ADDENDUM

BUDD INLET/DESCHUTES RIVER
WATERSHED CHARACTERIZATION

Part II
Water Quality Study
October 1995

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Lead Agency:

Thurston County Public Health and Social Services Department, Environmental Health Division, Resource Protection Program in coordination with Thurston County Community and Environmental Programs.

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INTRODUCTION AND PROJECT GOALS

This report is an addendum to the Budd Inlet/Deschutes River, Part II, Water Quality Study, Final Report, dated March 1993 and prepared by Thurston County Public Health and Social Services Department. The water quality monitoring reported both in this addendum and the March 1993 report was funded by the Centennial Clean Water grant funds distributed by Washington Department of Ecology and through funds provided by the local stormwater utilities. The primary purpose of the monitoring project was to characterize the water quality in the Budd/Deschutes watershed and identify the major nonpoint pollution sources impacting water quality.

The original March 1993 report was used to provide information to a watershed planning committee whose task was to develop an action plan to address non-point pollution problems. Existing water quality problems and increasing population growth within the watershed resulted in the ranking of the Budd Inlet/Deschutes River watershed in 1987 as a priority watershed for preparation of a watershed plan. The watershed ranking and watershed planning activities occurring in Thurston County are in accordance with the requirements of Chapter 400-12 W.A.C. regulating local planning and management of nonpoint source pollution. The Budd Inlet/Deschutes River Watershed Action Plan was completed in June 1995.

Ambient water quality monitoring in the river and tributaries was continued beyond the completion of the March 1993 report to strengthen the database and the conclusions that could be drawn from the data. The monitoring was also continued in order to be able to track trends in water quality in the future.

Ambient monitoring is repetitive sampling conducted at established sampling sites following an established schedule. Ambient monitoring was conducted throughout the watershed from the headwaters to the marine waters in order to characterize the water quality conditions throughout the systems and identify water quality changes due to seasonal influences. The sampling was conducted four times during the wet seasons and twice during the dry season to allow a review of the climatic influences on water quality.

The ambient monitoring data reported in this addendum was collected from July 1992 through September 1994. The methods used for data collection and interpretation were the same as those reported in the March 1993 report.

AMBIENT MONITORING METHODS

Ambient monitoring was conducted throughout the watershed from the headwaters of the Deschutes River to the marine water in Budd Inlet to provide a picture of the overall water quality in the basin. Maps showing the river and tributary stations are found on pages 7 and 8. A map showing the Budd Inlet sampling stations can be found on page 40. The data is included in Appendix D.

The continued ambient monitoring plan consisted of four parts:

- The mainstem of the Deschutes River
- Tributaries to the Deschutes River and Budd Inlet
- Capitol Lake
- Budd Inlet

Seven stations were monitored on the Deschutes River (this includes station C2, RM 1.75, which is located at the mouth of the river and is also considered Capitol Lake station). In the original monitoring plan, ten tributaries were monitored; five in the upper forested portion of the watershed, two in the primarily rural residential/agricultural area of mid-watershed, and three in the urban land use portion of the lower watershed. In December 1992, seven additional tributary stations were added to the monitoring program. Four of these streams had been areas of special study with results reported in the March 1993 water quality report. These streams were added to the monitoring program to gather additional data, particularly dry weather data and non-storm event data. The other 3 streams added were small streams discharging to Budd Inlet that were of interest to local agencies.

Two stations were monitored on Capitol Lake, one (C2) as mentioned previously at the very mouth of the river that represents inflow to the lake and one (C1) between the middle and north basins of the lake. Six stations were also monitored in Budd Inlet; five of these were within the lower part of the inlet where the impact from the lake inflow and urban/industrial center of the City of Olympia would be greatest, the last was near Gull Harbor a small embayment located about midway up the inlet along the eastern shoreline. Monitoring on the lake and Inlet stations was discontinued after August 1993 when it was determined that sufficient data had been collected to adequately characterize those waterbodies.

The parameters measured at all ambient monitoring stations included; temperature, pH, conductivity, dissolved oxygen (DO), fecal coliform bacteria, turbidity, total suspended solids (TSS), total phosphorus (TP), nitrate-nitrite nitrogen (NO3+NO2), and ammonia nitrogen (NH4). In addition, secchi disk measurements were made at the C1 lake station and all marine stations. Salinity was measured at all marine stations. Ortho-phosphorus (SRP) was measured during the earlier data collection period, but was discontinued due to difficulty with holding times and data quality.

Samples for laboratory analysis were collected at river and tributary stations at approximately mid-channel and mid-depth, either by wading out and submersing bottles in the water or by use of a river sampler dropped from a bridge. Field instruments were used for temperature, pH, dissolved oxygen, and conductivity measurements. At the marine stations, water column samples were collected at a depth of two feet below the surface and two feet from the bottom using a Kemmerer water sampler. Surface to bottom measurements, at two meter increments, were taken for temperature, conductivity, salinity, pH, and dissolved oxygen using a Hydrolab Surveyor II, multiparameter field instrument. Analytical procedures and measurement methods are provided in Appendix A. Quality assurance review methods are provided in Appendix B.

Sampling was designed to emphasize the wet weather period when the greatest portion of the nonpoint pollution load is believed to enter area waters. This data set includes 6 dry weather sampling events (three dry seasons) and 8 wet weather events (two wet seasons) for a total of 14 sampling events. A graph showing the rainfall for the three-day period preceding each months sampling event is included in Appendix E. One of the concerns with interpretation of the original data set was that there were only two dry weather sampling events, and a significant storm event (almost one inch of rain after a 15 day dry period) occurred just prior to one of them, thus skewing the dry weather.

Stream Flow Analysis

There are three flow gaging stations on the mainstem of the river which were used to obtain flow data. The gage near Rainier off Vail Loop Road and the gage at the "E" Street bridge are continuous flow recorders operated by the U.S. Geological Survey. A third continuous flow recorder is located upstream off the Weyerhaeuser forest road 1000 and is operated by Weyerhaeuser. Flow measurements were made at tributary stations using a Swoffer flow meter and the wading technique. Continuous flow recorders operated by Weyerhaeuser on Huckleberry, Thurston, and Hard Creeks; and Thurston County Public Works Department recorders on Chambers Creek at Rich Road and Percival Creek and Percival Ditch were used to provide flow estimates when creeks were too high to wade.

At four of the Deschutes River stations stream flow measurements were not made, so it was necessary to estimate those flows in order to make pollutant loading calculations. Appendix C describes how flow estimates were made for those sites where no flow data was available.

Pollutant Loading Analysis

A Pollutant Load is the estimated amount of a pollutant in a stream or river over a specified period of time, such as pounds per day. Loadings were calculated for three different parameters; total phosphorus, TSS, and fecal coliform bacteria. Pollutant loadings were calculated by multiplying pollutant concentrations by the estimated flows and a factor to correct for units. The formula used fecal coliform bacteria loading was:

fecal coliform (#/100ml) * flow (CFS) * 2.54 = fecal coliform load in (#/day)

The formula used for suspended solids and nutrient loading was:

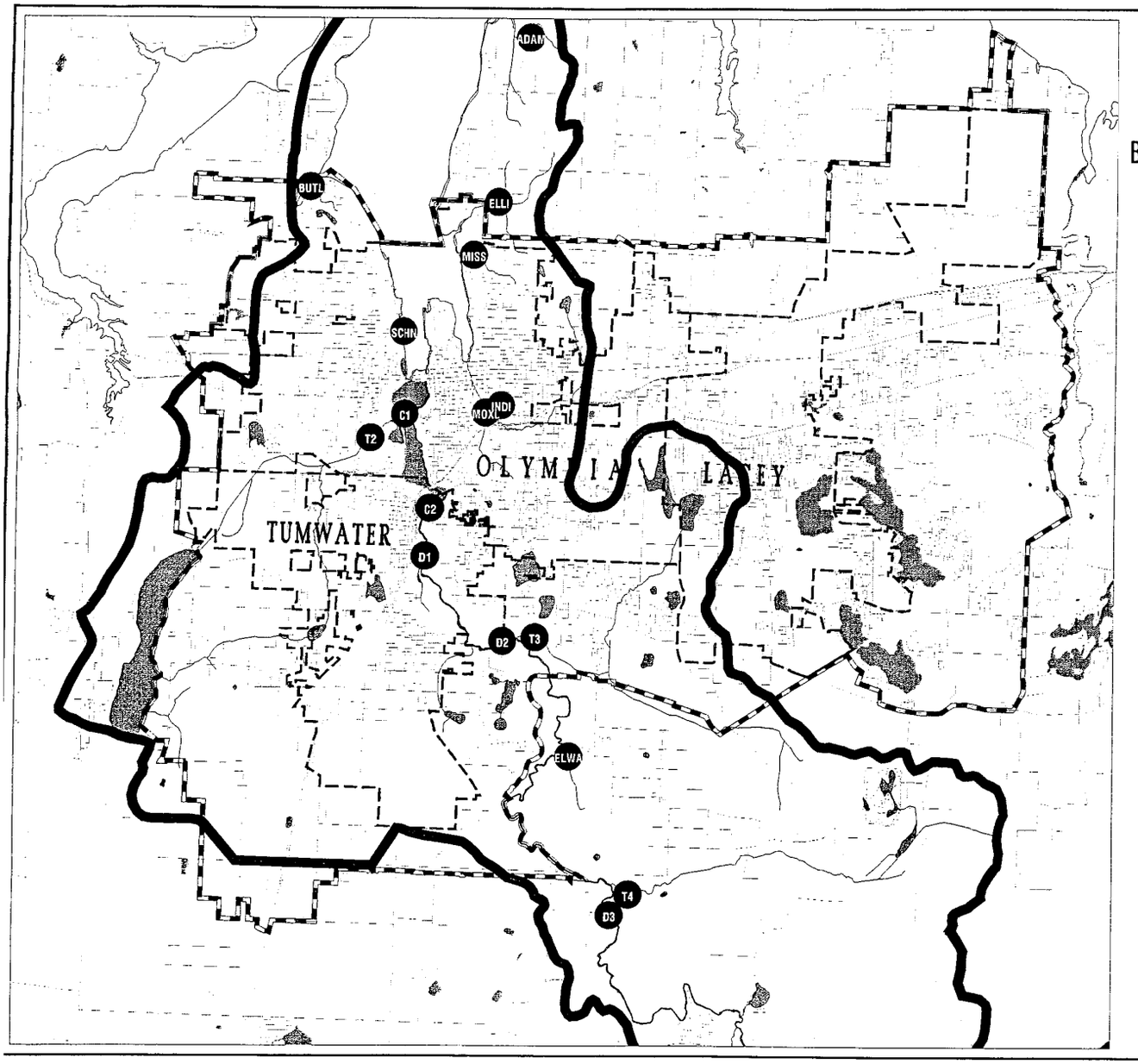
constituent (mg/l) * flow (cfs) * 5.4 = constituent load (lbs./day)

In calculating the mean fecal coliform loads, the geometric mean was used rather than the arithmetic mean. To assess seasonal variation, loadings were calculated and graphed by the mean of the dry weather concentrations and the mean of the wet weather concentrations.

These pollutant loadings are estimates based upon grab samples and measured and estimated stream flows. The methods used to estimate flows (described in Appendix C) did not take into account contributions and losses from groundwater. Therefore, these pollutant loads are only rough estimates which can be used to provide general trends in pollutant loads along the river's length.

Quality Assurance/Quality Control

Analytical and field procedures are listed in Appendix A. A complete discussion of the data quality can be found in Appendix B. Generally, the data met the criteria established with a few exceptions. Holding times were violated frequently for total suspended solids samples and a very few other sample sets. That data is qualified data. The laboratory had metals contamination difficulties during the study, therefore the data set for metals is incomplete. Data accuracy met specified criteria. Data precision met the criteria in all but two instances. That data is also qualified. See Appendix B for more details.



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BUDD INLET/DESCHUTES RIVER WATERSHED AMBIENT MONITORING STATIONS

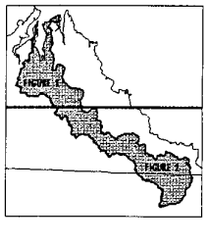
FIGURE 1 - URBAN AREA

ADAM - Adams Creek
BUTL - Butler Cove Creek
ELLI - Ellis Creek
ELWA - Elwanger (Ayer) Creek
INDI - Indian Creek
MISS - Mission Creek
MOXL - Moxlie Creek
SCHN - Schneider Creek
C1 - Capitol Lake At RR Tressel
C2 - Deschutes River Below Falls
D1 - Deschutes River At "E" Street
D2 - Deschutes River At Henderson Blvd.
D3 - Deschutes River At Rich Road
T2 - Percival Creek
T3 - Chambers Creek
T4 - Spurgeon Creek

Budd/Deschutes Watershed Boundary

City Limits

Long-Term Urban Growth Boundary



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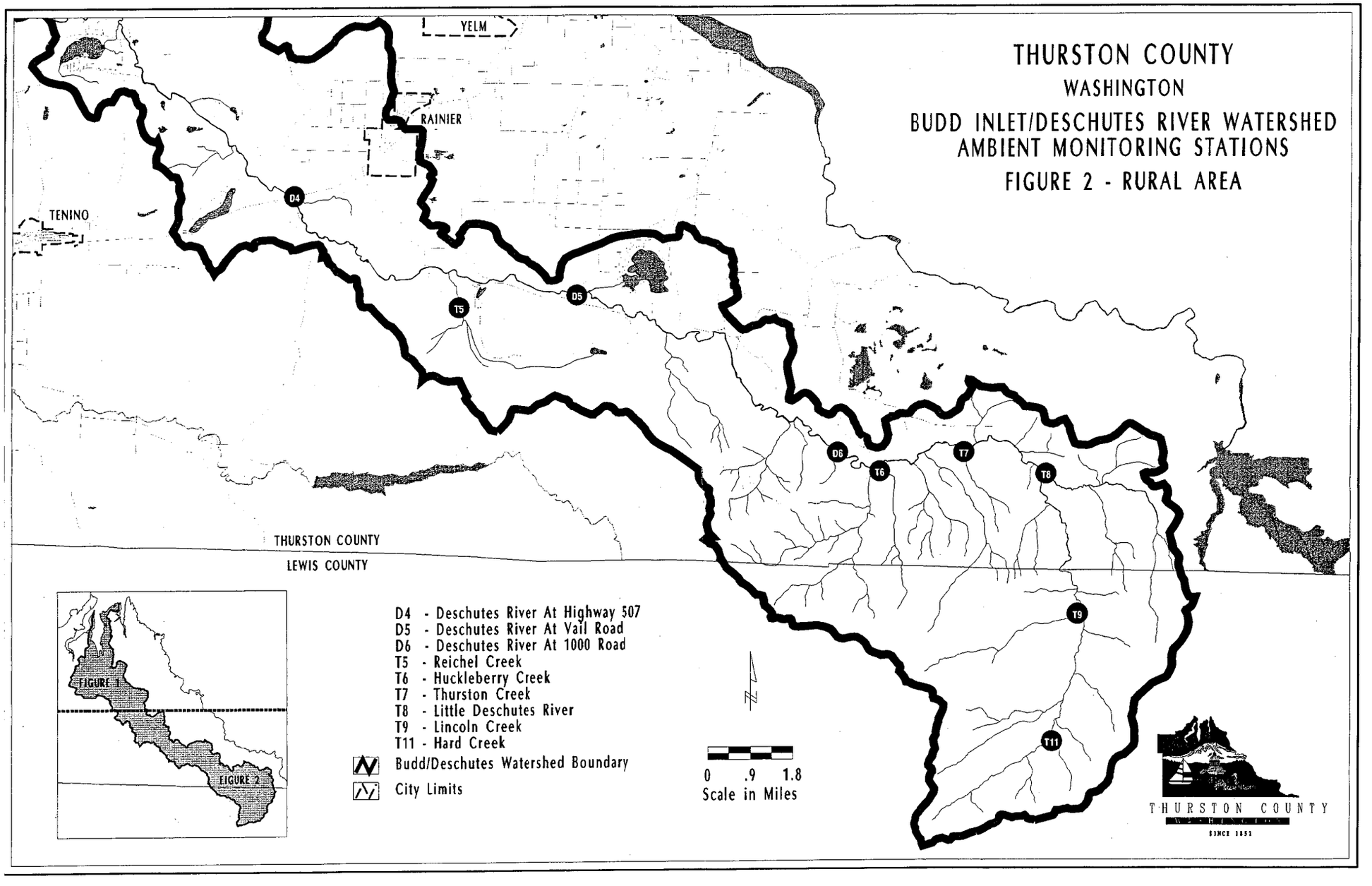
THURSTON COUNTY
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BUDD INLET/DESCHUTES RIVER WATERSHED
AMBIENT MONITORING STATIONS
FIGURE 2 - RURAL AREA
YELM
RAINIER
TENINO
D4
D5
D6
T5
T6
T7
T8
T9
T11
THURSTON COUNTY
LEWIS COUNTY
FIGURE 1
FIGURE 2
D4 - Deschutes River At Highway 507
D5 - Deschutes River At Vail Road
D6 - Deschutes River At 1000 Road
T5 - Reichel Creek
T6 - Huckleberry Creek
T7 - Thurston Creek
T8 - Little Deschutes River
T9 - Lincoln Creek
T11 - Hard Creek
Budd/Deschutes Watershed Boundary
City Limits
N
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Scale in Miles
THURSTON COUNTY
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RESULTS - DESCHUTES RIVER AND TRIBUTARIES

Comparison To Water Quality Standards

Mainstem

Table 1, page 13, contains a summary of water quality data collected from the seven stations on the Deschutes River. Figures 1 and 2 (pages 7 and 8) are maps showing the locations of the stations by station number. In the discussion which follows, the monitoring stations are also referred to by river miles. The river miles are estimated distances from the river mouth using the Washington State Department of Fisheries, Catalog of Washington Stream and Salmon Utilization, November 1975.

There are state water quality standards established for fecal coliform bacteria, turbidity, dissolved oxygen (DO), temperature, and pH. In the case of temperature and turbidity, the standards are based on the degree of change allowed by human activity and require special monitoring to assess properly. All waterbodies within the State of Washington are designated a specific classification from Class AA, Extraordinary, to Class C, Poor. The stream and river sites in this study are Class A waters, with the exception of Hard Creek, T11, which is Class AA. The water quality standards are as follows for Class A and AA streams:

- **Fecal Coliform** (FC) organisms shall not exceed a geometric mean value (GMV) of 100 organisms/100ml, with not more than 10 percent of samples exceeding 200 organisms/100ml. (Class AA is $\leq$ 50 GMV and not more than 10 % > 100.)
- **Turbidity** shall not exceed 5 NTU (nephelometric turbidity units) over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
- **Dissolved Oxygen** (DO) shall exceed 8.0 mg/l. (Class AA is > 9.5 mg/l)
- **Temperature** shall not exceed 18.0 degrees Centigrade due to human activities. When natural conditions exceed 18.0 degrees C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3 degrees C. (Class AA is $\leq$ 16 degrees C)
- **pH** shall be within the range of 6.5 to 8.5 with a man-caused variation within a range of less than 0.5 units.

Maximum river temperatures were highest and exceeded the State standard at RM 10.5, 20.75 and RM 28.5 (D3, D4, and D5 respectively) during one summer sampling event

(7/92). It is likely that the increase is due to the river being wider (canopy cover shades less of the stream) or slower (there are some natural dams in this segment) both of which would allow increased solar input and warmer temperatures. All three stations where temperatures exceeded the standard were monitored in mid-afternoon and may reflect typical peak summer temperatures in other portions of the river as well. Groundwater contributions to the flow in the lower portion of the river may help to decrease temperature. Stations D4 and D5 also had temperature violations during the previous monitoring period.

DO concentrations measured in the river were generally very good, with all sites meeting the standard of 8.0 mg/L. The range of dissolved oxygen concentrations was between 9.3 and 14.8 mg/L, with the lowest concentrations occurring during the summer low flow period. The most likely period for low DO concentration to occur is late in the summer when water temperatures are higher and stream flow and water turbulence is at its lowest. Although the lowest stream flow measured at the mouth station (D1) during this monitoring period was half of the lowest stream flow measured during the first monitoring period, the dissolved oxygen concentrations measured were still well above the standard.

Minimum pH measurements were below the State standard of 6.5 at three of the seven river stations (D01, D02, and D03). Low levels were also measured in many of the tributary stations (see Table 2). Natural influences of wetlands, low pH rainfall, and groundwater may explain these low pH measurements which consistently occurred in both the first monitoring period and this most recent data collection period. Median pH values from the groundwater aquifers contributing to the base flow in the river are 6.6 and 6.8 (USGS, 1994).

The river failed both parts of the State standard for fecal coliform bacteria at RM 1.75 (C2 below Tumwater Falls) and failed part 2 of the standard at RM 5.0 (D2, Henderson Road). Similarly, the station below Tumwater Falls also failed both parts of the fecal coliform standard during the previously reported monitoring period.

The fecal coliform concentration increase seen between RM 2.0 (D1, "E" street) and RM 1.75 (C2, below Tumwater Falls) during the first period of monitoring was seen again during this period. The downstream station, C2, had a geometric mean of 122 organisms per 100 ml and 36 percent of the samples were greater than 200 organisms per 100 ml. In contrast, the upstream station, D1, had a geometric mean of 48 organisms per 100 ml with only 7 percent of the samples being greater than 200 organisms per 100 ml. Though these stations are only about one quarter mile apart, Tumwater falls and the brewery discharges are located in this short stretch of river. There are also old sewer lines along this portion of the river and several stormwater discharges, all of which could be contributing to the higher concentrations measured. Further, waterfowl tend to congregate near RM 2.0 and would constitute another bacteria source to the downstream station.

On August 24, 1993 all three river stations downstream of the Rich Road station at RM 10.5 had bacteria concentrations greater than 1500 organisms per 100ml while concentrations above Rich Road were mostly less than 100 organisms per 100 ml. One tributary (Ayer or Elwanger Creek) discharging to the river downstream of Rich Road had a bacteria concentration of 119,040 organisms per 100 ml on that same day with a flow that was 1/100th of the flow in the river. With a bacteria concentration that was roughly 100 times the concentration measured in the river, it is likely that this stream was the source of the high level of bacteria seen in the river on that day. A dairy farm is the major land use in the watershed of that tributary, and although a farm plan has been done, implementation of the plan has yet to be completed.

The State standard for turbidity is based upon limiting the impact allowed by human activity. Since the average value for the river stations were all well below 50 NTU the amount of change allowed is less than 5 NTU's. Although the range is much larger than 5 NTU's, the differences are an expected result of season and weather conditions. It is not possible in this study to identify specific human activities causing increases. However, it is well documented that river bank erosion on the Deschutes is a major contributor of sediment load to the system. (McNicholas, 1984; Collins, 1994)

Generally, the average and maximum turbidity and total suspended solids values were lower during this monitoring period than the previous period. This was most probably due to the absence of a major flood event in the most recent data set. The stations with the highest turbidity and total suspended solids values changed between the two monitoring periods. The most recent data shows that Stations D2 and D3 (RM 5.0 and RM 10.5 respectively) had the highest values, but during the earlier monitoring period Stations D4 and D1 (RM 20.75 and RM 2.0, respectively) had the highest values. The peak turbidity and total suspended solids values occurred during March 1993 which was the highest flow event in the data set. See Appendix B for discussion about TSS qualified data.

Table 1. Summary of Sampling Results from the Mainstem of the Deschutes River (7/92-9/94)

River Mile MILE	RM 1.75	RM 2.0	RM 5.0	RM 10.5	RM 20.75	RM 28.5	RM 36.5
STATION #	**C2**	**D1**	**D2**	**D3**	**D4**	**D4.5/D5**	**D6**
FLOW (cfs)							
Av		384			314		255
Mn		60			21		16
Mx		1700			1360		1183
OXYGEN (mg/l)							
Av	11.71	11.13	11.04	11.49	11.60	11.41	11.77
Mn	9.91	9.72	10.00	9.90	10.18	9.30	10.19
Mx	14.10	14.80	13.20	14.40	13.90	13.40	14.00
pH							
Median	7.3	7.2	7.0	7.2	7.3	7.3	7.6
Mn	7.0	6.3	5.9	6.4	6.8	6.5	6.9
Mx	7.8	7.5	7.5	7.7	7.9	7.5	7.8
TEMP							
Mn	5.66	5.02	4.89	4.2	3.59	3.32	2.51
Mx	16.90	14.59	18.00	19.2	19.00	20.50	15.50
COND (umhos)							
Av	104	102	102	102	99	91	68
Mn	57	54	44	45	44	45	41
Mx	141	139	136	147	148	159	95
FC BACTI (org/100ml)							
GeoMn	122	48	67	24	33	47	11
Mn	15	5	10	0	12	5	0
Mx	1675	1745	1545	135	145	240	55
%>200	36%	7%	21%	0%	0%	7%	0%
TURBIDITY (NTU)							
Av	7.3	6.6	10.1	9.9	6.4	8.1	6.2
Mn	1.1	1.2	0.5	0.65	0.9	0.9	0.3
Mx	42.0	34.0	78.0	80.0	33.0	44.0	33.0
TSS (mg/l)							
Av	13.09	16.6	19.49	18.11	11.84	11.34	8.03
Mn	0.75	1.0	<0.50	1.00	0.86	<.50	<.50
Mx	89.00	156.0	175.00	171.00	78.00	66.00	49.00
TOTAL-P (mg/l)							
Av	0.041	0.038	0.044	0.036	0.030	0.026	0.020
Mn	0.016	0.013	0.011	0.008	0.011	0.006	0.006
Mx	0.166	0.191	0.268	0.208	0.109	0.098	0.082
NITRATE+ITE (mg/l)							
Av	.595	.590	.617	.505	.510	.363	.218
Mn	.232	.244	.420	.356	.368	.150	.015
Mx	.726	.745	.770	.716	.688	.730	.678
AMMONIA (mg/l)							
Av	.018	.017	.017	.020	.036	.017	.012
Mn	<.010	<.010	<.010	<.010	<.010	<.010	<.010
Mx	0.038	0.035	.031	.052	.252	.039	.026

Although there are no State standards for nutrient concentrations, they provide important information for assessing changes in water quality. For total phosphorus, the EPA suggests a limit of 0.1 ppm to prevent nuisance conditions (EPA, 1986). Assuming results from RM 36.5 (D6) are considered to represent background nutrient concentrations, then nutrient concentrations in the river increase roughly two-fold with distance downstream. The majority of this increase takes place between RM 36.5 (D6) and 20.75 (D4). Downstream of RM 20.75 the concentrations are fairly similar between stations. This was the case during both monitoring periods. The average concentrations of nitrate-nitrite and ammonia at all stations were similar in both monitoring periods. On average, the total phosphorus concentrations in the river at all stations were an order of magnitude lower than the recommended limit of 0.1 ppm.

Tributaries

Table 2 on pages 17 and 18 summarizes water quality data from the tributary stations. Figures 1 and 2 on pages 7 and 8, also show the locations of the tributary sampling stations. The tributaries on page 16 are tributaries to the Deschutes River. The tributaries on page 18 are tributaries to Budd Inlet.

Temperature, like DO, is most critical during low flow conditions. A maximum temperature of greater than 18°C was measured in one tributary--Reichel Creek, indicating that warm water could be a concern in this creek. This creek also violated the standard in the previous data set. This tributary's headwaters is a lake and then flows through open pasture land. The poor condition of the riparian area and the opportunity for solar input in the lake help explain the elevated summer water temperatures.

The dissolved oxygen standard of greater than 8.0 mg/l was violated in two tributaries, Ayer and Reichel Creeks. Both streams have very low gradients, and also have some of the highest nutrients and fecal coliform levels measured in the tributaries.

Similar to the results from the river stations, minimum pH values were measured that were below the standard of 6.5 units, and there were two values measured above the upper standard of 8.5 units. Ayer, Reichel, Huckleberry and Little Deschutes fell below the pH standard by a small margin on 2, 1, 1, and 1 occasion(s) respectively. All excursions below the acceptable range occurred during 2/23/93 except Ayer. Ayer Creek excursions were also during winter events. Influence from rainfall/runoff which is naturally on the acidic side, or inundation and overflow from associated wetlands, which are also commonly acidic in this region, may partially explain the low pH on this occasion.

Six of the 17 tributaries measured had fecal coliform bacteria concentrations that failed both parts of the state fecal coliform bacteria standard. Chambers, Ayer, Reichel,

Ellis, Mission, and Indian violated both parts of the water quality standard for fecal coliform. Ayer was the worst with a GMV of 1606 and 100% of samples greater than 200 organisms per 100ml. Three of the streams are tributaries to Budd Inlet and flow through the urban area or through rapidly developing areas. The other three streams are Deschutes River tributaries, and are in agricultural and rural residential areas except for Chambers Creek, which is influenced by both urban and rural land uses.

Spurgeon, Adams, Moxlie (above its confluence with Indian), Schneider, and Butler violated the second part of the standard by having more than 10 percent of the samples greater than 200 organisms per 100 ml. In all cases 25 percent or more of the samples were greater than 200. All but Spurgeon are Budd Inlet tributaries influenced by urban or residential land use.

All of the upper watershed (forested) creeks had a geometric mean value for fecal coliform bacteria of less than 10 per 100ml and 0% samples greater than 200, and the overall water quality was excellent.

Highest average turbidity and TSS values were in Ayer and Reichel creeks. The average values in all other tributaries was 9 mg/l or less. Ayer, Reichel, Huckleberry, Little Deschutes, and Thurston had maximum turbidity and TSS values considerably higher than the other tributaries. The turbidity data is not compared with the state standard, which is based upon limiting the impact allowed by human activity, because it is very difficult to determine how much is the result of human activities. However, the data implies that stream bank erosion or stormwater run-off are problems in these creeks.

Spurgeon Creek turbidity and TSS values appeared low in this data set compared to the previous set, but may be the result of the inability to sample during the flood event on 2/23/94 when most of the maximum concentrations occurred in the other streams.

Average total phosphorus concentrations were highest in Ayer (.186 mg/l), Mission (.08 mg/l), Moxlie (.068 mg/l), and Reichel (.060 mg/l). Ayer and Reichel Creek values fluctuate but it does not appear to be a seasonal pattern. This implies that the fluctuations may be related to land use practices directly impacting the creek. Moxlie has fairly consistent elevated values, which implies a constant source. Since Moxlie is a fairly short creek that originates from springs, it is likely that groundwater is the source for some of the phosphorus. However, stormwater from the Plum Street area and Interstate Highway 5 are discharged to the creek and may be the source of some of the winter time concentrations. Mission Creek has a clear pattern of the highest phosphorus values during the summer months and lower values during the winter months. The concentrations appear correlated with stream flow, so that during higher flows phosphorus values are lower. This may also

be a reflection of groundwater quality conditions, which are diluted during the wet season by run-off with lower concentrations of phosphorus than the base flow in the stream.

Ayer Creek had the highest average ammonia (.142 mg/l) followed by Percival (.054 mg/l) and Indian Creeks (.034 mg/l). The maximum ammonia concentration measured occurred in Percival on July 28, 1992. Correspondingly, total phosphorus and fecal coliform bacteria values were also the highest values in the data set on that day. It is likely that there was some contaminant discharge to the creek that day.

Of the 9 Deschutes River tributaries, Ayer and Chambers Creek had the highest average nitrate-nitrite values at 2.02 and 1.54 respectively. All other Deschutes tributaries were 1 or 2 orders of magnitude lower. In Chambers Creek, those nitrate values probably reflect groundwater influence. In Ayer Creek, the levels probably reflect surface contamination from the agricultural activities since all other contaminant values are very high. Budd Inlet tributaries generally had higher nitrate-nitrite levels than the Deschutes tributaries, with an overall average of 1.03 mg/l compared to 0.5 mg/l. Most of the Budd Inlet tributaries are heavily influenced by urban activities including on-site sewage systems and stormwater run-off.

Table 2. Summary of Sampling Results from the Tributaries (7/92-9/94).

	Percival	Chambers	Spurgeon	Ayer (Elwanger)	Reichel	Huckle	Thurston	L.Desch	Lincoln	Hard
FLOW										
Av	35.7	2.2	9.8*	2.1	12	7.6	15.1	8.94*	16.6	2.7
Mn	6.2	0.2	1.5	0.5	0.01	0.1	1.5	1	1.2	0.3
Mx	104.3	9.7	29.5	4.24	46.6	48.4	65.8	52.5	67.3	12.4
DISS OXY										
Av	11.09	11.07	10.89	8.53	9.76	10.91	11.59	11.51	11.26	11.47
Mn	8.9	9.46	9.36	5.7	4.56	8.2	9.97	9.7	9.6	9.52
Mx	13.8	14.4	13.5	10.01	14	13.35	13.8	14	13.2	14.2
pH										
Median	7.2	7.3	7.3	6.8	7	7.3	7.6	7.6	7.6	7.5
Mn	6.8	6.5	6.5	6.3	6.3	6.4	6.6	6.4	7.3	6.7
Mx	7.6	7.8	7.7	7.3	7.5	7.6	7.9	8.1	7.7	7.7
TEMP										
Mn	4.2	5.34	4.21	6.26	2.62	2.3	3.07	2.46	4.29	1.3
Mx	17.3	13.11	17.8	14.65	19	16	13.5	15.75	14.2	13.2
COND										
Av	94	108	101	117	114	96	84	90	50	41
Mn	64	68	74	100	57	48	41	39	29	30
Mx	122	132	119	129	167	138	122	172	72	51
TURB										
Av	3.6	1.8	2.1	17.9	12.9	7.8	4.9	9	1.3	0.7
Mn	1.2	0.4	1.1	1.7	2.4	0.4	0.4	1	0.2	0.1
Mx	7	5.5	5	97	34	58	27	39	3.7	1.6
TSS										
Av	4.65	3.33	3.81	16.38	9.88	8.37	4.49	5.63	0.74	All
Mn	1.5	<.50	1.25	3.3	1.1	<.50	<.50	<.50	<.50	Resul
Mx	9.6	17	9.7	50	36	84	32	44	3	<.50
TOTAL P										
Av	0.042	0.025	0.03	0.186	0.06	0.022	0.023	0.028	0.01	0.003
Mn	0.02	0.013	0.015	0.046	0.023	0.011	0.01	0.013	0.004	0.002
Mx	0.114	0.048	0.061	0.491	0.094	0.058	0.058	0.066	0.029	0.007
NO3+NO2										
Av	0.349	1.54	0.233	2.02	0.315	0.186	0.111	0.307	0.014	0.05
Mn	0.217	0.84	0.01	1.21	<.010	<.010	0.033	<.010	<.010	0.014
Mx	0.495	2.33	0.518	4.32	0.765	0.687	0.395	1.05	0.038	0.096
AMMONIA										
Av	0.054	0.014	0.025	0.142	0.027	0.012	0.009	0.017	0.01	0.009
Mn	<.010	<.010	<.010	0.013	<.010	<.010	<.010	<.010	<.010	<.01
Mx	0.43	0.041	0.097	0.396	0.062	0.062	0.018	0.105	0.03	0.02
FC BACTI										
Geo Mn	44	109	99	1606	128	4	2.4	9.7	1.6	1.5
Mn	0	10	25	300	15	0	0	0	0	0
Mx	280	500	625	119040	415	65	10	45	15	10
%>200	7%	21%	31%	100%	29%	0%	0%	0%	0%	0%

Table 2 (Cont.). Summary of Sampling Results from the Tributaries (7/92-9/94).

	Adams	Ellis	Mission	7/93-9/94 Indian	7/93-9/94 Moxlie A*	7/92-3/93 Moxlie B**	Schneider	Butler
FLOW								
Av	.78	2.3	0.7	1.6	6.2	10.1	1.5	0.9
Mn	.005 est	0.7	0.3	0.6	3.64	6.0	0.9	.04
Mx	3.12	6.8	1.3	4.2	9.06	13.8	2.4	3.0
DISS OXY								
Av	11.25	11.43	11.69	10.62	9.22	10.88	11.31	11.82
Mn	8.75	9.00	9.50	8.22	8.23	9.50	9.62	9.59
Mx	12.82	13.80	14.00	13.50	10.22	14.00	13.20	15.00
pH								
Median	6.8	7.2	7.4	7.3	7.4	7.0	7.4	7.4
Mn	6.4	6.8	6.9	7.0	7.0	6.9	7.0	5.9
Mx	7.3	7.5	7.6	7.7	7.5	7.3	7.6	7.7
TEMP								
Mn	5.30	4.70	4.50	5.50	8.30	6.80	6.75	5.20
Mx	13.21	14.24	13.79	14.90	11.90	12.00	12.02	12.90
COND								
Av	80	106	121	158	179	161	138	133
Mn	34	67	95	119	154	137	113	90
Mx	140	140	139	187	192	180	158	176
TURB								
Av	2.7	4.3	3.4	5.4	5.3	7.3	1.4	5.2
Mn	0.9	1.2	1.7	1.1	1.8	1.7	0.04	0.1
Mx	5.0	8.4	7.8	22.0	26.0	16.5	3.1	12.5
TSS								
Av	1.34	3.68	3.69	4.58	7.80	25.00	0.88	3.36
Mn	0.60	0.83	0.60	<.50	3.00	2.50	<.50	.50
Mx	2.60	8.80	9.00	18.00	24.50	80.00	2.70	12.00
TOTAL P								
Av	.025	.044	.080	.045	.068	.076	.025	.033
Mn	.014	.025	.044	.028	.056	.046	.017	.019
Mx	.033	.068	.130	.058	.090	.121	.031	.044
NO3+NO2								
Av	.798	.906	1.25	1.14	.623	.638	1.47	1.40
Mn	.181	.509	1.02	0.79	.474	.539	.759	.839
Mx	1.61	1.08	1.67	1.84	.734	.721	1.88	1.99
AMMONIA								
Av	.009	.015	.017	.034	.028	.023	.010	.010
Mn	<.010	<.010	<.010	<.010	<.010	.011	<.010	<.010
Mx	.026	.036	.036	.075	.101	.038	.031	.029
FC BACTI								
Geo Mn	66	119	248	310	91	327	48	28
Mn	10	20	15	90	15	85	0	0
Mx	3224	144,460	3844	820	505	1600	181,500	640
%>200	27%	17%	58%	62%	38%	50%	27%	25%

*Above Confluence w/Indian

**Below Confluence with Indian Creek

Metals and Total Petroleum Hydrocarbons (TPH) in Urban Tributaries

Total recoverable metals (copper, lead, and zinc), total hardness, and total petroleum hydrocarbons (TPH) sampling began on five of the urban streams in December 1992. A summary of the data is reported on Table 3. However, due to metals contamination problems in the laboratory the data set is incomplete, so only cursory observations are made from the available data. A discussion of lab blanks and other data qualifiers can be found in Appendix B. Holding time was exceeded for total petroleum hydrocarbon samples for the September 1994 data set. This data is qualified data.

TPH was detected relatively infrequently, but always during the wet season and probably associated with storm run-off.

Metals concentrations were generally low and frequently undetected. Percival and Indian/Moxlie Creeks has slightly higher average metals concentrations than Mission and Schneider Creeks. Copper, lead, and zinc were also detected more frequently in Percival and Indian/Moxlie Creeks.

Percival Creek also had the lowest overall average hardness concentration at 41.6 mg calcium carbonate per liter compared with the next closest at 53.6 for Mission Creek. This is important because metals become toxic at lower concentrations as hardness decreases. The water quality standards for metals are based on **dissolved metals** concentrations rather than the **total recoverable metals** reported in this document. However, *if it is assumed that all metals measured as total recoverable were in the form of dissolved metals,* then data for Percival Creek indicates that lead exceeded chronic toxicity levels on 6 occasions and exceeded acute levels 1 time. Both chronic and acute toxicity levels for copper would have been exceeded 2 times. By comparison, the stream that comes closest to Percival in the number of times metals concentration exceeded toxicity levels is Moxlie Creek. Moxlie Creek above its confluence with Indian Creek had exceeded chronic lead levels 2 times and exceeded chronic copper levels one time. It also exceeded chronic lead toxicity levels below its confluence with Indian Creek one time. This is information suggests that metals, particularly lead and copper, may be a concern in Percival and Indian/Moxlie Creeks. Consideration should be given to sampling these creeks for **dissolved** metals.

Table 3. Summary of Metals and Total Petroleum Hydrocarbon Results from Urban Tributaries

	Percival	Moxlie A	Moxlie B	Indian	Mission	Schneider
TPH mg/l						
# of times detected	2 of 12	3 of 8	0 of 4	3 of 8	3 of 12	3 of 11
Av	0.16	.26	<.25	.24	.19	.19
Mn	<.25	<.25	--	<.25	<.25	<.25
Mx	.32	.87	--	.59	.50	.48
COPPER ug/l						
# of times detected	5 of 7	3 of 6	0 of 1	5 of 7	3 of 7	5 of 8
Av	5.2	3.3	<1.0	1.7	1.0	1.0
Mn	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Mx	15.3	15.0	<1.0	3.4	2.7	1.6
LEAD ug/l						
# of times detected	7 of 10	3 of 7	2 of 2	3 of 8	3 of 11	1 of 10
Av	3.5	2.0	4.1	1.7	0.77	0.5
Mn	<1.0	<1.0	0.7	<1.0	<0.5	<0.5
Mx	19.2	8.1	7.5	7.2	2.6	0.8
ZINC ug/l						
# of times detected	7 of 10	5 of 7	3 of 4	6 of 6	6 of 10	3 of 10
Av	7.2	6.9	13.4	15.0	4.4	3.0
Mn	<3.0	<3.0	<3.0	5.0	<3.0	<3.0
Mx	19.0	21.5	24.0	27.0	13.0	10.0
HARDNESS mg CaCO3/l						
Av	41.6	81.0	65.9	74.3	53.6	62.7
Mn	31.2	64.8	56.4	40.5	38.8	42.4
Mx	74.1	101.0	80.4	141.0	103.0	95.0

Footnotes: Moxlie A is above the confluence with Indian Creek and includes the period from 7/93 - 9/94.
Moxlie B is below the confluence with Indian Creek and includes the period from 12/92 - 3/93.
Indian Creek includes the period from 7/93 - 9/94.

Tributaries Summary

To summarize the Deschutes River Tributary findings, Ayer and Reichel Creeks had very poor water quality as demonstrated by all parameters. Chambers and Spurgeon Creeks are somewhat impacted as shown by nitrate and bacteria data. Percival has generally good water quality, but the nutrient, bacteria, and metals data indicates sporadic events of contamination. The forested upper watershed streams had excellent overall water quality, although sediment loading and increased turbidity during storm events were apparent.

To summarize the Budd Inlet tributary findings, Mission and Indian/Moxlie Creeks had the poorest overall water quality. Ellis and Schneider creek data show sporadic contamination events. The elevated nitrate levels in most of the creeks imply impacted ground water.

POLLUTANT LOADING ANALYSIS

Deschutes Mainstem

Table 4, Figures 3-10, and the following discussion relate to pollutant loading in the mainstem of the Deschutes River. The figures provide a visual depiction of the change in loading and concentration of select pollutants, starting with river mile 31.5 (Station D6) in the upper watershed and moving downstream to river mile 1.75 (Station C2). The data base was separated into wet weather (December through March sampling dates) and dry weather (July and August sampling dates) periods.

The pollutant loadings should be considered as rough estimates. They are based on grab samples and measured stream flows **or** estimated stream flows. The estimated flows for the river do **not** take into account the contributions and losses from groundwater, which can be significant in specific reaches of the river. Some data used in this section is qualified data because it did not meet quality criteria established for the project. See Appendix B for details.

Pollutant loading is expressed in terms of pounds of pollutant (in the case of phosphorus and suspended solids) or number of organisms (in the case of fecal coliform bacteria) discharged per day. It is a function of the measured concentration of the pollutant and the total stream flow at the site. It is this total discharge of pollutants that is often most important in assessing the contribution of pollutants to a receiving water such as Capitol Lake or Budd Inlet.

The average dry season total phosphorus concentrations and loads gradually increase with distance downstream, but the increase is very slight. The total phosphorus concentration and load at the headwater station are 0.01 mg/l and 1.4 pounds/day respectively, and they increase to 0.03 mg/l and 15 pounds/day at the mouth station. The dry average total phosphorus concentrations and loads are very similar to the previously reported data.

During the wet season, the peak total phosphorus concentration and load occurred at station D2, Henderson Road bridge. This was also the case for the previous data set, however, the wet average concentration and load is almost half of the previous data set. That is due primarily to the effects of a major flood event on the wet season average of the previous data set. Wet season data has greater variability as a result of the effects of various intensities and durations of storms and floods.

Total suspended solids (TSS) concentrations and loads responded similarly to total phosphorus concentrations and loads, in part because the phosphorus is associated with the suspended solids. During the dry season, the TSS concentrations and loads are very low, but generally increase with distance downstream. However, the wet season average TSS

concentrations increase an order of magnitude from the dry season concentrations, and the wet season loads increase up to three orders of magnitude above dry season loads. The peak wet season TSS and total phosphorus concentration and load occurred at station D2, and decreased downstream. This implies that sediment deposition is occurring downstream of station D2. The previous report showed the wet season TSS peak farther upstream at station D4. This may have been a function of the rainfall and river hydrology for the storms which occurred during that data period.

Unlike the total phosphorus and TSS graphs, fecal coliform bacteria concentrations were higher during the dry season, although the bacteria loads are higher in the wet season due to greater flows. The largest increases in dry season bacteria concentrations and loads occur between stations D6 and D5 and again between D1 and C2. The bacteria increases in those two reaches are not as great during the wet season, most likely due to dilution effects from increased flows. The fact that the bacteria concentrations decrease during the wet season implies that there are continuous bacterial contamination sources in those two reaches of the river.

The dry season average nitrate concentration increased more than 0.4 mg/l between station D6 (river mile 36.5) and station D4 at river mile 20.75. It increased another 0.2 mg/l between station D3 and D2 in the lower river. The wet season concentration however increased more gradually with distance downstream. It is probable that the rise in the soluble nitrate concentration in these two specific reaches of the river indicates areas of groundwater contribution, with groundwater having higher nitrate concentrations than the river water. A US Geological Survey seepage run in 1988 from station D4 to the mouth verified that the river is gaining water from groundwater in the reach between station D3 and D2. A seepage run has not been done upstream of station D4, however the presence of springs discharging from the banks above the floodplain upstream of D4 provide evidence that this is also a reach of groundwater up-welling.

Table 4. Pollutant concentrations and loadings in the mainstem of the Deschutes River (7/92-9/94).

Station	River Mile		TSS (mg/L)	T. Phos (mg/L)	Fecal Col (#/100mL)	Flow (cfs)	T. Phos (lb/day)	TSS (lb/day)	Fecal Col (#/day)
	1.75	AVG	13.09	0.041	122	387	172	91,937	$63{,}937 \times 10^7$
C2	1.75	DRY AVG	1.92	0.030	338	92	15	872	$73{,}380 \times 10^7$
	1.75	WET	21.47	0.048	57	608	290	160,235	$57{,}662 \times 10^7$
	2.0	AVG	16.57	0.038	48	384	185	125,891	$24{,}934 \times 10^7$
D1	2.0	DRY AVG	2.42	0.024	72	90	12	1128	$15{,}083 \times 10^7$
	2.0	WET	27.18	0.049	36	605	314	219,463	$36{,}351 \times 10^7$
	5.0	AVG	19.49	0.044	67	384	241	145,628	$34{,}455 \times 10^7$
D2	5.0	DRY AVG	1.22	0.020	71	90	9.5	543	$15{,}009 \times 10^7$
	5.0	WET	33.19	0.062	64	605	415	254,443	$64{,}258 \times 10^7$
	10.50	AVG	18.11	0.036	24	369	181	132,645	$11{,}767 \times 10^7$
D3	10.50	DRY AVG	1.35	0.017	38	83	8.11	599	$7{,}460 \times 10^7$
	10.50	WET	30.69	0.050	17	584	312	231,679	$16{,}562 \times 10^7$
	20.75	AVG	11.84	0.030	33	314	112	69,498	$9{,}441 \times 10^7$
D4	20.75	DRY AVG	1.25	0.020	40	36	3.9	280	$3{,}298 \times 10^7$
	20.75	WET	19.78	0.038	28	522	194	121,412	$20{,}780 \times 10^7$
	28.50	AVG	11.34	0.026	47	305	96	66,497	$13{,}192 \times 10^7$
D5	28.50	DRY AVG	0.96	0.018	107	36	4.4	174	$8{,}651 \times 10^7$
	28.50	WET	19.11	0.032	26	507	166	116,238	$18{,}104 \times 10^7$
	36.50	AVG	8.03	0.020	11	255	67	41,546	$2{,}356 \times 10^7$
D6	36.50	DRY AVG	0.33	0.010	39	25	1.4	45	$2{,}176 \times 10^7$
	36.50	WET	13.79	0.026	4	428	116	72,672	$2{,}501 \times 10^7$

AVG: Average of all samples collected. Fecal coliform are geometric mean values.
DRY AVG: Average of 6 dry weather sampling dates.
WET: Average of 8 wet weather sampling dates.

Figure 3

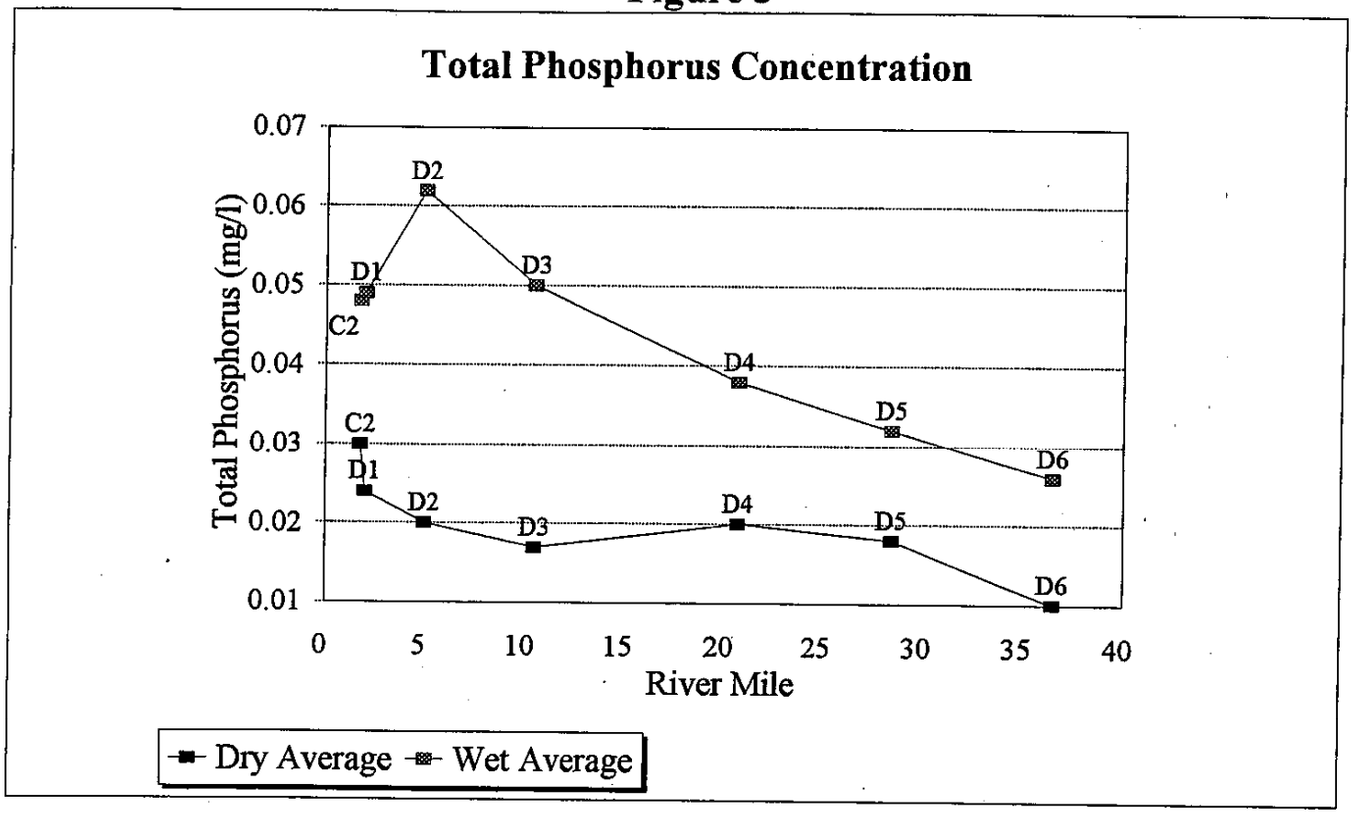
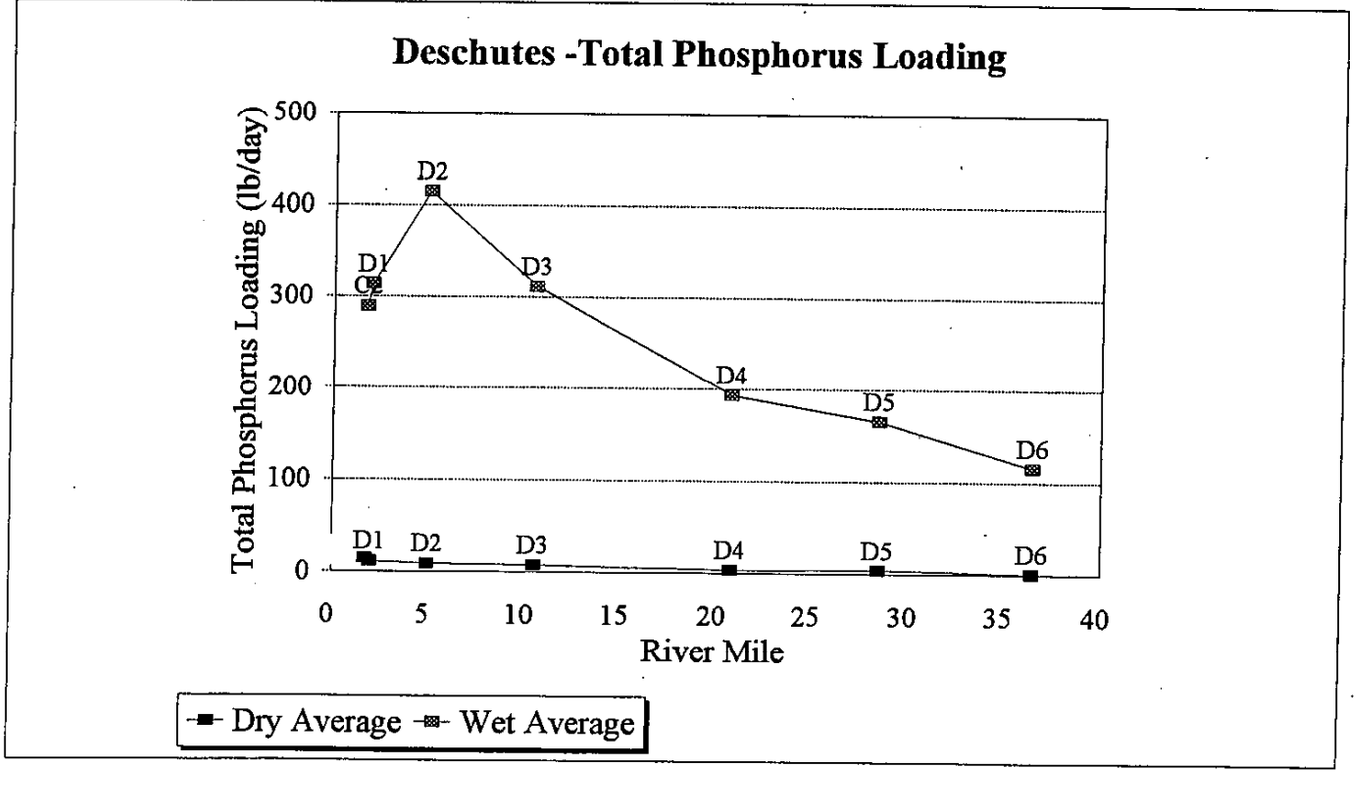


Figure 4



These Figures Depict the Seasonal Comparison of Total Phosphorus Loading and Concentrations with River Mile in the Deschutes River. Station Labels (C2...D6) are Described in the Text.

Figure 5

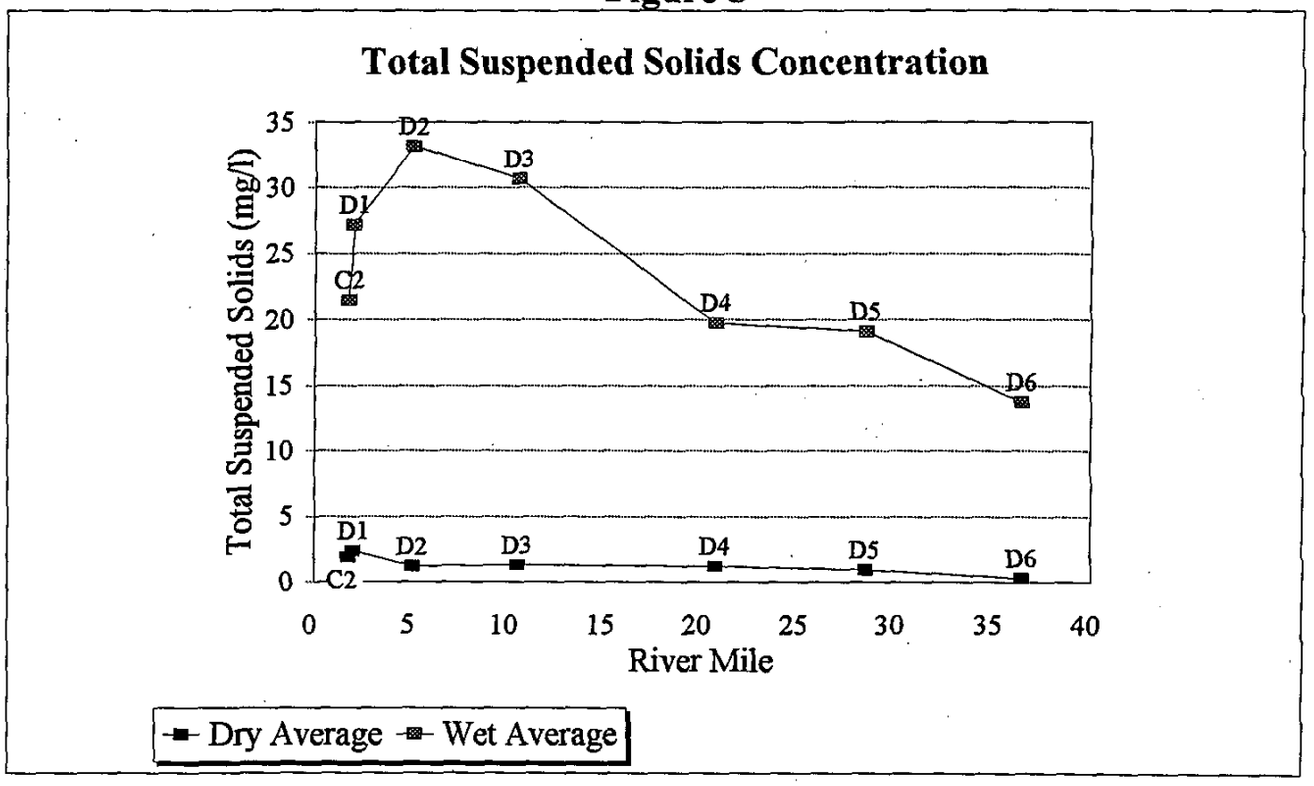
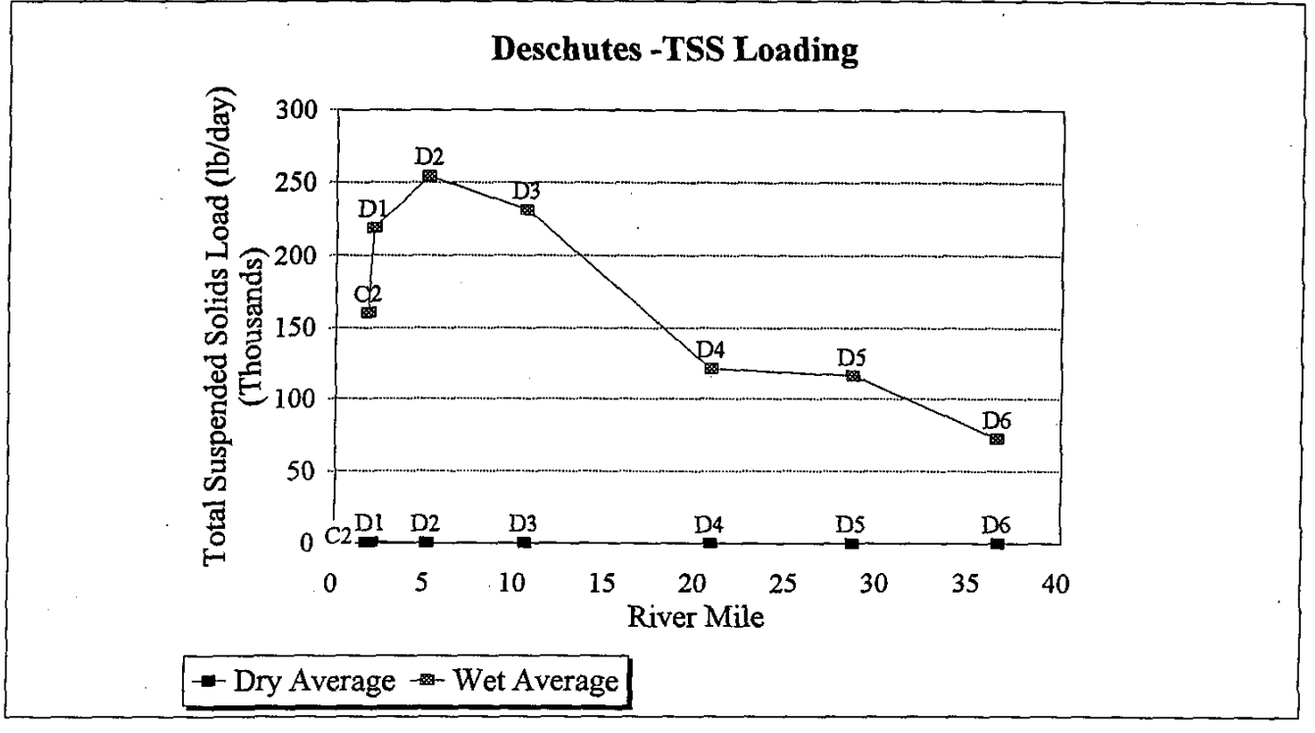


Figure 6



These Figures Depict the Seasonal Comparison of Total Suspended Solids Loading and Concentrations with River Mile in the Deschutes River. Station Labels (C2...D6) are Described in the Text.

Figure 7

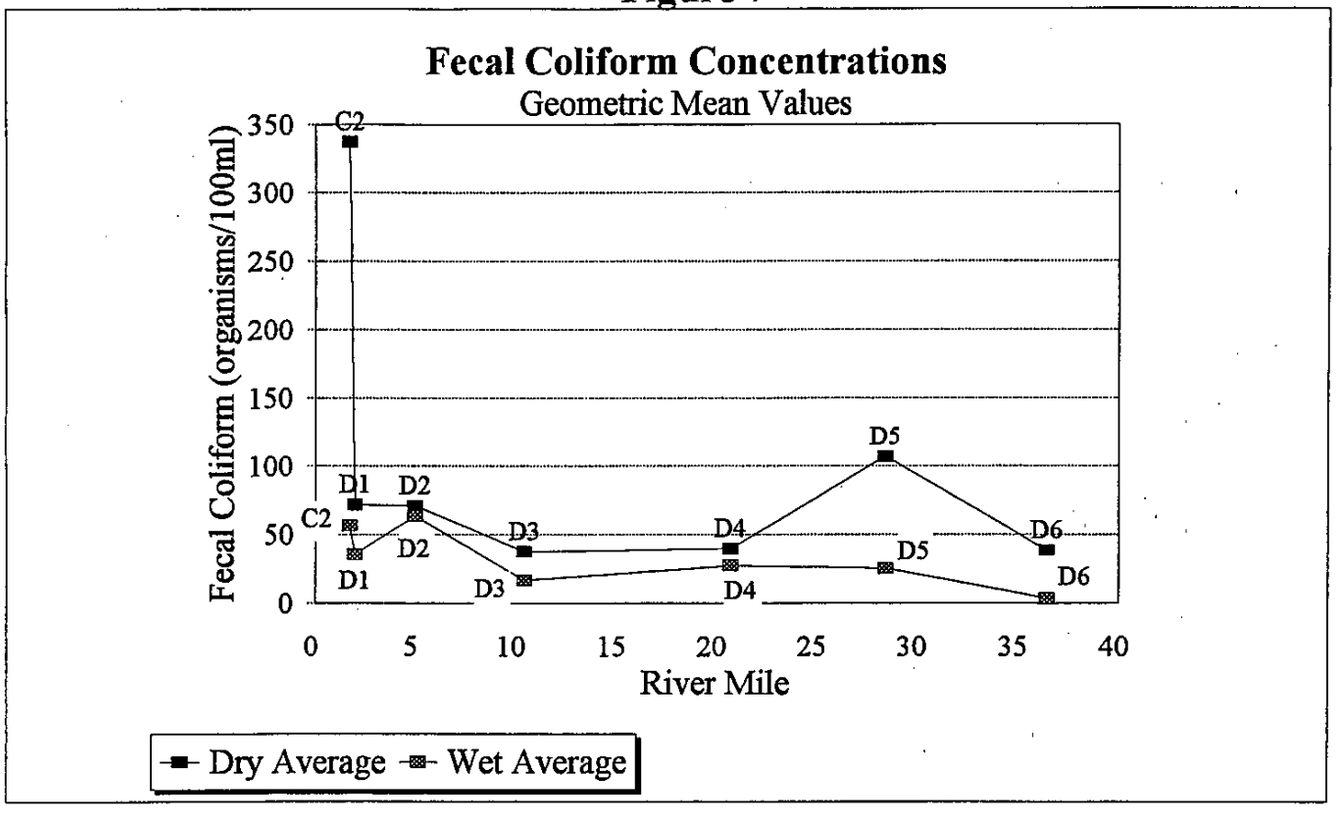
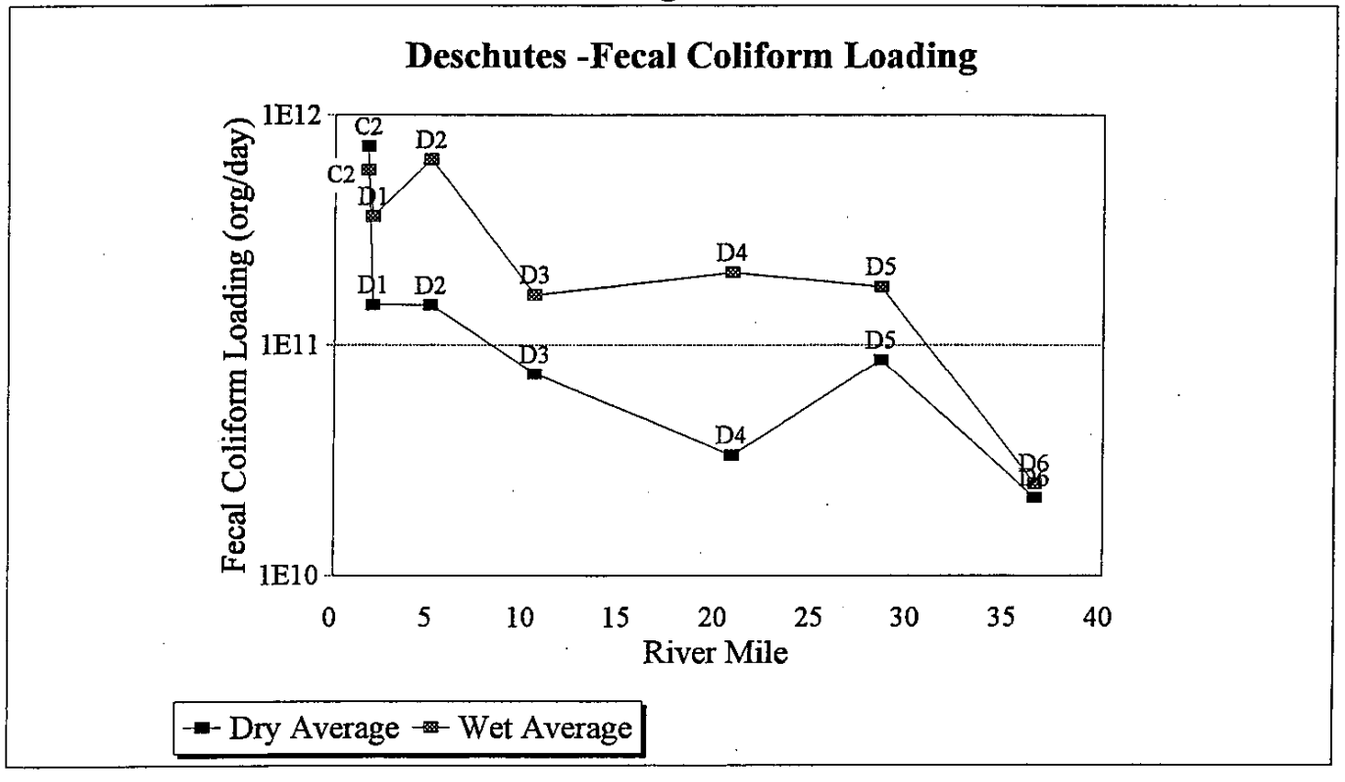


Figure 8



These Figures Depict the Seasonal Comparison of Fecal Coliform Bacteria Loading and Geometric Means with River Mile in the Deschutes River. Station Labels (C2...D6) are Described in the Text.

Figure 9

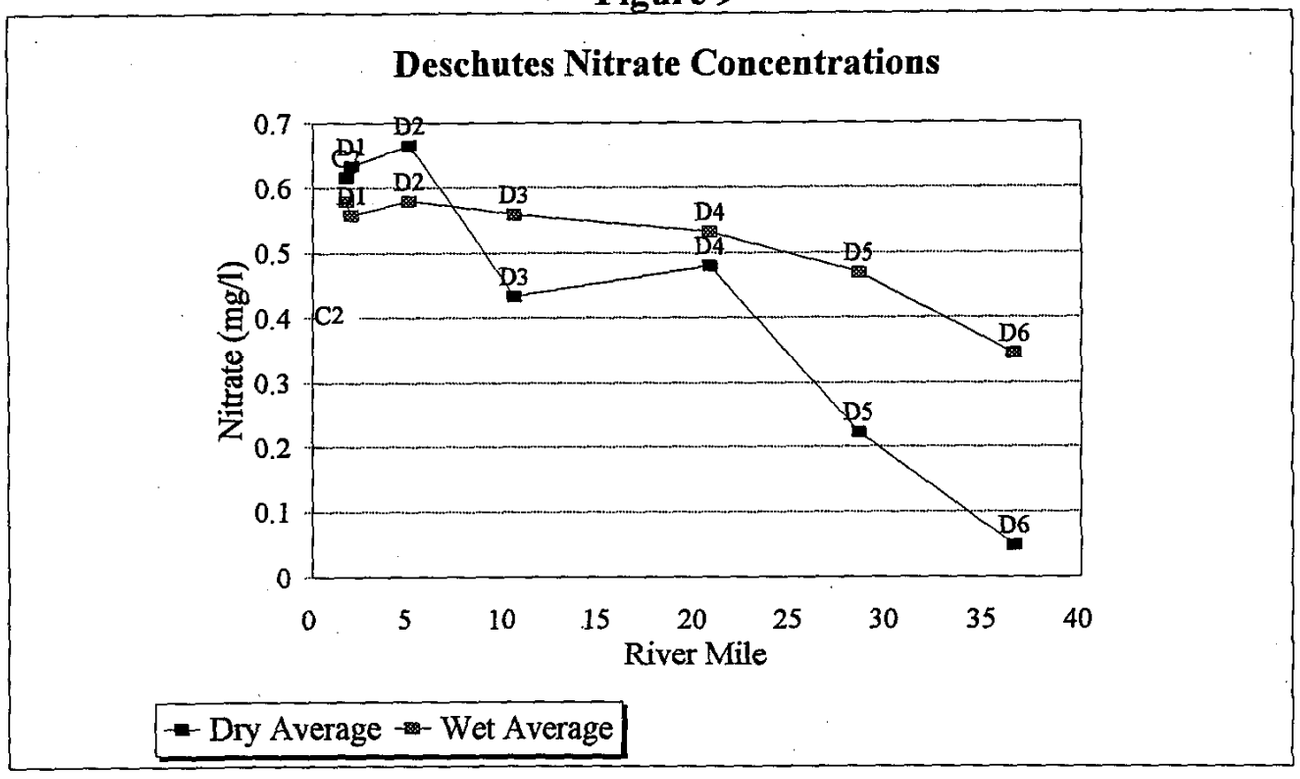
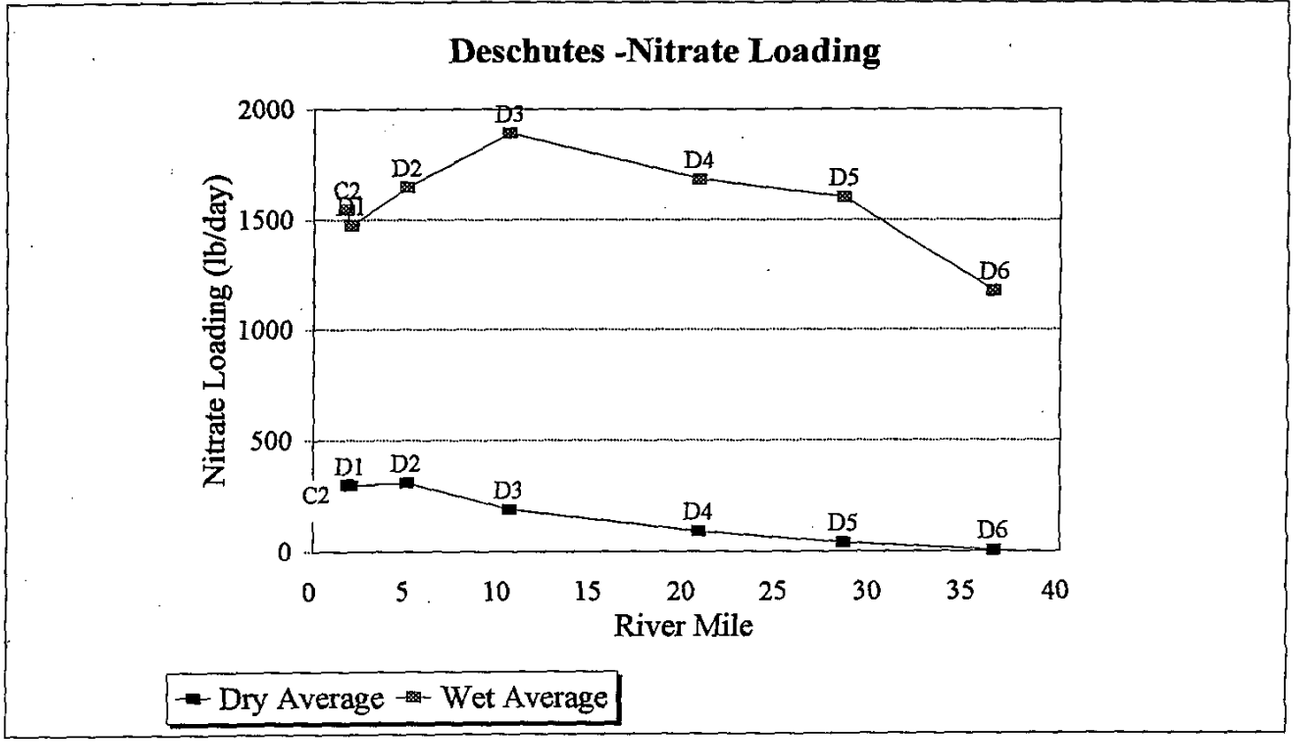


Figure 10



These Figures Depict the Seasonal Comparison of Total Suspended Solids Loading and Concentrations with River Mile in the Deschutes River. Station Labels (C2...D6) are Described in the Text.

Tributaries

Pollutant contributions from tributaries were calculated using the same formulas as used for the mainstem stations. Pollutant loads and concentrations were calculated and graphed for dry weather and wet weather. Results are summarized in Table 5 and Figures 11 - 26. The tributaries are grouped into two categories for graphing purposes and ease of comparison, Deschutes River tributaries and Budd Inlet tributaries. Some data used for pollutant loadings are qualified due to violation of quality criteria established for the project. See Appendix B for details. In a few instances stream flow measurements could not be made due to extreme flows. In those cases, the flows were estimated. The basis for the estimates are noted in the comments field of the data reports in Appendix D.

Figures 11 and 12 show the total phosphorus (TP) concentrations in the Deschutes tributaries an the Budd Inlet tributaries respectively. Figures 13 and 14 show the TP loadings for the Deschutes and Budd Inlet Tributaries. Both the wet and dry average TP concentrations are below the recommended 0.1 mg/l (ppm) except the wet season average in Ayer Creek and the dry season average in Mission Creek. The tributaries in the upper watershed had low average TP concentrations, which ranged from 0.003 to 0.028 mg/l. The highest average TP concentration was at Ayer (previously called Elwanger) Creek with 0.186 mg/l. The average wet season concentration in Ayer Creek was almost three times greater than the dry season concentration which implies that the source is related to contaminated run-off during storm events. The second highest average TP concentration was at Mission Creek with 0.080 mg/l. However, in Mission Creek the dry season concentration was almost two times higher than the wet season concentration, which is indicative of a more constant source of contamination that is not stormwater related. Ayer and Mission Creeks were sampled intensively for bacterial contamination in the previously reported study because they were identified as having poor water quality, but nutrient data was not collected.

In terms of phosphorus loading, the tributaries to the Deschutes overall contributed more pounds per day in the wet season than did the Budd Inlet tributaries, with Percival Creek contributing the most at 18 pounds per day. This was primarily due to the fact the river tributaries are larger streams than the Inlet tributaries. For example, Percival Creek and Ellis Creek had TP concentrations of 0.03 and 0.037 mg/l respectively. But because Percival's average flow during the winter season was 55 cubic feet per second compared to Ellis' 3 cubic feet per second, Percival contributed 18 pounds per day of phosphorus compared to 0.66 pounds per day from Ellis Creek. The second highest load was from Reichel Creek which contributed 7 pounds per day. Of the Budd Inlet tributaries, Moxlie Creek's wet season contribution was the highest with 2.4 pounds per day.

As with total phosphorus, the highest concentrations and loads of total suspended solids (TSS) were seen in the winter, although the difference between wet and dry TSS data

is more dramatic particularly in the river tributaries. Although Ayer Creek has the highest wet season TSS concentrations, three of the upper watershed tributaries (Huckleberry, Little Deschutes, and Thurston) had the highest wet season TSS load, with 3127, 3031, 2169 pounds per day. Reichel and Percival Creeks also had wet season TSS loads greater than 2000 pounds per day. The loads for all other creeks were less than 500 pounds per day. Because the previous data set included a major flood event which skewed the wet weather data, it is very difficult to compare the previously reported results with the current data.

In contrast to the TSS and TP, the fecal coliform concentrations were higher in the dry season than in the wet season in all but a few creeks. Typically, when a pollutant concentration is high (or most concentrated) during the dry season and decreases with increasing flows but the load remains fairly constant throughout the year, it is likely that the source(s) are continuous or point sources. Several creeks demonstrate this pattern such as Chambers, Spurgeon, Adams, and Indian. Percival, Reichel, and Schneider had higher loads during the winter which was probably a result of contaminated stormwater run-off impacting those creeks. Ayer Creek was severely impacted under both wet and dry conditions with bacteria loads of more than 60 billion organisms per day. Ellis Creek had one dry season result that was 144,460 organisms per 100 ml which skewed upward the mean concentration and load for that creek. Replication of that elevated result did not occur upon resampling days later.

Mission and Moxlie Creeks had both high concentrations and loads during the dry season, which implies that either the contaminant source is present only during the dry season or that bacterial reproduction is occurring in-stream during the warmer dry season. There are two seasonally related responses that are associated with bacteria sampling. First, during wet weather months bacteria loads increase in response to increased runoff where there are bacteria sources. However, bacteria sources are not infinite like the TSS and TP sources. For example, if a bacteria source is a cowpie lying on the shoreline, once that cowpie has been washed into the river the source is gone and will not be replenished until the cow returns. Consequently, while bacteria loads may be very high at the beginning of a storm or a period of rain, the loads often decrease if the wet weather persists. Second, environmental factors (air and water temperatures, wind and sunlight) that vary between seasons affect the growth and death rate of bacteria populations. During dry weather months, concentrations may increase due to improved incubating conditions even though originating sources may be fewer. Consequently, bacteria results are varied. The higher concentrations measured at most of the stations during dry weather resulted in higher load estimates in some cases. The difference is that the increased load is not necessarily a result of increased sources of bacteria, but instead a result of increased fecal bacteria growth, due to favorable growing conditions. (Davis, et al, 1993)

Table 5. Pollutant Concentrations and Loadings in the Tributaries (7/92-9/94).

STREAM		TSS (mg/L)	T.Phos (mg/L)	Fecal Col (#/100mL)	Flow (cfs)	T. Phos (lb/day)	TSS (lb/day)	Fecal Col (#/day)
Moxlie	AVG	7.80	.068	91	6.15	2.33	297	$1338*10^7$
	DRY AVG	5.72	.065	124	6.31	2.23	191	$1909*10^7$
	WET	9.88	.072	67	6.0	2.42	404	$938*10^7$
Percival	AVG	4.65	0.042	44	35.7	6.45	1243	$2475*10^7$
	DRY AVG	3.3	0.058	81	8.99	2.81	167	$1662*10^7$
	WET	5.7	.030	28	55.8	18.3	2049	$3337*10^7$
Indian	AVG	4.58	.045	310	1.59	0.42	69	$1018*10^7$
	DRY AVG	1.98	.045	464	0.98	0.26	12	$1077*10^7$
	WET	7.18	.046	208	2.20	0.58	126	$962*10^7$
Butler	AVG	3.36	.033	28	0.88	0.18	29	$24*10^7$
	DRY AVG	0.86	0.25	103	0.08	0.27	0.4	$18*10^7$
	WET	4.61	.036	15	1.29	0.01	44	$28*10^7$
Schneider	AVG	0.88	0.025	48	1.51	0.20	8.0	$167*10^7$
	DRY AVG	0.78	0.027	16	1.43	0.21	5.8	$53*10^7$
	WET	0.94	0.023	92	1.55	0.20	9.3	$321*10^7$
Mission	AVG	3.69	.080	248	0.68	.26	15	$375*10^7$
	DRY AVG	4.19	.116	1140	0.41	.26	11	$1113*10^7$
	WET	3.44	.062	116	0.82	.26	17	$217*10^7$
Ellis	AVG	3.68	.044	119	2.29	0.49	68	$407*10^7$
	DRY AVG	2.66	.058	891	0.46	0.14	7.3	$895*10^7$
	WET	4.19	.037	44	3.20	0.66	98	$275*10^7$
Adams	AVG	1.34	.025	66	.78	.10	7.0	$24*10^7$
	DRY AVG (based on 1 sample)	2.00	.026	152	.02	.004	0.1	$5*10^7$
	WET	1.26	.025	48	1.06	.14	7.8	$43*10^7$

AVERAGE: Average of all samples collected. Fecal coliform are geometric mean values.
DRY AVG: Average of dry weather sampling events.
WET: Average of all wet weather sampling.
NOTE: For 8/94, flow for Adams creek was estimated to be 0.005 cfs. Ellis Creek dry season fecal coliform concentration and load is skewed upward by one outlier that was 144,460 organisms per 100 ml.

Table 5. (Continued) Pollutant Concentrations and Loadings in the Tributaries (7/92-9/94).

STREAM		TSS (mg/L)	T.Phos (mg/L)	Fecal Col (#/100mL)	Flow (cfs)	T. Phos (lb/day)	TSS (lb/day)	Fecal Col (#/day)
Ayer (Elwanger)	AVG	16.38	.186	1606	2.10	2.04	160	$6910*10^7$
	DRY AVG	11.0	.089	2217	1.47	0.68	77	$7602*10^7$
	WET	20.0	.251	1296	2.52	2.95	215	$6484*10^7$
Chambers	AVG	3.32	.025	109	2.25	0.38	70	$341*10^7$
	DRY AVG	1.26	.021	234	0.94	0.12	6.7	$354*10^7$
	WET	4.62	.027	62	3.23	0.58	110	$332*10^7$
Spurgeon	AVG	3.81	.030	99	9.77	1.58	299	$1713*10^7$
	DRY AVG	3.12	.030	214	3.61	0.64	53	$1719*10^7$
	WET	4.40	.029	52	15.0	2.39	380	$1708*10^7$
Reichel	AVG	9.88	.060	128	11.95	4.38	1222	$837*10^7$
	DRY AVG	2.67	.056	135	0.68	0.23	8	$109*10^7$
	WET	15.29	.063	122	20.4	7.49	2132	$3926*10^7$
Huckleberry	AVG	8.37	.022	4	7.58	1.04	1788	$15*10^7$
	DRY AVG	0.94	.023	4	0.40	0.05	1.6	$3.2*10^7$
	WET	13.9	.021	4	13.0	1.78	3127	$50*10^7$
Thurston	AVG	4.49	.023	2	15.1	3.16	1244	$38*10^7$
	DRY AVG	0.88	.020	2	2.37	0.26	11	$11*10^7$
	WET	7.19	.024	3	24.6	5.33	2169	$92*10^7$
L.Deschutes	AVG	5.63	.028	10	16.52	3.98	1734	$137*10^7$
	DRY AVG	0.50	.024	8	1.74	0.25	4.7	$33*10^7$
	WET	9.48	.031	11	27.61	6.79	3031	$400*10^7$
Lincoln	AVG	0.74	.010	2	16.65	0.94	156	$32*10^7$
	DRY AVG	0.29	.011	3	2.91	0.24	4.2	$18*10^7$
	WET	1.13	.009	0	28.42	1.53	287	0
Hard	AVG	<.50	.003	1.5	2.75	0.05	3.7	$4.8*10^7$
	DRY AVG	<.50	.003	2.2	0.66	0.01	0.9	$2.7*10^7$
	WET	<.50	.004	0	4.83	0.09	6.5	0

AVERAGE: Average of all samples collected. Fecal coliform are geometric mean values.
DRY AVG: Average of all dry weather sampling events.
WET: Average of all wet weather sampling.
NOTE: Flows have been estimated for March 1993 and February 1994 for Little Deschutes, using the method described in Appendix D.

Figure 11

Total Phosphorus Concentration
Deschutes Tributaries

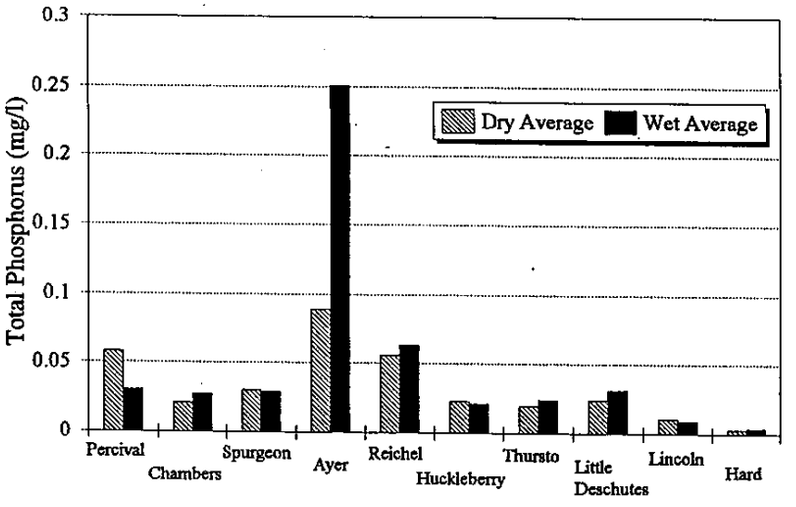


Figure 12

Total Phosphorus Concentration
Budd Inlet Tributaries

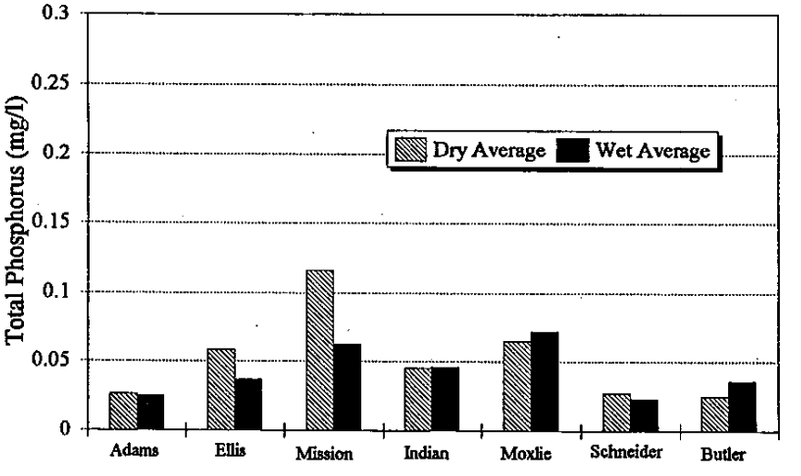


Figure 13

Total Phosphorus Loading
Deschutes Tributaries

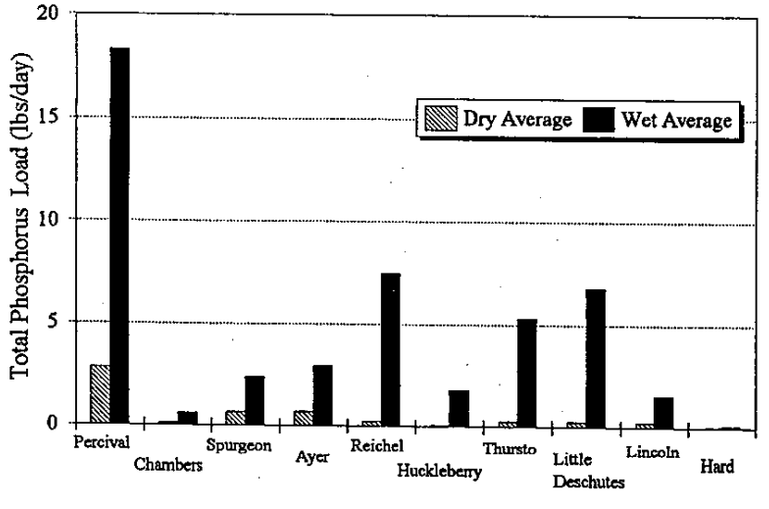
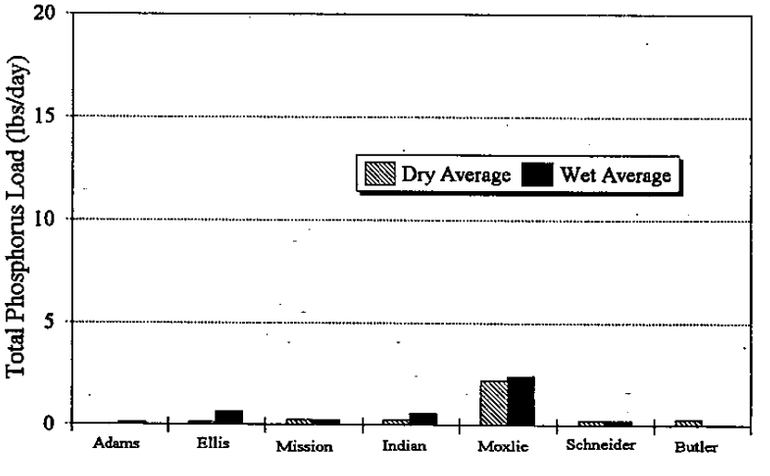


Figure 14

Total Phosphorus Load
Budd Inlet Tributaries



These Figures depict the seasonal comparison of Total Phosphorus Concentration and Loading of Deschutes River Tributaries and Budd Inlet Tributaries.

Figure 15

Total Suspended Solids Concentration
Deschutes Tributaries

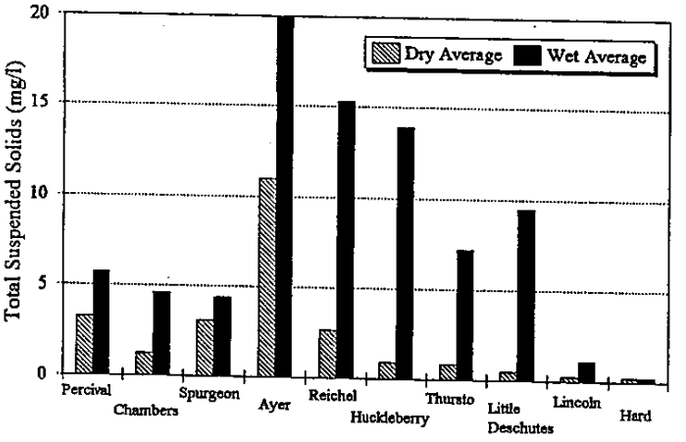


Figure 16

Total Suspended Solids Concentration
Budd Inlet Tributaries

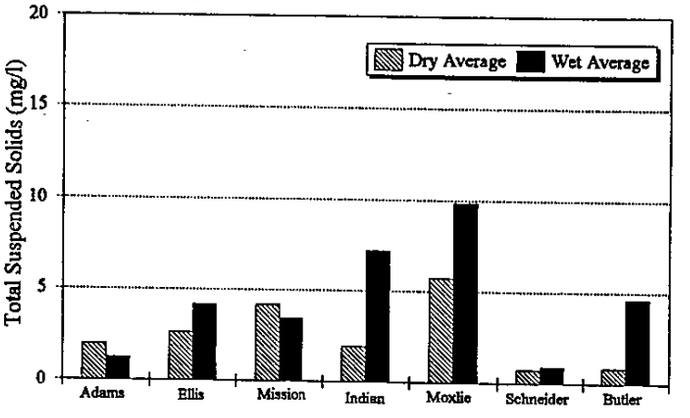


Figure 17
Total Suspended Solids Loading
Deschutes Tributaries

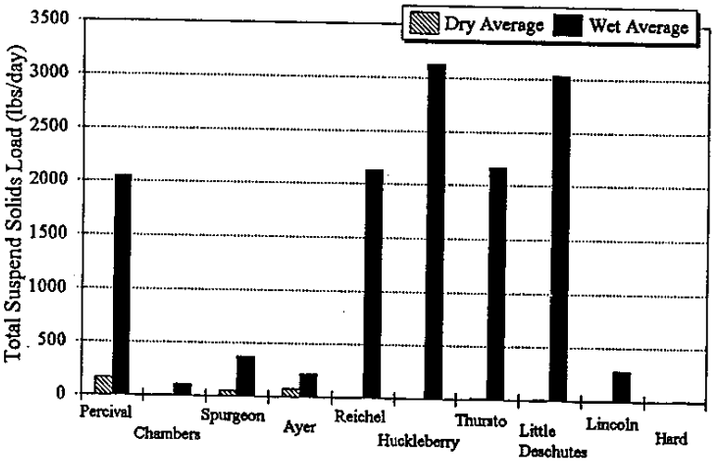
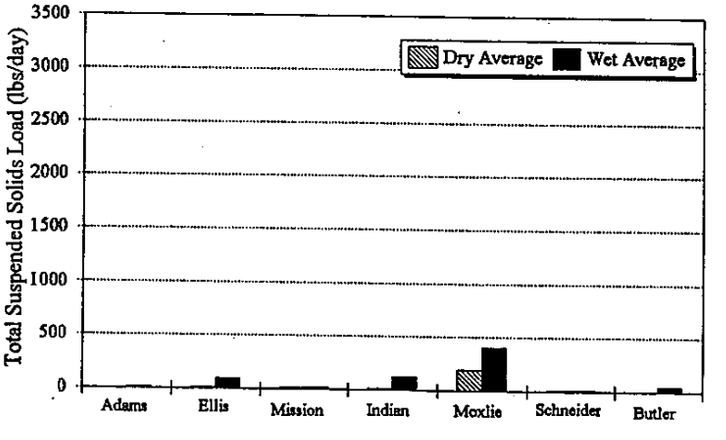


Figure 18
Total Suspended Solids Load
Budd Inlet Tributaries



These Figures depict the seasonal comparison of Total Suspended Solids Concentration and Loading of Deschutes River Tributaries and Budd Inlet Tributaries.

Figure 19

Fecal Coliform Bacteria Concentrations
Deschutes Tributaries

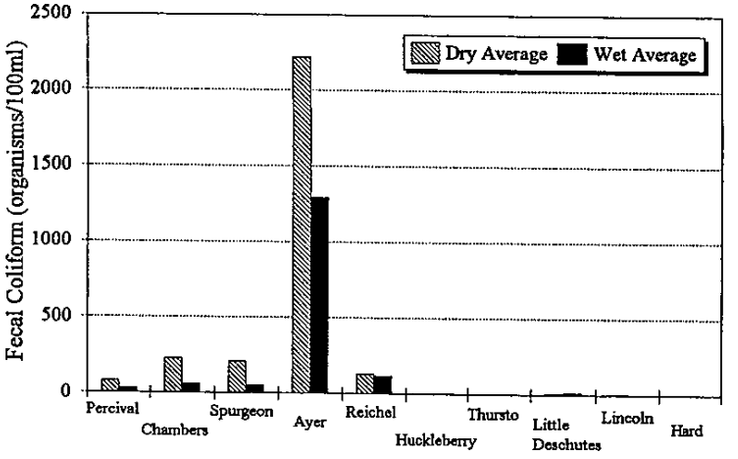


Figure 20

Fecal Coliform Bacteria Concentrations
Budd Inlet Tributaries

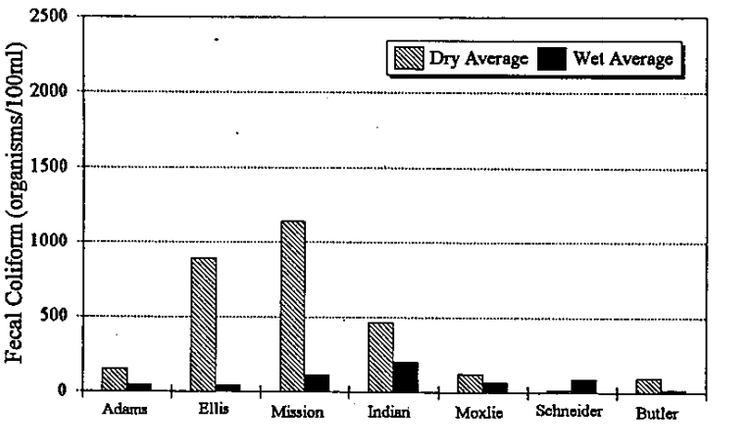


Figure 21

Fecal Coliform Bacteria Loading
Deschutes Tributaries

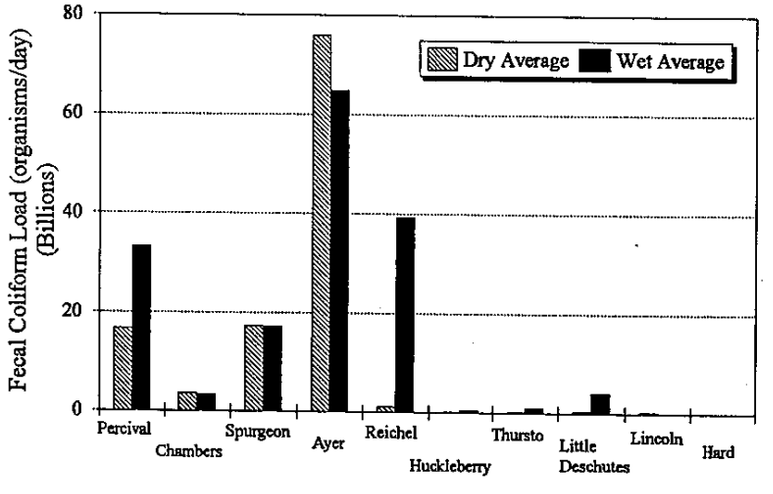
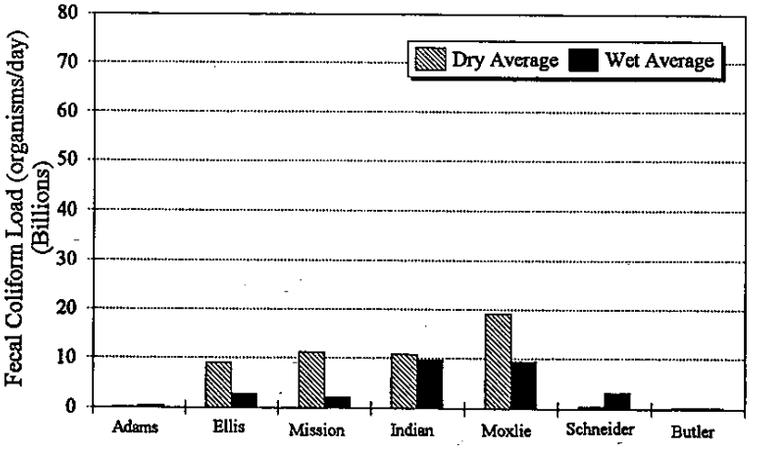


Figure 22

Fecal Coliform Bacteria Load
Budd Inlet Tributaries



These Figures depict the seasonal comparison of Fecal Coliform Bacteria Concentrations and Loading of Deschutes River Tributaries and Budd Inlet Tributaries. (The Ellis Creek dry season concentration and load is skewed upward by one outlier that was 144,460 organism/100ml.)

Figure 23

Nitrate-Nitrite Concentrations
Deschutes Tributaries

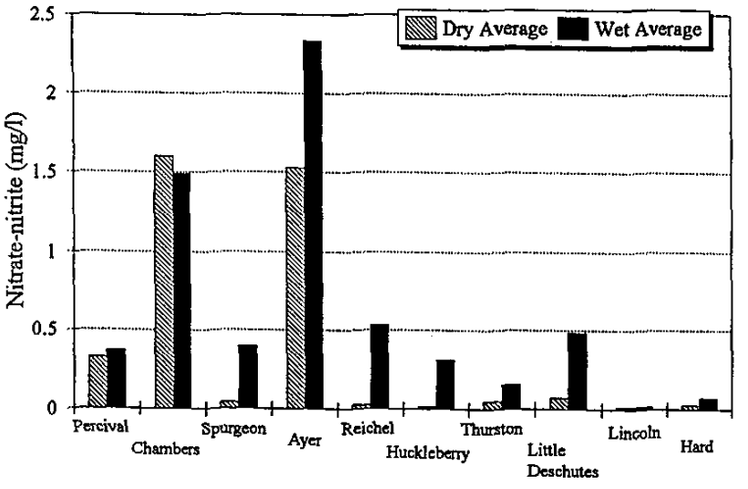


Figure 24

Nitrate-nitrite Concentrations
Budd Inlet Tributaries

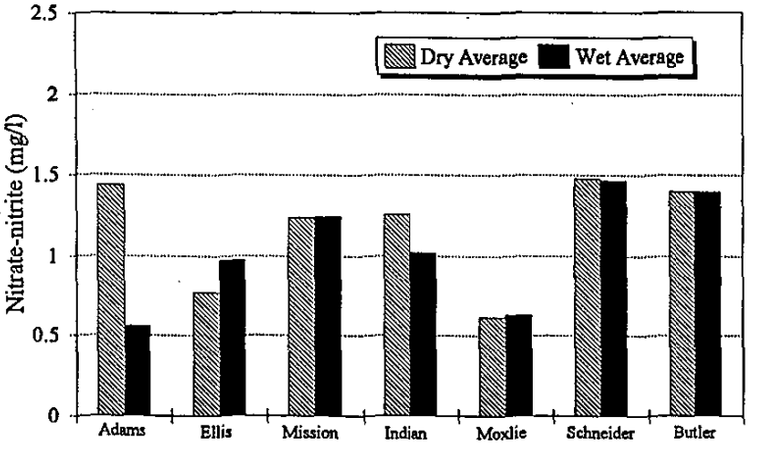


Figure 25

Nitrate-Nitrite Loading
Deschutes Tributaries

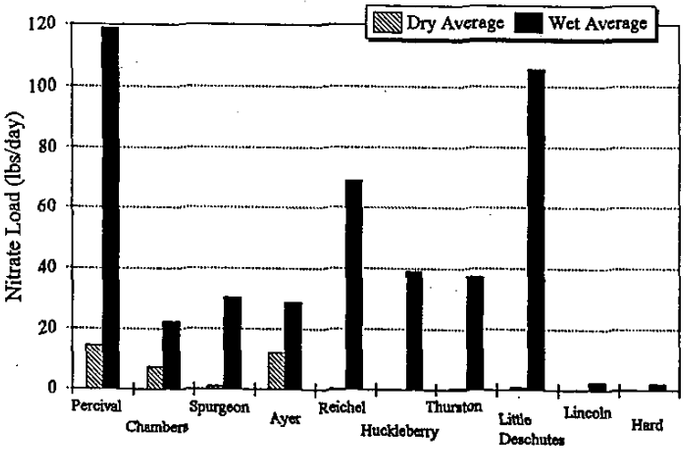
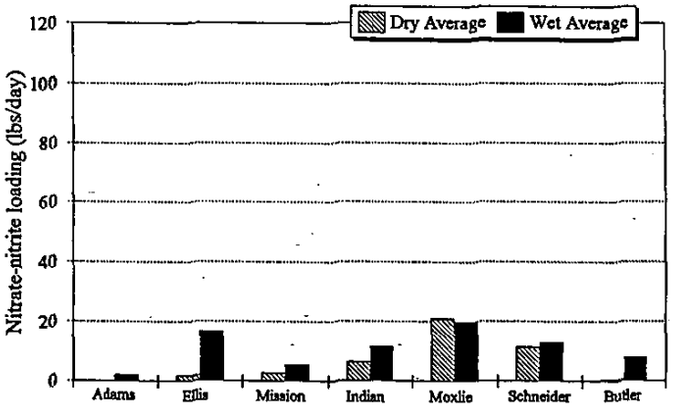


Figure 26

Nitrate-nitrite Loading
Budd Inlet Tributaries



These Figures depict the seasonal comparison of Nitrate-Nitrite Concentrations and Loading of Deschutes River Tributaries and Budd Inlet Tributaries.

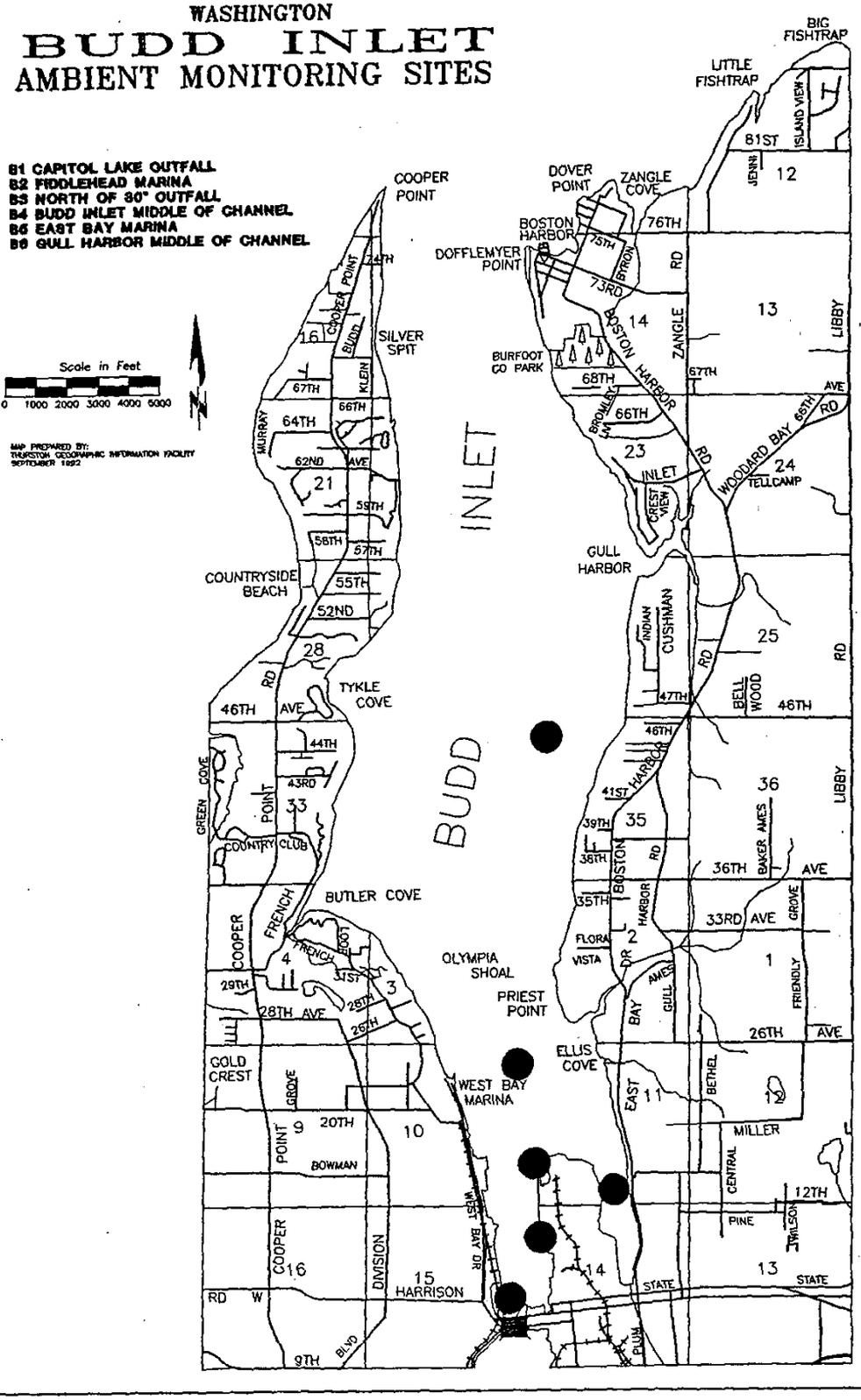
BUDD INLET AND CAPITOL LAKE MONITORING

Six Budd Inlet stations and a Capitol Lake station (C01), between the north and middle basins, were sampled from July 1992 to August 1993 in addition to the sampling completed during the previous study period. The previous sampling period was from January 1991 to March 1992. Seven sampling events were completed during this most recent period, and the data is reported in Appendix D. Data quality is discussed in the Quality Assurance Assessment Section in Appendix B.

A map of the Budd Inlet sampling locations is shown on the following page.

FIGURE 27

THURSTON COUNTY
WASHINGTON
BUDD INLET
AMBIENT MONITORING SITES



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APPENDIX A: ANALYTICAL PROCEDURES AND MEASUREMENT METHODS

ANALYTICAL METHODS FOR WATER SAMPLES

Parameter	Method	Method Reference	Lab
Ambient Sampling			
Total Suspended Solids	2540D	Std Methods 17th Ed.	Aquatic Research
Ammonia	4500NHH	Std Methods 17th Ed.	Aquatic Research
Nitrate-Nitrite	4500NOF	Std Methods 17th Ed.	Aquatic Research
Total Phosphorus	4500PF	Std Methods 17th Ed.	Aquatic Research
Total Recoverable Metals			
Copper	220.2	EPA	Aquatic Research
Lead	239.2	EPA	Aquatic Research
Zinc	200.7	EPA	Aquatic Research
TPH	418.1	EPA	Aquatic Research
Total Hardness	2340C	Std Methods 17th Ed.	Aquatic Research
Turbidity	2130B	Std Methods 17th Ed.	Thurston Co. Health
Fecal Coliform	9222D or 9221C	Std Methods 17th Ed.	Thurston Co. Health Lab

FIELD MEASUREMENT METHODS

FIELD PARAMETER	METHOD	INSTRUMENT	REFERENCE
Conductivity	Platinum-electrode	YSI 33 S-C-T or Hydrolab Surveyor II	EPA - 120.1[1] *APHA - 2510 B*[2]
Dissolved Oxygen	Membrane electrode	YSI 51B or Hydrolab Surveyor II	APHA - 4500-0 G
Flow	Current-meter	Swoffer 210	*USGS* - Geological Survey Water-Supply Paper 2175[3]
pH	Electrometric	Beckman pH ϕ10 or Hydrolab Surveyor II	EPA - 150.1
Temperature	Thermometric	YSI 33 S-C-T or Hydrolab Surveyor II	EPA - 170.1 APHA - 2550 B
Visibility	Secchi disk	20 cm black and white disk	Lind[4]

1. U.S. Environmental Protection Agency (Kopp and Mckee), 1983.
2. American Public Health Association, *et al.*, 1989.
3. Rantz, S. E., *et al.*, 1982.
4. Lind, Owen T., 1974.

APPENDIX B:
QA ASSESSMENT

QA ASSESSMENT OF BUDD/DESCHUTES AMBIENT WATER QUALITY MONITORING RESULTS FROM JULY 1992 TO SEPTEMBER 1994

Table 1 below lists the optimum criteria used to assess each of the data sets. Each data set was examined in relation to the criteria set for each subject area (e.g. Holding Times). Each of these subject areas is described separately below with descriptions of how the data sets met the stated criteria and what course of action was taken for those that did not.

Table 1. Criteria Used for QA Assessment of Budd/Deschutes Study.

	Holding Time	Detection Limit (mg/l)	Matrix Spikes	Lab Duplicates
TSS	7 days	0.50	NA	20%
TP	28 days	0.002	20%	20%
NO2+NO3	28 days	0.010	20%	20%
Ammonia	28 days	0.010	20%	20%
Copper	6 months	0.0010	25%	25%
Lead	6 months	0.0010	25%	25%
Zinc	6 months	0.003	25%	25%
TPH	28 days	0.25	25%	25%
Hardness	6 months	2.0	20%	20%

NOTE: Precision for metals data was evaluated in this way: The control limit is 25% RPD, if the result was > 5 times the detection limit; OR $\pm$ the detection limit if the result was $\leq$ 5 times detection limit.

Holding Time

Holding time criteria were violated for the dates and parameters listed in the Table 2 below. This data should be used as qualified data. The most serious holding time violation was selected nutrient samples collected in August 1992. This violation was the result of problems with the initial analysis in the lab, so it was necessary to re-run the samples at a later date. At that time of re-analysis the holding times had been exceeded.

Table 2. Data Exceeding Recommended Holding Times.

Violation Date	Parameter	Stations	Number of days past holding time
8/25,26/92	NO3	D02,T09,B5A,B6A,B6B	22
8/25/92	NH4	D05	22
1/26/93	TSS	All	1
3/23/93	TSS	All	2
8/23/93	TSS	All	2
8/24/93	TSS	All	1
12/27/93	TSS	All	3
12/28/93	TSS	All	2
2/22/94	TSS	All	1
3/29/94	TSS	All	1
9/26/94	TPH	All	4

Detection Limits and Blanks

All parameters met stated detection limits for all data sets.

During this project there was repeated lab contamination for metals. The metals data was "accepted" if the sample results were greater than 5 times the lab blank contamination. If the sample result was less than 5 times the lab blank contamination, the data was "rejected" and does not appear in the database. Lab blanks were below detection limits for all conventional parameters.

Matrix Spikes.

All but three of the matrix spikes were within the percent criteria specified in Table 1. The dates and parameters were 2/22,23/93 (NO3), 8/23,24/93 (TP), and 9/27,28/94 (NH4). The lab control samples for those runs were all within acceptable limits so the data was accepted without qualification.

Laboratory Duplicates

Table 3 below contains results from assessment of the lab duplicates. The first step in examining the laboratory duplicates was to determine whether the duplicates were within the range stated in Table 1. All data that did not meet the criteria are listed below. The second step was reviewed the data to determine whether the sample result was less than 5 times the detection limit. If the result was less than 5 times the detection limit **and** the difference between the duplicates was within plus or minus one detection limit, then the data was accepted without qualification. These data are marked with an "A" (accept) in Table 3 below. If the data was greater than the criteria and greater than 5 times the detection limit, then it was qualified. These data are marked with an "Q" (qualify) in Table 3 below.

Table 3. Results from Assessment of Laboratory Duplicate Analysis.

DATE	Pb	Cu	NH4	TSS
12-28-92	A	--	--	--
02-25-93	--	--	--	Q
03-23-93	--	--	Q	--
03-30-94	--	--	A	--
09-28-94	--	A	--	--

Field Duplicates

Field duplicates were collected to represent field variation and therefore was not used for decisions to "accept" or "reject" data. In the report, the averages of the field duplicates were reported. However, the data were examined to assess variation and look for possible problems. In general, field variation was low, with the exception of the August 1992 data set, where there appeared to be analytical problems and re-analysis was performed.

Quality Assurance Data

The laboratory quality assurance reports are available upon request from the Thurston County Environmental Health Division, Surface Water Section.

APPENDIX C:
BUDD/DESCHUTES FLOW ANALYSIS

BUDD/DESCHUTES FLOW ANALYSIS

In order to assess pollutant loading in the mainstem of the river, estimated flows were calculated for sites where no data were available. There are continuous stream flow recorders at stations D1, D6, and at Vail between stations D5 and D4. The following describes how these flow estimates were made at those river stations where there were no stream flow gages.

C02 (RM 1.75) flows were estimated by adding the estimated Olympia Brewery discharge of 2.6 cfs to the D1 flows measured at the USGS gaging station. D2 flows (RM 5.0) were assumed to be the same as those at station D1 (RM 2.0). D3 flows (RM 10.5) were estimated by subtracting the measured flows of tributaries T3 (enters at RM 4.7), T4 (RM 10.0), and Ayer Creek from the river flow measured at the USGS gage at (Station D1, RM 2.0). D4 (RM 20.75) flows were estimated to be the same as those measured at the USGS gage at Vail. Flows at Station D5 (RM 26.5) were estimated by subtracting tributary T5 measured flows from flows reported at the USGS gage at Vail.

Since these estimates do not account for small tributaries or groundwater that enter the river between the up- and downstream stations, they should be considered to be gross estimates. That is, the real flows are likely to be higher or lower than the estimated flows depending on which gaging station on the river was used as the basis for the estimate. For example, a dry season seepage run measured on the Deschutes River on 8/12/88 by USGS (unpublished) showed a 23 percent increase in stream flow between RM 10.5 and RM 5.0 from groundwater discharge to the river. Therefore the pollutant loadings calculated using these estimates should also be considered to be very crude estimates and used with caution.

Any other estimated flows used for tributaries when flows could not be measured are noted in the comments field of the data sheets in Appendix D.

APPENDIX D:
WATER QUALITY DATA

DESCHUTES RIVER BELOW TUMWATER FALLS
STATION C02 AT RIVER MILE 1.75

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
C02	07/28/92	11:00	16.90	128	-1	10.20	-0.10	1.60	2.90	0.034	0.594	0.020	1580	70.60	pH reading questionable.
C02	08/25/92	11:15	15.00	131	-1	10.30	7.05	2.70	3.20	0.037	0.577	0.005	900	75.60	Ammonia was < detection.
C02	12/28/92	11:00	5.66	-2	88	12.90	7.09	3.40	3.30	0.026	0.585	0.005	30	308.60	Used hydrolab. NH3 < detection.
C02	01/26/93	12:15	7.30	57	-1	13.80	-0.10	29.00	56.00	0.075	0.540	0.023	135	1332.60	
C02	02/22/93	11:00	5.60	110	-1	14.10	7.38	2.00	1.00	0.016	0.626	0.021	15	184.60	
C02	03/23/93	10:50	10.00	58	-1	13.20	7.05	42.00	89.00	0.166	0.232	0.031	500	1702.60	
C02	07/27/93	11:30	16.00	116	-1	10.20	7.57	1.30	1.50	0.028	0.558	0.038	20	129.60	
C02	08/24/93	11:30	14.70	126	-1	10.20	6.95	2.00	0.75	0.036	0.635	0.022	1675	125.60	
C02	12/28/93	10:20	5.65	-2	108	12.47	7.62	1.30	1.60	0.025	0.726	0.005	17	125.60	NH3 < detection limit. Field data measured 12/29 @ 9:15.
C02	01/25/94	12:00	7.55	-1	88	12.66	7.29	3.25	3.15	0.027	0.614	0.010	88	235.60	Lab data entered is avg of field duplicates.
C02	02/23/94	11:00	6.70	-1	78	12.47	7.12	8.50	11.00	0.030	0.675	0.005	160	594.60	NH3 < detection.
C02	03/30/94	09:50	10.53	-1	91	11.29	7.49	2.60	6.70	0.023	0.633	0.012	15	379.60	
C02	08/30/94	10:00	15.07	-1	141	10.25	7.84	1.10	1.40	0.017	0.649	0.028	85	88.60	
C02	09/28/94	13:15	14.79	-1	136	9.91	7.78	1.55	1.75	0.030	0.684	0.032	370	62.60	Lab results are average of field duplicates.

NOTE: Negative number means no data available.
Flows from this station were estimates from Station D01.

DESCHUTES RIVER AT "E" STREET BRIDGE
STATION D01 AT RIVER MILE 2.0

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
D01	07/28/92	11:30	16.50	126	-1	10.60	7.20	1.20	2.30	0.027	0.614	0.016	20	68.00	
D01	08/25/92	10:49	14.00	128	-1	10.20	6.84	2.00	2.50	0.027	0.628	0.017	100	73.00	Flow is estimate from USGS.
D01	12/28/92	11:15	5.63	-2	88	11.61	7.15	4.00	3.30	0.021	0.591	0.005	80	306.00	NH3 < D.L. DAILY AVG FLOW 306CFS.
D01	01/26/93	12:30	7.70	58	-1	12.80	-0.10	27.00	37.00	0.072	0.491	0.016	135	1330.00	USGS DAILY AVG - 1330CFS
D01	02/22/93	11:15	5.50	109	-1	14.80	7.25	2.10	1.30	0.013	0.626	0.018	5	182.00	USGS DAILY AVG FLOW 183
D01	03/23/93	11:15	10.50	54	-1	11.20	-0.10	34.00	156.00	0.191	0.244	0.026	80	1700.00	ESTIMATED DAILY AVG FLOW 1700CFS FROM USGS.
D01	07/27/93	12:00	15.90	115	-1	9.80	7.30	1.85	1.25	0.023	0.600	0.035	13	127.00	Lab data is avg of field dups. USGS DAILY AVG FLOW 128 CFS.
D01	08/24/93	12:00	14.50	124	-1	9.80	7.05	1.60	1.50	0.031	0.485	0.013	1745	123.00	
D01	12/28/93	10:45	5.02	-2	107	11.80	7.37	2.20	1.00	0.015	0.719	0.012	15	123.00	Field data measured 12/29 @ 9:40. USGS mean daily flow 124 cfs.
D01	01/25/94	12:30	7.62	-1	88	11.64	6.26	2.30	2.20	0.024	0.581	0.005	50	233.00	USGS mean daily flow 236 cfs. NH3 < detection.
D01	02/23/94	11:30	6.59	-2	78	11.31	6.61	9.00	12.00	0.034	0.663	0.013	90	592.00	USGS mean daily flow 746 cfs.
D01	03/30/94	10:00	10.41	-1	90	10.14	6.99	2.25	4.60	0.022	0.549	0.013	10	377.00	USGS mean daily flows 377 cfs.
D01	08/30/94	10:30	14.59	-1	139	9.72	7.49	1.30	5.80	0.018	0.724	0.021	60	86.00	USGS estimated mean daily flow - 86 cfs. No instantaneous flow ava
D01	09/28/94	13:45	14.39	-1	131	10.35	7.49	1.20	1.20	0.020	0.745	0.028	50	60.00	USGS estimated mean daily flow - 60 cfs. Instantaneous flow not av

NOTE: Negative number means no data available.
Flows from this station were from USGS gaging station at "E" Street.

DESCHUTES RIVER AT HENDERSON ROAD BRIDGE
STATION D02 AT RIVER MILE 5.0

)8/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND @25C umhos	COND_HYDRO @25C umhos	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
D02	07/28/92	13:15	18.00	126	-1	10.60	-0.10	1.70	2.20	0.026	0.661	0.019	25	68.00	Flow is from gage at D01.
D02	08/25/92	12:30	15.00	131	-1	10.20	5.94	2.20	1.05	0.024	0.727	0.013	95	73.00	pH reading was suspect so checked against stds. & OK. Lab data are avg of field duplicates. Flow from gage @ D01.
D02	12/28/92	12:30	5.83	-2	86	11.50	6.60	4.40	2.80	0.029	0.557	0.005	220	306.00	Used Beckman meter for pH. NH3 < D.L. Flow from gage @ D01.
D02	01/26/93		7.50	61	-1	12.00	-0.10	20.00	40.00	0.075	0.438	0.014	120	1330.00	Flow from gage @ D01.
D02	02/22/93	12:00	5.30	110	-1	13.20	-0.10	2.50	0.83	0.012	0.621	0.015	10	182.00	Flow from gage @ D01.
D02	03/23/93	12:30	9.50	44	-1	11.30	6.81	78.00	175.00	0.268	0.420	0.031	240	1700.00	Flow from gage @ D01.
D02	07/27/93	12:30	15.90	115	-1	10.00	7.39	1.50	1.30	0.029	0.554	0.025	30	127.00	Flow from gage @ D01.
D02	08/24/93	12:45	15.00	128	-1	10.21	7.10	2.00	0.25	0.011	0.521	0.030	1545	123.00	TSS < detection. Flow from gage @ D01.
D02	12/28/93	11:45	4.89	-2	106	11.84	7.30	2.00	0.80	0.014	0.712	0.017	30	123.00	Field data measured 12/29 @ 9:55. Flow from gage @ D01.
D02	01/25/94	13:30	7.42	-1	87	11.67	6.84	3.00	2.80	0.024	0.571	0.005	65	233.00	NH3 < detection. Flow from gage @ D01.
D02	02/23/94	15:30	6.37	-2	70	11.39	7.03	19.00	38.00	0.055	0.659	0.005	90	592.00	pH readings still slow to stablize & changing by hundredths. NH3 < detection. Flow from gage @ D01.
D02	03/30/94	10:50	10.41	-1	90	10.23	7.02	3.10	5.30	0.021	0.662	0.021	25	377.00	Flow from gage @ D01.
D02	08/30/94	11:45	15.20	-1	139	10.31	7.54	0.50	1.20	0.011	0.765	0.019	40	86.00	Flow from gage @ D01.
D02	09/28/94	14:45	14.79	-1	136	10.15	7.41	1.00	1.30	0.018	0.770	0.021	30	60.00	Flow from gage @ D01.

NOTE: Negative number means no data available.
Flows from this station were estimates.

DESCHUTES RIVER AT RICH ROAD BRIDGE
STATION D03 AT RIVER MILE 10.5

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
D03	07/28/92	14:00	19.20	132	-1	10.30	7.70	2.40	2.30	0.021	0.408	0.051	20	61.00	Estimated flow, using est flow of 1.5cfs @ "Elwa".
D03	08/25/92	13:20	16.00	139	-1	10.80	6.38	1.70	1.00	0.019	0.385	0.005	45	67.00	Ammonia was < detection. Estimated flow, using est flow of 1.5cfs @ "Elwa".
D03	12/28/92	13:50	5.97	-2	82	11.64	6.93	3.50	2.70	0.029	0.512	0.016	20	288.00	Estimated flow.
D03	01/26/93	15:50	7.00	53	-1	14.40	-0.10	14.50	26.50	0.045	0.499	0.016	13	1288.00	Lab data are avg. of field dups. Estimated flow.
D03	02/22/93	12:30	5.20	105	-1	13.50	-0.10	2.50	1.50	0.008	0.507	0.014	0	165.00	Estimated flow.
D03	03/23/93	14:00	8.80	45	-1	12.20	6.92	80.00	171.00	0.208	0.716	0.052	135	1670.00	Estimated flow, using est. flow of 5cfs @ "Elwa".
D03	07/27/93	15:30	16.00	117	-1	9.90	7.28	1.70	1.30	0.020	0.385	0.024	20	116.00	Estimated flow.
D03	08/24/93	14:30	16.70	125	-1	10.80	7.15	2.40	1.30	0.023	0.356	0.013	60	117.00	Estimated flow.
D03	12/28/93	13:00	4.20	-2	104	12.31	7.32	2.70	1.60	0.014	0.547	0.005	25	116.00	NH3 < detection limit. Field data measured 12/29 @ 11:15. Estimated flow.
D03	01/25/94	15:45	7.30	-1	81	12.00	7.16	2.50	2.50	0.021	0.473	0.005	5	220.00	NH3 < detection. Estimated flow.
D03	02/23/94	13:15	6.18	-2	65	11.46	6.75	21.00	36.00	0.059	0.620	0.005	25	568.00	pH & DO were slow but working. NH3 < detection. Estimated flow, Used est 4 cfs @ "Elwa" & 16cfs @ T04.
D03	03/30/94	12:00	10.45	-1	86	10.21	7.16	2.20	3.70	0.019	0.596	0.018	50	356.00	Estimated flow.
D03	08/30/94	14:00	16.97	-1	147	10.53	7.67	0.65	1.20	0.010	0.534	0.027	68	82.00	Lab results are the average of field duplicates. Estimated flow.
D03	09/28/94	15:15	15.18	-1	146	10.86	7.74	1.00	1.00	0.011	0.536	0.030	35	57.00	Estimated flow.

NOTE: Negative number means no data available.
Flows from this station were estimates.

DESCHUTES RIVER AT HIGHWAY 507 BRIDGE
STATION D04 AT RIVER MILE 20.75

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
D04	07/28/92	15:45	19.00	135	-1	10.18	7.80	1.15	0.92	0.031	0.414	0.037	25	30.00	People swimming downstream. Daily avg flow 30 CFS from USGS.
D04	08/25/92	14:15	16.00	139	-1	11.00	6.75	2.40	0.86	0.020	0.368	0.005	30	26.00	Ammonia was < detection. Daily avg flow 26CFS from USGS.
D04	12/28/92	16:15	6.00	77	-1	13.20	7.47	3.55	1.15	0.017	0.459	0.008	12	176.00	NH3 < D.L. USGS DAILY AVG FLOW 187. Lab data are avg of field duplicates.
D04	01/26/93	16:45	7.00	59	-1	11.80	-0.10	-1.00	21.00	0.033	0.477	0.005	20	1010.00	No turb sample taken. NH3 < D.L. USGS DAILY AVG 1050.
D04	02/22/93	14:30	5.00	95	-1	13.90	-0.10	4.35	2.90	0.011	0.457	0.015	23	84.00	USGS DAILY AVG FLOW 84 CFS. LAB DATA ARE AVG OF FIELD DUPLICATES.
D04	03/23/93	16:00	9.20	44	-1	12.40	7.04	33.00	78.00	0.109	0.672	0.010	90	1360.00	USGS DAILY AVG FLOW 1370CFS.
D04	07/27/93	16:00	16.20	115	-1	11.00	7.45	3.20	2.20	0.020	0.393	0.012	145	68.00	USGS DAILY AVG FLOW 68 CFS.
D04	08/24/93	16:00	15.20	122	-1	10.43	7.34	2.10	1.30	0.022	0.484	0.252	75	43.00	USGS DAILY AVG FLOW 44 CFS.
D04	12/28/93	14:30	3.59	-2	94	12.66	7.19	2.00	2.00	0.013	0.512	0.019	20	70.00	Field data measured 12/29 @ 11:50. USGS mean daily flow 70 cfs.
D04	01/25/94	16:15	6.75	-1	73	12.19	7.06	2.90	2.20	0.017	0.421	0.005	15	176.00	USGS mean daily flow 174 cfs. NH3 < detection.
D04	02/23/94	12:30	5.77	-2	55	11.83	-0.10	25.00	48.00	0.089	0.688	0.005	70	1060.00	Turbid Water. Raining. pH meter read 4.7, probable malfunction. USGS mean daily flow 902 cfs. NH3 < detection.
D04	03/30/94	13:15	9.72	-1	77	10.76	6.95	2.10	3.00	0.013	0.572	0.021	40	242.00	USGS mean daily flows 243 cfs.
D04	08/30/94	15:00	16.72	-1	148	10.61	7.90	0.90	1.20	0.011	0.614	0.077	15	29.00	USGS mean daily flow 28 cfs.
D04	09/28/94	14:00	13.97	-1	147	10.50	7.78	1.00	1.00	0.014	0.606	0.027	35	21.00	USGS mean daily flows 21 cfs.

NOTE: Negative number means no data available.
Flows from this station were estimates based on flows from an upstream USGS gaging station near Rainier.

DESCHUTES RIVER AT VAIL AND VAIL LOOP ROADS

STATION D05 and D4.5 RESPECTIVELY AT RIVER MILE 28.5 and 25.0

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
D05	07/28/92	15:00	20.50	109	-1	9.30	-0.10	1.22	1.15	0.016	0.195	0.039	123	29.50	Lab data are avg of field duplicates. Est. flow from D04-T05.
D05	08/25/92	15:00	17.20	118	-1	9.78	7.16	1.40	2.00	0.017	0.150	0.005	240	25.70	NH3 REPORTED VALUE AS < 0.010 Est. flow from D04-T05.
D05	12/28/92	15:45	6.00	66	-1	13.25	7.51	2.50	0.67	0.006	0.372	0.005	10	157.90	NH3 < D.L. Est. flow from D04-T05.
D4.5	01/26/93	16:30	7.80	159	-1	13.40	7.14	12.00	18.00	0.027	0.477	0.029	20	1005.00	USGS DAILY AVG FLOW 1050CFS. THIS IS AT USGS GAGE SITE.
D4.5	02/22/93	15:40	5.00	92	-1	13.40	6.52	1.20	0.25	0.007	0.442	0.020	10	84.00	TSS < D.L. Staff gage 3.56ft USGS DAILY AVG 84CFS.
D05	03/23/93	14:30	8.78	-1	45	11.50	7.44	44.00	65.00	0.098	0.669	0.011	110	1331.00	Est. flow from D04-T05.
D05	07/27/93	15:30	17.00	85	-1	10.20	-0.10	2.00	0.92	0.047	0.178	0.015	63	66.30	Lab data is avg of field duplicates. Est. flow from D04-T05.
D05	08/24/93	14:00	15.40	103	-1	10.20	7.50	1.30	0.25	0.011	0.225	0.024	145	41.90	TSS < detection. Est. flow from D04-T05.
D05	12/28/93	15:30	3.32	-2	81	13.29	7.45	1.13	0.25	0.008	0.340	0.021	103	67.20	TSS < detection. Lab data shown is avg of field duplicates. Est. flow from D04-T05.
D05	01/25/94	15:45	6.56	-2	63	11.99	7.37	3.20	1.00	0.014	0.335	0.005	5	167.20	NH3 < detection. Est. flow from D04-T05.
D05	02/23/94	15:45	5.70	-2	45	11.72	7.32	39.00	66.00	0.079	0.730	0.005	35	1013.40	Lab data is avg of field duplicates. NH3 < detection. Est flow from D04-T05.
D05	03/30/94	14:15	9.57	-1	62	11.39	7.24	2.00	1.75	0.014	0.386	0.019	48	231.20	Lab data is avg of field dups. Est flow from D04-T05.
D05	08/30/94	15:00	17.22	-1	122	10.20	7.29	0.90	0.80	0.008	0.298	0.016	40	28.60	Est flow from D04-T05.
D05	09/28/94	13:15	14.49	-1	122	10.09	7.31	1.00	0.67	0.008	0.290	0.018	142	21.00	Lab data is avg of field duplicates. Est flow from D04-T05.

NOTE: Negative number means no data available.
Flows from this station were estimates based on flows from USGS gaging station near Rainier.

DESCHUTES RIVER AT 1000 ROAD BRIDGE
STATION D06 AT RIVER MILE 36.5

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
D06	07/28/92	09:45	15.50	86	-1	10.30	7.04	1.35	0.25	0.017	0.061	0.015	35	19.00	Staff gage - 2.37. TSS was < detection limit.
D06	08/25/92	09:45	13.30	92	-1	11.05	7.33	0.40	0.25	0.011	0.060	0.005	45	16.00	Ammonia and TSS were < detection. Staff gage 2.31 ft.
D06	12/28/92	10:20	5.20	58	-1	13.00	7.82	2.10	0.50	0.006	0.258	0.005	0	168.00	Staff gage - 3.4ft FLOW FROM WEYCO RATING TABLE. NH3 < D.L.
D06	01/26/93	11:15	6.00	46	-1	13.20	6.87	8.00	10.00	0.020	0.371	0.011	10	750.00	FLOW FROM WEYCO RATING TABLE.
D06	02/22/93	12:00	3.50	67	-1	14.00	6.90	1.80	0.50	0.006	0.120	0.026	10	61.00	Staff gage - 2.82. Flow from WEYCO rating table.
D06	03/23/93	10:00	7.79	-1	41	11.68	7.60	33.00	49.00	0.082	0.624	0.022	35	1183.00	STAFF GAGE 5.95. FLOW FROM WEYCO RATING TABLE.
D06	07/27/93	10:00	13.50	72	-1	10.90	7.75	1.50	0.25	0.009	0.046	0.005	30	48.00	TSS & NH3 < detection. STAFF GAGE 2.75. FLOW FROM WEYCO RATING TABLE.
D06	08/24/93	09:45	13.00	86	-1	10.25	7.68	1.10	0.50	0.011	0.015	0.023	25	32.00	Staff gage 2.54. FLOW FROM WEYCO RATING TABLE.
D06	12/28/93	09:45	2.51	-2	66	13.51	7.61	0.50	0.25	0.010	0.226	0.005	0	59.00	NH3 & TSS < detection. Staff gage read 2.79.
D06	01/25/94	10:30	5.66	-2	55	12.30	7.61	4.50	1.00	0.012	0.259	0.005	0	148.00	Staff gage - 3.3ft. Used Surveyor III for upper Deschutes. NH3 < detection.
D06	02/23/94	11:00	5.74	-2	46	12.20	7.57	30.00	48.00	0.063	0.678	0.011	20	869.00	River high & turbid. Staff gage - 5.35 ft. Used Surveyor III.
D06	03/30/94	10:15	8.48	-1	53	11.80	7.39	1.40	1.10	0.011	0.226	0.017	0	187.00	Staff gage read 3.47.
D06	08/30/94	10:30	13.42	-1	93	10.40	7.83	0.30	0.25	0.006	0.059	0.015	45	18.00	Staff gage reading 2.35 ft. Flow

NOTE: Negative number means no data available.
Flows from this station were from a Weyerhaeuser gaging station.

DESCHUTES RIVER AT 1000 ROAD BRIDGE
STATION D06 AT RIVER MILE 36.5

08/07/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
															WeyCo rating curve. TSS < detecti Used hydrolab III.
D06	09/28/94	09:15	12.58	-1	95	10.19	7.70	0.50	0.50	0.009	0.055	0.005	55	17.00	Used Hydrolab II. Staff gage read 2.33'. NH3 < detection.

NOTE: Negative number means no data available.
Flows from this station were from a Weyerhaeuser gaging station.

ADAMS CREEK WATER QUALITY DATA
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Adam	12/29/92	10:45	5.30	58	-1	12.82	6.91	5.00	1.00	0.032	0.483	0.005	245	0.25	NH3 < D.L.
Adam	01/28/93	14:20	6.20	43	-1	12.80	6.86	4.00	1.30	0.023	0.385	0.005	10	3.12	NH3 < D.L.
Adam	02/23/93	12:45	6.00	87	-1	12.50	7.18	1.15	0.67	0.025	0.931	0.026	10	0.05	
Adam	03/24/93	11:15	8.25	-1	34	11.83	6.60	3.30	1.60	0.025	0.380	0.005	320	2.14	NH3 < D.L.
Adam	07/27/93	10:45	12.00	139	-1	8.75	6.78	2.80	2.00	0.032	1.130	0.005	3224	0.01	NH3 < detection.
Adam	08/23/93	11:30	13.00	128	-1	10.00	6.89	1.20	-1.00	0.027	1.580	0.023	55	0.06	TSS of 13 probably was sampling error due to low flows.
Adam	12/27/93	11:00	8.00	132	-1	11.60	6.58	0.60	0.60	0.014	1.560	0.005	35	0.01	NH3 < detection.
Adam	01/26/94	12:15	6.81	-1	44	11.86	6.60	2.70	1.30	0.033	0.190	0.005	40	0.32	NH3 < detection.
Adam	02/22/94	13:45	5.51	-2	36	12.69	6.38	4.30	1.00	0.020	0.352	0.005	165	2.05	NH3 < detection.
Adam	03/29/94	15:00	13.21	-1	40	9.65	6.45	3.40	2.60	0.029	0.181	0.005	15	0.53	NH3 < detection.
Adam	08/31/94	13:45	13.20	-1	140	9.25	7.30	0.90	-1.00	0.018	1.610	0.005	20	-1.00	NH3 < detection. Use estimated flow of .005cfs.

NOTE: Negative number means no data available.

BUTLER CREEK WATER QUALITY DATA
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Butl	12/29/92	09:30	5.75	110	-1	12.80	7.32	7.50	2.20	0.036	1.200	0.005	30	0.52	NH3 < D.L.
Butl	01/28/93	12:30	7.80	90	-1	15.00	5.90	7.00	3.80	0.044	1.110	0.024	20	2.76	
Butl	02/23/93	12:00	5.20	123	-1	14.10	7.50	2.70	1.50	0.025	1.180	0.020	0	0.70	
Butl	03/24/93	09:45	8.70	-1	90	11.84	7.43	5.80	6.40	0.034	0.839	0.005	45	3.01	NH3 < D.L.
Butl	07/27/93	08:45	11.75	171	-1	10.50	7.46	1.80	0.50	0.026	1.110	0.005	640	0.05	NH3 < detection.
Butl	08/23/93	09:15	12.90	157	-1	10.30	7.17	0.09	0.75	0.029	1.490	0.029	385	0.04	
Butl	12/27/93	09:30	6.50	161	-1	12.80	6.96	6.00	4.30	0.028	1.530	0.005	5	0.15	NH3 < detection.
Butl	01/26/94	10:15	8.08	-1	121	11.58	7.36	12.50	4.00	0.044	1.960	0.005	15	0.38	Golf course trib. had milky, turbid appearance. Used Surveyor II. NH3 < detection.
Butl	02/22/94	12:15	6.25	-2	100	12.54	7.45	9.50	12.00	0.044	1.400	0.005	150	2.48	NH3 < detection.
Butl	03/29/94	13:30	10.56	-1	130	10.64	7.41	6.70	2.70	0.034	1.990	0.005	5	0.30	NH3 < detection. Saw stone and caddis flies. Strange aqua-colored algae attached to weir.
Butl	08/31/94	11:15	12.53	-1	174	10.20	7.70	0.70	1.20	0.027	1.510	0.005	450	0.10	NH3 < detection.
Butl	09/26/94	11:20	12.24	-1	176	9.59	7.60	1.70	1.00	0.019	1.500	0.005	0	0.12	NH3 < detection.

NOTE: Negative number means no data available.

ELLIS CREEK WATER QUALITY DATA
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Elli	12/29/92	11:15	5.80	96	-1	12.90	7.17	5.70	1.70	0.038	0.918	0.005	30	2.51	NH3 < D.L.
Elli	01/28/93	15:15	7.20	75	-1	12.10	6.86	7.00	4.70	0.030	1.070	0.022	40	5.46	
Elli	02/23/93	13:30	5.00	108	-1	13.50	6.80	1.50	0.83	0.025	1.080	0.027	20	1.27	FC sample from Rd Culvert to South was 0.
Elli	03/24/93	11:50	7.50	-1	67	12.13	7.14	7.10	8.80	0.044	0.845	0.005	95	6.80	NH3 < D.L.
Elli	07/27/93	11:30	13.10	135	-1	10.50	7.19	3.60	3.50	0.060	0.760	0.005	670	0.89	NH3 < detection.
Elli	08/23/93	12:15	14.00	129	-1	9.00	7.09	4.15	5.30	0.068	0.509	0.012	144460	0.33	
Elli	12/27/93	11:30	4.70	122	-1	13.80	7.08	1.20	1.00	0.031	0.945	0.023	20	0.74	
Elli	01/26/94	13:00	7.30	-1	90	11.83	7.21	5.20	4.20	0.050	0.866	0.005	45	2.03	NH3 < detection.
Elli	02/22/94	14:15	6.22	-2	80	12.47	7.19	8.40	8.20	0.040	0.995	0.005	105	4.28	NH3 < detection.
Elli	03/29/94	15:30	11.28	-1	95	10.29	7.31	4.30	4.10	0.039	1.060	0.025	60	2.53	Lab data is avg of field duplicates.
Elli	08/31/94	14:30	14.24	-1	140	9.41	7.50	1.70	1.00	0.046	0.923	0.036	45	0.32	
Elli	09/26/94	13:00	13.44	-1	139	9.20	7.50	1.60	0.83	0.058	0.901	0.013	145	0.30	

NOTE: Negative number means no data available.

INDIAN CREEK ABOVE CONFLUENCE WITH MOXLIE CREEK
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Indi	07/27/93	10:45	14.90	164	-1	9.90	7.67	3.90	4.00	0.058	1.170	0.022	475	1.31	TPH, Cu, Pb < detection.
Indi	08/24/93	10:00	13.50	163	-1	10.00	7.34	3.00	2.00	0.055	1.030	0.036	585	1.08	TPH < detection.
Indi	12/27/93	12:30	5.50	162	-1	13.50	7.23	4.00	1.60	0.035	1.110	0.040	140	0.86	TPH & Pb < detection.
Indi	01/26/94	13:30	7.82	-1	138	11.59	7.27	3.90	4.30	0.049	0.794	0.005	90	1.73	NH3 < detection.
Indi	02/22/94	14:30	6.55	-2	119	12.21	7.33	22.00	18.00	0.055	0.894	0.062	820	4.15	
Indi	03/29/94	10:30	9.83	-1	146	11.21	7.43	3.50	4.80	0.044	1.290	0.075	180	2.07	Pb < detection.
Indi	08/31/94	15:00	14.51	-1	187	8.22	7.40	1.10	0.25	0.028	1.840	0.016	630	0.64	TSS, TPH, Cu, & Pb < detection.
Indi	09/26/94	13:40	14.06	-1	187	8.32	7.00	1.85	1.65	0.039	0.986	0.016	265	0.89	TPH & lead < detection. Channel was for 2 of the 5 ft width. Choked w/ reed canary grass. Lab results are avg of field dups.

NOTE: Negative number means no data available.

MISSION CREEK WATER QUALITY DATA
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Miss	12/29/92	10:15	5.80	123	-1	12.84	7.10	3.50	1.30	0.067	1.020	0.011	255	0.71	Zn & TPH < D.L.
Miss	01/28/93	13:40	8.00	107	-1	12.80	6.87	3.50	2.20	0.047	1.220	0.022	140	1.00	TPH < D.L.
Miss	02/23/93	14:15	5.10	126	-1	14.00	7.20	2.60	2.20	0.055	1.320	0.036	30	0.71	TPH, Cu, Pb, Zn < D.L.
Miss	03/24/93	10:45	7.23	-1	95	12.22	7.52	2.00	2.60	0.044	1.210	0.005	400	1.32	NH3 & Pb < D.L.
Miss	07/27/93	10:00	13.25	124	-1	10.20	7.32	6.10	8.65	0.130	1.140	0.005	3844	0.61	NH3, TPH, Cu, Pb < detection. Lab data is avg of field dups.
Miss	08/23/93	10:30	13.30	129	-1	10.25	7.32	2.10	2.30	0.118	1.380	0.017	1245	0.35	TPH, Pb, & Zn < detection.
Miss	12/27/93	10:30	4.50	129	-1	13.85	7.13	1.70	0.60	0.072	1.040	0.036	105	0.39	TPH, Cu, Pb, & Zn < detection.
Miss	01/26/94	11:45	7.30	-1	113	11.83	7.50	3.30	5.50	0.083	1.110	0.028	30	0.57	Lead was < detection. Tea colored but clear.
Miss	02/22/94	13:15	6.56	-2	102	12.19	7.46	7.80	9.00	0.061	1.400	0.005	1600	1.16	NH3 < detection.
Miss	03/29/94	14:15	10.33	-1	125	10.70	7.52	3.20	4.10	0.068	1.670	0.010	15	0.69	TPH, Cu & Pb < detection.
Miss	08/31/94	12:30	13.79	-1	139	9.85	7.60	2.50	3.80	0.105	1.310	0.025	750	0.32	TPH & Pb < detection.
Miss	09/26/94	12:30	13.35	-1	139	9.50	7.60	2.30	2.00	0.111	1.130	0.005	470	0.37	TPH, lead, & NH3 < detection.

NOTE: Negative number means no data available.

MOXLIE CREEK BELOW CONFLUENCE WITH INDIAN CREEK
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T01	07/28/92	8:55	12.00	180	-1	9.50	7.30	2.30	23.00	0.082	0.678	0.011	85	8.05	
T01	08/25/92	09:00	11.20	175	-1	9.60	7.12	15.00	80.00	0.121	0.683	0.028	160	6.04	Road construction widening on Plum St next to creek.
T01	12/28/92	09:30	7.14	-1	137	10.00	6.86	16.50	16.00	0.076	0.539	0.011	1600	-1.00	Used hydrolab. No flow taken due to high water. TPH < D.L.
T01	01/26/93	09:45	7.80	145	-1	11.30	-0.10	4.00	9.50	0.052	0.591	0.026	530	13.64	TPH < D.L. pH reading was 4.5, probably meter malfunction.
T01	02/22/93	09:00	6.80	179	-1	10.90	6.89	1.70	2.50	0.046	0.721	0.038	135	8.87	TPH, Cu, Zn < D.L.
T01	03/23/93	09:00	9.90	148	-1	14.00	7.05	4.30	19.00	0.081	0.616	0.025	785	13.79	TPH is < D.L.

NOTE: Negative number means no data available.

MOXLIE CREEK ABOVE CONFLUENCE WITH INDIAN CREEK
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Moxl	07/27/93	10:10	11.50	172	-1	9.25	7.34	2.50	6.30	0.070	0.714	0.017	215	7.18	TPH < detection.
Moxl	08/24/93	09:00	11.10	178	-1	9.58	7.03	2.50	3.80	0.071	0.474	0.101	210	6.46	TPH, Zn < detection.
Moxl	12/27/93	13:00	8.30	181	-1	10.22	7.27	2.00	3.80	0.063	0.637	0.026	45	3.64	TPH & Cu < detection.
Moxl	01/26/94	14:00	9.09	-1	169	9.28	7.42	1.80	3.30	0.065	0.598	0.005	15	5.63	NH3, copper, lead, & zinc were < detection.
Moxl	02/22/94	15:00	8.37	-1	154	9.58	7.35	26.00	24.50	0.090	0.545	0.014	505	9.06	Water very milky, can't see bottom. Lab data is avg of field duplicates.
Moxl	03/29/94	11:00	10.13	-1	191	8.99	7.51	2.30	7.90	0.068	0.734	0.032	60	5.65	Cu & Pb < detection.
Moxl	08/31/94	15:15	11.90	-1	192	8.65	7.50	2.60	3.00	0.056	0.638	0.025	105	6.23	TPH & Pb < detection.
Moxl	09/26/94	14:00	11.58	-1	192	8.23	7.50	2.80	9.80	0.064	0.642	0.005	50	5.38	TPH, lead, & NH3 < detection.

NOTE: Negative number means no data available.

SCHNEIDER CREEK WATER QUALITY DATA
BUDD INLET TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Schn	01/28/93	13:00	8.00	114	-1	12.20	7.17	3.00	0.97	0.029	1.500	0.005	410	2.41	TPH & NH3 < D.L.
Schn	02/23/93	11:15	7.00	141	-1	13.20	7.23	1.00	0.25	0.017	1.350	0.021	0	0.91	TPH, Cu, Zn, Pb, TSS < D.L.
Schn	03/24/93	10:20	8.43	-1	113	11.77	7.51	1.30	1.20	0.022	1.730	0.012	705	2.29	TPH, Pb, Zn < D.L.
Schn	07/27/93	09:30	11.00	156	-1	10.70	7.40	1.30	0.83	0.031	1.620	0.005	55	1.35	NH3, TPH, Cu, Pb < detection.
Schn	08/23/93	10:00	11.20	148	-1	10.85	7.50	0.04	0.50	0.030	1.440	0.031	5	1.57	TPH & Zn < detection.
Schn	12/27/93	10:00	6.75	147	-1	12.40	6.97	1.00	0.25	0.021	1.250	0.005	5	0.99	TSS, NH3, TPH, Pb, & Zn < detection.
Schn	01/26/94	11:15	8.26	-1	126	11.48	7.45	0.90	0.50	0.025	0.759	0.005	15	1.05	Lead and NH3 < detection.
Schn	02/22/94	12:00	7.38	-1	120	11.93	7.43	3.10	2.70	0.024	1.850	0.005	181500	1.86	Lead & NH3 < detection.
Schn	03/29/94	14:00	10.69	-1	139	10.32	7.46	1.10	0.71	0.026	1.880	0.005	10	1.35	NH3, Pb & Zn < detection.
Schn	08/31/94	12:00	12.02	-1	158	9.93	7.60	0.90	0.80	0.023	1.480	0.014	15	1.76	TPH, Cu, Pb, & Zn < detection.
Schn	09/26/94	12:15	11.71	-1	157	9.62	7.50	1.30	1.00	0.023	1.360	0.005	10	1.02	Lead, Zinc, TPH, NH3 < detection.

NOTE: Negative number means no data available.

PERCIVAL CREEK (T02) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T02	07/28/92	10:00	16.70	116	-1	9.50	6.89	2.00	5.60	0.114	0.322	0.430	280	6.99	
T02	08/25/92	10:00	14.00	111	-1	10.20	7.17	1.50	3.40	0.055	0.392	0.005	125	6.18	NH3 was < detection.
T02	12/28/92	09:50	5.11	-2	79	12.23	7.17	6.50	6.80	0.033	0.303	0.005	65	53.95	TPH & NH3 < detection limit.
T02	01/26/93	11:15	6.90	64	-1	12.80	-0.10	4.50	8.00	0.025	0.460	0.020	85	104.30	TPH < D.L. No pH.
T02	02/22/93	10:00	4.20	86	-1	14.00	6.98	1.30	1.50	0.020	0.353	0.031	10	27.00	Zn < D.L. Flow meter malfunct. Flow is ESTIMATE from up-stream County gages.
T02	03/23/93	09:50	9.00	77	-1	11.70	6.97	4.30	9.60	0.036	0.407	0.021	165	85.38	TPH is < D.L.
T02	07/27/93	09:15	17.30	99	-1	8.90	7.49	5.60	4.30	0.059	0.217	0.087	40	16.88	TPH, Cu, Pb < detection.
T02	08/24/93	10:45	15.10	105	-1	9.00	7.15	3.90	2.50	0.050	0.246	0.019	50	10.31	TPH < detection.
T02	12/27/93	14:30	5.50	95	-1	13.80	7.26	2.80	2.20	0.028	0.273	0.017	15	24.22	TPH & Zn < detection.
T02	01/25/94	10:45	7.64	-1	85	12.03	6.87	5.50	5.80	0.041	0.333	0.043	25	31.08	Lower Deschutes sampling done with Surveyor II.
T02	02/23/94	10:00	6.37	-2	77	11.71	6.80	7.00	8.00	0.035	0.495	0.012	80	72.06	Water is weak tea color w\ lt. cloudiness.
T02	03/30/94	09:00	11.07	-1	88	10.39	7.34	2.00	3.40	0.023	0.320	0.019	0	48.28	Cu, Pb, Zn, & TPH < detection.
T02	08/30/94	09:00	14.56	-1	122	9.55	7.60	1.20	1.80	0.030	0.427	0.021	145	6.51	TPH & Pb < detection. Foam in creek.
T02	09/28/94	12:30	14.87	-1	114	9.48	7.60	1.70	2.20	0.040	0.335	0.022	25	7.08	Used Hydrolab III for lower river. TPH < detection.

NOTE: Negative number means no data available.

CHAMBERS CREEK (T03) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T03	07/28/92	12:50	12.80	123	-1	10.60	7.32	0.90	0.85	0.024	1.600	0.011	393	0.78	Rich Rd. staff gage - .54ft Lab data are avg of field duplicates.
T03	08/25/92	11:39	11.20	115	-1	11.10	7.02	2.00	1.10	0.023	1.460	0.005	480	0.42	Rich Rd staff gage - .30 Ammonia was < detection.
T03	12/28/92	11:45	6.44	-2	110	10.90	7.04	2.70	2.00	0.023	1.440	0.010	36	1.40	Used hydrolab. DO & pH slow to stablize. Lab data are avg of field dups.
T03	01/26/93	13:15	7.20	74	-1	11.60	-0.10	2.60	4.90	0.031	1.270	0.026	105	9.72	
T03	02/22/93	11:40	5.90	118	-1	14.40	7.40	1.30	0.50	0.013	1.720	0.023	90	1.18	
T03	03/23/93	12:00	10.00	68	-1	11.10	6.94	2.80	6.60	0.048	0.840	0.005	95	5.70	NH3 < D.L.
T03	07/27/93	13:00	12.80	117	-1	10.40	7.44	1.60	1.00	0.024	1.270	0.005	80	3.13	
T03	08/24/93	12:30	12.10	117	-1	10.70	6.49	1.00	2.50	0.025	1.530	0.041	500	0.70	Staff @ Rich Rd. dry.
T03	12/28/93	11:15	5.34	-2	120	11.79	7.48	0.80	0.25	0.014	1.650	0.018	90	0.56	TSS < detection. Field data measur 12/29 @ 10:10.
T03	01/25/94	13:00	8.26	-1	108	11.31	7.30	1.80	3.70	0.034	1.870	0.012	60	1.20	
T03	02/23/94	15:00	6.49	-2	81	10.96	6.92	5.50	17.00	0.038	1.385	0.010	123	3.88	Lab data is avg. of field duplicates.
T03	03/30/94	10:30	10.41	-1	112	10.18	7.34	1.00	2.00	0.016	1.720	0.010	10	2.21	
T03	08/30/94	11:00	12.34	-1	132	10.44	7.80	0.40	-1.00	0.015	2.330	0.010	155	0.39	No TSS due to sampling error.
T03	09/28/94	14:15	13.11	-1	123	9.46	7.60	0.60	0.83	0.015	1.410	0.005	140	0.20	NH3 < detection.

NOTE: Negative number means no data available.

SPURGEON CREEK (T04) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T04	07/28/92	14:30	17.80	109	-1	9.42	7.58	2.25	3.40	0.036	0.077	0.097	90	4.72	
T04	08/25/92	13:40	15.00	107	-1	10.10	6.98	3.00	1.60	0.035	0.094	0.005	345	3.83	Ammonia was < detection.
T04	12/28/92	14:15	5.56	-2	96	11.50	6.54	2.60	2.30	0.021	0.303	0.014	40	14.27	
T04	01/26/93	15:00	7.20	74	-1	11.10	-0.10	2.00	3.80	0.018	0.361	0.025	80	29.51	
T04	02/22/93	13:00	5.00	103	-1	13.40	-0.10	1.50	2.80	0.015	0.436	0.028	40	11.61	
T04	03/23/93	14:45	11.30	79	-1	13.50	7.05	5.00	9.70	0.061	0.236	0.036	365	18.82	Lab data is avg of field dups.
T04	07/27/93	15:00	16.00	103	-1	9.60	7.10	1.70	2.80	0.035	0.051	0.014	155	5.55	
T04	08/24/93	15:00	16.00	105	-1	9.80	7.25	1.75	1.25	0.035	0.009	0.015	60	3.98	Lab data is avg of field duplicates.
T04	12/28/93	13:45	4.21	-2	107	12.54	7.52	1.85	3.50	0.024	0.479	0.030	28	5.56	Data is avg of field duplicates. Field data measured 12/29 @ 11:00.
T04	01/25/94	15:00	7.67	-1	96	11.60	7.38	1.50	3.80	0.036	0.433	0.016	25	10.85	
T04	02/23/94		-1.00	-2	-1	-1.00	-0.10	-1.00	-1.00	-0.100	-0.100	-0.100	-1	-1.00	River in flood stage is influencing creek. Didn't sample.
T04	03/30/94	12:30	10.95	-1	103	10.10	7.33	1.50	4.90	0.029	0.518	0.015	30	14.68	
T04	08/30/94	13:30	16.64	-1	119	9.50	7.70	1.10	2.50	0.019	0.017	0.015	625	2.10	
T04	09/28/94	14:45	15.54	-1	117	9.36	7.60	1.60	7.20	0.022	0.010	0.011	525	1.50	

NOTE: Negative number means no data available.

AYER (ELWANGER) CREEK WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
Elwa	12/28/92	13:00	6.85	-1	135	7.45	6.34	20.00	14.00	0.491	2.640	0.087	1600	2.11	Used Beckman meter for pH.
Elwa	01/26/93	14:15	7.80	104	-1	5.70	-0.10	7.40	3.80	0.318	2.260	0.298	3000	2.97	
Elwa	02/22/93	13:45	9.20	100	-1	9.80	-0.10	-1.00	17.00	0.090	1.400	0.173	335	3.94	
Elwa	03/23/93	13:15	-1.00	-2	-1	-1.00	-0.10	-1.00	-10.00	-0.100	-0.100	-0.100	-1	-1.00	River in flood stage and flowing backward up Elwanger Ck. Samples taken but not reported.
Elwa	07/27/93	13:45	12.00	114	-1	8.90	6.78	3.30	3.30	0.072	1.460	0.037	485	2.15	
Elwa	08/24/93	13:45	12.00	119	-1	8.10	6.84	6.10	31.00	0.173	2.060	0.013	119040	1.23	
Elwa	12/28/93	12:15	6.26	-2	119	9.43	6.88	97.00	23.00	0.158	1.640	0.232	1170	0.51	Field data measured 12/29 @ 10:30.
Elwa	01/25/94	14:00	9.00	-1	129	8.22	6.42	17.00	50.00	0.359	4.320	0.396	5000	1.36	
Elwa	02/23/94		-1.00	-2	-1	-1.00	-0.10	-1.00	-1.00	-0.100	-0.100	-0.100	-1	-1.00	River flowing back into Elwanger Creek.
Elwa	03/30/94	11:30	10.39	-1	121	9.21	6.72	4.90	12.00	0.089	1.810	0.053	503	4.24	Lab data is avg of field duplicates.
Elwa	08/30/94	12:30	12.56	-1	119	10.01	7.30	1.70	4.90	0.046	1.400	0.036	1395	1.56	
Elwa	09/28/94	15:15	14.65	-1	110	8.45	7.00	3.60	4.80	0.064	1.210	0.093	300	0.93	

NOTE: Negative number means no data available.

REICHEL CREEK (TO5) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
TO5	07/28/92	14:30	19.00	152	-1	7.40	-0.10	5.10	3.00	0.051	0.019	0.018	205	0.48	No pH measurement.
TO5	08/25/92	14:00	16.20	156	-1	6.70	7.46	9.60	6.30	0.056	0.029	0.005	190	0.34	Ammonia was < detection. Saw salmon fry in culvert.
TO5	12/28/92	15:00	5.50	81	-1	13.70	7.22	13.00	2.30	0.044	0.342	0.018	100	18.07	
TO5	01/26/93	10:30	7.00	67	-1	10.00	6.49	14.00	11.00	0.045	0.765	0.028	140	44.29	
TO5	02/22/93	09:40	3.00	105	-1	14.00	6.30	11.00	16.00	0.051	0.453	0.047	70	3.06	
TO5	03/23/93	15:00	12.12	-1	75	10.61	7.02	29.00	25.00	0.094	0.586	0.032	415	28.80	
TO5	07/27/93	15:00	17.00	136	-1	9.40	-0.10	7.20	1.80	0.090	0.101	0.016	385	1.70	
TO5	08/24/93	14:45	15.00	143	-1	8.60	7.45	5.20	1.50	0.047	0.005	0.005	120	1.13	NO3 & NH3 < detection.
TO5	12/28/93	14:30	2.62	-2	116	12.17	7.35	22.00	18.00	0.061	0.387	0.061	145	2.85	
TO5	01/25/94	15:15	6.56	-2	87	10.60	6.92	17.00	8.90	0.071	0.554	0.021	188	8.77	Lab data is avg of field duplicates.
TO5	02/23/94	15:15	5.64	-2	57	10.49	6.95	34.00	36.00	0.088	0.721	0.025	295	46.57	
TO5	03/30/94	14:00	11.29	-1	98	10.24	7.02	7.00	5.10	0.051	0.440	0.062	15	10.79	
TO5	08/30/94	15:15	16.60	-1	167	8.19	7.40	2.45	1.10	0.023	0.009	0.013	98	0.41	Lab results are the average of field duplicates. Gravel from road paving was in creek.
TO5	09/28/94	12:45	13.57	-1	160	4.56	7.20	4.30	2.30	0.066	0.005	0.028	35	0.01	NO3 < detection.

NOTE: Negative number means no data available.

HUCKLEBERRY CREEK (T06) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T06	07/28/92	10:15	16.00	123	-1	8.20	6.84	0.80	0.25	0.028	0.026	0.015	5	0.54	Staff gage - .12m. TSS was < detection limit.
T06	08/25/92	10:15	14.50	130	-1	8.78	7.34	0.42	1.20	0.029	0.029	0.005	5	0.40	Staff gage - .12m. Ammonia was < detection.
T06	12/28/92	11:00	5.00	74	-1	13.35	7.65	3.60	1.00	0.019	0.227	0.005	0	5.06	Staff gage - .205M NH3 < D.L.
T06	01/26/93	11:40	5.50	61	-1	13.20	7.29	7.50	5.20	0.019	0.483	0.062	15	16.88	
T06	02/22/93	12:15	2.30	90	-1	13.15	6.38	2.30	0.25	0.013	0.090	0.014	65	0.88	TSS < detection.
T06	03/23/93	10:15	7.64	-1	58	11.39	-0.10	23.50	18.00	0.058	0.547	0.005	5	25.88	NH3 < D.L.
T06	07/27/93	10:45	13.50	111	-1	10.00	7.45	2.00	0.67	0.018	0.005	0.005	5	0.50	NH3 & NO3 < detection.
T06	08/24/93	10:15	13.10	125	-1	9.25	7.38	1.20	0.25	0.024	0.010	0.014	15	0.61	TSS < detection.
T06	12/28/93	10:30	1.90	-2	95	13.25	7.45	0.80	0.25	0.011	0.074	0.005	0	0.54	NH3 & TSS < detection.
T06	01/25/94	11:00	5.41	-2	79	11.66	7.34	5.00	0.83	0.021	0.250	0.005	0	2.99	NH3 < detection.
T06	02/23/94	11:45	5.89	-2	48	11.85	7.38	58.00	84.00	0.012	0.687	0.005	10	48.39	Measured flow at d.s. end of culvert. High water. NH3 < detection.
T06	03/30/94	10:45	8.38	-1	79	10.87	7.54	2.25	2.00	0.018	0.152	0.021	0	3.16	
T06	08/30/94	11:00	13.83	-1	137	8.81	7.30	0.60	0.80	0.017	0.005	0.005	0	0.10	NO3 & NH3 < detection.
T06	09/28/94	09:45	13.13	-1	138	8.92	7.30	1.00	2.50	0.023	0.024	0.005	0	0.22	NH3 < detection.

NOTE: Negative number means no data available.

THURSTON CREEK (T07) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T07	07/28/92	11:00	13.50	114	-1	10.10	6.80	0.45	1.00	0.021	0.061	0.018	10	2.26	Staff gage - .55ft.
T07	08/25/92	11:00	11.90	116	-1	10.90	7.37	0.52	0.25	0.024	0.048	0.005	5	2.15	Ammonia and TSS were < detection. Staff gage read .54ft.
T07	12/28/92	11:45	5.50	65	-1	13.20	7.65	3.50	1.00	0.014	0.068	0.005	0	10.97	Staff gage - .95ft. NH3 < D.L.
T07	01/26/93	12:30	6.00	57	-1	13.80	7.28	6.00	3.70	0.016	0.158	0.011	5	36.33	
T07	02/22/93	13:00	3.90	82	-1	13.60	6.64	0.80	0.50	0.010	0.033	0.015	0	3.37	
T07	03/23/93	10:45	7.54	-1	50	11.52	-0.10	20.00	16.00	0.051	0.395	0.005	10	58.06	NH3 < D.L.
T07	07/27/93	11:30	12.00	94	-1	10.50	7.65	1.90	1.30	0.021	0.047	0.005	0	3.72	NH3 < detection.
T07	08/24/93	11:00	11.60	106	-1	10.30	7.68	1.40	0.25	0.022	0.033	0.017	0	2.61	TSS < detection.
T07	12/28/93	11:15	3.07	-2	82	13.13	7.69	0.70	1.40	0.013	0.065	0.010	0	3.95	Staff gage read .69.
T07	01/25/94	11:45	5.89	-2	70	11.89	7.74	2.10	1.30	0.017	0.120	0.005	5	8.31	Staff gage - 0.34M. NH3 < detection.
T07	02/23/94	12:15	6.00	-2	41	11.84	7.45	27.00	32.00	0.058	0.365	0.005	5	65.75	Staff gage - 1.73ft. Somewhat turbid. NH3 < detection.
T07	03/30/94	11:15	8.16	-1	65	11.25	7.72	2.00	1.60	0.016	0.051	0.011	0	10.22	
T07	08/30/94	11:30	11.82	-1	119	10.23	7.80	1.30	1.20	0.016	0.048	0.010	0	1.93	
T07	09/28/94	10:10	11.57	-1	122	9.97	7.90	1.10	1.30	0.016	0.055	0.005	0	1.53	NH3 < detection.

NOTE: Negative number means no data available.

LITTLE DESCHUTES RIVER (T08) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T08	07/28/92	13:30	15.75	105	-1	9.80	-0.10	1.55	0.92	0.024	0.082	0.005	10	1.11	Ammonia was < detection. pH meter failed.
T08	08/25/92	13:00	14.70	109	-1	10.20	8.06	1.35	0.25	0.027	0.037	0.005	20	1.43	Ammonia and TSS were < detection.
T08	12/28/92	14:15	4.80	64	-1	13.20	7.63	6.50	1.00	0.025	0.367	0.018	10	10.73	
T08	01/26/93	14:30	5.30	172	-1	13.50	7.40	14.50	4.50	0.022	0.706	0.018	25	52.47	
T08	02/22/93	14:50	3.20	84	-1	14.00	6.45	2.00	0.38	0.013	0.192	0.022	0	3.35	TSS < D.L. LAB DATA ARE AVG OF FIELD DUPS.
T08	03/23/93	13:15	7.88	-1	49	11.78	7.35	33.00	22.00	0.059	1.050	0.005	35	58.00	Flow too fast to measure; Flow is ESTIMATE from Thurston Ck. for estimating pollutant loads. NH3 < D.L.
T08	07/27/93	14:00	13.75	86	-1	9.70	-0.10	2.80	0.50	0.033	0.162	0.005	45	3.41	NH3 < detection.
T08	08/24/93	13:00	13.00	110	-1	10.20	7.97	2.00	0.50	0.023	0.005	0.015	5	2.26	NO3 < detection.
T08	12/28/93	13:45	2.46	-2	82	13.56	7.74	2.50	0.25	0.014	0.216	0.012	15	2.69	TSS < detection.
T08	01/25/94	14:15	5.79	-2	57	11.95	7.55	14.50	2.70	0.032	0.474	0.005	5	20.26	Water was Cloudy. NH3 < detection.
T08	02/23/94	14:45	4.80	-2	39	12.00	7.40	39.00	44.00	0.066	0.642	0.005	15	66.00	No flow, too fast to wade. Flow is ESTIMATE from Thurston Ck. to calc. pollutant loads. Turbid. NH3 < detection.
T08	03/30/94	13:15	8.67	-1	69	11.25	7.79	4.20	1.00	0.017	0.216	0.105	10	7.35	
T08	08/30/94	13:45	13.61	-1	118	9.76	8.00	1.00	0.60	0.020	0.071	0.010	5	1.24	
T08	09/28/94	12:00	12.10	-1	121	10.24	7.90	1.10	0.25	0.020	0.075	0.005	0	0.98	NH3 & TSS < detection.

NOTE: Negative number means no data available.

LINCOLN CREEK (T09) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T09	07/28/92	12:30	14.20	63	-1	9.60	-0.10	0.15	0.25	0.004	0.013	0.021	0	2.17	TSS was < detection limit. pH meter failed. Flow measurement made in field.
T09	08/25/92	12:30	12.00	68	-1	10.60	7.43	0.26	0.25	0.011	0.038	0.005	3	2.30	NH3 and TSS < detection. Lab data are avg of field dups.
T09	12/28/92	13:15	5.00	46	-1	13.20	7.66	1.50	0.25	0.011	0.023	0.005	0	14.60	TSS & NH3 < D.L.
T09	01/26/93	13:00	5.60	31	-1	13.10	7.27	2.50	2.40	0.005	0.023	0.005	0	67.32	NH3 < D.L. Lab data are avg of field dups.
T09	03/23/93	12:30	6.82	-1	29	12.05	7.60	1.70	3.00	0.018	0.005	0.005	0	50.75	NH3 and NO3-NO2 < D.L.
T09	07/27/93	13:00	12.25	51	-1	10.00	7.58	3.50	0.25	0.029	0.005	0.005	15	6.16	NH3, NO3, &TSS < detection.
T09	08/24/93	12:15	11.80	62	-1	10.40	7.69	0.55	0.25	0.009	0.005	0.013	8	3.78	TSS & NO3 < detection. Lab data is avg of field duplicates.
T09	12/28/93	12:30	4.29	-2	50	12.46	7.63	0.40	0.25	0.006	0.005	0.012	0	6.32	NO3 & TSS < detection.
T09	01/25/94	13:30	5.94	-2	40	11.61	7.61	0.50	0.25	0.008	0.005	0.005	0	12.05	NH3, NO3, & TSS < detection.
T09	02/23/94	14:00	4.60	-2	32	11.94	7.52	3.70	1.50	0.011	0.024	0.005	0	30.27	NH3 < detection.
T09	03/30/94	12:15	7.20	-1	38	11.31	7.54	0.80	0.25	0.006	0.021	0.030	0	17.63	TSS < detection.
T09	08/30/94	12:45	12.09	-1	68	9.89	7.70	0.20	0.25	0.007	0.005	0.012	0	1.91	TSS & NO3 < detection.
T09	09/28/94	11:15	10.57	-1	72	10.25	7.70	0.60	0.50	0.008	0.011	0.005	0	1.16	NH3 < detection.

NOTE: Negative number means no data available.

HARD CREEK (T11) WATER QUALITY DATA
DESCHUTES RIVER TRIBUTARY

10/30/95

STATION	DATE	TIME	TEMP degrees C	CORR_COND umhos @25C	COND_HYDRO umhos @25C	DO mg/l	pH	TURBIDITY NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org./100ml	FLOW cfs	COMMENTS
T11	07/28/92	11:45	13.20	48	-1	10.00	-0.10	0.22	0.25	0.003	0.028	0.019	0	0.32	Staff gage - .23cm. TSS was < detection limit. pH meter failed.
T11	08/25/92	11:30	12.00	50	-1	10.50	6.98	0.40	0.25	0.004	0.049	0.005	0	0.28	Ammonia and TSS were < detection. Staff gage - .22m.
T11	12/28/92	12:30	5.00	40	-1	13.25	7.70	1.60	0.25	0.003	0.086	0.005	0	3.30	Staff gage -.34m. Flow from WEYCO rating table. TSS & NH3 < D.L.
T11	02/22/93	14:10	1.30	38	-1	14.20	6.70	0.55	0.25	0.002	0.071	0.015	0	1.30	Staff gage .29. Flow from WEYCO rating table. TSS <D.L.
T11	07/27/93	12:00	12.00	37	-1	10.80	7.34	0.70	0.25	0.003	0.024	0.005	0	1.90	NH3 & TSS < detection. Staff gage - 0.31M. FLOW FROM WEYCO RATING TABLE.
T11	08/24/93	11:30	11.75	45	-1	10.40	7.52	1.60	0.25	0.003	0.020	0.020	10	0.81	Staff - .27. FLOW FROM WEYCO RATING TABLE. TSS < D.L.
T11	12/28/93	12:00	4.36	-2	39	12.95	7.61	0.20	0.25	0.003	0.058	0.005	0	1.60	NH3 & TSS < detection. Staff gage read .3 m.
T11	01/25/94	12:30	5.64	-2	32	11.85	7.41	0.30	0.25	0.007	0.051	0.005	0	3.30	Staff gage - .34M. NH3 & TSS < detection.
T11	02/23/94	13:00	4.95	-2	30	12.42	7.60	1.40	0.25	0.003	0.096	0.005	0	12.40	Staff gage - .43m. Clear. NH3 & TSS < detection.
T11	03/30/94	11:45	6.49	-2	30	11.60	7.40	1.20	0.25	0.004	0.066	0.019	0	7.10	TSS < detection. Staff gage - .39M
T11	08/30/94	12:00	11.52	-1	48	9.52	7.60	0.09	0.25	0.002	0.014	0.005	10	0.32	Staff gage .23M. Flow from WeyCo rating curve. TSS & NH3 < detection.
T11	09/28/94	10:45	11.01	-1	51	10.09	7.70	0.30	0.25	0.003	0.034	0.005	0	0.32	NH3 & TSS < detection. Staff gage - .23M.

NOTE: Negative number means no data available.

INDIAN CREEK METALS AND TPH RESULTS

STATION	DATE	TIME	TPH	COPPER	LEAD	ZINC	HARDNESS	COMMENTS
			mg/l	mg/l	mg/l	mg/l	mgCaCO3/l	
Indi	07/27/93	10:45	0.13	0.0005	0.0005	0.0220	66.10	TPH, Cu, Pb < detection.
Indi	08/24/93	10:00	0.13	0.0034	0.0024	0.0130	75.00	TPH < detection.
Indi	12/27/93	12:30	0.13	0.0019	0.0005	0.0060	63.80	TPH & Pb < detection.
Indi	01/26/94	13:30	0.33	0.0018	0.0013	-0.1000	60.10	NH3 < detection.
Indi	02/22/94	14:30	0.59	-0.1000	0.0072	0.0270	40.50	
Indi	03/29/94	10:30	0.37	0.0014	0.0005	0.0170	56.30	Pb < detection.
Indi	08/31/94	15:00	0.13	0.0005	0.0005	-0.1000	91.70	TSS, TPH, Cu, & Pb < detection.
Indi	09/26/94	13:40	0.13	0.0021	0.0005	0.0050	141.00	TPH & lead < detection. Channel was for 2 of the 5 ft width. Choked w/ reed canary grass. Lab results are avg of field dups.

Note: Negative number means no data available.
Where result was less than detection limit, 1/2 the detection limit is reported.

MISSION CREEK METALS AND TPH RESULTS .

STATION	DATE	TIME	TPH	COPPER	LEAD	ZINC	HARDNESS	COMMENTS
			mg/l	mg/l	mg/l	mg/l	mgCaCO3/l	
Miss	12/29/92	10:15	0.13	-0.1000	0.0026	0.0015	50.00	Zn & TPH < D.L.
Miss	01/28/93	13:40	0.13	-0.1000	-0.1000	0.0040	44.00	TPH < D.L.
Miss	02/23/93	14:15	0.13	0.0005	0.0003	0.0015	52.50	TPH, Cu, Pb, Zn < D.L.
Miss	03/24/93	10:45	0.36	-0.1000	0.0005	0.0050	-1.00	NH3 & Pb < D.L.
Miss	07/27/93	10:00	0.13	0.0005	0.0005	0.0130	46.60	NH3, TPH, Cu, Pb < detection. Lab data is avg of field dups.
Miss	08/23/93	10:30	0.13	0.0013	0.0004	0.0015	52.40	TPH, Pb, & Zn < detection.
Miss	12/27/93	10:30	0.13	0.0005	0.0005	0.0015	49.90	TPH, Cu, Pb, & Zn < detection.
Miss	01/26/94	11:45	0.29	0.0010	0.0005	-0.1000	50.20	Lead was < detection. Tea colored but clear.
Miss	02/22/94	13:15	0.50	-0.1000	0.0017	0.0070	38.80	NH3 < detection.
Miss	03/29/94	14:15	0.13	0.0005	0.0005	0.0050	45.30	TPH, Cu & Pb < detection.
Miss	08/31/94	12:30	0.13	-0.1000	0.0005	-0.1000	56.80	TPH & Pb < detection.
Miss	09/26/94	12:30	0.13	0.0027	0.0005	0.0080	103.00	TPH, lead, & NH3 < detection.

Note: Negative number means no data available.
Where result was less than detection limit, 1/2 the detection limit is reported.

MOXLIE CREEK ABOVE CONFLUENCE WITH INDIAN CREEK
METALS AND TPH RESULTS

STATION	DATE	TIME	TPH mg/l	COPPER mg/l	LEAD mg/l	ZINC mg/l	HARDNESS mgCaCO3/l	COMMENTS
Moxl	07/27/93	10:10	0.13	0.0017	-0.1000	0.0060	77.10	TPH < detection.
Moxl	08/24/93	09:00	0.13	0.0017	0.0013	0.0015	79.50	TPH, Zn < detection.
Moxl	12/27/93	13:00	0.13	0.0005	0.0026	0.0040	79.70	TPH & Cu < detection.
Moxl	01/26/94	14:00	0.31	0.0005	0.0005	0.0015	80.30	NH3, copper, lead, & zinc were < detection.
Moxl	02/22/94	15:00	0.87	-0.1000	0.0081	0.0215	64.85	Water very milky, can't see bottom. Lab data is avg of field duplicates.
Moxl	03/29/94	11:00	0.28	0.0005	0.0005	0.0050	78.40	Cu & Pb < detection.
Moxl	08/31/94	15:15	0.13	-0.1000	0.0005	-0.1000	87.30	TPH & Pb < detection.
Moxl	09/26/94	14:00	0.13	0.0150	0.0005	0.0090	101.00	TPH, lead, & NH3 < detection.

Note: Negative number means no data available.
Where result was less than detection limit, 1/2 the detection limit is reported.

MOXLIE CREEK BELOW CONFLUENCE WITH INDIAN CREEK
METALS AND TPH RESULTS

STATION	DATE	TIME	TPH mg/l	COPPER mg/l	LEAD mg/l	ZINC mg/l	HARDNESS mgCaCO3/l	COMMENTS
T01	12/28/92	09:30	0.13	-0.1000	0.0075	0.0210	56.40	Used hydrolab. No flow taken due to high water. TPH < D.L.
T01	01/26/93	09:45	0.13	-0.1000	-0.1000	0.0070	61.00	TPH < D.L. pH reading was 4.5, probably meter malfunction.
T01	02/22/93	09:00	0.13	0.0005	0.0007	0.0015	80.40	TPH, Cu, Zn < D.L.
T01	03/23/93	09:00	0.13	-0.1000	-0.1000	0.0240	-1.00	TPH is < D.L.

Note: Negative number means no data available.
Where result was less than detection limit, 1/2 the detection limit is reported.

PERCIVAL CREEK METALS AND TPH RESULTS

STATION	DATE	TIME	TPH mg/l	COPPER mg/l	LEAD mg/l	ZINC mg/l	HARDNESS mgCaCO3/l	COMMENTS
T02	12/28/92	09:50	0.13	-0.1000	0.0015	0.0100	33.60	TPH & NH3 < detection limit.
T02	01/26/93	11:15	0.13	-0.1000	-0.1000	0.0040	31.20	TPH < D.L. No pH.
T02	02/22/93	10:00	0.32	0.0085	0.0008	0.0015	40.10	Zn < D.L. Flow meter malfunct. Flow is ESTIMATE from up-stream County gages.
T02	03/23/93	09:50	0.13	-0.1000	-0.1000	0.0060	-1.00	TPH is < D.L.
T02	07/27/93	09:15	0.13	0.0005	0.0005	0.0060	40.20	TPH, Cu, Pb < detection.
T02	08/24/93	10:45	0.13	0.0014	0.0080	0.0130	44.20	TPH < detection.
T02	12/27/93	14:30	0.13	0.0066	0.0012	0.0015	37.70	TPH & Zn < detection.
T02	01/25/94	10:45	0.13	0.0033	0.0014	-0.1000	38.20	Lower Deschutes sampling done with Surveyor II.
T02	02/23/94	10:00	0.30	-0.1000	0.0192	0.0090	31.90	Water is weak tea color w\ lt. cloudiness.
T02	03/30/94	09:00	0.13	0.0005	0.0005	0.0015	33.50	Cu, Pb, Zn, & TPH < detection.
T02	08/30/94	09:00	0.13	-0.1000	0.0005	-0.1000	52.90	TPH & Pb < detection. Foam in creek.
T02	09/28/94	12:30	0.13	0.0153	0.0013	0.0190	74.10	Used Hydrolab III for lower river. TPH < detection.

Note: Negative number means no data available.
Where result was less than detection limit, 1/2 the detection limit is reported.

SCHNEIDER CREEK METALS AND TPH RESULTS

STATION	DATE	TIME	TPH mg/l	COPPER mg/l	LEAD mg/l	ZINC mg/l	HARDNESS mgCaCO3/l	COMMENTS
Schn	01/28/93	13:00	0.13	-0.1000	-0.1000	0.0040	42.40	TPH & NH3 < D.L.
Schn	02/23/93	11:15	0.13	0.0005	0.0003	0.0015	74.00	TPH, Cu, Zn, Pb, TSS < D.L.
Schn	03/24/93	10:20	0.13	-0.1000	0.0005	0.0015	-1.00	TPH, Pb, Zn < D.L.
Schn	07/27/93	09:30	0.13	0.0005	0.0005	0.0060	61.50	NH3, TPH, Cu, Pb < detection.
Schn	08/23/93	10:00	0.13	0.0010	0.0008	0.0015	64.50	TPH & Zn < detection.
Schn	12/27/93	10:00	0.13	0.0015	0.0005	0.0015	58.50	TSS, NH3, TPH, Pb, & Zn < detection.
Schn	01/26/94	11:15	0.27	0.0012	0.0005	-0.1000	54.80	Lead and NH3 < detection.
Schn	02/22/94	12:00	0.48	-0.1001	0.0005	0.0100	47.30	Lead & NH3 < detection.
Schn	03/29/94	14:00	0.29	0.0016	0.0005	0.0015	52.00	NH3, Pb & Zn < detection.
Schn	08/31/94	12:00	0.13	0.0005	0.0005	0.0015	76.80	TPH, Cu, Pb, & Zn < detection.
Schn	09/26/94	12:15	0.13	0.0013	0.0005	0.0015	95.00	Lead, Zinc, TPH, NH3 < detection.

Note: Negative number means no data available.
Where result was less than detection limit, 1/2 the detection limit is reported.

CAPITOL LAKE STATION C01
JULY 1992 - August 1993

04/95

TION	DATE	TIME	SECCHI meters	DEPTH meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
	07/29/92	15:30	1.20	1.00	2.8	3.5	0.049	0.116	0.034	80	Bacteria sample was collected from the surface. Ortho-P was < detection. Conductivity indicates saltwater present from Budd Inlet backflushing in mid-July
	08/26/92	12:15	0.66	1.00	5.2	2.4	0.071	0.019	0.013	80	Bacteria sample was collected at the surface.
	01/28/93	16:50	0.85	1.00	11.0	9.0	0.034	0.548	0.019	13	
	02/23/93	12:00	1.77	1.00	5.2	2.5	0.018	0.601	0.019	15	
	03/24/93	15:00	0.35	1.00	23.5	16.0	0.054	0.537	0.013	30	
	07/29/93	12:15	0.50	1.00	9.0	16.0	0.057	0.287	0.122	500	Lake was drained earlier in week. Just started to refill. Very low & muddy.
	08/25/93	11:45	1.52	1.00	1.6	1.0	0.027	0.242	0.124	10	
VERAGE -			0.98		8.3	7.2	0.044	0.336	0.049		

Negative number means no data available.
Depth indicates the depth the sample was collected.

BUDD INLET STATION B01 (CAPITOL LAKE OUTFALL)
JULY 1992 - AUGUST 1993

05/31/95

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B01	07/29/92	13:45	0.66	0.68	5.9	10.0	0.063	0.088	0.039	240	Water color is yellow-green and murky.
B01	08/26/92	10:15	0.66	1.00	4.5	4.8	0.139	0.103	0.085	220	
B01	01/28/93	13:00	0.66	1.42	1.8	6.8	0.051	0.321	0.034	50	Used new Surveyor III for field parameters.
B01	02/25/93	09:45	0.66	-1.00	2.0	2.2	0.044	0.390	0.044	23	Current too strong to collect profile data, secchi reading, & depth sample. Used Surveyor 3. Dredging operation over B03 site
B01	03/25/93	11:45	0.66	0.55	16.5	14.0	0.047	0.478	0.037	50	Used surveyor II.
B01	07/29/93	09:45	0.66	-1.00	2.3	3.2	0.057	0.094	0.111	30	Visibility was to the bottom. No bottom sample taken.
B01	08/25/93	09:30	0.66	2.50	2.5	4.3	0.061	0.111	0.179	22	
AVERAGE -				1.2	5.1	6.5	0.066	0.226	0.076		

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B01	07/29/92	13:45	1.20	-1.00	5.5	16.0	0.111	0.237	0.222	-1	
B01	08/26/92	10:15	0.75	-1.00	4.9	4.8	0.181	0.042	0.051	-1	
B01	01/28/93	13:00	3.00	-1.00	0.8	1.5	0.056	0.260	0.025	-1	
B01	03/25/93	11:45	1.50	-1.00	1.4	4.6	0.090	0.293	0.146	-1	
B01	08/25/93	09:30	2.50	-1.00	1.2	4.3	0.074	0.044	0.221	-1	
AVERAGE -				-1.00	2.8	6.2	0.102	0.175	0.133		

NOTE: Negative numbers means no data available.
Depth indicates the depth the sample was collected.

BUDD INLET STATION B02 (FIDDLEHEAD)
JULY 1992 - AUGUST 1993

05/31/95

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B02	07/29/92	13:15	0.66	1.25	4.2	14.0	2.000	1.630	5.740	1600	Fiddlehead outfall was visible. Large flow of apparent sewage discharge. Smelled. Water color greenish-brown.
B02	08/26/92	10:20	0.66	1.89	3.6	4.8	0.739	0.475	2.470	1600	Bacteria result was >1600. Sewe outfall had high flow. A lot of suspended material in water.
B02	01/28/93	13:35	0.66	2.00	3.3	3.8	0.166	0.325	0.100	23	
B02	02/25/93	10:15	0.66	4.60	3.2	1.7	0.089	0.342	0.224	4	
B02	03/25/93	12:15	0.66	1.00	8.4	8.2	0.113	0.486	0.273	50	
B02	07/29/93	10:00	0.66	2.50	3.0	8.0	1.030	1.180	3.060	140	Visibility was to bottom.
B02	08/25/93		0.66	3.00	1.1	2.8	0.065	0.137	0.299	110	
AVERAGE -				2.32	3.8	6.2	0.600	0.654	1.738		

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B02	07/29/92	13:15	2.50	-1.00	2.9	4.4	0.167	0.071	0.152	-1	
B02	08/26/92	10:20	1.75	-1.00	2.1	2.8	0.234	0.111	0.342	-1	
B02	01/28/93	13:35	3.40	-1.00	1.5	1.7	0.089	0.268	0.060	-1	
B02	02/25/93	10:15	5.00	-1.00	1.9	1.3	0.078	0.281	0.047	-1	
B02	03/25/93	12:15	2.50	-1.00	4.1	2.6	0.105	0.308	0.205	-1	
B02	07/29/93	10:00	2.00	-1.00	2.6	3.2	0.067	0.041	0.156	-1	
B02	08/25/93		3.50	-1.00	1.0	3.0	0.065	0.045	0.176	-1	Alot of particulate matter & filamentous algae in water.
AVERAGE -				-1.00	2.3	2.7	0.115	0.161	0.163		

NOTE: Negative numbers means no data available.
Depth indicates the depth the sample was collected.

BUDD INLET STATION B03 (KGY)
JULY 1992 - AUGUST 1993

05/31/95

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B03	07/29/92	13:00	0.66	2.22	3.1	2.8	0.157	0.071	0.151	23	Water color reddish.
B03	08/26/92	10:45	0.66	2.05	2.5	2.3	0.476	0.226	0.827	30	
B03	01/28/93	14:20	0.66	2.20	0.8	1.8	0.072	0.017	0.005	130	NH3 < D.L.
B03	03/25/93	12:30	0.66	2.00	7.5	5.9	0.085	0.380	0.125	30	
B03	07/29/93	10:50	0.66	3.25	1.5	3.7	0.121	0.117	1.010	14	
B03	08/25/93	10:10	0.66	1.80	1.4	4.0	0.136	0.375	0.684	4	
AVERAGE -				2.25	2.8	3.4	0.175	0.198	0.467		

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B03	07/29/92	13:00	6.60	-1.00	2.3	3.6	0.130	0.030	0.023	-1	
B03	08/26/92	10:45	7.10	-1.00	1.6	1.1	0.146	0.049	0.194	-1	
B03	01/28/93	14:20	3.00	-1.00	1.6	3.0	0.063	0.265	0.053	-1	
B03	03/25/93	12:30	9.30	-1.00	1.8	1.2	0.080	0.249	0.058	-1	
B03	07/29/93	10:50	7.20	-1.00	2.2	4.7	0.064	0.005	0.080	-1	NO3 < detection.
B03	08/25/93	10:10	5.50	-1.00	1.1	3.5	0.086	0.064	0.589	-1	
AVERAGE -				-1.00	1.8	2.9	0.095	0.110	0.166		

NOTE: Negative numbers means no data available.
Depth indicates the depth the sample was collected.

BUDD INLET STATION B04 (BUOY 6)
JULY 1992 - AUGUST 1993

05/31/95

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B04	07/29/92	12:30	0.66	2.18	-1.0	2.8	0.112	0.022	0.012	4	Some outer areas of Inlet very red & fishy smell. No turbidity sample.
B04	08/26/92	11:00	0.66	1.77	2.9	4.4	0.198	0.066	0.028	30	
B04	01/28/93	14:35	0.66	2.98	1.2	3.8	0.072	0.308	0.070	12	Lab results are avg. of field duplicates.
B04	02/25/93	10:40	0.66	7.45	1.5	1.8	0.127	0.343	0.374	13	
B04	03/25/93	12:45	0.66	4.60	5.3	4.4	0.067	0.348	0.109	50	
B04	07/29/93	11:04	0.66	2.60	1.7	4.0	0.052	0.005	0.056	30	NO3 < detection. Water color red/brown.
B04	08/25/93	10:30	0.66	1.70	1.3	2.0	0.072	0.060	0.204	8	Water color is red-brown.
AVERAGE -				3.33	2.3	3.3	0.100	0.165	0.122		

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B04	07/29/92	12:30	7.60	-1.00	2.1	4.0	0.139	0.030	0.129	-1	
B04	08/26/92	11:00	8.10	-1.00	1.6	2.2	0.131	0.072	0.182	-1	
B04	01/28/93	14:35	10.00	-1.00	1.0	2.7	0.069	0.271	0.048	-1	
B04	02/25/93	10:40	10.90	-1.00	1.6	2.5	0.069	0.298	0.041	-1	
B04	03/25/93	12:45	8.80	-1.00	2.1	1.4	0.078	0.254	0.042	-1	
B04	07/29/93	11:04	9.10	-1.00	2.8	6.5	0.056	0.005	0.045	-1	NO3 < detection.
B04	08/25/93	10:30	10.60	-1.00	0.7	4.5	0.065	0.096	0.221	-1	
AVERAGE -				-1.00	1.7	3.4	0.087	0.147	0.101		

NOTE: Negative numbers means no data available.
Depth indicates the depth the sample was collected.

BUDD INLET STATION B05 (EAST BAY)
JULY 1992 - AUGUST 1993

10/30/95

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B05	07/29/92	14:30	0.66	2.08	2.4	9.0	0.136	0.044	0.052	8	Lab results are the avg of field duplicates.
B05	08/26/92	11:40	0.66	-1.00	2.4	-1.0	0.182	0.027	0.015	10	Very shallow. Secchi Disk visibility to bottom. Lab results are avg of field dups
B05	01/28/93	15:45	0.66	4.16	0.7	0.8	0.066	0.269	0.055	11	
B05	02/25/93	11:30	0.66	3.40	2.7	2.0	0.097	0.379	0.210	2	
B05	03/25/93	13:30	0.66	2.38	5.5	5.8	0.084	0.392	0.167	21	
B05	07/29/93	11:15	0.66	-1.00	1.8	3.7	0.072	0.056	0.214	23	
B05	08/25/93	11:10	0.66	2.10	1.7	1.9	0.074	0.078	0.306	8	Lab results are avg of field duplicates.
AVERAGE -				2.8	2.5	3.9	0.102	0.178	0.146		

STATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
B05	07/29/92	14:30	2.00	-1.00	3.5	11.0	2.510	0.045	0.081	-1	
B05	01/28/93	15:45	5.00	-1.00	0.6	1.5	0.067	0.261	0.052	-1	
B05	02/25/93	11:30	2.90	-1.00	1.6	1.5	0.069	0.275	0.052	-1	
B05	03/25/93	13:30	4.10	-1.00	7.8	2.8	0.077	0.365	0.119	-1	
B05	07/29/93	11:15	4.50	-1.00	2.3	4.3	0.001	0.013	0.107	-1	TP < detection. Very windy, didn't do B06.
B05	08/25/93	11:10	6.30	-1.00	1.5	5.3	0.053	0.091	0.260	-1	
AVERAGE -				-1.00	2.9	4.4	0.463	0.175	0.112		

NOTE: Negative numbers means no data available.
Depth indicates the depth the sample was collected.

BUDD INLET STATION B06 (GULL HARBOR)
JULY 1992 - AUGUST 1993

)5/31/95

;TATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
)06	07/29/92	12:00	0.66	2.43	1.8	7.8	0.095	0.027	0.015	7	Water color greenish-brown. Floating clumps of filamentous algae is water column.
)06	08/26/92	11:30	0.66	1.20	1.5	8.5	0.120	0.029	0.005	2	Bacteria was <2. Ammonia was < detection.
)06	01/28/93	15:10	0.66	3.60	1.2	1.7	0.190	0.297	0.047	4	
)06	02/25/93	11:15	0.66	5.32	4.5	1.0	0.089	0.369	0.347	8	
)06	03/25/93	13:00	0.66	1.80	7.2	5.4	0.715	0.389	0.088	23	
)06	08/25/93	10:50	0.66	3.30	0.8	2.2	0.007	0.057	0.120	8	
AVERAGE -				2.94	2.8	4.4	0.203	0.195	0.104		

TATION	DATE	TIME	DEPTH meters	SECCHI meters	TURB NTU	TSS mg/l	TOTALP mg/l	NITRATE mg/l	AMMONIA mg/l	COLIFORM org/100ml	COMMENTS
)6	07/29/92	12:00	2.70	-1.00	2.6	6.0	0.126	0.034	0.023	-1	
)6	08/26/92	11:30	3.10	-1.00	2.8	3.3	0.153	0.021	0.005	-1	Ammonia was < detection.
)6	01/28/93	15:10	4.20	-1.00	0.7	2.0	0.066	0.278	0.041	-1	
)6	02/25/93	11:15	6.30	-1.00	2.8	2.9	0.060	0.296	0.037	-1	
)6	03/25/93	13:00	5.50	-1.00	2.5	1.3	0.060	0.249	0.035	-1	
)6	08/25/93	10:50	6.40	-1.00	1.5	5.0	0.059	0.043	0.325	-1	
AVERAGE -				-1.00	2.2	3.4	0.087	0.154	0.078		

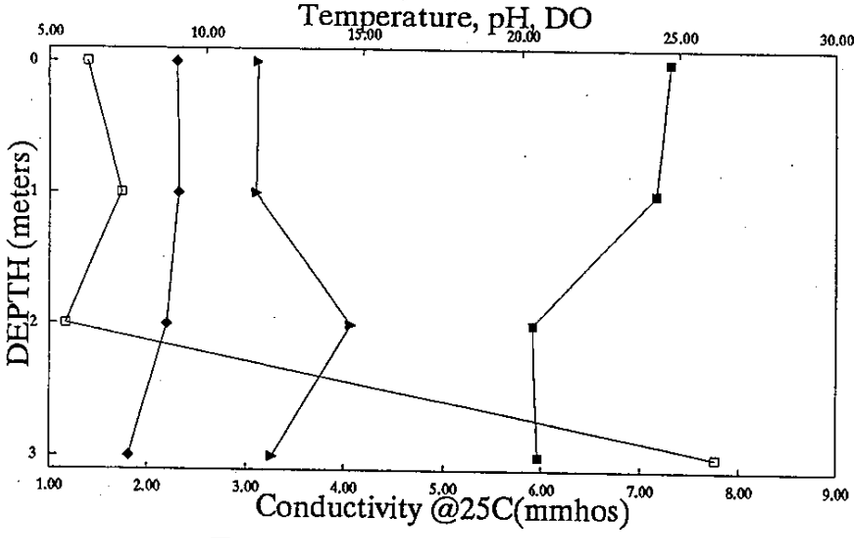
NOTE: Negative numbers means no data available.
Depth indicates the depth the sample was collected.

CAPITOL LAKE
STATION #C1

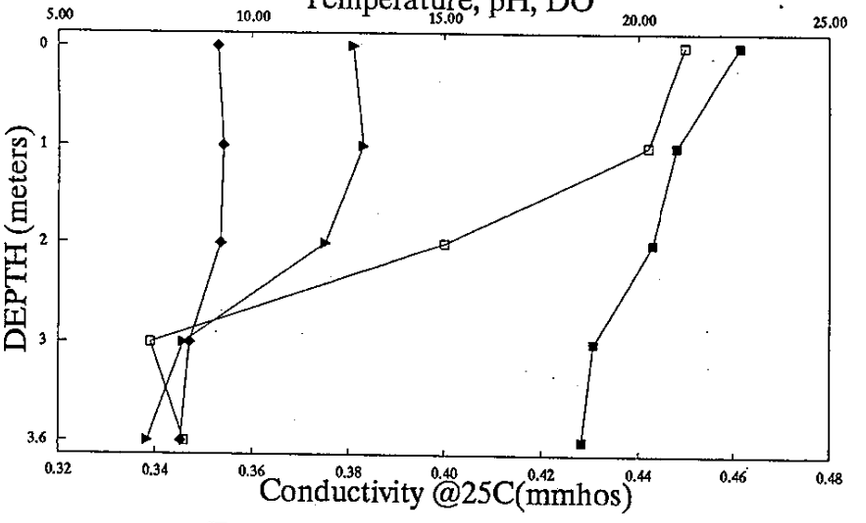
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)
7/29/92	0	24.72	9.08	11.64	1.397
7/29/92	1	24.27	9.11	11.56	1.740
7/29/92	2	20.33	8.74	14.59	1.170
7/29/92	3	20.50	7.54	12.12	7.760
8/26/92	0	22.67	9.12	12.63	0.450
8/26/92	1	21.01	9.25	12.87	0.442
8/26/92	2	20.36	9.19	11.90	0.400
8/26/92	3	18.83	8.39	8.23	0.339
8/26/92	3.6	18.55	8.16	7.30	0.346
1/28/93	0	7.33	7.48	12.65	
1/28/93	1	7.15	7.45	12.65	
1/28/93	2	7.31	7.43	12.6	
1/28/93	3	7.25	7.42	12.7	
1/28/93	3.5	7.12	7.39	12.66	
2/23/93	0	5.49	7.54	12.78	0.12
2/23/93	1	5.46	7.61	12.65	0.124
2/23/93	2	5.41	7.61	12.65	0.127
2/23/93	3.1	5.33	7.62	12.68	0.16
3/24/93	0	9.19	7.5	13	0.28
3/24/93	1	9.14	7.5	12.77	0.286
3/24/93	2	8.92	7.5	12.92	0.272
7/29/93	0	16.45	8.15	9.49	0.381
7/29/93	1	16.47	7.74	9.17	1.7
7/29/93	2	16.7	7.52	6.72	17.7
7/29/93	2.3	16.7	7.59	6.16	18.8
8/25/93	0	19.03	8.65	10.51	0.919
8/25/93	1	19	8.71	10.73	0.881
8/25/93	2	18.22	8.72	11.66	0.696
8/25/93	3	17.67	8.23	10.66	0.66
8/25/93	4	18.68	7.06	2.93	11.145

Capitol Lake #C1

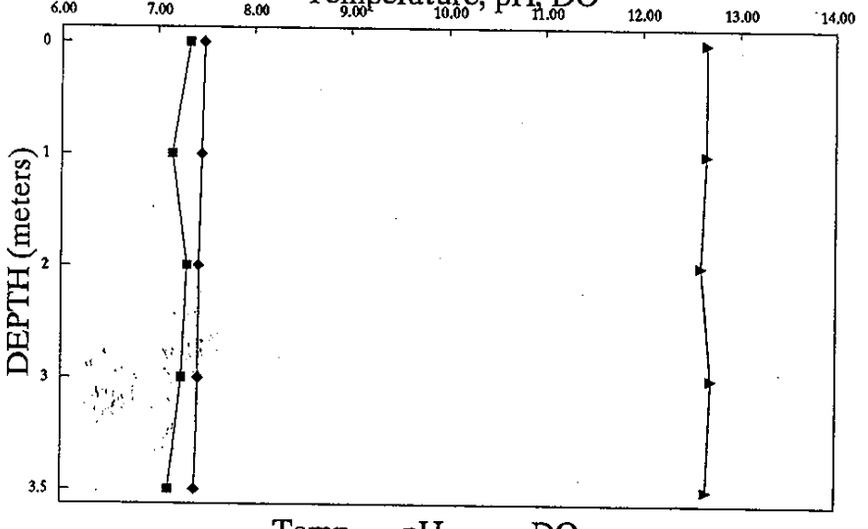
July 29, 1992
Temperature, pH, DO



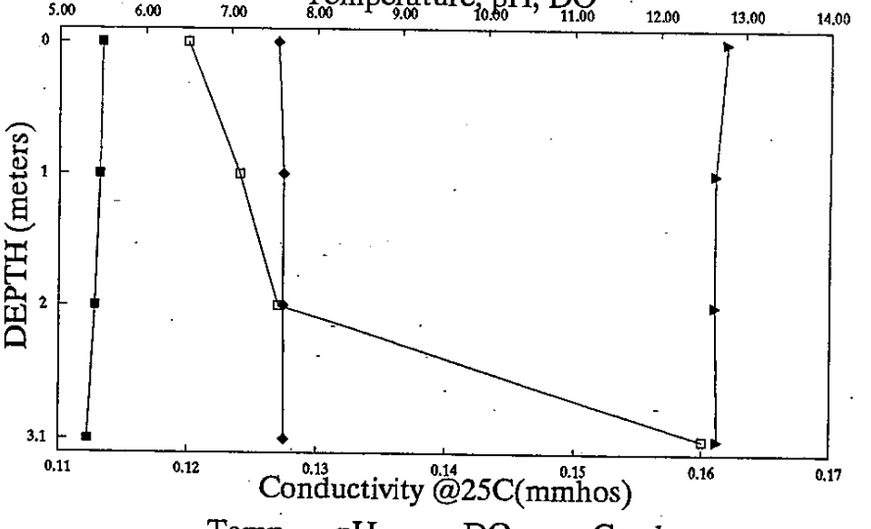
August 26, 1992
Temperature, pH, DO



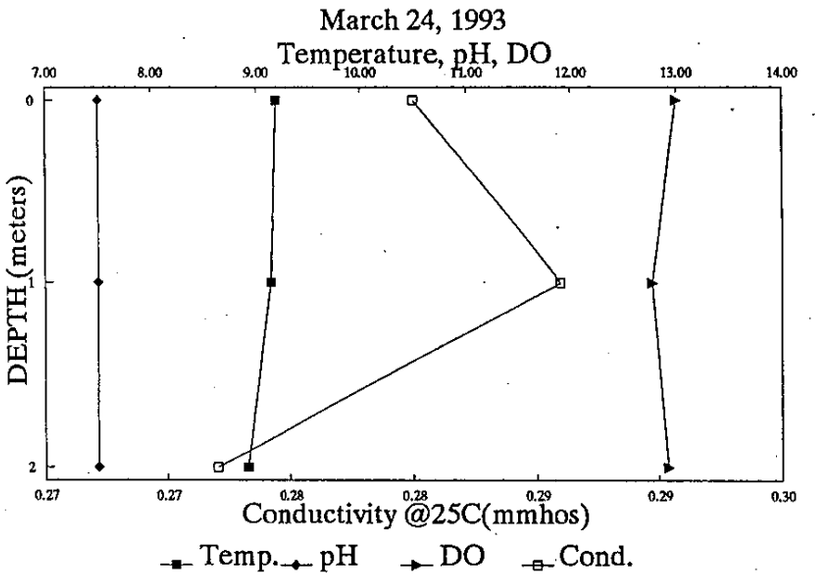
January 28, 1993
Temperature, pH, DO

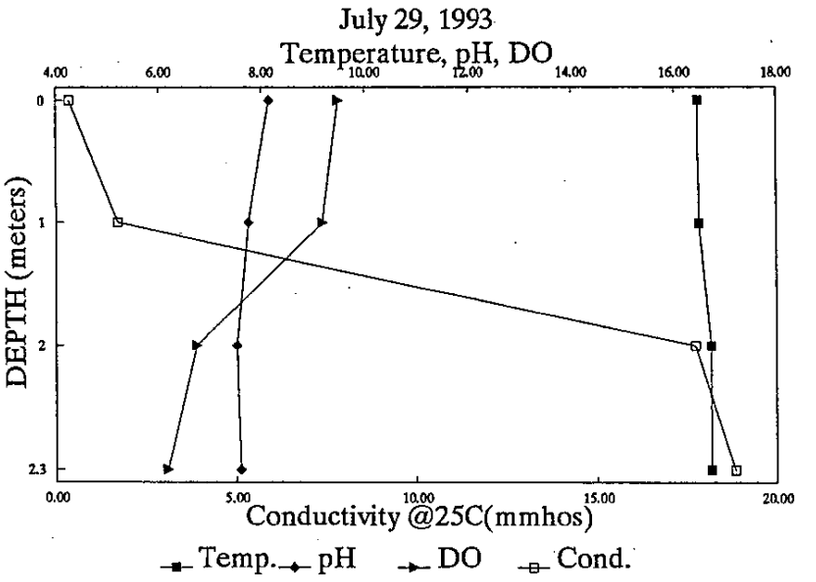


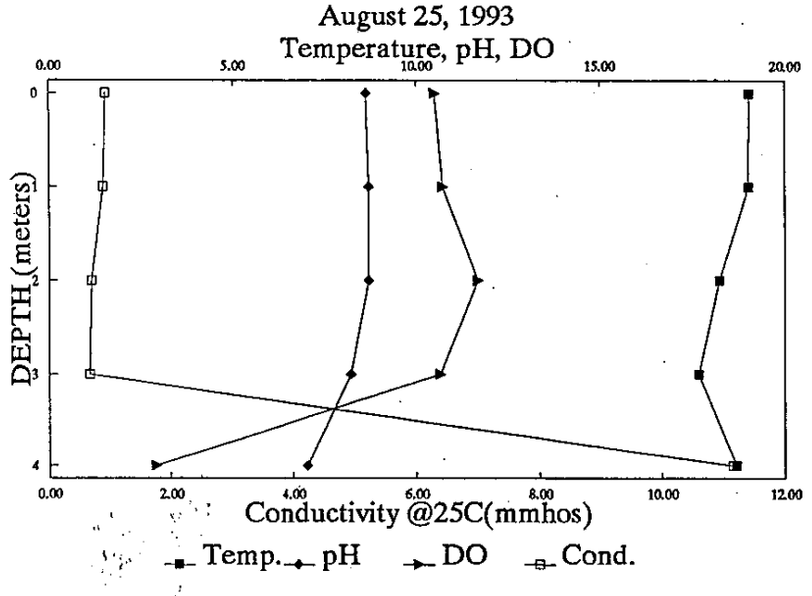
February 23, 1993
Temperature, pH, DO



Capitol Lake #C1





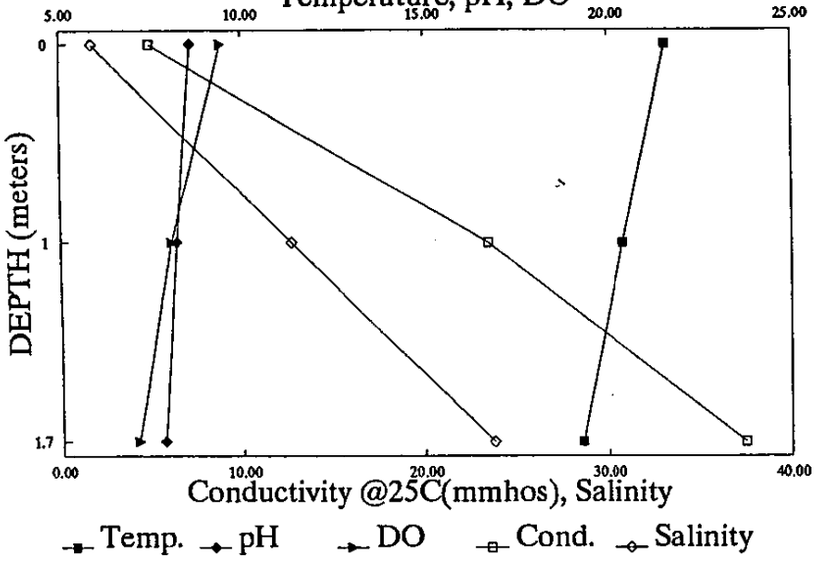


CAPITOL LAKE OUTFALL
STATION #B1

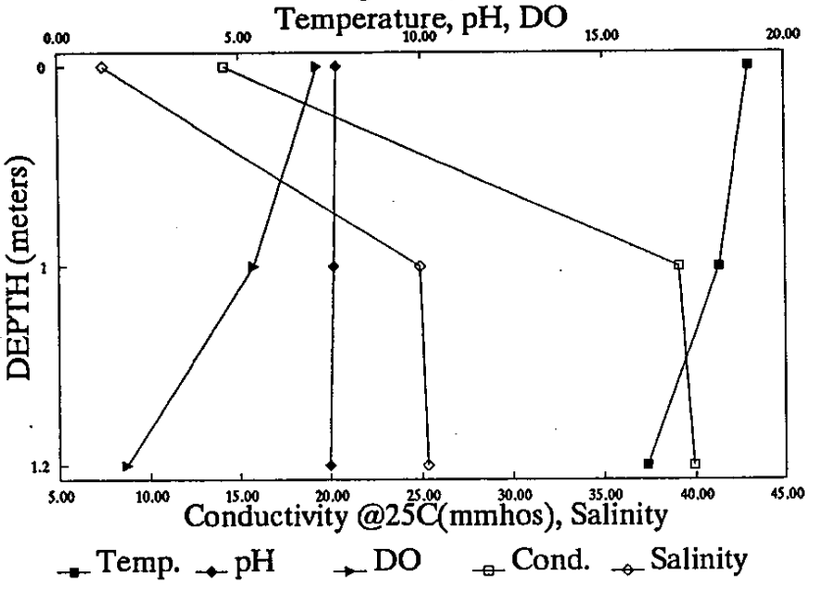
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)	Salinity
7/29/92	0	21.60	8.60	9.45	5.00	1.80
7/29/92	1	20.40	8.21	8.06	23.50	12.70
7/29/92	1.7	19.30	7.84	7.12	37.50	23.80
8/26/92	0	19.02	7.70	7.18	14.20	7.50
8/26/92	1	18.14	7.57	5.37	39.10	24.90
8/26/92	1.2	16.18	7.48	1.85	39.90	25.30
1/28/93	0	7.18	7.57	12.76		
1/28/93	2	7.38	7.79	11.98		
1/28/93	3	7.36	7.81	11.01		
1/28/93	4.6	7.33	7.77	10.67		
2/25/93	0	5.46	7.85	11.48	19.5	11.7
3/25/93	0	8.62	7.47	11.55	12.87	6.6
3/25/93	1	8.87	7.79	10.93	22.9	13.5
3/25/93	2	9.12	7.65	10.17	38.6	24.6
7/29/93	0	15.05	7.65	6.25	29.8	18.6
7/29/93	1.2	14.08	7.76	4.17	40.6	26
8/25/93	0	16.82	7.61	6.67	27.48	16.5
8/25/93	1	15.46	7.6	6.24	40.64	26.1
8/25/93	2	14.75	7.57	5.48	41.293	26.5
8/25/93	3	14.74	7.56	5.09	41.35	26.5

Capitol Lake Outfall #B1

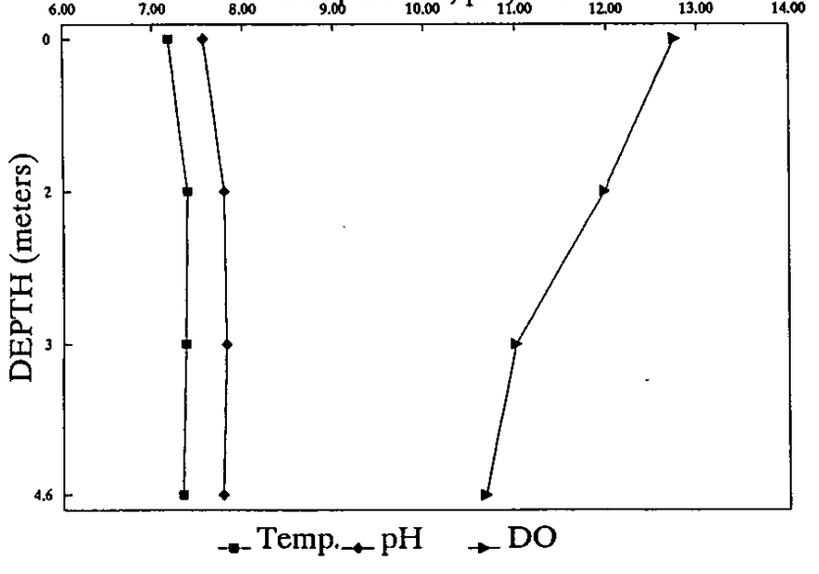
July 29, 1992
Temperature, pH, DO



August 26, 1992
Temperature, pH, DO



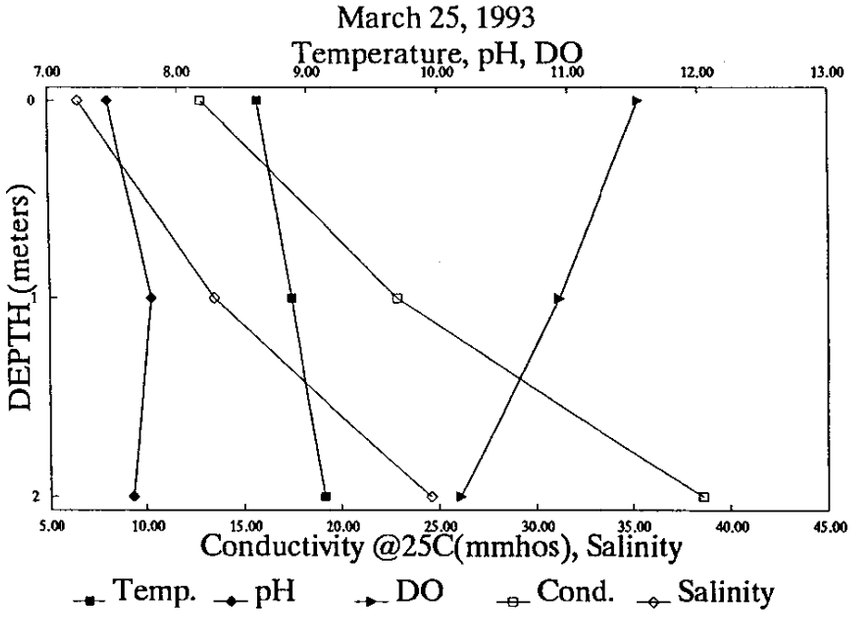
January 28, 1993
Temperature, pH, DO

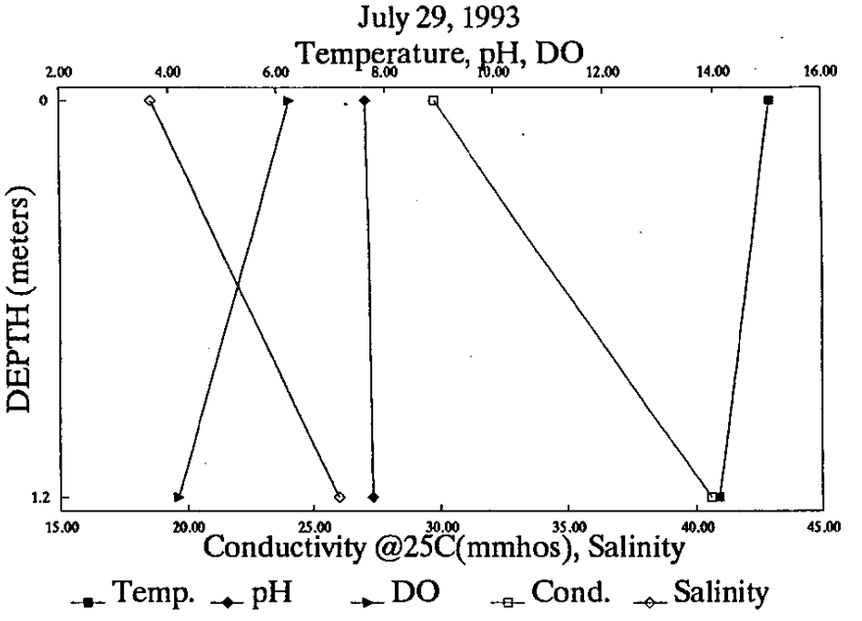


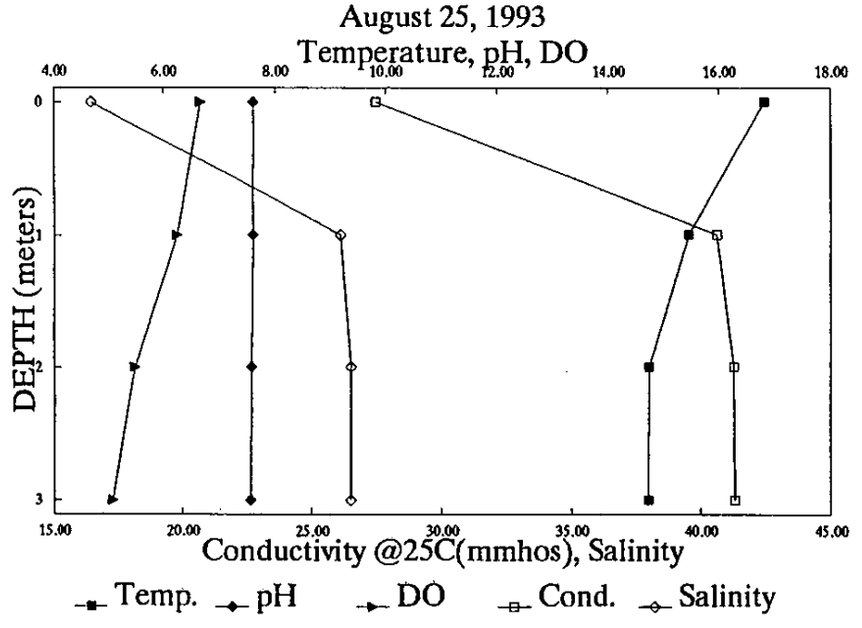
February 25, 1993
at 0 depth:

Temperature	5.46
pH	7.85
DO	11.48
Conductivity	19.5
Salinity	11.7

Capitol Lake Outfall #B1





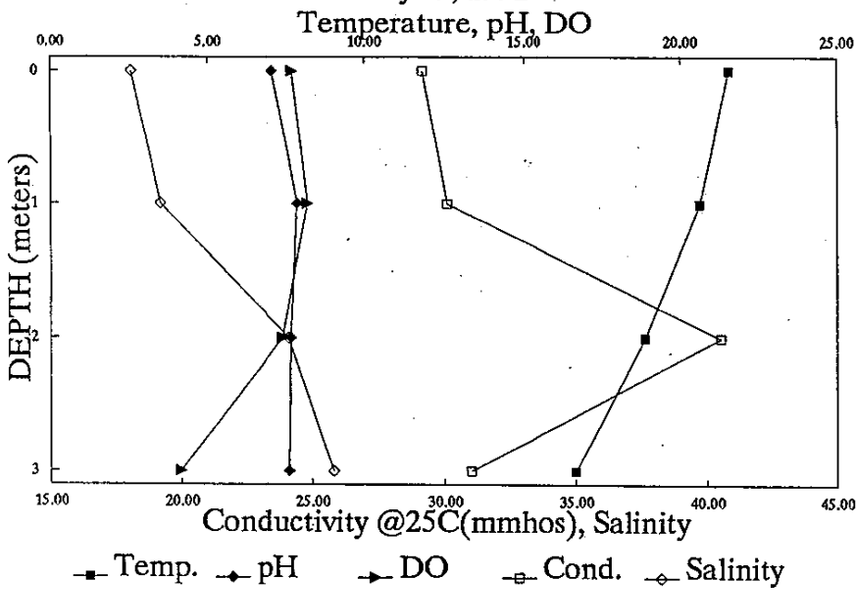


FIDDLEHEAD
STATION #B2

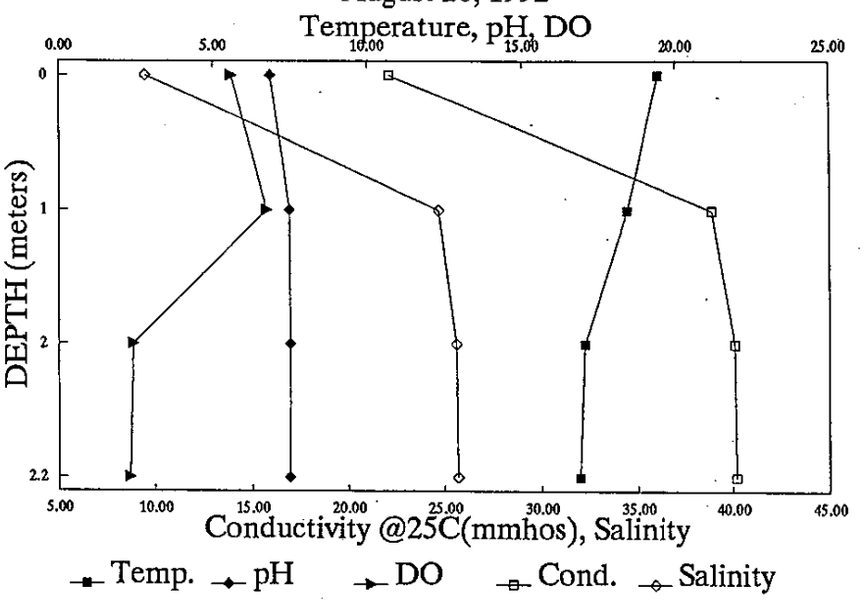
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)	Salinity
7/29/92	0	21.50	7.06	7.69	29.20	18.10
7/29/92	1	20.60	7.84	8.18	30.10	19.20
7/29/92	2	18.88	7.65	7.38	40.50	24.10
7/29/92	3	16.68	7.59	4.14	31.00	25.80
8/26/92	0	19.40	6.85	5.58	22.10	9.50
8/26/92	1	18.40	7.46	6.71	38.90	24.70
8/26/92	2	17.03	7.49	2.42	40.10	25.60
8/26/92	2.2	16.86	7.47	2.34	40.20	25.70
1/28/93	0	7.53	7.78	11.12		
1/28/93	2	7.42	7.84	9.64		
1/28/93	4	7.33	7.76	10.58		
1/28/93	4.8	7.35	7.76	10.52		
2/25/93	0	6.4	7.82	10.48	31.3	19.4
2/25/93	1	6.77	7.73	9.96	35.2	22.2
2/25/93	2	7.17	7.9	9.95	41.1	26.4
2/25/93	3	7.13	7.92	9.86	41.3	26.5
2/25/93	4	7.05	7.94	9.97	41.4	26.6
2/25/93	5	7.13	7.91	9.58	41.4	26.6
2/25/93	5.5	7.15	7.9	9.47	41.5	26.6
3/25/93	0	9.65	7.5	10.75	22.6	13.6
3/25/93	1	9.42	7.56	10.04	26.2	15.5
3/25/93	2	9.02	7.68	9.91	36.6	22.4
3/25/93	3	8.96	7.77	9.95	38.5	24.5
7/29/93	0	15	7.71	4.32	37.5	20.9
7/29/93	1	14.45	7.83	4.71	39.2	25.1
7/29/93	2	14.03	7.88	4.17	40.5	25.9
8/25/93	0	16.36	7.58	6.97	28.487	17.5
8/25/93	1	15.65	7.61	6.68	40.22	25.6
8/25/93	2	15.3	7.63	5.85	41.237	26.3
8/25/93	3	15.03	7.64	5.95	41.263	26.4
8/25/93	4	14.7	7.7	6.25	41.355	26.6

Fiddlehead #B2

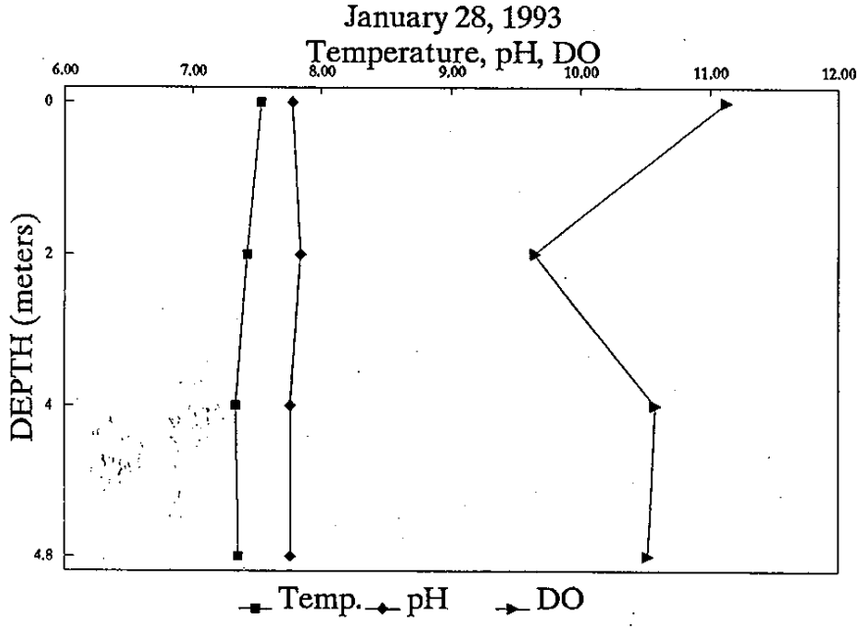
July 29, 1992



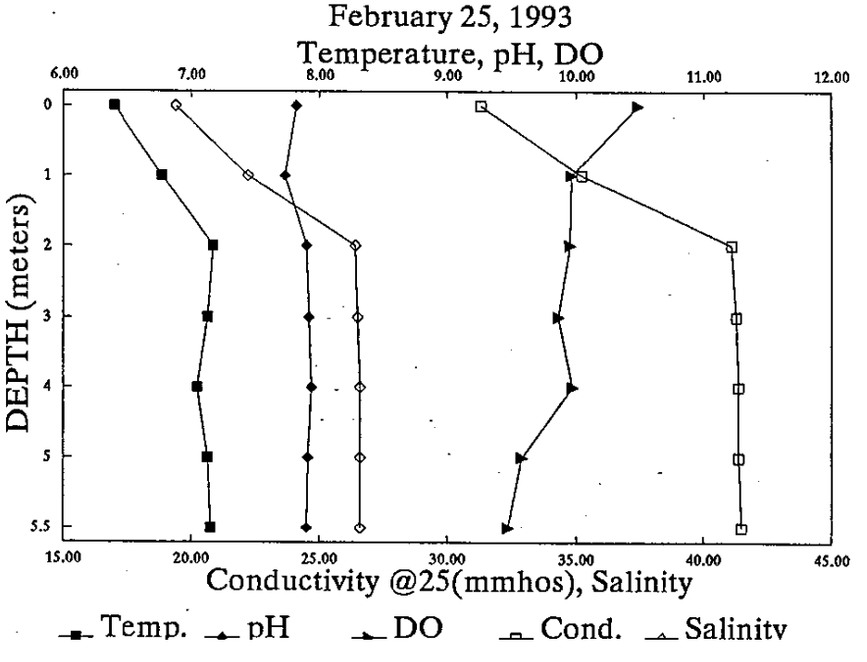
August 26, 1992



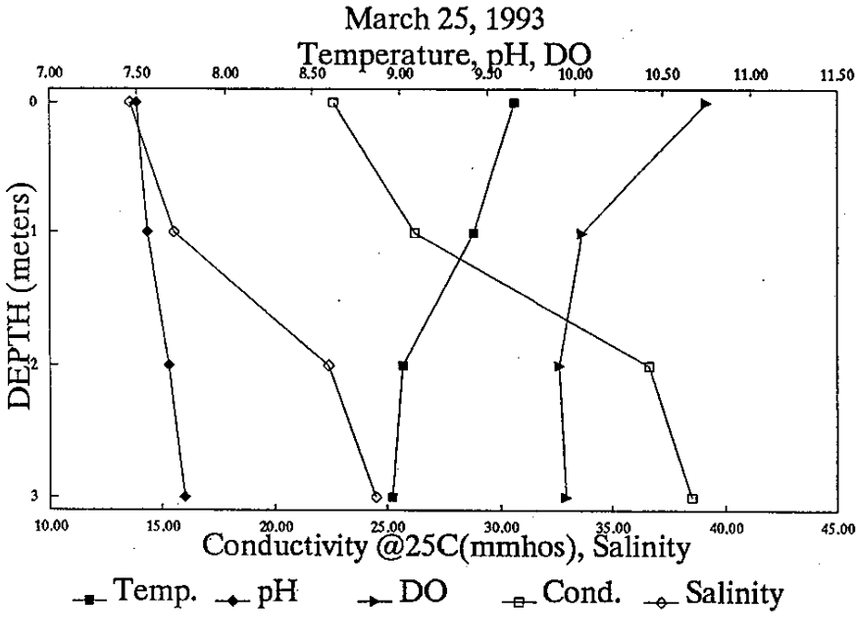
January 28, 1993

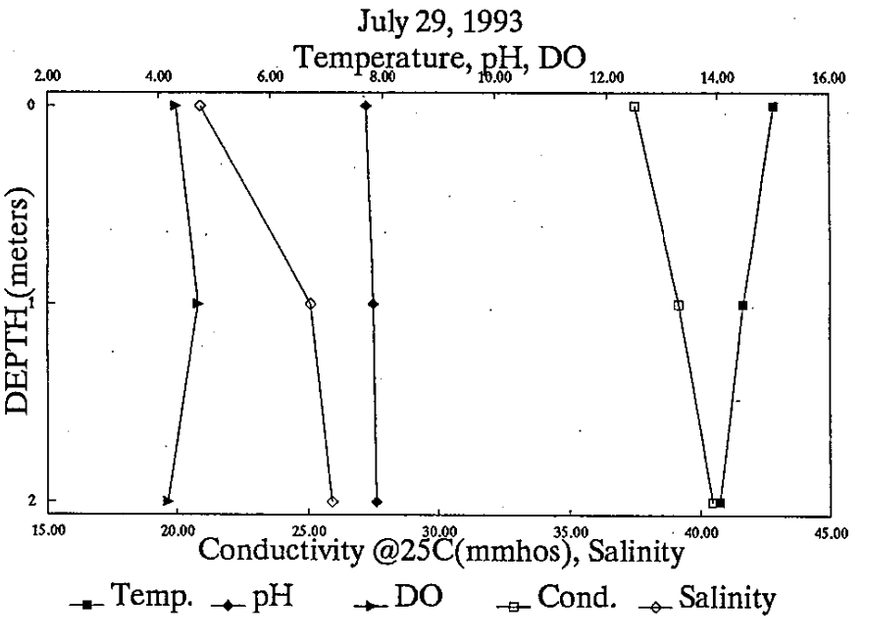


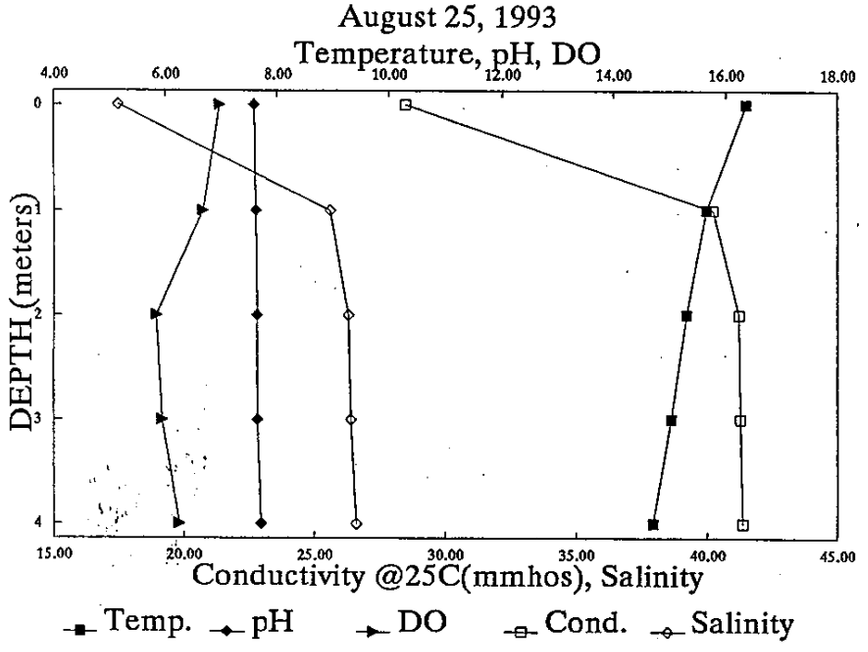
February 25, 1993



Fiddlehead #B2







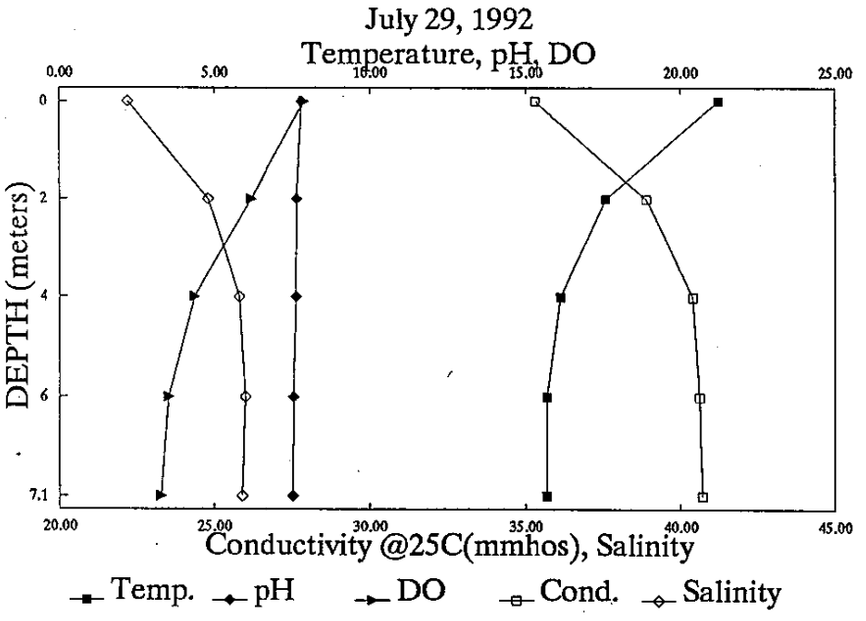
KGY
STATION #B3

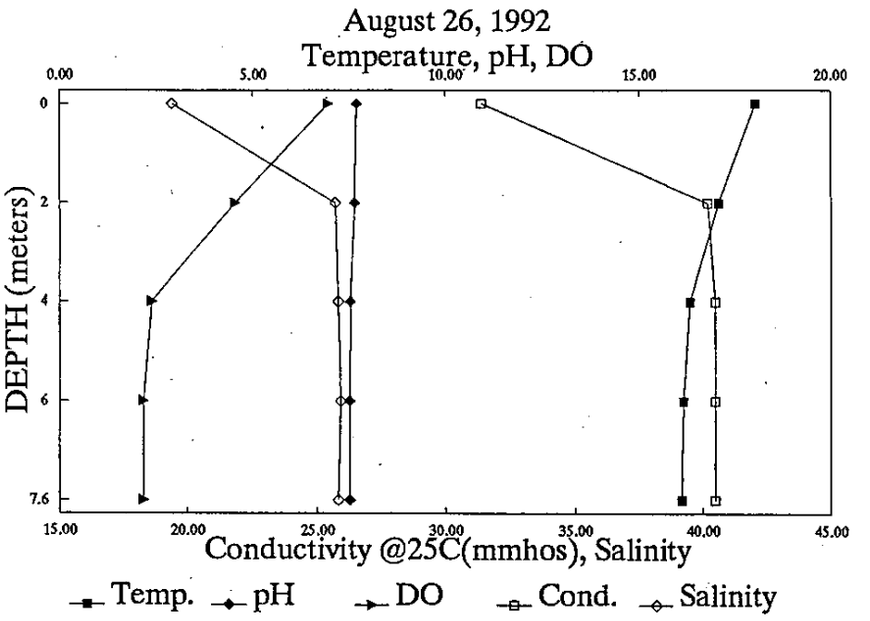
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)	Salinity
7/29/92	0	21.20	7.81	7.90	35.30	22.20
7/29/92	2	17.59	7.67	6.18	38.90	24.80
7/29/92	4	16.12	7.64	4.36	40.40	25.80
7/29/92	6	15.70	7.57	3.52	40.60	26.00
7/29/92	7.1	15.69	7.54	3.29	40.70	25.90
8/26/92	0	18.05	7.69	6.96	31.40	19.40
8/26/92	2	17.07	7.63	4.56	40.20	25.70
8/26/92	4	16.34	7.52	2.41	40.50	25.80
8/26/92	6	16.17	7.50	2.19	40.50	25.90
8/26/92	7.6	16.12	7.50	2.19	40.50	25.80
1/28/93	0	7.54	7.54	11.93		
1/28/93	2	7.41	7.75	11.36		
1/28/93	3.6	7.38	7.79	11.38		

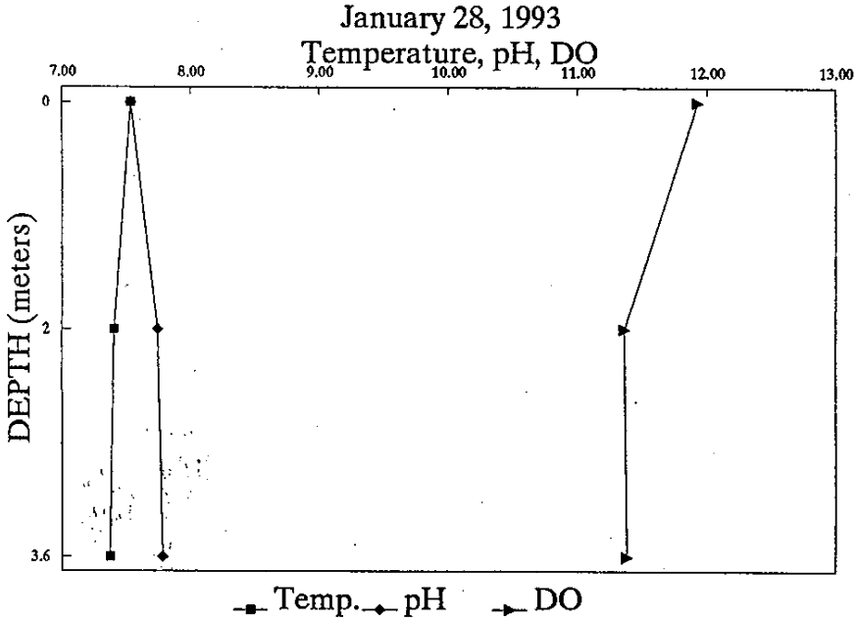
No Feb 93 data due to dredging operation

3/25/93	0	9.89	7.72	10.56	26.1	15.8
3/25/93	1	9.06	7.72	10.16	36.7	23.2
3/25/93	2	9	7.71	10.02	38	24
3/25/93	3	9.05	7.86	10.48	38.8	24.7
3/25/93	4	8.85	7.9	10.34	39.2	24.9
3/25/93	5	8.77	7.89	10.03	39.2	24.9
3/25/93	6	8.74	7.89	10	39.3	24.9
3/25/93	7	8.68	7.88	9.85	39.3	25
3/25/93	8	8.64	7.88	9.75	39.3	25
3/25/93	9	8.52	7.86	9.44	39.3	25
3/25/93	9.8	8.42	7.84	9.22	39.3	25
7/29/93	0	14.31	7.75	5.22	39.5	25.2
7/29/93	1	14.26	7.81	5.21	39.8	25.4
7/29/93	2	14.24	7.84	5.08	40.1	25.6
7/29/93	3	14.2	7.88	5.01	40.2	25.7
7/29/93	4	14.16	7.95	5.09	40.5	26
7/29/93	5	14.13	7.96	5.09	40.5	26
7/29/93	6	14.09	7.98	5.07	40.7	26
7/29/93	7	14.05	7.98	5.07	40.8	26.1
7/29/93	7.7	14.05	7.98	5.02	40.8	26.2
8/25/93	0	15.02	7.73	7.67	40.102	25.6
8/25/93	2	15	7.05	7.69	40.566	26
8/25/93	4	14.87	6.79	7.72	41.466	26.6
8/25/93	6	14.59	7.43	7.81	41.61	26.7

KGY #B3

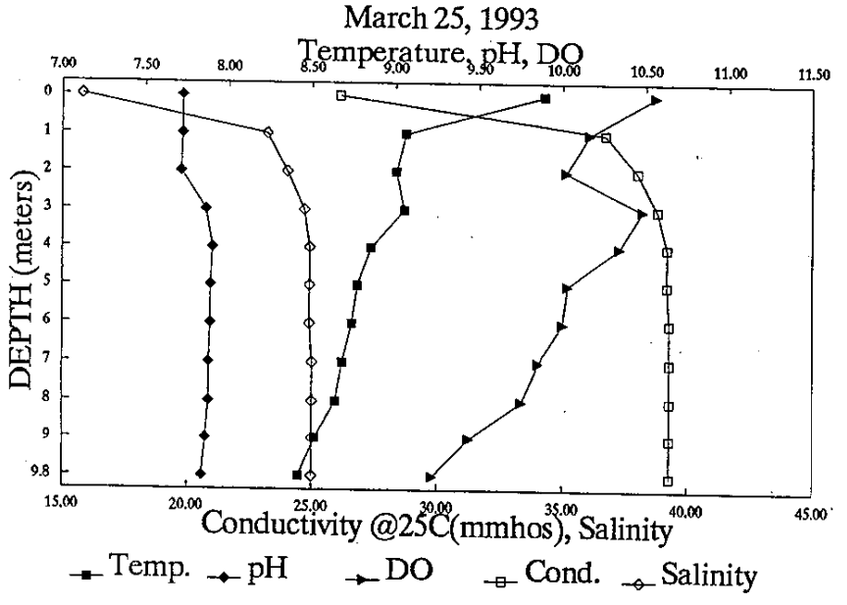


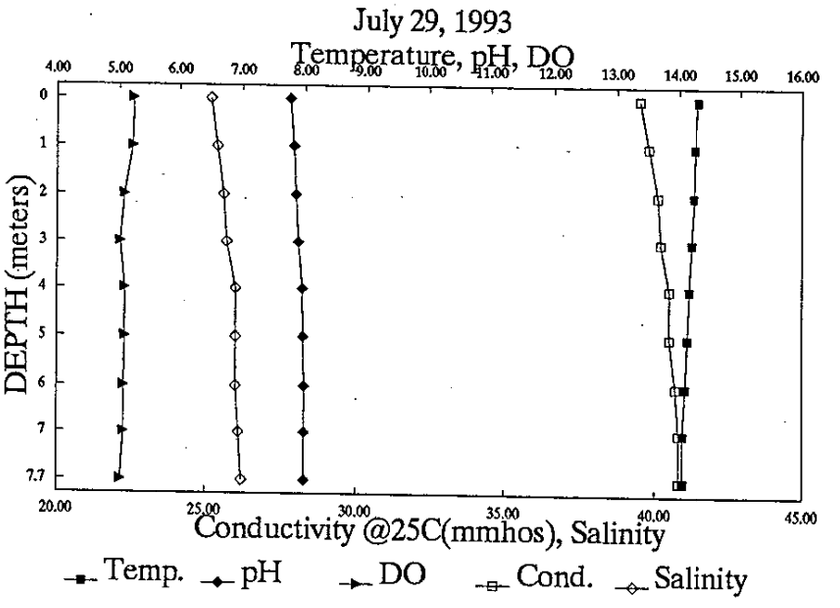


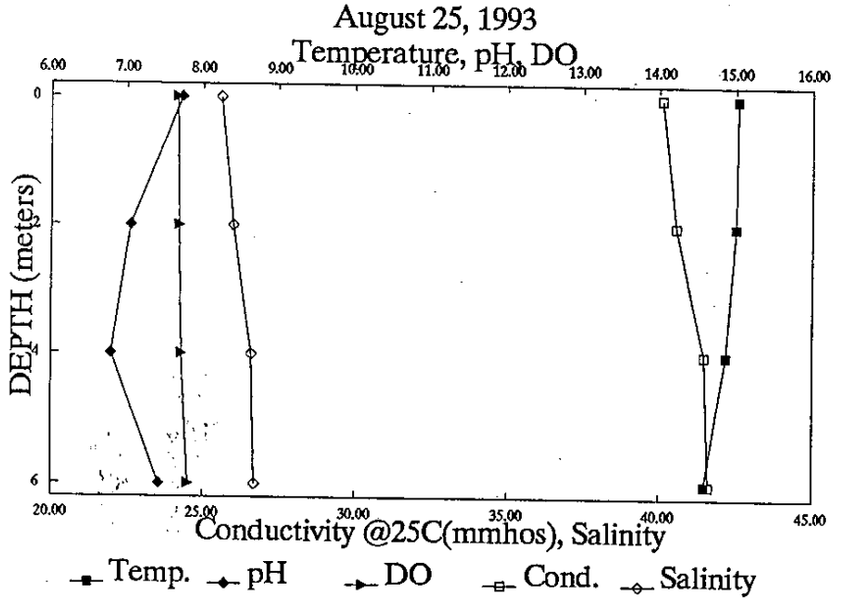


No February data due to dredging operation.

KGY #B3


March 25, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

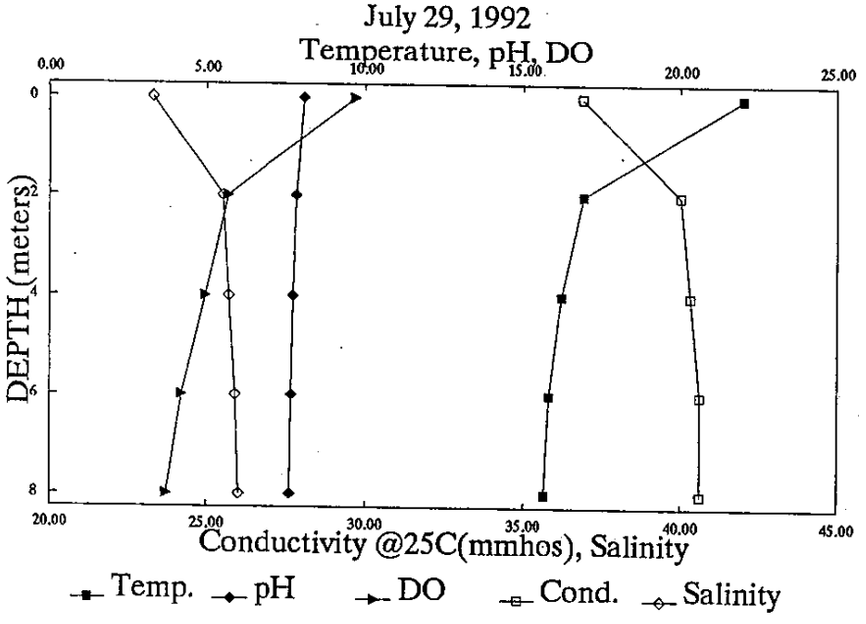

July 29, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

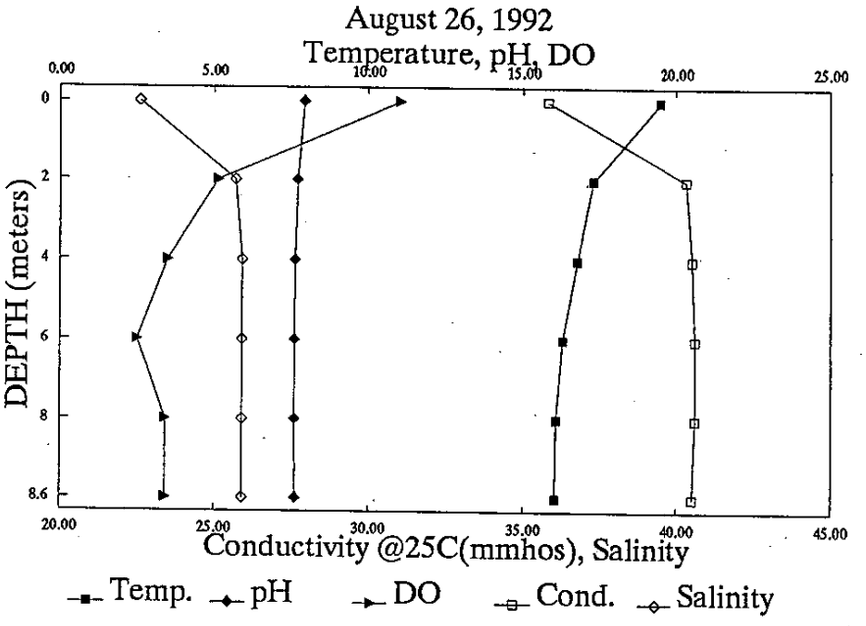

August 25, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

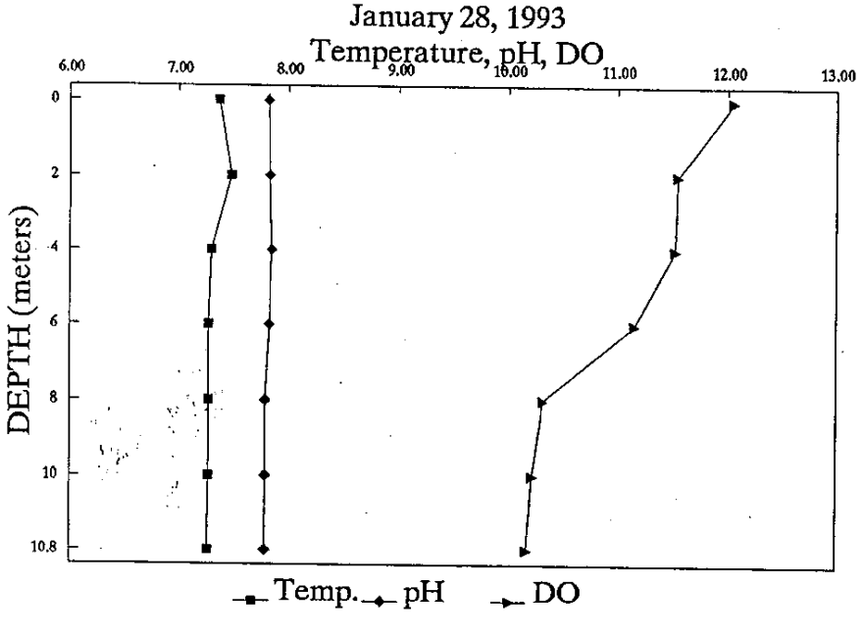
Buoy 6
STATION #B4

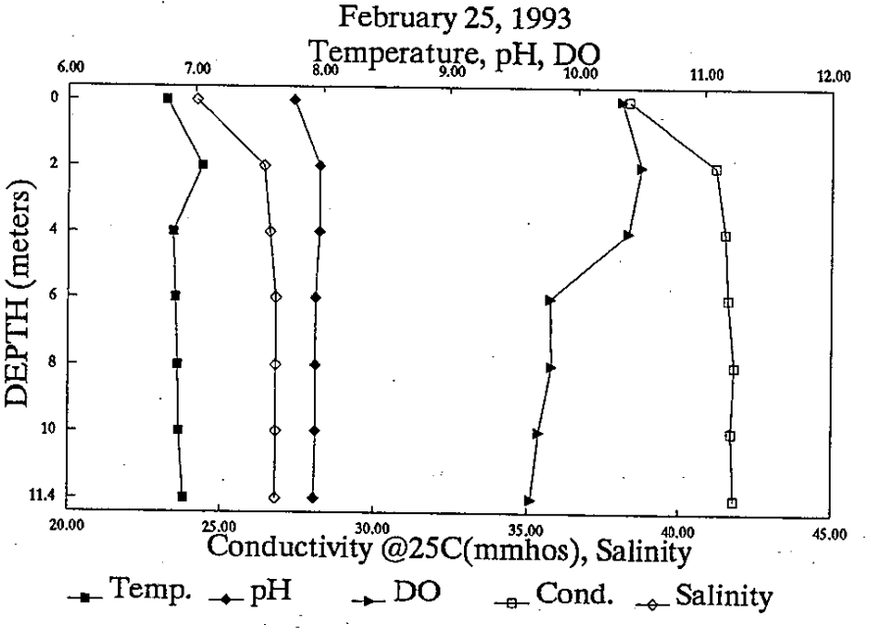
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)	Salinity
7/29/92	0	21.99	8.07	9.69	36.90	23.30
7/29/92	2	16.93	7.82	5.68	40.00	25.50
7/29/92	4	16.23	7.73	4.97	40.30	25.70
7/29/92	6	15.84	7.67	4.21	40.60	25.90
7/29/92	8	15.68	7.62	3.72	40.60	26.00
7/29/92	8.6					
8/26/92	0	19.45	7.93	11.07	35.80	22.60
8/26/92	2	17.26	7.69	5.13	40.30	25.70
8/26/92	4	16.75	7.61	3.49	40.50	25.90
8/26/92	6	16.28	7.59	2.50	40.60	25.90
8/26/92	8	16.05	7.60	3.41	40.60	25.90
8/26/92	8.6	16.02	7.61	3.42	40.50	25.90
1/28/93	0	7.37	7.82	12.05		
1/28/93	2	7.48	7.83	11.54		
1/28/93	4	7.3	7.85	11.52		
1/28/93	6	7.28	7.83	11.15		
1/28/93	8	7.28	7.79	10.32		
1/28/93	10	7.28	7.79	10.22		
1/28/93	10.8	7.27	7.79	10.17		
2/25/93	0	6.77	7.77	10.34	38.3	24.2
2/25/93	2	7.05	7.97	10.49	41.2	26.4
2/25/93	4	6.82	7.97	10.39	41.5	26.6
2/25/93	6	6.84	7.94	9.78	41.6	26.8
2/25/93	8	6.86	7.94	9.79	41.8	26.8
2/25/93	10	6.87	7.94	9.69	41.7	26.8
2/25/93	11.4	6.91	7.93	9.63	41.8	26.8
3/25/93	0	9.91	7.79	10.62	30.7	18.9
3/25/93	2	8.99	7.82	10.09	38.6	24.5
3/25/93	4	8.87	7.84	9.7	39.1	24.9
3/25/93	6	8.71	7.88	10.06	39	25
3/25/93	8	8.58	7.88	9.87	39.3	25.1
3/25/93	9.3	8.37	7.83	9.16	39.5	25.2
7/29/93	0	14.15	8.12	6.7	40.7	26.1
7/29/93	1	14.16	8.12	6.3	40.8	26.1
7/29/93	2	14.13	8.14	6.36	40.8	26.2
7/29/93	3	14.1	8.16	6.5	40.9	26.2
7/29/93	4	14.05	8.13	6.17	40.9	26.2
7/29/93	6	13.88	8.06	5.65	41	26.3
7/29/93	8	13.82	8.03	5.14	41	26.3
7/29/93	9.6	13.78	8	4.86	41.1	26.3
8/25/93	0	15.69	7.99	11.08	39.109	24.9
8/25/93	2	15.4	7.94	8.71	41.249	26.5
8/25/93	4	14.69	7.81	7.6	41.659	26.7
8/25/93	6	14.61	7.86	7.86	41.728	26.8
8/25/93	8	14.59	7.84	7.78	41.67	26.8
8/25/93	10	14.54	7.85	7.72	41.66	26.8
8/25/93	11.1	14.56	7.85	7.71	41.732	26.6

Buoy 6 #B4

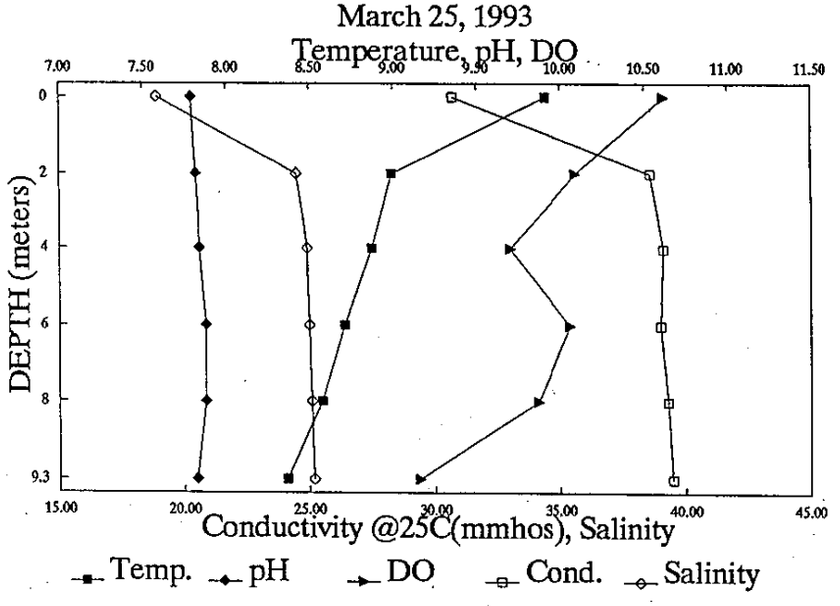

July 29, 1992
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

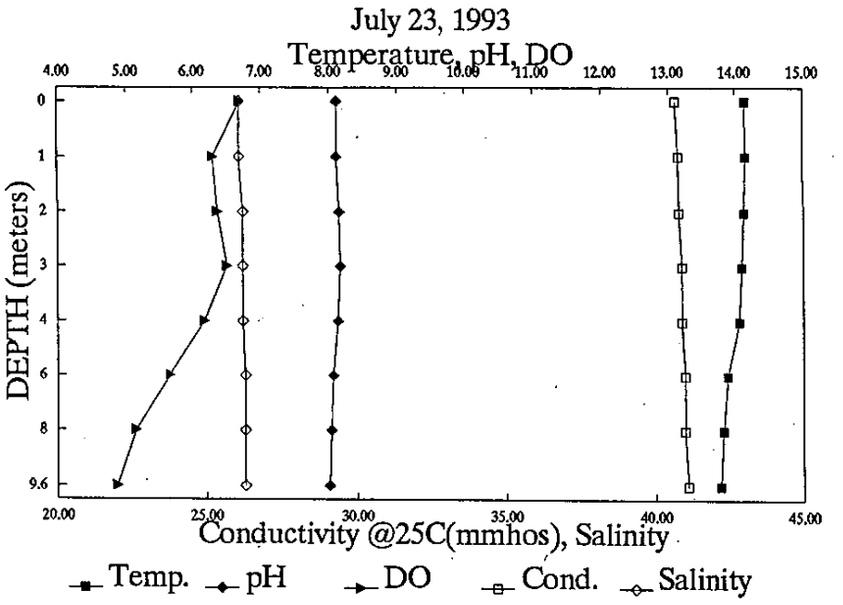

August 26, 1992
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

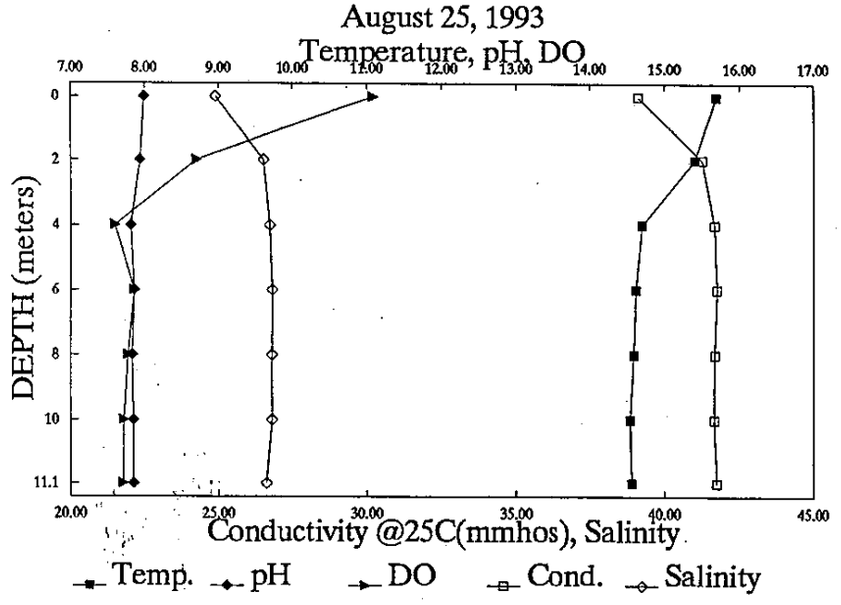

January 28, 1993
Temperature, pH, DO
DEPTH (meters)
Temp.
pH
DO


February 25, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

Buoy 6 #B4


March 25, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity


July 23, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

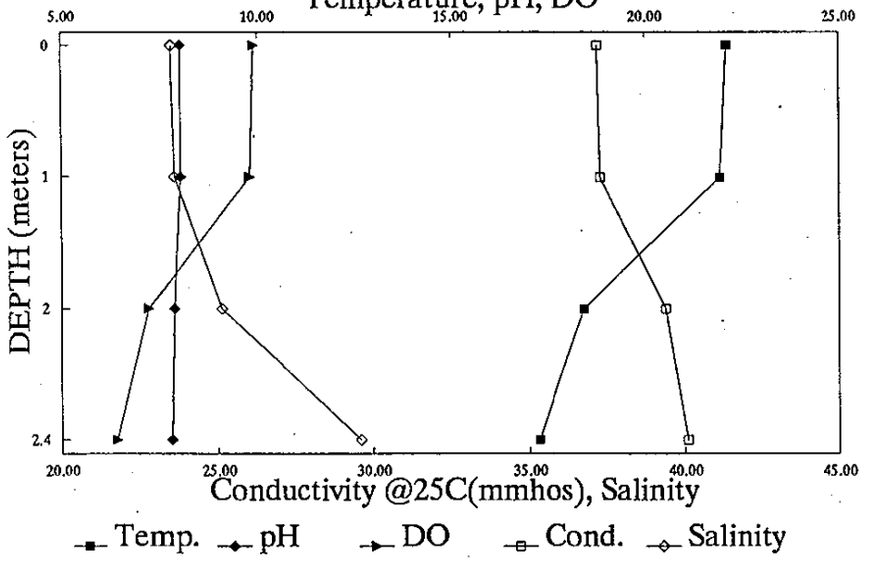

August 25, 1993
Temperature, pH, DO
DEPTH (meters)
Conductivity @25C(mmhos), Salinity
Temp.
pH
DO
Cond.
Salinity

EAST BAY
STATION #B5

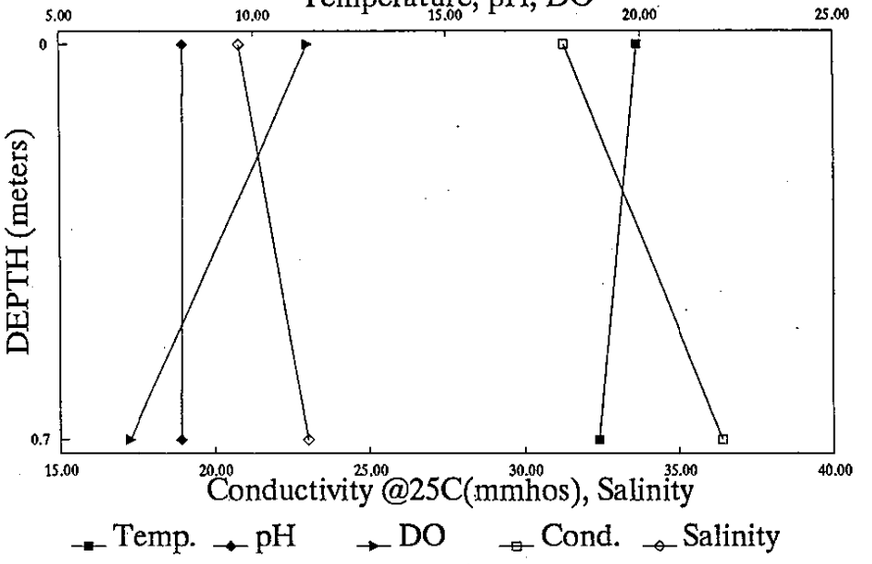
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)	Salinity
7/29/92	0	22.08	8.03	9.91	37.20	23.50
7/29/92	1	21.90	8.04	9.80	37.30	23.60
7/29/92	2	18.40	7.88	7.25	39.40	25.10
7/29/92	2.4	17.24	7.81	6.44	40.10	29.60
8/26/92	0	19.91	8.20	11.42	31.30	20.80
8/26/92	0.7	18.90	8.13	6.80	36.40	23.00
1/28/93	0	7.66	7.8	11.29		
1/28/93	2	7.42	7.84	11.35		
1/28/93	4	7.41	7.83	11.08		
1/28/93	5.6	7.38	7.81	10.52		
2/25/93	0	7.35	7.83	10.4	38.5	24.1
2/25/93	1	7.28	7.99	10.33	41.2	26.4
2/25/93	2	7.09	7.99	10.38	41.3	26.5
2/25/93	3	6.97	7.99	10.41	41.4	26.6
2/25/93	3.4	6.92	7.99	10.42	41.5	26.6
3/25/93	0	10.01	7.83	10.51	27.9	17
3/25/93	1	9.37	7.81	10.1	36.5	23.1
3/25/93	2	9.09	7.86	10.53	38.7	24.6
3/25/93	3	8.92	7.87	10.22	39.1	24.9
3/25/93	4	8.74	7.87	9.83	39.3	25
3/25/93	4.6	8.73	7.88	10.04	39.2	25
7/29/93	0	14.38	7.89	5.61	40.2	25.7
7/29/93	1	14.38	7.91	5.56	40.2	25.7
7/29/93	2	14.26	7.96	5.51	40.5	25.9
7/29/93	3	14.15	7.99	5.35	40.7	26.1
7/29/93	4	14.11	8	5.23	40.7	26.1
7/29/93	5	14.1	8	5.16	40.9	26.1
8/25/93	0	15.72	7.9	8.97	36.206	22.9
8/25/93	1	15.72	7.96	9.52	39.932	25.6
8/25/93	2	15.15	7.87	8	41.139	26.6
8/25/93	3	14.87	7.82	7.51	41.581	26.6
8/25/93	4	14.82	7.81	7.3	41.586	27.7
8/25/93	5	14.66	7.82	7.31	41.546	26.8
8/25/93	6	14.58	7.85	7.44	41.555	26.8
8/25/93	6.8	14.56	7.85	7.45	41.557	26.8

East Bay #B5

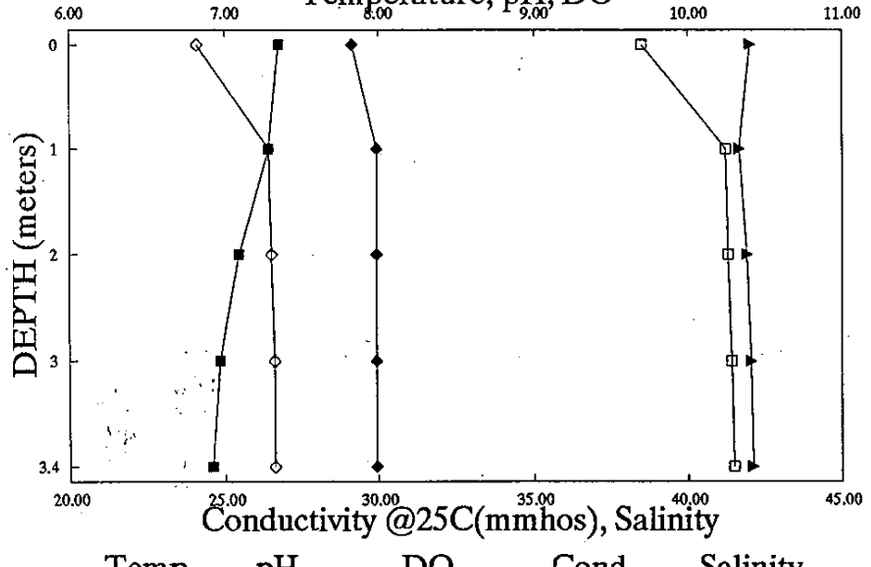
July 29, 1992
Temperature, pH, DO



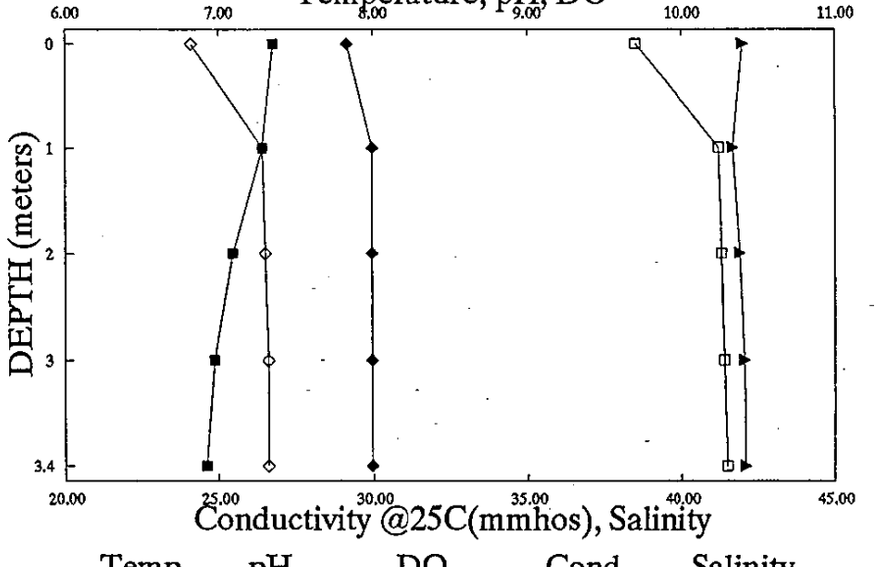
August 26, 1992
Temperature, pH, DO



January 28, 1993
Temperature, pH, DO

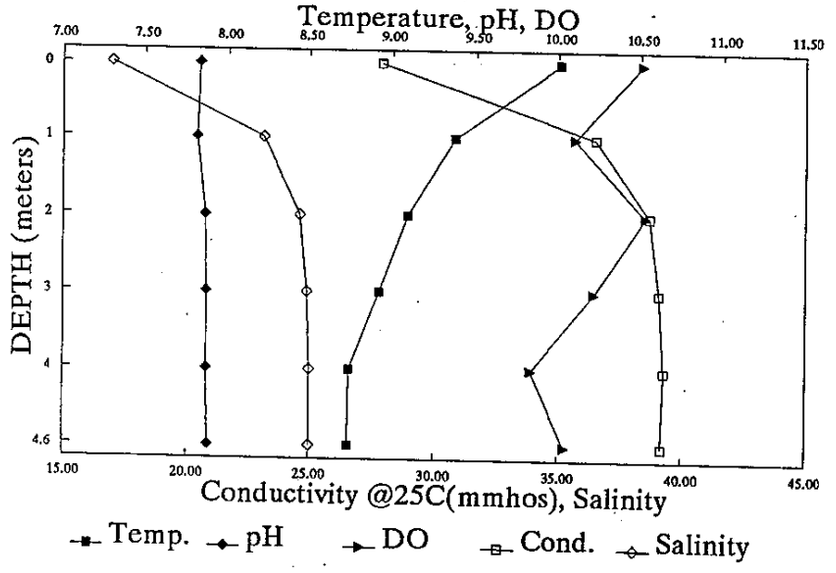


February 25, 1993
Temperature, pH, DO

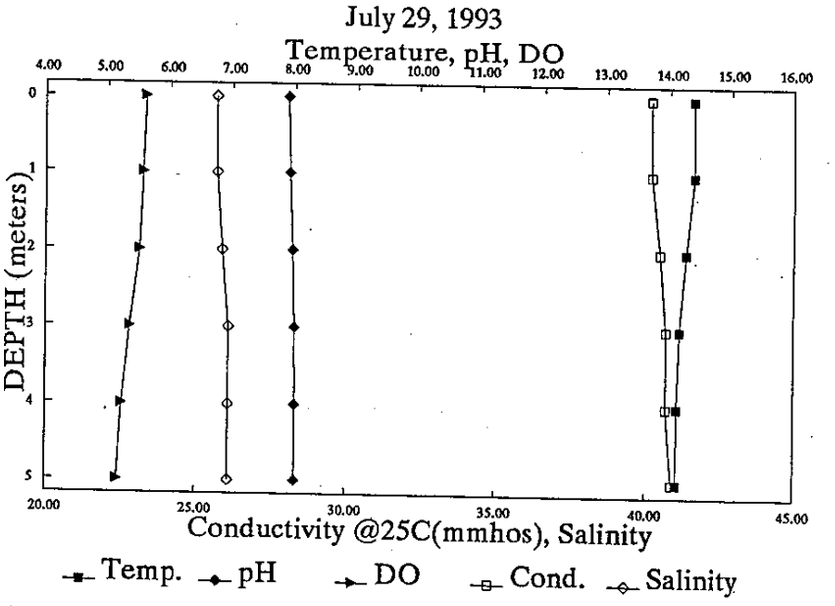


East Bay #B5

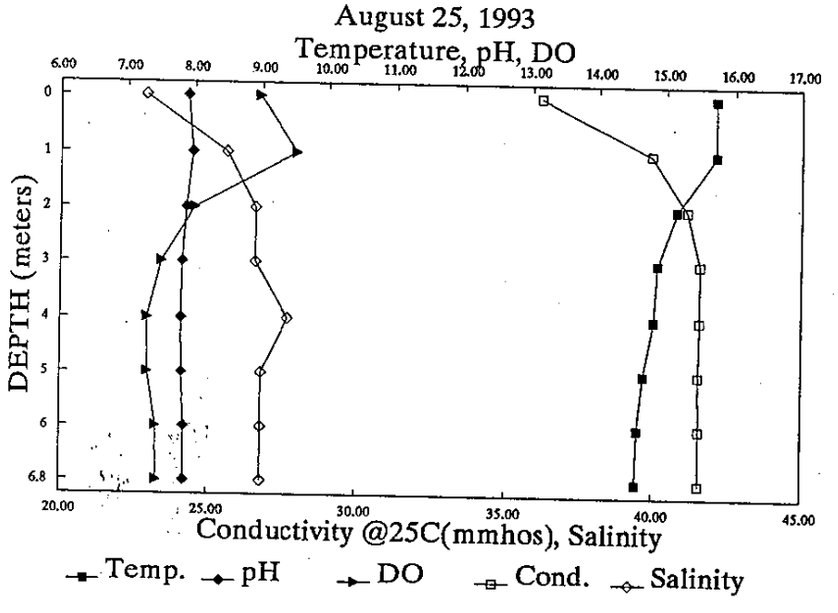
March 25, 1993



July 29, 1993



August 25, 1993



GULL HARBOR
STATION #B6

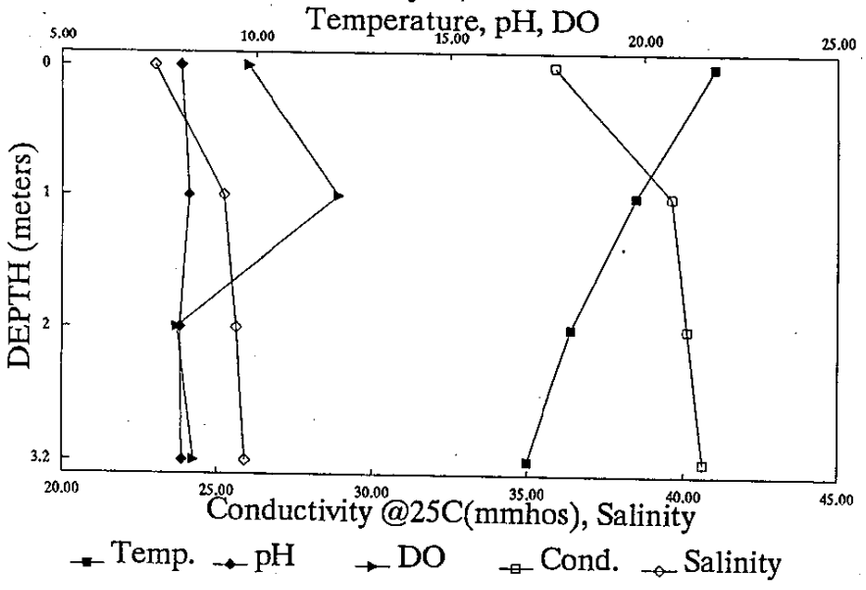
Date	Depth (Meters)	Temp.	pH	DO	Cond. @ 25 C (mmhos)	Salinity
7/29/92	0	21.78	8.08	9.81	35.90	23.00
7/29/92	1	19.78	8.27	12.12	39.60	25.20
7/29/92	2	18.11	8.03	7.95	40.10	25.60
7/29/92	3.2	16.98	8.09	8.40	40.60	25.90
8/26/92	0	19.87	8.18	9.93	38.20	24.30
8/26/92	2	17.12	7.81	5.87	40.40	25.80
8/26/92	3.6	16.60	7.61	3.45	40.50	25.80
1/28/93	0	7.61	7.81	11.91		
1/28/93	2	7.58	7.84	11.9		
1/28/93	4	7.38	7.81	11.07		
1/28/93	4.3	7.33	7.8	10.58		
2/25/93	0	5.61	7.77	11.07	35.4	22
2/25/93	2	7.12	7.99	10.73	41.2	26.5
2/25/93	4	6.84	7.95	10.2	41.7	26.7
2/25/93	6	6.88	7.94	9.81	41.8	26.8
2/26/93	6.8	6.89	7.94	9.76	41.8	26.8
3/25/93	0	10.71	7.8	10.53	26.6	16.1
3/25/93	2	9.16	7.88	10.66	38.2	24.2
3/25/93	4	8.86	7.9	10.42	38.9	24.8
3/25/93	6	8.79	7.89	10.12	39.1	24.8

No sampling done in July 1993 due to rough water conditions.

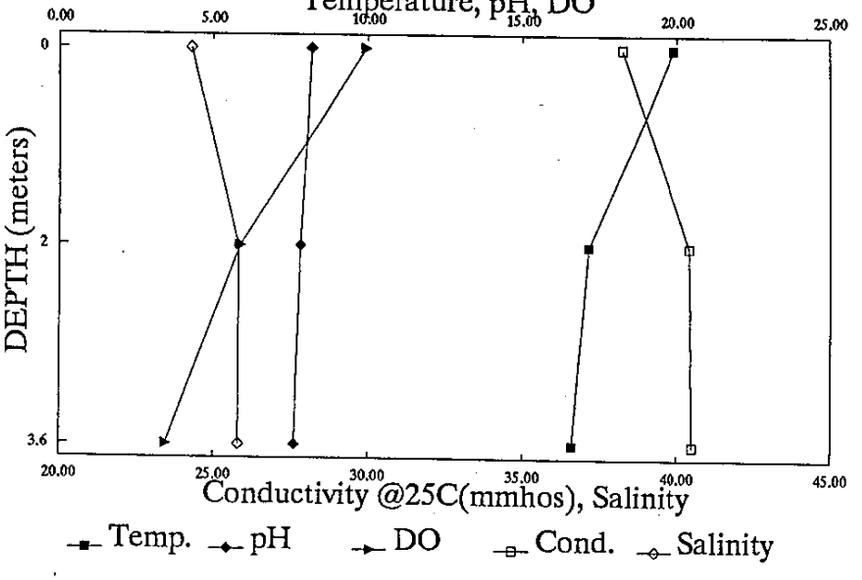
8/25/93	0	15.15	8.07	10.97	38.754	24.7
8/25/93	2	15.35	8.23	12.72	41.659	26.1
8/25/93	4	14.99	7.99	9.74	41.627	26.7
8/25/93	6	14.99	7.99	9.64	41.686	26.8
8/25/93	6.9	14.99	7.99	9.6	41.686	26.8

Gull Harbor #B6

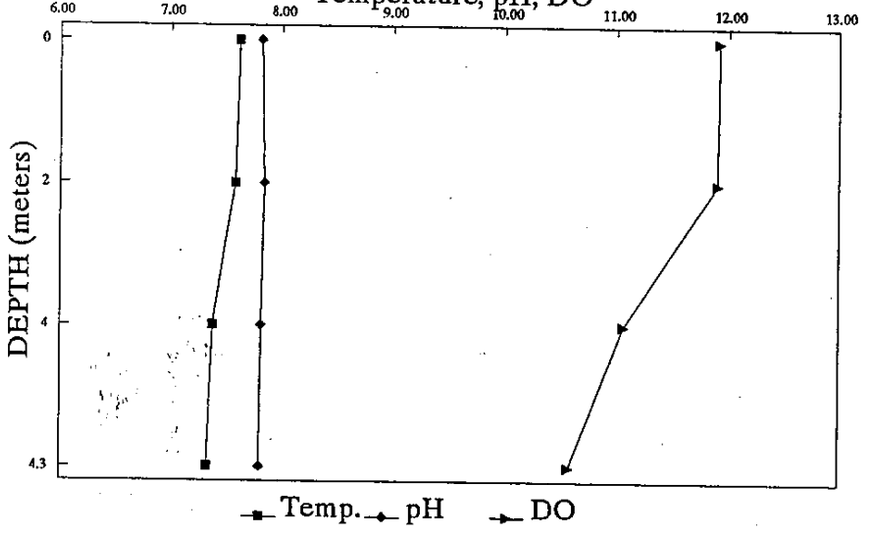
July 29, 1992
Temperature, pH, DO



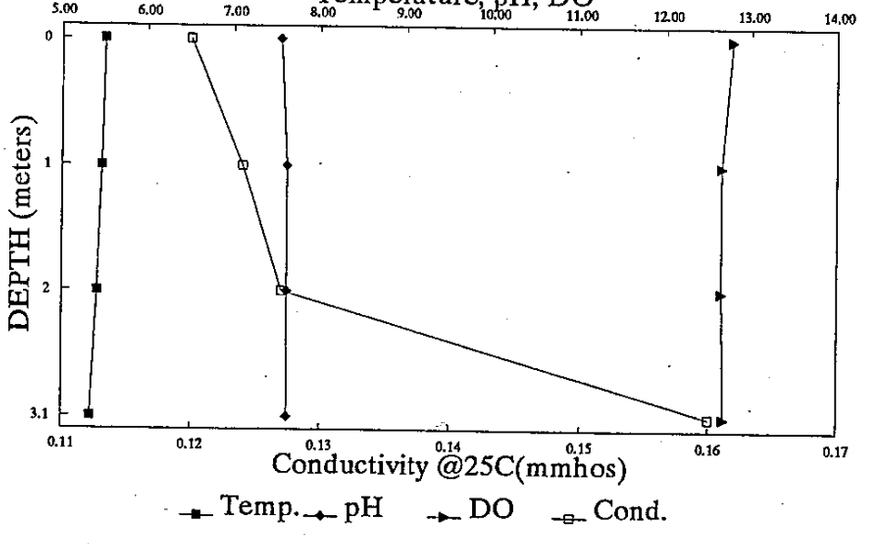
August 26, 1992
Temperature, pH, DO



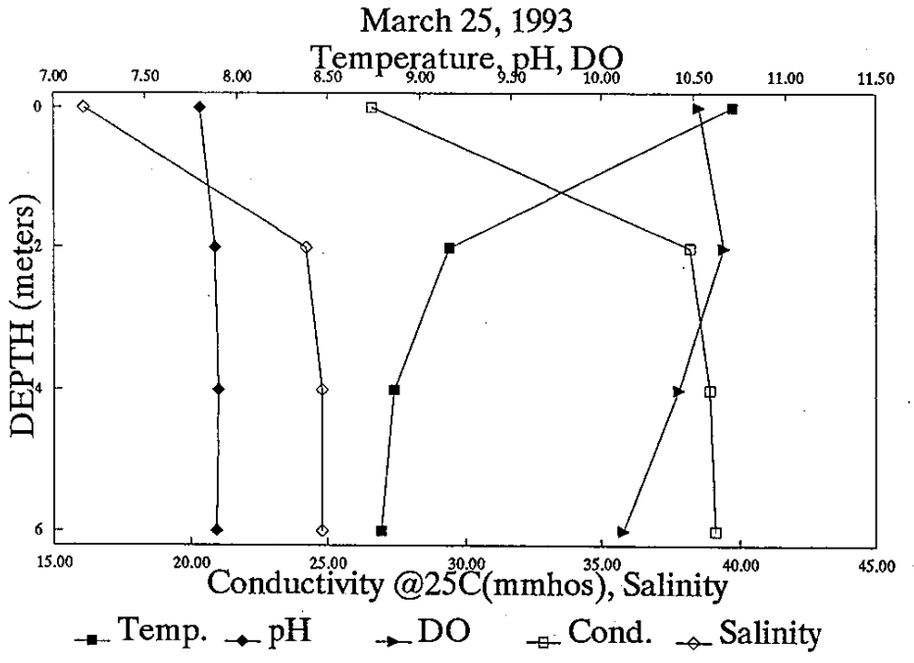
January 28, 1993
Temperature, pH, DO



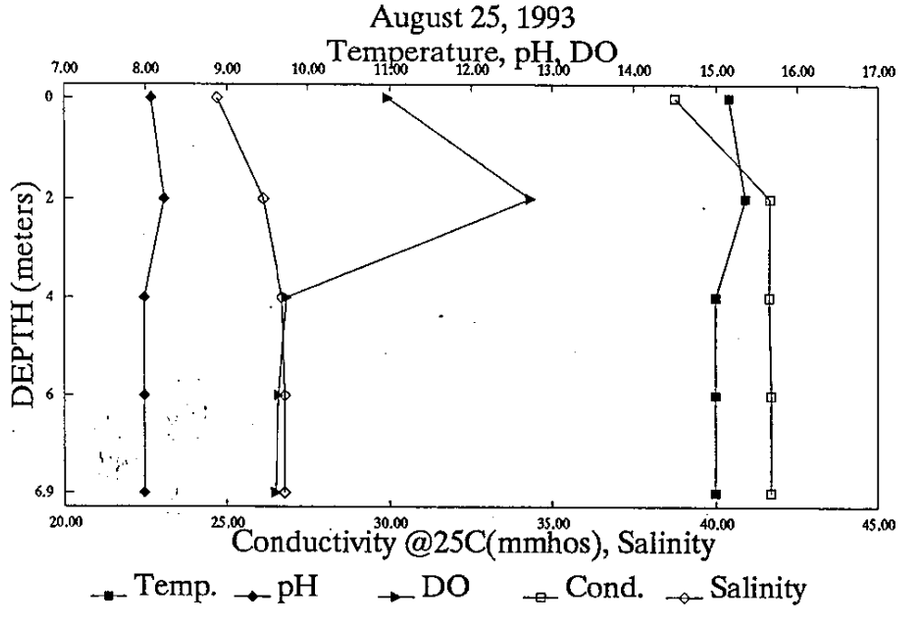
February 23, 1993
Temperature, pH, DO



Gull Harbor #B6



No sampling done in July 1993 due to rough water conditions.



APPENDIX E:
RAINFALL GRAPH

3-Day Antecedent Rainfall