Tijuana River (TJR) NERR Water Quality Metadata
January to December 2015
Last Revised: June 7, 2017

I. Data Set and Research Descriptors

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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

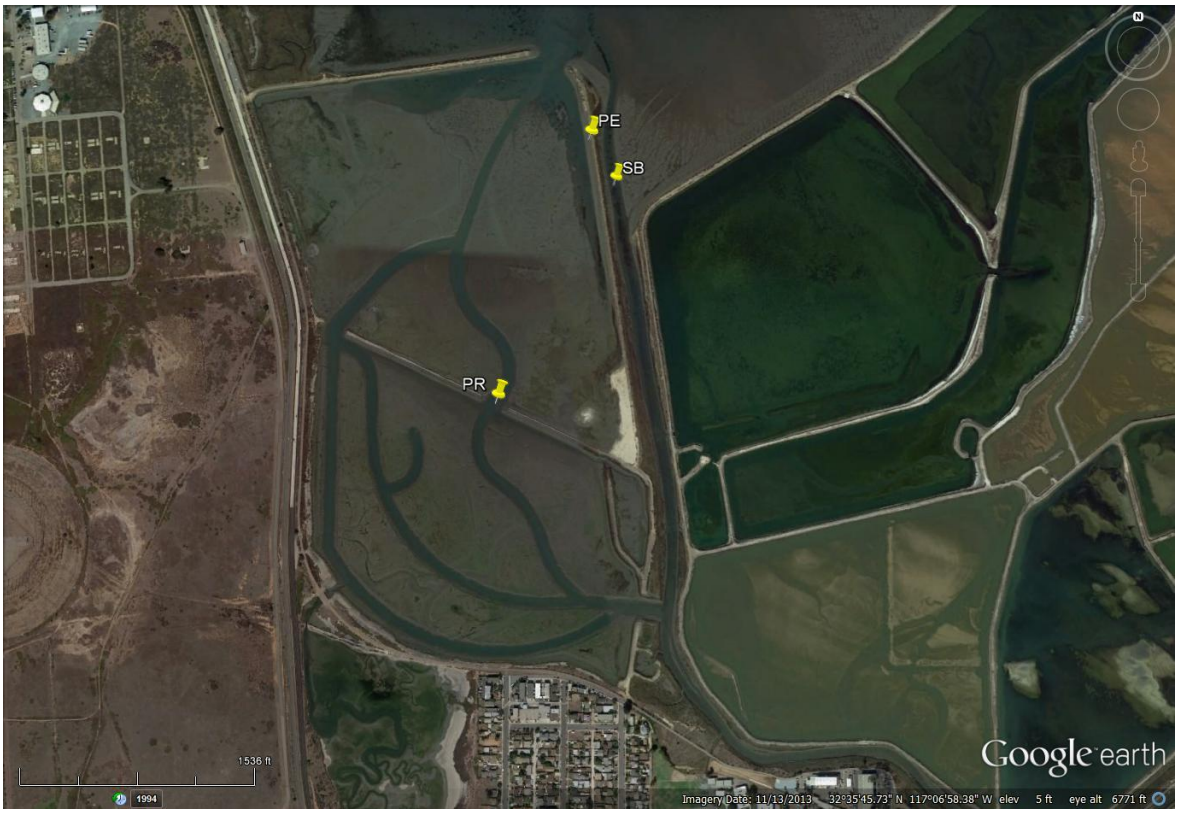
influenced and few channels are deep enough for datalogger deployment. Two stations were originally set up: a treatment station (RC) was set up close to the river mouth on the southern end of the Oneonta Slough, while a control station (OS) was set up on the northern end of Oneonta Slough. The treatment 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 4,483km^2 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 .82m^3/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 Mm^3), 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; 32º 33' 33.7'' N, 117º 7' 44.4" 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; 32º 34' 6.0" N, 117º 7' 52.7" 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 ; 32º 35' 46.0", 117º 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; 32º 36' 3.6" N, 117º 06 min 56.9" 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

6) Data Collection period

YSI model 6600 EDS dataloggers were used to collect data for the following dates and times.
Note: Time code is based on a 2400 hour clock and refers to Pacific Standard Time. Date format is mm/dd/yyyy.

Boca Rio

Deployment date	Deployment time	Retrieval date	Retrieval time
12/30/2014	13:45	1/28/2015	13:45
1/28/2015	14:15	2/27/2015	15:00
2/27/2015	15:30	3/31/2015	16:00
3/31/2015	16:15	4/28/2015	15:00
4/28/2015	15:15	6/5/2015	8:15
6/5/2015	8:30	7/9/2015	11:15
7/9/2015	11:30	8/12/2015	16:15
8/12/2015	16:30	9/23/2015	15:45
9/23/2015	14:00	10/13/2015	17:00
10/13/2015	17:15	11/20/2015	11:00
11/20/2015	11:15	12/18/2015	9:15
12/18/2015	9:30	1/20/2016	13:45

Oneonta Slough

Deployment date	Deployment time	Retrieval date	Retrieval time
12/30/2014	14:15	1/28/2015	14:30
1/28/2015	15:00	2/27/2015	14:15
2/27/2015	14:45	3/31/2015	15:15
3/31/2015	15:30	4/28/2015	14:30
4/28/2015	14:45	6/5/2015	9:00
6/5/2015	9:15	7/9/2015	12:45
7/9/2015	13:00	8/12/2015	15:30
8/12/2015	15:45	9/15/2015	17:30
9/15/2015	17:45	10/12/2015	15:15
10/12/2015	15:30	11/20/2015	11:45
11/20/2015	12:00	12/18/2015	10:00
12/18/2015	10:15	1/20/2016	14:15

Pond Restored

Deployment date	Deployment time	Retrieval date	Retrieval time
12/30/2014	10:30	1/29/2015	10:30
1/29/2015	11:00	2/25/2015	9:45
2/25/2015	10:15	4/2/2015	11:30
4/2/2015	12:00	4/28/2015	9:45
4/28/2015	10:15	6/8/2015	10:00
6/8/2015	10:15	7/8/2015	7:45
7/8/2015	8:00	8/11/2015	12:30
8/11/2015	12:45	9/14/2015	15:15
9/14/2015	15:30	10/12/2015	13:00
10/12/2015	13:15	11/18/2015	8:30
11/18/2015	8:45	12/16/2015	15:15
12/16/2015	15:30	1/21/2016	12:45

South Bay

Deployment date	Deployment time	Retrieval date	Retrieval time
12/30/2014	10:00	1/29/2015	10:10
1/29/2015	10:30	2/25/2015	10:15
2/25/2015	10:45	4/2/2015	11:00
4/2/2015	11:30	4/28/2015	9:30
4/28/2015	10:00	6/8/2015	10:30
6/8/2015	10:45	7/8/2015	8:15
7/8/2015	8:30	8/11/2015	13:00
8/11/2015	13:15	9/14/2015	15:45
9/14/2015	16:00	10/11/2015	16:15
10/12/2015	12:45	11/18/2015	8:15
11/18/2015	8:30	11/29/2015	13:15
12/16/2015	16:00	1/21/2016	12:15

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

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

Parameter: Dissolved Oxygen % saturation
Units: percent air saturation (%)
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% of 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#: 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: pH
Units: units
Sensor Type: Glass combination electrode
Model #: 6561 or 6579
Range: 0 to 14 units
Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Units: nephelometric turbidity units (NTU)
Sensor Type: Optical, 90 ° scatter, with mechanical cleaning
Model #: 6136
Range: 0 to 1000 NTU
Accuracy: +/- 5 % reading or 2 NTU (whichever is greater)
Resolution: 0.1 NTU

Parameter: Chlorophyll
Units: micrograms/Liter
Sensor Type: Optical probe w/mechanical cleaning
Model #: 6025
Range: 0 to 400 µg/Liter
Accuracy: Dependent on methodology
Resolution: 0.1 µg/Liter 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 1.03 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.

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	tjrsbwq

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.

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

NP = no probe installed
NC = no calibration done
ND= no data
Numbers in parentheses are used if standard differs from those stated.

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.

b) Precipitation Data observed at the Tijuana River Estuary Reserve (mm) - Data is provisional and has not undergone final QAQC
Please see Tijuana River Meteorological Data for precipitation events

Observation taken randomly from http://www.sccoos.org/data/tracking/IB/
1/3/15 @0845 34MGD
1/5/15 @0800 24MGD
1/8/15 @1000 5MGD pump station began working
1/11/15 rain

1/12/15 @1000 86 MGD
1/14/15 @1330 25MGD
1/20/15 @1030 5MGD

According to the USIBWC gage on the Tijuana River there were 3 separate spills with flow into the United States during the period.
2/13/15 @1200 to 2100 53,000 gallons
2/14/15 @ 1630 to 2/15/15 @0615 140,000 gallons
2/15/15 @ 0815 to 1100 14,000 gallons
2/16/15 @0000 to 0400 18,000 gallons

3/1/15 rain
3/2/15 @0945 130MGD
3/5/15 @1100 25MGD
3/9/15 @0900 25 MGD
3/9/15 @ 1630 pump station began working so flow stopped

4/8/15 @ 0230-0515 the pump station stopped working due to debris and there was flow getting into the US
4/22/15 rain
4/22/15 @0600 to 4/22/15 @0700 there was a sewage flow entering into the US
4/24/15 rain
4/25/15 rain

5/8/15 rain
5/8/15 @0800 to 5/12/15 @1600 there was sewage flow entering into the US
5/9/15 rain
5/14/15 rain
5/14/15 @1830 to 5/20/15 @1500 there was sewage flow entering into the US
5/15/15 rain
5/16/15 rain
5/21/15 rain
5/23/15 rain
5/25/15 rain

6/10/15 rain
6/27/15 rain
6/30/15 rain

7/1/15 rain
7/18/15 rain
7/19/15 rain
7/20/15 rain
7/21/15 rain
7/27/15 a problem with a sewer collector in Playas de Tijuana caused flows of 10 liters per second to cross the international boundary at Yogurt Canyon

8/25/15 rain

9/14/15 fish kill – our real-time monitoring data indicated that there was about an eight hour period where oxygen basically went to zero in the estuary. Water has been very warm in this period
9/15/15 rain
9/16/15 rain
9/18/15 pump station stopped working
9/19/15 pump station not fully operating

10/4/15 rain
10/5/15 rain
10/11/15 @16:30 to 10/12/15 @12:30 South Bay (SB) site is missing 24 hours of data due to not enough memory in the sonde.
10/12/15 rain
10/12/15 Sondes of the sites Pond Restored (PR) and South Bay (SB) were accidentally switched on deployment. PR sonde was deployed on South Bay site and SB sonde was deployed on Pond Restored site. Sondes were calibrated:

SB sonde (deployed at Pond Restored site)

baro.press.	759.5
depth offset	-0.007
station offset	-0.379 (South Bay site offset)
level	-0.386

PR sonde (deployed at South Bay site)

baro.press.	759.9
depth offset	-0.002
station offset	-0.310 (Pond Restored offset)
level	-0.312

After retrieval, depth correction was done in the following steps:

1. The raw files were renamed in order to correspond to the correct site.
2. Correction was done in the .csv raw file
3. In the SB151012 file, the value of 0.069 was subtracted from the values in the level column (-0.310 -0.069 = -0.379)
4. In the PR151012 file, the value of 0.069 was added to the values in the level column (-0.379+0.069 = -0.310)
5. Data was graphed with older data to verify if correction was done correctly.

10/17 rain
10/17 spill/Transboundary Flow Event Form @ ~2040 to 2045
10/21 spill/Transboundary Flow Event Form @ ~0200 to 0300
10/31 to 11/13 there was a sudden drop in DO readings in the Boca Rio site. Probe might need a new membrane. There was a little shrimp in the guard upon retrieval.

11/3 rain
11/3 @1030 to 11/6 @1305 hours- because of rainfall and runoff, the Tijuana River was flowing into the U.S.
11/4 rain
11/9 rain

11/10 @0600 to 11/11 @1015 - due to rainfall in the Tijuana River watershed, runoff was flowing into the U.S.
11/15 rain and strong winds
11/15 @~1845 Tijuana River began to flow into U.S.
11/16 shortly after midnight to 11/17@0800 pump station was shut off
11/19 @0715 to 11/19 @1000 flow in the Tijuana River into the United States, due to a potable water main break. Pump was operating. However, the excess water resulted in a spill into the U.S.
11/25 to 11/27 rain
11/25 @0830 to 11/26 @1030 pump operation suspended due to runoff in the Tijuana River from precipitation in the watershed. Flow in the river entering U.S.
11/27 @0130 to 11/29 @1000 pump operation suspended due to runoff in the Tijuana River from precipitation in the watershed. Flow in the river entering the U.S.

12/06 there is a sudden drop of salinity and sp. conductivity readings on the Oneonta Slough data. On retrieval there was a long Polychaeta worm inside the guard. It's possible that the critter entered the hollowed out portion of the CT probe and causing interference with the readings and then vacating and causing the readings to return to normal.
12/11 rain
12/11 @~1000 to 12/11 @1030 there was an overflow entering the U.S.
12/11 @1700 to 12/17 @0800 pump stopped working, flow in the river entering the U.S.
12/13 rain
12/16 South Bay sonde was retrieved and it was not logging; the battery compartment was flooded. After cleaning and drying was possible to upload 11 days of data. Sonde was logging from 11/18 to 11/29
12/19 rain
12/21 rain
12/22 rain
12/22 @0900 pump stopped working, river flow entering the U.S.
12/25 rain
12/28 rain

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