (TJR) NERR started to report level data. In January and February datalogger holders were surveyed using the Spectra Precision Epoch real-time kinematic GPS and calculations were done to find the correct depth offset. The site offset specifications are:

Boca Rio (BR)

Elevation of sonde: .053m NAVD88, surveyed and measured on January 27, 2015.

Oneonta Slough (OS)

Elevation of sonde: .332m NAVD88, surveyed and measured on January 23, 2015.

Pond Restored (PR)

Elevation of sonde: -.310m NAVD88, surveyed and measured on February 25, 2015.

South Bay (SB)

Elevation of sonde: -.379m NAVD88, surveyed and measured on February 25, 2015.

A Sutron Sat-Link2 transmitter was installed at the Oneonta Slough station on 12/20/2006 and transmits data to the NOAA GOES satellite, NESDIS ID #3B0252F2. The transmissions are scheduled hourly and contain four (4) datasets reflecting fifteen minute data sampling intervals. The telemetry data is “Provisional” data and not the “Authentic” dataset used for long term monitoring and study. This data can be viewed by going to <http://cdmo.baruch.sc.edu>.

5) Site location and character

General site Characteristics (TRNERR)

- a) Latitude and longitude: 32° 34' N, 117° 07' W
- b) Tidal exchange (extremes): approx. -2 +7 MLLW
- c) Salinity: 4 ppt (extreme rain events) to 38 ppt (except Pond Restored and South Bay)
- d) The dominant freshwater source to the estuary is the Tijuana River, which drains a 4,483km² watershed, approximately 2/3 of which resides in Mexico. Stream flows in the river vary considerably from season to season and year to year, with no flow during many months and a mean annual discharge of .82m³/s. Additional freshwater sources are storm drains located mostly in the northern arm of the estuary from the adjacent military airfield and residential area. The entire estuary is shallow and has a relatively small tidal prism (0.36 Mm³), so even low freshwater flows result in reduced salinity throughout the reserve. Estimated residence times for freshwater entering the estuary vary from 7 hours to a few days, depending on the tide and mouth conditions. Rainfall within the watershed accounts for most of the freshwater entering the reserve, with 90% of the mean annual rainfall occurring between November and April. Freshwater discharge with untreated sewage occurs year round, although these have decreased with the construction of a binational water treatment plant. Vegetation in the area is dominated by common pickleweed (*Salicornia pacifica*) and Pacific cordgrass (*Spartina foliosa*).

Specific Site characteristics: Boca Rio (BR)

- a) Location of site: the datalogger station is located approximately 400m north of the Tijuana River in the middle of a channel which runs north-south; 32° 33' 33.7" N, 117° 7' 44.3" W.
- b) Elevation of sonde: .053m NAVD88, approximately .5m above the channel bottom. Surveyed and measured on January 27, 2015.

- c) Channel width: approximately 30 m.
- d) Bottom type: sand, very little silt and clay.

Specific Site characteristics: Oneonta Slough (OS)

- a) Location of site: the datalogger station is located on the upper portion of the Oneonta Slough in the northwest corner of the reserve, approximately 1.4km north of the Tijuana River in the middle of the same channel as the Boca Rio site; : 32° 34' 6.0" N, 117° 7' 52.6" W .
- b) Elevation of sonde: .332m NAVD88, approximately .5m above the channel bottom. Surveyed and measured on January 23, 2015.
- c) Channel width: approximately 23 meters.
- d) Bottom type: silty clay.
- e) The area adjacent to the west side of the channel is developed. There is a 50+ meter buffer of natural vegetation between development and the channel. The area adjacent to the east side of the channel is relatively undisturbed.
- f) Direct impacts may be runoff from streets into channel during rain events.

Specific Site Characteristics: Pond Restored (PR)

- a) Location of site: The datalogger is located at the middle levee breach between Pond Eleven and Pond Ten, which is part of the South San Diego Bay Coastal Wetland Restoration and Enhancement Project ; 32° 35' 45.9", 117° 7' 5.5" W.
- b) Elevation of sonde: -.310m NAVD88, approximately .5m above the channel bottom. Surveyed and measured on February 25, 2015.
- c) Channel width: approximately 40m.
- d) Bottom type: very fine mud.
- e) Tidal Exchange (extremes): approximately -2 to +7 MLLW.
- f) Salinity: 2ppt (extreme rain event) to 33 ppt.

Specific Site Characteristics: South Bay (SB)

- a) Location of site: The datalogger is located at the mouth of Otay River where it flows into San Diego Bay; 32° 36' 3.6" N, 117° 6' 57.0" W .
- b) Elevation of sonde: -.379m NAVD88, approximately .5m above the channel bottom. Surveyed and measured on February 25, 2015.
- c) Channel width: approximately 25m
- d) Bottom type: very fine mud.
- e) Tidal Exchange (extremes): approximately -2 to +7 MLLW.
- f) Salinity: 2 ppt (extreme rain event) to 40 ppt

SWMP Station Timeline

Station Code	SWMP Status	Station Name	Location	Active Dates	Reason Decommissioned	Notes
tjrbrwq	P	Boca Rio	32° 33' 33.70 N, 117° 7'	12/23/2004 15:30	NA	NA

			44.30 W			
tjroswq	P	Oneonta Slough	32° 34' 6.00 N, 117° 7' 52.60 W	01/01/1996 00:00 -	NA	NA
tjrprwq	P	Pond Eleven Restored	32° 35' 45.90 N, 117° 07' 5.59 W	02/16/2012 11:00	NA	NA
tjrswbq	P	South Bay	32° 36' 3.60 N, 117° 6' 57.00 W	01/02/2008 00:00 -	NA	NA
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	
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 temporarily 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.
tjrrewq	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
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

Data was collected every 15 minutes for all parameters at each station from 01/01/2016 00:00 until 12/31/2016 23:45 using YSI model 6600 EDS dataloggers.

Boca Rio

Deployment

12/18/2015 9:30

1/20/2016 13:45

2/17/2016 15:00

Retrieval

1/20/2016 13:30

2/17/2016 12:00

3/21/2016 14:00

3/21/2016 14:15	4/18/2016 12:30
4/18/2016 12:45	5/19/2016 12:15
5/19/2016 12:30	6/13/2016 9:45
6/13/2016 10:00	7/13/2016 9:30
7/13/2016 9:45	8/17/2016 13:00
8/17/2016 13:15	9/27/2016 15:00
9/27/2016 15:15	10/12/2016 12:00
10/12/2016 12:30	11/14/2016 16:15
11/14/2016 16:30	12/13/2016 14:30
12/13/2016 14:45	1/24/2017 16:00

Oneonta Slough

Deployment

12/18/2015 10:15
 1/20/2016 14:15
 2/17/2016 13:00
 3/21/2016 15:15
 4/18/2016 13:30
 5/19/2016 13:15
 6/13/2016 11:15
 7/13/2016 10:45
 8/17/2016 14:30
 9/14/2016 14:00
 10/12/2016 13:15
 11/14/2016 15:45
 12/13/2016 15:45

Retrieval

1/20/2016 14:00
 2/17/2016 12:45
 3/21/2016 15:00
 4/18/2016 13:15
 5/19/2016 13:00
 6/13/2016 11:00
 7/13/2016 10:30
 8/17/2016 14:15
 9/14/2016 13:45
 10/12/2016 13:00
 11/14/2016 15:30
 12/13/2016 15:30
 01/25/2017 15:15

Pond Restored

Deployment

12/16/2015 15:30
 1/21/2016 12:45
 2/18/2016 11:45
 3/22/2016 12:15
 4/19/2016 11:30
 5/20/2016 13:30
 6/14/2016 09:45
 7/14/2016 09:15
 8/18/2016 12:45
 9/15/2016 12:15
 10/13/2016 11:30
 11/15/2016 14:15
 12/14/2016 13:45

Retrieval

1/21/2016 12:30
 2/18/2016 11:30
 3/22/2016 12:00
 4/19/2016 11:15
 5/20/2016 13:15
 6/14/2016 09:30
 7/14/2016 09:00
 8/18/2016 12:30
 9/15/2016 12:00
 10/13/2016 11:15
 11/15/2016 14:00
 12/14/2016 13:30
 01/26/2017 13:30

South Bay Deployment	Retrieval
12/16/2015 16:00	1/21/2016 12:00
1/21/2016 12:15	2/18/2016 11:45
2/18/2016 12:00	3/22/2016 11:30
3/22/2016 11:45	4/19/2016 11:45
4/19/2016 12:00	5/20/2016 12:45
5/20/2016 13:00	6/14/2016 09:00
6/14/2016 09:15	7/14/2016 08:45
7/14/2016 09:00	8/18/2016 12:00
8/18/2016 12:15	9/15/2016 12:30
9/15/2016 12:45	10/13/2016 10:45
10/13/2016 11:00	11/15/2016 13:30
11/15/2016 13:45	12/14/2016 13:00
12/14/2016 13:15	01/26/2017 13:00

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 process the data. Following academic courtesy standards, the NERR site where the data were collected should be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

Requested citation format:

NOAA National Estuarine Research Reserve System (NERRS). System-wide Monitoring Program. Data accessed from the NOAA NERRS Centralized Data Management Office website: <http://www.nerrsdata.org/>; accessed 12 October 2012.

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

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Principal Investigators and Contact Persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page www.nerrsdata.org. Data are available in comma delimited format.

8) Associated researchers and projects

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 experiences mouth closure, provides an interesting contrast to data from other regional systems, which experience frequent closure events. Also, SWMP water quality data are incorporated into a high school curriculum developed at the reserve. Tier 1 nutrient sampling is being conducted at all water quality datalogger stations. NERR SWMP meteorological sampling is being conducted at 1 station which is located near the former Tidal Linkage water quality station. In addition, much of the reserve is used as a test bed for research related to adaptive marsh restoration, with recent attention on the Model Marsh.

II. Physical Structure Descriptors

9) Sensor Specifications

YSI 6600EDS V2-4 datasondes were used at Oneonta Slough, South Bay and Pond Restored. These datasondes had depth, temperature/conductivity, ROX DO, pH, turbidity, and chlorophyll probes. The Boca Rio site utilized an YSI 6600 EDS V2-2 datasonde with temperature/conductivity, ROX DO, pH and turbidity probes.

YSI 6600EDS data sonde:

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model#: 6560
Range: -5 to 50 C
Accuracy: +/- 0.15
Resolution: 0.01 C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: 4-electrode cell with autoranging
Model#: 6560
Range: 0 to 100 mS/cm
Accuracy: +/- 0.5% of reading + 0.001 mS/cm
Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependant)

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

Parameter: Dissolved Oxygen % saturation
Units: percent air saturation (%)
Sensor Type: Rapid Pulse - Clark type, polarographic
Model#: 6562
Range: 0 to 500% air saturation
Accuracy: 0-200% air saturation: +/- 2% of the reading or 2% air saturation, whichever is greater; 200 to 500% air saturation: +/- 6% of the reading
Resolution: 0.1% air saturation

or

Sensor Type: Optical probe w/ mechanical cleaning
Model#: 6150 ROX
Range: 0 to 500% air saturation
Accuracy: 0-200% air saturation: +/- 1% of the reading or 1% air saturation, whichever is greater 200-500% air saturation: +/- 15% or reading
Resolution: 0.1% air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature, and salinity)
Units: milligrams/Liter (mg/L)
Sensor Type: Rapid Pulse - Clark type, polarographic
Model#: 6562

Range: 0 to 50 mg/L
Accuracy: 0-20 mg/L: +/- 2% of the reading or 0.2 mg/L, whichever is greater
20 to 50 mg/L: +/- 6% of the reading
Resolution: 0.01 mg/L

or

Units: milligrams/Liter (mg/L)
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 6150 ROX
Range: 0 to 50 mg/L
Accuracy: 0-20 mg/L: +/-0.1 mg/l or 1% of the reading, whichever is greater
20 to 50 mg/L: +/- 15% of the reading
Resolution: 0.01 mg/L

Parameter: Non-vented Level - Shallow (Depth)
Units: feet or meters (ft or m)
Sensor Type: Stainless steel strain gauge
Range: 0 to 30 ft (9.1 m)
Accuracy: +/- 0.06 ft (0.018 m)
Resolution: 0.001 ft (0.001 m)

Parameter: pH – bulb probe or EDS flat glass probe
Units: pH units
Sensor Type: Glass combination electrode
Model#: 6561 or 6561FG
Range: 0 to 14 units
Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Units: nephelometric turbidity units (NTU)
Sensor Type: Optical, 90 degree scatter, with mechanical cleaning
Model#: 6136
Range: 0 to 1000 NTU
Accuracy: +/- 2% of reading or 0.3 NTU (whichever is greater)
Resolution: 0.1 NTU

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

YSI EXO Sonde:

Parameter: Temperature

Units: Celsius (C)

Sensor Type: CT2 Probe, Thermistor

Model#: 599870

Range: -5 to 50 C

Accuracy: -5 to 35: +/- 0.01, 35 to 50: +/- .005

Resolution: 0.01 C

Parameter: Conductivity

Units: milli-Siemens per cm (mS/cm)

Sensor Type: CT2 Probe, 4-electrode cell with autoranging

Model#: 599870

Range: 0 to 200 mS/cm

Accuracy: 0 to 100: +/- 0.5% of reading or 0.001 mS/cm; 100 to 200: +/- 1% of reading

Resolution: 0.001 mS/cm to 0.1 mS/cm (range dependant)

Parameter: Salinity

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

Sensor Type: CT2 probe, Calculated from conductivity and temperature

Range: 0 to 70 psu

Accuracy: +/- 1.0% of reading pr 0.1 ppt, whichever is greater

Resolution: 0.01 psu

OR

Parameter: Temperature

Units: Celsius (C)

Sensor Type: Wiped probe; Thermistor

Model#: 599827

Range: -5 to 50 C

Accuracy: ± 0.2 C

Resolution: 0.001 C

Parameter: Conductivity

Units: milli-Siemens per cm (mS/cm)

Sensor Type: Wiped probe; 4-electrode cell with autoranging

Model#: 599827

Range: 0 to 100 mS/cm

Accuracy: $\pm 1\%$ 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: $\pm 2\%$ 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: $\pm 1\%$ of the reading or 1% air saturation, whichever is greater
200-500% air saturation: $\pm 5\%$ 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: $\pm 5\%$ of the reading

Resolution: 0.01 mg/L

Parameter: Non-vented Level - Shallow (Depth)

Units: feet or meters (ft or m)

Sensor Type: Stainless steel strain gauge

Range: 0 to 33 ft (10 m)

Accuracy: ± 0.013 ft (0.004 m)

Resolution: 0.001 ft (0.001 m)

Parameter: pH

Units: pH units

Sensor Type: Glass combination electrode

Model#: 599701(guarded) or 599702(wiped)

Range: 0 to 14 units

Accuracy: ± 0.01 units within $\pm 10^\circ$ of calibration temperature, ± 0.02 units for entire temperature range

Resolution: 0.01 units

Parameter: Turbidity

Units: formazin nephelometric units (FNU)

Sensor Type: Optical, 90 degree scatter

Model#: 599101-01

Range: 0 to 4000 FNU

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

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

Dissolved Oxygen Qualifier (Rapid Pulse / Clark type sensor):

The reliability of dissolved oxygen (DO) data collected with the rapid pulse / Clark type sensor after 96 hours post-deployment for non-EDS (Extended Deployment System) data sondes may be problematic due to fouling which forms on the DO probe membrane during some deployments (Wenner et al. 2001). Some Reserves utilize the YSI 6600 EDS data sondes, which increase DO accuracy and longevity by reducing the environmental effects of fouling. Optical DO probes have further improved data reliability. The user is therefore advised to consult the metadata for sensor type information and to exercise caution when utilizing rapid pulse / Clark type sensor DO data beyond the initial 96-hour time period. Potential drift is not always problematic for some uses of the data, i.e. periodicity analysis. It should also be noted that the amount of fouling is very site specific and that not all data are affected. If there are concerns about fouling impacts on DO data beyond any information documented in the metadata and/or QAQC flags/codes, please contact the Research Coordinator at the specific NERR site regarding site and seasonal variation in fouling of the DO sensor.

Depth Qualifier:

The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either vented or non-vented depth/level sensors. Readings for both vented and non-vented sensors are automatically compensated for water density change due to variations in temperature and salinity; but for all non-vented depth measurements, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.02 cm for every 1 millibar change in atmospheric pressure, and is eliminated for vented sensors because they are vented to the atmosphere throughout the deployment time interval.

Beginning in 2006, NERR SWMP standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg). To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in

the SWMP calibration sheet or digital calibration log. This offset procedure standardizes each depth calibration for the entire NERR System. If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR can be corrected.

In 2010, the CDMO began automatically correcting depth/level data for changes in barometric pressure as measured by the Reserve's associated meteorological station during data ingestion. These corrected depth/level data are reported as cDepth and cLevel, and are assigned QAQC flags and codes based on QAQC protocols. Please see sections 11 and 12 for QAQC flag and code definitions.

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

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 Name	Sampling Site Code	Station Code
Boca Rio	BR	tjrbrwq
Oneonta Slough	OS	tjroswq
Pond Restored	PR	tjrprwq
South Bay	SB	tjrswq

11) **QAQC flag definitions** – This section details the automated and secondary QAQC flag definitions. Include the following excerpt:

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** – This section details the secondary QAQC Code definitions used in combination with the flags above. Include the following excerpt:

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

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Sonde Model	pH Model	rpDO Model	roxDO Model	Turb Model	Cond Model	Chloro Model	EXO Model	Number		
1/20/2016	13:45	2/17/2016	12:15	6600EDSV	6561		6150	6136	6560					
2/17/2016	15:00	3/21/2016	14:15	6600EDSV	6561		6150	6136	6560					
3/21/2016	14:15	4/18/2016	12:45	6600EDSV	6561		6150	6136	6560					
4/18/2016	12:45	5/19/2016	12:30	6600EDSV	6561		6150	6136	6560					
5/19/2016	12:30	6/13/2016	10:00	6600EDSV	6561		6150	6136	6560					
6/13/2016	10:00	7/13/2016	9:45	6600EDSV	6561		6150	6136	6560					
7/13/2016	9:45	8/17/2016	13:15	6600EDSV	6561		6150	6136	6560					
8/17/2016	13:15	9/27/2016	15:15	6600EDSV	6561		6150	6136	6560					
9/27/2016	15:15	10/12/2016	12:30	6600EDSV	6561		6150	6136	6560					
10/12/2016	12:30	11/14/2016	16:30	6600EDSV	6561		6150	6136	6560					
11/14/2016	16:30	12/13/2016	14:45	6600EDSV	6561		6150	6136						
12/13/2016	14:45	1/24/2017	16:00	6600EDSV	6561		6150	6136	6560					
Deploy Date	Sonde Name	SpCond	RPDO1	RPDO2	ROXDO1	ROXDO2	pH7	pH10	pH4	Turb	Turb	Depth	Level	CHL(0)
1/20/2016	BR2	45.3(50.0)			101		7.05	9.89		1.4(0.0)	127.0(126.	-0.029)	0.016(0.024)	
2/17/2016	BR2	52.35(50.0)			100.2		7	9.97		2.4(0.0)	126.3(126.	-0.057	0.107(0.11)	
3/21/2016	SB/BR	49.1(50.0)			98		7.1	10.08		0.2(0.0)	126.3(126.	-0.011	0.064(0.064)	
4/18/2016	BR2	50.12(50.0)			98.3		7.2	10.22		0.9(0.0)	128.0(126.	-0.014)	0.047(0.039)	
5/19/2016	SB(spare)	50.89(50.0)			98.4		6.91	9.87		0.0(0.0)	125.4(126.	-0.018	0.073(0.071)	
6/13/2016	BR2	48.75(50.0)			96		7.02	9.86		0.0(0.0)	123.8(126.	-0.03	0.085(0.083)	
7/13/2016	SB(spare)	49.75(50.0)			98.5		6.79	9.76		1.7(0.0)	123.8(126.	-0.034)	0.025(0.019)	
8/17/2016	BR2	50.94(50.0)			14.7		7.17	10.18		-0.1(0.0)	126.0(126.	-0.019)	0.034(0.034)	
9/27/2016	SB(spare)	50.24(50.0)			101.1		6.76	9.74		0.0(0.0)	122.5(126.	-0.008	0.045(0.061)	
10/12/2016	BR2	49.9(50.0)			99.1		7.05	10.02		0.4(0.0)	125.1(126.	-0.015	0.066(0.068)	
11/14/2016	SB(spare)	50.05(50.0)			100.7		6.99	9.98		0.0(0.0)	125.3(126.	-0.02	0.078(0.073)	
12/13/2016	BR2	50.0(50.0)			112.7		7.12	10.05		1.6(0.0)	126.1(126.	-0.098	0.154(0.151)	

Oneonta Slough

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Sonde Model	pH Model	rpDO Model	roxDO Model	Turb Model	Cond Model	Chloro Model	EXO Model	Number		
1/20/2016	14:15	2/17/2016	13:00	6600EDSV	6561		6150	6136	6560	6025				
2/17/2016	13:00	3/21/2016	15:15	6600EDSV	6561		6150	6136	6560	6025				
3/21/2016	15:15	4/18/2016	13:30	6600EDSV	6561		6150	6136	6560	6025				
4/18/2016	13:30	5/19/2016	13:15	6600EDSV	6561		6150	6136	6560	6025				
5/19/2016	13:15	6/13/2016	11:15	6600EDSV	6561		6150	6136	6560	6025				
6/13/2016	11:15	7/13/2016	10:45	6600EDSV	6561		6150	6136	6560	6025				
7/13/2016	10:45	8/17/2016	14:30	6600EDSV	6561		6150	6136	6560	6025				
8/17/2016	14:30	9/14/2016	14:00	6600EDSV	6561		6150	6136	6560	6025				
9/14/2016	14:00	10/12/2016	13:15	6600EDSV	6561		6150	6136	6560	6025				
10/12/2016	13:15	11/14/2016	15:45	6600EDSV	6561		6150	6136	6560	6025				
11/14/2016	15:45	12/13/2016	15:45	6600EDSV	6561		6150	6136	6560	6025				
12/13/2016	15:45	1/25/2017	15:30	6600EDSV	6561		6150	6136	6560	6025				
Deploy Date	Sonde Name	SpCond	RPDO1	RPDO2	ROXDO1	ROXDO2	pH7	pH10	pH4	Turb	Turb	Depth	Level	CHL(0)
1/20/2016	OS2	48.85(50.0)			93.7		7.15	10.15		0.0(0.0)	125.2(126.	-0.023	0.351(0.35	0.3
2/17/2016	OS	49.9(50.0)			99.3		7.12	10.08		-0.2(0.0)	127.9(126.	-0.056	0.386(0.38	0.1
3/21/2016	OS2	48.9(50.0)			96.6		7.3	10.2		1.5(0.0)	125.4(126.	-0.011	0.346(0.34	0.5
4/18/2016	OS	48.88(50.0)			97.5		6.78	9.68		0.1(0.0)	128.2(126.	-0.015	0.325(0.31	-0.2
5/19/2016	OS2	50.8(50.0)			94.6		7.1	10		0.6(0.0)	115.4(126.	-0.039	0.372(0.37	0.5
6/13/2016	OS	46.0(50.0)			99		6.52	8.88		15.66(0.0)	125.6(126.	-0.005	0.344(0.33	2.2
7/13/2016	OS2	48.67(50.0)			98.8		6.79	9.67		2.2(0.0)	111.0(126.	-0.031	0.292(0.30	1.6
8/17/2016	OS	48.85(50.0)			99.5		6.85	9.83		-0.4(0.0)	104.5(126.	-0.015	0.353(0.34	0.1
9/14/2016	LPL2	50.01(50.0)			99.2		7.05	10.03		0.3(0.0)	112.3(126.	-0.007	0.329(0.33	-0.3
10/12/2016	OS	49.25(50.0)			96.6		7.05	10		0.0(0.0)	126.1(126.	-0.015	0.347(0.34	0.3
11/14/2016	LPL2	49.84(50.0)			102.3		7.07	10.15		0.1(0.0)	126.9(126.	-0.027	0.361(0.35	0.2
12/13/2016	OS	48.69(50.0)			102.7		7.06	9.86		0.1(0.0)	126.9(126.	-0.099	0.437(0.43	0.1

Pond Restored

South Bay

Deploy Date	Deploy Time	Retrieve Date	Retrieve Time	Sonde Model	pH Model	rpDO Model	roxDO Model	Turb Model	Cond Model	Chloro Model	EXO Model	Number		
1/21/2016	12:15	2/18/2016	12:00	6600EDSV	6561		6150	6136	6560	6025				
2/18/2016	12:00	3/22/2016	11:45	6600EDSV	6561		6150	6136	6560	6025				
3/22/2016	11:45	4/19/2016	11:45	6600EDSV	6561		6150	6136	6560	6025				
4/19/2016	11:45	5/20/2016	13:00	6600EDSV	6561		6150	6136	6560	6025				
5/20/2016	13:00	6/14/2016	9:15	6600EDSV	6561		6150	6136	6560	6025				
6/14/2016	9:15	7/14/2016	9:00	6600EDSV	6561		6150	6136	6560	6025				
7/14/2016	9:00	8/18/2016	12:15	6600EDSV	6561		6150	6136	6560	6025				
8/18/2016	12:15	9/15/2016	12:45	6600EDSV	6561		6150	6136	6560	6025				
9/15/2016	12:45	10/13/2016	11:00	6600EDSV	6561		6150	6136	6560	6025				
10/13/2016	11:00	11/15/2016	13:45	6600EDSV	6561		6150	6136	6560	6025				
11/15/2016	13:45	12/14/2016	13:15	6600EDSV	6561		6150	6136	6560	6025				
12/14/2016	13:15	1/26/2017	13:15	6600EDSV	6561		6150	6136	6560	6025				
Deploy Date	Sonde Name	SpCond	RPDO1	RPDO2	ROXDO1	ROXDO2	pH7	pH10	pH4	Turb	Turb	Depth	Level	CHL(0)
1/21/2016	SB(spare)	48.98(50.0)			97.2		7.01	10		0.4(0.0)	125.9(126.0)	-0.053	-0.353(-0.326)	0.3
2/18/2016	SB3	49.1(50.0)			96.3		7.15	9.9		1.2(0.0)	126.6(126.0)	-0.065	-0.313(-0.314)	0.2
3/22/2016	SB2	48.7(50.0)			101.8		7.13	10.03		2.5(0.0)	125.1(126.0)	-0.0040	-0.385(-0.383)	0
4/19/2016	SB3	48.72(50.0)			98.4		7.1	10.07		3.6(0.0)	127.3(126.0)	-0.014	-0.371(-0.365)	0
5/20/2016	SB2	50.83(50.0)			100.2		7.06	10.02		1.3(0.0)	127.5(126.0)	-0.02	-0.355(-0.359)	0.4
6/14/2016	SB3	48.74(50.0)			92.3		7.13	10.05		0.0(0.0)	126.2(126.0)	-0.023	-0.351(-0.356)	-0.3
7/14/2016	SB2	49.57(50.0)			87.8		7.07	10.05		0.2(0.0)	136.4(126.0)	-0.011	-0.388(-0.39)	0.1
8/18/2016	SB3	49.71(50.0)			106.5		7.05	10.07		-0.2(0.0)	129.6(126.0)	-0.0030	-0.384(-0.382)	-0.1
9/15/2016	SB2	49.5(50.0)			99.9		7.1	10.06		0.0(0.0)	123.6(126.0)	-0.005	-0.372(-0.374)	0.3
10/13/2016	SB3	49.51(50.0)			98.6		7.07	10.09		2.7(0.0)	127.0(126.0)	-0.001	-0.37(-0.378)	0.5
11/15/2016	SB2	49.57(50.0)			102.5		6.9	9.93		1.3(0.0)	127.2(126.0)	-0.02	-0.353(-0.359)	0.4
12/14/2016	SB3	52.0(50.0)			100.3		7	9.96		0.6(0.0)	133.7(126.0)	-0.109	-0.269(-0.27)	0.1

14) Other Remarks

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. If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

Precipitation and other events

01/04 Rain

01/04 @ 0300 Pump Station operations were suspended due to runoff in the Tijuana Watershed. Tijuana River is flowing north across the international border.

01/05 - 01/08 Rain

01/10 Rain

01/15 Rain

01/16 @ 0700 resumed operations of Pump Station

01/17 – 01/18 two separate potable water line breaks resulted in discharges in the Tijuana River, which caused flow to spill over the diversion wire at Pump Station and into the U.S. - Pump Station remained operational during these periods.

01/17 - 01/21- an octopus was found inside the South Bay sonde guard on retrieval

01/18 Rain

01/23 Rain

01/30 -01/31 Rain

01/31 Pump Station CILA off line due to rainfall in the basin

02/01 Rain

02/11 @1745 operations of Pump Station were resumed (off since 01/31)

02/18 Rain

03/05-03/07 Rain

03/06 @1130 Pump Station was shut down due to rainfall runoff

03/07 random Stormwater Plume Tracking Tijuana River Flow Rate Observations

24hr Maximum - 223.68 MGD 9.80 cm/s UTC 2016-03-07 20:00:00

24hr Minimum - 18.72 MGD 0.82 cm/s UTC 2016-03-07 15:30:00

MGD = Millions of gallons per day. cm/s = Cubic meters per second.

03/11-03/12 Rain

03/16 @1730 Pump Station resumed operations

03/22 Pond restored deployment – turbidity post check was too low

03/28 at this day (approximately) Tijuana River mouth fully closed after a slow process of a sediment barrier forming on its south side. The river mouth was mechanically opened on April 11, because during this period rain events combined with sewage spill caused changes in the water quality - DO went down almost to zero, nutrients were added. It is visible on the graphs that it affected all parameters. There was a high mortality of leopard and smoothound sharks as well as clams (tagelus) and snails (bulla)

03/28 Rain

03/29-03/30 Rain

04/05 @0700 Pump Station out of Service due to a transit system accident in Tijuana

04/05 Rain

04/06- 04/08 Rain

04/07 @1045 Pump Station was suspended due to runoff from precipitation in the basin.

04/09 - 04/10 Rain

04/11 Tijuana River mouth was opened and a climb in chlorophyll levels was observed.

04/12 – random Tijuana River Flow Rate Observations

24hr Maximum 73.72 MGD 3.23 cm/s 2016-04-12 05:00:00 UTC

24hr Minimum 25.56 MGD 1.12 cm/s 2016-04-11 20:00:00 UTC

MGD = Millions of gallons per day. cm/s = Cubic meters per second.

04/15 @0930 Pump Station CILA resumed operation (suspended since 04/07)

04/27 (approximately) River mouth started to close again and it opened on May 2nd (partially mechanically and partially by some rain).

5/2 to 5/20 Pond Restored turbidity - sonde had moderate to heavy mud inside guard and a polychaete worm around turbidity probe when retrieved. Some of the data was flagged suspect and readings that went over 26 and didn't go back under 20 were rejected

5/5 - 5/6 Rain - .735in (18.669mm)

5/6 @ 0400 due to runoff in the Tijuana River watershed, operation of Pump Station was suspended. Water flowing in the Tijuana River - from Mexico into the US.

_Tijuana River daily discharge:

5/6/2016 1:15	0.763187039
5/6/2016 1:30	3.486939403
5/6/2016 1:45	3.347047348
5/6/2016 2:00	3.107742405
5/6/2016 2:15	2.619004358
5/6/2016 2:30	2.372078348
5/6/2016 2:45	4.765651809
5/6/2016 3:00	10.45493081
5/6/2016 3:15	14.50803893
5/6/2016 3:30	16.96130633
5/6/2016 3:45	17.54094974
5/6/2016 4:00	18.61626033
5/6/2016 4:15	20.10820277
5/6/2016 4:30	20.66245602
5/6/2016 4:45	23.59404947
5/6/2016 5:00	141.5681123
5/6/2016 5:15	205.5230534
5/6/2016 5:30	209.0300257
5/6/2016 5:45	202.0524598
5/6/2016 6:00	192.7709711
5/6/2016 6:15	179.3478025
5/6/2016 6:30	163.1910416
5/6/2016 6:45	149.2603316
5/6/2016 7:00	133.1504898
5/6/2016 7:15	115.6886545
5/6/2016 7:30	95.29672187
5/6/2016 7:45	75.89399519
5/6/2016 8:00	56.94271835
5/6/2016 8:15	40.74801726
5/6/2016 8:30	34.71442942
5/6/2016 8:45	29.84844255
5/6/2016 9:00	26.56702243
5/6/2016 9:15	23.75103493
5/6/2016 9:30	21.83352381
5/6/2016 9:45	20.30930821
5/6/2016 10:00	17.15397303
5/6/2016 10:15	15.72256576
5/6/2016 10:30	14.32339905
5/6/2016 10:45	13.43971395
5/6/2016 11:00	12.37298554
5/6/2016 11:15	11.91018358
5/6/2016 11:30	11.28532241
5/6/2016 11:45	10.8393117
5/6/2016 12:00	10.23776454

5/11 @1500 Pump Station resumed operations, no flow into the US.

5/25 Rain

5/30 Rain

6/29 – 6/30 @0100 a water line break in southeast Tijuana resulted in flow past Pump Station. The overflow was estimated to be 300 liters per second for one-hour duration. Pump Station CILA continued to operate during this time. The river gage registered flow from midnight until 1 am on June 30.

Due to damage caused by construction, Pump Station CILA was partially affected. There was flow into the US:

7/2 @ 0815 until 1130 approximately 1.32 million gallons

7/4 @ 1100 until 1115 approximately 0.033 million gallons. It does not appear that the flow reached too far into the reserve's system.

7/25-7/26 flow into the river and rain sprinkles

7/31- flow into the river for approximately 15 hours

9/6 (approximately) River mouth starts to present signs of another closure. OS site had turbidity increase starting on 9/5

9/8 flow into the river for couple of hours

9/10 River mouth is closed

9/16 river mouth is mechanically opened

9/19 Rain .015in (thunderstorm) – flow in the river for one hour and a half

9/20-9/23 heavy runoff in the Tijuana River, pump station has been shut down

9/20-9/21 Rain .5in

10/23 Rain .005in

10/25 Rain .015in

10/30 Rain .04in

11/7 the cross-boundary sewage flow at Yogurt Canyon at Border Field State Park

11/15 pipes at pump station in construction – flow in the river 11/20 .04in

11/21 .19in

11/26 .19in

11/27 .13in

11/28 .04in

11/29 @ 1245 a water main break resulting in flow into the US in Goat Canyon. As of 1600 hours flow had ceased

12/7@ 0800 there is no longer flow crossing the border into the U.S. The Tijuana River gage is still not operating

12/16 Rain .99in +

12/16 @ 0230 operation of Pump Station CILA was suspended at hours due to runoff from precipitation in the Tijuana basin. The river gage is operating but not reporting accurately or reliably

12/21 - 12/22 1.91in

12/22 .17in

12/24 .60in

12/30-12/31 .74in

Site Specific Issues:

01/21 South Bay level data was flagged as suspect – when graphing the daily average of water level noticed a drift of the entire deployment, could not find out the cause. Level marked 1 GSM CCU and other parameters marked 0 GSM CCU. This is a well-mixed site and other parameters should not be impacted by this issue.

02/17 Boca Rio site has 11 missing readings, because the sonde that was about to be deployed had a problem in the Ph port. So, we used the same sonde that was on field. It was retrieved; brought back to the laboratory, post calibrated, cleaned, calibrated and deployed again.

04/02 PH readings from pond restored (PR) site that vary from 8.6 to 10.2 were anomalous and therefore rejected. Post calibration slope was lower than 155.

5/20 Pond restored turbidity data was suspect - post check reading was low. Probe was sent to YSI after this deployment

5/20 13:30 to 15:00 Oneonta Slough - Level here is odd. The sonde may have been hung up in the tube during those readings. Depth data here is marked 1 GSM CWD and 0 GSM CWD for other parameters.

6/13 to 7/13 Oneonta slough – Sonde came back from deployment and noted there were extremely muddy conditions in the field and in the tube. During post check all of the probes

responded slower than normal. During this deployment the turbidity probe also malfunctioned, which caused cross talk and issues with the chlorophyll probe.

6/14 to 7/14 when Pond Restored sonde was retrieved, the bulkhead connector was wet and with couple of the male pins broken. Sonde was sent to the YSI repair center and all the data was recovered, meaning that sonde didn't stop logging. Data seemed good. However, it was not possible to post check.

6/30 Oneonta Slough turbidity data was flagged as suspect - sonde post calibrated fine, but there was too much mud, amphipods, algae on the screen, in the guard and on all probes – the screen had a small part ripped off.

7/13 Oneonta Slough site had a lot of turbidity spikes on this deployment. Data was compared to the readings at Boca Rio, site that share similar water characteristics and data were flagged as:

Suspect – values over 12 and under 20, 12 seemed the appropriate threshold to fit conditions and the values fewer than 20 seemed a little high but still with the possibility to be real. Rejected – values out of range, values over 20 that appeared randomly and all readings starting on July 31st (they went up pretty high and never went back down). Upon retrieval, sonde had heavy mud and the wiper was partially blocking the turbidity sensor LED; data was rejected and flagged [SBO].

8/17-9/27 Boca Rio – suspect DO due to a low post check was too low (14.7%). The probe came back with a thick layer of patina and according to the inventory it needed new quad seal and membrane. Data from 8/17 to 8/30 00:45 marked 1 SPC CSM and data from 8/30 1:00 to 9/27 15:00 marked -3 SPC CSM.

10/14 the chlorophyll data from South Bay seemed anomalous and was rejected, readings were either too high or negative. The probe was just back from maintenance it was its first deployment. It post-checked fine. It was recorded heavy biofouling. No other data seems to be affected.

12/15 the chlorophyll data from South Bay site was rejected, it had anomalous spikes and negative readings. The prior deployment with the same probe had same problem, however the probe was just back from maintenance at YSI and this was its second deployment and it post checked fine. It was recorded moderate biofouling, heavy amount of mud inside the guard and sediment close to LED. No other data seems to be affected.