

Tijuana River Estuary (TJR) NERR Site Water Quality Metadata Form
January to December 1996
Last Revised June 13, 2000

I. Data Set and Research Descriptors

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2. Entry Verification:

The data are uploaded directly from the YSI model 6000upg dataloggers to the YSI PC6000 software into a file appended with the suffix .dat. The data are also downloaded directly from the datalogger into a spreadsheet importable file appended with the suffix .raw. The data are then reviewed for major problems (i.e. logger out of water, probe malfunction, battery failure etc.) using the YSI PC6000 plotting software. The resulting plot is printed out and saved in a folder named "datalogger deployment log". The .raw file is imported into Excel 5.0 for Macintosh and is edited and formatted: Alternatively, if Hydrolab Recorder model dataloggers are used, the data are uploaded as a text file to the PC using Microsoft Windows 3.1 terminal program and imported into Excel 5.0 for further editing and formatting.

The tails of each sampling period are deleted and any suspect data is

identified with the aid of Excel CDMO 5.0 macros and are evaluated and dealt with according to CDMO Operations Manual (ver.3.0) guidelines. The parameter columns are checked for proper order and formatted to the correct decimal places using the "column reformat" macro supplied by the CDMO. Missing data fields are inserted into the Excel spreadsheet and are denoted by periods (.). Reasons for any missing or anomalous data are entered directly into the data file and the edited file is saved as a two-week excel file. When an entire month of two-week edited data files have been collected, the files are combined into a 1 month excel file. Any dates and times when data was not collected are inserted and the reason for the missing data (from the deployment log) are entered directly into the excel file along with the editing information from the two week files. All editing and missing data documentation are also recorded in an excel file named "missing data log". The information in the "missing data log" is transferred to the metadata form. The edited and raw files are archived on a Sun Sparc 20 workstation and backed up to tape weekly. Data and metadata files are uploaded via ftp to the CDMO. The person responsible for the data management is Michelle Cordrey.

3. Research Objectives:

The Tijuana Estuarine Research Reserve is impacted heavily by both periodic raw sewage outflows and urban development. Only about a quarter of the reserve's 2,531 acres are tidally influenced with few channels deep enough for deployment of dataloggers. Initially two stations were set up; the "treatment" station was set up close to the mouth on the Southern end of the Oneonta Slough. It was thought that this location would be best suited for monitoring changes caused by sewage outflow events. The "control" station was set up on the northern end of Oneonta Slough. 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, with no success, logging at this site was terminated. Recently, however, a new channel was dredged in the northeast section of the estuary to increase tidal flushing. This restoration site named the "Tidal Linkage" will be the new location of the "treatment" site. Comparisons will be made with the natural site as the hydrology of the constructed treatment site changes over time.

4. Research Methods (Dataloggers)

A 4 inch diameter PVC pipe was strapped to a 6 ft length of steel fencing post and driven into the sediment until refusal prior to datalogger deployment in the center of the channel. The bottom of the pipe is raised 1' off of the channel bottom and is capped. Multiple 1.5" holes have been drilled in the bottom cap and sides to permit unrestricted flow to the sensors. The datalogger units are then placed into and rest on the bottom of the tubes during deployment. The sampling period is two weeks with measurements being taken every 30 minutes. Measurements for specific conductivity, salinity, dissolved oxygen (percent saturation), dissolved oxygen (mg/l), temperature, turbidity and water level are recorded. At the end of each two week period, the YSI data logger unit is replaced by another YSI datalogger unit and brought back to the laboratory for 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, pH and turbidity are purchased pre-made from VWR scientific. The QA/QC procedures for the collected data are followed as given in the CDMO Operations Manual version 3.0.

In May 1997 sampling at the "Tidal Linkage" station will begin and all deployment, calibration and QA/QC procedures will be followed exactly as they are at the Oneonta Slough station.

5. Site location and character

General site Characteristics (TJE)

- a) Tidal exchange (extremes): approx. -2 +7 MLLW,
- b) Salinity: 4 ppt (extreme rain events) to 38 ppt

d) Latitude and longitude: 32 deg. 34 min. N, 117 deg. 07 min. W
c) Potential impacts: storm drain runoff from military airfield and adjacent residential areas, occasional sewage spills (10-15 MGD) into the Tijuana River from Mexico. The area surrounding the estuary is heavily developed by residential housing as is the watershed which drains into the estuary. Approximately 2/3 of the watershed is in Mexico. The North Eastern section of the reserve is bordered by a military helicopter training base. Vegetation in the area is dominated by common pickleweed (*Spartina virginica*) and Pacific cordgrass (*Spartina foliosa*).

Specific Site characteristics: Oneonta Slough

- a) Orientation of site: Datalogger is located on the upper portion of Oneonta Slough. The channel runs North to South and is located on the northwestern edge of the reserve.
- b) The elevation of the channel bottom directly below the datalogger is approx. 0.55m below Mean Sea Level.
- c) Channel width is approx. 20 meters. Datalogger site is located 1km from mouth
- d) Bottom type: sand and sediment
- e) Area adjacent to west side of channel is developed. There is a 50 meter buffer of natural vegetation between development and the channel. Area adjacent to east side of channel is relatively natural.
- f) Direct impacts are estimated to be runoff from streets into channel during rain events.
- g) Site location: 32° 34' 4.8"N, 117° 07' 52.3"W

Specific Site Characteristics: The Tidal Linkage

- a) Orientation of site: Datalogger is located in the middle of the newly constructed channel. The channel runs Northwest to Southwest and is located adjacent to the visitor's center in the northeastern section of the reserve.
- b) The elevation of the channel bottom is approximately 0.9m below Mean Sea Level.
- c) Channel width: Approximately 5 meters.
- d) Bottom type: mostly sand in the area of the datalogger with a change to mostly mud at either end of the channel.
- e) Site location: 32° 34' 27.9"N, 117° 07' 32.2"W

6. Data Collection period

Oneonta Slough data collection began July 1, 1995. Multiple instrument problems (defective sensors, software bugs, exploding batteries) and subsequent repairs and upgrades delayed data processing and compromised some of the data acquired between July 1995 and January 1, 1996. These data are currently being evaluated and will be posted if found to be valid. Sampling at the Tidal Linkage began in May 1997. Sampling is ongoing.

7. Associated researchers and projects

A computer animated salinity model is being developed by Phil Williams Assoc. in collaboration with the Pacific Estuarine Research Laboratory (PERL) at San Diego State University (SDSU). The datalogger data will be used to adjust and validate the model. The salinity data and dilution model will be used to determine the distribution and dilution of human pathogens resulting from sewage spills into Tijuana Estuary. The pathogen study is being conducted by Dr. Rick Gersberg, SDSU Grad. School of Public Health and PERL. The newly constructed channel is the site of research being conducted by PERL which focuses on methods for increasing the success of saltmarsh revegetation projects.

II. Physical Structure Descriptors

8. Variable sequence, column format, range of measurements, units for:
YSI 6000upg datalogger:

Variable Name	Range of Measurements (units)	Resolution
Accuracy		
Date	1-12,1-31,00-99 (Mo,Day,Yr)	1 month,1 day, 1 year
Time	0-24,0-60,0-60 (Hr,Min,Sec)	1 hour, 1 minute, 1 second
Temp	-5 TO 45 (C)	0.01 C
SpCond	0-100 (mS/cm)	0.01 mS/cm
Sal	0-70 parts per thousand (ppt)	0.01 ppt

	+/-1.0% of reading or 0.01 ppt (whichever is greater)	
DO	0-200 (% air Saturation)	0.1% @air saturation
	+/-2.0%@air sat.	
DO	200-500 (% air saturation)	0.1% @air saturation
	+/-6%@air sat.	
DO	0-20 (mg/l)	0.01 mg/l
	+/-0.2 mg/l	
DO	20-50 (mg/l)	0.01 mg/l
	+/-0.6 mg/l	
Depth	0-152 (m)	0.001m
	+/-0.3 m	
pH	2-14 units	0.01 units
	+/-0.2 units	
Turbidity	0-1000 (NTU)	0.1 NTU
	+/-5% of reading or 2 NTU (whichever is greater)	

Hydrolab Recorder datalogger:

Variable Name	Range of Measurements (units)	Resolution
Accuracy		
Date	1-12,1-31,00-99 (Mo,Day,Yr)	1 month,1 day, 1 year
NA		
Time	0-24,0-60,0-60 (Hr,Min,Sec)	1 hour, 1 minute, 1
second		
NA		
Temp	-5 TO 50(C)	0.01 C
	+/-0.15C	
SpCOND	0-100 (mS/cm)	0.01 mS/cm
	+/- (1% of range)	
Sal	0-70 parts per thousand (ppt)	0.1 ppt
	+/-0.2 ppt	
DO	0-200 (% air Saturation)	0.1% @air saturation
	+/-2.0%@air sat.	
DO	0-20 (mg/l)	0.01 mg/l
	+/-0.2 mg/l	
Depth	no depth installed on model	
pH	0-14 units	0.01 units
	+/-0.2 units	
Turbidity	no turbidity installed on model	

data columns are separated by tabs

9. Coded variable indicator and variable code definitions

Site definitions: OS = Oneonta Slough TL = Tidal Linkage

10. Data anomalies (suspect data):

January 1996

- a) Specific Conductance (mS/cm) values were too low between 01/04(17:00) and 01/19(15:00) and were deleted. Improper maintenance suspected.
- b) Salinity and DO(mg/l) were also deleted as values are calculated from Specific Conductance.
- c) Between 01/19(16:30) and 01/31(23:00) Depth values were transformed by subtracting .3048m (1 ft.) to adjust for offset value that was entered on unit (deployment is such that offset value was not necessary) this continued until July when problem was corrected on unit.

February 1996

- a) 02/01(00:00) - 02/02(14:30) Depth readings were transformed by subtracting .3048m (1 ft.) to adjust for offset value that was entered on unit
- b) 02/16(16:30) - 02/29(23:30) Depth readings were transformed by subtracting .3048m (1 ft.) to adjust for offset value that was entered on unit

March 1996

- a) Between 03/01(13:55) and 03/15(14:25) time values were offset by -4 min. 8 sec and were corrected.
- b) Between 03/01(13:55) and 03/15(14:25) depth values were deleted because they fell well below expected values. Reason could not be determined
- c) Between 03/15(15:05) and 03/30(13:35) time values were offset by +5min 25 sec and were corrected.
- d) Turbidity spikes:
03/15/96 15:05:25 0376

03/15/96	16:35:25	0146
03/17/96	09:05:25	0126

e) Many slightly negative turbidity values - calibration suspected.

Negative turbidity values:

Date	Time	Turb
03/17/96	00:35:25	-0001
03/17/96	02:35:25	-0001
03/17/96	03:35:25	-0001
03/17/96	04:05:25	-0001
03/20/96	03:35:25	-0001
03/20/96	04:05:25	-0001
03/20/96	04:35:25	-0001
03/20/96	06:05:25	-0001
03/21/96	05:05:25	-0001
03/21/96	05:35:25	-0001
03/22/96	05:35:25	-0001
03/22/96	17:35:25	-0001
03/22/96	19:05:25	-0001
03/22/96	19:35:25	-0001
03/23/96	05:35:25	-0001
03/24/96	05:35:25	-0001
03/25/96	05:35:25	-0001
03/25/96	21:35:25	-0001
03/26/96	06:05:25	-0001
03/26/96	20:05:25	-0001
03/26/96	20:35:25	-0001
03/26/96	21:05:25	-0001
03/26/96	21:35:25	-0001
03/26/96	22:05:25	-0001
03/27/96	01:05:25	-0001
03/27/96	03:35:25	-0001
03/27/96	19:35:25	-0001
03/27/96	20:05:25	-0001
03/27/96	20:35:25	-0001
03/27/96	21:05:25	-0001
03/27/96	21:35:25	-0001
03/27/96	22:05:25	-0001
03/27/96	22:35:25	-0001
03/27/96	23:05:25	-0001
03/27/96	23:35:25	-0001
03/28/96	00:05:25	-0001
03/28/96	00:35:25	-0001
03/28/96	03:35:25	-0001
03/28/96	04:05:25	-0001
03/28/96	19:35:25	-0001
03/28/96	20:05:25	-0001
03/28/96	20:35:25	-0001
03/28/96	21:05:25	-0001
03/28/96	21:35:25	-0001
03/28/96	22:05:25	-0001
03/28/96	22:35:25	-0001
03/28/96	23:05:25	-0001
03/28/96	23:35:25	-0001

03/29/96	00:05:25	-0001
03/29/96	00:35:25	-0001
03/29/96	01:05:25	-0001
03/29/96	01:35:25	-0001
03/29/96	04:05:25	-0001
03/29/96	10:05:25	-0001
03/29/96	12:05:25	-0001
03/29/96	13:35:25	-0001
03/29/96	19:35:25	-0001
03/29/96	20:05:25	-0001
03/29/96	20:35:25	-0001
03/29/96	21:35:25	-0001
03/29/96	22:05:25	-0001
03/29/96	22:35:25	-0001
03/29/96	23:05:25	-0001
03/29/96	23:35:25	-0001
03/30/96	00:05:25	-0001
03/30/96	00:35:25	-0001
03/30/96	01:05:25	-0001
03/30/96	01:35:25	-0001
03/30/96	02:05:25	-0001
03/30/96	03:05:25	-0001
03/30/96	10:35:25	-0001

f) pH values were removed because of a larger than usual drift (approx. 1 pH unit). Heavy biofouling was observed and is believed to be responsible for the large drift

April 1996

a) pH values were removed because of a larger than usual drift (approx. 1 pH unit). Heavy biofouling was observed and is believed to be responsible for the large drift
(see missing data)

b) Between 04/06(07:30) and 04/22(12:00) dissolved oxygen (DO% and DOmg/l) were deleted as values fell below range of sensor (<0).
Date
Time
DO

04/06/96
07:30:00
-002.3

04/06/96
08:00:00

-002.3

04/06/96
08:30:00
-002.2

04/06/96
09:00:00
-002.0

04/06/96
09:30:00
-002.1

04/06/96
17:00:00
-000.1

04/06/96
17:30:00
-000.1

04/06/96
18:00:00
-000.2

04/07/96
10:00:00
-000.4

04/07/96
10:30:00
-001.2

04/07/96
16:30:00
-000.2

04/07/96
17:00:00
-000.2

04/07/96
17:30:00
-000.1

04/07/96
18:00:00
-000.1

04/07/96
18:30:00
-000.2

04/07/96
19:00:00
-000.1

04/07/96
19:30:00
-000.3

04/07/96
20:00:00
-000.1

04/08/96
09:30:00
-000.3

04/08/96
10:00:00
-000.4

04/08/96
10:30:00
-000.5

04/08/96
11:00:00
-000.4

04/08/96
11:30:00
-000.4

04/08/96
12:00:00
-000.3

04/08/96
12:30:00
-000.3

04/09/96
08:30:00
-000.2

04/09/96
09:00:00
-000.2

04/09/96
09:30:00
-000.3

04/09/96
10:00:00

-000.3

04/09/96
10:30:00
-000.2

04/09/96
11:00:00
-000.3

04/09/96
11:30:00
-000.3

04/09/96
12:00:00
-000.2

04/09/96
12:30:00
-000.2

04/09/96
13:00:00
-000.3

04/09/96
13:30:00
-000.2

04/20/96
06:00:00
-000.5

04/20/96
09:00:00
-001.1

04/20/96
10:00:00
-000.9

04/22/96
11:30:00
-000.1

04/22/96
12:00:00
-000.8

c) Between 04/11(15:00) and 04/26(12:00) depth values transformed by subtracting .3048m to adjust for offset value on unit

d) Between 04/12(00:30) and 04/26 (07:00) negative turbidity values present. data was not removed.

Negative turbidity values:

Date	Time	Turb
04/12/96	00:30:00	-0491
04/12/96	12:30:00	-0001
04/12/96	13:30:00	-0001
04/12/96	14:30:00	-0001
04/12/96	15:00:00	-0001
04/12/96	15:30:00	-0001
04/12/96	16:00:00	-0001
04/12/96	19:30:00	-0001
04/13/96	00:30:00	-0001
04/13/96	01:00:00	-0001
04/13/96	01:30:00	-0001
04/13/96	02:00:00	-0001
04/13/96	02:30:00	-0001
04/13/96	12:30:00	-0001
04/13/96	13:00:00	-0001
04/13/96	13:30:00	-0001
04/13/96	14:00:00	-0001
04/13/96	14:30:00	-0001
04/13/96	15:00:00	-0001
04/13/96	15:30:00	-0001
04/13/96	16:00:00	-0001
04/13/96	16:30:00	-0001
04/13/96	17:00:00	-0001
04/14/96	01:00:00	-0001
04/14/96	02:00:00	-0001
04/14/96	02:30:00	-0001
04/14/96	03:00:00	-0001
04/14/96	03:30:00	-0001
04/14/96	04:30:00	-0001
04/14/96	09:00:00	-0001
04/14/96	12:00:00	-0001
04/14/96	12:30:00	-0001
04/14/96	13:00:00	-0001
04/14/96	13:30:00	-0001
04/14/96	14:00:00	-0001
04/14/96	14:30:00	-0001
04/14/96	15:00:00	-0001
04/14/96	15:30:00	-0001
04/14/96	16:00:00	-0001
04/14/96	16:30:00	-0001
04/14/96	17:30:00	-0001
04/15/96	01:30:00	-0001
04/15/96	02:00:00	-0001
04/15/96	04:00:00	-0001
04/15/96	05:30:00	-0001
04/15/96	06:00:00	-0001
04/15/96	12:30:00	-0001
04/15/96	13:00:00	-0001

04/15/96	13:30:00	-0001
04/15/96	14:00:00	-0001
04/15/96	14:30:00	-0001
04/15/96	15:00:00	-0001
04/15/96	15:30:00	-0001
04/15/96	16:30:00	-0001
04/15/96	17:00:00	-0001
04/15/96	17:30:00	-0001
04/16/96	04:00:00	-0001
04/16/96	05:00:00	-0001
04/16/96	14:00:00	-0001
04/16/96	14:30:00	-0001
04/16/96	15:00:00	-0001
04/16/96	15:30:00	-0001
04/16/96	16:00:00	-0001
04/16/96	17:00:00	-0001
04/16/96	18:00:00	-0001
04/17/96	03:30:00	-0001
04/17/96	04:00:00	-0001
04/17/96	04:30:00	-0001
04/17/96	05:00:00	-0001
04/17/96	06:00:00	-0001
04/17/96	07:00:00	-0001
04/17/96	13:30:00	-0001
04/17/96	14:00:00	-0001
04/17/96	14:30:00	-0001
04/17/96	15:00:00	-0001
04/17/96	15:30:00	-0001
04/17/96	16:00:00	-0001
04/17/96	16:30:00	-0001
04/17/96	17:00:00	-0001
04/17/96	17:30:00	-0001
04/18/96	05:30:00	-0001
04/18/96	06:00:00	-0001
04/18/96	06:30:00	-0001
04/18/96	07:00:00	-0001
04/18/96	07:30:00	-0001
04/18/96	08:00:00	-0001
04/20/96	14:30:00	-0001
04/20/96	15:00:00	-0001
04/20/96	15:30:00	-0001
04/21/96	00:30:00	-0001
04/21/96	04:30:00	-0001
04/21/96	05:00:00	-0001
04/21/96	05:30:00	-0001
04/21/96	06:00:00	-0001
04/21/96	06:30:00	-0001
04/21/96	16:00:00	-0001
04/21/96	18:00:00	-0001
04/21/96	22:00:00	-0001
04/21/96	23:00:00	-0001
04/22/96	00:00:00	-0001
04/22/96	00:30:00	-0001
04/22/96	04:30:00	-0001

04/22/96	05:00:00	-0001
04/22/96	05:30:00	-0001
04/22/96	06:00:00	-0001
04/22/96	06:30:00	-0001
04/22/96	07:00:00	-0001
04/22/96	17:30:00	-0001
04/23/96	00:30:00	-0001
04/23/96	01:30:00	-0001
04/23/96	04:30:00	-0001
04/23/96	05:00:00	-0001
04/23/96	05:30:00	-0001
04/23/96	06:00:00	-0001
04/23/96	06:30:00	-0001
04/23/96	07:00:00	-0001
04/23/96	16:30:00	-0001
04/23/96	18:00:00	-0001
04/25/96	19:30:00	-0001
04/25/96	21:30:00	-0001
04/25/96	22:00:00	-0001
04/25/96	22:30:00	-0001
04/25/96	23:00:00	-0001
04/25/96	23:30:00	-0001
04/26/96	00:00:00	-0001
04/26/96	00:30:00	-0001

e) Turbidity spikes:

Date	Time	Turb
04/16/96	12:00:00	0464

May 1996

a) Between 05/10(15:00) - 05/24(12:00) depth values were transformed by subtracting .3048m to adjust for offset value set on unit

June 1996

a) Between 06/11(13:00) and 06/21(09:30) depth values were transformed by subtracting .3048m to adjust for depth offset value set on unit.

b) Negative turbidity values present. Data was not removed.

Negative turbidity values:

Date	Time	Turb
06/12/96	04:30:00	-0001
06/12/96	05:00:00	-0001
06/12/96	11:30:00	-0001
06/12/96	12:00:00	-0001
06/12/96	13:00:00	-0001
06/12/96	13:30:00	-0001
06/12/96	14:00:00	-0001
06/12/96	14:30:00	-0001
06/12/96	15:30:00	-0001
06/12/96	16:00:00	-0001

06/13/96	04:30:00	-0001
06/13/96	05:00:00	-0001
06/13/96	05:30:00	-0001
06/13/96	06:00:00	-0001
06/13/96	06:30:00	-0001
06/13/96	12:00:00	-0001
06/13/96	12:30:00	-0001
06/13/96	13:00:00	-0001
06/13/96	14:00:00	-0001
06/13/96	14:30:00	-0001
06/13/96	15:30:00	-0001
06/13/96	16:00:00	-0001
06/14/96	07:00:00	-0001
06/14/96	07:30:00	-0001
06/14/96	08:00:00	-0001
06/14/96	12:30:00	-0001
06/14/96	13:30:00	-0001
06/14/96	14:00:00	-0001
06/14/96	16:00:00	-0001
06/14/96	16:30:00	-0001
06/15/96	05:00:00	-0001
06/15/96	05:30:00	-0001
06/15/96	06:00:00	-0001
06/15/96	06:30:00	-0001
06/15/96	07:00:00	-0001
06/15/96	07:30:00	-0001
06/15/96	08:00:00	-0001
06/15/96	08:30:00	-0001
06/15/96	13:30:00	-0001
06/15/96	14:00:00	-0001
06/15/96	15:00:00	-0001
06/15/96	16:30:00	-0001
06/15/96	17:00:00	-0001
06/16/96	06:00:00	-0001
06/16/96	07:00:00	-0001
06/16/96	08:00:00	-0001
06/16/96	14:00:00	-0001
06/16/96	14:30:00	-0001
06/16/96	15:00:00	-0001
06/16/96	15:30:00	-0001
06/16/96	16:30:00	-0001
06/16/96	17:00:00	-0001
06/17/96	06:00:00	-0001
06/17/96	06:30:00	-0001
06/17/96	07:00:00	-0001
06/17/96	07:30:00	-0001
06/17/96	08:00:00	-0001
06/17/96	09:00:00	-0001
06/17/96	09:30:00	-0001
06/17/96	14:30:00	-0001
06/18/96	06:30:00	-0001
06/18/96	07:00:00	-0001
06/18/96	07:30:00	-0001
06/18/96	08:00:00	-0001

06/18/96	08:30:00	-0001
06/18/96	09:00:00	-0001
06/18/96	09:30:00	-0001
06/18/96	17:00:00	-0001
06/18/96	17:30:00	-0001
06/19/96	07:00:00	-0001
06/19/96	07:30:00	-0001
06/19/96	08:00:00	-0001
06/19/96	08:30:00	-0001
06/19/96	09:00:00	-0001
06/19/96	09:30:00	-0001
06/19/96	10:30:00	-0001
06/19/96	17:00:00	-0001
06/19/96	17:30:00	-0001
06/19/96	18:00:00	-0001
06/20/96	06:30:00	-0001
06/20/96	07:00:00	-0001
06/20/96	07:30:00	-0001
06/20/96	08:00:00	-0001
06/20/96	08:30:00	-0001
06/20/96	09:00:00	-0001
06/20/96	09:30:00	-0001
06/20/96	10:00:00	-0001
06/20/96	10:30:00	-0001
06/20/96	11:00:00	-0001
06/20/96	11:30:00	-0001
06/20/96	17:30:00	-0001
06/20/96	18:00:00	-0001
06/20/96	19:00:00	-0001
06/21/96	05:30:00	-0001
06/21/96	06:30:00	-0001
06/21/96	07:00:00	-0001
06/21/96	07:30:00	-0001
06/21/96	08:30:00	-0001
06/21/96	09:00:00	-0001

July 1996

a) Turbidity Spikes:

07/05/96	12:00:00	0110
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b) Negative turbidity values present. Data was not deleted.

Negative turbidity values:

Date	Time	Turb
07/05/96	20:00:00	-0001
07/05/96	20:30:00	-0001
07/05/96	21:00:00	-0001
07/05/96	21:30:00	-0001
07/05/96	22:00:00	-0001
07/06/96	05:30:00	-0001
07/06/96	07:00:00	-0001
07/06/96	07:30:00	-0001
07/06/96	08:00:00	-0001
07/06/96	08:30:00	-0001

07/06/96	09:00:00	-0001
07/06/96	09:30:00	-0001
07/06/96	10:00:00	-0001
07/06/96	10:30:00	-0001
07/06/96	11:00:00	-0001
07/06/96	11:30:00	-0001
07/06/96	21:30:00	-0001
07/06/96	22:30:00	-0001
07/06/96	23:00:00	-0001
07/06/96	23:30:00	-0001
07/07/96	00:00:00	-0001
07/07/96	00:30:00	-0001
07/07/96	06:00:00	-0001
07/07/96	06:30:00	-0001
07/07/96	07:00:00	-0001
07/07/96	08:00:00	-0001
07/07/96	08:30:00	-0001
07/07/96	09:00:00	-0001
07/07/96	09:30:00	-0001
07/07/96	10:00:00	-0001
07/07/96	10:30:00	-0001
07/07/96	11:00:00	-0001
07/07/96	11:30:00	-0001
07/07/96	12:00:00	-0001
07/07/96	12:30:00	-0001
07/07/96	22:00:00	-0001
07/08/96	00:30:00	-0001
07/08/96	01:00:00	-0001
07/08/96	01:30:00	-0001
07/08/96	02:00:00	-0001
07/08/96	02:30:00	-0001
07/08/96	03:00:00	-0001
07/08/96	07:00:00	-0001
07/08/96	07:30:00	-0001
07/08/96	08:00:00	-0001
07/08/96	08:30:00	-0001
07/08/96	09:00:00	-0001
07/08/96	09:30:00	-0001
07/08/96	10:00:00	-0001
07/08/96	10:30:00	-0001
07/08/96	11:00:00	-0001
07/08/96	11:30:00	-0001
07/08/96	12:00:00	-0001
07/08/96	12:30:00	-0001
07/08/96	13:00:00	-0001
07/08/96	22:30:00	-0001
07/09/96	01:00:00	-0001
07/09/96	01:30:00	-0001
07/09/96	02:00:00	-0001
07/09/96	02:30:00	-0001
07/09/96	03:30:00	-0001
07/09/96	04:00:00	-0001
07/09/96	04:30:00	-0001
07/09/96	08:30:00	-0001

07/09/96	09:30:00	-0001
07/09/96	10:00:00	-0001
07/09/96	10:30:00	-0001
07/09/96	11:00:00	-0001
07/09/96	11:30:00	-0001
07/09/96	12:00:00	-0001
07/09/96	12:30:00	-0001
07/09/96	13:00:00	-0001
07/09/96	13:30:00	-0001
07/09/96	14:00:00	-0001
07/09/96	14:30:00	-0001
07/10/96	01:00:00	-0001
07/10/96	02:30:00	-0001
07/10/96	03:00:00	-0001
07/10/96	05:00:00	-0001
07/10/96	10:30:00	-0001
07/10/96	11:00:00	-0001
07/10/96	11:30:00	-0001
07/10/96	12:00:00	-0001
07/10/96	12:30:00	-0001
07/10/96	13:00:00	-0001
07/10/96	13:30:00	-0001
07/10/96	14:30:00	-0001
07/11/96	02:00:00	-0001
07/11/96	02:30:00	-0001
07/11/96	04:00:00	-0001
07/11/96	04:30:00	-0001
07/11/96	05:00:00	-0001
07/11/96	05:30:00	-0001
07/11/96	06:00:00	-0001
07/11/96	06:30:00	-0001
07/11/96	07:30:00	-0001
07/11/96	10:30:00	-0001
07/11/96	11:00:00	-0001
07/11/96	11:30:00	-0001
07/11/96	12:00:00	-0001
07/11/96	12:30:00	-0001
07/11/96	13:00:00	-0001
07/11/96	13:30:00	-0001
07/11/96	14:00:00	-0001
07/11/96	14:30:00	-0001
07/11/96	15:00:00	-0001
07/11/96	15:30:00	-0001
07/11/96	16:00:00	-0001
07/12/96	04:00:00	-0001
07/12/96	04:30:00	-0001
07/12/96	05:00:00	-0001
07/12/96	05:30:00	-0001
07/12/96	06:00:00	-0001
07/12/96	06:30:00	-0001
07/12/96	07:00:00	-0001
07/12/96	07:30:00	-0001
07/12/96	12:00:00	-0001
07/12/96	13:30:00	-0001

07/12/96	14:00:00	-0001
07/12/96	14:30:00	-0001
07/12/96	15:00:00	-0001
07/12/96	15:30:00	-0001
07/13/96	06:30:00	-0001
07/13/96	08:00:00	-0001
07/13/96	12:30:00	-0001
07/13/96	13:00:00	-0001
07/13/96	13:30:00	-0001
07/13/96	14:30:00	-0001
07/13/96	15:00:00	-0001
07/13/96	15:30:00	-0001
07/13/96	16:00:00	-0001
07/14/96	06:00:00	-0001
07/14/96	08:00:00	-0001
07/14/96	08:30:00	-0001
07/14/96	15:00:00	-0001
07/14/96	15:30:00	-0001
07/14/96	16:30:00	-0001
07/14/96	17:00:00	-0001
07/14/96	17:30:00	-0001
07/15/96	06:30:00	-0001
07/15/96	07:00:00	-0001
07/15/96	08:00:00	-0001
07/15/96	08:30:00	-0001
07/15/96	09:00:00	-0001
07/15/96	14:00:00	-0001
07/15/96	14:30:00	-0001
07/15/96	15:00:00	-0001
07/15/96	16:30:00	-0001
07/15/96	17:00:00	-0001
07/15/96	17:30:00	-0001
07/16/96	06:00:00	-0001
07/16/96	07:00:00	-0001
07/16/96	07:30:00	-0001
07/16/96	08:00:00	-0001
07/16/96	08:30:00	-0001
07/16/96	09:00:00	-0001
07/16/96	09:30:00	-0001
07/16/96	16:00:00	-0001
07/16/96	16:30:00	-0001
07/16/96	17:00:00	-0001
07/16/96	17:30:00	-0001
07/16/96	18:00:00	-0001
07/17/96	07:00:00	-0001
07/17/96	08:00:00	-0001
07/17/96	08:30:00	-0001
07/17/96	09:00:00	-0001
07/17/96	09:30:00	-0001
07/17/96	15:30:00	-0001
07/17/96	16:00:00	-0001
07/17/96	16:30:00	-0001
07/17/96	17:00:00	-0001
07/17/96	17:30:00	-0001

07/17/96	18:00:00	-0001
07/17/96	18:30:00	-0001
07/18/96	08:30:00	-0001
07/18/96	09:00:00	-0001
07/18/96	16:00:00	-0001

August 1996

a) Between 08/01(00:00) - 08/02(15:00) DO% and DOmg/l missing - probe malfunctioned

during deployment

b) Between 08/02(15:00) - 08/16(16:00) many turbidity values slightly below 0.

Data was

not deleted.

Negative turbidity values:

Date	Time	Turb
08/03/96	01:00:00	-0001
08/03/96	05:00:00	-0001
08/03/96	05:30:00	-0001
08/03/96	06:00:00	-0001
08/03/96	07:30:00	-0001
08/03/96	08:00:00	-0001
08/03/96	08:30:00	-0001
08/03/96	09:00:00	-0001
08/03/96	09:30:00	-0001
08/03/96	10:00:00	-0001
08/03/96	10:30:00	-0001
08/03/96	18:30:00	-0001
08/03/96	19:00:00	-0001
08/03/96	19:30:00	-0001
08/03/96	20:00:00	-0001
08/03/96	20:30:00	-0001
08/03/96	21:00:00	-0001
08/03/96	21:30:00	-0001
08/03/96	22:00:00	-0001
08/03/96	22:30:00	-0001
08/03/96	23:00:00	-0001
08/04/96	02:00:00	-0001
08/04/96	04:00:00	-0001
08/04/96	05:00:00	-0001
08/04/96	05:30:00	-0001
08/04/96	06:00:00	-0001
08/04/96	06:30:00	-0001
08/04/96	07:00:00	-0001
08/04/96	07:30:00	-0001
08/04/96	08:00:00	-0001
08/04/96	08:30:00	-0001
08/04/96	09:00:00	-0001
08/04/96	09:30:00	-0001
08/04/96	10:00:00	-0001
08/04/96	10:30:00	-0001
08/05/96	10:00:00	-0001
08/05/96	16:30:00	-0001

08/05/96	20:30:00	-0001
08/05/96	21:00:00	-0001
08/06/96	21:30:00	-0001
08/06/96	22:00:00	-0001
08/06/96	22:30:00	-0001
08/06/96	23:00:00	-0001
08/06/96	23:30:00	-0001
08/07/96	00:00:00	-0001
08/07/96	00:30:00	-0001
08/07/96	01:00:00	-0001
08/07/96	02:00:00	-0001
08/07/96	02:30:00	-0001
08/07/96	03:30:00	-0001
08/07/96	23:00:00	-0001
08/07/96	23:30:00	-0001
08/08/96	00:00:00	-0001
08/08/96	00:30:00	-0001
08/08/96	01:00:00	-0001
08/08/96	01:30:00	-0001
08/08/96	02:00:00	-0001
08/08/96	02:30:00	-0001
08/08/96	03:00:00	-0001
08/08/96	04:00:00	-0001
08/08/96	04:30:00	-0001
08/08/96	23:30:00	-0001
08/09/96	00:00:00	-0001
08/09/96	00:30:00	-0001
08/09/96	01:00:00	-0001
08/09/96	01:30:00	-0001
08/09/96	02:00:00	-0001
08/09/96	02:30:00	-0001
08/09/96	03:00:00	-0001
08/09/96	03:30:00	-0001
08/09/96	04:00:00	-0001
08/09/96	04:30:00	-0001
08/09/96	20:30:00	-0001
08/10/96	02:00:00	-0001
08/10/96	02:30:00	-0001
08/10/96	03:00:00	-0001
08/10/96	03:30:00	-0001
08/10/96	04:00:00	-0001
08/10/96	05:00:00	-0001
08/10/96	05:30:00	-0001
08/10/96	06:00:00	-0001
08/10/96	06:30:00	-0001
08/10/96	08:30:00	-0001
08/10/96	09:30:00	-0001
08/10/96	10:00:00	-0001
08/10/96	10:30:00	-0001
08/10/96	11:00:00	-0001
08/10/96	11:30:00	-0001
08/10/96	12:00:00	-0001
08/10/96	12:30:00	-0001
08/10/96	13:00:00	-0001

08/10/96	13:30:00	-0001
08/10/96	21:00:00	-0001
08/10/96	21:30:00	-0001
08/11/96	02:30:00	-0001
08/11/96	03:00:00	-0001
08/11/96	03:30:00	-0001
08/11/96	04:30:00	-0001
08/11/96	05:00:00	-0001
08/11/96	05:30:00	-0001
08/11/96	06:00:00	-0001
08/11/96	06:30:00	-0001
08/11/96	07:00:00	-0001
08/11/96	10:00:00	-0001
08/11/96	11:30:00	-0001
08/11/96	12:00:00	-0001
08/11/96	12:30:00	-0001
08/11/96	13:00:00	-0001
08/11/96	13:30:00	-0001
08/11/96	14:00:00	-0001
08/11/96	14:30:00	-0001
08/11/96	15:00:00	-0001
08/12/96	03:00:00	-0001
08/12/96	03:30:00	-0001
08/12/96	04:00:00	-0001
08/12/96	04:30:00	-0001
08/12/96	05:00:00	-0001
08/12/96	05:30:00	-0001
08/12/96	06:30:00	-0001
08/12/96	07:00:00	-0001
08/12/96	07:30:00	-0001
08/12/96	11:30:00	-0001
08/12/96	14:00:00	-0001
08/13/96	04:30:00	-0001
08/13/96	06:00:00	-0001
08/13/96	07:00:00	-0001
08/14/96	05:00:00	-0001
08/14/96	05:30:00	-0001
08/14/96	06:00:00	-0001
08/14/96	06:30:00	-0001
08/14/96	07:00:00	-0001
08/16/96	06:30:00	-0001

c) Between 08/02(16:00) - 08/31(15:00) pH drift unusually large - values were removed.

d) Between 08/11(16:00) - 08/31(15:00) DO% and DOmg/l missing - values below 0

September 1996

a) Between 09/02/96 (17:33:18) and 09/13 (15:33:18) time values were offset by +3min 18sec.

- b) Between 09/17/96 (16:24:54) and 09/30 (15:54:54) time values were offset by -
5min
6sec.
- c) Between 09/17/96 (16:24) and 09/30(15:54:54) DO% and DOmg/l missing -
values
below
0
- d) Between 09/17/96 (16:24) and 09/30(15:54:54) pH values unusually low
and were
removed (see missing data). Probe malfunctioned during deployment.

October 1996

a) Turbidity spikes:

Date	Time	Turb
10/14/96	05:00:00	0562
10/16/96	15:30:00	0601
10/17/96	17:30:00	0720

- b) Between 10/17(11:30) and 10/22(13:30) DO% and DOmg/l missing -
puncture in
membrane

- c) Between 10/22(14:15) and 10/25(23:45) time values were offset by 15
minutes.

November 1996

a) Turbidity Spikes:

Date	Time	Turb
11/16/96	04:30:00	0408
11/21/96	16:30:00	0239
11/22/96	02:30:00	0214
11/22/96	03:00:00	0190
11/22/96	03:30:00	0106
11/22/96	04:00:00	0169
11/22/96	05:00:00	0193
11/22/96	20:00:00	0127
11/23/96	05:00:00	0238
11/23/96	05:30:00	0164
11/23/96	06:00:00	0127

December

a) Turbidity Spikes:

Date	Time	Turb
12/04/96	13:30:00	153.8
12/04/96	14:30:00	476.1

- b) Between 12/05(10:00) and 12/19 (13:30) pH values were removed because
of a
larger

than usual drift (approx. 1 pH unit). Reason for drift could not be determined.

c) 12/23(10:30) - 12/31(23:30) Turbidity missing - wiper parked over optics

11. Missing Data:

January 1996

01/01(00:00) - 01/04(16:30)	All parameters missing - units out for repair
01/04(17:00) - 01/19(15:00)	Sp. Cond, Salinity and DO (mg/l) missing - deleted
because values for Sp. Cond. were too low	
01/04(17:00) - 01/31(23:30)	No turbidity - no probe
01/19(15:30 - 16:00)	All parameters missing - exchange of units
01/19(16:30) - 01/31(23:30)	pH missing - no probe installed

February 1996

02/01(00:00) - 02/02(14:30)	pH missing - no probe installed
02/01(00:00) - 02/29(23:30)	Turbidity missing - no probe

March 1996

03/01(00:00) - 03/15(14:25)	Turbidity missing - Did not have probe
03/01(13:55) - 03/15(14:25)	Depth values missing - they were deleted
because values were too low	
03/01(13:55) - 03/31(23:30)	pH values missing - were removed
because of large drift (biofouling suspected)	
03/30(14:00 - 15:30)	All parameters missing - exchange of units
03/30(16:00 - 23:30)	Turbidity missing - no probe

April 1996

04/01(00:00) - 04/11(14:30)	Turbidity missing - no probe installed
04/01(00:00) - 04/30(23:30)	pH values missing - removed because of large drift
(biofouling suspected)	

Between 04/06(07:30) and 04/22(12:00) dissolved oxygen (DO% and DOmg/l) were deleted as values fell below range of sensor (<0).
Date

Time
DO

04/06/96
07:30:00
-002.3

04/06/96
08:00:00
-002.3

04/06/96
08:30:00
-002.2

04/06/96
09:00:00
-002.0

04/06/96
09:30:00
-002.1

04/06/96
17:00:00
-000.1

04/06/96
17:30:00
-000.1

04/06/96
18:00:00
-000.2

04/07/96
10:00:00
-000.4

04/07/96
10:30:00
-001.2

04/07/96
16:30:00
-000.2

04/07/96
17:00:00
-000.2

04/07/96
17:30:00
-000.1

04/07/96
18:00:00
-000.1

04/07/96
18:30:00
-000.2

04/07/96
19:00:00
-000.1

04/07/96
19:30:00
-000.3

04/07/96
20:00:00
-000.1

04/08/96
09:30:00
-000.3

04/08/96
10:00:00
-000.4

04/08/96
10:30:00
-000.5

04/08/96
11:00:00
-000.4

04/08/96
11:30:00
-000.4

04/08/96
12:00:00
-000.3

04/08/96
12:30:00
-000.3

04/09/96
08:30:00
-000.2

04/09/96

09:00:00
-000.2

04/09/96
09:30:00
-000.3

04/09/96
10:00:00
-000.3

04/09/96
10:30:00
-000.2

04/09/96
11:00:00
-000.3

04/09/96
11:30:00
-000.3

04/09/96
12:00:00
-000.2

04/09/96
12:30:00
-000.2

04/09/96
13:00:00
-000.3

04/09/96
13:30:00
-000.2

04/20/96
06:00:00
-000.5

04/20/96
09:00:00
-001.1

04/20/96
10:00:00
-000.9

04/22/96
11:30:00
-000.1

04/22/96
12:00:00
-000.8

04/26(12:30 - 16:30)
terminated
before
unit retrieved.

All Parameters missing - logging

04/26(17:00) - 04/30(23:30)

Turbidity missing - no probe installed

May 1996

05/01 (00:00) -05/10 (14:30)
installed

pH and Turbidity missing - probes not

05/24 (12:30) -05/31 (23:30)

Turbidity missing - probe not installed

June 1996

06/01(00:00) - 06/08(11:00)
06/08(11:30) - 06/11(12:30)
terminated
before
unit retrieved.

Turbidity missing - no probe

All parameters missing - program

06/21(10:00) - 06/30(23:30)

Turbidity missing - no probe

July 1996

07/01(00:00) -07/05(11:30)
07/18(17:30) -07/31(23:30)
07/18(17:30) -07/31(23:30)

Turbidity missing - no probe installed

DO missing- no probe installed

Turbidity missing - no probe installed

August 1996

08/01(00:00) - 08/02(15:00)
malfunctioned
during deployment
08/01(00:00) - 08/02(15:00)
08/02(15:30)
exchanged
08/02(16:00) - 08/31(15:00)
drift was
too

DO% and DOmg/l missing - probe

Turbidity missing - no probe

All parameters missing - units

pH values missing- removed because

large (biofouling suspected)
08/11(16:00) - 08/31(15:00)
08/16(16:30) - 08/31(15:00)
08/31(15:30 -23:30)
before unit
retrieved

DO% and DOmg/l missing - values below 0

Turbidity missing - no probe

All parameters missing - Logging ended

September 1996

09/01(00:00) - 09/02(17:00) before unit retrieved.	All parameters missing - logging ended
09/02(17:33) - 09/13(15:33)	Turbidity missing - no probe
09/13(16:00) - 09/17(16:00) failed before end of deployment	All parameters missing - batteries
09/17(16:24) - 09/30(15:54)	DO% and DOmg/l missing - values below 0
09/17(16:24) - 09/30(15:54) probe failure caused values to fall below expected.	pH values missing - removed because
09/17(16:24) - 09/30(15:54)	Turbidity missing - no probe
09/30(16:30) - 09/30(23:30) was used and not functioning properly	All parameters missing - Hydrolab unit
October 1996	
10/01(00:00) - 10/08(14:30) Recorder unit was used and malfunctioned during deployment	All parameters missing - Hydrolab
10/17(11:30) - 10/22(13:30) membrane	DO% and DOmg/l missing - puncture in
10/22(14:15) - 10/25(23:45)	Turbidity missing - probe malfunction
10/26(00:00) - 10/30(23:30) unit was washed out by strong currents	All parameters missing - deployment
November 1996	
11/01(00:00) - 11/07(14:30) apparatus had to be replaced after washout	All parameters missing - deployment
December 1996	
12/05(10:00) - 12/19(13:30) large drift (reason for drift unknown)	pH values missing - removed because of
12/23(10:30) - 12/31(23:30) optics	Turbidity missing - wiper parked over