Padilla Bay (PDB) NERR Water Quality Metadata
January – December 2003
Latest Update: June 11, 2025

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

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2) Entry verification:

The data are downloaded from the YSI 6600 sondes to a Windows based PC. Graphs of all data are printed using EcoWatch software and are examined for suspect, anomalous, or outlying data. The files are then exported as .csv files and the CDMO macros are used for final formatting and a second check for outliers and missing data. The CDMO cdmomac3.xls macro allows the user to automatically format column widths to the correct number of decimal places based on YSI sensor specifications. It also allows the user to QA/QC each datalogger generated file for missing data points, fill all cells that do not contain data with periods, and find all data points that fall outside the range of what the data logger is designed to measure (outliers). The CDMO import.xls macro allows PC users with 30-minute data to automatically create a monthly Excel file from a two-week deployment and insert periods for missing data. It also has a graphing capability that allows users to produce single parameter and missing data point graphs on a monthly basis. After formatting the data, some files are more closely checked for anomalies in DeltaGraph Pro®. Edited and raw files are archived on a PC hard drive and on a Macintosh hard drive at Padilla Bay NERR.
Periods were later removed for data dissemination purposes and left blank. Robin

Cottrell completed this process of entry verification for the 2003 data. Robin Cottrell and Douglas Bulthuis completed final verification and this metadata documentation.

3) Research objectives:

The Bay View Channel site has been set out to detect and monitor short-term variability and long-term changes in the southern part of Padilla Bay. The Ploeg Channel site has been set out to detect and monitor short-term variability and long-term change in the northern part of Padilla Bay for comparison and contrast with water quality in the southern part of the bay. The Joe Leary Slough site 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 an implementation of a non point source pollution watershed action plan. The Gong site has been set in the deep water strait east of the northern part of Padilla Bay to monitor short-term variability and long-term change in the waters that are a source for the tidal waters flowing into Padilla Bay. Both surface (1.5 m below the surface) and bottom waters (2.0 m above the bottom, about 20 m deep) are being monitored to detect any vertical differences. The four sites are set up to provide an indication of the salinity gradient from Joe Leary Slough (freshwater) through Bayview Channel (downstream of freshwater sources from Indian and No Name Sloughs) to Ploeg Channel (remote from freshwater sources but in a tidal channel) to Gong on the marine end of the gradient. Measurements are taken every 30 minutes at all sites unless otherwise noted in data anomalies.

4) Research methods:

YSI 6600 sondes were deployed in Joe Leary Slough in a vertical position, 1.7 m from the bottom of the slough in a 4 in. diameter PVC pipe with a metal bar secured at the bottom as a stop. That portion of pipe around the sensors is cut out so that only two one-inch wide strips of deployment pipe remain around the sensor guard to allow water circulation around the probes. The PVC pipe is

attached to a steel pipe that was driven into the sediment. (This slough was dredged in the fall of 2000 so the area of deployment is much deeper than it had been the previous 5 years. To keep the data comparable the YSI is deployed at the same height relative to Mean Sea Level.)

YSI 6600 sondes were deployed in Padilla Bay in a tributary of Bayview Channel. They were deployed using the same design as that in Joe Leary Slough, except that the PVC pipe was attached to two steel pipes. To keep marine fauna from interfering with operation of the sensors "Gutter Guard" (a sheet of plastic ¼ ? mesh) is formed into a cylinder to fit inside the sensor guard. 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.

YSI 6600 sondes were deployed in Ploeg Channel using the same design as that in Bayview Channel including the use of mesh to protect the sensors. The depth of the datalogger was 0.5 m above the bottom along the sloping edge of a channel draining the surrounding intertidal flats.

Two YSI 6600 sondes were deployed at Gong site at two depths suspended from a single buoy: 1.5 m below the surface and 2.0 m above the bottom in 18-20 m water depth (only the surface site data is reported to CDMO). The dataloggers were secured to the line with YSI mooring clamps. The deep datalogger was deployed at about –18 m (depth below MLLW) on a gradual slope that is intertidal on the Padilla Bay side and goes down to about 75 m near the Guemes Island side of the strait. A subsurface buoy was attached to it to keep the sensors above the sediment surface during tidal fluctuations.

In all cases, measurements of temperature, specific conductivity, salinity, percent saturation of dissolved oxygen, depth, pH and turbidity are recorded every half hour. At the end of each deployment, the YSI 6600 is brought back

into the laboratory for downloading, cleaning, and recalibration. Before final cleaning and recalibration a post-deployment check is done that consists of recording sensor readings in the standard solutions. The results of these checks are used to help evaluate the validity of the logged data.

All calibrations are conducted according to the protocols in the YSI Environmental Operations Manual for the 6-Series Environmental Monitoring Systems. For the conductivity calibration a conductivity standard of 50 mS/cm was used. The pH calibration is a 2-point calibration using standard 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 6600 deployment and the new oxygen membrane is allowed to stabilize overnight in water saturated air before calibration. A 2-point calibration is used for the turbidity probe and the wiper pad is changed prior to each deployment. The standards used are distilled/deionized water for zero and 4000 NTU Formazin solution diluted to 100 NTU.

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 that 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. Upstream water flows out of Joe Leary Slough when water height in Padilla Bay is lower than water height in Joe Leary Slough (i.e. ebbing tide and low water). Some saline water from Padilla Bay seeps through the tide gates during high water. The bottom of the slough is composed of very soft sediment, which is periodically dredged, most recently October 2000. The deployment site is on the freshwater side of the tide gates. The latitude/longitude were measured with a Trimble GeoExplorer II and differentially corrected with post processing providing a manufacturer's stated accuracy of ± 5 m.

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 macro-vegetation. The datalogger 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 deployment site are fine silt and clay overlying sand. 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 ± 5 m.

Ploeg Channel Site: (48° 33' 23.5" N; 122° 31' 46.7" W) Ploeg Channel floods and drains intertidal flats at the north end of Padilla Bay that are comprised of

mud flats and eelgrass beds (Zostera marina and Z.Japonica) in approximately
equal amounts. Bottom sediments beneath the deployment site are fine silt. Depth
at this site is –1.54 m (depth below MLLW). 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 ± 5 m.

Gong Site: (48° 33' 30" N; 122° 34' 21" W) The Gong site is located at –18 m on
a gradually sloping bottom (from –1 m to –75 m over 2 Km) in the strait between
Samish and Guemes Islands. Water in the strait flows north and south with tidal
currents, the net water movement is apparently south toward the inlet to Guemes
Channel. Water from the strait flows onto the intertidal flats in the northern
part of Padilla Bay with each tidal cycle. Bottom sediments are mud. The only
apparent pollution sources are the general sources of pollution to the Strait of
Georgia and Northwest Straits. The latitude/longitude were measured with a
Trimble GeoExplorer II and differentially corrected with post processing
providing a manufacturer's stated accuracy of ± 5 m.

6) Data collection period: Data collection was continuous from January 1 to
December 31 at Joe Leary Slough, Bayview Channel and Ploeg Channel sites. Gong
site was first installed in March 2003; data collection at this site was
continuous from March 28 to December 31 (only the surface site data is reported
to CDMO).

Deployment and retrieval times are listed below. The times indicate the first
and last measurements made with each deployment. (Deployments using the new
6600EDS [Extended Deployment System] sonde are noted with "EDS".)

BEGAN		ENDED	
Bayview Channel Site			
12/31/02	10:30:00	01/21/03	11:00:00
01/21/03	11:30:00	02/06/03	10:00:00
02/06/03	10:30:00	02/25/03	10:30:00

02/25/03	11:00:00	03/25/03	09:30:00	
03/25/03	10:00:00	04/11/03	08:30:00	
04/11/03	09:00:00	04/24/03	10:00:00	
04/24/03	10:30:00	05/08/03	10:00:00	
05/08/03	10:30:00	05/20/03	07:30:00	
05/20/03	08:00:00	06/10/03	12:00:00	
06/10/03	12:30:00	06/24/03	13:30:00	
06/24/03	14:00:00	07/08/03	12:30:00	
07/08/03	13:00:00	07/22/03	13:30:00	
07/22/03	14:00:00	08/13/03	09:00:00	
08/13/03	09:30:00	08/22/03	13:30:00	
08/22/03	14:00:00	09/05/03	12:00:00	
09/05/03	12:30:00	09/17/03	10:00:00	
09/17/03	10:30:00	10/01/03	12:00:00	
10/01/03	12:30:00	10/15/03	08:30:00	
10/15/03	09:00:00	10/29/03	10:30:00	
10/29/03	11:00:00	11/12/03	13:30:00	
11/12/03	14:00:00	12/09/03	11:30:00	
12/09/03	12:00:00	12/17/03	15:00:00	EDS
12/17/03	15:30:00	12/30/03	14:30:00	
12/30/03	15:00:00	01/15/04	09:00:00	

Ploeg Channel Site

12/31/02	10:00:00	01/21/03	11:30:00	
01/21/03	12:00:00	02/06/03	10:30:00	
02/06/03	11:00:00	02/25/03	11:00:00	
02/25/03	11:30:00	03/25/03	10:00:00	
03/25/03	10:30:00	04/11/03	09:00:00	
04/11/03	09:30:00	04/24/03	09:00:00	
04/24/03	09:30:00	05/09/03	08:30:00	
05/09/03	09:00:00	05/20/03	07:00:00	
05/20/03	07:30:00	06/10/03	12:30:00	
06/10/03	13:00:00	06/24/03	14:00:00	
06/24/03	14:30:00	07/08/03	13:00:00	
07/08/03	13:30:00	07/22/03	13:00:00	
07/22/03	13:30:00	08/13/03	07:30:00	
08/13/03	08:00:00	08/22/03	13:30:00	
08/22/03	14:00:00	09/05/03	12:30:00	
09/05/03	13:00:00	09/17/03	09:30:00	
09/17/03	10:00:00	10/01/03	12:30:00	
10/01/03	13:00:00	10/15/03	09:00:00	
10/15/03	09:30:00	10/29/03	10:00:00	
10/29/03	10:30:00	11/12/03	14:00:00	
11/12/03	14:30:00	12/03/03	10:00:00	
12/03/03	10:30:00	12/17/03	14:30:00	
12/17/03	15:00:00	12/30/03	14:30:00	EDS
12/30/03	15:00:00	01/20/04	15:00:00	

Joe Leary Site

12/23/02	12:00:00	01/13/03	14:30:00	
01/13/03	15:00:00	01/23/03	14:30:00	EDS
01/23/03	15:00:00	02/05/03	13:30:00	
02/05/03	14:00:00	02/19/03	13:00:00	EDS
02/19/03	13:30:00	03/06/03	10:00:00	

03/06/03	10:30:00	03/14/03	11:30:00	
03/14/03	12:30:00*	04/02/03	13:30:00	
04/02/03	14:00:00	04/18/03	12:00:00	EDS
04/18/03	12:30:00	05/01/03	08:30:00	
05/01/03	09:00:00	05/14/03	09:30:00	EDS
05/14/03	10:00:00	05/28/03	14:00:00	
05/28/03	14:30:00	06/13/03	13:00:00	EDS
06/13/03	13:30:00	06/27/03	13:30:00	
06/27/03	14:00:00	07/16/03	11:00:00	EDS
07/16/03	11:30:00	07/31/03	13:30:00	
07/31/03	14:00:00	08/15/03	12:00:00	
08/15/03	12:30:00	08/27/03	10:30:00	EDS
08/27/03	11:00:00	09/12/03	10:30:00	
09/12/03	11:00:00	09/25/03	11:00:00	
09/25/03	11:30:00	10/08/03	10:30:00	
10/08/03	11:00:00	10/24/03	10:30:00	
10/24/03	11:00:00	11/06/03	11:30:00	
11/06/03	12:00:00	11/20/03	10:00:00	
11/20/03	10:30:00	12/10/03	13:30:00	
12/10/03	14:00:00	12/23/03	13:30:00	EDS
12/23/03	14:00:00	01/08/04	09:30:00	

*Missed sample at 12:00:00 while switching out instruments.

Gong, surface Site

03/28/03	13:30:00	04/9/03	11:00:00	
04/09/03	11:30:00	04/24/03	09:30:00	
04/24/03	10:00:00	05/08/03	09:00:00	
05/08/03	09:30:00	05/20/03	07:00:00	
05/20/03	07:30:00	06/10/03	12:30:00	
06/10/03	13:00:00	06/25/03	13:00:00	
06/25/03	13:30:00	07/08/03	13:30:00	
07/08/03	14:30:00*	07/23/03	10:30:00	
07/23/03	11:00:00	08/13/03	08:30:00	EDS
08/13/03	09:00:00	08/22/03	13:00:00	
08/22/03	13:30:00	09/05/03	13:00:00	
09/05/03	14:00:00**	09/17/03	09:30:00	EDS
09/17/03	10:00:00	10/02/03	12:30:00	
10/02/03	13:00:00	10/15/03	09:00:00	EDS
10/15/03	09:30:00	10/29/03	09:30:00	
10/29/03	10:00:00	11/12/03	14:30:00	
11/12/03	15:00:00	11/26/03	10:30:00	
11/26/03	11:00:00	12/17/03	14:30:00	
12/17/03	15:00:00	12/31/03	09:00:00	
12/31/03	09:30:00	01/20/04	14:30:00	EDS

*Missed sample at 14:00:00 while switching out instruments.
** Missed sample at 13:30:00 while switching out instruments.

7) Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy
for the NERRS System-wide Monitoring Program, NOAA/ERD retains the right to

analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from the NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. 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.

NERR water quality data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see section 1. Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under general information link on CDMO homepage) and online at the CDMO homepage http://cdmo.baruch.sc.edu/. Data are available in text tab-delimited format, Microsoft Excel spreadsheet format and comma-delimited format.

8) Associated researchers and projects:
None

II. Physical Structure Descriptors

9) Variable sequence, range of measurements, units, resolution, and accuracy:

YSI 6600 datalogger

Variable	Range of Measurements	Resolution	Accuracy
Date	1-12, 1-31, 00-99 (Mo,Day,Yr)	1 mo, 1 day, 1 yr	NA

Time	0-24, 0-60, 0-60 (Hr,Min,Sec)	1 hr, 1 min, 1 s	NA
Temp	-5 to 45 (c)	0.01 C	+/- 0.15C
Sp COND	0-100(mS/cm)	0.01mS/cm	+/-0.5% Of reading + 0.001mS/Cm
Salinity	0-70 Parts per thousand (ppt)	0.01 ppt	+/- 1% of Reading or 0.1 ppt, (whichever is greater)
DO	0-200 (% air saturation)	0.1% @air sat	+/-2% @air Saturation
DO	200-500 (% air saturation	0.1% @ air sat	+/- 6% @ Saturation
DO	0-20 (mg/l)	0.01 mg/l	+/- 0.2mg/l
DO	20-50 (mg/l)	0.01 mg/l	+/- 0.6mg/l
Depth (shallow)	0-9.1 (m)	0.001m	+/- 0.018m
PH	2-14 units	0.01 units	+/- 0.2units
Turb	0-1000 NTU	0.1 NTU	+/- 5% of Reading or 2 NTU (whichever is greater)

Data columns are separated by tabs. Each file contains a two line column header at the top of the page which identifies measurements and units for each column.

10) Coded variable indicator and variable code definitions:

File definitions: YSI deployment site/file definition/month/year (e.g. bywq0903=Bayview Channel water quality data from September 2003)

by=Bayview Channel
bp=Ploeg Channel
jl=Joe Leary
gs=Gong Surface.

EQWin station codes:
pdbbywq=Bayview Channel
pdbbpwq=Ploeg Channel
pdbjlwq=Joe Leary
pdbgswq=Gong Surface.

11) Data anomalies:

On mm/dd/yyyy this dataset was updated to include updated QAQC flags and codes for the Gong Surface surface site at PDB reserve. The GS sonde is a surface sonde that is attached to a floating buoy. The sonde sits in a tube built into the buoy and there is a bolt at the bottom of the tube which sits 1 m below the surface, therefore the sonde's position does not

change relative to the buoy. The depth data collected by the sonde reflects the depth the sonde is under the surface of the water. The buoy, and therefore sonde, experiences wave action, unlike the stable platform of the other sites. Any changes in depth are from barometric pressure changes (prior to correction) and wave action. The overall depth at the buoy location changes based on the fluctuation of the tide and ranges from 16 to 21m. The buoy is anchored to the bottom (~ 18 m) with a 13 ft helical anchor.

January 1-31, 2003

Bayview Channel
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:
01/11/2003 11:00:00
01/12/2003 12:30:00

The post-calibration salinity value for the deployment period of 01/01/03 at
00:00:00 through 01/21/03 at 11:00:00 was low, 46.0 in a solution of 50.0 mS/cm.
This could be due to fouling in the probe orifice or the calibration solution
used for the post calibration check was at fault. Salinity values during this
period may be lower than actual values.

During the following periods pH data were deleted because the slope of the
sensor as indicated by the millivolt readings during calibration were out of the
acceptable range:
01/01/03 00:00:00 to 01/21/03 11:00:00

Ploeg Channel
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:

Date	Time
01/04/03	01:30:00
01/24/03	00:30:00

The post-calibration salinity value for the deployment period of 01/21/03 at
12:00:00 to 01/31/03 at 23:30:00 was high, 50.86 mS/cm in a solution of 50.0
mS/cm. The probe may have been calibrated in a contaminated calibration solution. Salinity values during this deployment may be slightly higher than
actual values.

Joe Leary

The post-calibration salinity value for two deployment periods was high. The
first period was 01/13/03 at 15:00:00 to 01/23/03 at 14:30:00 and the value was
50.76 mS/cm, the second period was 01/23/03 at 15:00:00 to 01/31/03 at 23:30:00
and that value was 50.68 mS/cm, both in a solution of 50.00. The probes may have
been calibrated in a contaminated calibration solution. Salinity values during
these deployments may be slightly higher than actual values.

February 1 – 28, 2003
Bayview Channel
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:
02/06/2003 04:00:00
02/26/2003 06:30:00
02/27/2003 06:00:00

During the following period pH values may be higher than actual values. The
solution used to calibrate this probe was bad, the post-cal reading in the
standard of 7 was 7.60.
02/25/03 11:00:00 to 02/28/03 23:30:00

Ploeg Channel
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:
O2/04/2003 07:30:00
02/06/2003 09:00:00
02/26/2003 07:30:00

During the following period pH values may be higher than actual values. The
solution used to calibrate this probe was bad, the post-cal reading in the
standard of 7 was 7.67.
02/25/03 11:30:00 to 02/28/03 23:30:00

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The post-calibration turbidity value was low for the deployment period of
02/05/03 at 14:00:00 to 02/19/03 at 13:00:00, 81.9 NTU in 100 NTU solution,
which is outside the specified accuracy for this probe. This was a new model
(#6136) turbidity probe and YSI eventually recalled them to replace the motor
and lubricant. Turbidity values during the deployment of this probe may be lower
than actual values.

On 02/16 at 01:00:00 there was a small negative depth reading of -.006 m. There
is no evidence from the other sensors that the datalogger was out of the water.
This value is within the range of accuracy expected from the non-vented pressure
sensor reacting to a change in atmospheric pressure.

During the following period pH values may be higher than actual values. The
solution used to calibrate this probe was bad, the post-cal reading in the
standard of 7 was 7.57.
02/19/03 13:30:00 to 02/28/03 23:30:00

March 1 - 31, 2003
Bayview Channel
During the following periods turbidity data were deleted because they were high
and erratic, perhaps caused by several large shrimp that were found in the
sensor guard at retrieval:
03/04/03 07:30:00
03/06/03 15:00:00
03/09/03 09:30:00,11:00:00
03/10/03 05:30:00
03/11/03 05:00:00,08:00:00
03/14/03 11:00:00
03/14/03 14:00:00
03/16/03 09:00:00
03/17/03 10:00:00
03/18/03 11:30:00
03/19/03 08:00:00
03/20/03 17:30:00
03/21/03 21:00:00
03/23/03 00:00:00
03/24/03 04:30:00,05:30:00
03/25/03 06:30:00,07:00:00

During the following period pH values may be higher than actual values. The
solution used to calibrate this probe was bad, the post-cal reading in the
standard of 7 was 7.6.
03/01/03 00:00:00 to 03/25/03 09:30:00

Ploeg Channel
During the following period turbidity data were deleted because it was high and
erratic, cause unknown:
03/22/03 14:00:00

During the following period pH values may be higher than actual values. The
solution used to calibrate this probe was bad, the post-cal reading in the
standard of 7 was 7.67.
03/01/03 00:00:00 to 03/25/03 10:00:00

Joe Leary
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown although it is not uncommon to get debris in the
sensor guard at this site:
03/04/03 22:00:00,23:30:00
03/05/03 07:30:00. 09:30:00, 10:30:00, 12:00:00, 15:00:00, 19:30:00,
20:00:00, 21:00:00, 22:30:00
03/06/03 00:00:00
03/22/03 12:30:00
03/27/03 21:00:00

There is no data on 03/14/03 at 12:00:00 because the logger was being switched
out at that time.

During the following period pH values may be higher than actual values. The
solution used to calibrate this probe was bad, the post-cal reading in the
standard of 7 was 7.57.
03/01/03 00:00:00 to 03/06/03 10:00:00

Gong Surface
(This is the first month with data from the new Gong site.)

For the deployment period of 03/28/03 at 13:30:00 to 03/31/03 at 23:30:00:
The turbidity probe post-calibration value of 87.6 in a solution of 100.0 NTU
indicates a possible problem with the probe. It was returned for repair in June
so turbidity data from this deployment should be interpreted with caution.
The post-calibration salinity value was high, 50.62 in a solution of 50.0 mS/cm.
The probe may have been calibrated in a contaminated calibration solution.
Salinity values during this deployment may be slightly higher than actual
values. The post-calibration dissolved oxygen value was low, 92.6%, cause
unknown. D. O. values may be lower than actual values.

April 1 – 30, 2003
Bayview Channel
A post-calibration turbidity value of 109.3 NTU in a standard of 100.0 NTU

indicates the values during the following period may be higher than actual
values:
04/11/03 09:00:00 to 04/24/03 10:00:00
(Since both Bayview and Ploeg instruments were calibrated on the same day the
turbidity standard used was probably at fault, see Ploeg Channel below.)

Ploeg Channel
A post-calibration turbidity value of 108.5 NTU in a standard of 100.0 NTU
indicates the values during the following period may be higher than actual
values:
04/11/03 09:30:00 to 04/24/03 09:00:00
(Since both Bayview and Ploeg instruments were calibrated on the same day the
turbidity standard used was probably at fault, see Bayview Channel above.)

Joe Leary
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:
04/01/03 00:00:00,10:00:00
04/13/03 21:00:00
04/14/03 17:30:00
04/15/03 08:30:00,09:30:00,19:00:00

During the post-calibration check for the deployment from 04/18/03 at 12:30:00
to 04/30/03 at 23:30:00 the wiper on the turbidity sensor was not parking
properly, it may be interference from the wiper that caused the high turbidity
values during the last part of this time period. All turbidity values during
this deployment period should be interpreted with caution.

Gong Surface
For the deployment period of 04/01/03 at 002:00:00 to 04/09/03 at 11:00:00:
The turbidity probe post-calibration value of 87.6 in a solution of 100.0 NTU
indicates a possible problem with the probe. It was returned for repair in June
so turbidity data from this deployment should be interpreted with caution.
The post-calibration salinity value was high, 50.62 in a solution of 50.0 mS/cm.
The probe may have been calibrated in a contaminated calibration solution.
Salinity values during this deployment may be slightly higher than actual
values. The post-calibration dissolved oxygen value was low, 92.6%, cause
unknown. D. O. values may be lower than actual values.

Dissolved oxygen values were deleted from 04/24/03 at 10:00:00 to 04/30/03 at
23:30:00 because the sensor membrane was damaged prior to deployment.

Turbidity values for the period of 04/24/03 at 10:00:00 to 04/30/03 at 23:30:00
change rapidly over the course of the deployment. The scale looks reasonable but
the rapid fluctuations are inconsistent with the other turbidity data for the
year at this site. There was no indication of a problem with the turbidity probe
but this data should be interpreted with caution

May 1 – 31, 2003
Bayview Channel
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:
05/12/03 19:00:00
05/27/03 13:30:00

On 05/18/03 at 12:00:00 there was an abrupt drop in salinity from 29.6 to 15.4
mS/cm, it occurred only once, cause unknown.

Ploeg Channel
During the following periods turbidity data were deleted because they were high
and erratic, cause unknown:
05/08/03 10:30:00,12:30:00,14:30:00
05/10/03 13:30:00
05/27/03 20:00:00,21:30:00

Joe Leary
During the post-calibration check for the deployment from 05/01/03 at 00:00:00
to 05/01/03 at 08:30:00 the wiper on the turbidity sensor was not parking
properly, it may be interference from the wiper that caused the high turbidity
values during this time period. All turbidity values during this deployment
period should be interpreted with caution.

During the following periods turbidity data were above the sensors top range of
measurement limit so they were deleted, cause unknown:
05/11/03 15:30:00
05/12/03 07:30:00, 08:30:00, 09:30:00, 19:30:00

Other high readings during this time correspond with low depth levels so they

are occurring when the tide gates are open and water is flowing out of the
slough. The cause of the high readings is unknown.

Gong Surface
Dissolved oxygen values were deleted from 05/01/03 at 00:00:00 to 05/08/03 at
09:00:00 because the sensor membrane was damaged prior to deployment.
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
05/13/03 23:00:00,23:30:00

Turbidity values were deleted from 05/20/03 at 07:30:00 to 05/31/03 at 23:30:00
because the turbidity probe was not operating properly and was returned to YSI
for repair following this deployment.

Turbidity values for the period of 05/01/03 at 00:00:00 to 05/08/03 at 09:00:00
change rapidly over the course of the deployment. The scale looks reasonable but
the rapid fluctuations are inconsistent with the other turbidity data for the
year at this site. There was no indication of a problem with the turbidity probe
but this data should be interpreted with caution

June 1 – 30, 2003
Bayview Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
06/04/03 06:30:00
06/11/03 00:30:00
06/12/03 07:00:00
06/13/03 22:00:00

Small negative turbidity readings of = –1.0 NTU and/or zero values occurring
intermittently from 06/24 through 06/29 are within the accuracy specified for
this probe and should be interpreted as zero.

Ploeg Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
06/05/03 00:00:00,05:30:00
06/13/03 22:00:00
06/22/03 21:30:00
06/27/03 20:00:00

06/28/03 01:30:00,22:00:00
06/29/03 02:30:00

Joe Leary
During the following period turbidity data were deleted because it was high and
erratic, cause unknown:
06/01/03 12:30:00

On 06/29 at 13:30:00 and 14:00:00 there were a small negative depth readings of
>.015 m. There is no evidence from the other sensors that the datalogger was out
of the water. These values are within the range of accuracy expected from the
non-vented pressure sensor reacting to a change in atmospheric pressure.

All pH data were removed for the deployment period from 06/13/03 at 13:30:00 to
06/27/03 at 13:30:00 due to probe failure.

The post-calibration salinity value for the deployment period of 06/27 at
14:00:00 through 06/30 at 23:30:00 was low, 49.19 in a solution of 50.0 mS/cm.
This could be due to fouling in the probe orifice or the calibration solution
used for the post calibration check was at fault. Salinity values during this
period may be lower than actual values.

Gong Surface
Turbidity values were deleted from 06/01/03 at 00:00:00 to 06/10/03 at 12:30:00
because the turbidity probe was not operating properly and was returned to YSI
for repair following this deployment.

July 1 – 31, 2003
(The outside of Bayview and Ploeg site PVC deployment pipes were scraped cleaned
on July 29, Bayview at about 11:00 and Ploeg at about 12:30. No apparent effects
of this show up in the data record.)

Bayview Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
07/04/03 12:30:00,13:00:00,14:00:00
07/15/03 18:00:00
07/20/03 11:30:00

Small negative turbidity readings of = -1.0 and/or zero values NTU occurring

intermittently from 07/01 through 07/05 are within the accuracy specified for
this probe and should be interpreted as zero.The post-calibration turbidity
value for the deployment period from 07/22/03 at 14:00:00 to 07/31/03 at
23:30:00 was very low, 80.1 NTU in a 100.0 NTU standard, so the turbidity values
should be interpreted with caution.

Ploeg Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
07/07/03 18:30:00
07/08/03 03:30:00
07/16/03 07:30:00
07/19/03 01:00:00
07/30/03 07:00:00,09:30:00
07/31/03 08:30:00

Joe Leary
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
07/14/03 09:00:00
07/24/03 08:30:00

The post-calibration salinity value for the deployment period of 07/01/03 at
00:00:00 through 07/16/03 at 11:00:00 was low, 49.19 in a solution of 50.0
mS/cm. This could be due to fouling in the probe orifice or the calibration
solution used for the post calibration check was at fault. Salinity values
during this period may be lower than actual values.

High salinity from the afternoon of 07/23/03 to the morning of 07/24/03
indicates the tide gates were leaking marine water into the fresh water side
when the gates should have been closed. This can happen when debris gets caught
in one or more of the tide gates.

Gong Surface
There is no data on 07/08/03 at 14:00:00 because the logger was being switched
out at that time.
During the following period turbidity data were deleted because it was high and
erratic, cause unknown:
07/07/03 22:00:00
07/19/03 15:30:00
07/20/03 04:00:00

The depth reading on 07/11/03 at 10:30:00 was deleted because a Padilla Bay
research boat was tied up to it at this time causing about a .5 m change in
depth, other readings do not appear to be affected.

The post-calibration salinity value for the deployment period of 07/23/03 at
11:00:00 through 07/31/03 at 23:30:00 was low, 48.90 in a solution of 50.0
mS/cm. This could be due to fouling in the probe orifice or the calibration
solution used for the post calibration check was at fault. Salinity values
during this period may be lower than actual values.

August 1 – 31, 2003
Bayview Channel
The post-cal turbidity value for the deployment period from 08/01/03 at
00:00:00
to 08/13/03 at 09:00:00 was very low, 80.1 NTU in a 100.0 NTU standard, so the
turbidity values during this period should be interpreted with caution.

During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
08/07/03 12:00:00
08/19/03 01:00:00

The post-calibration salinity value for the deployment period of 08/22/03 at
14:00:00 to 08/31/03 at 23:00:00 was high, 51.07 in a standard of 50.00
mS/cm.
Salinity values during this period may be higher than actual values.

Ploeg Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
08/04/03 09:30:00
08/06/03 13:00:00,13:30:00
08/09/03 14:00:00,15:00:00
08/27/03 14:00:00

On 8/30/03 at 10:30:00 there was one, low salinity value of 26.72, cause
unknown.The post-calibration salinity value for the deployment period of
08/13/03 at 08:00:00 to 08/22/03 at 13:30:00 was high, 50.51 in a standard of
50.00 mS/cm. Salinity values during this period may be higher than actual
values.

Joe Leary

During the following period turbidity data were deleted because it was high and
erratic, cause unknown:
08/14/03 12:00:00

Gong Surface
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
08/08/03 07:00:00,16:30:00
08/09/03 22:00:00

The post-calibration salinity value for the deployment period of 08/01/03 at
00:00:00 through 08/13/03 at 08:30:00 was low, 48.90 in a solution of 50.0
mS/cm. This could be due to fouling in the probe orifice or the calibration
solution used for the post calibration check was at fault. Salinity values
during this period may be lower than actual values.The post-calibration salinity
value for the deployment period of 08/13/03 at 09:00:00 to 08/22/03 at 13:00:00
was high, 50.59 in a standard of 50.00 mS/cm. Salinity values during this period may be higher than actual values.

The depth reading on 08/22/03 at 13:00:00 was deleted because a Padilla Bay
research boat was tied up to the site buoy at this time causing about a .4 m
change in depth, other readings do not appear to be affected.

The post-calibration dissolved oxygen value for the deployment period of
08/22/03 at 13:30:00 to 08/31/03 at 23:30:00 was low, 91.4%. This may have been
caused by biofouling so this data should be interpreted with caution particularly toward the end of the deployment period.

September 1 - 30, 2003
Bayview Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
09/12/03 19:00:00
09/22/03 13:30:00
09/26/03 03:30:00

The post-calibration salinity value for the deployment period of 09/01/03 at
00:00:00 to 09/05/03 at 12:00:00 was high, 51.07 in a standard of 50.00 mS/cm.
Salinity values during this period may be higher than actual values.

Ploeg Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
09/01/03 14:00:00
09/03/03 22:00:00

The post-calibration salinity value for the deployment period of 09/17/03 at
10:00:00 to 09/30/03 at 23:30:00 was high, 50.44 in a standard of 50.00 mS/cm.
Salinity values during this period may be higher than actual values.

Joe Leary
During the following period turbidity data were deleted because it was high and
erratic, cause unknown:
09/08/03 12:00:00

From 09/06/03 at 08:30:00 to 09/09/03 at 16:30:00 there were intermittent small
negative depth readings. There is no evidence from the other sensors that the
datalogger was out of the water. These values are within the range of accuracy
expected from the non-vented pressure sensor reacting to a change in atmospheric
pressure.

Gong Surface

The post-calibration dissolved oxygen value for the deployment period of
09/01/03 at 00:00:00 to 09/05/03 at 13:00:00 was low, 91.4%. This may have been
caused by biofouling so this data should be interpreted with caution
particularly toward the end of the deployment period.

During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
09/14/03 08:30:00
09/15/03 01:00:00
09/16/03 10:00:00
09/24/03 07:00:00

On 09/16/03 from 12:00:00 to 16:0:00 there are anomalous depth readings that are
also present, to a greater extent, on an instrument deployed at a deeper depth
on the same line. This indicates that debris may have been caught on the line
pulling both instruments out of position. Readings on the other sensors remained
stable.

October 1 - 31, 2003
A major flood occurred on the Skagit River this month caused by heavy rainfall
in the mountains. The crest reached the flood gauge in Mount Vernon on 10/21/03
at about 20:00. Rain events and floodwaters influenced salinity values at the
Ploeg, Bayview and Gong sites.

Bayview Channel
During the following period the turbidity data were high and erratic so it was
deleted, cause unknown:
10/16/03 21:00:00

The post-calibration salinity value for the deployment period of 10/29/03 at
11:00:00 to 10/31/03 at 23:30:00 was high, 50.50 in a standard of 50.00 mS/cm.
Salinity values during this period may be higher than actual values.

Ploeg Channel
During the following period the turbidity data were high and erratic so it was
deleted, cause unknown:
10/08/03 15:00:00

The post-calibration salinity value for the deployment period of 10/29/03 at
10:30:00 to 10/31/03 at 23:30:00 was high, 50.60 in a standard of 50.00 mS/cm.
Salinity values during this period may be higher than actual values.

Joe Leary
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
10/02/2002 01:30:00
10/03/2002 04:00:00
10/09/03 20:00:00

On 10/04/03 at 08:30:00 and on 10/29/03 from 02:30:00 to 05:00:00 there were
small negative and/or zero depth readings. There is no evidence from the other
sensors that the datalogger was out of the water. These values are within the
range of accuracy expected from the non-vented pressure sensor reacting to a
change in atmospheric pressure.

Gong Surface

The post-calibration turbidity value for the deployment period of 10/02/03 at 13:00:00 to 10/15/03 at 09:00:00 was very low, 69.5 in a solution of 100.0 NTU, and the data recorded during this period was uncharacteristically erratic for this site so all of the turbidity data during this deployment was deleted. It appeared to be a probe failure but there were no problems with this probe on subsequent deployments so the cause is unknown.

The post-calibration salinity value for the deployment period of 10/29/03 at 10:00:00 to 10/31/03 at 23:30:00 was high, 50.61 in a standard of 50.00 mS/cm. Salinity values during this period may be higher than actual values.

November 1 – 30, 2003

Bayview Channel
During the following periods turbidity data were high and erratic so they were deleted, cause unknown:
11/20/03 03:30:00
11/21/03 06:30:00

Small negative depth readings as low as -0.23m that occurred intermittently from 11/24/03 through 11/27/03 on the low tides is probably a result of the non-vented depth sensor being calibrated during a high pressure event of 30.45 in/Hg, and most of these readings occurring at or below 29.7 in/Hg. Salinity values indicate the sensors were submerged during the entire deployment.

The post-calibration salinity value for the deployment period of 11/01/03 at 00:00:00 to 10/12/03 at 13:30:00 was high, 50.50 in a standard of 50.00 mS/cm. Salinity values during this period may be slightly higher than actual values.

Ploeg Channel
During the following periods turbidity data were high and erratic so they were deleted, cause unknown:
11/02/03 06:30:00
11/11/03 22:00:00
11/20/03 18:00:00
11/24/03 18:00:00,20:00:00

Joe Leary
During the following period the turbidity data were high and erratic so it was
deleted, cause unknown:
11/25/03 16:30:00

High salinity on 11/20/03 and 11/25/03 indicates the tide gates were leaking
marine water into the fresh water side when the gates should have been closed.
This can happen when debris gets caught in one or more of the tide gates.

Gong Surface
The post-calibration salinity value for the deployment period of 11/01/03 at
00:00:00 to 11/12/03 at 14:30:00 was high, 50.61 in a standard of 50.00 mS/cm.
Salinity values during this period may be higher than actual values.

December 1 – 31, 2003
Bayview Channel
Small negative depth readings as low as –0.18m that occur intermittently from
12/22/03 through 12/24/03 on the low tides is probably a result of the non-
vented depth sensor being calibrated during a high pressure event of 30.45
in/Hg, and these readings occurring at pressures ranging from 29.9 to 29.3
in/Hg. Salinity values indicate the sensors were submerged during the entire
deployment.

Ploeg Channel
During the following periods turbidity data were high and erratic so they were
deleted, cause unknown:
12/16/03 17:30:00
12/18/03 19:30:00
12/19/03 22:30:00
12/23/03 12:00:00,19:00:00,20:30:00
12/24/03 03:30:00,22:30:00
12/25/03 23:30:00
12/26/03 00:00:00,21:30:00
12/27/03 22:30:00
12/30/03 04:00:00

Joe Leary
During the first week of December there was dirt work, brush cutting and rock
added to the dike where the tide gates are installed. This may have contributed

to some elevated turbidities from 12/01/03 through 12/05/03

Gong Surface
None

12) Missing data:
Missing data are denoted by a period in the data set. Periods were later removed
for data dissemination purposes and left blank. Data are missing due to equipment failure where no probes deployed, maintenance/calibration of equipment, elimination of obvious outliers, or elimination of data due to calibration (both pre and post) problems. For more details on deleted data, see
the Anomalous Data Section (11.). To find out more details about missing data,
contact the Research Coordinator at the site submitting the data.

13) Post deployment information
End of deployment post-calibration readings in standard solutions (new model
6136 turbidity probes are indicated with a +):

Site	Date	pH (Std. 7)	Sp. Cond (mS/cm) (Std. 50)	Turbidity (Std. 100 NTU)	DO (Air Sat.) (Std. 100%)
BY	01/21/03	6.84	46.0	95.1	100.9
	02/06/03	6.98	50.03	97.6(+)	100.9
	02/25/03	6.99	50.52	98.5	106.4
	03/25/03	7.60	50.24	99.9(+)	101.5
	04/11/03	7.01	50.87	92.6	100.6
	04/24/03	7.04	48.81	109.3	102.0
	05/08/03	7.13	50.29	99.9	99.5
	05/20/03	6.99	49.20	98.6	101.1
	06/10/03	7.05	50.23	100.6(+)	damaged
	06/24/03	7.04	49.69	99.9	101.7
	07/08/03	7.10	49.15	98.3	101.3
	07/22/03	7.03	49.97	98.5(+)	101.8
	08/13/03	7.10	*	80.1	102.3
	08/22/03	7.03	50.68	99.6	99.0
	09/05/03	7.07	51.07	98.9(+)	99.9
	09/17/03	7.05	50.10	97.2(+)	100.5
	10/01/03	7.13	49.83	98.6(+)	103.1
	10/15/02	7.09	49.95	98.9(+)	100.2
	10/29/03	7.10	49.73	98.7	103.9
	11/12/03	7.05	50.50	99.1(+)	105.1
	12/09/03	7.04	50.19	97.9(+)	102.6
	12/17/03	7.01	50.35	102.5(+)	102.8
	12/30/03	6.98	49.71	98.3(+)	102.5
	01/15/04	7.08	49.80	99.6(+)	damaged

* Probe was broken in the lab before post-cal check.

Site	Date	pH	Sp. Cond (mS/cm)	Turbidity	DO (Air Sat.)

		(Std. 7)	(Std. 50)	(Std. 100 NTU)	(Std. 100%)
BP					
	01/21/03	7.01	49.29	97.0	101.3
	02/06/03	6.98	50.86	98.5	101.9
	02/25/03	6.97	49.51	101.3(+)	97.1
	03/25/03	7.67	49.74	99.3	103.2
	04/11/03	7.10	50.42	101.5	100.8
	04/24/03	7.07	49.03	108.5	102.9
	05/09/03	7.06	50.11	100.6(+)	93.7
	05/20/03	7.06	49.10	99.1(+)	101.5
	06/10/03	7.08	50.02	98.8	100.5
	06/10/03	7.03	50.47	99.5(+)	99.4
	07/08/03	7.14	49.04	99.8	101.4
	07/22/03	7.07	49.54	99.4(+)	100.3
	08/13/03	7.02	49.25	98.8(+)	99.6
	08/22/03	7.00	50.51	99.6(+)	101.6
	09/05/03	7.06	50.18	99.8	107.6
	09/17/03	7.16	49.88	98.0	99.5
	10/01/03	7.11	50.44	101.0	100.3
	10/15/03	7.00	49.74	100.6	98.3
	10/29/03	7.09	49.70	98.4	99.7
	11/12/03	7.08	50.60	99.1(+)	104.0
	12/03/03	7.02	50.07	99.2	100.8
	12/17/03	7.16	50.00	99.8	101.0
	12/30/03	6.99	50.24	100.1(+)	104.1
	01/20/03	6.99	50.17	102.6	102.8

Site	Date	pH	Sp. Cond (mS/cm)	Turbidity	DO (Air Sat.)
		(Std. 7)	(Std. 50)	(Std. 100 NTU)	(Std. 100%)
JL					
	01/13/03	6.81	49.85	98.0	100.3
	01/23/03	7.02	50.76	96.8(+)	104.7
	02/05/03	7.05	50.68	100.9(+)	99.6
	02/19/03	7.02	49.54	81.9(+)	102.5
	03/06/03	7.57	50.31	97.1	98.1
	03/14/03	7.12	49.81	101.1	100.3
	04/02/03	7.03	50.21	99.2	99.0
	04/18/03	7.00	49.58	96.8(+)	101.6
	05/01/03	7.09	49.94	113.9(+)	100.9
	05/14/03	7.05	49.36	98.0(+)	106.2
	05/28/03	7.12	50.52	98.9	101.0
	06/13/03	7.05	49.66	97.4(+)	110.2
	06/27/03	7.60	49.61	102.5	95.1
	07/16/03	7.06	49.19	96.7(+)	105.0
	07/31/03	7.05	49.71	100.3(+)	99.8
	08/15/03	7.14	49.80	100.4(+)	111.5
	08/27/03	7.02	50.15	100.0(+)	104.6
	09/12/03	7.06	50.20	98.7(+)	102.9
	09/25/03	7.03	50.36	98.2	97.8
	10/08/03	7.00	50.43	99.0(+)	99.4
	10/24/03	7.12	49.73	95.7(+)	107.5

	11/06/03	7.06	50.19	100.1	100.9
	11/20/03	7.09	50.10	99.8	103.0
	12/10/03	7.04	50.23	98.4(+)	103.4
	12/23/03	7.04	49.92	103.8(+)	98.1
	01/08/04	7.07	49.49	94.4	98.9

Site	Date	pH	Sp. Cond (mS/cm)	Turbidity	DO (Air Sat.)
		(Std. 7)	(Std. 50)	(Std. 100 NTU)	(Std. 100%)
GS					
	04/09/03	7.05	50.62	87.6(+)*	92.6
	04/24/03	7.09	48.89	99.6(+)	102.8
	05/08/03	7.05	49.96	97.4(+)	damaged
	05/20/03	7.03	49.45	99.0(+)	96.0
	06/10/03	7.15	50.02	85.9(+)*	99.8
	06/25/03	7.07	50.27	101.1(+)	102.8
	07/08/03	7.11	49.43	97.8(+)	99.1
	07/23/03	7.02	49.36	99.0(+)	103.8
	08/13/03	7.08	48.90	99.5(+)	100.2
	08/22/03	7.01	50.59	100.7	100.2
	09/05/03	7.04	50.76	99.6(+)	91.4
	09/17/03	7.05	50.22	98.7(+)	104.1
	10/02/03	6.95	49.82	99.1(+)	101.0
	10/15/03	7.03	49.99	69.5(+)	102.8
	10/29/03	7.02	50.05	99.2	98.9
	11/12/03	7.06	50.61	99.0(+)	103.7
	11/26/03	7.05	50.30	97.7(+)	102.0
	12/17/03	7.10	50.10	97.7(+)	103.0
	12/31/03	7.12	49.68	100.3	103.6
	01/21/04	7.05	49.62	100.1(+)	103.5

*Same turbidity probe, it was defective and returned to YSI for repair in June.

14) Other Remarks/notes

On 07/07/2023 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2006, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes.

No other flags or codes were embedded in the dataset and users should still
refer to the detailed explanations above for more information.

Generally high turbidities in Joe Leary Slough correspond to heavy rain events
as on November 18 when 38.4 mm of precipitation was recorded at our weather
station. At the two bay sites, Bayview Channel and Ploeg Channel, wind is often
the driving force affecting turbidity as occurred during the period of March 12
to14 when both sites had elevated turbidities and average wind speed for those
days ranged from 7.1 to 8.9 m/s with a maximum gust of 24.0 m/s on March 12.
Periodic low salinity values in the 20 to 25 ppt range at Gong Surface during
the summer months may be the result of high river flows (the Fraser and Nooksack
Rivers to the north and the Skagit River to the south) due to melt water from
snow fields and glaciers in the Cascade Range.

Gong Surface:
On 06/30/2025 this dataset was updated to include updated QAQC flags and codes for the Gong Surface surface site at PDB reserve. The GS sonde is a surface sonde that is attached to a floating buoy. The sonde sits in a tube built into the buoy and there is a bolt at the bottom of the tube which sits 1 m below the surface, therefore the sonde's position does not change relative to the buoy. The depth data collected by the sonde reflects the depth the sonde is under the surface of the water. The buoy, and therefore sonde, experiences wave action, unlike the stable platform of the other sites. Any changes in depth are from barometric pressure changes (prior to correction) and wave action. The overall depth at the buoy location changes based on the fluctuation of the tide and ranges from 16 to 21m. The buoy is anchored to the bottom (~ 18 m) with an anchor.

Erratic depth readings on 09/01/03 correspond to windy conditions recorded at
the Padilla Bay weather station.

(Elevated turbidities at Ploeg, Bayview and Joe Leary sites on Nov. 10,16-18 and
28 correspond to storm events with strong winds and heavy rain.)