Padilla Bay (PDB) NERR Water Quality Metadata

Bay View Channel site: January to December 1998
Joe Leary Slough site: January to December 1998

Latest update: 27 March 2000

I. Data Set and Research Descriptors

1. Principal investigator and contact persons

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2. Entry verification

The data are downloaded from the YSI 6000s to an IBM compatible PC. Graphs of all data are printed using PC6000 software during the first part of the year and using Ecowatch software during the rest of the year and are examined for suspect, anomalous, or outlying data. Files are converted to Macintosh Excel files and edited for transfer to the NERRS CDMO. Files are merged to contain one full month of data. Missing data (from maintenance and downloading down time) are inserted into the spreadsheet and are denoted by a period (.). Suspect data are deleted and replaced by periods (.). After formatting the data, some files are more closely checked for anomalies in DeltaGraph Pro(r). No CDMO Excel 5.0 macros were used. Edited and raw files are archived on a Macintosh hard drive at Padilla Bay NERR. This process of entry verification was completed by Robin Cottrell, Heather Defenderfer, Daniel Hahn, and Douglas Bulthuis for the 1998 data. Final verification and this metadata documentation were completed by Douglas Bulthuis.

3. Research Objectives

The Bay View Channel YSI 6000 has been set out to detect and monitor short-term variability and long-term changes in Padilla Bay. The Joe Leary

Slough YSI 6000 has been set at the mouth of the slough to measure the effects of tidal "closure" of the tide gates on water in the slough and to detect long-term changes in water quality in the slough associated with implementation of a non point source pollution watershed action plan. The No Name Slough YSI 6000 has been set at the mouth of No Name Slough to detect seasonal and long-term changes in water quality of the slough associated with residential development in the watershed and changes associated with experimental farming methods designed to reduce non-point source pollution to No Name Slough. Measurements are taken every 30 minutes at all three sites unless otherwise noted in data anomalies.

4. Research methods

A YSI 6000 was deployed in Joe Leary Slough in a vertical position, 0.25 m above the bottom of the slough, in a 4 in. diameter PVC pipe which has holes and slits drilled in it to allow water circulation around the probes. The PVC pipe is attached to a steel pipe that was driven into the sediment. Some dissolved oxygen data from Joe Leary Slough were anomalous and could be explained if there were poor exchange between the water inside the deployment tube and water outside the deployment tube. Therefore during four days in October 1998 and 10 days in December 1998, YSI datasondes were deployed inside and outside the deployment tube simultaneously at the same depth. All data were very similar inside and outside the deployment tube (or fluctuated in parallel indicating differences in calibration) during October and December with the exception of the dissolved oxygen data during October. During four tidal cycles in October, the dissolved oxygen concentration inside the deployment tube did not increase with increasing salinity as much as dissolved oxygen in the water outside the deployment tube. (In Joe Leary Slough, salinities typically fluctuate from 0 to 10, 20 or even 30 PSU with each tidal cycle, with higher oxygen concentrations usually observed in the high salinity water.) The October dissolved oxygen data

could indicate that organic material with a high oxygen demand might have accumulated inside the deployment tube and/or epiphytic and bacterial growth along the openings in the deployment tube may be exerting a high oxygen demand on the water in the tube. If exchange between the water inside and outside the pipe were slow enough, the material and organisms inside the tube could exert a measurable decrease in dissolved oxygen. When the same experiment was repeated in December, there was no difference in dissolved oxygen inside and outside the deployment tube. Therefore, dissolved oxygen data from Joe Leary Slough need to be interpreted with caution because there may be times when the data indicate dissolved oxygen concentrations inside the deployment tube that are different than concentrations in Joe Leary Slough outside the deployment tube.

A YSI 6000 was deployed in Padilla Bay in a tributary of Bayview Channel. It was deployed using the same design as that in Joe Leary Slough, except that the PVC pipe was attached to two steel pipes. The depth of the YSI was -1.1 m (depth below MLLW) and about 0.75 m above the bottom along the sloping edge of a small channel draining the surrounding intertidal flats.

A YSI 6000 was deployed in No Name Slough using the same design as that in Joe Leary Slough, except that the PVC pipe was attached to a piling supporting a pump house in front of the tide gates. The YSI 6000 sensors are about 0.20 m above the bottom.

In all cases, measurements of temperature, specific conductivity, salinity, percent saturation of dissolved oxygen, depth and pH are recorded every half-hour. At the end of each sampling period, the YSI 6000 is brought back into the laboratory for downloading, cleaning, and recalibration.

All calibrations are conducted according to the protocols in the YSI 6000 Operation and Service Manual. During January 1998, the software that was used to download data from the sondes and for pre- and post- deployment calibration was upgraded to version 3.14. For the conductivity calibration a conductivity

standard of 50 mS/cm was used. The pH calibration is a 2 point calibration using standard pH buffer solutions with a pH of 7 and 10. The KCl solution and Teflon membrane on the dissolved oxygen probe are changed prior to each YSI 6000 deployment and the new oxygen membrane is allowed to soak overnight in water before calibration.

5. Site location and character

General Padilla Bay (48° 30' N; 122° 30' W) is a shallow embayment in northern Puget Sound. The tide flats are dominated by the eelgrass Zostera marina, which covers approximately 3,000 ha. Zostera japonica, a recent invader to the region, now covers about 350 ha of the bay. Tides are mixed semi-diurnal with a mean range of 1.55 m. Salinity varies from about 15 to 30 PSU.

Padilla Bay is an "orphaned" estuary in that the Skagit River no longer empties directly into it. Most of the land in the 9300 ha Padilla Bay watershed is agricultural, and is drained by four sloughs which empty into the bay. The salinity in Padilla Bay reflects both the sloughs that flow into the bay and the greater Puget Sound-Georgia Basin estuary in which Padilla Bay is located. Major freshwater flows into this area of the Puget Sound-Georgia Basin estuary come from the Fraser and Nooksack Rivers to the north and from the Skagit River to the south.

Joe Leary Slough Site (48° 31' 05.3" N; 122° 28' 22.8" W) Joe Leary Slough drains land which is predominantly annual crop agriculture and pasture land with some low density housing. The slough is characterized by high fecal and nutrient inputs, high turbidity, and low dissolved oxygen concentrations. During the summer, there is low flow and the depth ranges from 0.5-1.5 m. During winter flooding, the slough can reach a depth of 4 m. There is a dam at the mouth of the slough with twelve 4-ft diameter outfall pipes that have one-way hinged tide gates. Saline water from Padilla Bay seeps through the tide

gates during high tide. The bottom of the slough is composed of very soft sediment, which is periodically dredged. A YSI 6000 is deployed on the freshwater side of the tide gates at a depth of about 0.25 m above the bottom. The latitude/longitude were measured with a Trimble GeoExplorer II and differentially corrected with post processing providing a manufacturer's stated accuracy of ± 5m.

Bayview Channel Site (48° 29' 46.6" N; 122° 30' 01.8" W) Bayview Channel, a major Padilla Bay tributary/distributary, floods and drains intertidal flats including eelgrass beds, mats of macroalgae, and flats without macrovegetation. The YSI 6000 is located in a tributary channel to Bayview Channel. The tributary drains predominately eelgrass (Zostera marina and Z. Japonica) covered intertidal flats. Bottom sediments beneath the YSI 6000 are fine silt and clay overlying sand. The YSI 6000 is deployed in a black PVC pipe that is attached to two steel pipes set in the sediment. When deployed, the datasonde is located about 0.75 m above the bottom. Pollutants entering the bay include general non-point source, agricultural non-point source, and fecal coliform bacteria from agriculture, failing septic tanks and wildlife. The latitude/longitude were measured with a Trimble GeoExplorer II and differentially corrected with post processing providing a manufacturer's stated accuracy of ± 5m.

No Name Slough Site (48° 28' 10.3" N; 122° 28' 02.6" W) No Name Slough drains a 990 ha watershed composed of an "upland" portion of rural, pasture, woodlot, and low density housing land use on a glacial moraine; and a "floodplain" portion of intensive annual crop agriculture on drained marsh land. The slough water is characterized by periodic high turbidity, high salinity in the lower part of the slough most of the year, and algal blooms in the lower slough during the summer. During summer, there is little or no freshwater flow in the slough and depth ranges from 0.25-0.50 m. During winter flooding, water depth at the mouth can be as high as 2 m. No Name Slough flows into Padilla Bay through 4 tide gates that have been placed in the sea dike. Saline water seeps

through the tide gates, under the dike, or through the dike so that water is usually partially saline at the mouth of the slough on the "freshwater" side of the dike where the YSI 6000 is located. Two pumps are located at the mouth of No Name Slough. These pump water over the dike into Padilla Bay during times of high rainfall and high tides when water depth in the slough reaches preset depths. Bottom sediments in No Name Slough are very soft. The YSI 6000 is deployed 0.20 m above the bottom on the freshwater side of the dike on one of the piles supporting the pump house. The latitude/longitude were measured with a Trimble GeoExplorer II and differentially corrected with post processing providing a manufacturer's stated accuracy of ± 5m.

6. Data collection period

Data collection was continuous from January 1 to December 31 at both sites except for times of downloading, cleaning and recalibration as noted in the missing data section.

Joe Leary Slough (JL)	BayView Channel (BY)
Deployment Date/Time Retrieval Date/Time	Deployment Date/Time Retrieval Date/Time
12/23/97 13:00:00 to 01/13/98 10:30:00	11/25/97 14:30:00 to 01/08/98 14:30:00
01/13/98 11:00:00 to 01/28/98 11:00:00	01/08/98 15:00:00 to 01/22/98 10:00:00
01/28/98 11:30:00 to 02/20/98 10:00:00	01/22/98 11:00:00 to 02/19/98 10:00:00
02/20/98 10:30:00 to 03/03/98 11:00:00	02/19/98 10:30:00 to 04/01/98 09:00:00
03/03/98 12:00:00 to 03/24/98 13:00:00	04/01/98 10:00:00 to 04/21/98 10:00:00
03/24/98 13:30:00 to 04/13/98 09:00:00	04/21/98 10:30:00 to 05/21/98 12:00:00
04/13/98 09:30:00 to 04/29/98 11:30:00	05/21/98 12:30:00 to 06/19/98 13:00:00
04/29/98 12:00:00 to 05/14/98 08:30:00	06/19/98 14:00:00 to 07/15/98 08:00:00
05/14/98 09:30:00 to 06/08/98 13:00:00	07/15/98 09:00:00 to 08/05/98 14:30:00
06/08/98 13:30:00 to 06/29/98 11:00:00	08/05/98 15:00:00 to 08/28/98 09:30:00

06/29/98 11:30:00 to 07/13/98 13:00:00 08/28/98 10:00:00 to 09/18/98 13:00:00
07/13/98 13:30:00 to 07/23/98 10:30:00 09/18/98 14:00:00 to 10/14/98 13:30:00
07/23/98 11:00:00 to 08/12/98 14:30:00 10/14/98 14:00:00 to 10/29/98 10:30:00
08/12/98 15:00:00 to 08/19/98 12:30:00 10/29/98 11:00:00 to 12/09/98 10:30:00
08/19/98 13:00:00 to 09/01/98 12:30:00 12/09/98 11:00:00 to 02/17/99 09:30:00
09/01/98 13:30:00 to 09/09/98 10:00:00
09/09/98 10:30:00 to 09/22/98 09:00:00
09/22/98 09:30:00 to 09/30/98 13:00:00
09/30/98 13:30:00 to 10/12/98 14:00:00
10/12/98 14:30:00 to 10/21/98 11:30:00
10/21/98 12:00:00 to 10/27/98 12:00:00
10/27/98 12:30:00 to 11/09/98 14:30:00
11/09/98 15:00:00 to 11/23/98 15:00:00
11/23/98 15:30:00 to 12/11/98 13:30:00
12/12/98 20:30:00 to 12/20/98 21:00:00
12/22/98 12:30:00 to 01/06/99 14:30:00

7. Associated researchers and projects
None

II. Physical Structure Descriptors

8. Variable sequence, range of measurements, units, resolution, accuracy:

Variable Name	Range of Measurements	Resolution	Accuracy
DATE	1-12, 1-31, 00-99	(Month, Day, Year)	n/a
HOUR	0-24, 0-60, 0-60	(Hour, Minutes, Seconds)	n/a
TEMP	-5 to 45 (°C)	0.01° C	±0.15 °C
SPCOND	0-100 (mS/cm)	0.01mS/cm	±0.5 % of reading or 0.001 mS/cm
SALINITY	0-70 (ppt)	0.01ppt	±1.0 % of reading or 0.1ppt, whichever is greater
DOSAT	0-200 (% saturation)	0.1 % air saturation	±2 % air sat.
DOSAT	200-500 (% saturation)	0.1 % air saturation	±6 % air sat.
DOMG	0-20 (mg/L)	0.01 mg/L	±0.2 mg/L
DOMG	20-50 (mg/L)	0.01 mg/L	±0.6 mg/L
*DEPTH (Level)	-0.3-9.1 (m)	0.001 m	±0.018 m
PH	2-14	0.01 units	±0.2 units

TURB 0-1000 NTU 0.1 NTU ±5% of reading or 2
NTU, whichever is greater
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*During 1997 records were kept of the atmospheric pressure during calibration of
depth and the apparent depth after each two to four week deployment. The data
indicated that depth readings could read as much as 0.28 m above or below true
depth. Therefore, although the sensor may accurately read ± 0.001 m, changes in
atmospheric pressure when deployed indicate depth may be ± 0.3 m.

9. Coded variable code definitions
JL - Joe Leary Slough Site; BY - Bayview Channel Site

10. Data anomalies
Please note* - There is no data from No Name Slough (NN) during 1998 due to
insufficient staff support.

January 1998
JL: Isolated erratic high turbidity values were recorded at 1800 1 Jan, 0130
and 0230 2 Jan, and 1730 25 Jan; cause unknown; data deleted. pH data from 1130
on 28 Jan to 2330 on 31 Jan appears erratic but probe calibrated (2 Point) in pre-deployment calibration and read 7.2 in pH 7.0 buffered standard in
a post-deployment check on 20 Feb.
BY: All data suspect and need to be interpreted with caution from 0400 on 3
Jan to 1700 on 7 Jan because probes had been exposed to the air during spring
lower low water. Depth data is relative because datasonde was caught in the
deployment tube at an unknown depth. Negative depths were recorded from 0130 to
0300 on 4 Jan. Depth above bottom is not known but is estimated to have been
about 1.75 m. Turbidity data from 1500 on 8 Jan to 1000 on 22 Jan may be somewhat high and should be interpreted with caution because at the end of the
deployment period a check of the turbidity probe indicated a reading of 120 NTU
in 100 NTU standard. Dissolved oxygen data from 1500 on 8 Jan through 1000 on
22 Jan may be suspect and should be interpreted with caution because the probe
was slightly tarnished on retrieval and the probe failed the next time it was

deployed; however, a post deployment check on 22 Jan indicated a reading of
104.3% in water saturated air. An erratic high turbidity was recorded at 1830
on 22 Jan; cause unknown; datum deleted.

February 1998
JL: pH data from 0000 1 Feb to 1000 20 Feb appears erratic but probe calibrated (2 Point) in pre-deployment calibration and read 7.2 in pH 7.0 buffered standard in a post-deployment check on 20 Feb. Erratic low and high
conductivity and salinity readings from 0230 to 0330 on 18 February were deleted; cause for erratic values not known.
BY:

March 1998
JL: Dissolved oxygen values dropped to near zero for 3 readings and then back
up to 78%, the cause is unknown, data deleted from 0430 to 0530 on 3 March. A
single turbidity value over 1000 at 0930 on 3 March was deleted, cause is not
known. Erratic high and low values for turbidity were observed from 2300 on 13
Mar through 1300 on 24 Mar; data were deleted; cause unknown but could have been
build up of vegetative material in the guard around the sonde. Erratic high
values for turbidity were recorded from 2330 29 Mar to 0000 30 Mar, cause unknown, data deleted. Negative depth readings were recorded at the following
times and were probably related to changes in barometric pressure after calibration in the lab (see note above in 8. Variable sequence, range of measurements, units, resolution and accuracy): 1830 to 1900 on 21 Mar.
BY:

April 1998
JL: No data for all parameters from 1900 on 20 April to 1230 on 21 April
because the datalogger failed to log any data, the cause for the failure is not
known but could have been caused by poor battery contacts. Turbidity data were
high and erratic from 2100 on 5 April to 0900 on 1300 April; cause is unknown
but were probably caused by large amount of vegetation debris found in the water
and the deployment tube on retrieval; data deleted. Turbidity data were high
and erratic from 0900 on 27 April to 1130 on 29 April; cause unknown; data
deleted.
BY: Single erratic high turbidity values were recorded at 2000 on 8 April and

1430 on 29 April; cause unknown; data deleted. Dissolved oxygen data from 1030 on 21 April to 2330 on 30 April may be suspect and should be interpreted with caution because a post deployment check on 21 May at the end of the deployment indicated a reading of 78.9% in water saturated air.

May 1998
JL: Dissolved oxygen data from 0930 on 14 May through 2330 on 31 May may be suspect and should be interpreted with caution because a post deployment check on 8 June at the end of the deployment indicated a reading of 88.1% in water saturated air. Negative depth readings were recorded at the following times and were probably related to changes in barometric pressure after calibration in the lab (see note above in 8. Variable sequence, range of measurements, units, resolution and accuracy): 1700-1730 on 1 May, 1230-1330 on 11 May, 1130-1500 on 12 May, and 1200-1530 on 13 May.
BY: Dissolved oxygen data from 0000 on 1 May to 1200 on 21 May may be suspect and should be interpreted with caution because a post deployment check on 21 May at the end of the deployment indicated a reading of 78.9% in water saturated air. Dissolved oxygen data from 1230 on 21 May to 2330 on 31 May may be suspect and should be interpreted with caution because a post deployment check on 19 June at the end of the deployment indicated a reading of 90.8% in water saturated air.

June 1998
JL: Dissolved oxygen data from 0000 1 June to 1300 on 8 June may be suspect and should be interpreted with caution because a post deployment check on 8 June at the end of the deployment indicated a reading of 88.1% in water saturated air. Erratic and high values for turbidity were observed from 1600 on 19 June to 1100 on 29 June; data were deleted; cause unknown but could have been caused by vegetative material in the guard around the sonde; some of which was observed at the end of the deployment period. Negative depth readings were recorded at the following times and were probably related to changes in barometric pressure

after calibration in the lab (see note above in 8. Variable sequence, range of
measurements, units, resolution and accuracy): 1330 to 1430 on 24 June.
BY: Dissolved oxygen data from 1000 on 1 June to 1300 on 19 June may be suspect and should be interpreted with caution because a post deployment check
on 19 June at the end of the deployment indicated a reading of 90.8% in water
saturated air. Occasional negative values for turbidity (-001) were observed
from 0230 on 20 June to 0000 on 30 June. The cause is not known but these
slight negative turbidity values probably indicate drift of the zero line during
deployment.

July 1998
JL: A single high turbidity value was recorded at 1400 on 25 July, cause
unknown. Dissolved oxygen data from 29 to 31 July may be suspect and should be
interpreted with caution because a post deployment check on 12 August at the end
of the deployment indicated a reading of 78.3% in water saturated air.
BY: A single erratic high turbidity value was recorded at 1300 on 23 July;
cause unknown; datum deleted. Occasional negative values for turbidity (-001)
were observed from 0100 on 3 July to 0630 on 13 July. The cause is not known
but these slight negative turbidity values probably indicate drift of the zero
line during deployment.

August 1998
JL: Dissolved oxygen data from 0000 1 Aug to 1430 on 12 Aug may be suspect and
should be interpreted with caution because a post deployment check on 12 August
at the end of the deployment indicated a reading of 78.3% in water saturated
air. A single high turbidity was recorded at 1400 on 10 August, cause unknown.
Dissolved oxygen data from 0300 on 26 August to 2330 on 31 August appears
irregular and may not be reliable; however, a post-deployment check on 1 Sep at
the end of the deployment indicated a reading of 94.5% in water saturated air;
the decreasing dissolved oxygen may have been due to decreasing salinity (less
highly oxygenated salt water seeping through the tide gates into Joe Leary
Slough). Negative depth readings were recorded at the following times and were

probably related to changes in barometric pressure after calibration in the lab
(see note above in 8. Variable sequence, range of measurements, units, resolution and accuracy): 0900 on 16 Aug, 1000 on 17 Aug, 1100-1130 on 18 Aug,
1130-1200 on 19 Aug, and 1300 on 20 Aug.
BY: Single erratic high turbidity values were recorded at 1500 on 6 Aug and
1130 on 20 Aug; cause unknown; data deleted.

September 1998
JL: Dissolved oxygen data from 0000 to 1230 on 1 Sep appears irregular and may
not be reliable; however, a post-deployment check on 1 Sep at the end of the
deployment indicated a reading of 94.5% in water saturated air; the decreasing
dissolved oxygen may have been due to decreasing salinity (less highly oxygenated salt water seeping through the tide gates into Joe Leary Slough).
Negative depth readings were recorded at the following times and were probably
related to changes in barometric pressure after calibration in the lab (see note
above in 8. Variable sequence, range of measurements, units, resolution and
accuracy): 0900-0930 1 Sep, 0930-1030 on 2 Sep, 0930-1130 on 3 Sep, 1130-1200 on
4 Sep, 1230 on 5 Sep, and 1330 on 7 Sep.
BY: On two occasions during September the salinity and conductivity dropped
suddenly 1 to 4 units for three hours and three days and then returned to the
previous values. The cause for this drop and "recovery" is not known; however,
after deployment the conductivity probe recorded 49.45 mS/cm in 50.0 standard;
therefore, data were deleted during the periods of low readings: 1800 to 2000 on
21 Sep and 0200 on 23 Sep to 0000 on 27 Sep. Single erratic high turbidity
values were recorded at 1200 and 1600 on 30 Sep; cause unknown; data were deleted.

October 1998
JL: Dissolved oxygen data from 0430 15 Oct to 1130 on 21 Oct were very low.
High turbidity during this time period indicated an increase in nonpoint source
pollution. A post-deployment check on 21 Oct at the end of the deployment
indicated a reading of 95.9% in water saturated air; but the new datasonde that

was deployed read 39.9% dissolved oxygen in water that had been reading 0.9% dissolved oxygen 30 minutes earlier. The causes for these anomalous data are not known, but water inside the deployment tube may not be exchanging very well with the surrounding water. During 22-26 October and 12 to 20 December 1998, YSI 6000 datasondes were simultaneously deployed inside and outside of the deployment tube. See Section 4. (above) Research Methods, Joe Leary Slough site. Negative depth readings were recorded at the following times and were probably related to changes in barometric pressure after calibration in the lab (see note above in 8. Variable sequence, range of measurements, units, resolution and accuracy): 0630 to 1230 on 1 Oct, 0800 to 1230 on 2 Oct, 0900 to 1300 on 3 Oct, 0030 to 0330 on 7 Oct, 0030 to 0530 on 8 Oct, 0200 to 0530 on 9 Oct, 0230 to 0630 on 10 Oct 0300 to 0900 on 11 Oct, and 0300 to 0930 on 12 Oct.
BY: Datasonde was "caught" in deployment tube from 1600 on 14 Oct through 0730 on 17 Oct; the probes were exposed to the air during low tides; all data were deleted during this time period. All data from 0800 on 17 Oct through 1030 on 29 Oct should be interpreted with caution because the probes had been exposed to the air at the beginning of the deployment (1600 on 14 Oct through 0730 on 17 Oct). All probes appeared in good condition on retrieval and read within 10% of the correct value in post-deployment calibration checks.

November 1998
JL: Dissolved oxygen data from 4 Nov to 1430 on 9 Nov were very low. There may have been a lot of organic material in Joe Leary Slough associated with the early seasonal rains. A post-deployment check on 9 Nov at the end of the deployment indicated a reading of 98.0% in water saturated air; but the new datasonde that was deployed read 53.6% dissolved oxygen in water that had been reading 1.7% dissolved oxygen 30 minutes earlier. Similarly, high turbidities and low dissolved oxygen concentrations were recorded from 14 Nov to 1500 on 23 Nov (post-deployment check indicated a reading of 90.3% dissolved oxygen in

water saturated air). The causes for these anomalous data are not known, but water inside the deployment tube may not be exchanging very well with the surrounding water. During 22-26 October and 12 to 20 December 1998, YSI 6000 datasondes were simultaneously deployed inside and outside of the deployment tube. See Section 4. (above) Research Methods, Joe Leary Slough site. High and erratic turbidity values were recorded at the following times and removed from the database, the causes for these high erratic values is not known but could be caused by vegetative debris caught in the guard around the probes: 2300 on 6 Nov, 0030 on 8 Nov, 1430 on 9 Nov, from 0000 18 Nov to 2100 on 19 Nov, 0700 and 2330 on 20 Nov, and from 0330 on 27 Nov to 1730 on 29 Nov. Turbidity data from 2130 on 19 Nov to 1500 on 23 Nov may be suspect because of high and erratic turbidities observed earlier in the deployment.
BY:

December 1998
JL: High and erratic turbidity values at 0030 on 6 Dec and 0030 on 8 Dec were deleted, cause unknown. Erratic fluctuations in turbidity values were observed from 1100 to 1800 on 3 Dec, the cause is not known. High turbidity values were observed on the 29th and 30th of December, cause unknown. Negative temperatures were recorded on the 20th, 22nd and 23rd of December.
BY: Dissolved oxygen data sharply increased at 1630 on 18 Dec and looked suspicious during the remainder of the deployment. The dissolved oxygen membrane was punctured on retrieval and it was presumed that the membrane was punctured between 1600 and 1630 on 18 Dec; all dissolved oxygen data from 1630 on 18 Dec to 2330 on 31 Dec98 were deleted. A single erratic high turbidity value was recorded at 0330 on 7 Dec; cause unknown; datum was deleted.

11. Missing data
Please note* - There is No data from No Name Slough during 1998 due to insufficient staff support.

January 1998
JL: Isolated erratic high turbidity values were recorded at 1800 1 Jan, 0130 and 0230 2 Jan, and 1730 25 Jan; cause unknown; data deleted.

BY: No data for all parameters from 0000 on 1 Jan through 0330 on 3 Jan and from 1730 on 7 Jan to 1430 on 8 Jan because the depth and salinity data indicated that the datasonde was caught in the PVC deployment tube and the probes were out of the water for part of each day during these time periods. No data for all parameters at 1030 on 22 Jan because of exchange of datasondes for cleaning, maintenance, and calibration. An erratic high turbidity was recorded at 1830 on 22 Jan; cause unknown; datum deleted.

February 1998
JL: Erratic low and high conductivity and salinity readings from 0230 to 0330 on 18 February were deleted; cause for erratic values not known.
BY:

March 1998
JL: No data for all parameters at 1130 on 3 March because of exchange of datasondes for cleaning, maintenance, and calibration. Dissolved oxygen values dropped to near zero for 3 readings and then back up to 78%, the cause is unknown, data deleted from 0430 to 0530 on 3 March. A single turbidity value over 1000 at 0930 on 3 March was deleted, cause is not known. Erratic high and low values for turbidity were observed from 2300 on 13 Mar through 1300 on 24 Mar; data were deleted; cause unknown but could have been build up of vegetative material in the guard around the sonde. Erratic high values for turbidity were recorded from 2330 29 Mar to 0000 30 Mar, cause unknown, data deleted.
BY:

April 1998
JL: No data for all parameters from 1900 on 20 April to 1230 on 21 April because the datalogger failed to log any data, the cause for the failure is not known but could have been caused by poor battery contacts. Turbidity data were high and erratic from 2100 on 5 April to 0900 on 1300 April; cause is unknown but were probably caused by large amount of vegetation debris found in the water and the deployment tube on retrieval; data deleted. Turbidity data were high and erratic from 0900 on 27 April to 1130 on 29 April; cause unknown; data

deleted.
BY: No data for all parameters at 0930 on 1 April because of exchange of
datasondes for cleaning, maintenance, and calibration. Single erratic high
turbidity values were recorded at 2000 on 8 April and 1430 on 29 April; cause
unknown; data deleted.

May 1998
JL: No data for all parameters at 0900 on 14 May because of exchange of
datasondes for cleaning, maintenance, and calibration.
BY:
NN:

June 1998
JL: Erratic and high values for turbidity were observed from 1600 on 19 June
to 1100 on 29 June; data were deleted; cause unknown but could have been caused
by vegetative material in the guard around the sonde; some of which was observed
at the end of the deployment period.
BY: No data for all parameters from 1330 to 1530 on 19 June because of exchange of datasondes for cleaning, maintenance, and calibration.

July 1998
JL:
BY: No data for all parameters at 0830 on 15 July because of exchange of
datasondes for cleaning, maintenance, and calibration. A single erratic high
turbidity value was recorded at 1300 on 23 July; cause unknown; datum deleted.

August 1998
JL:
BY: No data for all parameters from 1000 on 28 Aug to 2330 on 31 Aug because
the depth and salinity data indicated that the datasonde was caught in the PVC
deployment tube and that the probes were out of the water for part of each day.
Single erratic high turbidity values were recorded at 1500 on 6 Aug and 1130 on
20 Aug; cause unknown; data deleted.

September 1998
JL: No data for all parameters at 1300 on 1 Sep because of exchange of datasondes for cleaning, maintenance, and calibration.
BY: No data for all parameters from 0000 on 1 Sep to 1300 on 18 Sep because

the depth and salinity data indicated that the datasonde was caught in the PVC
deployment tube and that the probes were out of the water for part of each day.
No data for all parameters at 1330 on 18 Sep because of exchange of datasondes
for cleaning, maintenance, and calibration. On two occasions during September
the salinity and conductivity dropped suddenly 1 to 4 units for three hours and
three days and then returned to the previous values. The cause for this drop
and "recovery" is not known; however, after deployment the conductivity probe
recorded 49.45 mS/cm in 50.0 standard; therefore, data were deleted during the
periods of low readings: 1800 to 2000 on 21 Sep and 0200 on 23 Sep to 0000 on 27
Sep. Single erratic high turbidity values were recorded at 1200 and 1600 on 30
Sep; cause unknown; data were deleted.

October 1998
JL: No data for all parameters from 0000 to 0400 on 20 Oct because the
datasonde stopped logging. It is not known why the datasonde stopped logging
but it may be because of poor battery contacts.
BY: No data for all parameters from 1600 on 14 Oct through 0730 on 17 Oct
because the probes were exposed to the air during low tides because the
datasonde was "caught" in deployment tube.

November 1998
JL: No data for all parameters from 2200 on 3 Nov to 0330 on 4 Nov because the
datasonde stopped logging. It is not known why the datasonde stopped logging
but it may have been caused by poor battery contacts. High and erratic
turbidity values were recorded at the following times and removed from the
database, the causes for these high erratic values is not known but could be
caused by vegetative debris caught in the guard around the probes: 2300 on 6
Nov, 0030 on 8 Nov, 1430 on 9 Nov, from 0000 18 Nov to 2100 on 19 Nov, 0700 and
2330 on 20 Nov, and from 0330 on 27 Nov to 1730 on 29 Nov.
BY:

December 1998
JL: No data for all parameters from 1400 on 11 Dec to 2000 on 12 Dec and from
2130 on 20 Dec to 1200 on 22 Dec because of exchange of datasondes for cleaning,

maintenance, and calibration. High and erratic turbidity values at 0030 on 6
Dec and 0030 on 8 Dec were deleted, cause unknown.
BY: No dissolved oxygen data from 1630 on 18 Dec to 2330 on 31 Dec98 because
data sharply increased at 1630 on 18 Dec and looked suspicious during the
remainder of the deployment. The dissolved oxygen membrane was punctured on
retrieval and it was presumed that the membrane was punctured between 1600 and
1630 on 18 Dec; all dissolved oxygen data from 1630 on 18 Dec to 2330 on 31
Dec98 were deleted. A single erratic high turbidity value was recorded at 0730
on 7 Dec; cause unknown; datum was deleted.

12. Other Remarks