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Lake Whatcom Monitoring Project 1994/1995 Report

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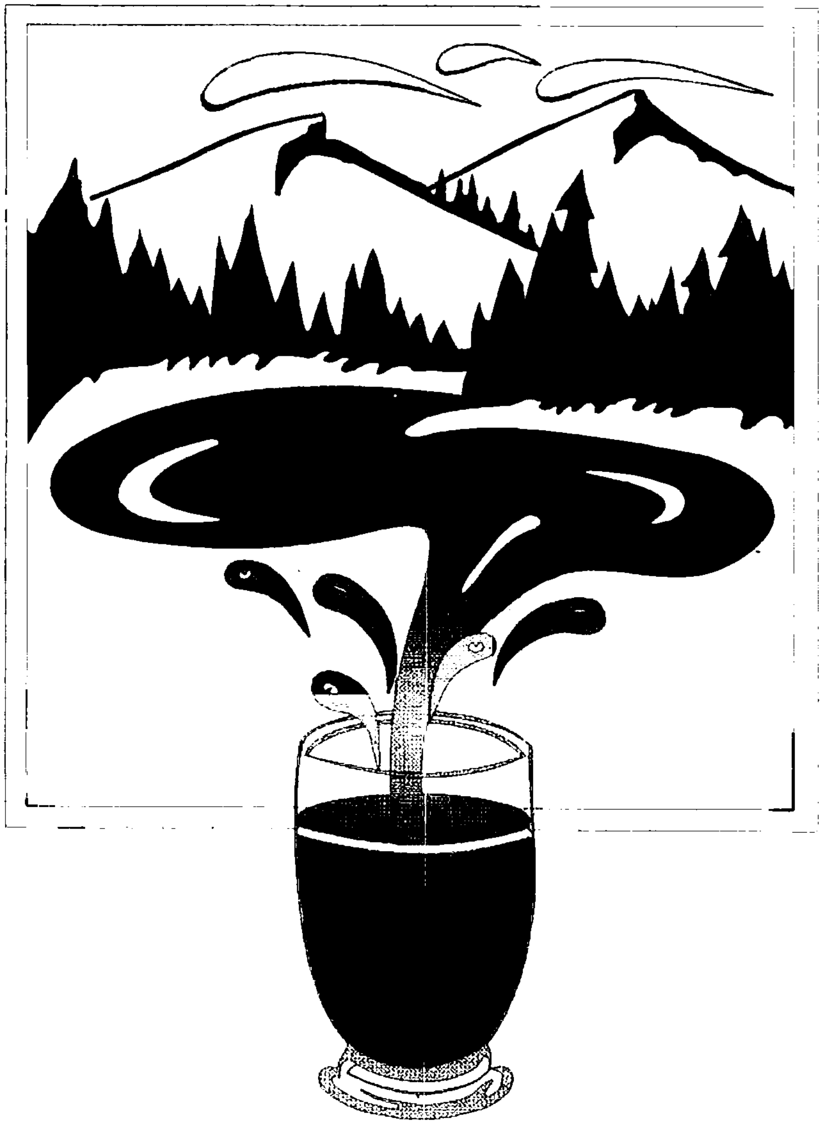
Lake Whatcom Monitoring Project



1994/95 Final Report

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Executive Summary

This report describes the results from the 1994/95 Lake Whatcom monitoring program. The objectives of this program were to continue baseline water quality monitoring program in Lake Whatcom and representative creeks in the Lake Whatcom watershed; begin monitoring the water quality of the Park Place wet pond, and to estimate hydrologic inputs and outputs for Lake Whatcom using the HSPF model. In addition, this report includes the results from the 1993/94 microlayer study of metals and hydrocarbons in the lake; the microlayer data were not available in time to be included in last year's final report.

The lake was sampled on October 4, November 8, December 13, 1994, and on February 8, April 6, May 2, June 8, July 5, August 1–2, and September 11, 1995. The water quality patterns in the lake were generally similar to previous years, except that the cooler summer slowed biological production at Site 1 enough to delay the onset of low-oxygen conditions for about 4–6 weeks. Despite a relatively cool, cloudy summer, both Sites 1 and 2 developed severe hypolimnetic oxygen deficits by late August. As a result, ammonia and total phosphorus concentrations were high in the deepest samples collected at these sites during September. Cadmium, copper, and iron concentrations were also elevated at Site 1, 20 m, during September. Chlorophyll concentrations and plankton counts were usually highest at Site 1. The phytoplankton were dominated by diatoms, but green algae were also common, especially at Site 1. Coliforms and *Enterococcus* counts were usually low at all sites, including the Bloedel-Donovan boat dock area, and all sites met the EPA criteria for freshwater swimming areas (geometric means $\leq$ 126 fecal coliforms/100 mL or 33 enterococci/100 m)L.

Seven creeks were sampled during February 1995: Austin Creek, Anderson Creek, the Park Place storm drain, Silver Beach Creek, Smith Creek, Wildwood Creek, and Blue Canyon Creek. The water quality in the creeks fell within expected ranges, with the residential creeks typically having higher conductivities; higher ammonia, phosphorus, and total suspended solids concentrations; and much higher total and fecal coliform counts.

The Park Place wet pond was sampled on October 26–28, 1994, and March 13–15, June 26–28, and September 25–27, 1995. Because the pond was only recently constructed (1994), and the vegetation is not yet stabilized, it is difficult to tell whether there will be an effective biofiltration process. However, the pond did appear to act as a sediment trap most of the year, reducing sediment and metals discharges into Lake Whatcom from the Park Place storm drain. Nuisance growths of algae occurred during the summer that caused low oxygen conditions at the bottom of the pond. The City may want to consider harvesting algal mats when they become dense as a means of increasing the biofiltration potential in the pond and because low oxygen concentrations may cause the release of nutrients and metals from the pond sediments.

The 1993/94 microlayer study showed that total organic carbon was significantly higher in all microlayer samples, and aluminum, iron, and zinc concentrations were higher in most samples, compared to water collected just below the surface. In addition, during a period of air stagnation in February, 1993, elevated concentrations of polycyclic aromatic hydrocarbons (organic constituents of wood smoke), chromium, lead, and nickel were measured in the microlayer samples from Site 1 and the Bloedel-Donovan area.

The HSPF hydrologic model was used to estimate inputs (precipitation and the diversion from the middle fork of the Nooksack River) and outputs (Whatcom Creek, the Whatcom Falls fish hatchery, Georgia Pacific Corp., the Bellingham water treatment plant, Water District #10, and lake evaporation) for Lake Whatcom. Whatcom Creek and Georgia Pacific Corp. were the major outputs; watershed runoff and the Nooksack River diversion were the major inputs. As of August, 1994 the HSPF data and model parameters have been updated by Steve Walker, and this report includes the updated HSPF results.

1 Introduction

Lake Whatcom is the primary drinking water source for the City of Bellingham and parts of Whatcom County (including Sudden Valley), and provides high quality water for the Georgia-Pacific Corporation mill. The lake and parts of the watershed provide recreational opportunities, as well as providing important habitats for fish and wildlife. The lake is used as a storage reservoir to buffer peak storm water flows in Whatcom Creek. Much of the watershed is zoned for forestry and is managed by state or private timber companies. Finally, because of its aesthetic appeal, much of the Lake Whatcom watershed is highly valued for residential development.

The City of Bellingham and Western Washington University have collaborated on investigations of the water quality in Lake Whatcom since the early 1960's. Beginning in 1981, a monitoring program was initiated by the City and WWU that was designed to provide long-term data for Lake Whatcom for basic parameters such as temperature, pH, dissolved oxygen, conductivity, turbidity, nutrients (nitrogen and phosphorus), and other representative water quality measurements. The major goal of the long-term monitoring effort is to provide a record of Lake Whatcom's water quality over time. In addition, since the City and WWU review the scope of work for the monitoring program each year, short-term water quality questions can be addressed as needed.

The major objectives of the 1994/95 Lake Whatcom monitoring program were to continue the City's water quality monitoring program in Lake Whatcom, as part of a baseline study to monitor changes in the raw water quality of Lake Whatcom; to monitor the water quality of the Park Place wet pond; and to maintain the HSPF[1] hydrologic data base in order to provide estimates of the hydrologic budget for Lake Whatcom.

This report will be subdivided into the following sections:

Section 1: Introduction
Section 2: Lake Whatcom Monitoring
Section 3: Creek Monitoring
Section 4: HSPF Hydrologic Modelling
Section 5: Park Place Wet Pond Monitoring
Section 6: 1993/94 Microlayer Study
Section 7: Quality Control
Section 8: References
Section 9: Tables
Section 10: Figures
Appendix A: Site Descriptions
Appendix B: Lake and Creek Data
Appendix C: Park Place Wet Pond Data

Note that all of the tables and figures are located at the end of the report in Sections 9–10. Detailed site descriptions and raw data are included in the Appendices.

[1]The Hydrologic Simulation Program–FORTRAN (HSPF) model was calibrated for the Lake Whatcom watershed during an earlier storm water monitoring project, and is described in detail by Walker, et al. (1992) and Walker (1995).

2 Lake Whatcom Monitoring

2.1 Site Descriptions

Water quality samples were collected at five sites in Lake Whatcom (Figure 1, page 37). Sites 1–2 are located at the deepest points in their respective basins. The Intake site is located adjacent to the underwater intake point where the City of Bellingham withdraws raw water from basin 2. Site 3 is located at the deepest point in the northern sub-basin of basin 3 (north of the Sunnyside Sill), and Site 4 is located at the deepest point in the southern sub-basin of basin 3 (south of the Sunnyside Sill). An orange marker buoy is anchored at each of the sampling sites. Detailed descriptions are included in Appendix A. Water samples were also collected at the City of Bellingham Water Treatment Plant gatehouse, which is located onshore and west of the intake site.

2.2 Field Sampling and Analytical Methods

The lake was sampled on October 4, November 8, and December 13, 1994, and on February 8, April 6, May 2, June 8, July 5, August 1–2, and September 11, 1995. The water quality parameters measured for the 1994/95 lake monitoring program are shown in Table 1 (see Section 9, beginning on page 17, for all Tables).

A Surveyor II Hydrolab was used to measure temperature, pH, dissolved oxygen, and conductivity. All water samples (including bacteriological samples) collected in the field were stored on ice and in the dark until they reached the laboratory, and were analyzed following the procedures listed in Table 2 (APHA, 1992; EPA, 1983; Lind, 1985). The total metals analyses (arsenic, cadmium, chromium, copper, iron, mercury, nickel, lead, and zinc) were done by AmTest[2]. The plankton samples were placed in a cooler and returned to the laboratory unpreserved. In the laboratory the sample volumes were measured and each sample was split into a taxonomic sample and an archived sample. Both types of plankton samples were preserved with Lugol's solution and analyzed as soon as possible. The bacteria samples were analyzed by the City of Bellingham at their water treatment plant. All other analyses were done by the personnel hired by this grant.

[2]AmTest, 14603 N.E. 87th St., Redmond, WA, 98052.

2.3 Results and Discussion

2.3.1 Hydrolab data

The 1994/95 Lake Whatcom Hydrolab data (dissolved oxygen, temperature, pH, and conductivity) are shown in Figures 2–21 and summarized in Tables 3–7 (see Sections 9–10 for all Tables and Figures). In order to provide a better analysis of the water quality patterns in the lake, the graphs include data from the previous two contract years. The lines on these figures connect data from a single sampling depth through time. Because of the large number of sampling depths, it is not practical to include a depth key, but the raw data are listed in Appendix B. The lines help identify seasonal patterns of convergence and divergence; however, they do not represent continuous sampling. Furthermore, missing values were not interpolated. As a result, some of the lines join values separated by more than one sampling period, and the minimum and maximum values represent only dates actually sampled, not the annual extremes.

The 1994/95 temperature data are plotted in Figures 2 through 6. A comparison of the minimum and maximum temperatures recorded at each site indicated that the summer of 1995 was as much as 2.2 degrees (C) cooler during the summer and 1.8 degrees warmer during the winter than during the previous two sampling years.

	1992/93		1993/94		1994/95	
Site	Min	Max	Min	Max	Min	Max
1	4.7	22.4	4.6	22.2	5.4	21.5
2	5.9	22.7	5.0	22.0	6.8	21.1
Intake	6.0	23.0	6.0	22.5	6.8	21.1
3	5.8	22.8	6.0	21.5	6.6	20.6
4	5.8	22.0	6.3	21.5	6.6	20.0

Minimum and maximum recorded temperatures (°C).

Despite the slightly cooler summer temperatures, both Sites 1 and 2 developed severe hypolimnetic oxygen deficits by mid-summer (Figures 7 and 8). We have been watching the summer oxygen patterns in basin 1 closely to see whether the cooler, cloudier summer of 1995 would mitigate the rate of hypolimnetic oxygen loss. There did appear to be a slightly slower rate of oxygen depletion compared to 1994. As a result, in 1995 the hypolimnion became anaerobic in late August rather than early August. However, the oxygen concentrations throughout the hypolimnion dropped to near zero, which is a pattern that seems to have appeared recently.

The data below show the oxygen profiles for Site 1 during the first or second week in September from 1988 through 1995. Depths above 8 meters lie within the epilimnion, which circulates freely during the summer and maintains high oxygen concentrations.

Lower depths (hypolimnion and metalimnion) show the effects of oxygen consumption in the portion of the lake that is isolated from the surface. Beginning in 1994, the oxygen concentrations at 8–10 m have dropped below 1 mg/L, whereas previously they remained above 1 mg/L

Early September dissolved oxygen concentrations at Site 1								
Depth	1988	1989	1990	1991	1992	1993	1994	1995
0	9.62	9.7	9.6	9.5	9.2	9.7	9.7	10.3
1		9.6	9.6	9.4		10.1	9.6	9.9
2	9.71	9.6	9.7	9.4		10.0	9.6	9.9
3		9.6	9.6	9.3		9.9	9.5	9.8
4	9.77	9.5	9.6	9.3		9.9	9.5	9.8
5		9.5	9.6	9.2	9.2	9.8	9.4	9.6
6	9.62	9.5	9.5	9.0		9.7	9.1	9.6
7		9.4	9.2	8.7		9.6	9.3	9.5
8	8.48	9.0	8.2	8.7		9.3	9.0	9.5
9		7.8	6.2	8.3		4.9	4.5	6.4
10	2.39	5.6	4.7	6.8	5.2	3.4	0.1	3.7
11		3.0	2.2	5.4		1.7*	0.1	0.1
12	1.08	1.7	1.7	2.1		1.7*	0.0	0.1
13		0.8	1.1	1.1		1.7*	0.0	0.1
14	0.7	0.6	0.8	0.6		1.7*	0.0	0.1
15		0.6	0.8	0.6	0.7	1.7*	0.0	0.1
16	0.43	0.5	0.8	0.6		1.7*	0.0	0.1
17		0.5	0.8	0.6		1.7*	0.0	0.1
18	0.38	0.5	0.9	0.6		1.6*	0.0	0.1
19		0.5	0.9	0.6		1.6*	0.0	0.0
20			0.9	0.7	1.1	1.6*	0.0	0.0
21			0.8					

*Oxygen probe appeared to have lost sensitivity at low oxygen concentrations; Hydrolab was reconditioned during fall of 1993.

The effects of residential development on basins 1 and 2 will very likely include an increase in the biological productivity of the lake. We are not certain whether the 1994 and 1995 summer oxygen data indicate that this increase is now measurable, or that the differences are just annual variations. Earlier data (1960–1987) are not helpful because prior to 1988, oxygen data were only collected at a few depths (usually surface and bottom). Regardless of the cause, this condition presents a problem for basin 1 because the low oxygen concentrations allow dissolved nutrients, metals, and other compounds such as hydrogen sulfide to leak from the sediments and move freely through the hypolimnion. The narrow boundary between the epilimnion and hypolimnion means that these compounds can move to within 8–10 m of the surface. This places additional nutrients within the photic zone of the lake, increasing the accessibility of these nutrients to phytoplankton, and increasing the overall productivity of the basin. (As mentioned below, the greatest chlorophyll concentrations at Site 1 are usually at 10 m.)

The pH and conductivity data followed typical trends for Lake Whatcom, with only small differences between sites and depths except during the summer. During the summer the surface pH increased due to photosynthetic activity, especially at Site 1. Hypolimnetic pH values decreased and conductivity values increased due to decomposition and the release of dissolved compounds from the sediments. The conductivities from April through December, 1993, increased gradually due to a problem with the Hydrolab probe (see Matthews and Matthews, 1995). The probe was repaired before sampling in February, 1994, and the Hydrolab conductivity data since that time have been in close agreement with the laboratory conductivity data.

2.3.2 Other ambient water quality data

The remaining water quality data that were collected monthly or bimonthly (nutrients, alkalinity, turbidity, Secchi depth, chlorophyll, bacteria, and plankton) are shown in Figures 22 through 96 and summarized in Tables 3 through 7 (see Sections 9–10). The raw data are listed in Appendix B. In order to provide a better analysis of the water quality patterns in the lake, the graphs also include data from the previous two contract years. Because of the large amount of data presented in these graphs, only the important patterns will be discussed in the text. The metals data from 1993/95 are listed in Table 8; the AmTest data reports for the lake and creek samples are included in Appendix B.

The alkalinity and lab conductivity values (Figures 22 through 21) remained fairly low at all sites except at the deepest sampling points for Site 1 and Site 2. During the summer at these locations the alkalinity and conductivity values increase due to decomposition and the release of dissolved compounds in the lower waters. The turbidity values (Figures 32 through 36) were mostly <1–2 NTU except during late summer samples at the lower depths at Sites 1 and 2. The influences of winter storm-related turbidity can also be seen, particularly in basin 3.

The nutrient data from Site 1 continue to show that basin 1 is more productive than the rest of Lake Whatcom. The 1995 late summer ammonia concentrations were high at the lowest depths at Sites 1 and 2 (Figures 42 through 46). The September 1995 ammonia concentration at Site 1, 20 m, was lower than last year. This was probably due to the cooler summer in 1995, which delayed the onset of ammonia release by 4–6 weeks. The highest ammonia concentrations are usually measured just prior to overturn[3], so the ammonia peak height for 1995 has not yet been established. As in 1994, there was an ammonia peak at Site

[3]The October 1995 ammonia concentrations for Site 1, 15–20 m were 183 and 184 μg/, which is lower than in 1994, but higher than 1992 and 1993. The ammonia concentrations for Site 2, 20 m, was 198 μg/L, which is higher than 1994.

4, 20 m during the summer. This phenomenon is probably the result of a band of bacterial activity at the thermocline, and is unrelated to low oxygen conditions. A similar pattern was observed in the oligotrophic (biologically unproductive) deep basin of Lake Samish during the summers of 1993 and 1994 (McNair, 1995)

The nitrate depletion rates at Sites 1 and 2 were slower during the summer of 1995 than 1994 (Figures 47 through 51), but were about the same as the summer of 1993. Soluble phosphate concentrations remained low at all sites and depths throughout the summer of 1995 (Figures 62 through 66). The soluble phosphate peaks at Sites 1 and 2 are usually short-lived, occurring just prior to overturn, and are usually accompanied by increased turbidity and total phosphorus levels, indicating a link between the release of phosphorus from the sediments and increased turbulence in the hypolimnion just prior to fall overturn. The cool 1995 summer delayed the development of anoxia at Site 1, so the release of phosphorus will also be delayed. The highest total phosphorus concentrations were measured during late summer at Sites 1 and 2 at 20 m (Figures 67 through 71). As of August, 1995, the Site 1 total phosphorus concentrations had not reached the levels measured in 1994 but the Site 2 concentrations were about the same as in 1994.

In keeping with the general pattern, the summer of 1995 had slightly lower chlorophyll concentrations than 1994. Site 1 usually had the highest chlorophyll concentrations and total plankton counts (Figures 72 through 76 and 87 through 91), but the differences between Site 1 and the other lake sites, including those in basin 3, were less than last year. The effects of reduced light transmission were apparent at at all sites, especially Site 1, as seen in the lower chlorophyll concentrations at 20 m. In addition, it appears that nutrients from the hypolimnion were being utilized because the highest summer chlorophyll concentrations were measured at 10 m for Site 1 and 15 m for Site 2. Diatoms (Chyrsophyta) and green algae (Chlorophyta) dominated the phytoplankton counts. Site 1 had unusually high green algal counts during the summer of 1995, but because the algae were mostly small flagellates, the high counts did not always equate with high chlorophyll concentrations. Secchi depths (Figures 92 through 96) continue to show no clear seasonal patterns, probably because transparency in Lake Whatcom is a function of both summer algal blooms and winter storm events.

Most of the Lake Whatcom coliform and *Enterococcus*[4] counts were low throughout the year (Figures 77 through 86 and Appendix B.4). The total coliform counts increased slightly during October and November, which appears to be a typical pattern. There was a single high *Enterococcus* count of 90 CFU/100 mL at Site 4 on September 11, 1995 and a single high fecal coliform count of 1600 CFU/100 mL at Site 3 on May 2, 1995 (see Appendix B.4). In addition to our regularly sampled lake sites, in November, 1994, we began collecting monthly bacteria samples from the Bloedel-Donovan area (Appendix B.4). The Bloedel-Donovan bacteria counts were usually slightly higher than mid-basin

[4]The City began providing *Enterococcus* data in June, 1995. Because there were only four samples collected at each site in 1994/95, the *Enterococcus* data were not plotted.

counts, ranging from 4–1600 CFU/100 mL, 2–1600 CFU/100 mL, and 2–4 CFU/100 mL for total coliforms, fecal coliforms, and enterococci, respectively. The highest total coliform counts (1600 CFU/100 mL) were collected on November 11, 1994 and May 2, 1995; the single high fecal coliform count (1600 CFU/100 mL) was collected on May 2, 1995. As shown below, the fecal coliform and *Enterococcus* geometric means[5] at all sites, including Bloedel-Donovan, met the EPA criteria for freshwater swimming areas of no more than 126 fecal coliforms/100 mL or 33 enterococci/100 mL (EPA, 1986).

	Bloedel	Site 1	Site 2	Intake	Site 3	Site 4
Fecal Coliform Geom. Mean	18.4	2.00	2.17	2.00	4.63	1.97
Enterococcus Geom. Mean	3.72	2.00	1.41	2.34	3.80	4.36

It should be noted, however, that the Lake Whatcom Monitoring Project is not designed to test bacterial levels at public beaches, but rather to provide long-term water quality data describing the general condition of the lake.

The September 1995 metals concentrations were fairly similar to those from previous years (Table 8). Arsenic, chromium, mercury, nickel, and lead were at, or below, detection limits at all sites. Zinc concentrations were detectable, but low, throughout the lake. The cadmium concentration at Site 1, 20 m, was 6 μg/L, which was higher than expected. This concentration is above the National Primary Drinking Water Standard of 5 μg/L and the WAC water quality standard for freshwater of 0.4–1.5 μg/L (Federal Register, 1991; WAC 173–201A). The cadmium concentrations at all other sites were less than 2 μg/L. The reason for the elevated cadmium concentration is not known. At the same location, the copper concentration was 20 μg/L and iron concentration was 640 μg/L. The copper concentration did not exceed the National Secondary Drinking Water Standard (1300 μg/L), but was above the WAC freshwater standard of 3.6–4.9 μg/L. Copper concentrations in Lake Whatcom and its tributaries are usually near the detection limit of 2 μg/L, but concentrations of 6–12 μg/L are not uncommon. The source of copper could be from residential runoff as well as from mineral-rich soils in the watershed (Walker, et al., 1992; Matthews and Matthews, 1994). The high iron concentration did not exceed freshwater standards (1000 μg/L; EPA, 1986), but was higher than the Secondary Drinking Water Standard of 300 μg/L. High iron concentrations in drinking water sources may increase water treatment requirements, or cause taste and odor problems and staining of porcelain and laundry. Elevated iron concentrations are commonly measured near the anoxic sediments at Sites 1 and 2.

[5]Geometric means were calculated as described by Fisher and Van Belle (1993). Arithmetic means for all regularly sampled lake sites are presented in Tables 3-7.

3 Creek Monitoring

3.1 Site Descriptions

Seven creeks were sampled biannually during the 1994/95 monitoring program, including Austin Creek, Anderson Creek[6], the Park Place storm drain, Silver Beach Creek, Smith Creek, the unnamed creek that flows through the Wildwood campground, and the northern unnamed creek on Blue Canyon Rd. (Blue Canyon #1). The exact sampling locations for these sites are described by Walker, et al. (1992), and are summarized in Appendix A.

These creeks included two small, mostly forested creeks located in the southern portion of the watershed (Wildwood Creek and Blue Canyon Creek); a small residential creek located in the northeastern portion of the watershed (Silver Beach Creek); one underground storm drain (Park Place drain); two large, perennial creeks (Austin Creek and Smith Creek); and Anderson Creek, which is a major water source for Lake Whatcom because is receives the diversion flow from the Middle Fork of the Nooksack River. These seven creeks represent water quality conditions ranging from heavily impacted by residential runoff (Park Place drain) to relatively unaffected by residential development (e.g., Blue Canyon Creek). Of the three large creeks, Austin Creek, which is sampled near its mouth, receives residential runoff from Sudden Valley. Smith Creek and Anderson Creek, which are also sampled near their mouths, receive relatively little residential runoff.

3.2 Field Sampling and Analytical Methods

The creeks were sampled on February 23 and August 15, 1995. The water quality parameters measured for the 1994/95 creek monitoring program are shown in Table 9. The analytical procedures are summarized in Table 2. All water samples (including bacteriological samples) collected in the field were stored on ice and in the dark until they reached the laboratory. Once in the laboratory the handling procedures that were relevant for each analysis were followed (see Table 2). The total metals analyses (arsenic, cadmium, chromium, copper, iron, mercury, nickel, lead, and zinc) were done by AmTest, Inc. The bacteria samples were analyzed by the City of Bellingham at their water treatment plant. All other analyses were done by the field and laboratory personnel hired by this grant.

3.3 Results and Discussion

The primary purpose for the biannual creek monitoring was to provide data that can be compared to the more complete data set generated in 1990 during the storm water runoff

[6]Anderson Creek was added to our routine sampling effort beginning in February 1995.

project (Walker, et al., 1992). Tables 10 through 13 show selected creek data from the 1993/95 compared to the 1990 average water quality values for each creeks.

Most of the 1994/95 creek data fell within expected ranges. Compared to the streams in forested areas, the residential streams typically had higher conductivities; higher ammonia, phosphorus, and total suspended solids concentrations; and much higher total and fecal coliform[7] counts. The nitrite/nitrate and total nitrogen concentrations were mostly higher in February than in August, which was probably due to leaching of soluble nitrogen compounds during the wet season. The ammonia concentrations were mostly higher during August, especially in the small residential streams. Ammonia is converted fairly quickly to nitrate in turbulent water, so the ammonia in the Lake Whatcom streams probably came from near-by watershed sources (animal wastes, swampy areas, etc.), and persisted long enough to be sampled because of the lower flow rates during August. The metals concentrations at all sites were at or near their detection levels except for iron (240–790 μg/L), lead (which was ≤ 3 μg/L), copper (3–8 μg/L), and zinc (7–19 μg/L). None of the metals concentrations exceeded the 1990 ranges.

4 HSPF Hydrologic Modelling

The HSPF model calibrations were originally completed as part of an earlier project (Walker, et al., 1992). In August, 1994 the HSPF data and model parameters were updated by Steve Walker, as part of his M. S. thesis (Walker, 1995). In his thesis, Mr. Walker describes the Lake Whatcom HSPF model application in detail. He lists problems and discrepancies in the time series data, describes the structure of the Lake Whatcom HSPF model, and includes an error analysis to identify the most important changes that could be implemented to improve the accuracy of the model estimates.

Figures 140 through 143 show the predicted hydrologic inputs (lake surface precipitation, watershed runoff, and diversion flow) and outputs (Whatcom Creek, fish hatchery, Georgia-Pacific, Bellingham and Water District #10 withdrawals, and lake evaporation) for the Lake Whatcom watershed. Whatcom Creek and Georgia Pacific continue to be the major outputs; watershed runoff and the Nooksack River diversion continue to be the major inputs.

[7]A single set of *Enterococcus* creek samples were collected in August, 1995; data are insufficient to establish trends.

5 Park Place Wet Pond Monitoring

5.1 Field Sampling and Analytical Methods

The Park Place Storm Water Quality Facility was sampled on October 26-28, 1994; March 13-15, 1995; June 26-28, 1995; and September 25-27, 1995. The sample regime consisted of two components: composite samples and grab samples. Automatic composite samplers (ISCO type, supplied by the City of Bellingham) were placed at the inlet and outlet of the storm water quality facility. The inlet sampler was located at the casement on North Shore Drive directly opposite Britton Road. The outlet sampler was located at the outlet well of the facility. Water samples were collected by the composite samplers continually over the 48 hours of each sample period at 90 minute intervals (120 minute intervals for the October 1994 sample period). Composite samples for each of the three cells of the facility were obtained by collecting grab samples for the appropriate water quality parameters (total number of samples per cell for each sample period = 4) and compositing equal volumes of each grab sample. Composite samples were analyzed for representative total metals, total Kjeldahl nitrogen, total phosphorus, total organic carbon, total hydrocarbons, and total suspended solids by AmTest. The composite data for the Park Place wet pond are included in Appendix C.

Grab samples were collected at the inlet, each of the three cells, and the outlet. Inlet grab samples were collected from the manhole at the northwest corner of North Shore Drive and Britton road. Cell grab samples were collected 0.3 meters below the surface at the approximate midpoint of each cell. Outlet grab samples were collected from the casement in the middle of Park Place (the September 1995 samples were collected at the culvert outfall to Lake Whatcom). Grab samples were taken four times during each 48-hour sample period. *In situ* temperature, pH, dissolved oxygen, and conductivity was measured at each grab sample using a Hydrolab Surveyor. Total suspended solids samples were collected and subsequently analyzed by EREC personnel. Bacteria samples were collected and analyzed for total coliforms, fecal coliforms, and *Enterococcus* by City of Bellingham Department of Public Works personnel. The grab sample data for the Park Place wet pond are included in Appendix C.

5.2 Results and Discussion

Pond construction and vegetation planting had just been completed by the fall of 1994 when our first samples were collected. At that time, the pond was probably only functioning as a sediment trap; it is unlikely that there was much biofiltration occurring. By the following September, however, the aquatic macrophytes were well established and were expanding their coverage (see Appendix C.2). Unfortunately, the role of these macrophytes in improving water quality in this facility will probably be quite limited because the littoral zone in the pond is very small. Furthermore, water usually moves through the pond quickly, which, along with the small littoral zone, limits macrophyte biofiltration. Finally, the period of greatest runoff is during the fall and winter, which is not the growing season for aquatic plants.

Dense mats of algae, principally consisting of filamentous greens and the net-like *Hydrodictyon* established themselves in the cells of the pond. These mats increased in density through the growing season, especially in cell-1 and cell-2. They contributed to oxygen depletion at the bottom of the cells and supersaturation near the surface (June 1995 sampling showed severe anoxia in the bottom cell-1 and cell-2), interfered with sampling, and have been cited as a nuisance by residents near the pond, who complained about the unappealing, scum-like look (see Appendix C.3). Oxygen depletion may prove to be a serious problem in the Park Place wet pond for the same reasons that it is a problem in the lake. The City may want to consider removing the algal mats when they become a nuisance. There should be an added benefit from removing the algal mats because nutrients are removed from the water column by the algae, thus providing some biofiltration, as long as the algae are removed from the pond before they die and decompose.

Field data and analytical results are summarized in Table 14 and Figures 98 – 136. In the grab samples there was a fairly consistent reduction in the total suspended solids concentrations between the inflow and outflow (Table 14). The percent reduction ranged from 24% in June to 85% in October. In September, the total suspended solids concentrations increased slightly at the outlet (2%). Coliforms and *Enterococcus* counts also were reduced between the inlet and outlet, except in September. The temperatures and pH levels were higher at the outlet during the summer, and dissolved oxygen levels were lower, due to the algal activity in the pond. Conductivities increased at the outlet, most likely due to calcium carbonate leaching from the limestone berms.

In the composition data the total suspended solids concentrations also were lower at the outlet (4–87% reductions). Arsenic, cadmium[8], chromium, and nickel concentrations were consistently at or below their detection limits. Copper, iron, and zinc concentrations were lower at the outlet on most occasions. There were large concentration increases at the outlet for copper and lead in October, 1994, and for iron in September, 1995. The iron releases in September were probably due to the low oxygen concentrations in the pond during late summer. The October increases have no apparent cause other than the fact that the pond was newly established at that time. Total organic carbon concentrations were higher at the outlet except in September when the TOC concentrations were particularly high at the inlet (and cell 1). Total Kjeldahl nitrogen and total phosphorus concentrations showed no consistent patterns, although total Kjeldahl nitrogen was higher at all sites during June and September, 1995.

[8]Data for 32 different metals are included with the AmTest reports in Appendix C.3; only the results for cadmium, chromium, copper, iron, lead, nickel, and zinc are discussed here.

Measuring discharge into the facility proved difficult. An automatic flow monitoring system was installed by the City in February 1995. This consisted of a Marsh-McBurney magnetic flow sensor mounted in the outlet pipe in the casement located on Park Place and attached to a data logging unit. Flow data are only available for the March 1995 sample period, as flows were too low to measure for the June and September 1995 sample periods. The flow system was removed by the City in November of 1995.

Bathymetric mapping of the cells to establish sedimentation rates was also problematic. Several methods were tried, but the small size, relatively shallow depth, steep sides, and soft sediments of the cells prevented acquiring accurate water depth measurements along transect lines. Field measurements indicated that the depth profile of the cells was consistent with the engineering plans for the facility, so a scanned map of the engineering drawing has been included in this report (Figure 97). A more suitable method of assessing sedimentation rates would involve establishing sediment traps in each cell and monitoring sediment accumulation over extended periods. Sediment depth measuring also proved unfeasible, as there is no hard bottom beneath the sediments, and coring devices could damage the membrane that lines the cells.

In summary, because the pond was only recently constructed, and the vegetation is not yet stabilized, it is difficult to tell whether there will be an effective biofiltration process. However, the pond did appear to act as a sediment trap most of the year, reducing sediment and metals discharges into Lake Whatcom from the Park Place storm drain. Nuisance growths of algae occurred during the summer that caused low oxygen conditions at the bottom of the pond. The City may want to consider harvesting algal mats when they become dense as a means of increasing the biofiltration potential in the pond and because low oxygen concentrations may cause the release of nutrients and metals from the pond sediments.

6 1993/95 Microlayer Study

6.1 Field Sampling and Analytical Methods

The Lake Whatcom microlayer study was designed to provide information about the concentrations of metals, hydrocarbons, and other chemicals that are present, sometimes in high concentrations, in the thin film (< 1 mm) at the surface of the lake. Water samples were collected on September 26–27, 1993 and February 5, 1994 at 4 sites in basins 1 and 2: the Bloedel-Donovan boat dock, mid-basin 1 (Site 1), the intake, and mid-basin 2 (Site 2). Two microlayer sampled and two and underlying surface water (bulk-water) samples were collected at each site. The metals and hydrocarbon samples were analyzed by AmTest, Inc.; the data are summarized in Tables 15 through 18.

6.2 Results and Discussion

The Lake Whatcom microlayer study was part of an M. S. thesis research project conducted by Karen Christner (1995). In addition to the metals and hydrocarbon data collected for the City, Ms. Christner measured the concentrations of total organic carbon and selected polycyclic aromatic hydrocarbons (which are common wood-smoke contaminants). Her thesis includes an analysis of all of the microlayer data; only a brief summary of her results will be discussed here.

There were large variances between "replicate" microlayer samples; however, this was to be expected. The microlayer is very heterogeneous, in part because it accumulates hydrophobic compounds that form localized slicks, and also because material at the surface of the lake is subject to wind-related, localized accumulations. Because of this, microlayer samples collected in close proximity may be as different from one-another as samples taken from opposite ends of the lake. Despite this variability, there were significant differences between the metals and total organic carbon concentrations in the microlayer compared to water collected just below the lake's surface. All of the total organic carbon concentrations in microlayer samples were significantly different from the mean concentration of the bulk water samples (z-statistic, $\alpha \leq 0.05$). When comparing the microlayer samples to the bulk water, 88% of the aluminum concentrations, 94% of the iron, and 56% of the zinc concentrations were significantly higher in the microlayer.

All of the total hydrocarbons and oil and grease microlayer concentrations were below the detection limits (1 mg/L). Unfortunately, 1 mg/L is a high detection limit and can't measure the small amounts of hydrocarbons that might be present in the microlayer. Lower detection limits were not feasible for this study because of the added analytical expense and because of the large microlayer sample that would have had to be collected. (All of the microlayer samples in Lake Whatcom were collected at night during the calm, pre-dawn period on the lake, and each sample took approximately 1 hour to collect.)

During February the weather conditions just prior to sampling were cold and clear, with an apparent temperature inversion that caused visible haze, especially around basin 1. Both microlayer samples from Site 1 were opaque and very dark, while the samples from other sites were more-or-less clear (Figures 137 through 139). Nearly all of the metals concentrations in the February microlayer samples from Site 1 were higher than the other bulk-water or microlayer samples. The only detectable concentrations of chromium, lead, and nickel were measured in the February microlayer samples from Site 1. During this sampling period the only detectable concentrations of polycyclic aromatic hydrocarbons were measured in the microlayer samples at Site 1 and Bloedel-Donovan.

The metals and organics in the microlayer undoubtedly come from both natural sources (*e.g.*, dust from local soils, microbiota trapped in the surface layer, etc.) and anthropogenic sources (*e.g.*, wood smoke, dust from road surfaces, boating activities, etc.). Because the microlayer of the lake represents a very small volume of water, and the microlayer in basin

1 is smaller yet, the overall influence of microlayer contaminants on water quality in the lake is likely to be minimal. Nevertheless, the data indicate that metals and polycyclic aromatic hydrocarbons were concentrated in the microlayer of basin 1, especially during periods of air stagnation.

7 Quality Control

In order to maintain a high degree of accuracy and confidence in the water quality data all personnel associated with this project were trained according to EREC standard operating procedures. Single-blind quality control tests were conducted during August, 1995, and the results are presented in Table 19). All results from the single-blind test were within the expected ranges. Laboratory duplicates were analyzed for at least 10% of all water quality parameters except those collected using the Hydrolab, and field duplicates were collected and analyzed for at least 10% of all of the water quality parameters except those collected using the Hydrolab. Duplicate water samples were analyzed for at least 10% of the Hydrolab measurements using water samples collected from the same depth as the Hydrolab measurement. The duplicate data were used to create control charts for as many of the laboratory analyses as possible[9], using a minimum of 10 replicates for each chart. These results are presented in Figures 144 through 150. In addition, Figures 151 through 154 show the paired plots for all of the 1994/95 field duplicate data. The paired plots were linear, and demonstrated that the variances were homogeneous throughout the concentration ranges.

8 References

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[9]Parameters that are sampled infrequently or that generated mostly below-detection values, may not have generated enough QC data to develop a control chart.

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9 Tables

Parameter	1994 Oct	Nov	Dec	1995 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Location
DO - Hydrolab	•	•	•		•		•	•	•	•	•	•	Sites 1, 2, Intake - every 1 m;
pH - Hydrolab	•	•	•		•		•	•	•	•	•	•	Sites 3, 4 - every 1 m to 10 m
Temp - Hydrolab	•	•	•		•		•	•	•	•	•	•	then every 5 m;
Cond - Hydrolab	•	•	•		•		•	•	•	•	•	•	Gatehouse
Secchi disc	•	•	•		•		•	•	•	•	•	•	Sites 1, 2, 3, 4, Intake
Ammonia	•	•	•		•		•	•	•	•	•	•	Sites 1, 2 - 0.3, 5, 10, 15, 20 m;
Nitrite/Nitrate	•	•	•		•		•	•	•	•	•	•	Intake - 0.3, 5, 10 m;
Total Nitrogen	•	•	•		•		•	•	•	•	•	•	Site 3 - 0.3, 5, 10, 20, 40, 60,
Soluble Phosphate	•	•	•		•		•	•	•	•	•	•	80 m;
Total Phosphorus	•	•	•		•		•	•	•	•	•	•	Site 4 - 0.3, 5, 10, 20, 40, 60,
Alkalinity	•	•	•		•		•	•	•	•	•	•	80, 90 m;
Conductivity (lab)	•	•	•		•		•	•	•	•	•	•	Gatehouse
Turbidity	•	•	•		•		•	•	•	•	•	•	
Total Arsenic												•	Sites 1, 2, 3, 4, Intake -
Total Cadmium												•	0.3 m and bottom only
Total Chromium												•	
Total Copper												•	
Total Iron												•	
Total Lead												•	
Total Mercury												•	
Total Nickel												•	
Total Zinc												•	
Total O. Carbon					•							•	
Chlorophyll	•	•	•		•		•	•	•	•	•	•	Sites 1, 2, 3, 4 - 0.3, 5, 10,
													15, 20 m; Intake - 0.3, 5, 10 m
Plankton	•	•	•		•		•	•	•	•	•	•	Sites 1, 2, 3, 4, Intake; 5 m
Bacteria (City)	•	•	•		•		•	•	•	•	•	•	Sites 1, 2, 3, 4, Intake; 0.3 m

Table 1: Lake Whatcom 1994/95 lake monitoring schedule.

Parameter	Method	Description	Detection Limits (dl) or Sensitivity (±)
Conductivity-field	Field meter	Hydrolab	± 2 μMHO/cm
Conductivity-lab	APHA 2510	Low-level	± 2 μMHO/cm
Dissolved oxygen-field	Field meter	Hydrolab	± 0.1 mg/L
Dissolved oxygen-lab	APHA 4500-O.C.	Winkler titration	± 0.1 mg/L
pH-field	Field meter	Hydrolab	± 0.1 pH unit
pH-lab	APHA 4500-H^+	Low-ionic	± 0.1 pH unit
Temperature	Field meter	Hydrolab	± 0.1° C
Alkalinity	APHA 2320 B	Low level method	± 0.1 mg/L
Discharge	Lind (1985)	Rating curve	na
Secchi disk	Lind (1985)	na	± 0.1 m
Total suspended solids	APHA 2540	Gravimetric	dl = 2 mg/L
Turbidity	EPA 180.1	Nephelometric	± 0.2 NTUs
Ammonia	EPA 350.1 D	Phenate	dl = 5 μg/L
Nitrite/Nitrate	EPA 353.1	Cd reduction	dl = 10 μg/L
Total Nitrogen	Ebina et al. (1983)	Modified, salicylate	dl = 100 μg/L
Soluble Phosphate	EPA 365.1	Ascorbic acid	dl = 5 μg/L
Total Phosphorus	EPA 365.1	Persulf. digestion	dl = 5 μg/L
Chlorophyll	APHA 10200 H	Acetone extract	± 0.1 mg/m^3
Plankton	Lind (1985)	Schindler trap (1 m)	na

Table 2: Summary of analytical methods.

Variable	Arith. Mean (9/94-10/95)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	20.0	1.9	15.9	27.0
Conductivity - lab (μMHO)	65.3	3.6	62.6	78.5
Conductivity - Hydrolab (μMHO)	65.1	3.1	62.0	78.0
Dissolved oxygen (mg/L)	8.5	3.6	0.0	11.7
pH	7.5	0.5	6.7	8.4
Temperature (°C)	11.8	4.6	5.4	21.5
Turbidity (NTU)	1.0	1.3	0.3	7.9
Nitrogen, ammonia (μg/L)	33*	61	< 5	307
Nitrogen, nitrate/nitrite (μg/L)	252	115	53	417
Nitrogen, total (μg/L)	371	96	121	569
Phosphorus, sol. phosphate (μg/L)	< 5*	4	< 5	31
Phosphorus, total (μg/L)	7*	7	< 5	43
Chlorophyll a (mg/m^3)	2.1	1.4	0.3	4.7
Secchi depth (m)	5.7	1.3	3.6	7.6
Coliforms, fecal (CFU/100 mL)	< 2**	1	< 2	4
Coliforms, total (CFU/100 mL)	37**	51	< 2	170
Enterococcus (CFU/100 mL)	2	1	1	4

* Means were calculated by replacing bdl values with 2.5 (detection limit = 5μg/L).
**Means were calculated by replacing bdl values with 0 (detection limit = 2/100 mL).

Table 3: Site 1 average ambient water quality data.

Variable	Arith. Mean (9/94-10/95)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.9	1.2	16.6	23.7
Conductivity - lab (μMHO)	62.6	1.0	61.8	67.7
Conductivity - Hydrolab (μMHO)	62.6	1.5	60.0	74.0
Dissolved oxygen (mg/L)	9.6	2.4	0.0	12.0
pH	7.6	0.4	6.5	8.3
Temperature (°C)	12.8	4.9	6.8	21.1
Turbidity (NTU)	0.7	0.8	0.3	5.9
Nitrogen, ammonia (μg/L)	14*	35	< 5	188
Nitrogen, nitrate/nitrite (μg/L)	290	85	62	410
Nitrogen, total (μg/L)	401	77	243	550
Phosphorus, sol. phosphate (μg/L)	< 5*	0	< 5	< 5
Phosphorus, total (μg/LL)	< 5*	3	< 5	14
Chlorophyll a (mg/m^3)	1.4	0.6	0.5	3.7
Secchi depth (m)	5.8	1.3	3.6	7.0
Coliforms, fecal (CFU/100 mL)	< 2**	3	< 2	9
Coliforms, total (CFU/100 mL)	25**	38	< 2	130
Enterococcus (CFU/100 mL)	< 2	1	1	2

* Means were calculated by replacing bdl values with 2.5 (detection limit = 5μg/L).
**Means were calculated by replacing bdl values with 0 (detection limit = 2/100 mL).

Table 4: Site 2 average ambient water quality data.

Variable	Arith. Mean (9/94-10/95)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.8	0.6	17.5	19.5
Conductivity - lab (μMHO)	62.4	0.2	61.8	62.7
Conductivity - Hydrolab (μMHO)	62.6	0.7	61.0	64.0
Dissolved oxygen (mg/L)	10.3	0.9	9.1	12.0
pH	7.8	0.2	7.2	8.2
Temperature (°C)	14.0	5.2	6.8	21.1
Turbidity (NTU)	0.6	0.3	0.4	1.4
Nitrogen, ammonia (μg/L)	3*	2	< 5	13
Nitrogen, nitrate/nitrite (μg/L)	300	82	186	442
Nitrogen, total (μg/L)	383	77	264	535
Phosphorus, sol. phosphate (μg/L)	< 5*	0	< 5	< 5
Phosphorus, total (μg/L)	3*	2	< 5	9
Chlorophyll a (mg/m^3)	1.5	0.5	0.5	2.5
Secchi depth (m)	5.7	1.0	3.6	6.7
Coliforms, fecal (CFU/100 mL)	< 2**	1	< 2	2
Coliforms, total (CFU/100 mL)	48**	57	< 2	170
Enterococcus (CFU/100 mL)	3	1	1	5

* Means were calculated by replacing bdl values with 2.5 (detection limit = 5μg/L).
**Means were calculated by replacing bdl values with 0 (detection limit = 2/100 mL).

Table 5: Intake site average ambient water quality data.

Variable	Arith. Mean (9/94-10/95)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.3	0.6	17.2	20.3
Conductivity - lab (μMHO)	62.4	0.4	61.7	64.2
Conductivity - Hydrolab (μMHO)	61.8	1.4	59.0	70.0
Dissolved oxygen (mg/L)	9.6	0.9	3.5	11.2
pH	7.5	0.4	6.8	8.3
Temperature (°C)	10.9	5.2	6.6	20.6
Turbidity (NTU)	0.55	0.4	0.2	1.5
Nitrogen, ammonia (μg/L)	< 5*	2	< 5	14
Nitrogen, nitrate/nitrite (μg/L)	380	90	183	539
Nitrogen, total (μg/L)	428	68	262	599
Phosphorus, sol. phosphate (μg/L)	< 5*	0	< 5	< 5
Phosphorus, total (μg/L)	3*	2	< 5	10
Chlorophyll a (mg/m^3)	1.2	0.8	0.2	3.5
Secchi depth (m)	6.6	2.3	3.2	8.0
Coliforms, fecal (CFU/100 mL)	< 2**	3	< 2	8
Coliforms, total (CFU/100 mL)	17**	26	< 2	80
Enterococcus (CFU/100 mL)	6	4	1	13

* Means were calculated by replacing bdl values with 2.5 (detection limit = 5μg/L).
**Means were calculated by replacing bdl values with 0 (detection limit = 2/100 mL).

Table 6: Site 3 average ambient water quality data.

Variable	Arith. Mean (9/94-10/95)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.2	0.6	17.4	21.7
Conductivity - lab (μMHO)	62.3	0.2	61.8	62.8
Conductivity - Hydrolab (μMHO)	61.6	1.3	59.0	65.0
Dissolved oxygen (mg/L)	10.1	0.9	7.5	12.5
pH	7.5	0.3	6.9	8.4
Temperature (°C)	10.0	4.6	6.6	20.0
Turbidity (NTU)	0.4	0.2	0.2	1.1
Nitrogen, ammonia (μg/L)	< 5*	2	< 5	19
Nitrogen, nitrate/nitrite (μg/L)	376	83	103	522
Nitrogen, total (μg/L)	436	78	225	611
Phosphorus, sol. phosphate (μg/L)	< 5*	0	< 5	< 5
Phosphorus, total (μg/L)	< 5*	2	< 5	22
Chlorophyll a (mg/m^3)	1.2	0.6	0.3	3.0
Secchi depth (m)	6.8	1.7	4.9	9.3
Coliforms, fecal (CFU/100 mL)	< 2**	1	< 2	2
Coliforms, total (CFU/100 mL)	10**	15	< 2	50
Enterococcus (CFU/100 mL)	24	38	1	90

* Means were calculated by replacing bdl values with 2.5 (detection limit = 5μg/L).
**Means were calculated by replacing bdl values with 0 (detection limit = 2/100 mL).

Table 7: Site 4 average ambient water quality data.

Site	Date	Depth	As (μg/L)	Cd (μg/L)	Cr (μg/L)	Cu (μg/L)	Fe (μg/L)	Hg (μg/L)	Ni (μg/L)	Pb (μg/L)	Zn (μg/L)
Intake	Sept 1993	0	< 30	< 2	< 6	< 2	40	< 10	< 10	< 1	18
	Sept 1994	0	< 30	< 2	< 6	8	30	< 10	< 10	< 1	< 2
	Sept 1995	0	< 30	< 2	< 6	< 2	30	< 10	< 10	< 1	19
Intake	Sept 1993	10	30	< 2	< 6	< 2	30	< 10	< 10	< 1	8
	Sept 1994	10	< 30	< 2	< 6	6	< 10	< 10	< 10	< 1	11
	Sept 1995	10	< 30	< 2	< 6	< 2	20	< 10	< 10	< 1	32
Site 1	Sept 1993	0	< 30	< 2	< 6	< 2	40	< 10	< 10	< 1	12
	Sept 1994	0	< 30	< 2	< 6	6	30	< 10	< 10	< 1	3
	Sept 1995	0	< 30	< 2	< 6	< 2	40	< 10	< 10	< 1	30
Site 1	Sept 1993	20	< 30	< 2	< 6	3	550	< 10	< 10	6	21
	Sept 1994	20	< 30	< 2	< 6	6	910	< 10	< 10	< 1	2
	Sept 1995	20	< 30	6	< 6	20	640	< 10	< 10	< 1	59
Site 2	Sept 1993	0	< 30	< 2	< 6	< 2	30	< 10	< 10	2	13
	Sept 1994	0	< 30	< 2	< 6	4	< 10	< 10	< 10	< 1	< 2
	Sept 1995	0	< 30	< 2	< 6	< 2	110	< 10	< 10	< 1	18
Site 2	Sept 1993	20	< 30	< 2	< 6	< 2	220	< 10	20	< 1	15
	Sept 1994	20	< 30	3	< 6	4	290	< 10	< 10	< 1	< 2
	Sept 1995	20	< 30	< 2	< 6	< 2	580	< 10	20	< 1	23
Site 3	Sept 1993	0	< 30	< 2	< 6	< 2	30	< 10	< 10	< 1	10
	Sept 1994	0	< 30	< 2	< 6	12	10	< 10	< 10	< 1	12
	Sept 1995	0	< 30	< 2	< 6	< 2	20	< 10	< 10	< 1	58
Site 3	Sept 1993	80	< 30	< 2	< 6	< 2	40	< 10	< 10	< 1	14
	Sept 1994	80	< 30	3	< 6	5	20	< 10	< 10	< 1	< 2
	Sept 1995	80	< 30	< 2	< 6	< 2	50	< 10	20	2	50
Site 4	Sept 1993	0	< 30	< 2	< 6	< 2	30	< 10	< 10	< 1	20
	Sept 1994	0	< 30	< 2	< 6	3	< 10	< 10	< 10	< 1	< 2
	Sept 1995	0	< 30	< 2	< 6	< 2	20	< 10	20	< 1	41
Site 4	Sept 1993	90	< 30	< 2	< 6	< 2	40	< 10	< 10	1	14
	Sept 1994	90	< 30	3	< 6	5	30	< 10	< 10	< 1	2
	Sept 1995	90	< 30	< 2	< 6	< 2	30	< 10	< 10	2	34

All 1993–1995 metals samples were analyzed by AmTest for total metals (unfiltered, digested).

Table 8: Lake Whatcom metals data, 1993–1995.

Parameter	1994 Oct	Nov	Dec	1995 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Temperature					•					•		
Discharge					•					•		
Alkalinity					•					•		
Conductivity					•					•		
DO - Winkler					•					•		
pH					•					•		
T. Suspended Solids					•					•		
Turbidity					•					•		
Ammonia					•					•		
Nitrite/Nitrate					•					•		
Total Nitrogen					•					•		
Soluble Phosphate					•					•		
Total Phosphorus					•					•		
Total Organic Carbon					•					•		
Total Arsenic					•							
Total Cadmium					•							
Total Chromium					•							
Total Copper					•							
Total Iron					•							
Total Lead					•							
Total Mercury					•							
Total Nickel					•							
Total Zinc					•							
Bacteria (City)					•					•		

Table 9: Lake Whatcom 1994/95 creek monitoring schedule.

Site	Date	pH	Cond. (μMHO)	NH_3 (μg/L)	TN (μg/L)	NO_{2+3} (μg/L)	SRP (μg/L)	TP (μg/L)	DO (mg/L)	TSS (mg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
Blue	1990 min	8.1	250	10	-99	167	< 5	< 5	9.0	< 2	90	< 2	
Canyon	1990 avg	8.4	344	20	-99	336	< 5	13	10.5	5	1163	7	
	1990 max	8.6	409	34	-99	545	12	25	12.3	29	9000	27	
	Feb 1993	8.3	391	< 5	689	452	5	8	10.5	4	500	< 2	
	July 1993	8.4	368	< 5	304	274	< 5	18	11.0	7	-99	220	
	Feb 1994	7.5	76	< 5	2234	2049	6	< 5	12.6	2	230	2	
	July 1994	8.4	342	33	483	107	< 5	10	9.3	9	1100	300	
	Feb 1995	8.3	302	11	693	707	< 5	< 5	9.6	9	1400	4	
	Aug 1995	8.4	369	27	176	203	< 5	< 5	10.7	4	140	28	20
Park	1990 min	7.1	118	22	-99	145	6	41	6.4	3	230	8	
Place	1990 avg	7.7	245	51	-99	357	22	66	9.1	13	8254	1353	
	1990 max	8.1	410	111	-99	549	86	168	11.8	57	> 16000	16000	
	Feb 1993	7.4	244	320	1279	548	19	146	10.4	129	16000	240	
	July 1993	7.7	176	36	1384	250	36	148	8.8	18	-99	220	
	Feb 1994	7.6	205	37	1480	1264	24	101	11.0	50	9000	90	
	July 1994	8.1	273	29	3273	1250	194	205	7.8	11	> 16000	130	
	Feb 1995	7.5	194	20	1187	1235	14	30	9.5	10	114	13	
	Aug 1995	7.9	317	110	1469	903	46	68	8.1	5	85000	1192	76
Silver	1990 min	7.4	103	< 10	-99	173	< 5	27	6.9	< 2	170	8	
Beach	1990 avg	7.9	187	19	-99	583	16	41	9.8	6	7110	3307	
	1990 max	8.1	290	43	-99	1118	42	61	12.1	12	> 16000	16000	
	Feb 1993	7.7	150	5	1688	1235	12	36	11.4	< 2	900	300	
	July 1993	7.8	271	40	1092	374	40	87	9.4	7	-99	42000	
	Feb 1994	7.7	137	30	1840	1394	20	61	11.4	18	50000	500	
	July 1994	8.1	279	29	939	372	29	39	8.5	5	3000	1700	
	Feb 1995	7.6	128	13	2380	3053	13	33	9.9	9	800	50	
	Aug 1995	8.3	257	24	532	155	36	59	9.3	4	3020	1484	-99
Wildwd	1990 min	6.7	34	8	-99	755	< 5	< 5	6.9	< 2	23	< 2	
	1990 avg	7.2	54	189	-99	1790	< 5	9	10.0	2	1164	74	
	1990 max	7.6	126	32	-99	4857	9	33	12.3	11	> 16000	1300	
	Feb 1993	7.2	54	< 5	2922	2397	< 5	< 5	11.4	< 2	300	< 2	
	July 1993	7.5	56	6	2243	1860	6	7	10.5	< 2	-99	30	
	Feb 1994	7.1	67	< 5	5039	5587	< 5	< 5	11.8	3	170	< 2	
	July 1994	7.4	68	< 5	3994	2885	9	6	8.7	< 2	800	< 2	
	Feb 1995	7.0	50	< 5	2231	2480	< 5	< 5	10.7	11	240	< 2	
	Aug 1995	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99

The 1990 creek data do not include the November 1990 storm event.

Cond = conductivity
NH_3 = ammonia
TN = total nitrogen
NO_{2+3} = nitrate/nitrite
SRP = soluble phosphate
TP = total phosphorus
DO = dissolved oxygen
TSS = total susp. solids
TC = total coliforms
FC = fecal coliforms

Table 10: Water quality data for Blue Canyon, Wildwood, Park Place, and Silver Beach Creeks.

Site	Date	pH	Cond. (μMHO)	NH_3 (μg/L)	TN (μg/L)	NO_{2+3} (μg/L)	SRP (μg/L)	TP (μg/L)	DO (mg/L)	TSS (mg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
Anderson	1990 min	7.2	37	10	-99	50	< 5	6	10.0	4	30	< 2	
	1990 avg	7.4	57	19	-99	121	< 5	24	11.3	17	344	13	
	1990 max	8.4	71	32	-99	221	8	55	13.0	48	2400	130	
	Feb 1995	7.0	55	< 5	756	956	6	10	9.8	9	110	30	
	Aug 1995	7.7	63	10	64	78	< 5	26	11.1	8	100	10	12
Austin	1990 min	7.1	50	6	-99	259	< 5	< 5	8.3	< 2	50	7	
	1990 avg	7.4	81	20	-99	441	< 5	13	10.5	3	3366	950	
	1990 max	7.6	121	40	-99	658	9	23	12.1	13	16000	5000	
	Feb 1993	7.2	74	5	1118	779	9	12	11.2	4	220	11	
	July 1993	7.5	95	6	603	437	6	15	10.3	< 2	-99	320	
	Feb 1994	7.2	62	20	2207	1967	9	21	11.7	20	800	130	
	July 1994	7.6	111	51	635	410	6	11	8.6	5	800	800	
	Feb 1995	7.2	57	< 5	1292	759	< 5	15	10.2	14	70	4	
	Aug 1995	7.5	112	< 5	304	326	5	14	10.2	2	540	804	172
Smith	1990 min	6.6	44	12	-99	396	< 5	< 5	8.7	< 2	17	< 2	
	1990 avg	7.5	64	17	-99	687	< 5	6	10.5	3	1138	14	
	1990 max	7.8	90	37	-99	1025	8	12	12.6	10	9000	170	
	Feb 1993	7.4	52	< 5	1045	904	5	< 5	10.4	< 2	170	2	
	July 1993	7.4	72	< 5	770	698	< 5	< 5	10.3	< 2	-99	250	
	Feb 1994	7.4	60	12	2573	2386	6	31	12.2	16	80	2	
	July 1994	7.8	80	17	848	701	< 5	< 5	9.0	2	130	130	
	Feb 1995	7.4	54	< 5	1355	1643	< 5	< 5	10.4	9	240	< 2	
	Aug 1995	8.6	83	< 5	383	367	< 5	< 5	10.4	2	88	14	24

The 1990 creek data do not include the November 1990 storm event.

Cond = conductivity
NH_3 = ammonia
TN = total nitrogen
NO_{2+3} = nitrate/nitrite
SRP = soluble phosphate
TP = total phosphorus
DO = dissolved oxygen
TSS = total susp. solids
TC = total coliforms
FC = fecal coliforms

Table 11: Water quality data for Anderson, Austin, and Smith Creeks.

Site	Date	As (μg/L)	Cd (μg/L)	Cr (μg/L)	Cu (μg/L)	Fe (μg/L)	Hg (μg/L)	Ni (μg/L)	Pb (μg/L)	Zn (μg/L)
Blue	1990 avg	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	2
Canyon	1990 min	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	< 0.2
	1990 max	-99	< 0.5	4	9	-99	-99	4	6	33
	Feb 1993	< 30	< 2	8	< 2	150	< 10	< 10	8	17
	Feb 1994	< 30	< 2	< 6	< 2	70	< 10	< 10	2	17
	Feb 1995	< 30	< 2	< 6	< 2	240	< 10	< 10	3	15
Park	1990 avg	-99	< 0.5	< 0.5	7	-99	-99	< 5	6	16
Place	1990 min	-99	< 0.5	1	< 5	-99	-99	< 5	< 5	3
	1990 max	-99	< 0.5	10	16	-99	-99	7	20	148
	Feb 1993	< 30	< 2	22	20	8700	< 10	10	10	< 2
	Feb 1994	< 30	10	8	< 2	2700	< 10	< 10	2	26
	Feb 1995	< 30	< 2	< 6	3	600	< 10	< 10	2	19
Silver	1990 avg	-99	< 0.5	< 0.5	<5	-99	-99	< 5	< 5	2
Beach	1990 min	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	0.2
	1990 max	-99	< 5	3	7	-99	-99	< 5	< 5	5
	Feb 1993	< 30	< 2	< 6	< 2	1100	< 10	< 10	4	< 2
	Feb 1994	<30	< 2	< 6	< 2	1700	< 10	< 10	2	22
	Feb 1995	< 30	< 2	< 6	< 2	790	< 10	< 10	3	12
Wildwd	1990 avg	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	3
	1990 min	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	0.5
	1990 max	-99	< 0.5	2	8	-99	-99	7	6	10
	Feb 1993	< 30	< 2	< 6	< 2	20	< 10	< 10	3	16
	Feb 1994	< 30	< 2	< 6	<2	60	< 10	< 10	1	23
	Feb 1995	< 30	< 2	< 6	< 2	270	< 10	< 10	1	12

All 1993–1995 metals samples were analyzed by AmTest for total metals.
The 1990 creek data do not include the November 1990 storm event.

Table 12: Metals data for Blue Canyon, Wildwood, Park Place, and Silver Beach Creeks.

Site	Date	As (μg/L)	Cd (μg/L)	Cr (μg/L)	Cu (μg/L)	Fe (μg/L)	Hg (μg/L)	Ni (μg/L)	Pb (μg/L)	Zn (μg/L)
Anderson	1990 avg	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	1
	1990 min	-99	< 0.5	1	< 5	-99	-99	< 5	< 5	4
	1990 max	-99	< 0.5	3	6	-99	-99	< 5	< 5	14
	Feb 1995	< 30	< 2	< 6	< 2	520	< 10	< 10	1	11
Austin	1990 avg	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	5
	1990 min	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	0.4
	1990 max	-99	< 0.5	7	11	-99	-99	7	26	21
	Feb 1993	< 30	< 2	< 6	< 2	220	< 10	< 10	3	< 2
	Feb 1994	< 30	< 2	< 6	< 2	1000	< 10	< 10	2	18
	Feb 1995	< 30	< 2	< 6	8	640	< 10	< 10	1	10
Smith	1990 avg	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	2
	1990 min	-99	< 0.5	< 0.5	< 5	-99	-99	< 5	< 5	0.3
	1990 max	-99	< 0.5	2	18	-99	-99	< 5	< 5	3
	Feb 1993	< 30	< 2	< 6	< 2	70	< 10	< 10	< 1	< 2
	Feb 1994	< 30	< 2	< 6	< 2	770	< 10	< 10	3	19
	Feb 1995	< 30	< 2	< 6	< 2	310	< 10	< 10	1	7

All 1993–1995 metals samples were analyzed by AmTest for total metals.
The 1990 creek data do not include the November 1990 storm event.

Table 13: Metals data for Anderson, Austin, and Smith Creeks.

	October, 1994			March, 1995			June, 1995			September, 1995		
	Inlet	Outlet	%	Inlet	Outlet	%	Inlet	Outlet	%	Inlet	Outlet	%
Composite Samples (n=4)												
Temperature	10.9	10.8	–1	9.0	9.0	0	17.6	21.1	+20	17.8	18.6	+5
pH	7.8	8.3	+6	7.5	7.8	+4	7.4	7.4	0	6.9	7.8	+13
D. Oxygen	10.8	11.1	+3	11.3	12.0	+6	8.5	5.3	–38	7.3	6.4	–12
Conductivity	165	181	+10	179	182	+2	196	271	+38	225	274	+22
T. S. Solids	99	15	–85	13.4	6.3	–53	10.5	8.0	–24	5.5	5.6	+2
T. Coliforms	8290	6525	–21	2395	2040	–15	2875	287	–90	1674	34175	+1942
F. Coliforms	4470	3236	–28	142	74	–48	120	46	–62	267	120	–55
Enterococcus	159	86	–46	na	na	na	120	37	–69	243	188	+23
Grab Samples (n=1)												
Copper	0.001	0.004	+300	0.010	0.008	–20	0.009	0.004	–55	0.010	0.001	–90
Iron	1.80	0.69	–62	0.91	0.50	–45	4.80	0.91	–81	1.40	2.30	+64
Lead	0.003	0.008	+167	0.005	0.003	–40	0.013	0.001	–92	na	na	na
Zinc	0.023	0.009	–61	0.006	0.003	–50	0.035	0.005	–86	0.026	0.027	+4
T. Organic C.	6.0	6.6	+10	0.5	1.5	+200	6.7	7.8	+16	15.0	9.1	–39
T. K. Nitrogen	0.65	0.66	+2	0.05	0.05	0	2.00	1.30	–35	1.30	1.10	–15
T. Phosphorus	0.075	0.062	+17	0.032	0.037	+16	0.200	0.061	–70	0.054	0.077	+43
T. S. Solids	41	22	–46	15	8.8	–41	43	5.6	–87	11.5	11.0	–4

Arsenic, Cadmium, Chromium, Nickel, and T. Hydrocarbons were $\leq$ detection limits for all sampled.

Table 14: Park Place wet pond water quality summary.

Site	Rep	Al	Bo	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg
Bloedel-Donovan bulk water (0.3 m)	1	0.10	< 0.10	0.007	5.3	< 0.002	< 0.003	< 0.006	0.005	0.14	< 1.0	1.8
	2	0.17	< 0.10	0.008	5.5	< 0.002	0.005	< 0.006	0.021	0.11	< 1.0	1.8
Bloedel-Donovan microlayer	1	0.44	< 0.10	0.015	6.3	< 0.002	0.011	< 0.006	0.053	0.91	< 1.0	2.2
	2	0.44	< 0.10	0.009	5.9	< 0.002	0.006	< 0.006	0.038	0.21	< 1.0	2.0
Intake bulk water (0.3 m)	1	0.14	< 0.10	0.010	5.7	< 0.002	< 0.003	< 0.006	< 0.002	0.05	< 1.0	1.9
	2	0.09	< 0.10	0.007	5.4	< 0.002	0.004	< 0.006	< 0.002	0.03	< 1.0	1.8
Intake microlayer	1	0.50	< 0.10	0.012	5.8	< 0.002	< 0.003	< 0.006	< 0.002	0.49	< 1.0	2.0
	2	0.39	< 0.10	0.011	5.4	< 0.002	< 0.003	< 0.006	< 0.002	0.45	< 1.0	1.9
Site 1 bulk water (0.3 m)	1	0.11	< 0.10	0.008	5.2	< 0.002	< 0.003	< 0.006	< 0.002	0.08	< 1.0	1.8
	2	0.13	< 0.10	0.007	5.1	< 0.002	< 0.003	< 0.006	< 0.002	0.07	< 1.0	1.7
Site 1 microlayer (midbasin 1)	1	1.10	< 0.10	0.020	6.4	< 0.002	< 0.003	< 0.006	0.028	1.40	< 1.0	2.1
	2	0.47	< 0.10	0.013	6.3	< 0.002	0.006	< 0.006	0.011	0.59	< 1.0	2.0
Site 2 bulk water (0.3 m)	1	0.10	< 0.10	0.007	5.2	< 0.002	0.004	< 0.006	< 0.002	0.03	< 1.0	1.7
	2	0.20	< 0.10	0.007	5.4	0.003	< 0.003	< 0.006	< 0.002	0.03	< 1.0	1.8
Site 2 microlayer (midbasin 2)	1	0.98	< 0.10	0.020	5.8	< 0.002	0.004	< 0.006	< 0.002	1.00	< 1.0	2.0
	2	0.15	< 0.10	0.008	5.6	< 0.002	0.004	< 0.006	< 0.002	0.11	< 1.0	1.9

Table 15: Lake Whatcom microlayer data from September 27, 1993 . All units are mg/L.

Site1	Rep	Mn	Na	Ni	P	Pb	S	Si	Sn	Ti	V	Y	Zn	TOC
Bloedel-Donovan bulk water (0.3 m)	1	0.01	3.1	< 0.01	< 0.05	< 0.02	1.6	2.9	0.053	< 0.01	< 0.002	< 0.001	0.044	4.4
	2	0.01	3.2	< 0.01	< 0.05	< 0.02	1.6	1.1	0.056	< 0.01	< 0.002	< 0.001	0.042	7.5
Bloedel-Donovan microlayer	1	0.11	3.8	< 0.01	0.08	< 0.02	2.1	2.7	0.057	0.02	< 0.002	< 0.001	0.068	18.1
	2	0.02	3.5	< 0.01	< 0.05	< 0.02	1.8	2.0	0.061	< 0.01	< 0.002	< 0.001	0.062	12.4
Intake bulk water (0.3 m)	1	0.00	3.5	< 0.01	< 0.05	< 0.02	1.8	1.7	0.058	< 0.01	< 0.002	< 0.001	0.035	2.9
	2	0.00	3.2	< 0.01	< 0.05	< 0.02	1.7	0.9	0.056	< 0.01	< 0.002	< 0.001	0.024	3.2
Intake microlayer	1	0.03	3.5	< 0.01	< 0.05	< 0.02	1.8	2.5	0.060	0.02	< 0.002	< 0.001	0.028	12.5
	2	0.04	3.1	< 0.01	< 0.05	< 0.02	1.6	1.5	0.055	0.01	< 0.002	< 0.001	0.032	9.0
Site 1 bulk water (0.3 m)	1	0.01	3.1	< 0.01	< 0.05	< 0.02	1.6	1.2	0.053	< 0.01	< 0.002	< 0.001	0.032	7.5
	2	0.01	3.1	< 0.01	< 0.05	< 0.02	1.5	1.6	0.053	< 0.01	< 0.002	< 0.001	0.028	8.0
Site 1 microlayer (midbasin 1)	1	0.13	3.6	< 0.01	0.21	< 0.02	1.8	3.5	0.064	0.05	< 0.002	< 0.001	0.060	51.1
	2	0.05	3.7	< 0.01	0.08	< 0.02	1.8	2.2	0.062	0.02	< 0.002	< 0.001	0.068	27.6
Site 2 bulk water (0.3 m)	1	-88.00	3.0	< 0.01	< 0.05	< 0.02	1.6	0.6	0.052	< 0.01	< 0.002	< 0.001	0.028	4.8
	2	0.00	3.3	< 0.01	< 0.05	< 0.02	1.7	1.3	0.054	< 0.01	< 0.002	< 0.001	0.022	3.5
Site 2 microlayer (midbasin 2)	1	0.05	3.3	< 0.01	0.09	< 0.02	1.8	0.4	< 0.02	< 0.01	< 0.002	< 0.001	0.130	53.9
	2	0.01	3.4	< 0.01	0.06	< 0.02	1.8	1.0	0.056	< 0.01	< 0.002	< 0.001	0.026	14.5

Table 16: Lake Whatcom microlayer data from September 27, 1993 , continued. All units are mg/L.

Site	Rep	Al	Bo	Ba	Ca	Cd	Co	Cr	Cu	Fe	K	Mg
Bloedel-Donovan bulk water (0.3 m)	1	0.03	< 0.10	0.008	5.8	< 0.002	< 0.003	< 0.006	< 0.002	0.05	< 1.0	1.9
	2	0.08	< 0.10	0.008	6.0	< 0.002	< 0.003	< 0.006	< 0.002	0.04	< 1.0	2
Bloedel-Donovan microlayer	1a	1.40	< 0.10	0.031	6.6	< 0.002	< 0.003	< 0.006	< 0.002	1.60	< 1.0	2.4
	1b	1.30	0.13	0.027	6.3	0.002	< 0.003	< 0.006	< 0.002	1.30	< 1.0	2.3
	2a	0.29	< 0.10	0.013	6.0	< 0.002	< 0.003	< 0.006	< 0.002	0.30	< 1.0	2
	2b	0.33	0.12	0.013	5.8	< 0.002	< 0.003	< 0.006	< 0.002	0.28	< 1.0	1.9
Intake bulk water (0.3 m)	1	0.09	< 0.10	0.008	5.3	< 0.002	< 0.003	< 0.006	< 0.002	0.04	< 1.0	1.8
	2	0.05	< 0.10	0.008	5.6	0.006	< 0.003	< 0.006	< 0.002	0.04	< 1.0	1.8
Intake microlayer	1	0.23	< 0.10	0.010	5.8	< 0.002	< 0.003	< 0.006	< 0.002	0.26	< 1.0	1.9
	2	0.25	0.16	0.009	5.4	< 0.002	< 0.003	< 0.006	< 0.002	0.26	< 1.0	1.8
Site 1 bulk water (0.3 m)	1	0.05	< 0.10	0.009	6.2	< 0.002	< 0.003	< 0.006	< 0.002	0.03	< 1.0	2
	2	0.05	< 0.10	0.008	5.9	< 0.002	< 0.003	< 0.006	< 0.002	0.03	< 1.0	2
Site 1 microlayer (midbasin 1)	1	6.50	< 0.10	0.110	9.2	< 0.002	< 0.003	0.016	0.033	9.60	< 1.0	4.5
	2	6.30	< 0.10	0.084	8.7	< 0.002	< 0.003	0.012	0.012	7.80	1.3	4.2
Site 2 bulk water (0.3 m)	1	0.12	0.15	0.007	5.3	< 0.002	< 0.003	< 0.006	< 0.002	0.05	< 1.0	1.7
	2	0.09	< 0.10	0.009	5.4	< 0.002	< 0.003	< 0.006	< 0.002	0.03	< 1.0	1.8
Site 2 microlayer (midbasin 2)	1	0.17	< 0.10	0.011	5.9	< 0.002	< 0.003	< 0.006	< 0.002	0.18	< 1.0	2
	2	0.56	< 0.10	0.016	6.5	< 0.002	< 0.003	< 0.006	< 0.002	0.89	< 1.0	2.2

Table 17: Lake Whatcom microlayer data from February 5, 1994 . All units are mg/L. Bloedel-Donovan microlayer samples include quality control splits (a and b) for each replicate.

Site1	Rep	Mn	Na	Ni	P	Pb	S	Si	Sn	Ti	V	Y	Zn	TOC
Bloedel-Donovan bulk water (0.3 m)	1	0.004	3.0	< 0.01	< 0.05	< 0.02	1.7	2.3	0.056	< 0.01	< 0.002	< 0.001	0.020	1.6
Bloedel-Donovan bulk water (0.3 m)	2	0.005	3.2	< 0.01	< 0.05	< 0.02	1.7	2.4	0.058	< 0.01	< 0.002	< 0.001	0.027	2.5
Bloedel-Donovan microlayer	1a	0.041	3.2	< 0.01	0.14	< 0.02	1.8	3.8	0.062	0.07	< 0.002	< 0.001	0.071	24.3
Bloedel-Donovan microlayer	1b	0.035	3.5	< 0.01	0.14	< 0.02	1.6	4.2	0.060	0.06	< 0.002	< 0.001	0.070	
Bloedel-Donovan microlayer	2a	0.010	3.4	< 0.01	< 0.05	< 0.02	1.7	2.5	0.058	0.01	< 0.002	< 0.001	0.029	18.0
Bloedel-Donovan microlayer	2b	0.009	3.1	< 0.01	< 0.05	< 0.02	1.7	3.1	0.056	0.01	< 0.002	< 0.001	0.030	
Intake bulk water (0.3 m)	1	< 0.002	3.1	< 0.01	< 0.05	< 0.02	1.5	2.4	0.053	< 0.01	< 0.002	< 0.001	0.021	4.0
Intake bulk water (0.3 m)	2	0.003	3.0	< 0.01	< 0.05	< 0.02	1.7	2.2	0.054	< 0.01	< 0.002	< 0.001	0.025	3.6
Intake microlayer	1	0.035	3.2	< 0.01	< 0.05	< 0.02	1.7	2.6	0.056	< 0.01	< 0.002	< 0.001	0.018	4.5
Intake microlayer	2	0.028	3.4	< 0.01	< 0.05	< 0.02	1.5	3.2	0.053	< 0.01	< 0.002	< 0.001	0.018	4.1
Site 1 bulk water (0.3 m)	1	< 0.002	3.1	< 0.01	< 0.05	< 0.02	1.7	2.2	0.058	< 0.01	< 0.002	< 0.001	0.024	2.8
Site 1 bulk water (0.3 m)	2	< 0.002	3.2	< 0.01	< 0.05	< 0.02	1.7	2.1	0.058	< 0.01	< 0.002	< 0.001	0.014	1.9
Site 1 microlayer (midbasin 1)	1	0.260	3.5	0.02	0.47	0.04	2.2	10.0	0.088	0.25	0.016	0.003	0.130	87.2
Site 1 microlayer (midbasin 1)	2	0.180	3.6	0.02	0.34	< 0.02	2.0	11.0	0.082	0.29	0.014	0.002	0.110	24.7
Site 2 bulk water (0.3 m)	1	0.002	3.0	< 0.01	< 0.05	< 0.02	1.5	2.9	0.050	< 0.01	< 0.002	< 0.001	0.035	1.4
Site 2 bulk water (0.3 m)	2	< 0.002	3.1	< 0.01	< 0.05	< 0.02	1.6	2.5	0.053	< 0.01	< 0.002	< 0.001	0.024	1.4
Site 2 microlayer (midbasin 2)	1	0.020	3.2	< 0.01	< 0.05	< 0.02	1.8	2.6	0.058	< 0.01	< 0.002	< 0.001	0.040	4.6
Site 2 microlayer (midbasin 2)	2	0.140	3.2	< 0.01	< 0.05	< 0.02	1.9	4.0	0.065	0.02	< 0.002	< 0.001	0.021	5.2

Table 18: Lake Whatcom microlayer data from February 5, 1994, continued . All units are mg/L. Bloedel-Donovan microlayer samples include quality control splits (a and b) for each replicate.

Parameter	Certified Value	APHA Low-Level Range*	APHA High-Level Range**	Laboratory Value
Turbidity	1.75 NTU	na	1.58–1.92	1.60
pH	8.92	na	8.03–9.81	9.08
Conductivity	189 μS/cm	na	170–208	188
Total Phosphorus	19.4 μg-P/L	14.6–24.2	17.5–21.3	18
Soluble Phosphate	16.9μg-P/L	12.7–21.1	15.2–18.6	17
Nitrate	109 μg-N/L	81.8–136	98.1–120	102 (rep #1) 114 (rep #2)
Alkalinity	23.8 mg/L	na	21.4–26.2	24.5
Ammonia	78.8 μg-N/L	59.1–98.5	70.9–86.7	76 (rep #1) 70 (rep #2)

* Low-level is used for concentrations $\leq 20 \times$ detection limit.
**High-level is used for concentrations $> 20 \times$ detection limit.

Table 19: Summary of single-blind quality control results.

10 Figures

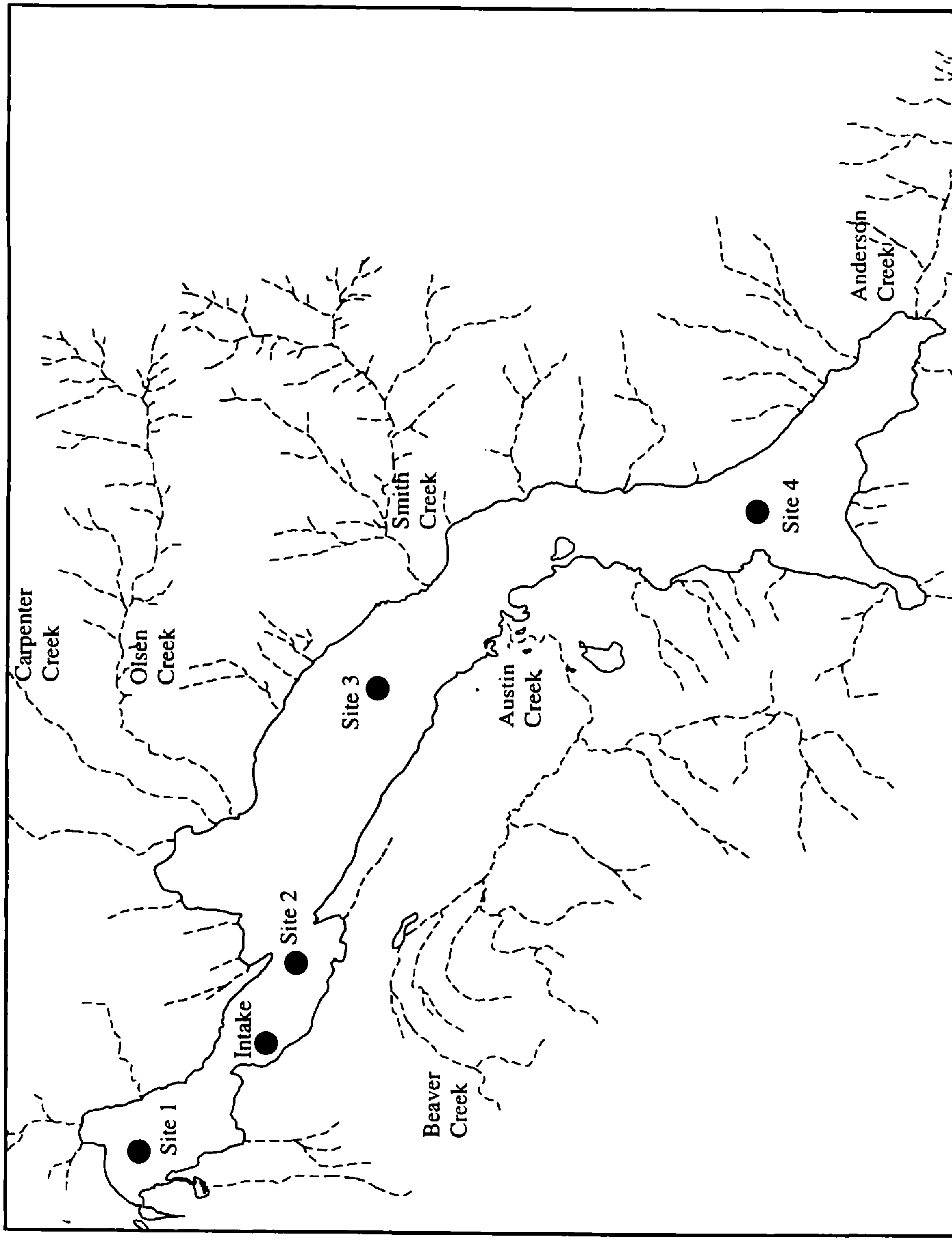


Figure 1: Lake Whatcom 1994–1995 sampling sites

Figure 2: Lake Whatcom temperature data for Site 1, September 1992 through September 1995.

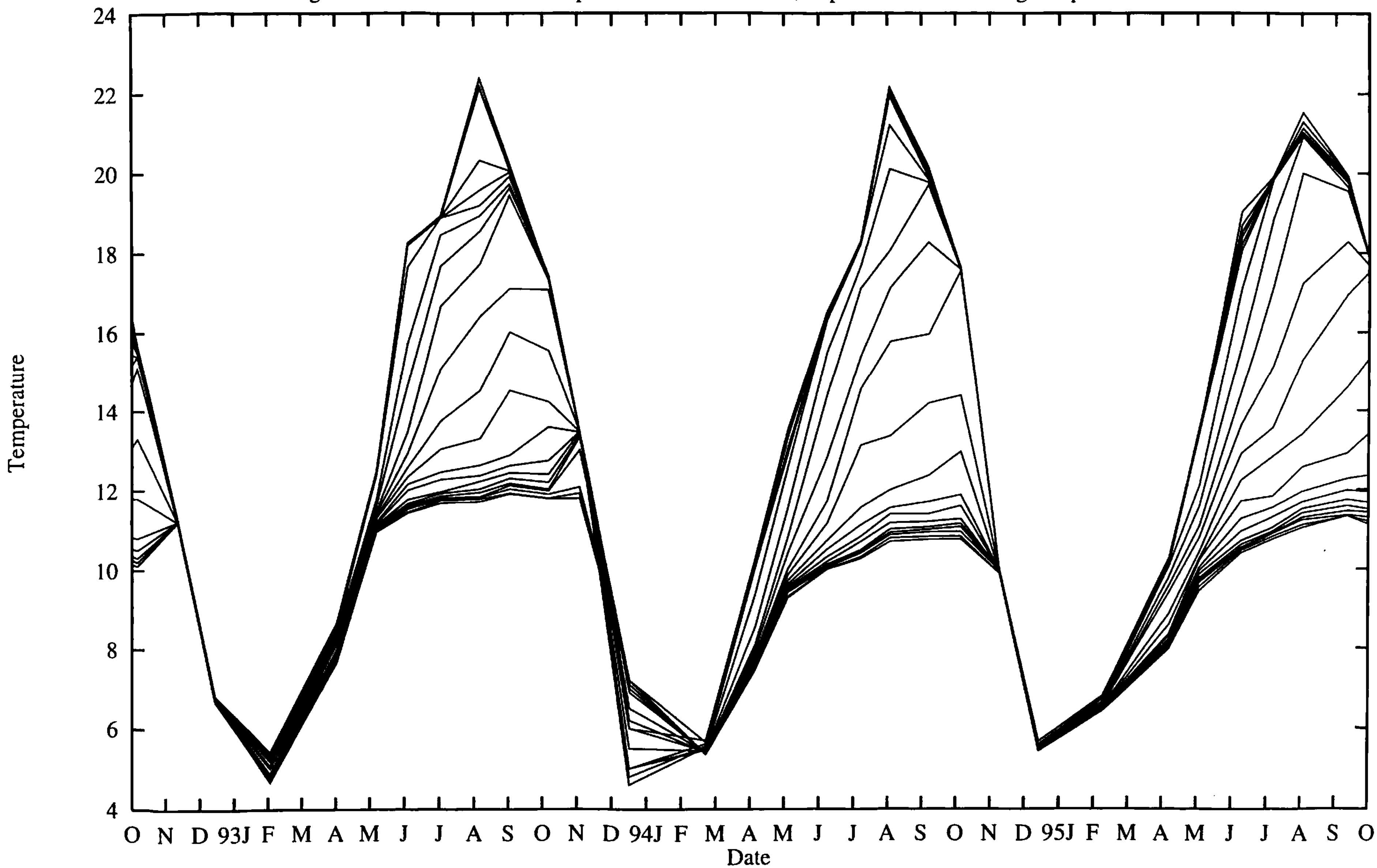


Figure 3: Lake Whatcom temperature data for Site 2, September 1992 through September 1995.

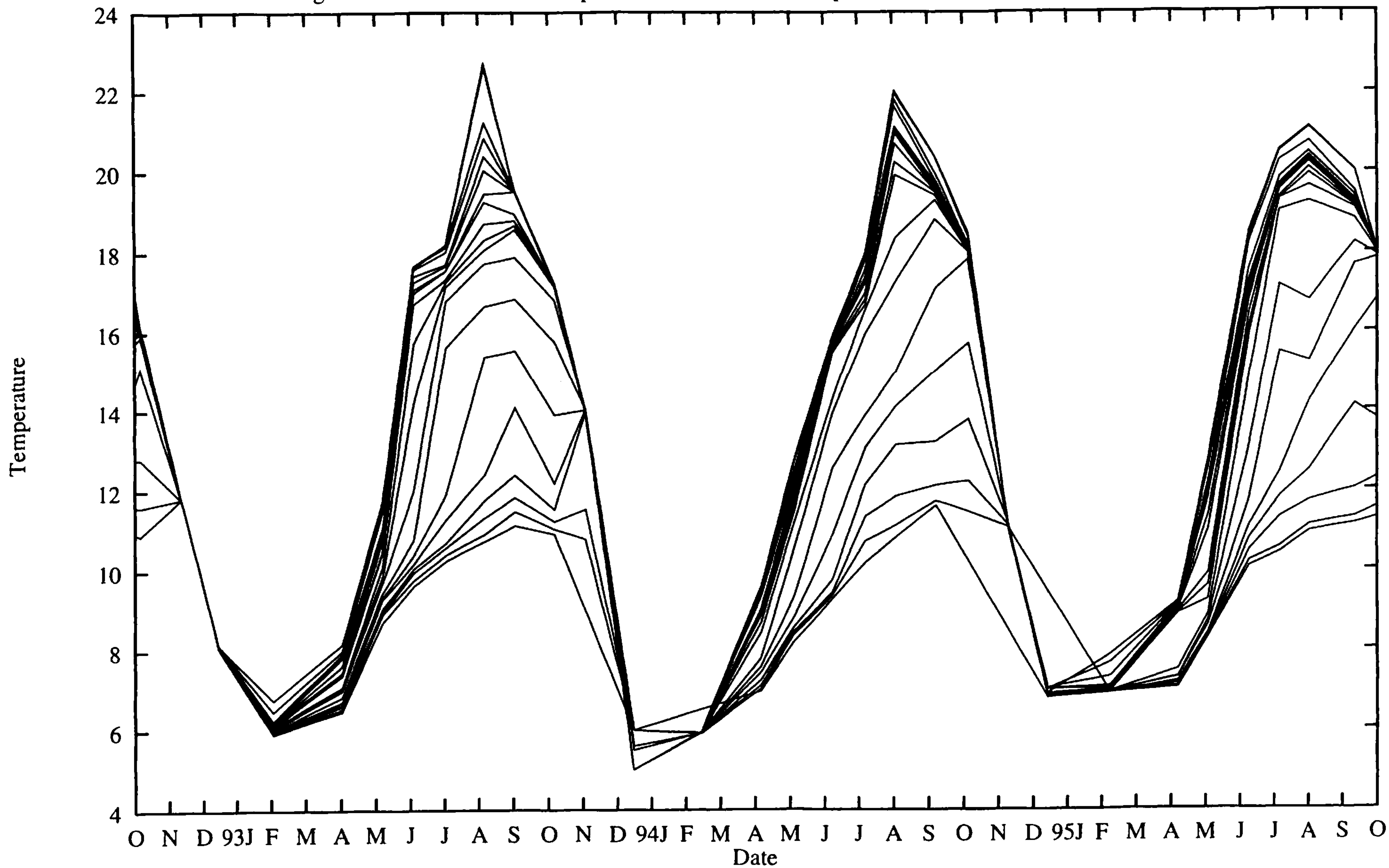


Figure 4: Lake Whatcom temperature data for Intake site (Basin 2), September 1992 through September 1995.

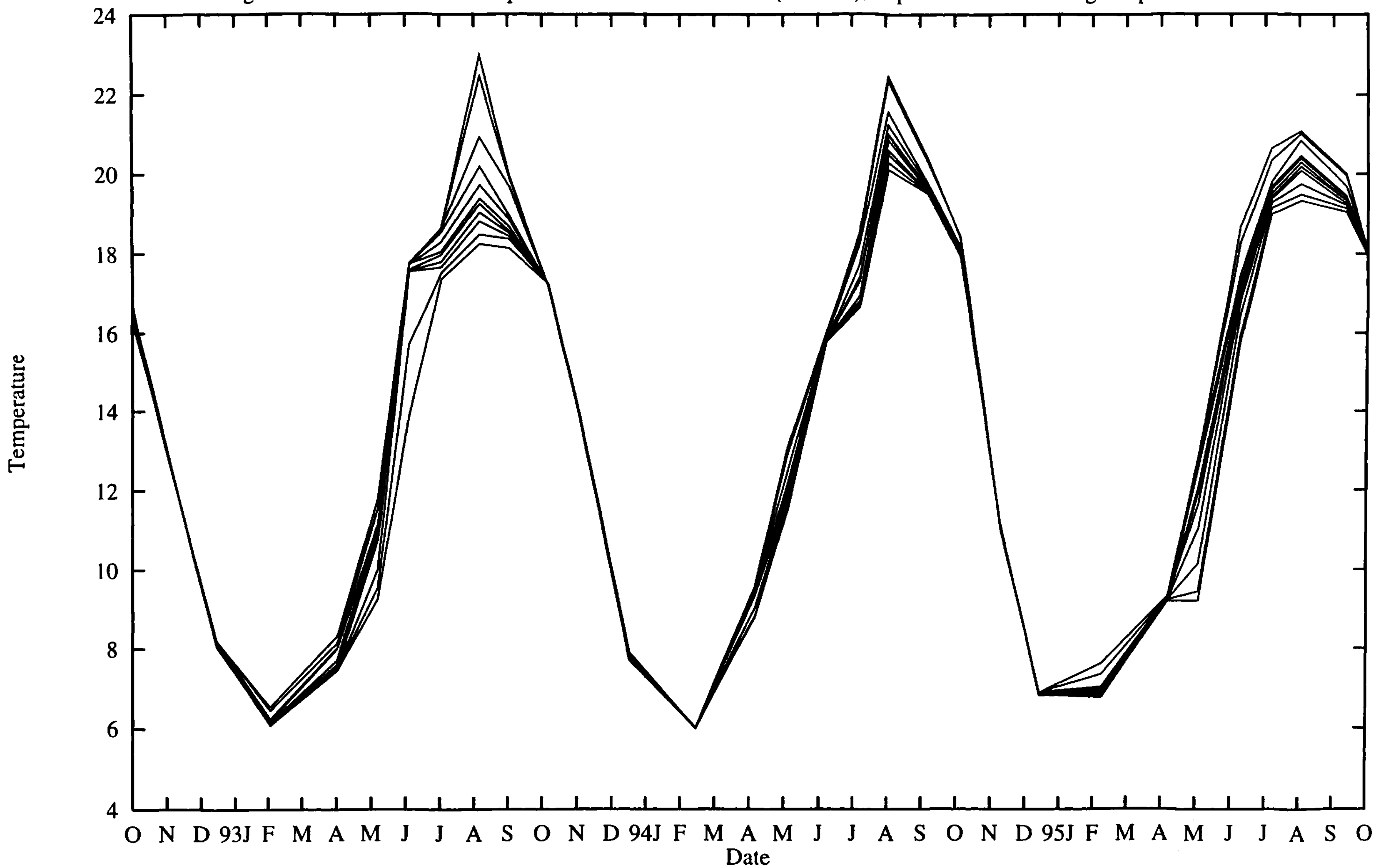


Figure 5: Lake Whatcom temperature data for Site 3, September 1992 through September 1995.

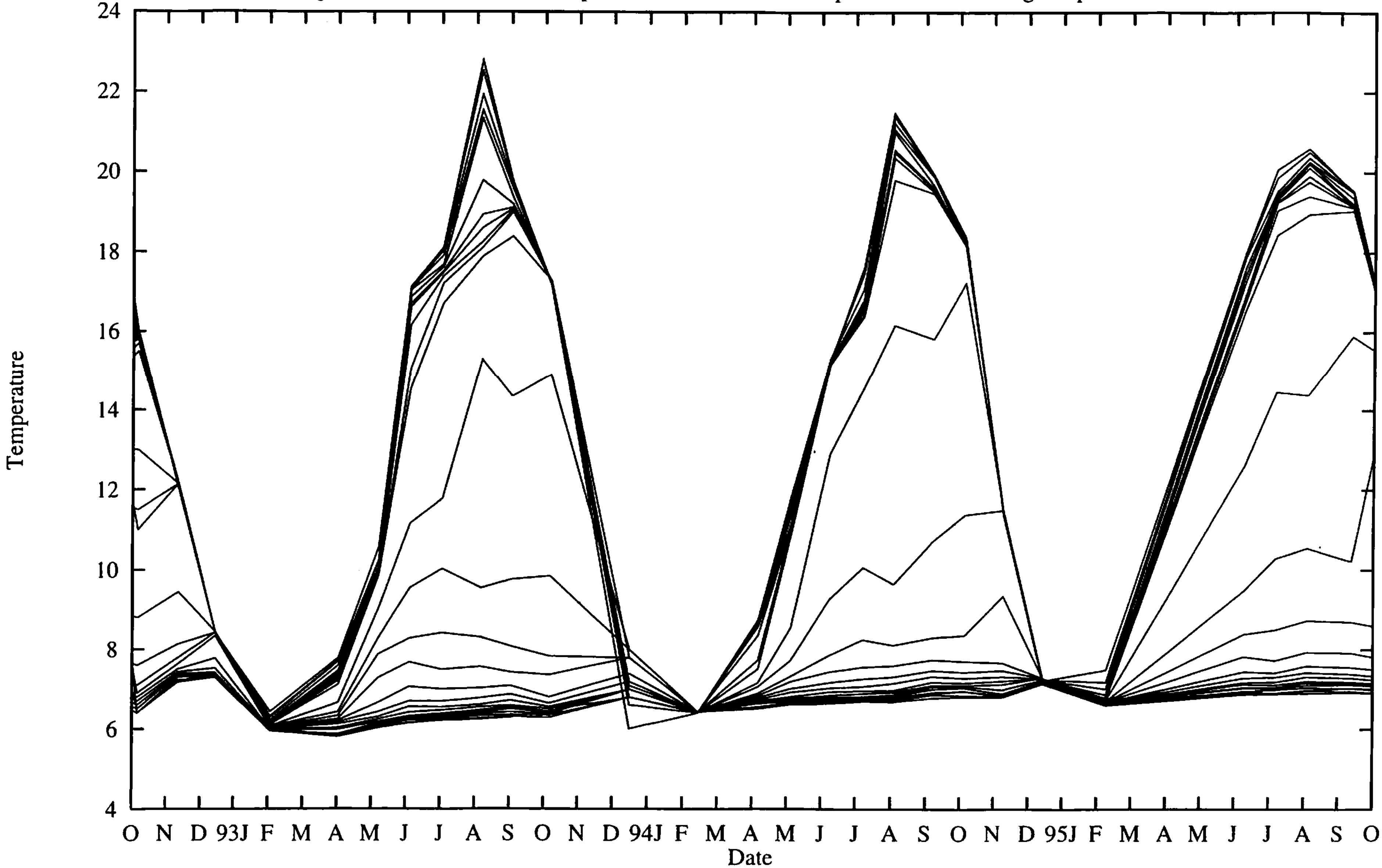


Figure 6: Lake Whatcom temperature data for Site 4, September 1992 through September 1995.

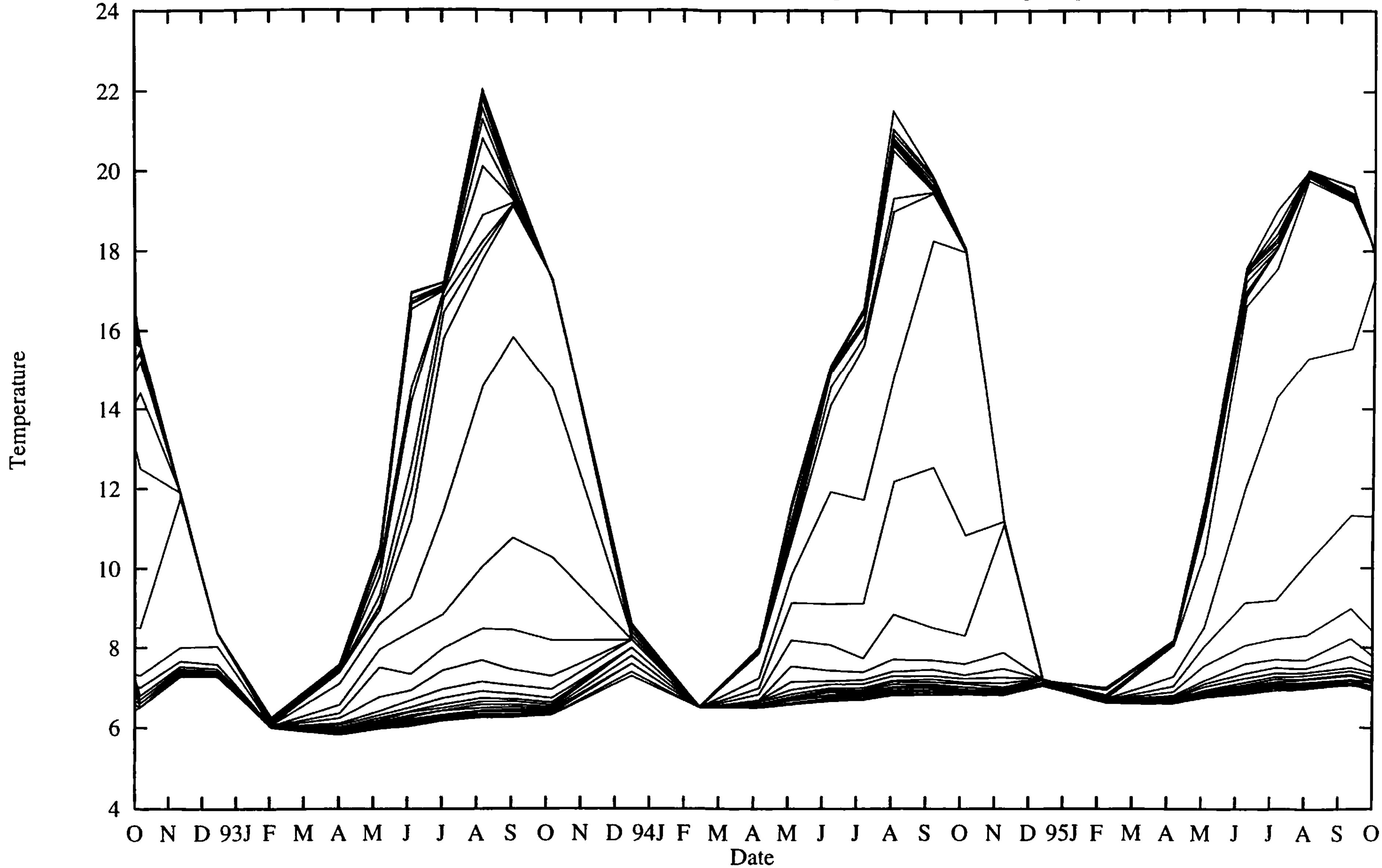


Figure 7: Lake Whatcom dissolved oxygen data for Site 1, September 1992 through September 1995.

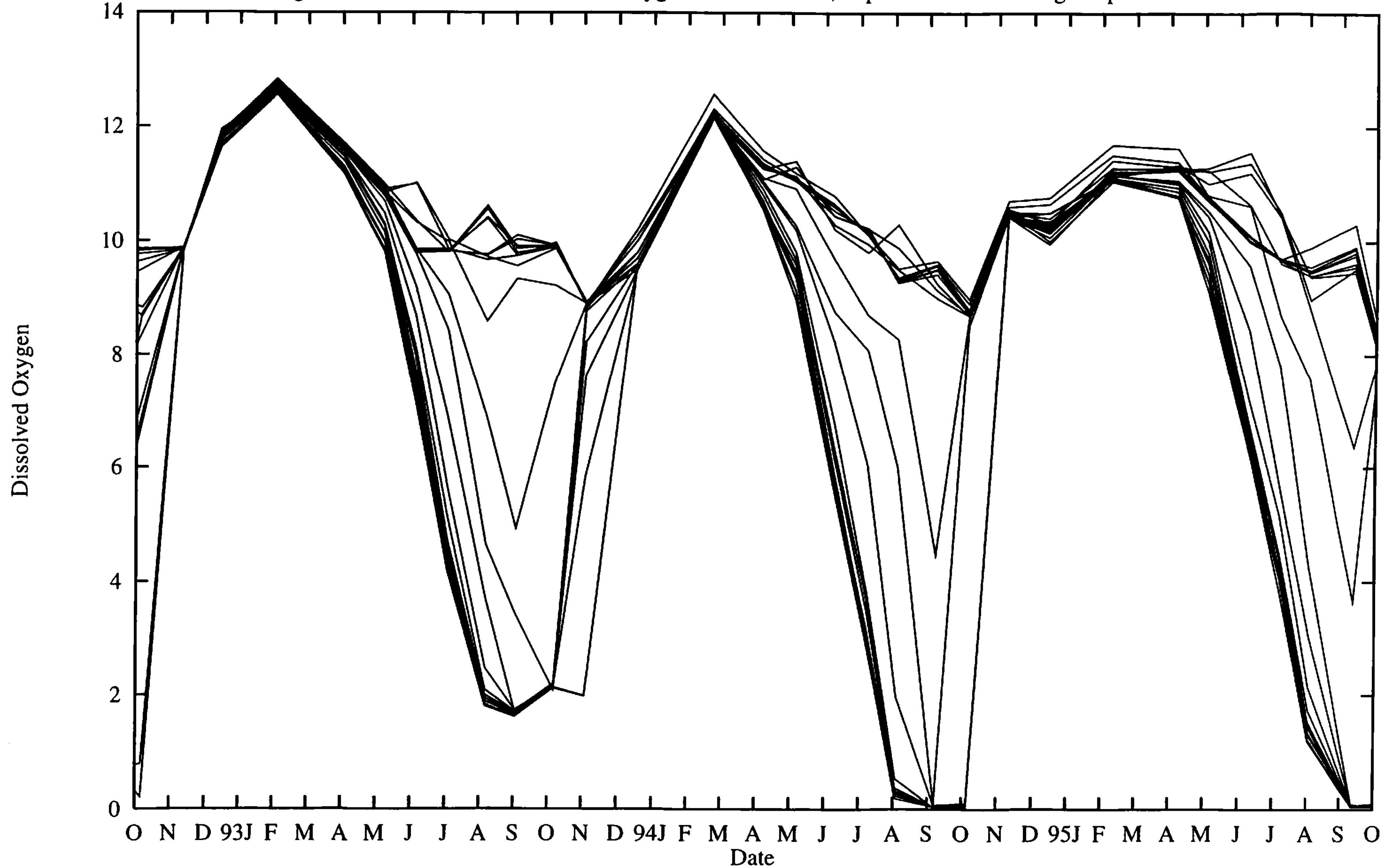


Figure 8: Lake Whatcom dissolved oxygen data for Site 2, September 1992 through September 1995.

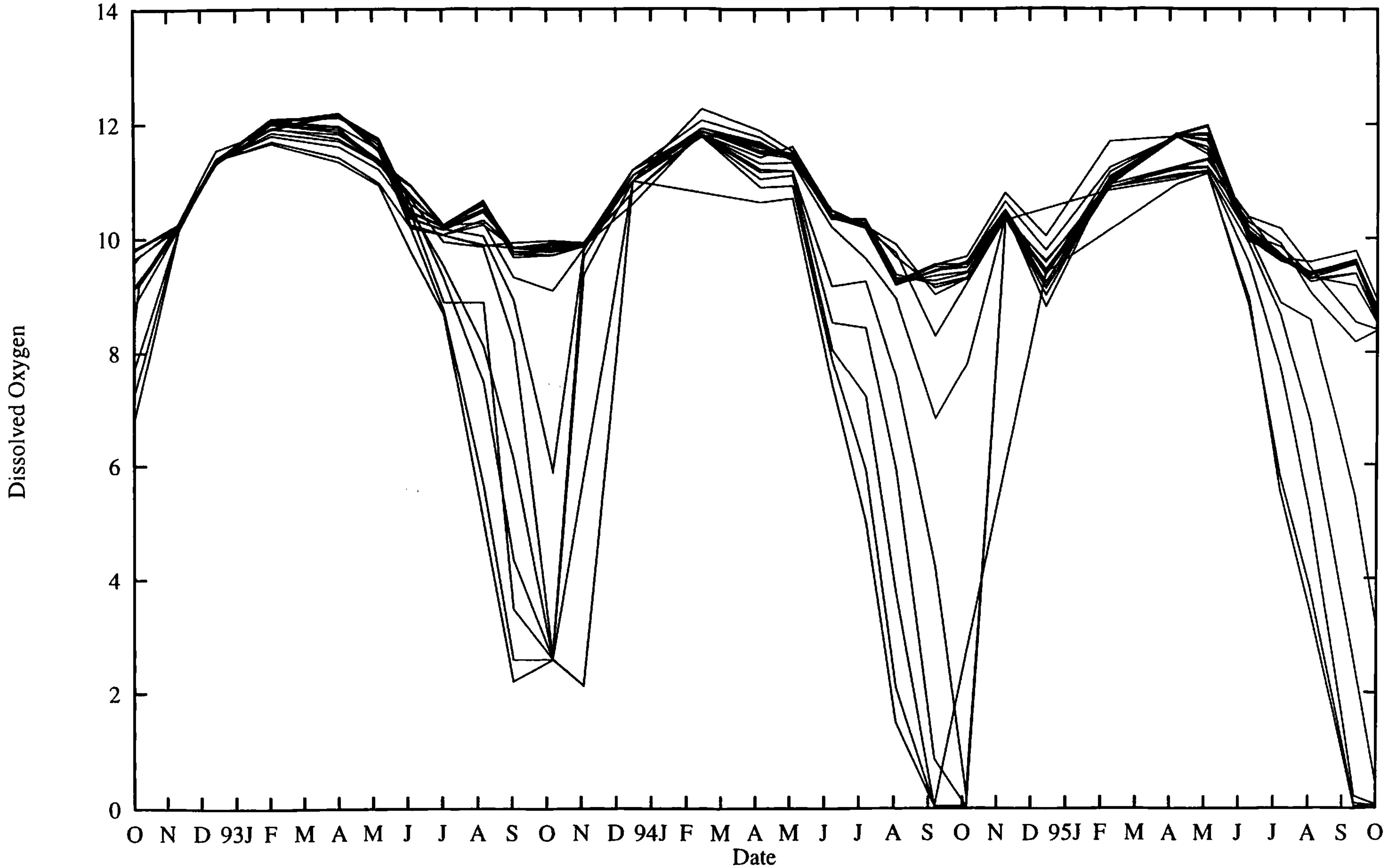


Figure 9: Lake Whatcom dissolved oxygen data for Intake site (Basin 2), September 1992 through September 1995.

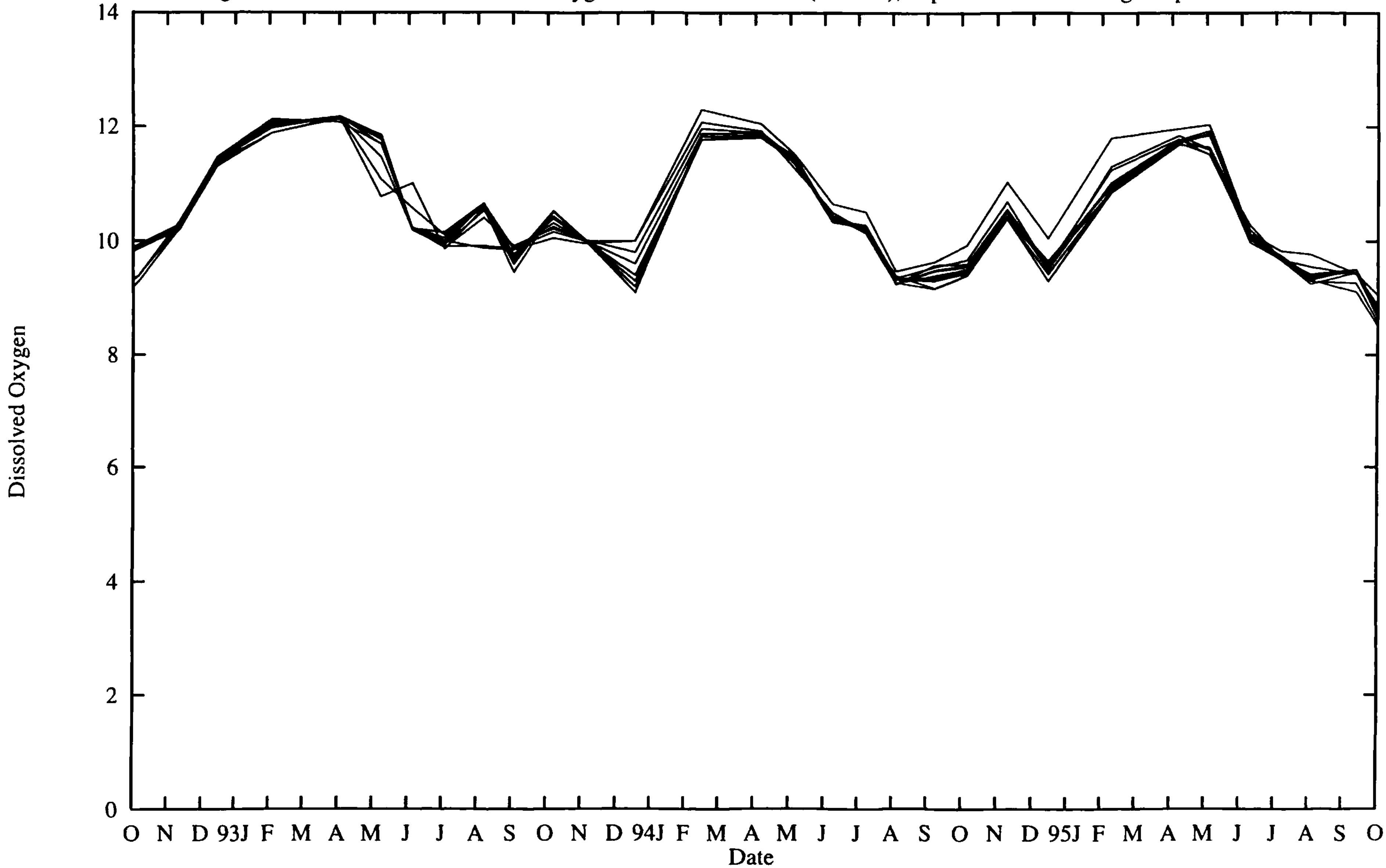


Figure 10: Lake Whatcom dissolved oxygen data for Site 3, September 1992 through September 1995.

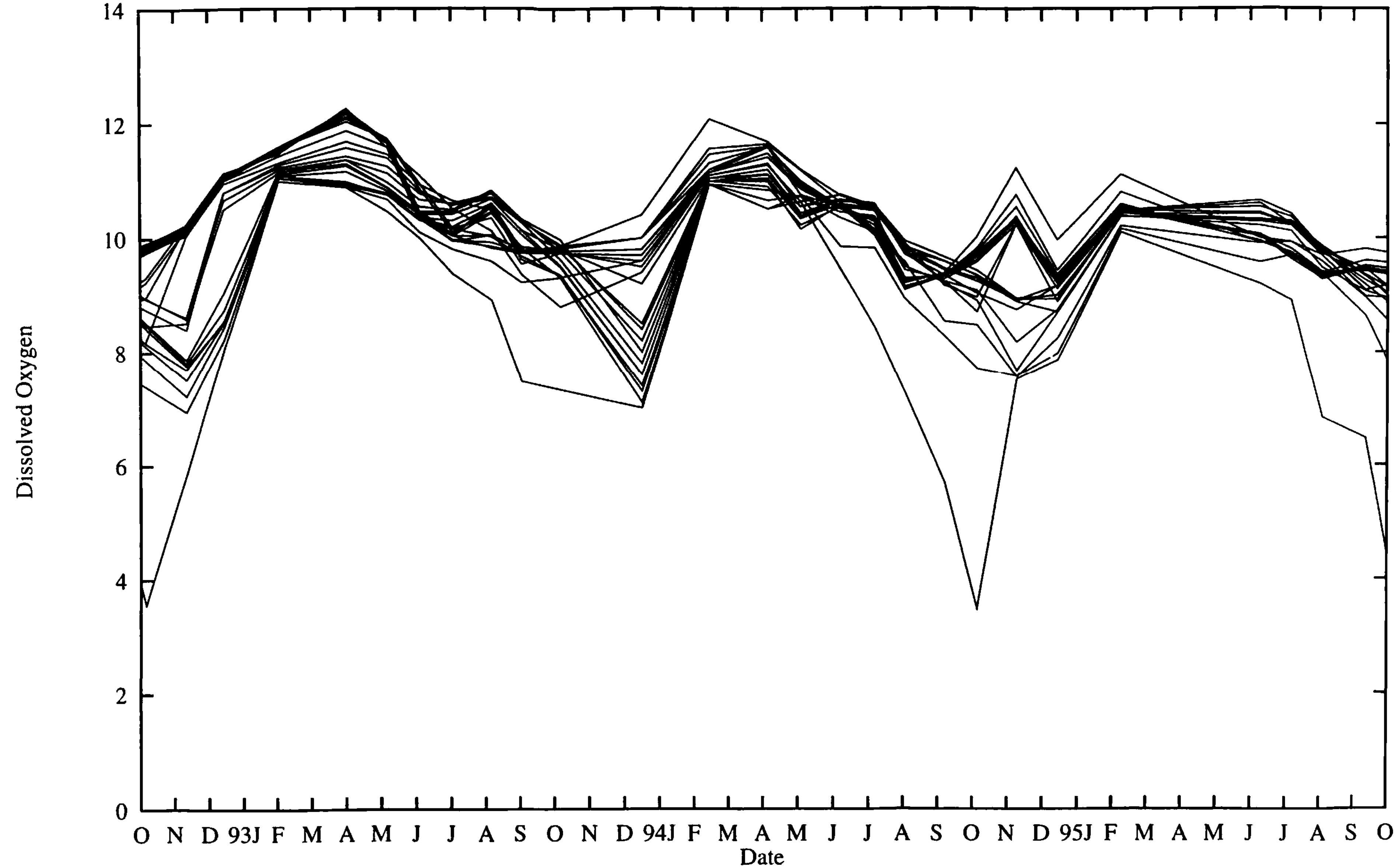


Figure 11: Lake Whatcom dissolved oxygen data for Site 4, September 1992 through September 1995.

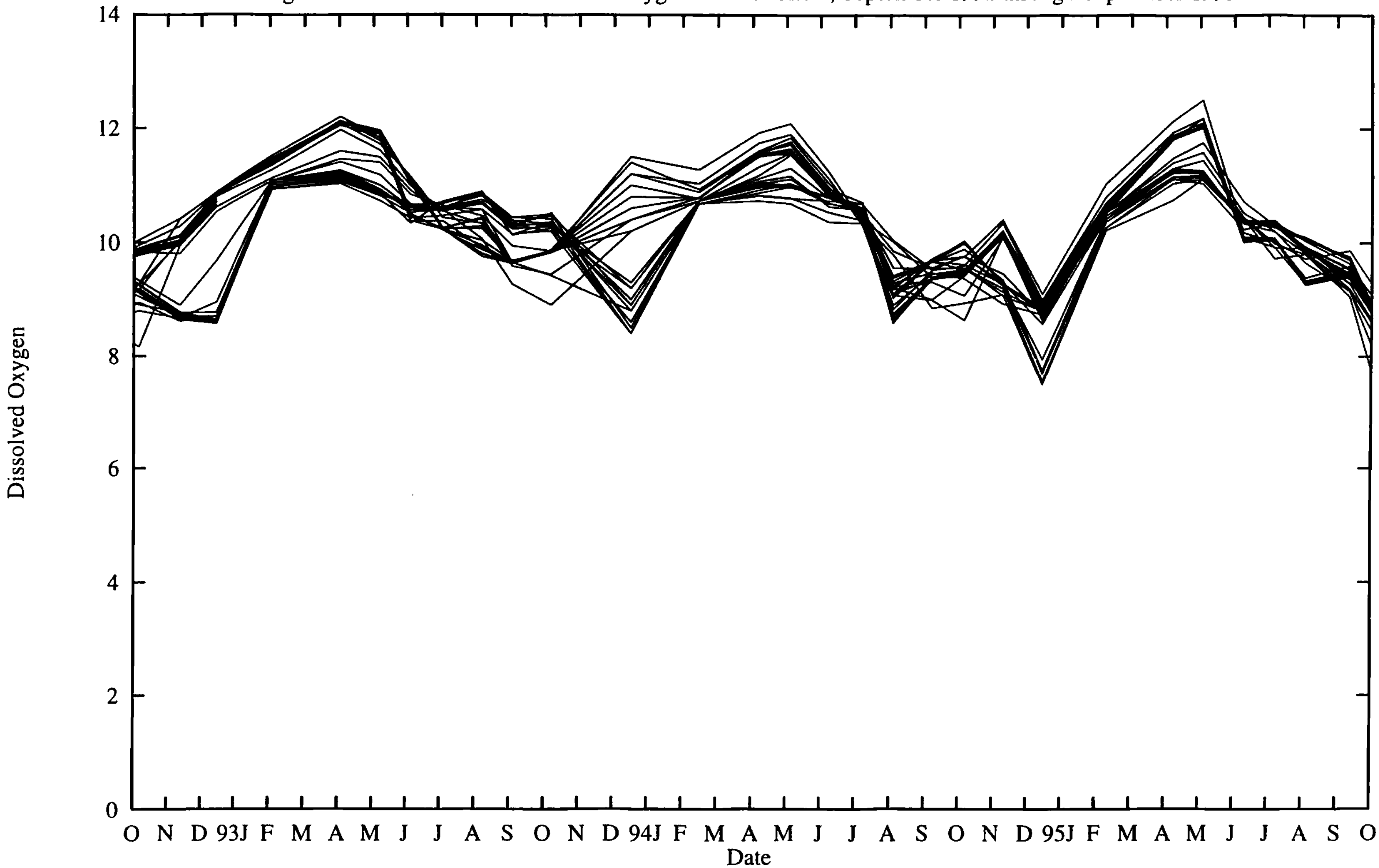


Figure 12: Lake Whatcom pH data for Site 1, September 1992 through September 1995.

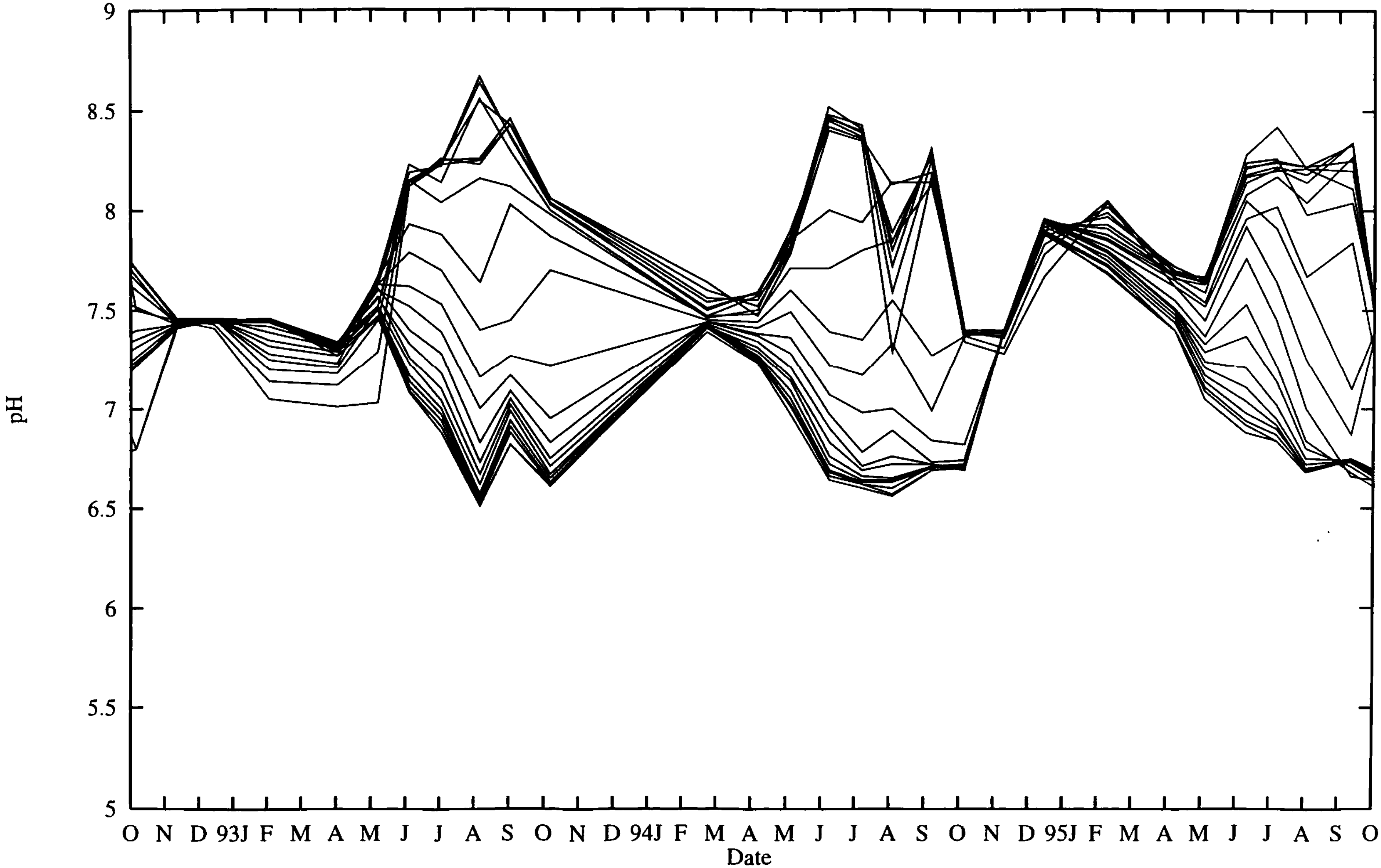


Figure 13: Lake Whatcom pH data for Site 2, September 1992 through September 1995.

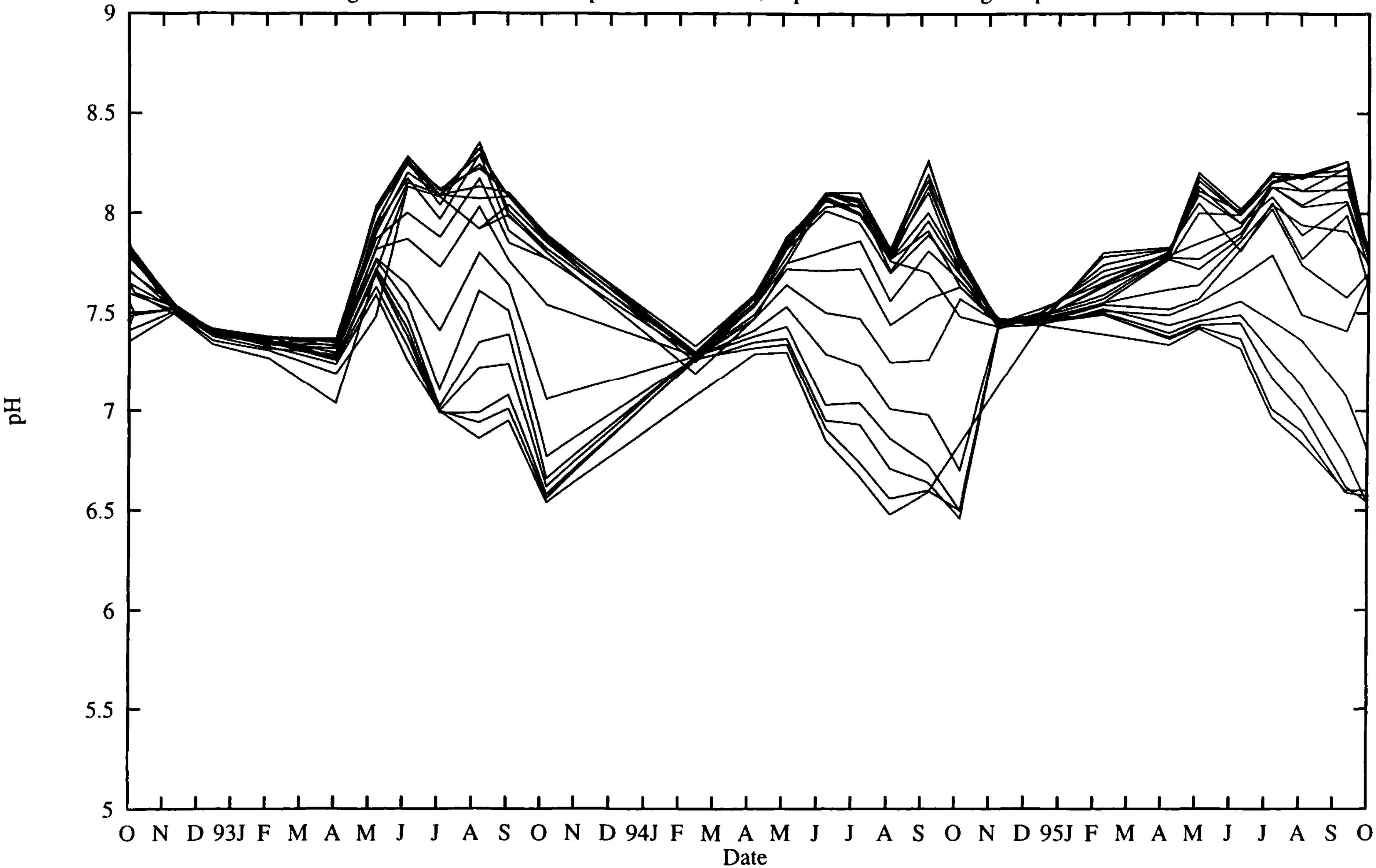


Figure 14: Lake Whatcom pH data for Intake site (Basin 2), September 1992 through September 1995.

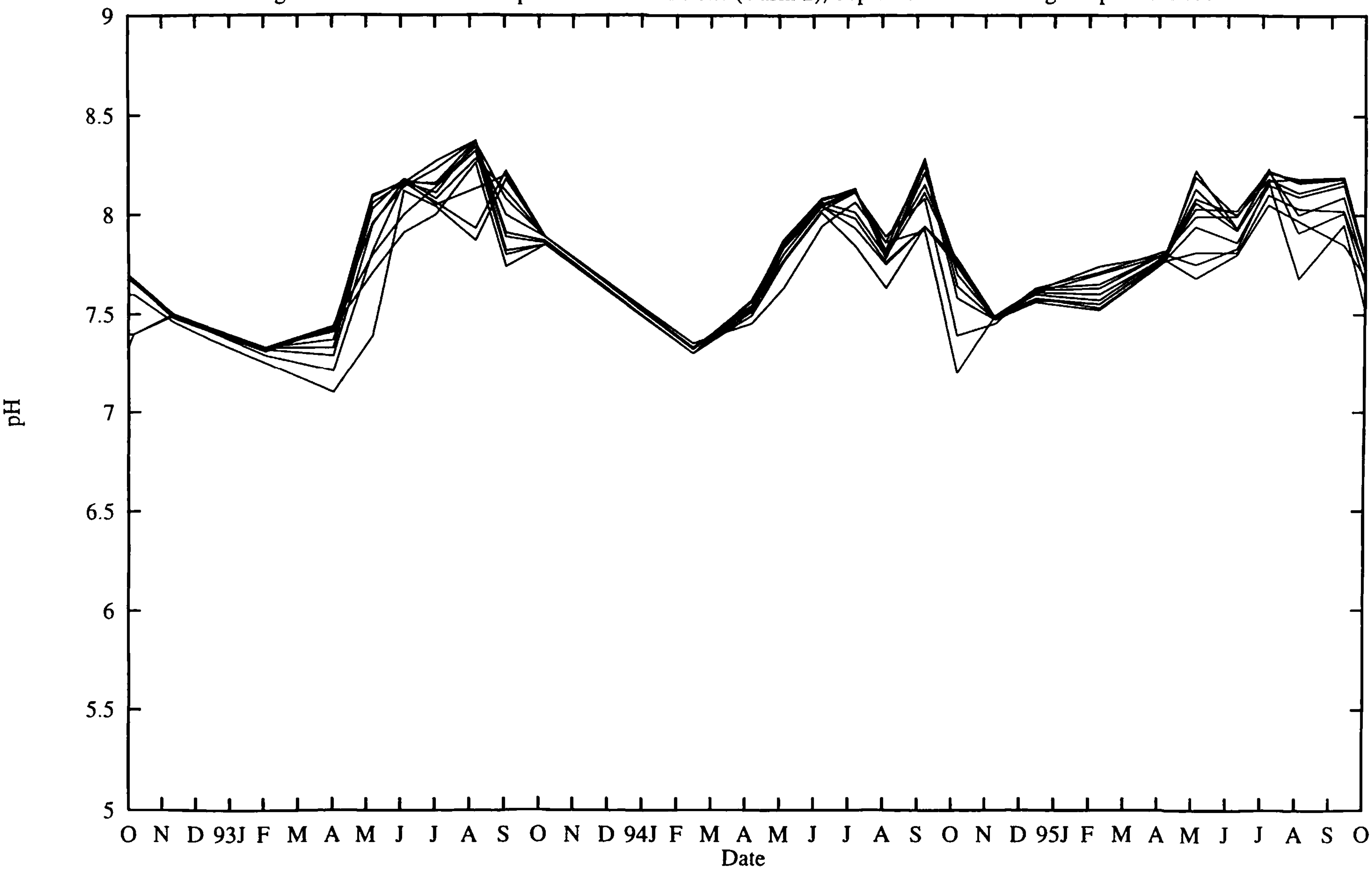


Figure 15: Lake Whatcom pH data for Site 3, September 1992 through September 1995.

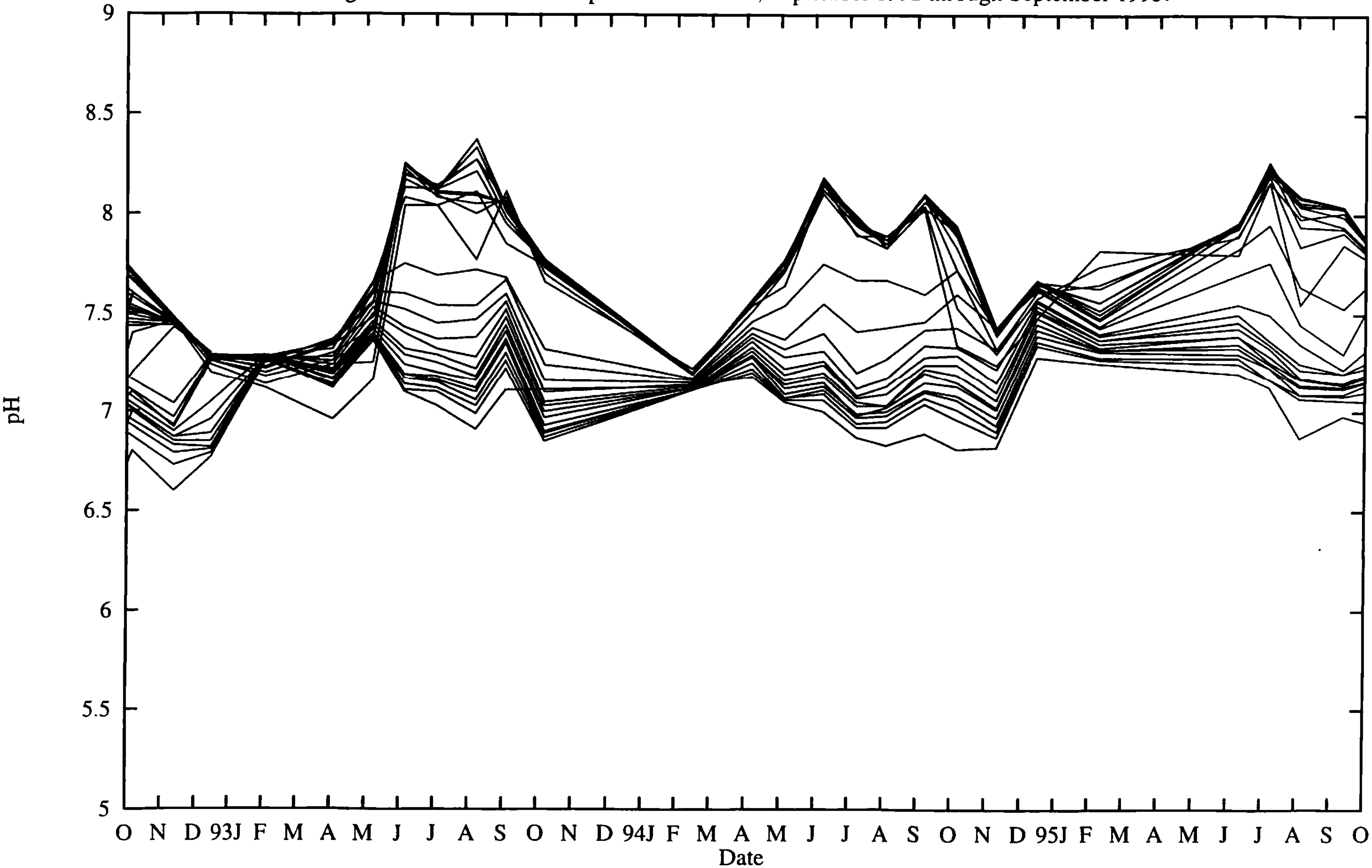


Figure 16: Lake Whatcom pH data for Site 4, September 1992 through September 1995.

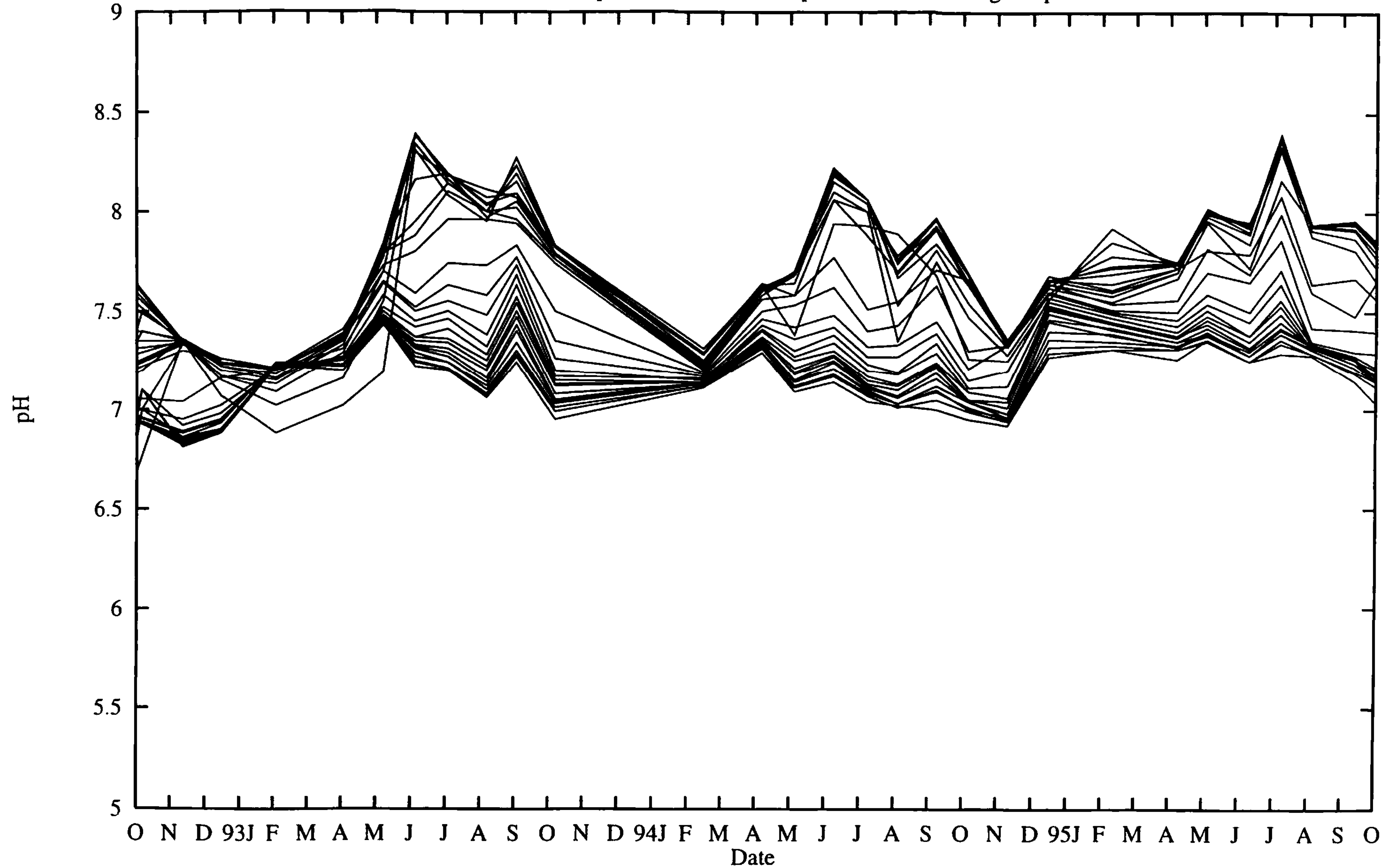


Figure 17: Lake Whatcom conductivity data for Site 1, September 1992 through September 1995.

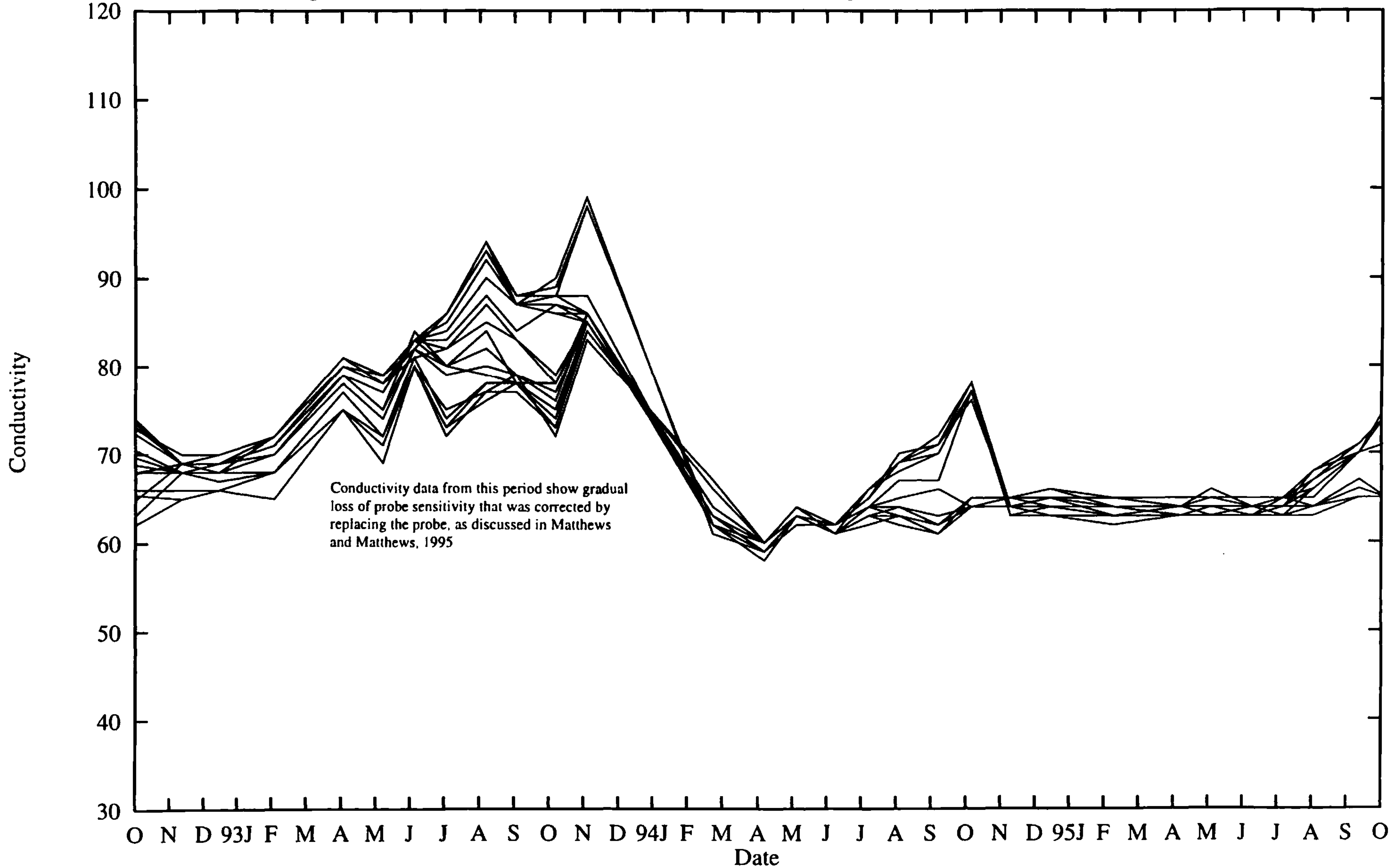


Figure 18; Lake Whatcom conductivity data for Site 2, September 1992 through September 1995.

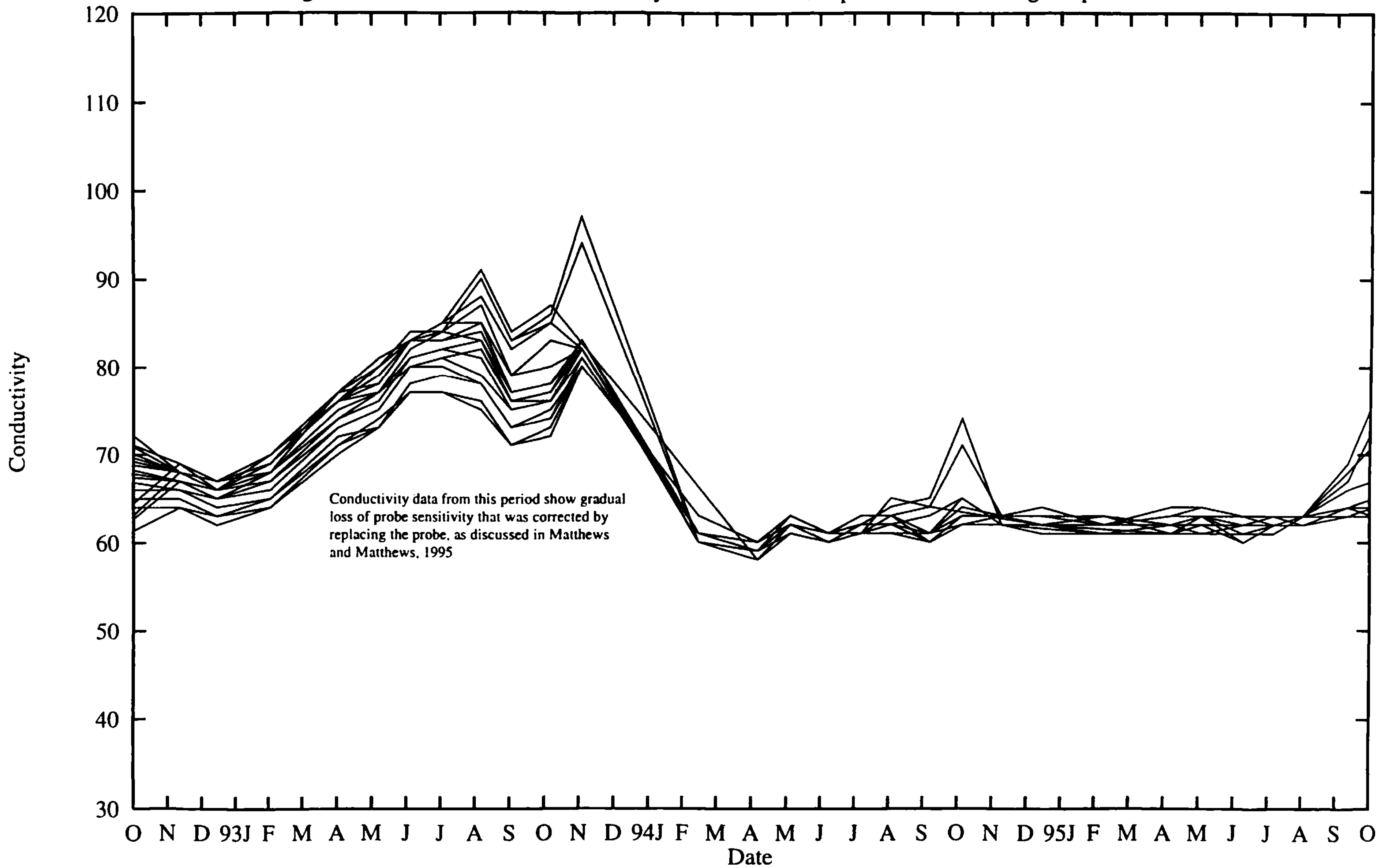


Figure 19: Lake Whatcom conductivity data for Intake site (Basin 2), September 1992 through September 1995.

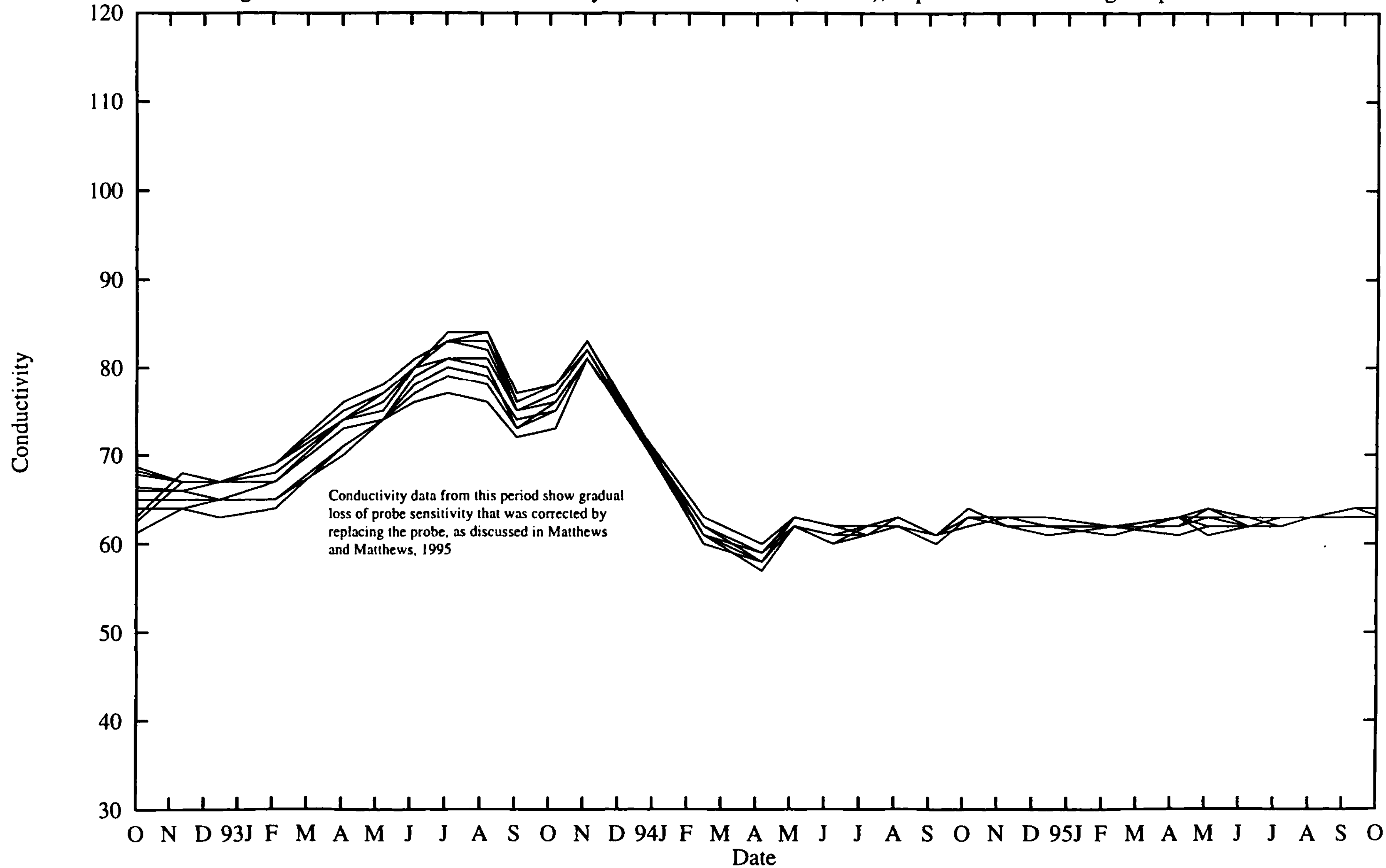


Figure 20: Lake Whatcom conductivity data for Site 3, September 1992 through September 1995.

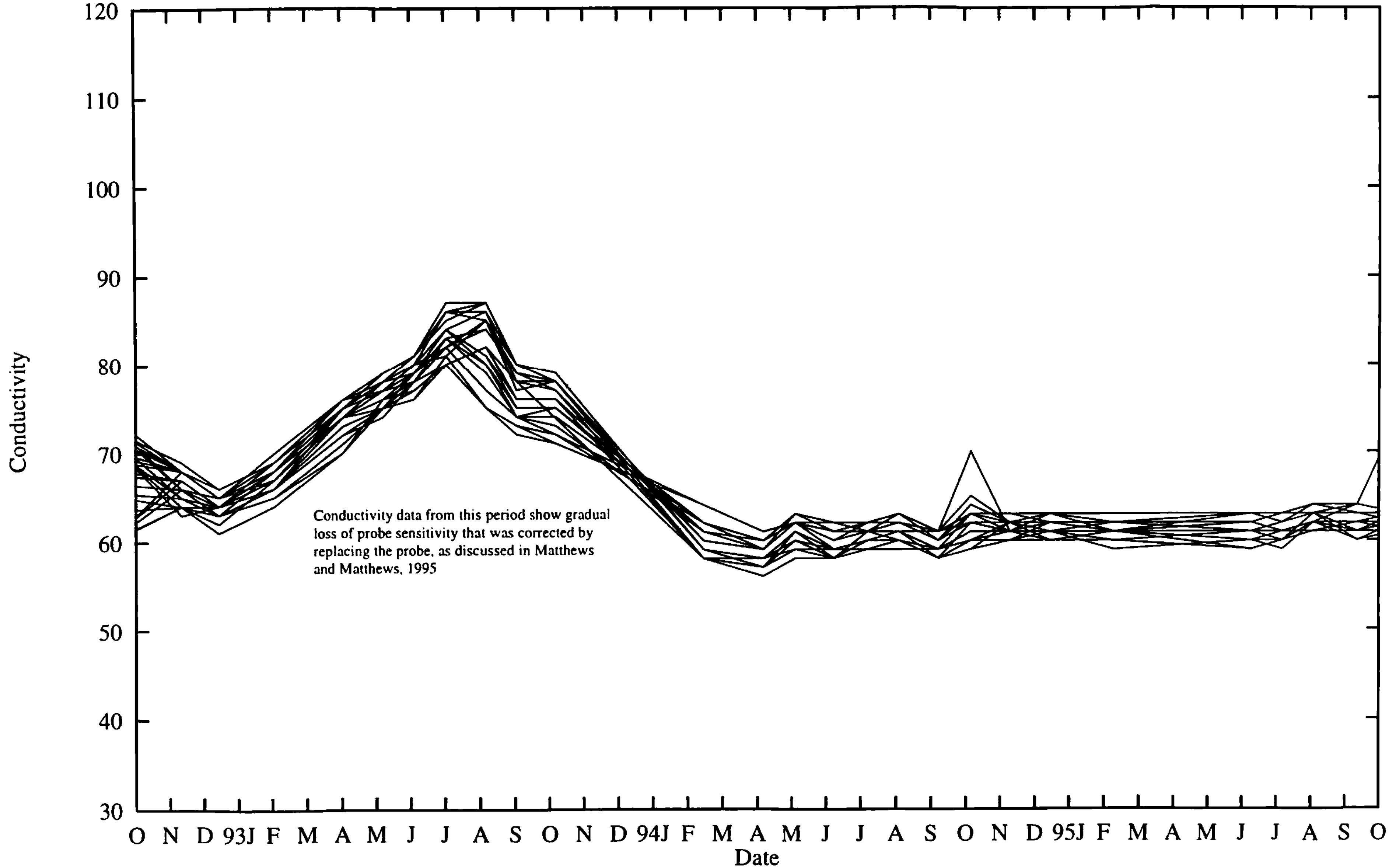


Figure 21: Lake Whatcom conductivity data for Site 4, September 1992 through September 1995.

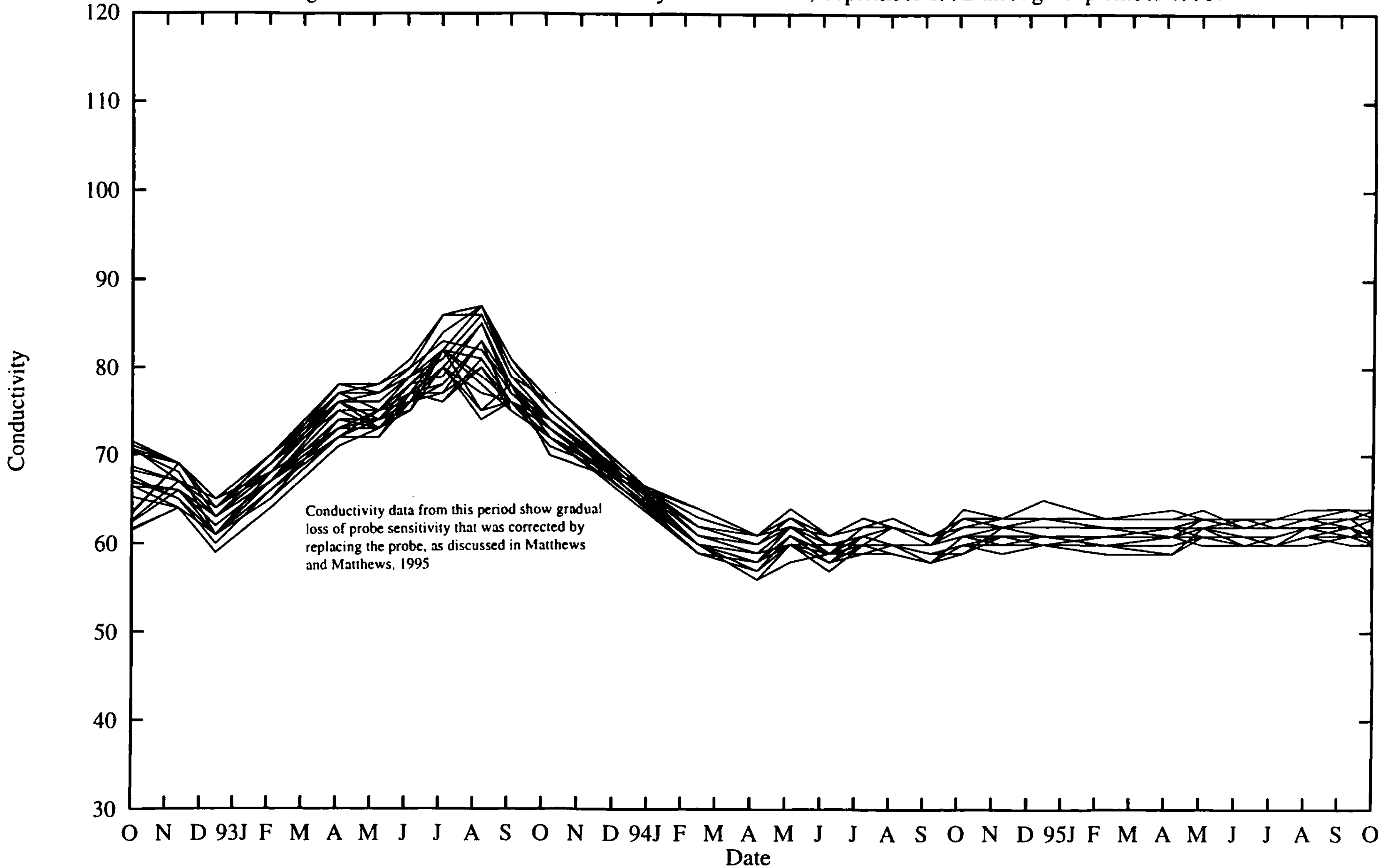


Figure 22: Lake Whatcom alkalinity data for Site 1, September 1992 through September 1995.

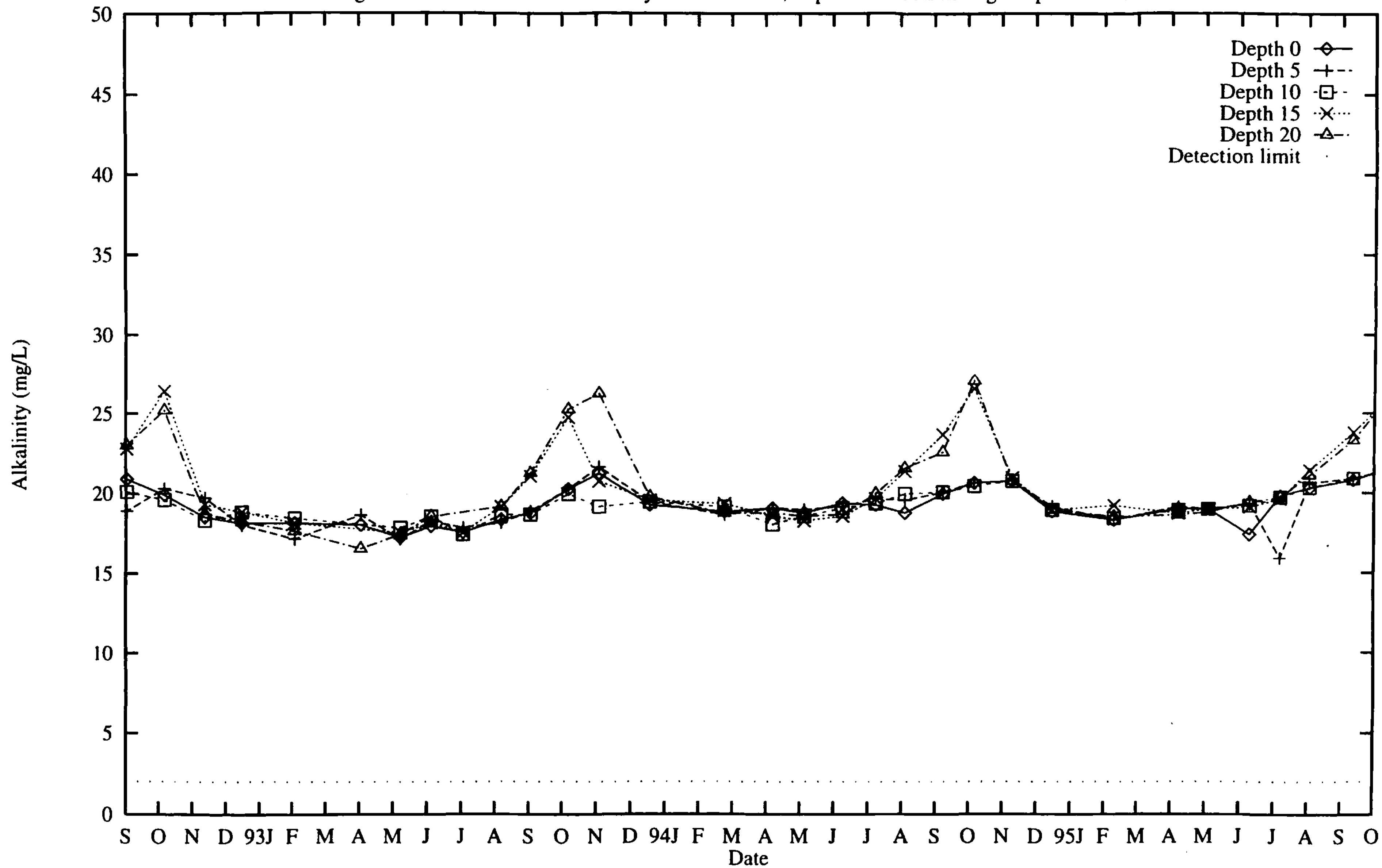


Figure 23: Lake Whatcom alkalinity data for Site 2, September 1992 through September 1995.

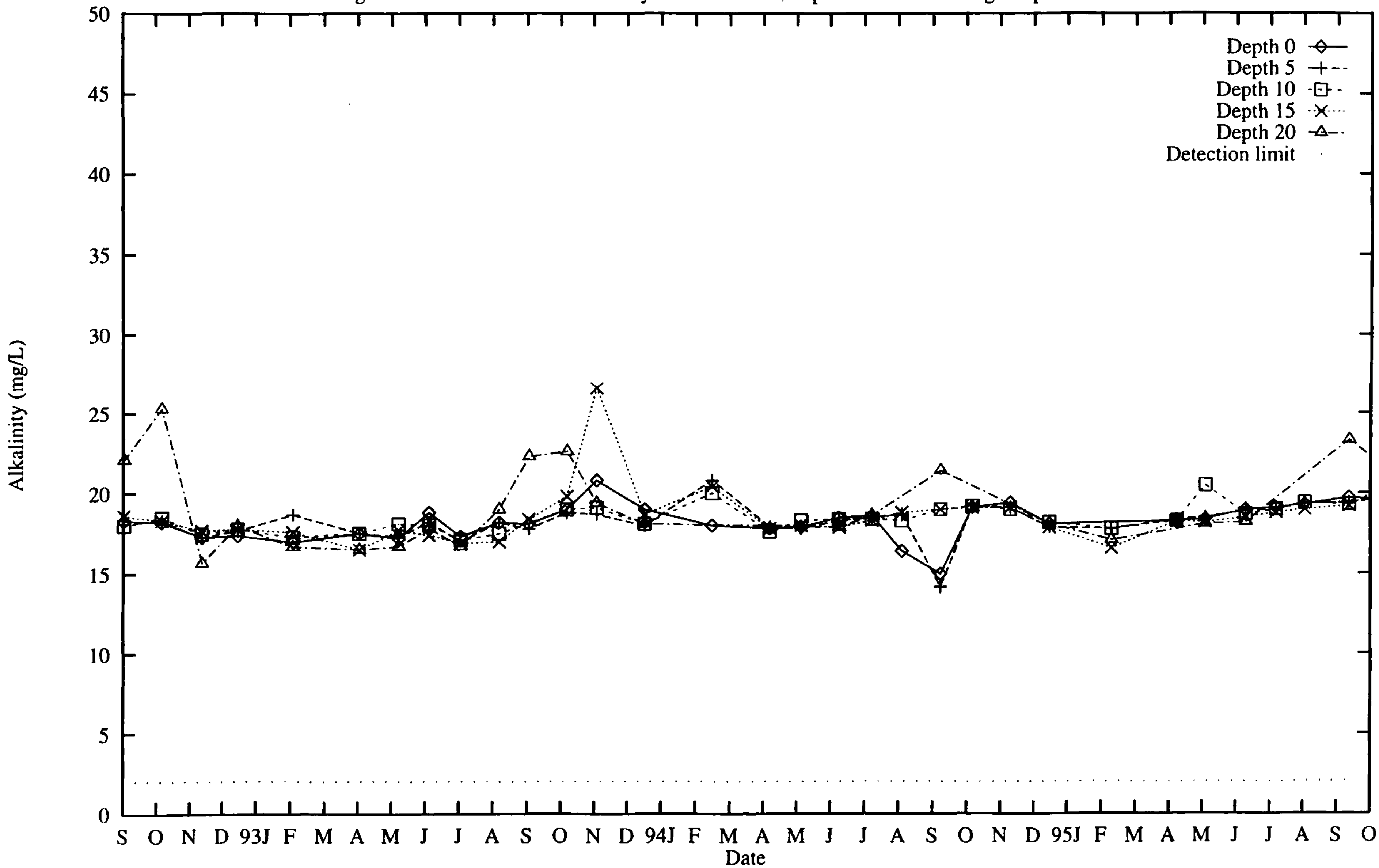


Figure 24: Lake Whatcom alkalinity data for Intake site (basin 2), September 1992 through September 1995.

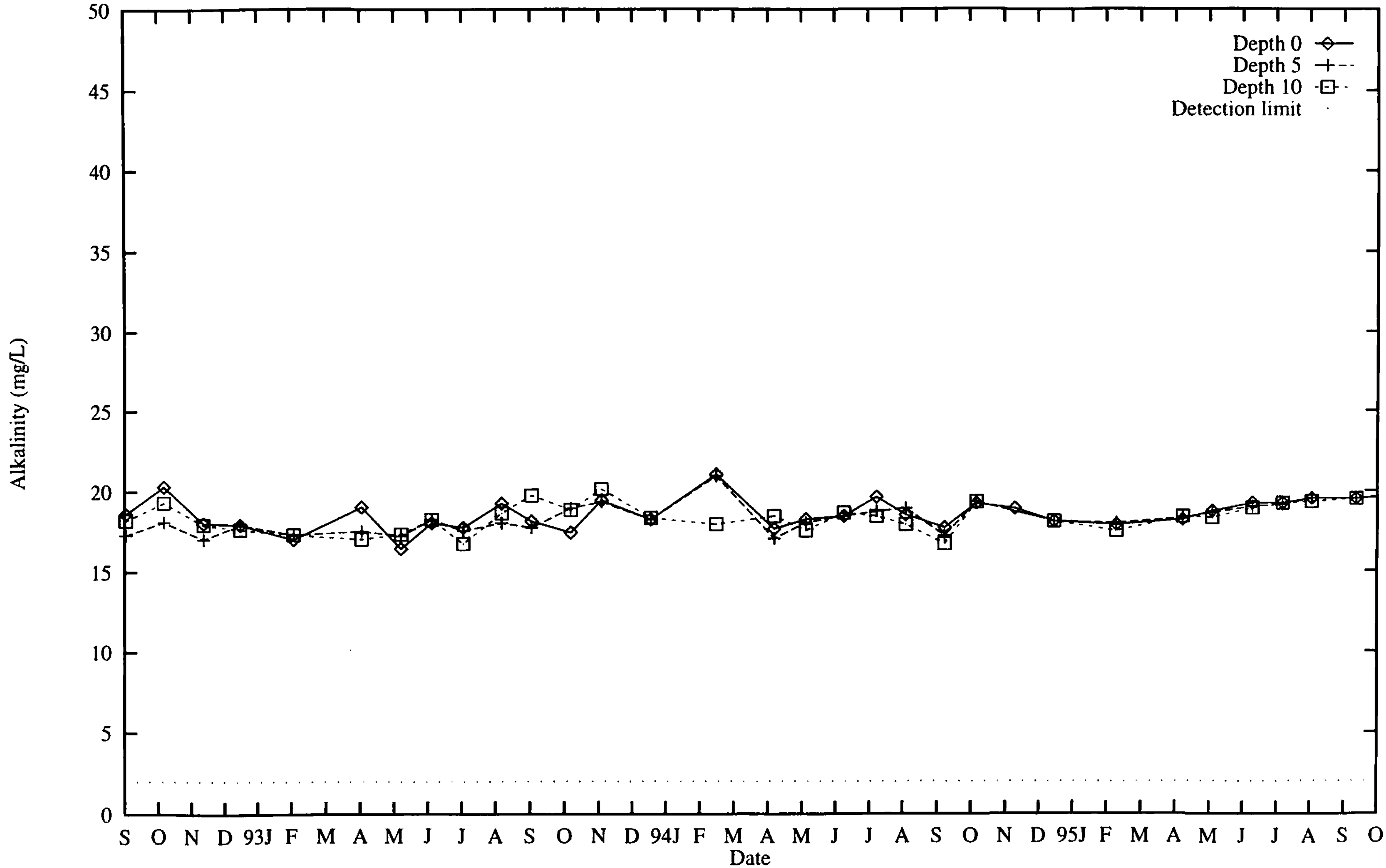


Figure 25: Lake Whatcom alkalinity data for Site 3, September 1992 through September 1995.

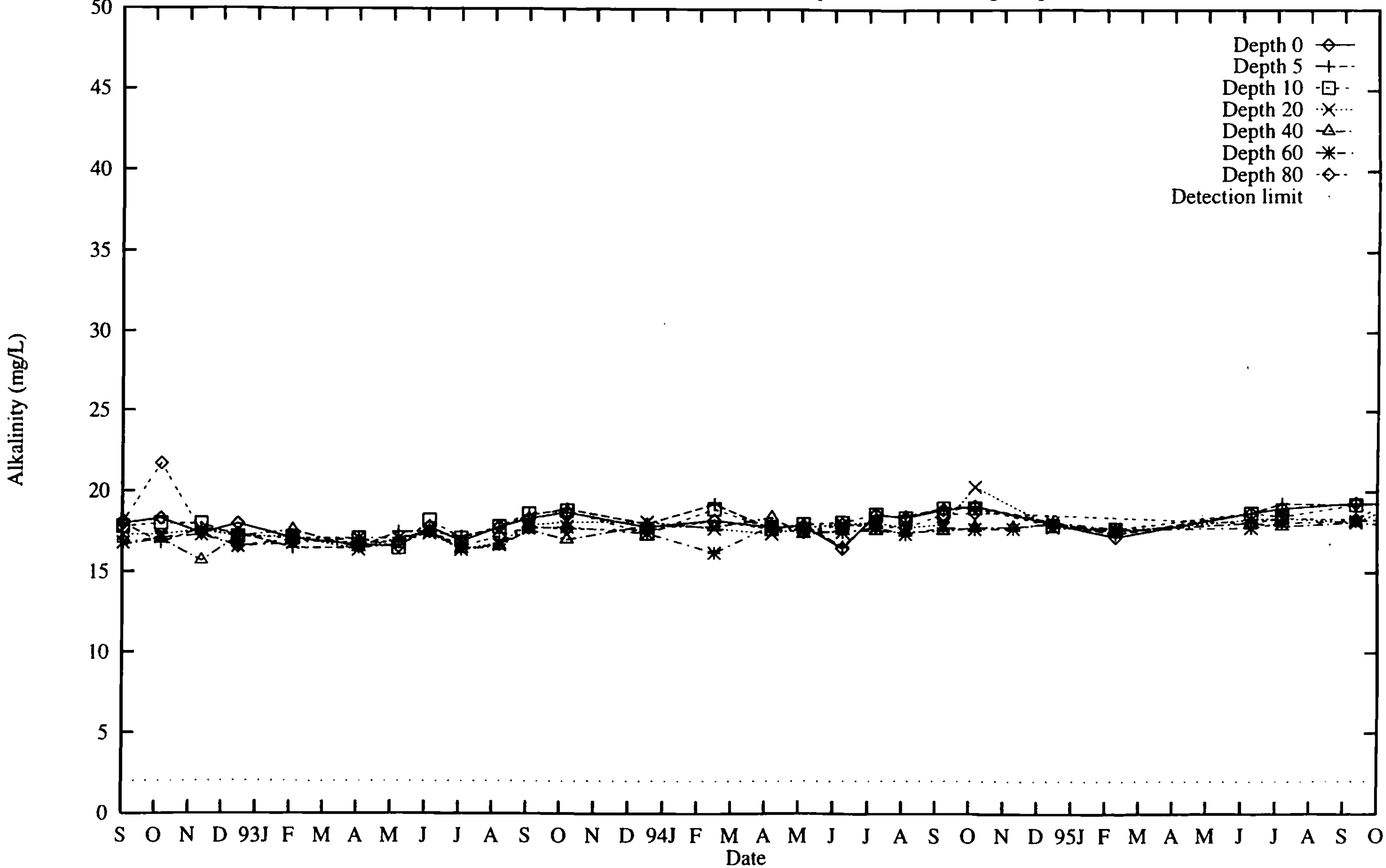


Figure 26: Lake Whatcom alkalinity data for Site 4, September 1992 through September 1995.

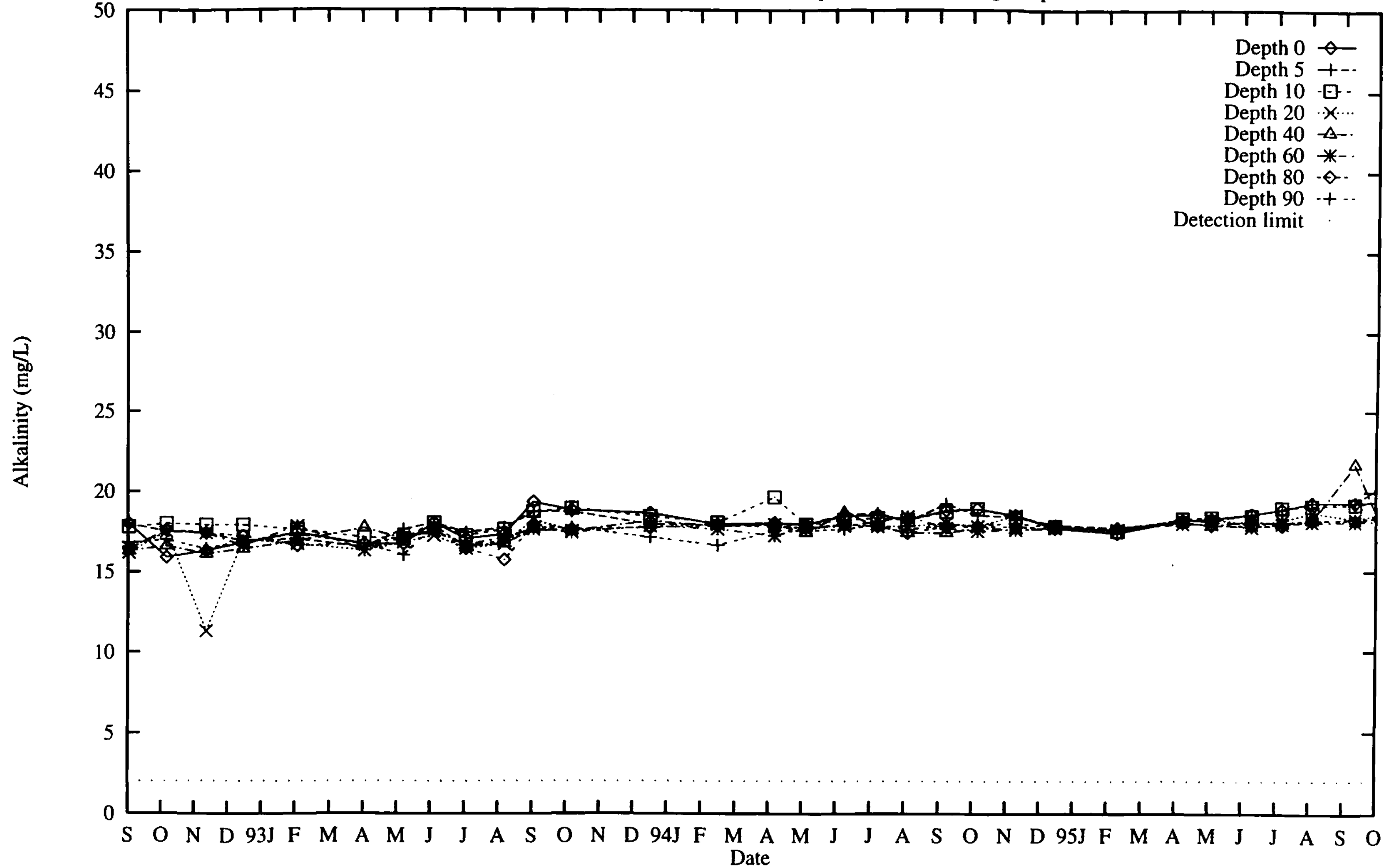


Figure 27: Lake Whatcom conductivity data (laboratory) for Site 1, September 1992 through September 1995.

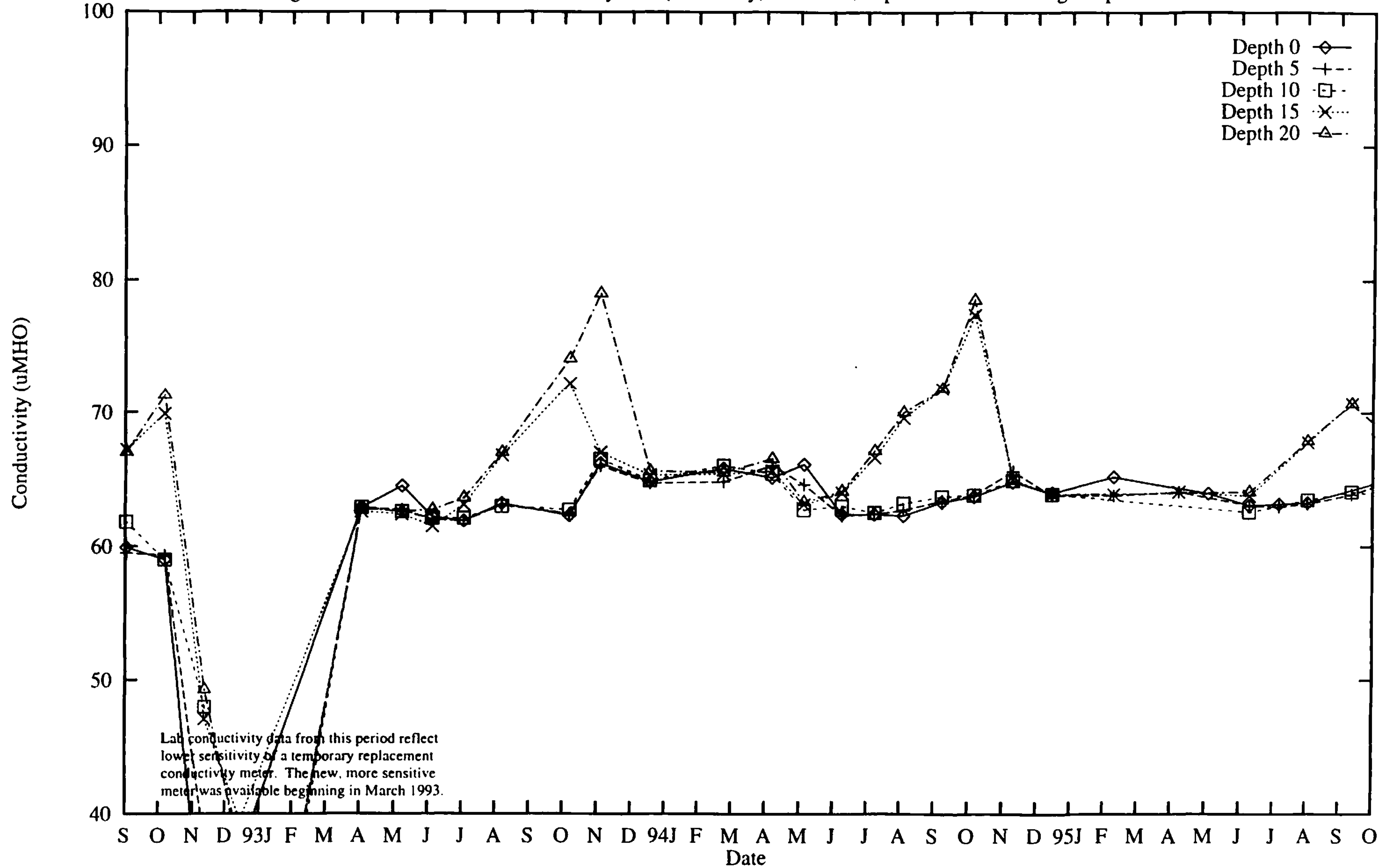


Figure 28: Lake Whatcom conductivity data (laboratory) for Site 2, September 1992 through September 1995.

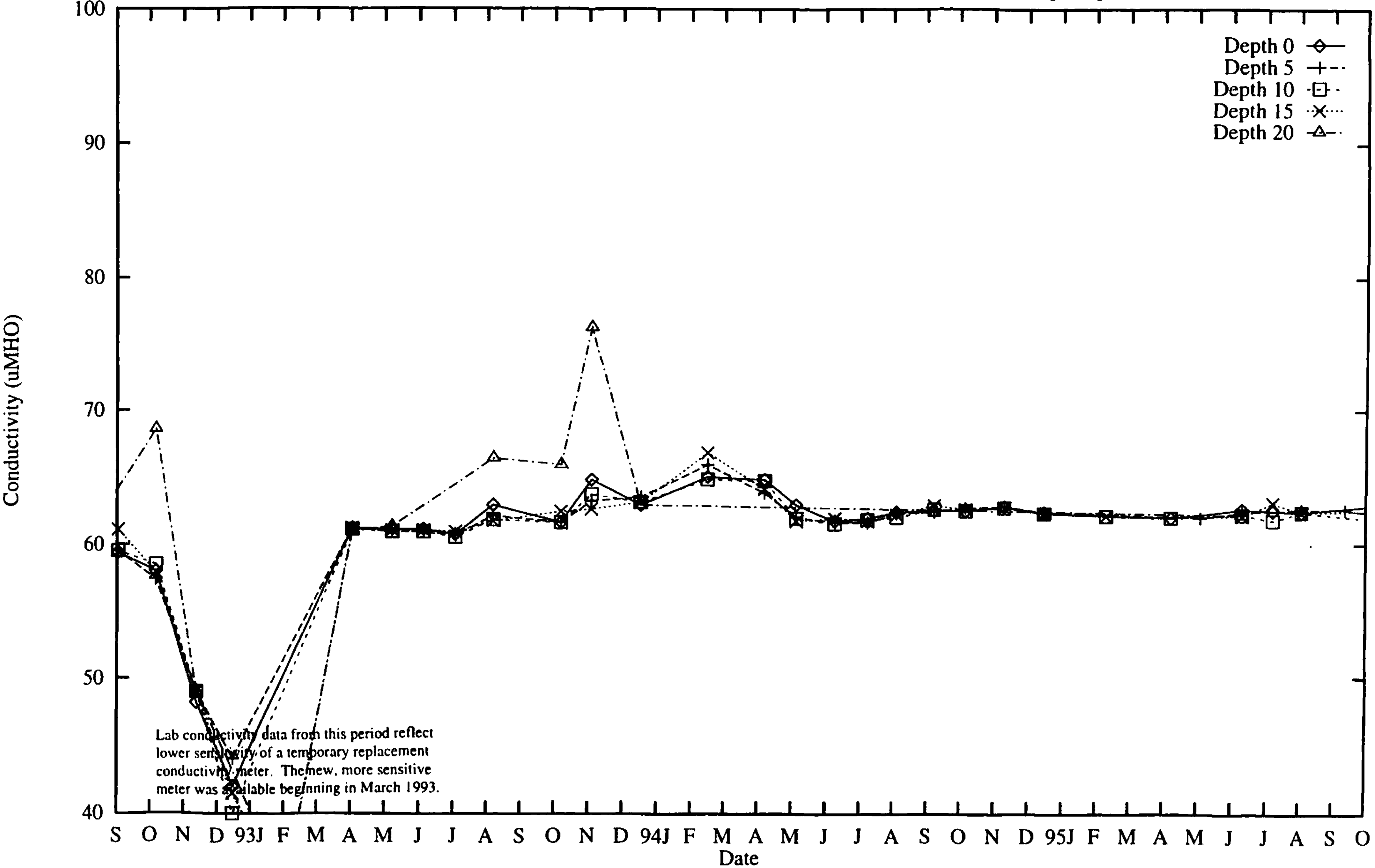


Figure 29: Lake Whatcom conductivity data (laboratory) for Intake site (basin 2), September 1992 through September 1995.

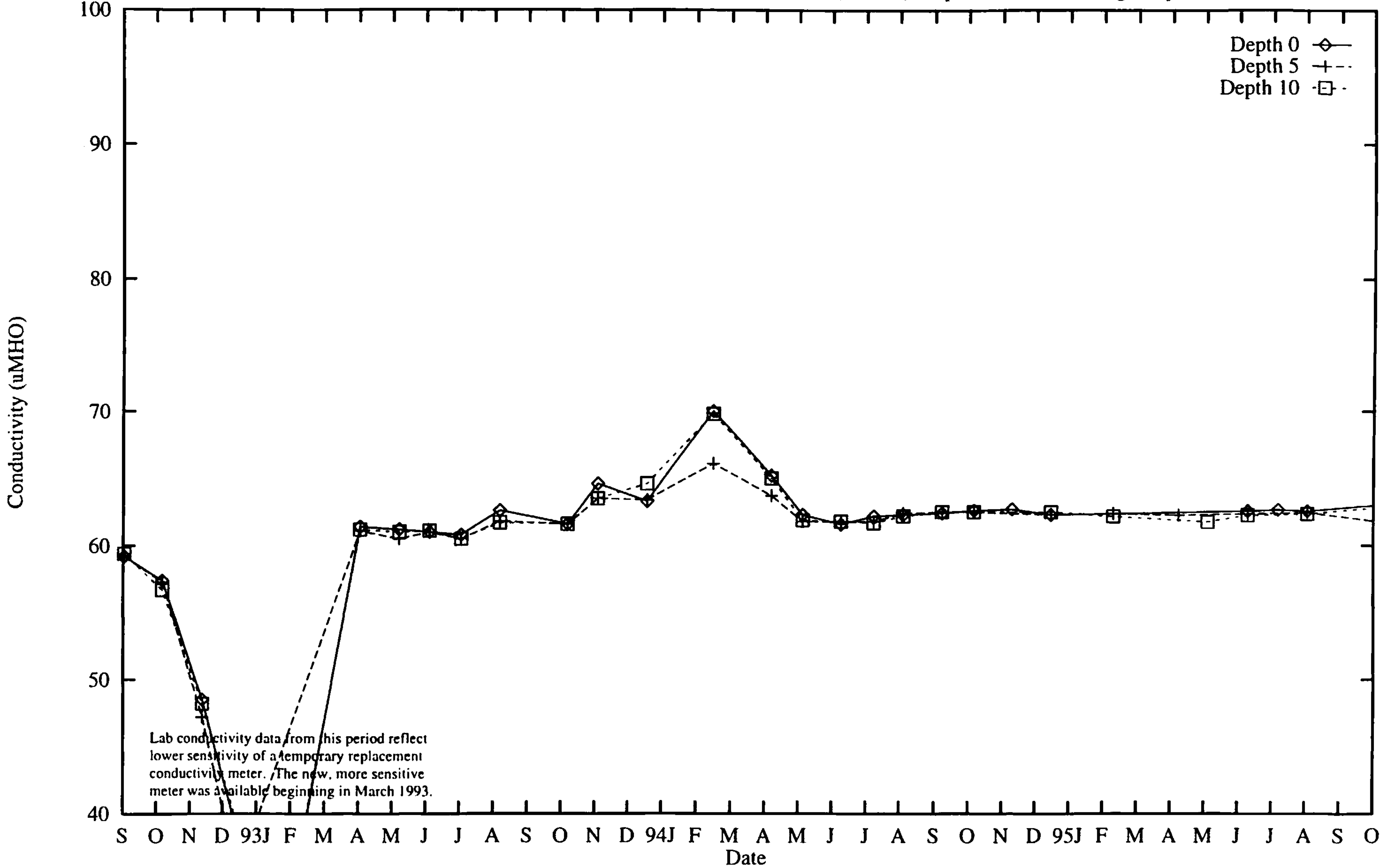


Figure 30: Lake Whatcom conductivity data (laboratory) for Site 3, September 1992 through September 1995.

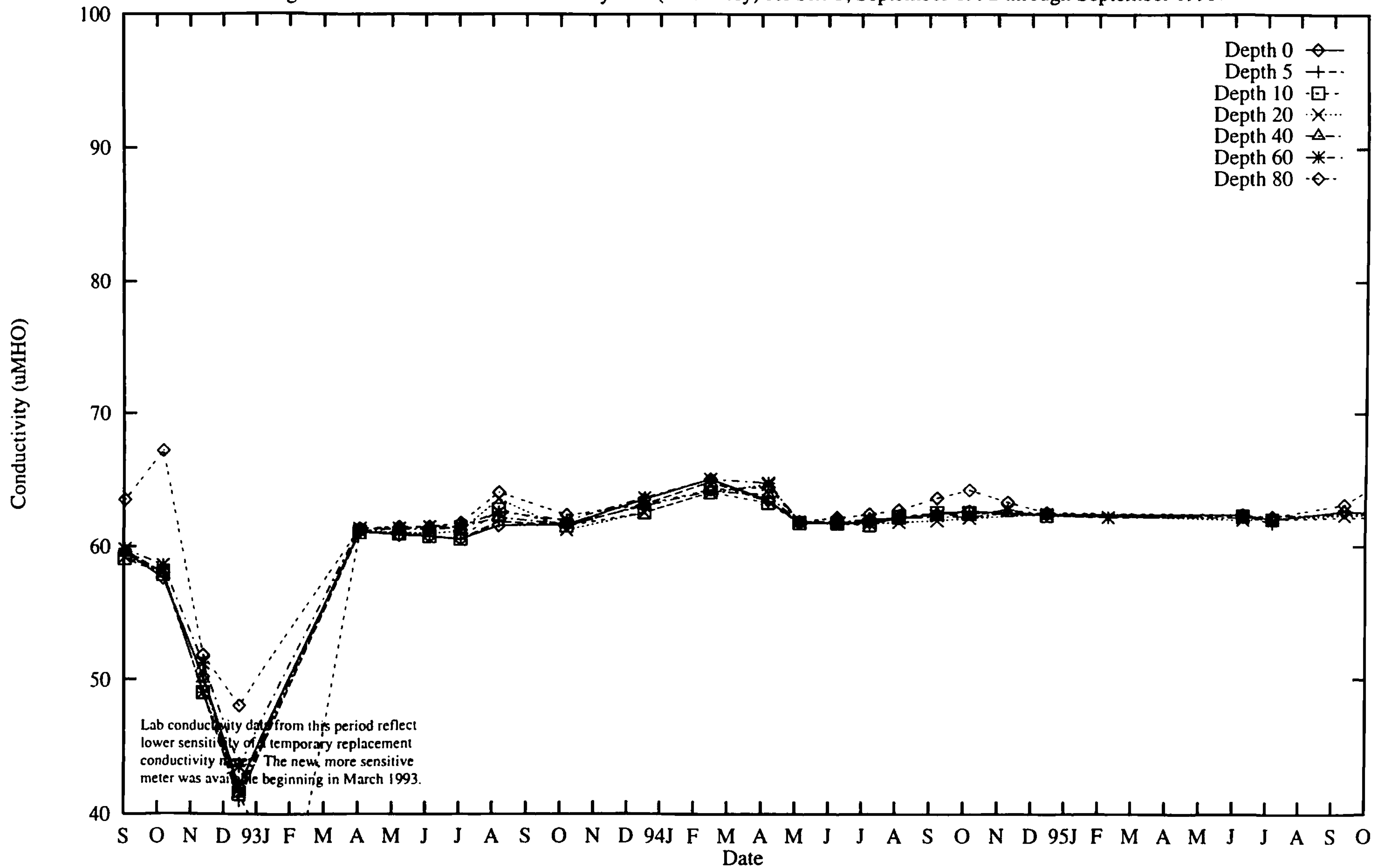


Figure 31: Lake Whatcom conductivity data (laboratory) for Site 4, September 1992 through September 1995.

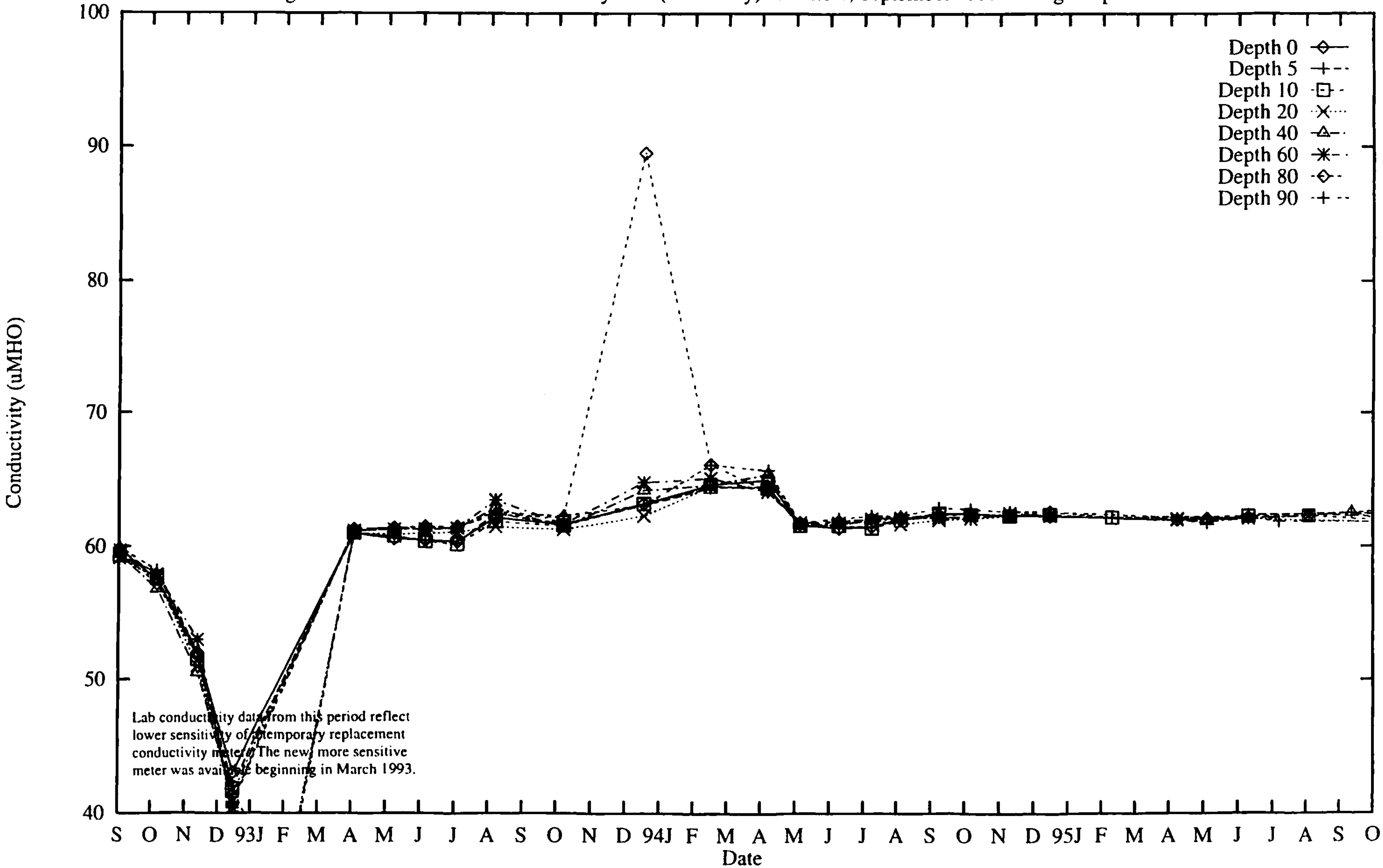


Figure 32: Lake Whatcom turbidity data for Site 1, September 1992 through September 1995.

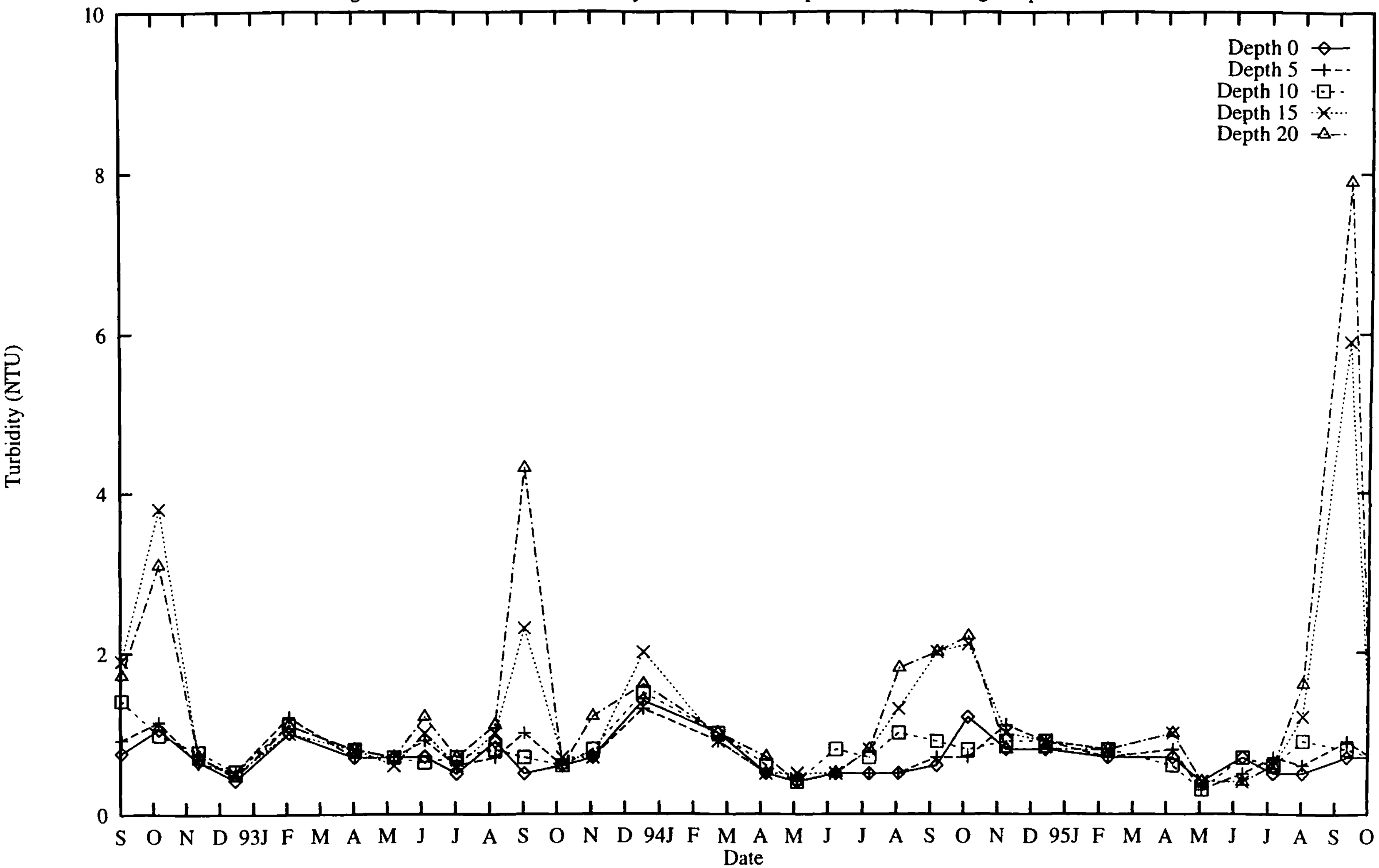


Figure 33: Lake Whatcom turbidity data for Site 2, September 1992 through September 1995.

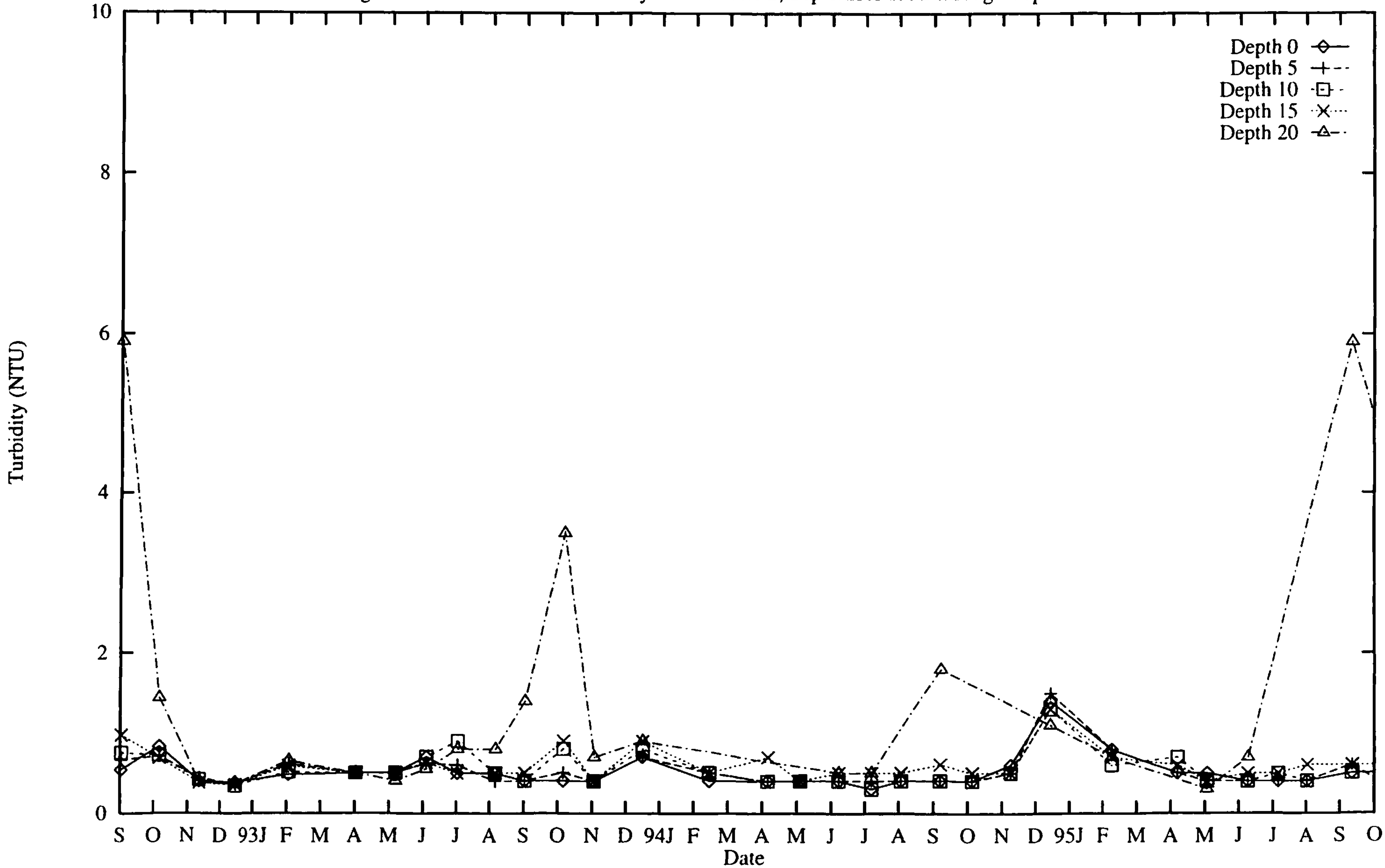


Figure 34: Lake Whatcom turbidity data for Intake site (basin 2), September 1992 through September 1995.

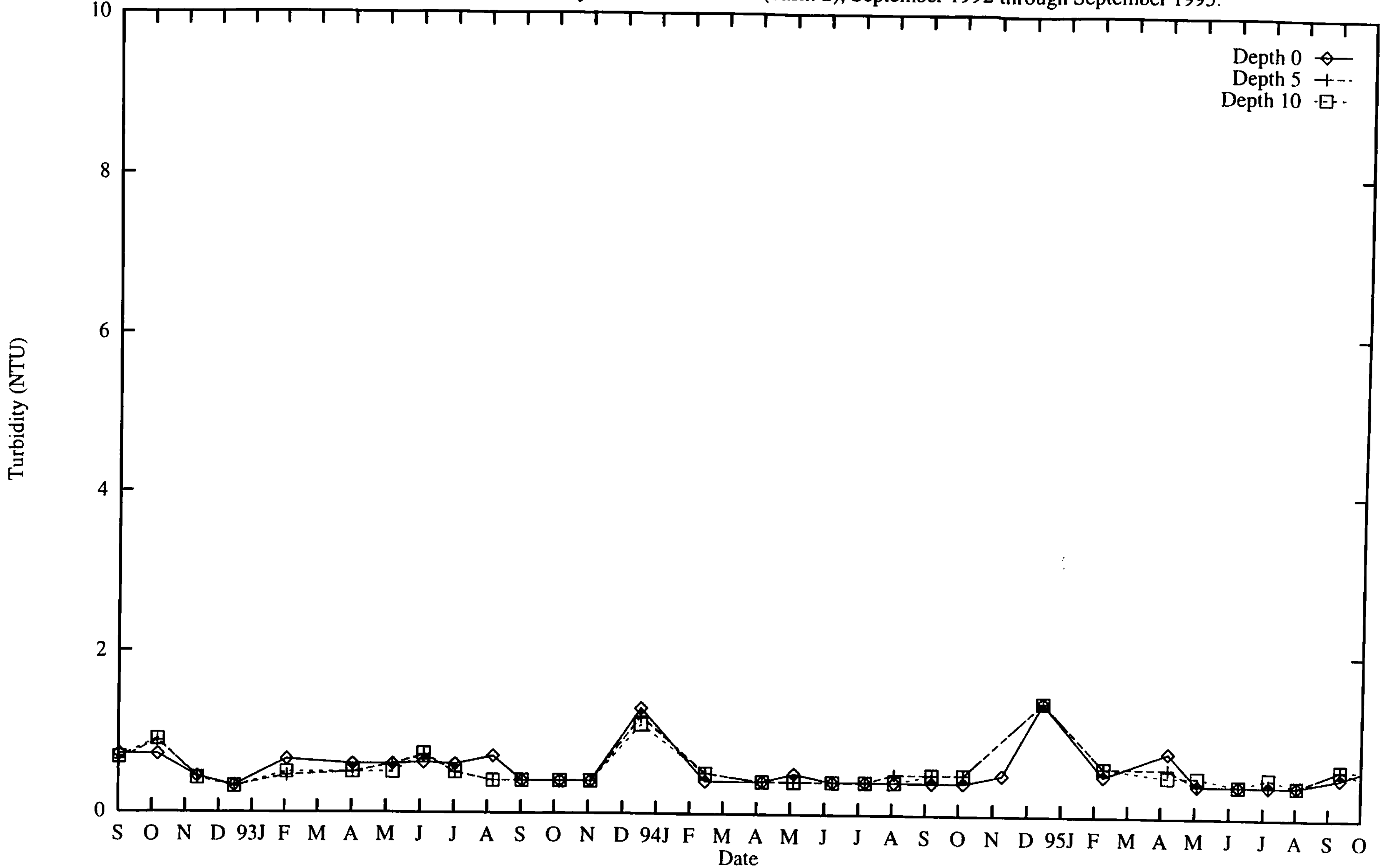


Figure 35: Lake Whatcom turbidity data for Site 3, September 1992 through September 1995.

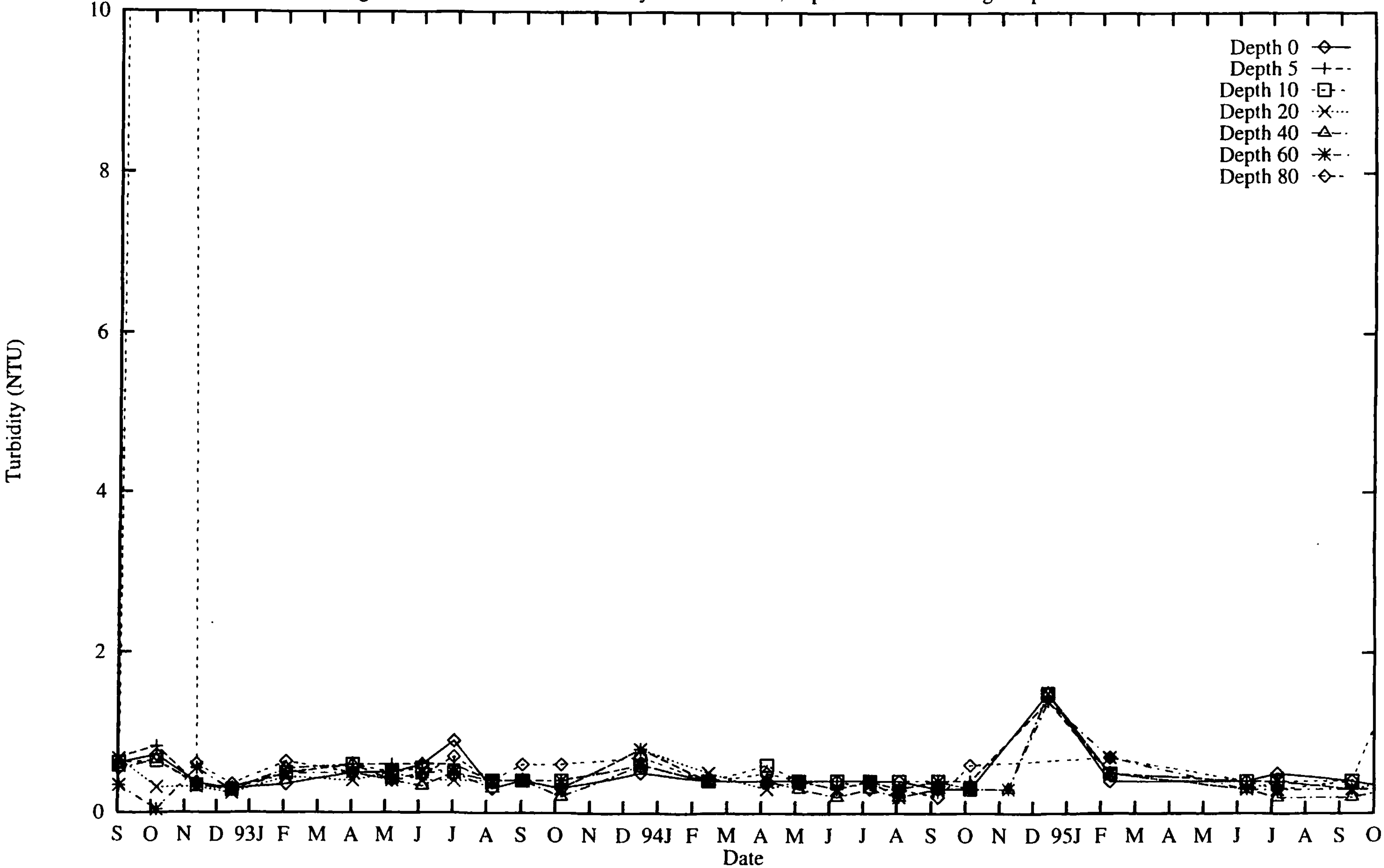


Figure 36: Lake Whatcom turbidity data for Site 4, September 1992 through September 1995.

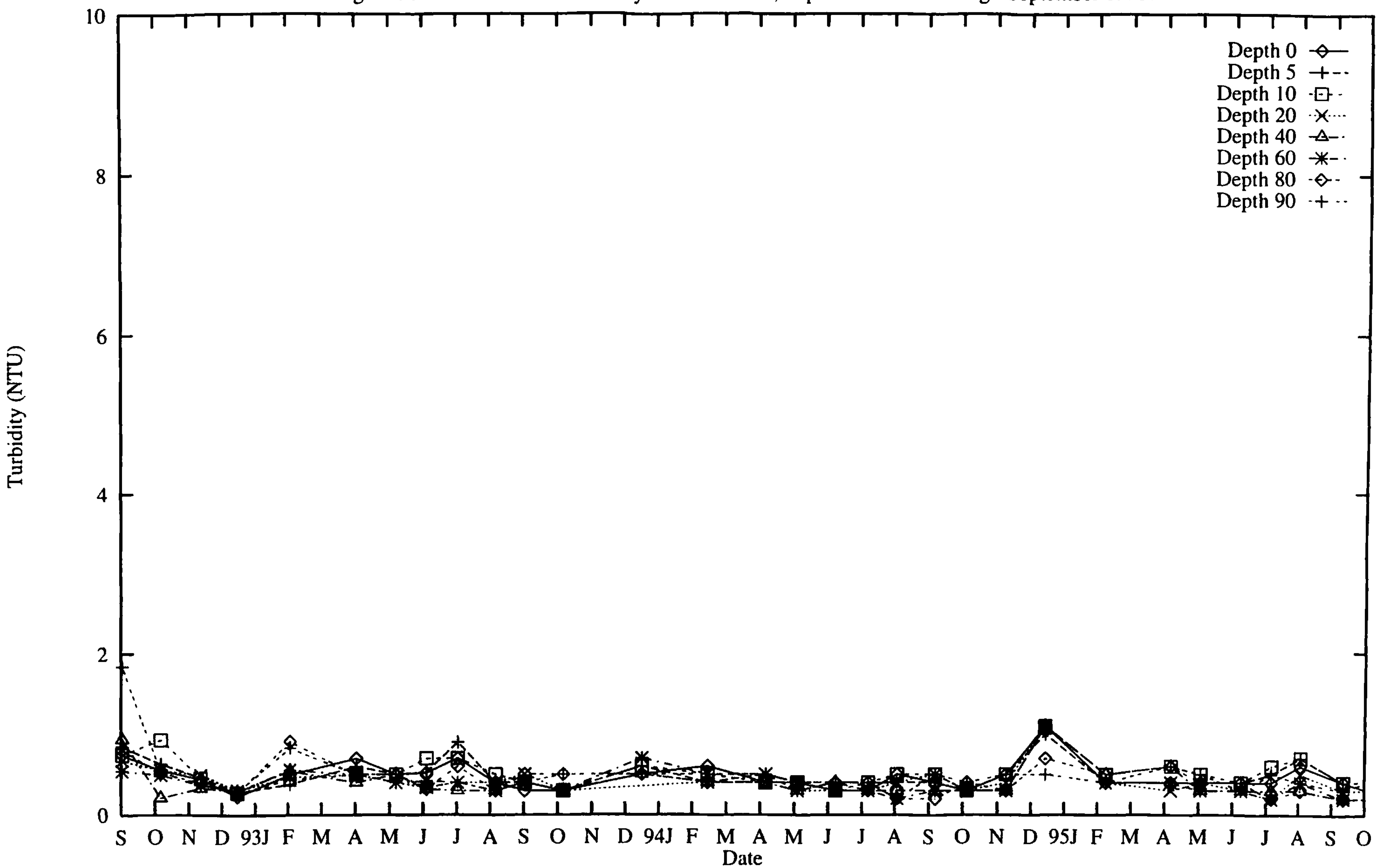


Figure 37: Lake Whatcom nitrogen summary data (ammonia, nitrate/nitrite, and total nitrogen) for Site 1, September 1992 through September 1995.

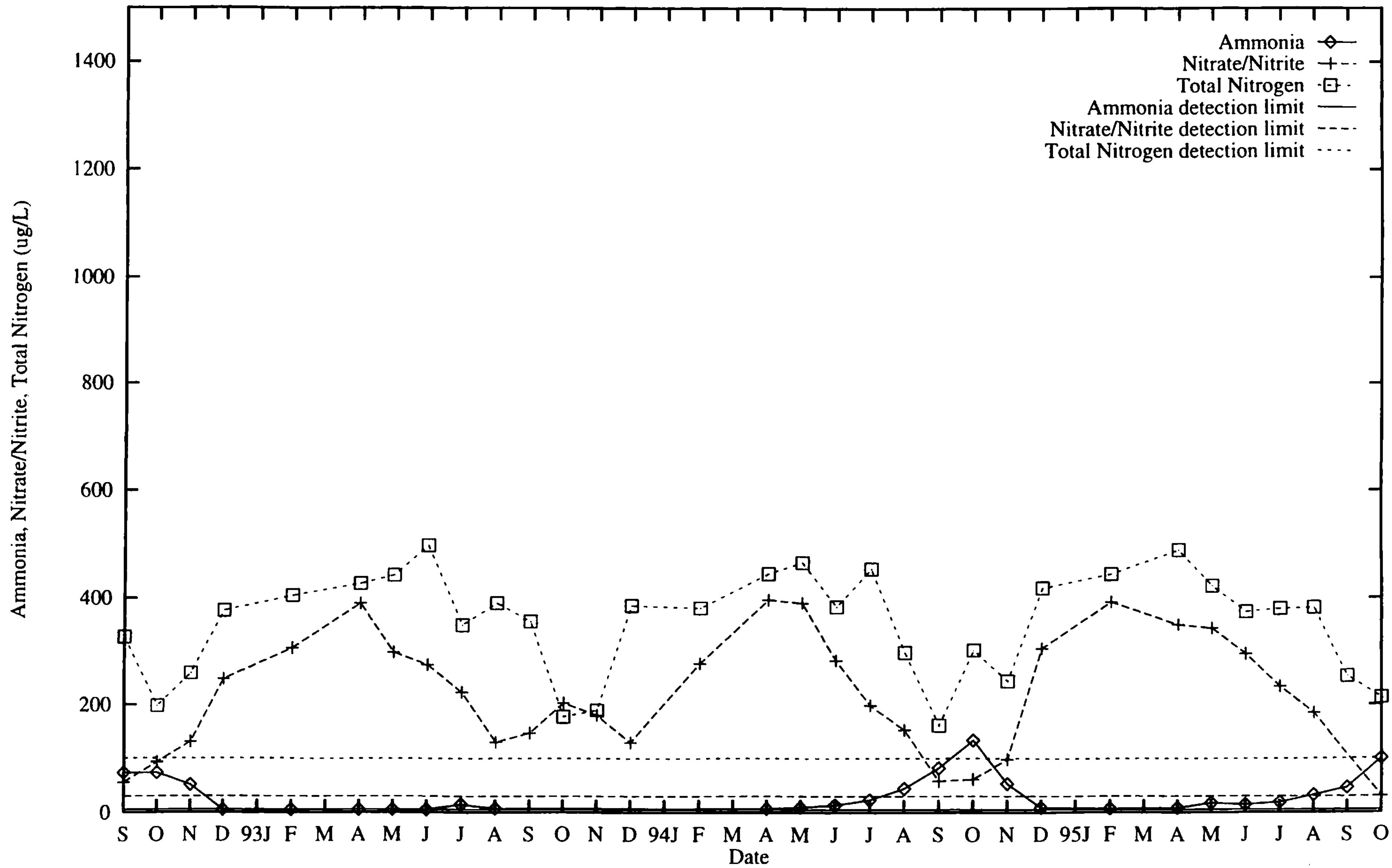


Figure 40: Lake Whatcom nitrogen summary data (ammonia, nitrate/nitrite, and total nitrogen) for Site 3, September 1992 through September 1995.

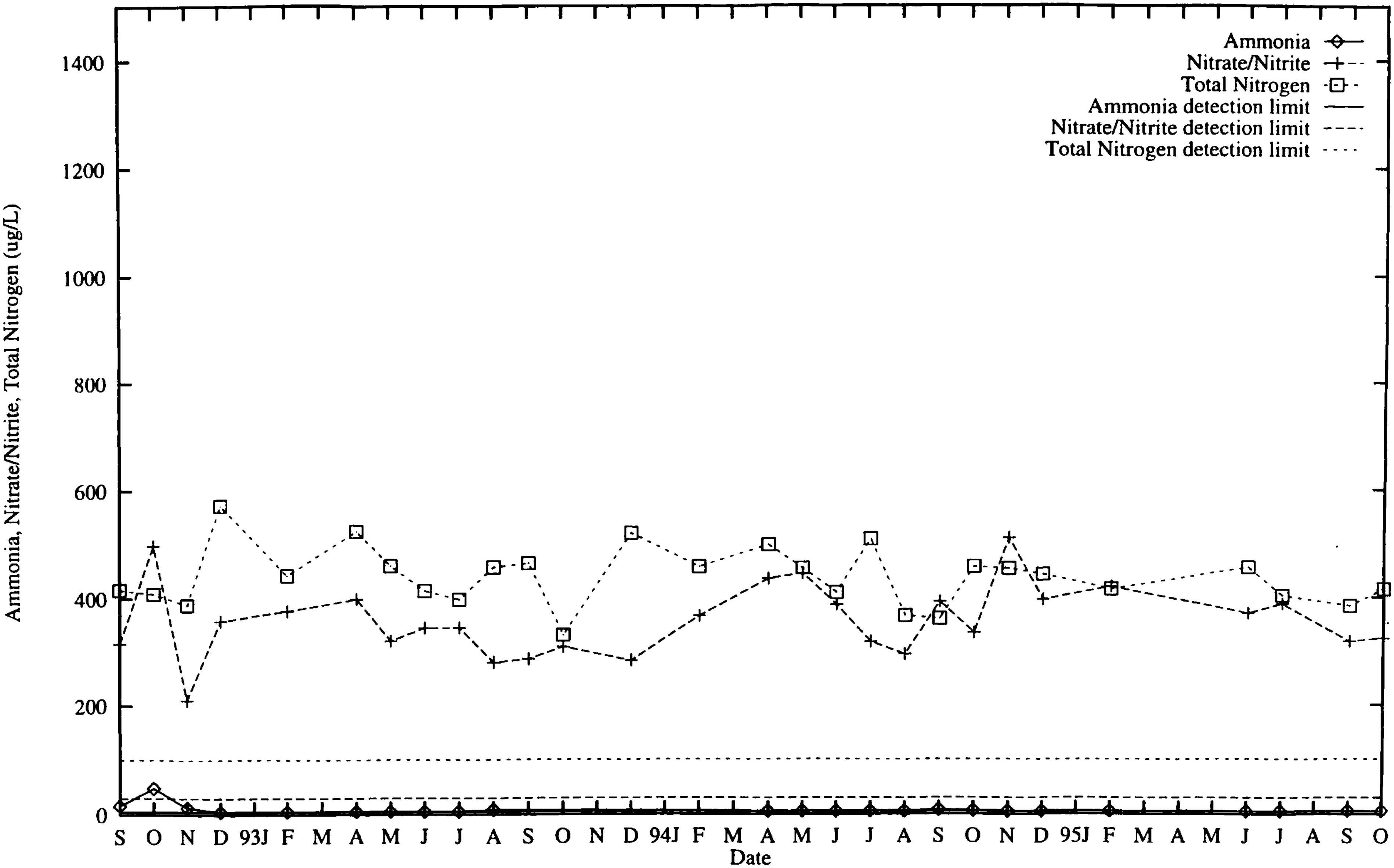


Figure 41: Lake Whatcom nitrogen summary data (ammonia, nitrate/nitrite, and total nitrogen) for Site 4, September 1992 through September 1995.

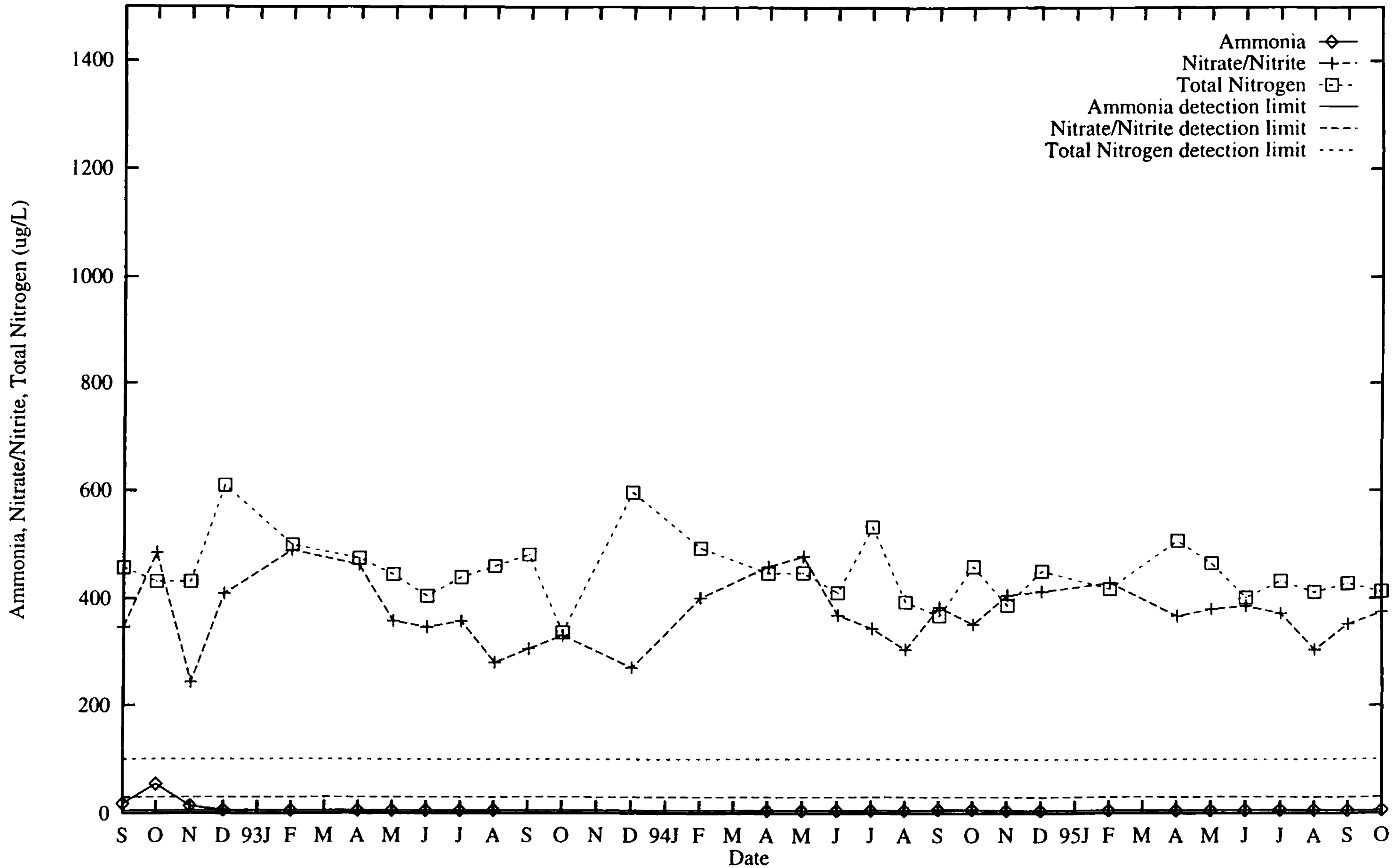


Figure 42: Lake Whatcom ammonia data for Site 1, September 1992 through September 1995.

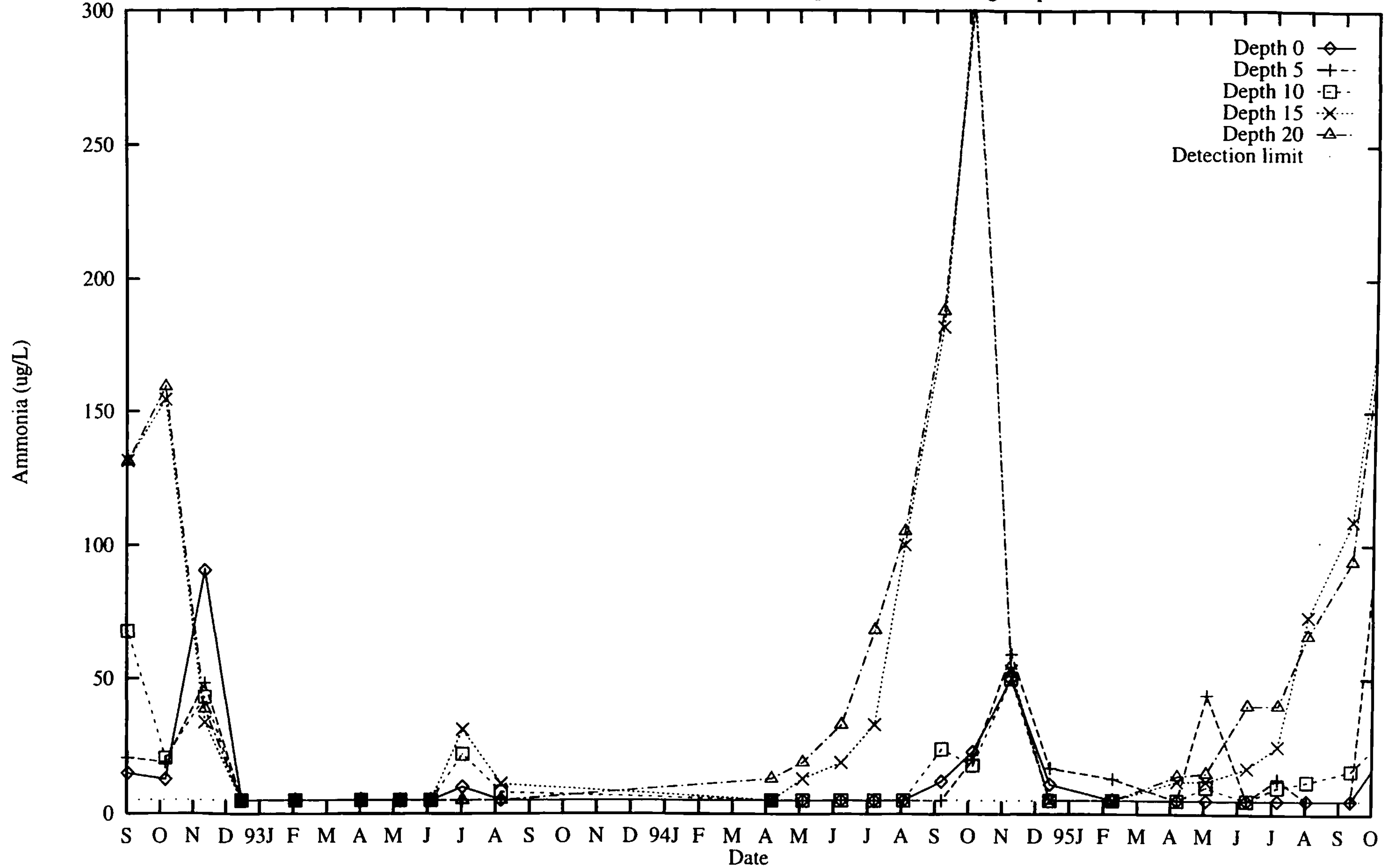


Figure 43: Lake Whatcom ammonia data for Site 2, September 1992 through September 1995.

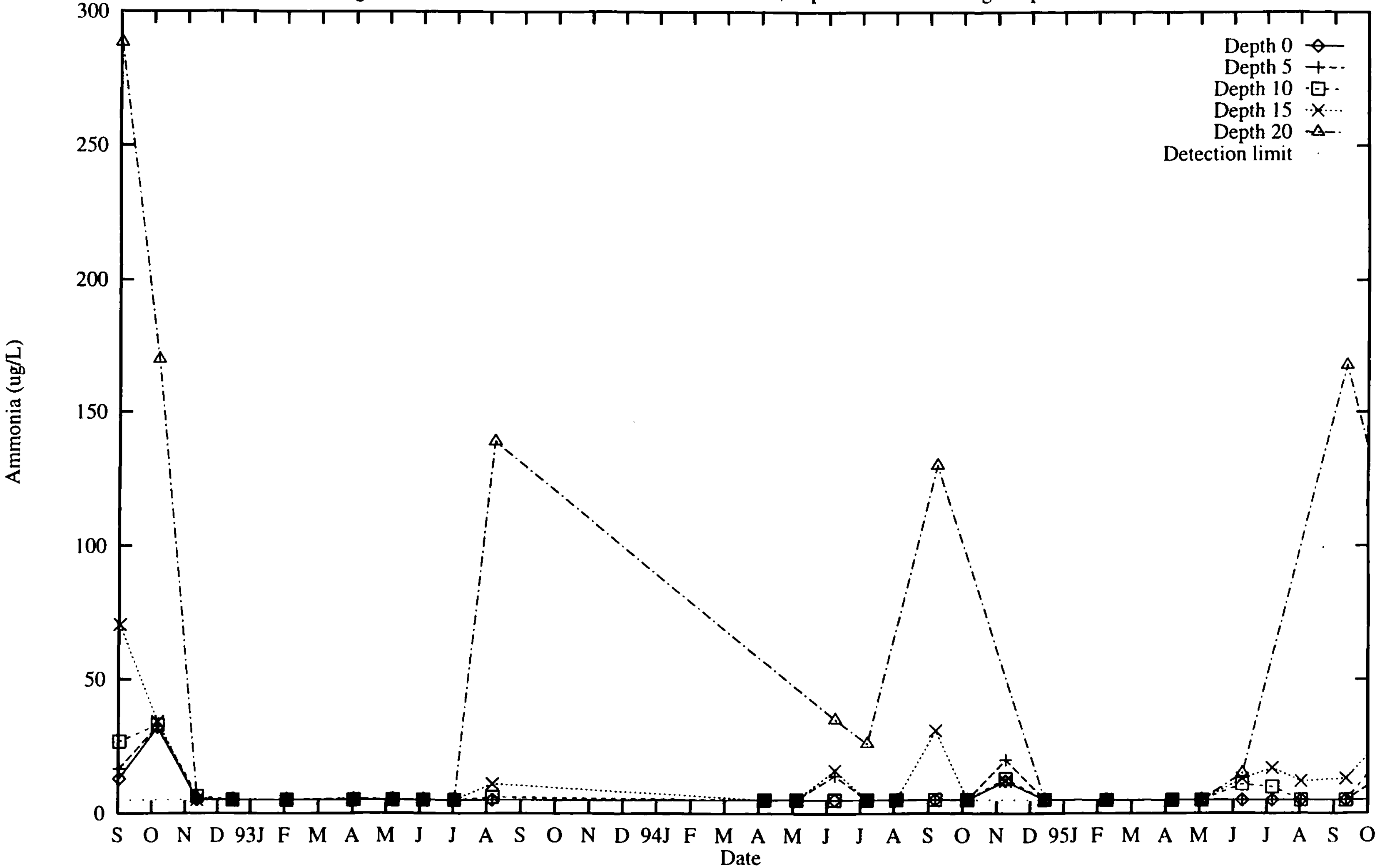


Figure 44: Lake Whatcom ammonia data for Intake site (basin 2), September 1992 through September 1995.

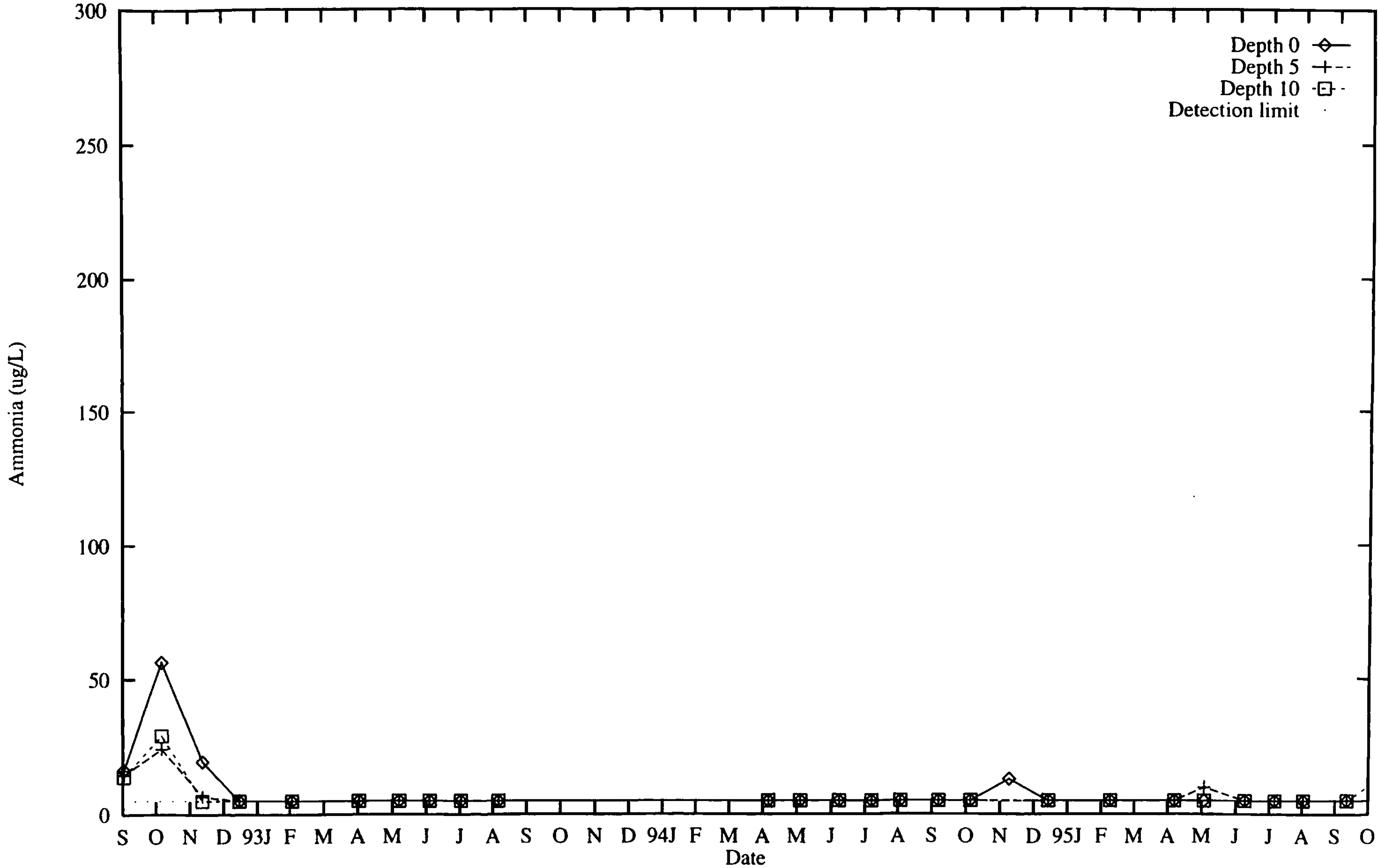


Figure 45: Lake Whatcom ammonia data for Site 3, September 1992 through September 1995.

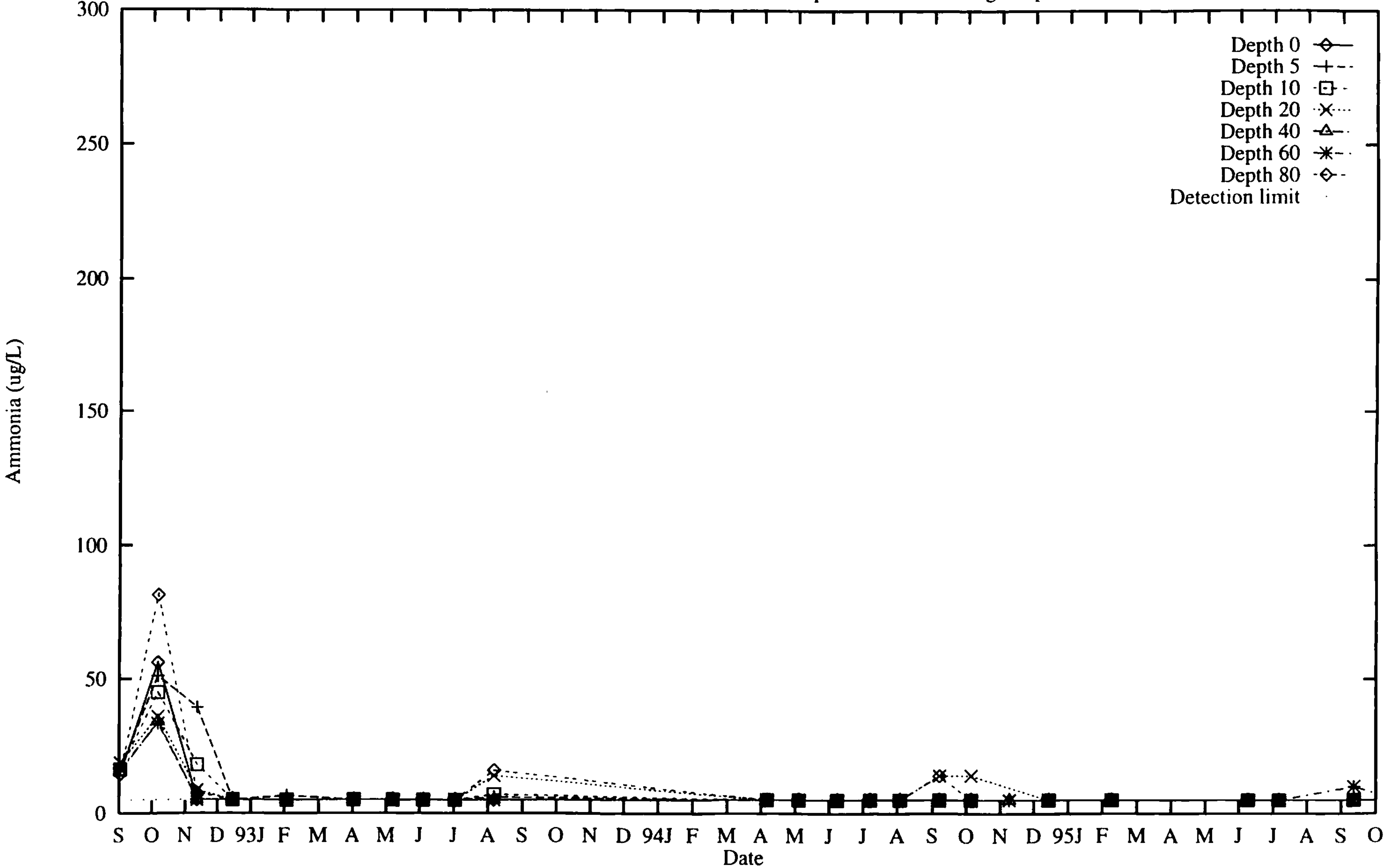


Figure 48: Lake Whatcom nitrate/nitrite data for Site 2, September 1992 through September 1995.

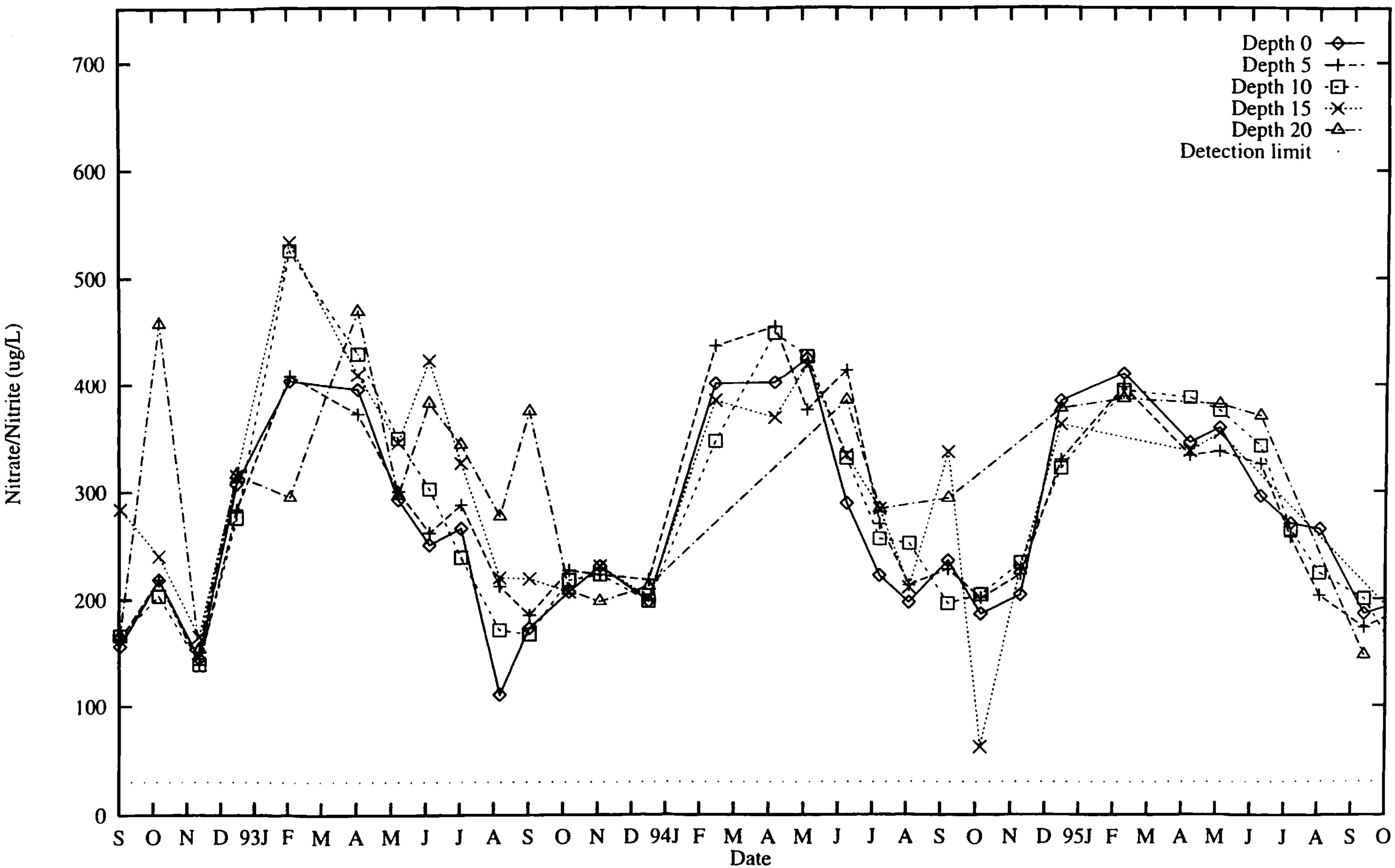


Figure 49: Lake Whatcom nitrate/nitrite data for Intake site (basin 2), September 1992 through September 1995.

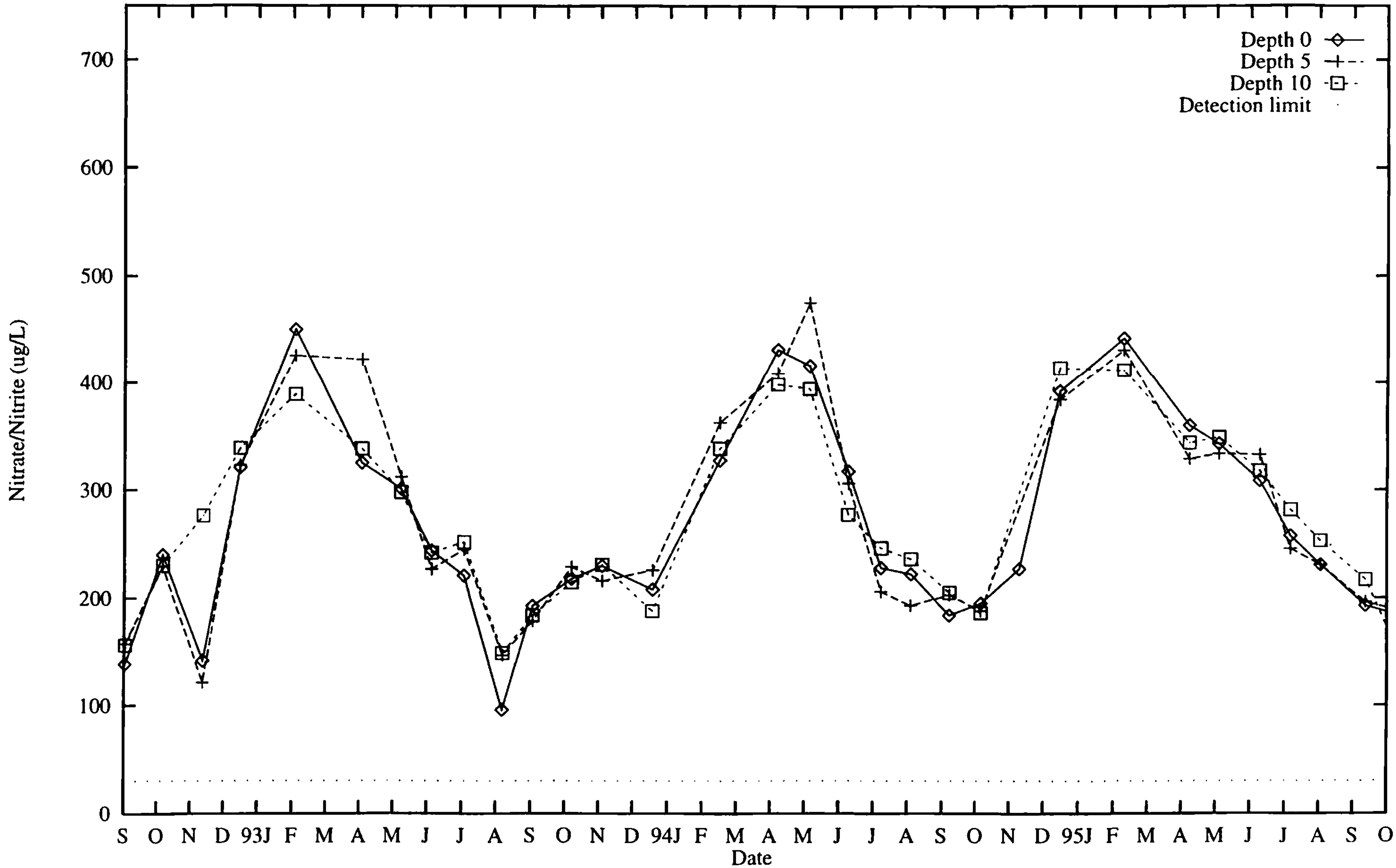


Figure 50: Lake Whatcom nitrate/nitrite data for Site 3, September 1992 through September 1995.

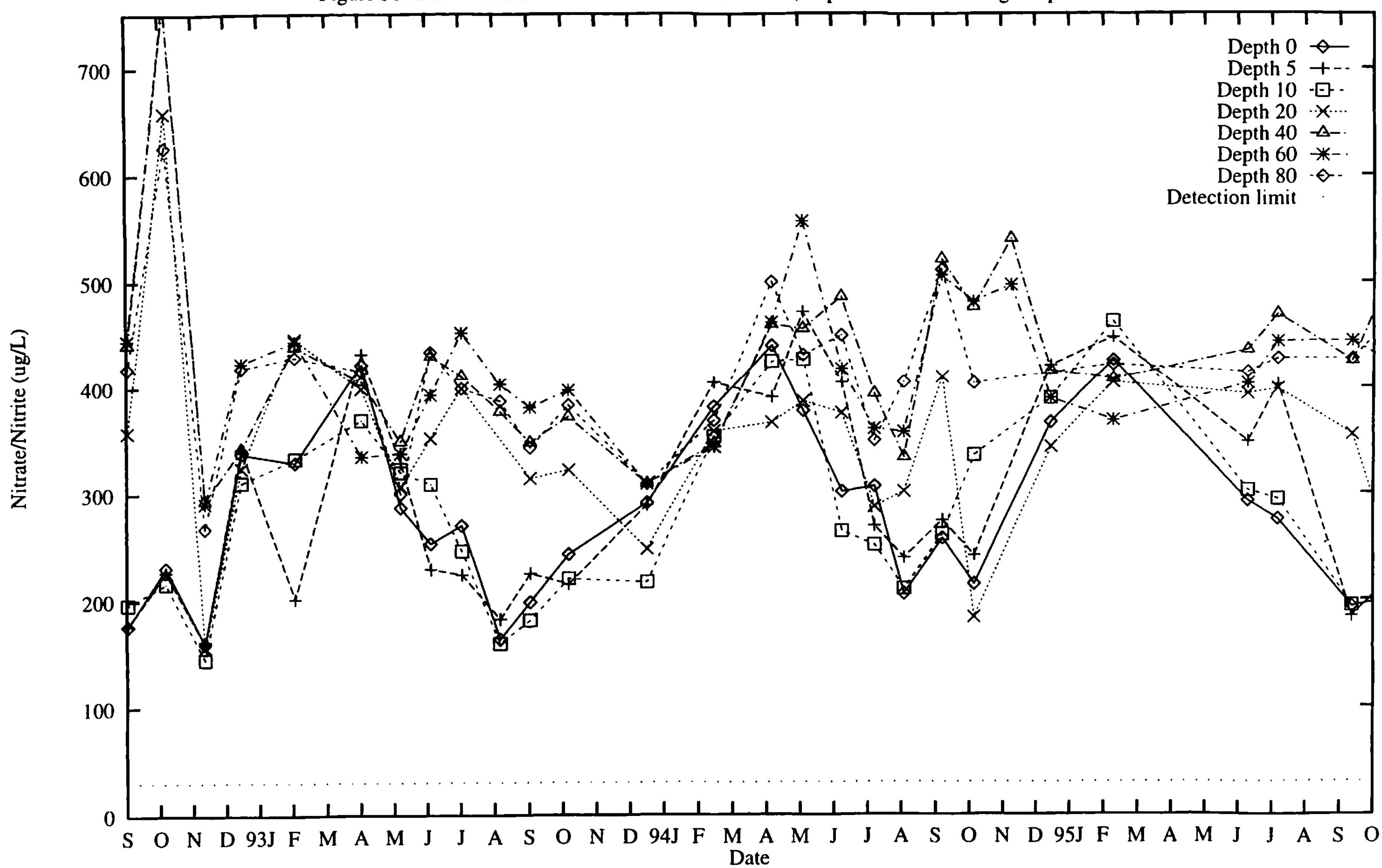


Figure 51: Lake Whatcom nitrate/nitrite data for Site 4, September 1992 through September 1995.

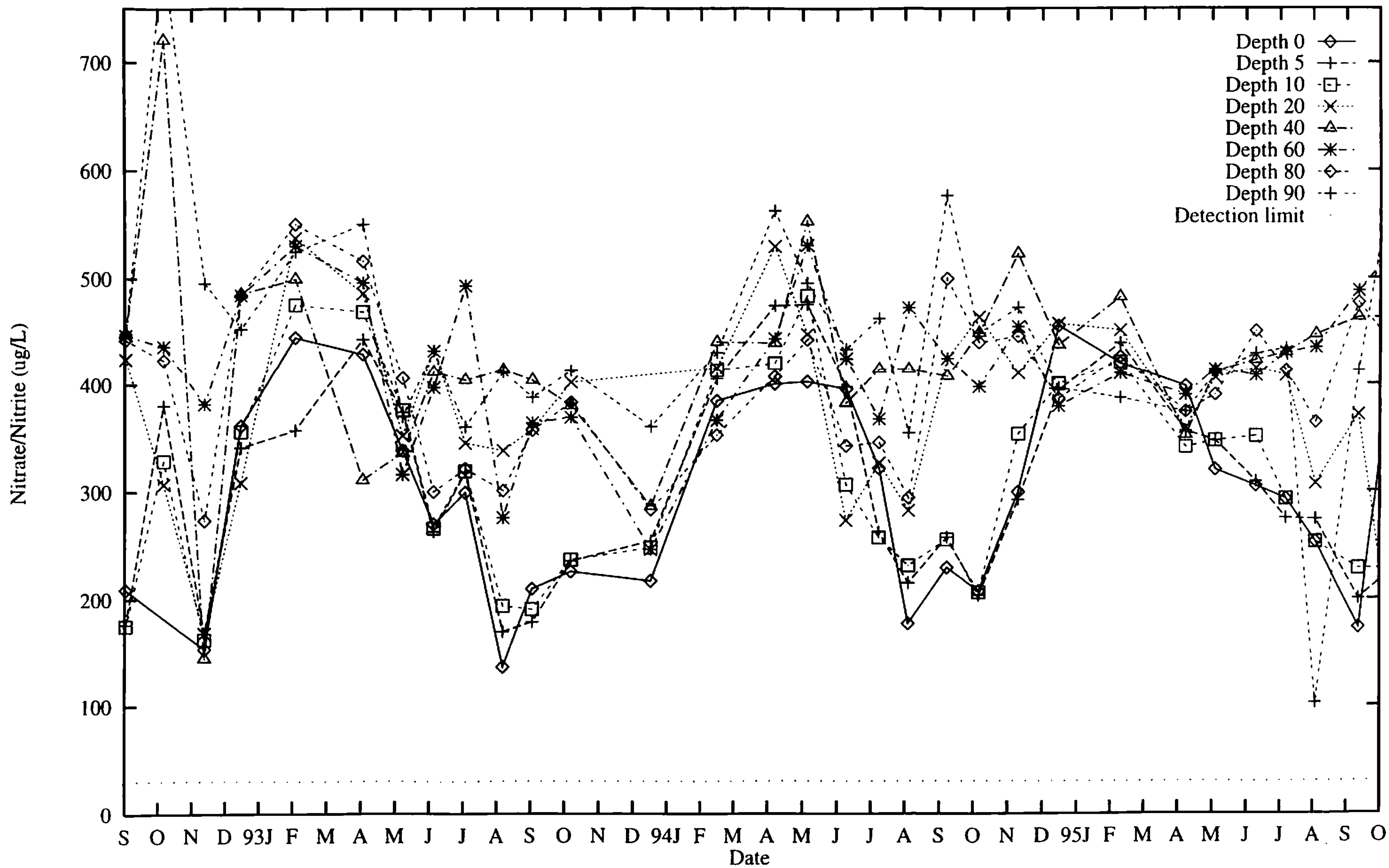


Figure 52: Lake Whatcom total nitrogen data for Site 1, September 1992 through September 1995.

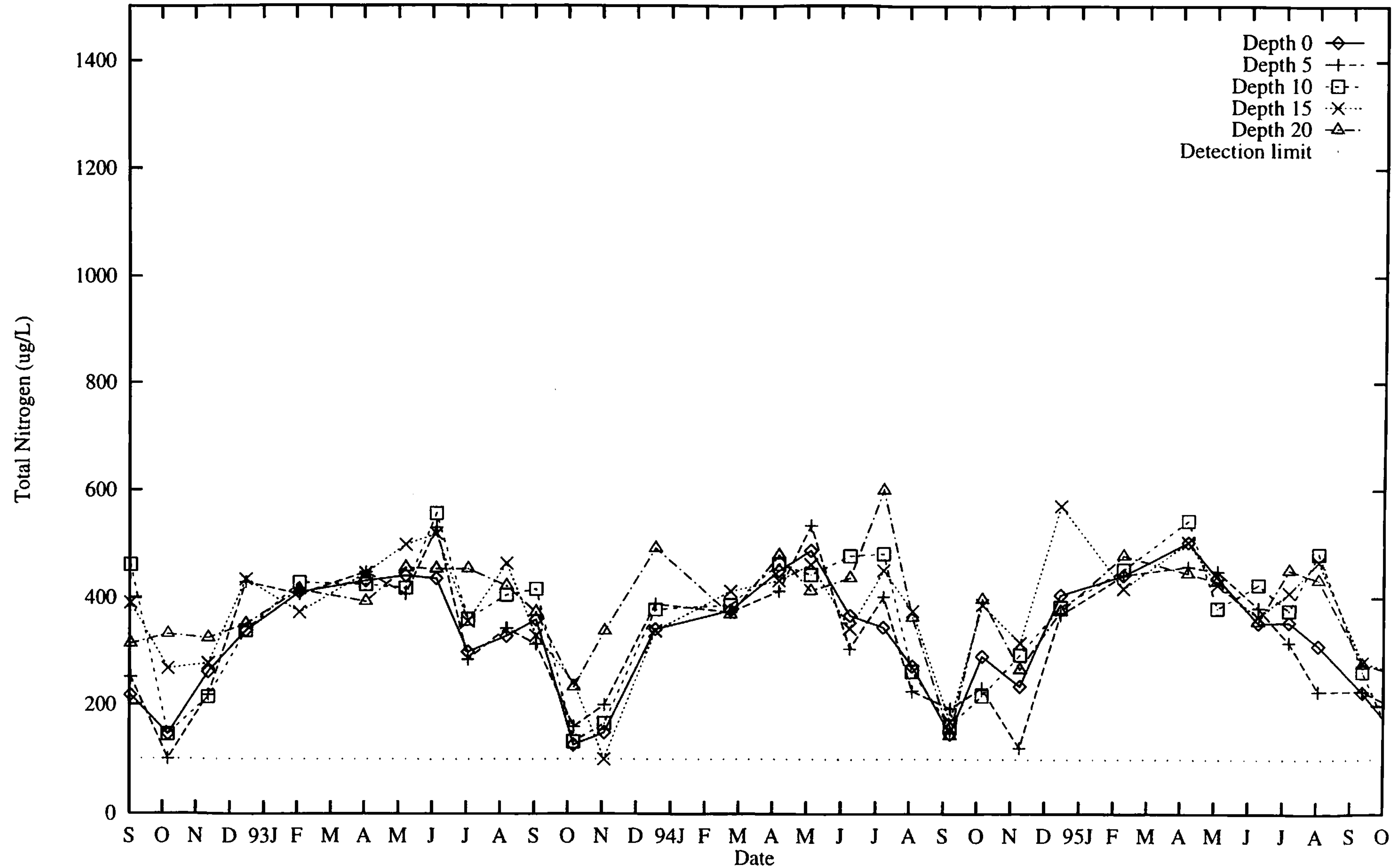


Figure 53: Lake Whatcom total nitrogen data for Site 2, September 1992 through September 1995.

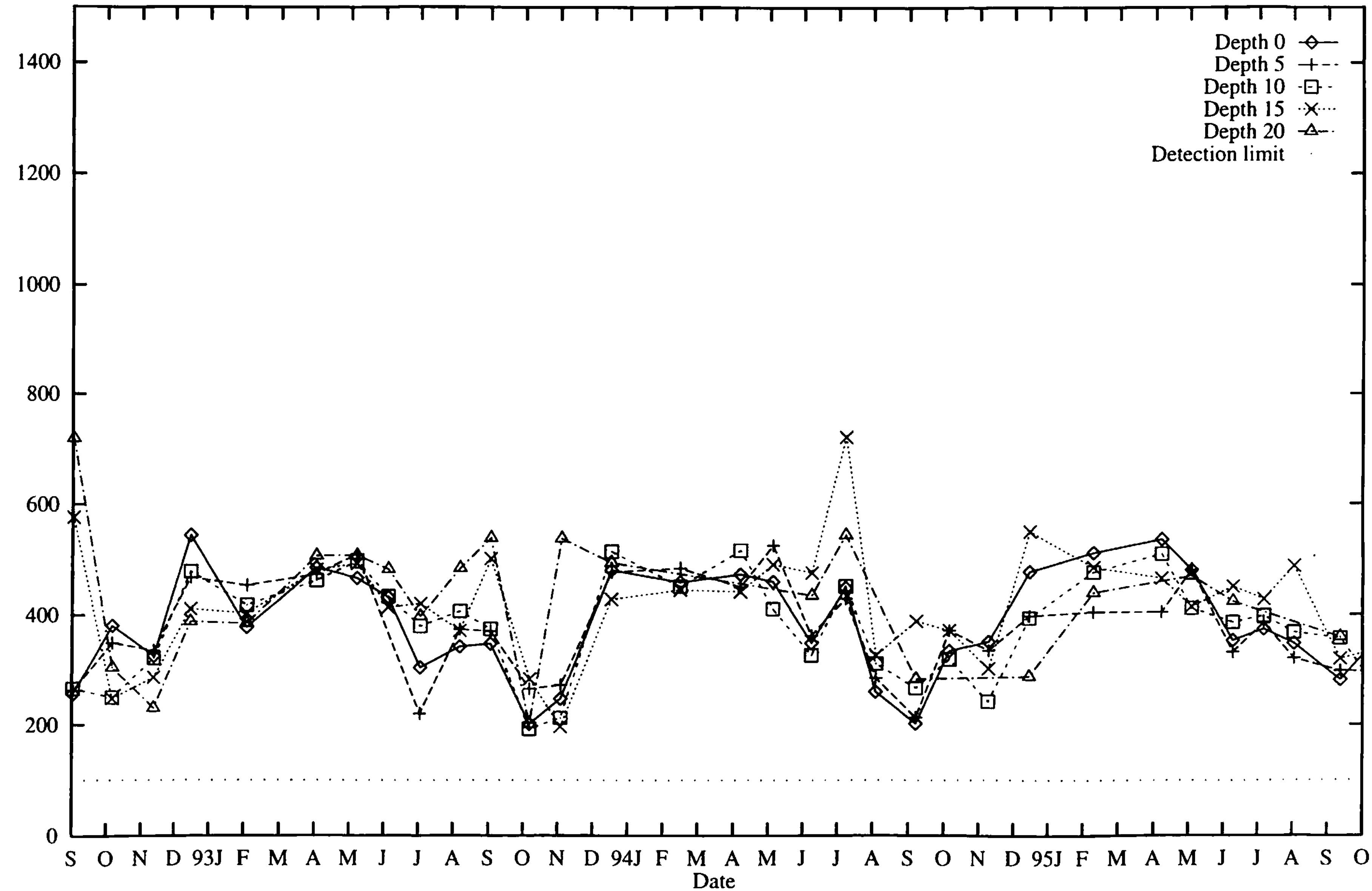


Figure 54: Lake Whatcom total nitrogen data for Intake site (basin 2), September 1992 through September 1995.

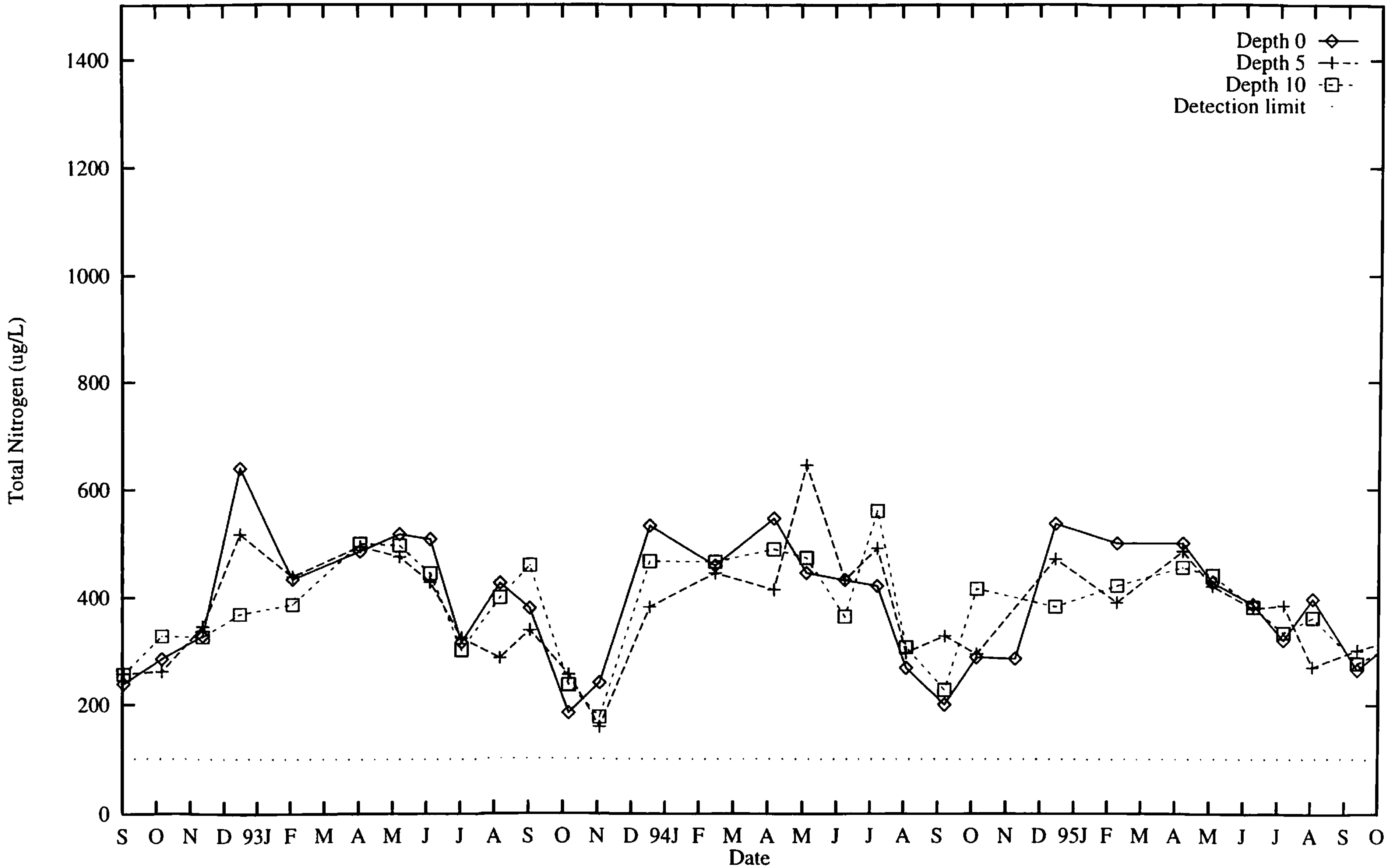


Figure 55: Lake Whatcom total nitrogen data for Site 3, September 1992 through September 1995.

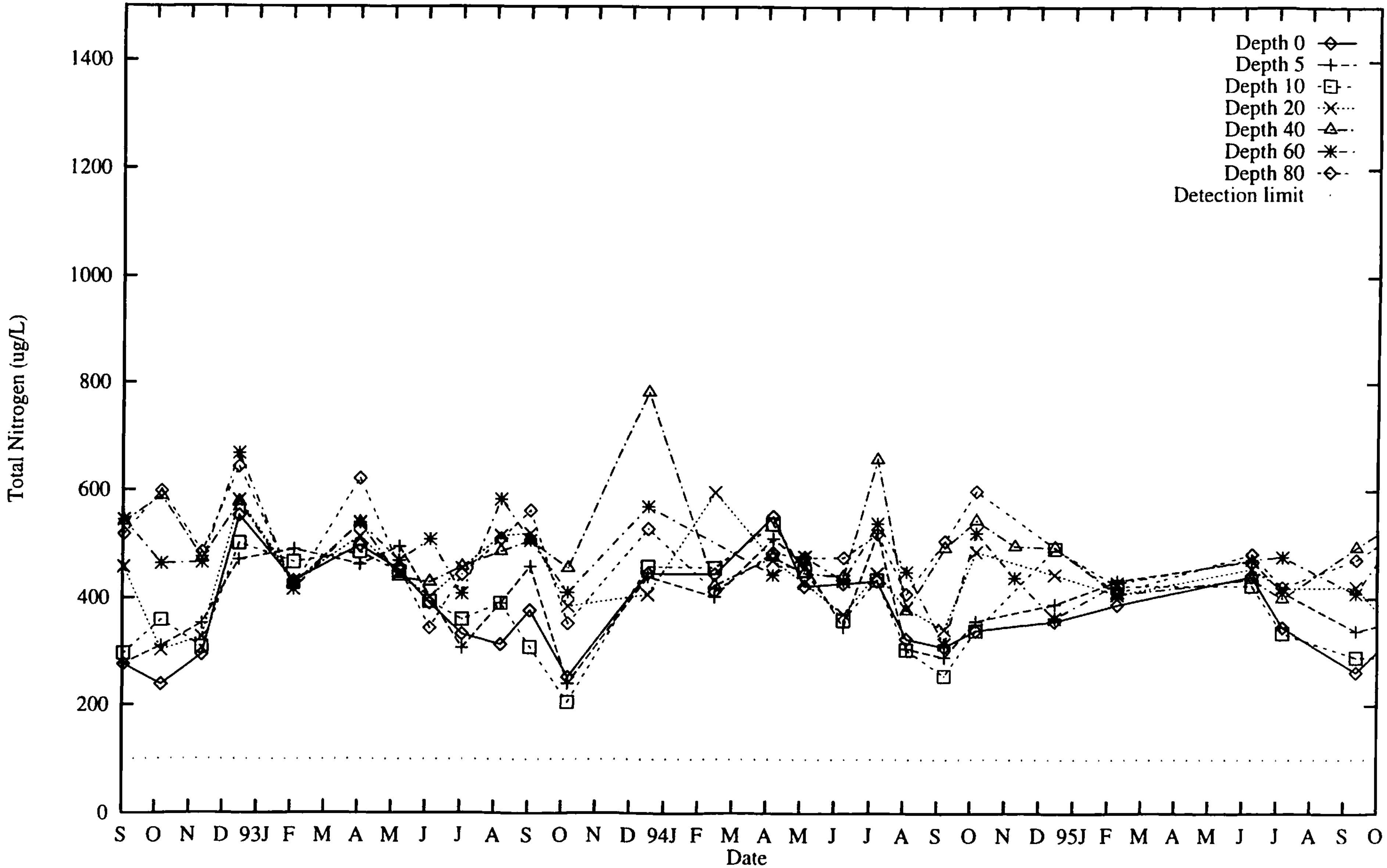


Figure 56: Lake Whatcom total nitrogen data for Site 4, September 1992 through September 1995.

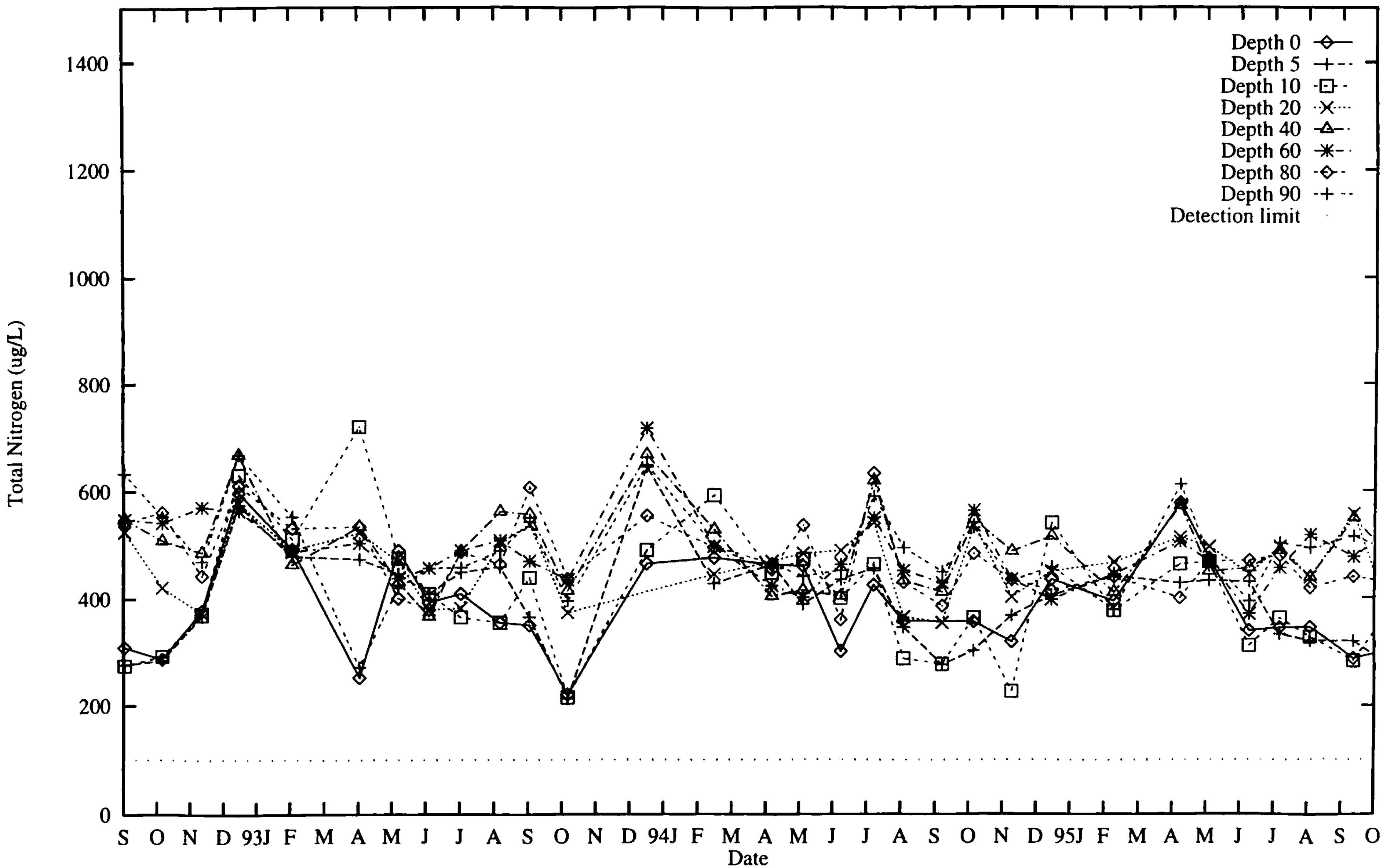


Figure 57: Lake Whatcom phosphorus summary data (total and soluble) for Site 1, September 1992 through September 1995.

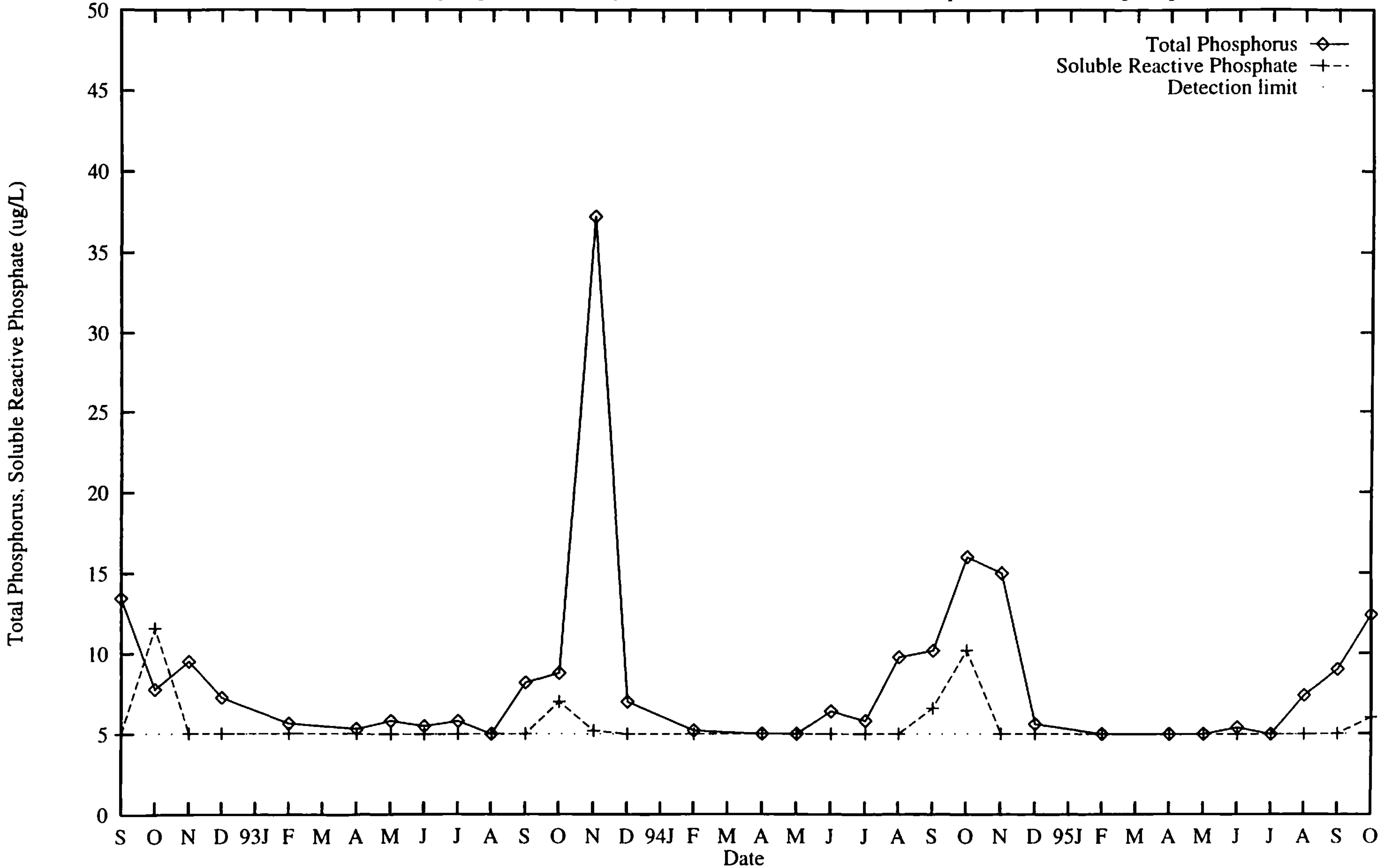


Figure 58: Lake Whatcom phosphorus summary data (total and soluble) for Site 2, September 1992 through September 1995.

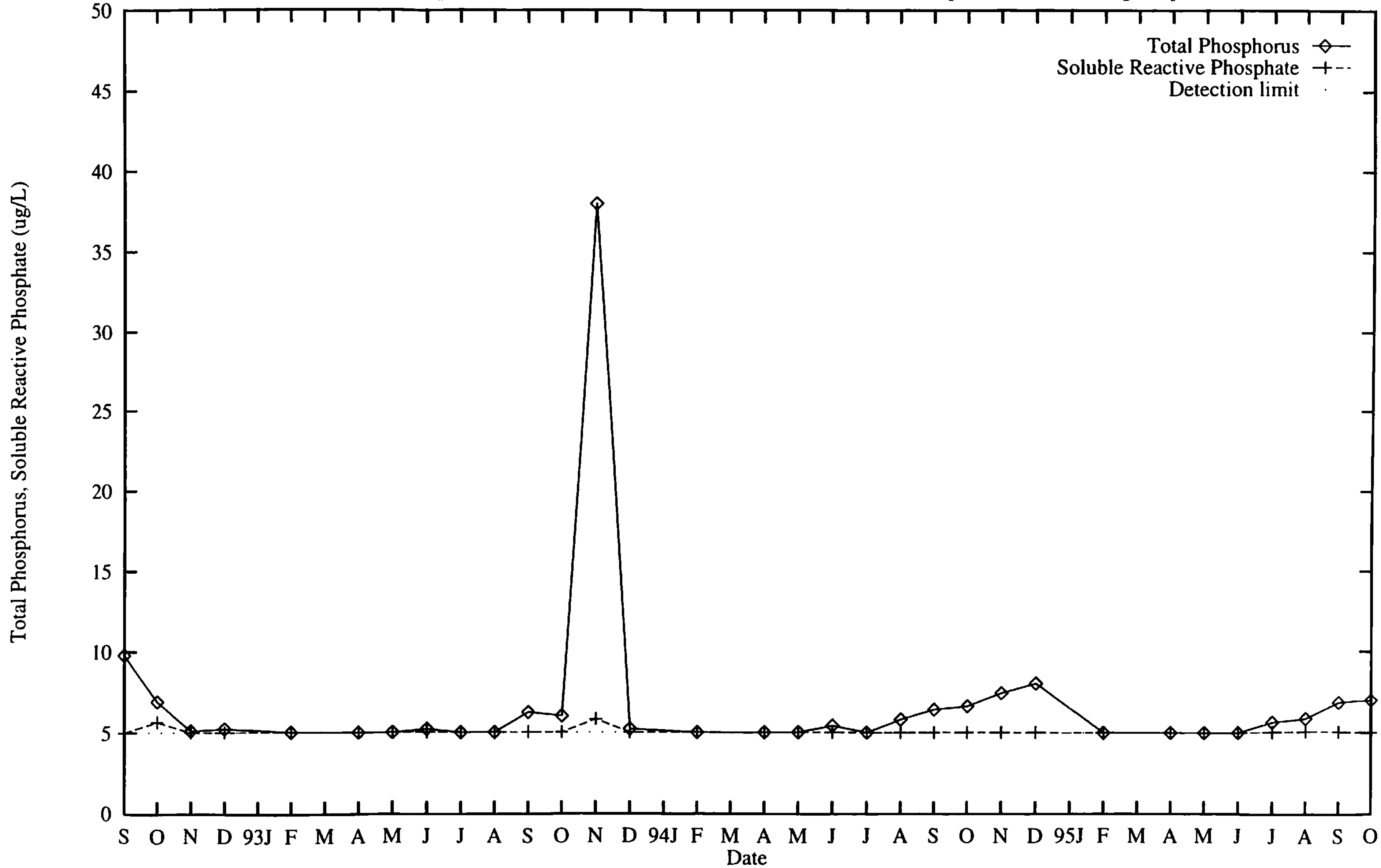


Figure 59: Lake Whatcom phosphorus summary data (total and soluble) for Intake site (basin 2), September 1992 through September 1995.

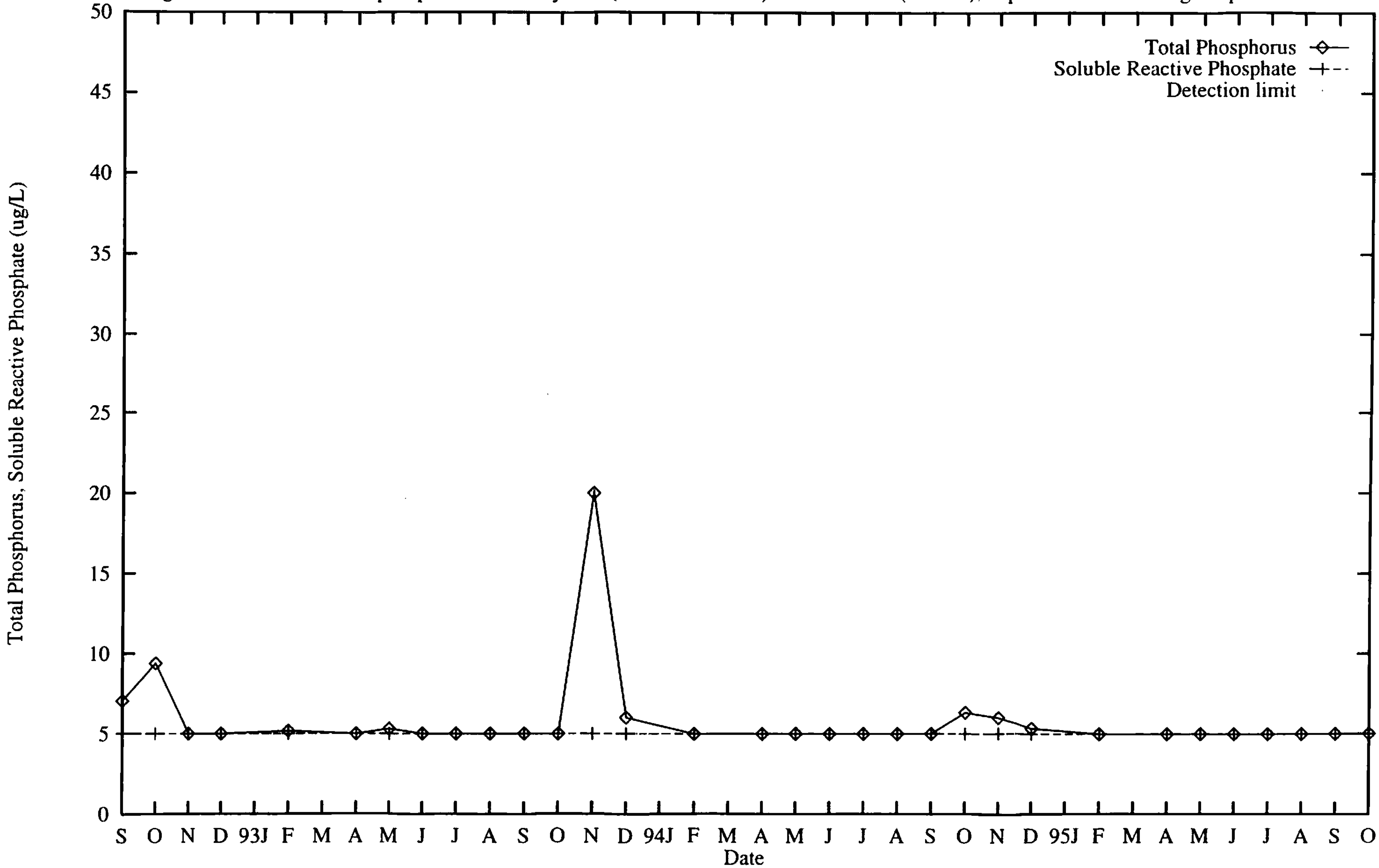


Figure 60: Lake Whatcom phosphorus summary data (total and soluble) for Site 3, September 1992 through September 1995.

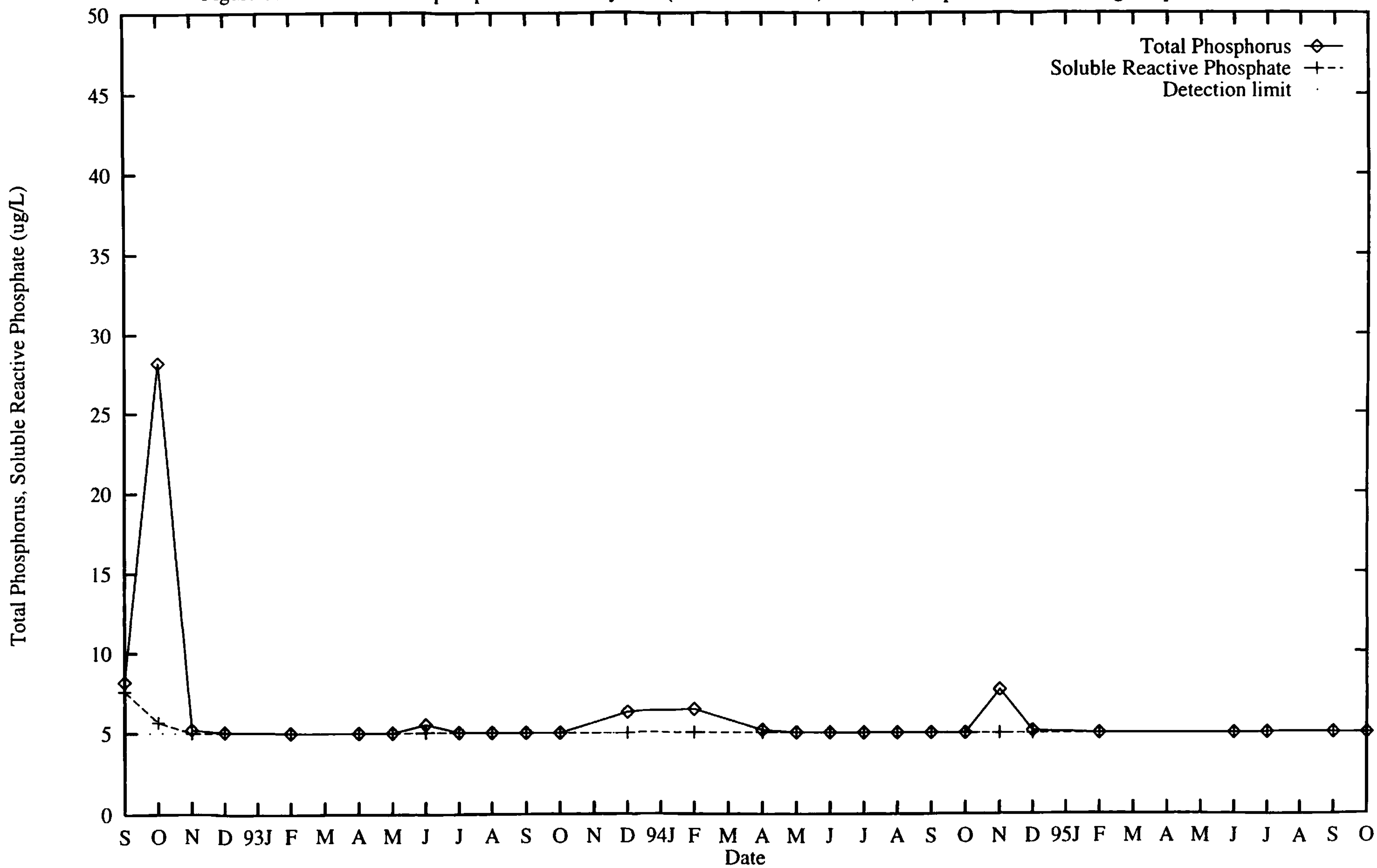


Figure 61: Lake Whatcom phosphorus summary data (total and soluble) for Site 4, September 1992 through September 1995.

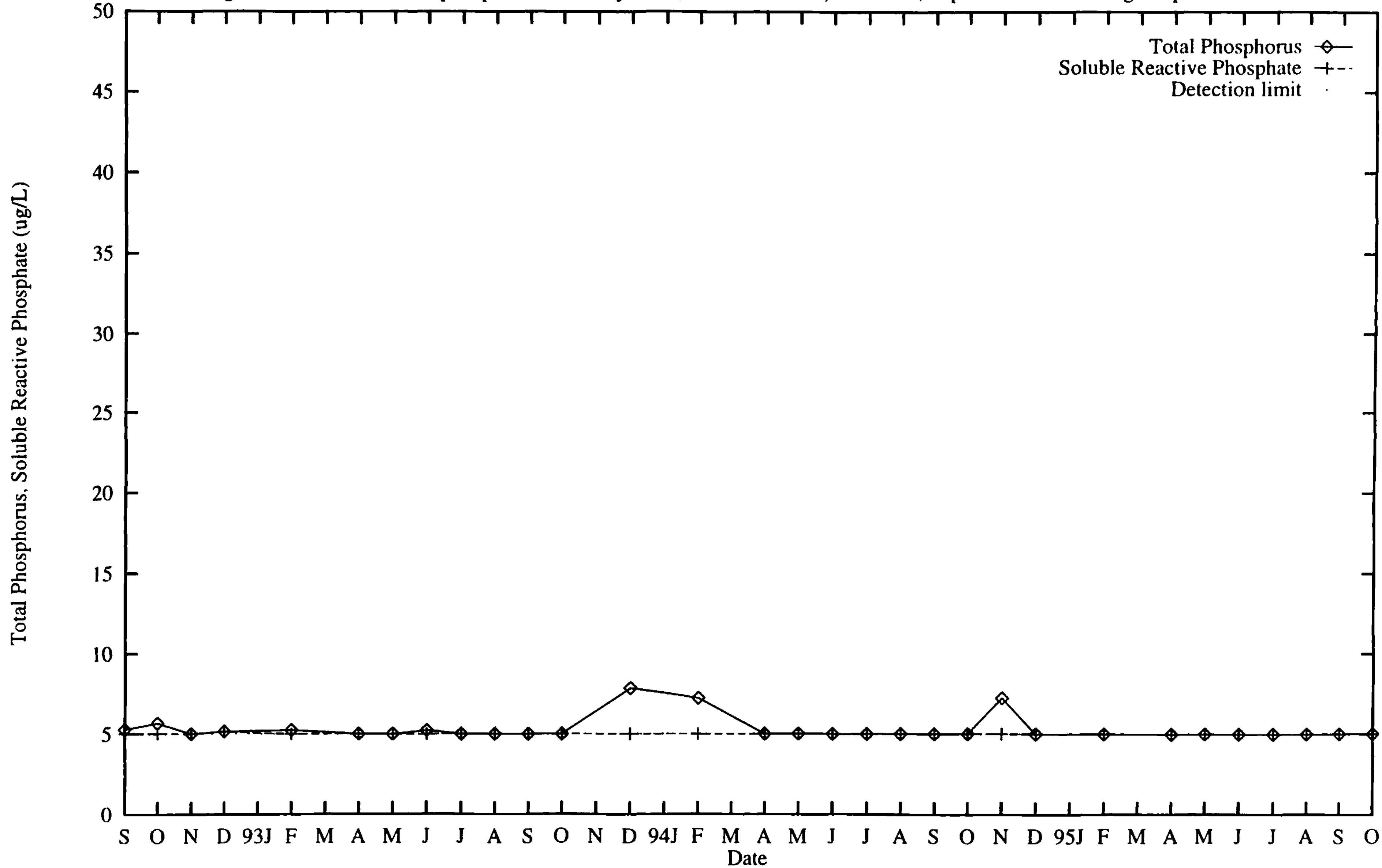


Figure 62: Lake Whatcom soluble phosphate data for Site 1, September 1992 through September 1995.

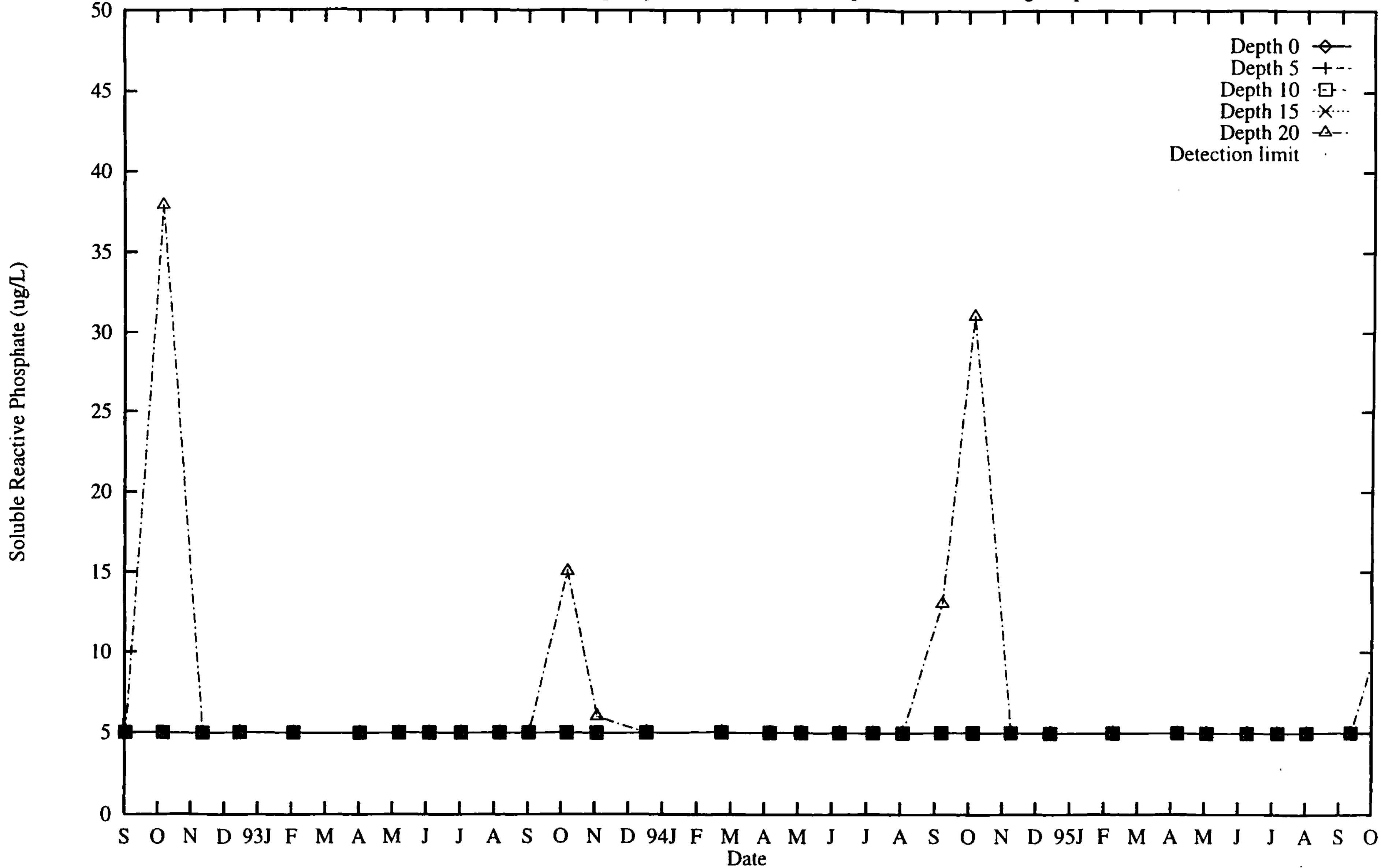


Figure 63: Lake Whatcom soluble phosphate data for Site 2, September 1992 through September 1995.

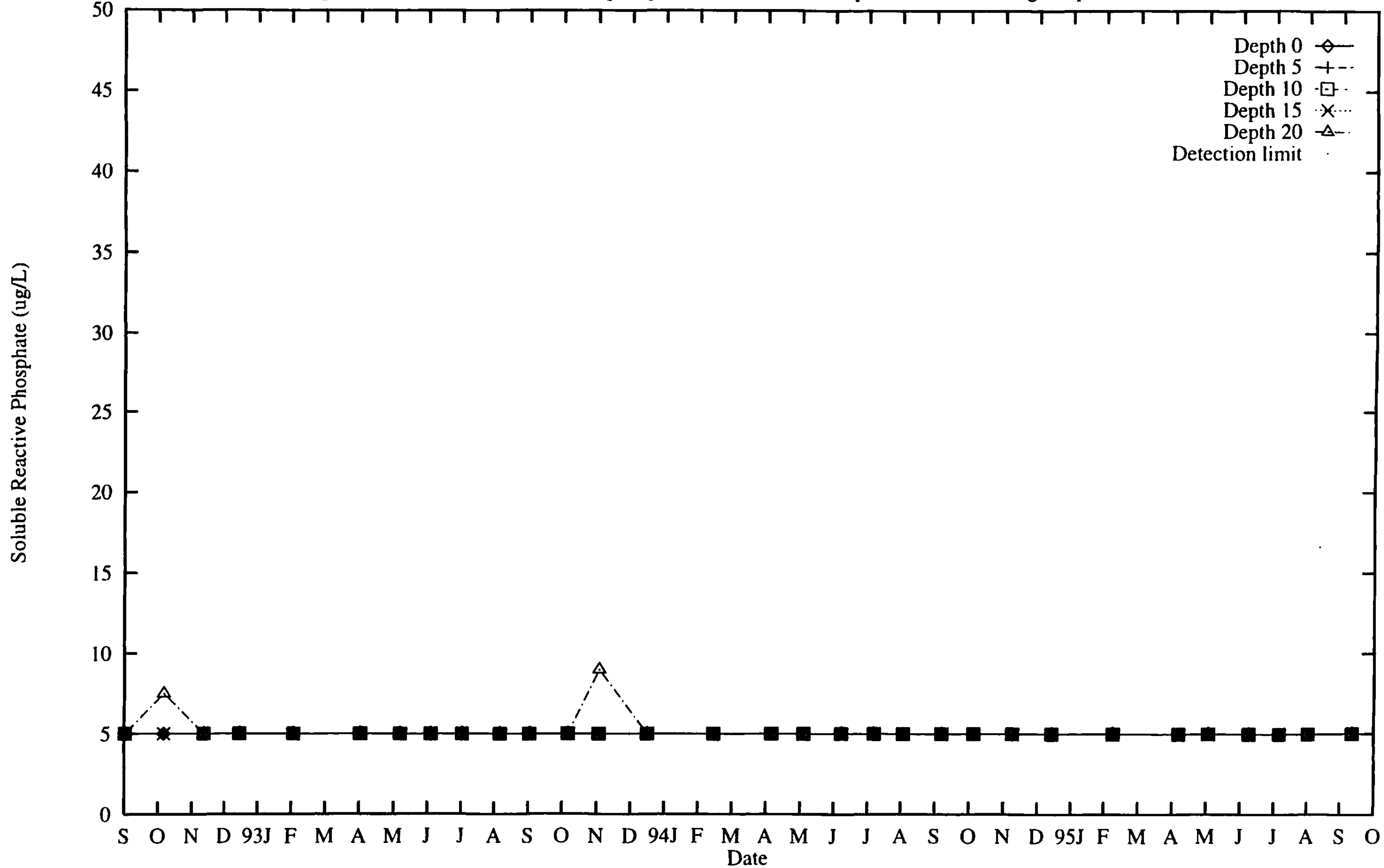


Figure 64: Lake Whatcom soluble phosphate data for Intake site (basin 2), September 1992 through September 1995.

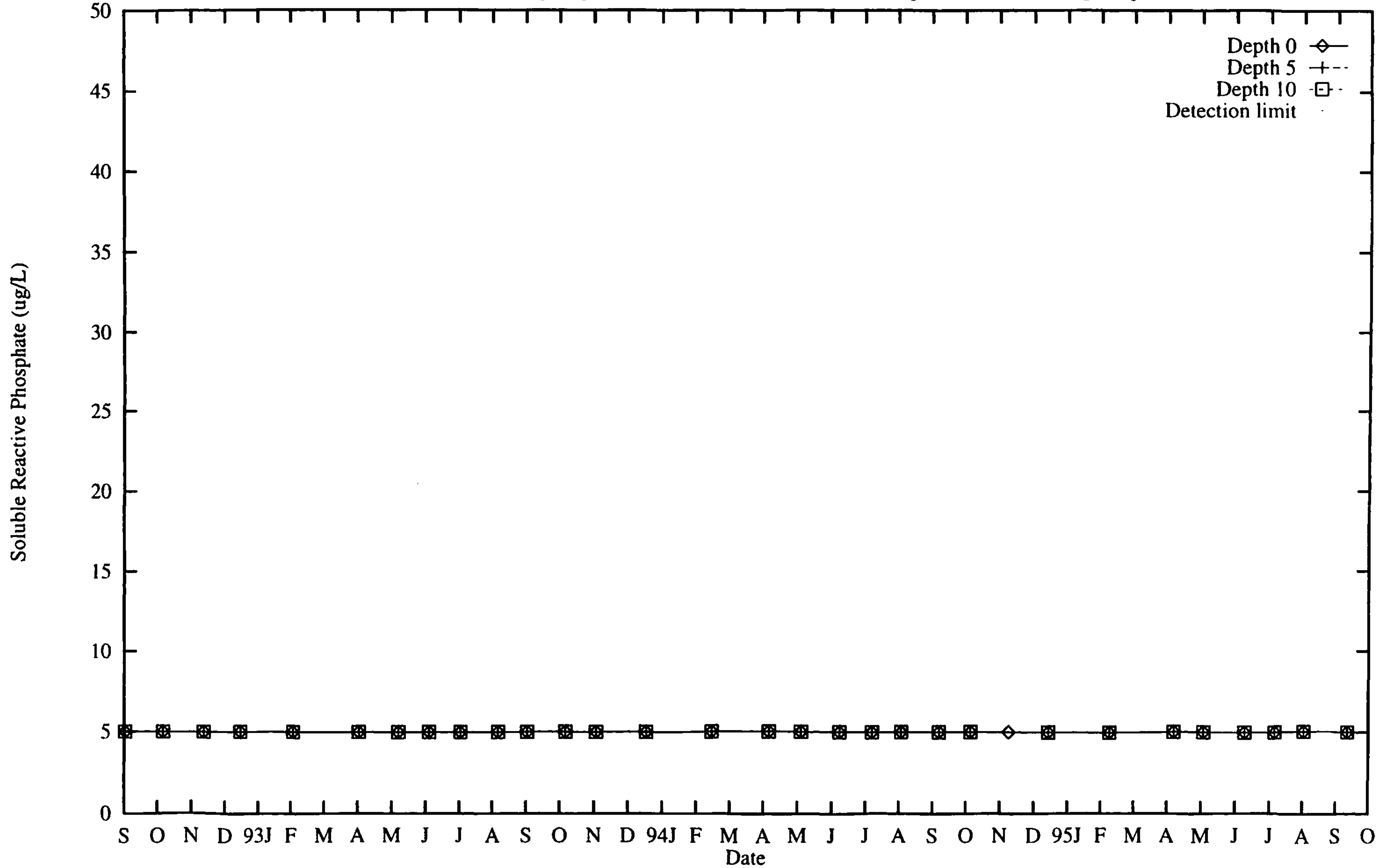


Figure 65: Lake Whatcom soluble phosphate data for Site 3, September 1992 through September 1995.

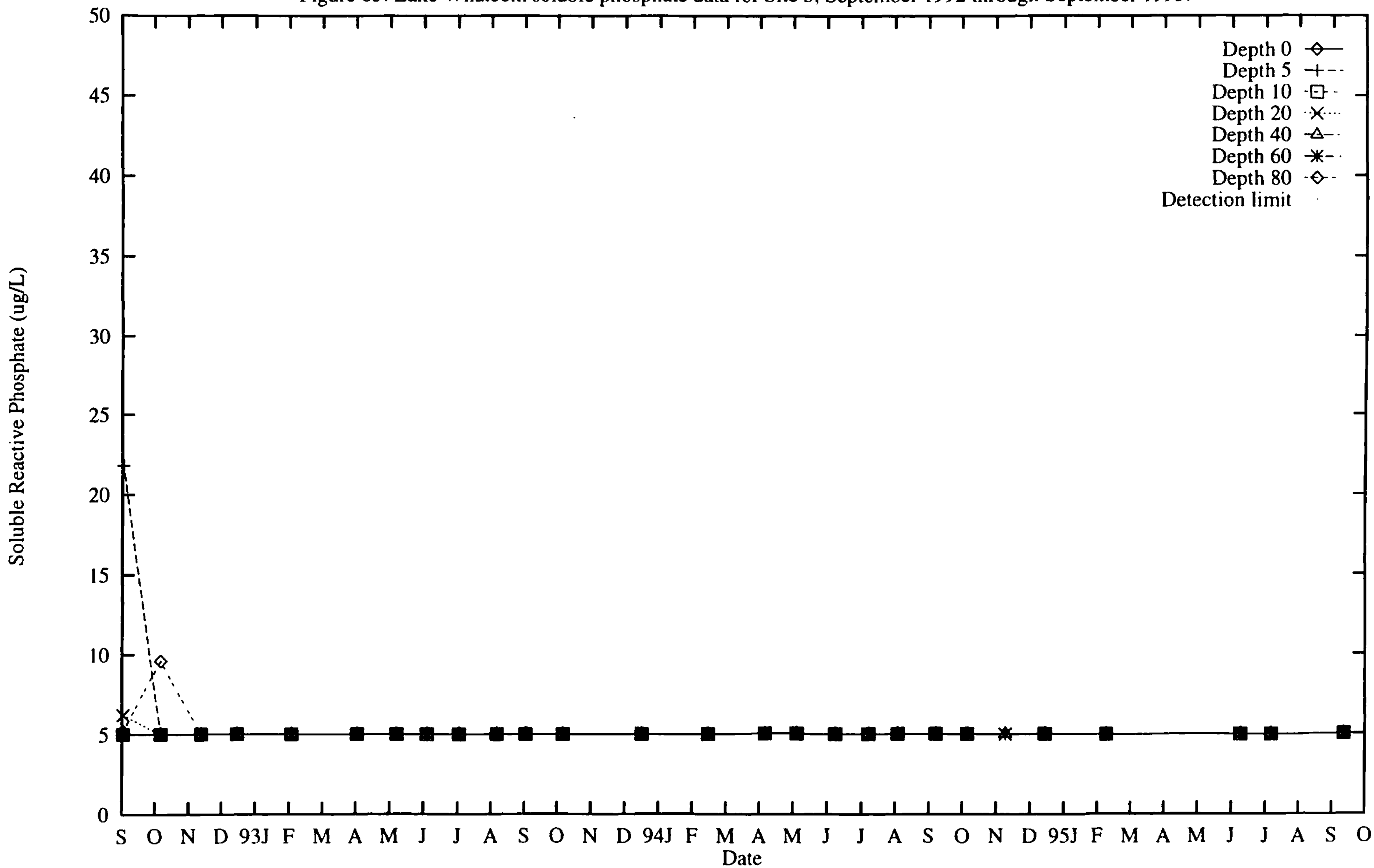


Figure 66: Lake Whatcom soluble phosphate data for Site 4, September 1992 through September 1995.

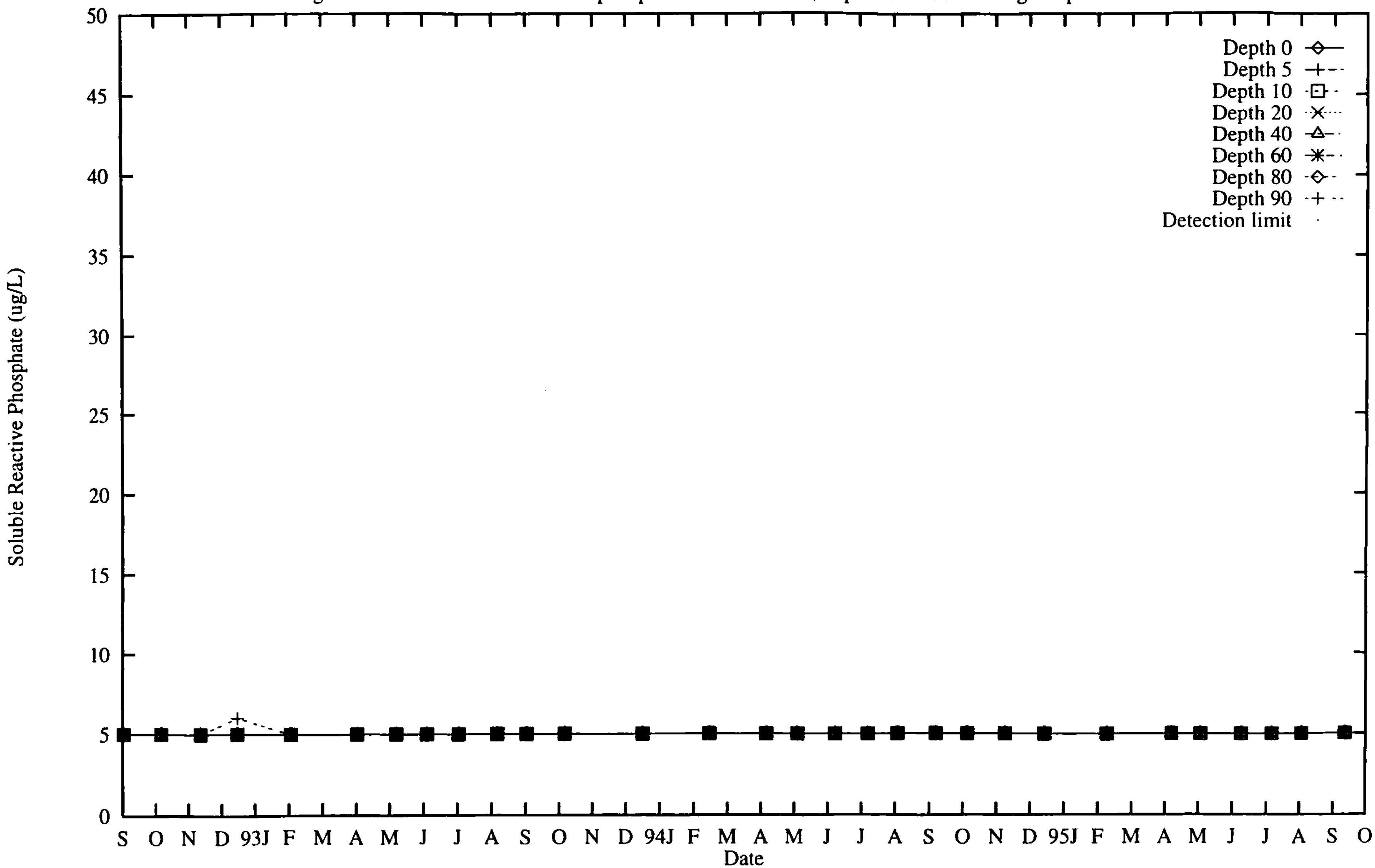


Figure 67: Lake Whatcom total phosphorus data for Site 1, September 1992 through September 1995.

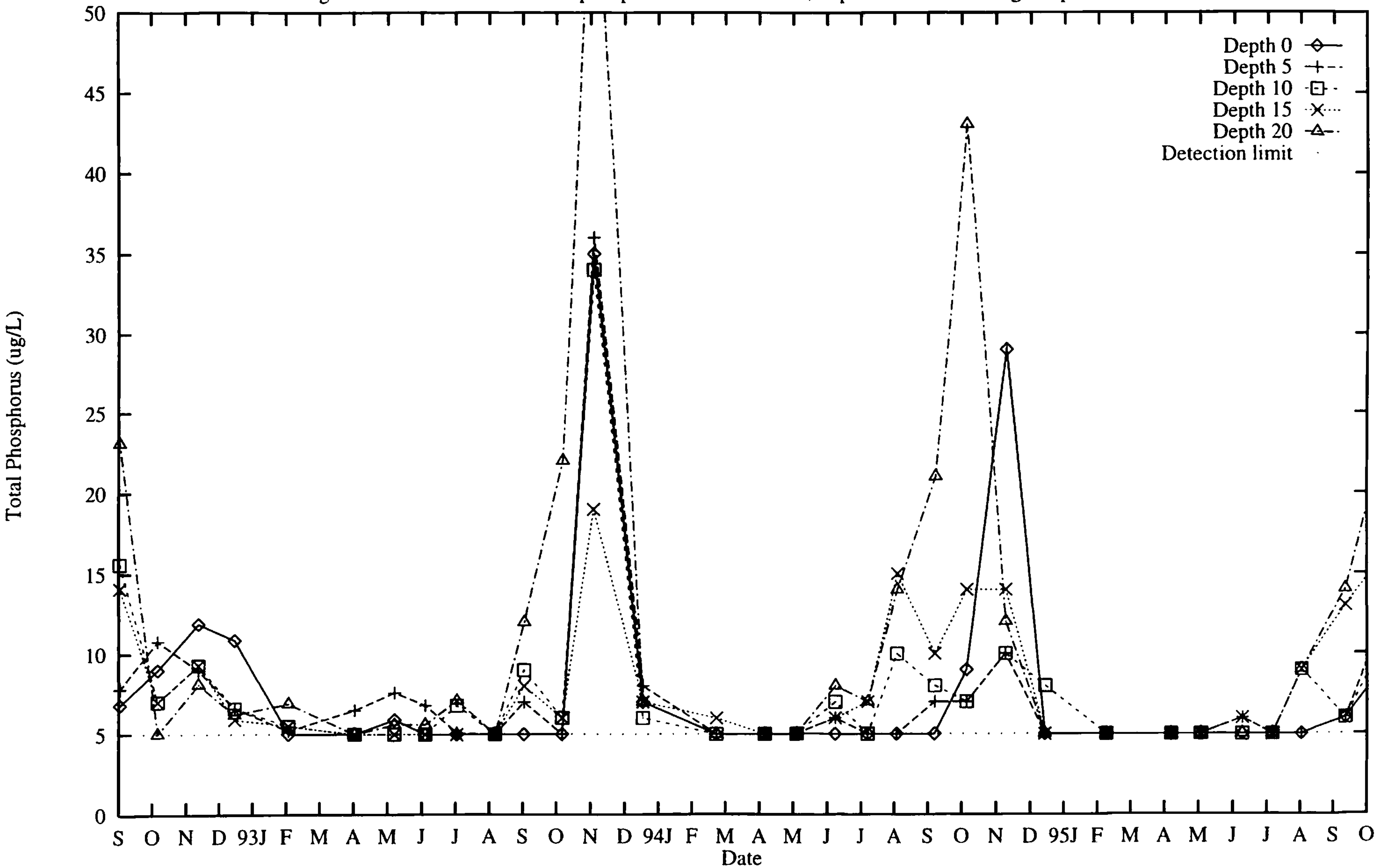


Figure 68: Lake Whatcom total phosphorus data for Site 2, September 1992 through September 1995.

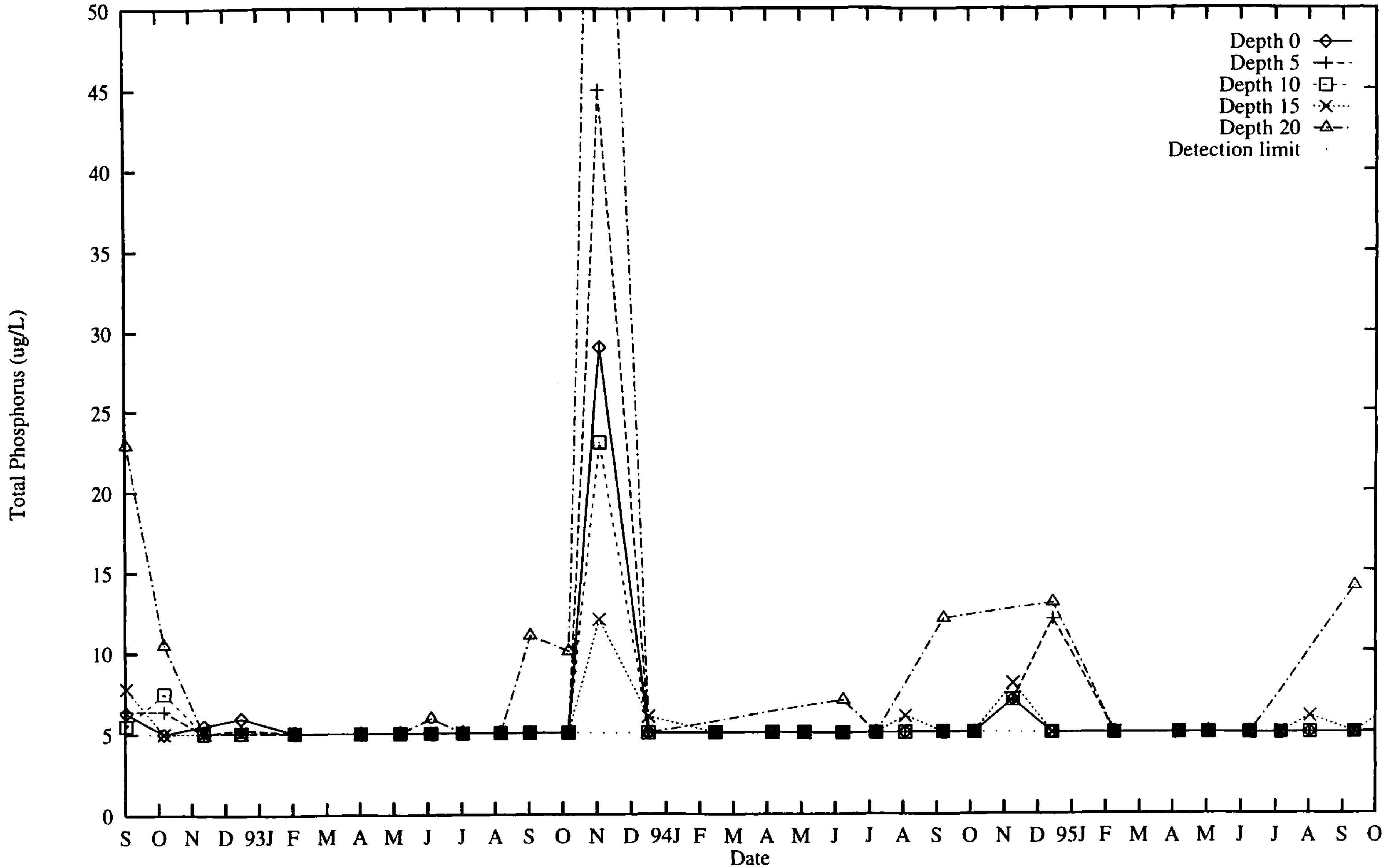


Figure 69: Lake Whatcom total phosphorus data for Intake site (basin 2), September 1992 through September 1995.

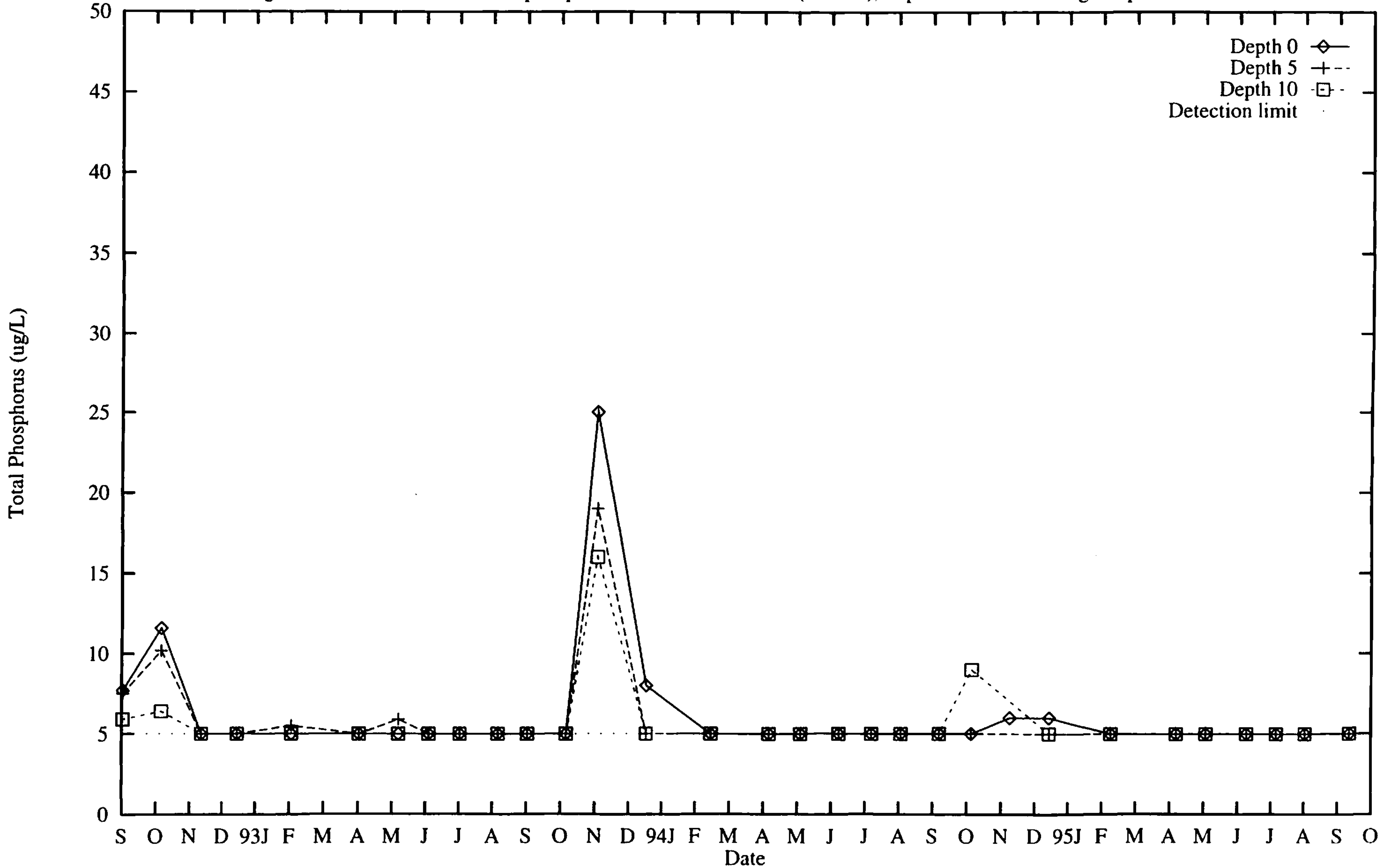


Figure 70: Lake Whatcom total phosphorus data for Site 3, September 1992 through September 1995.

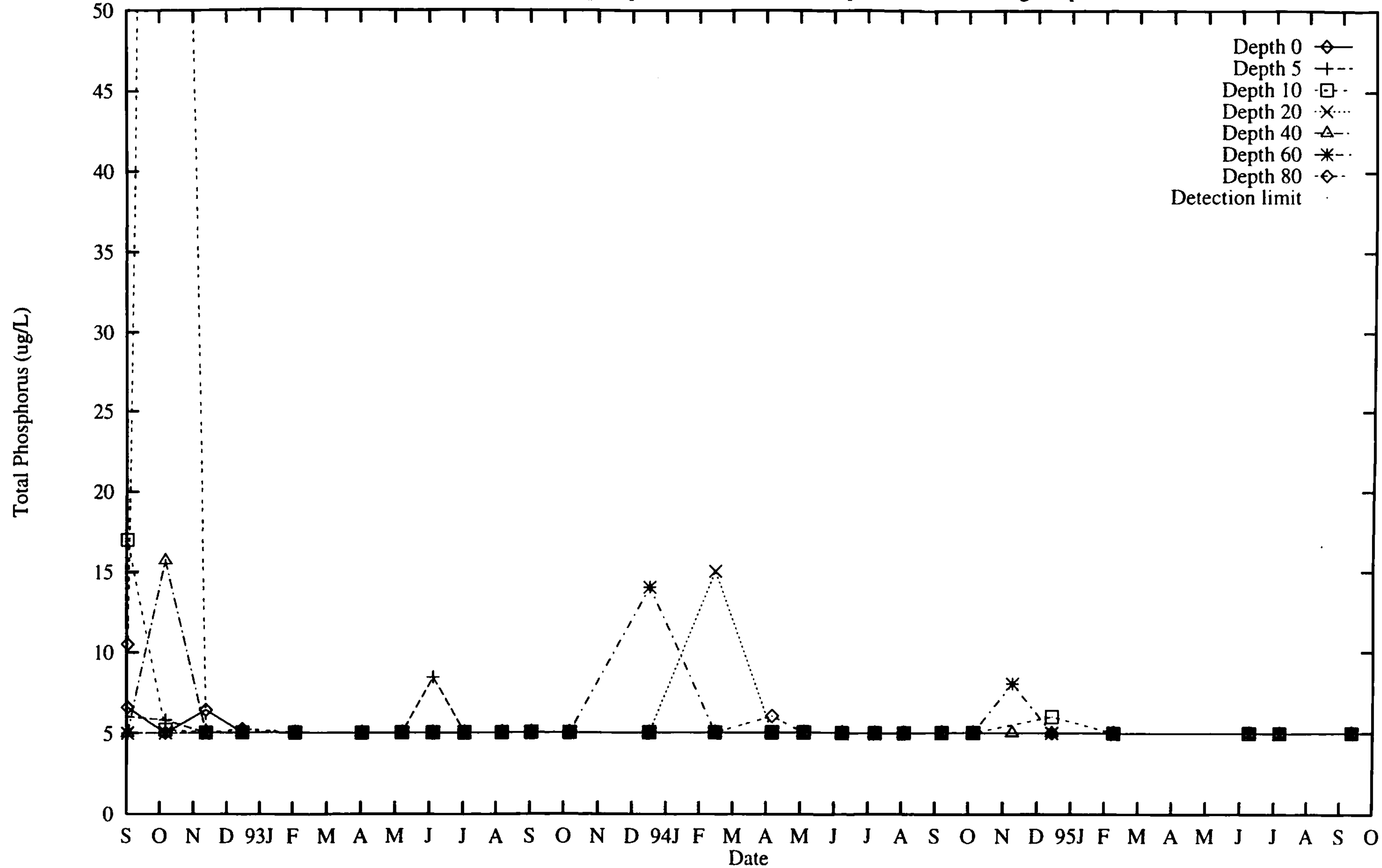


Figure 71: Lake Whatcom total phosphorus data for Site 4, September 1992 through September 1995.

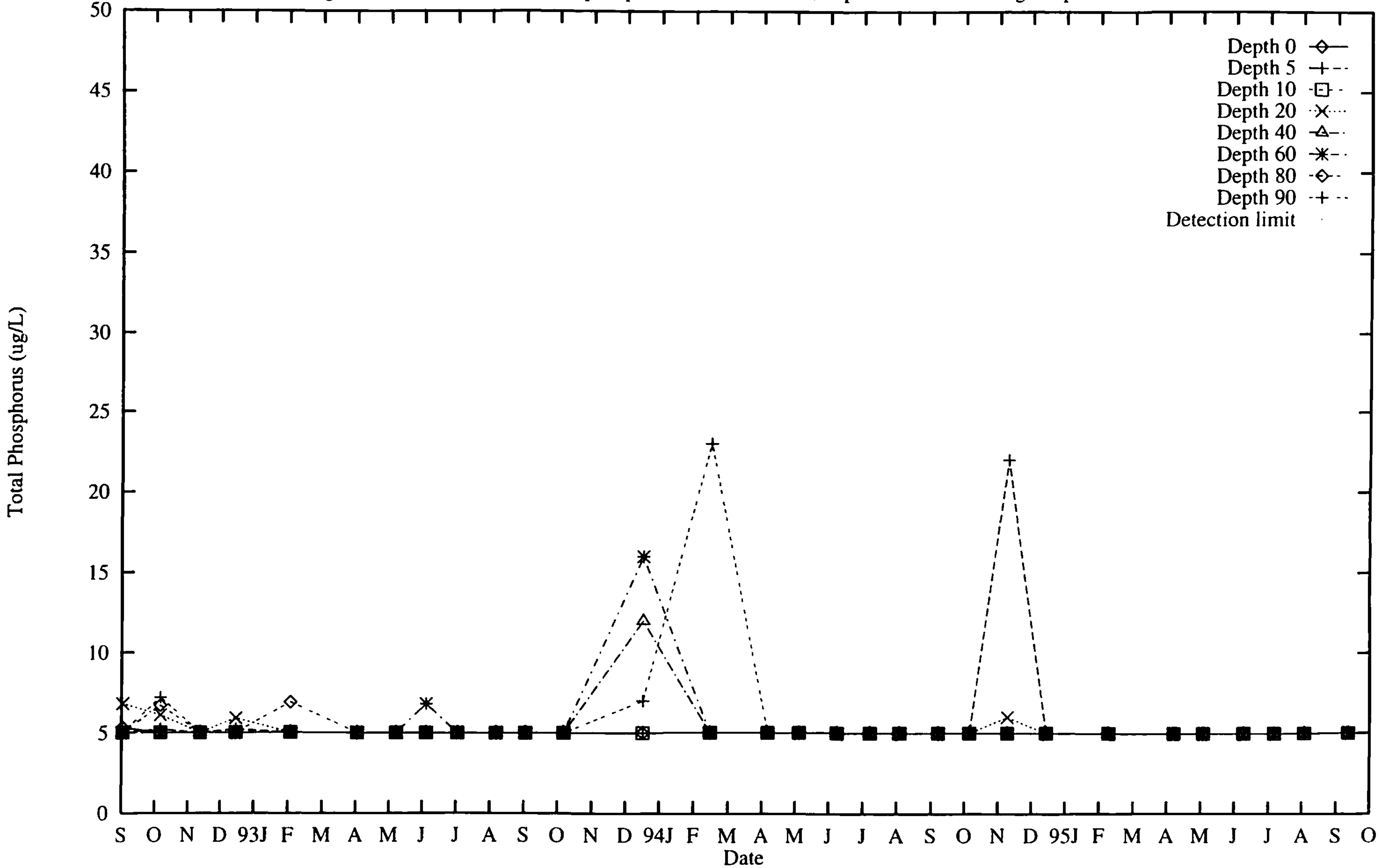


Figure 72: Lake Whatcom chlorophyll data for Site 1, September 1992 through September 1995.

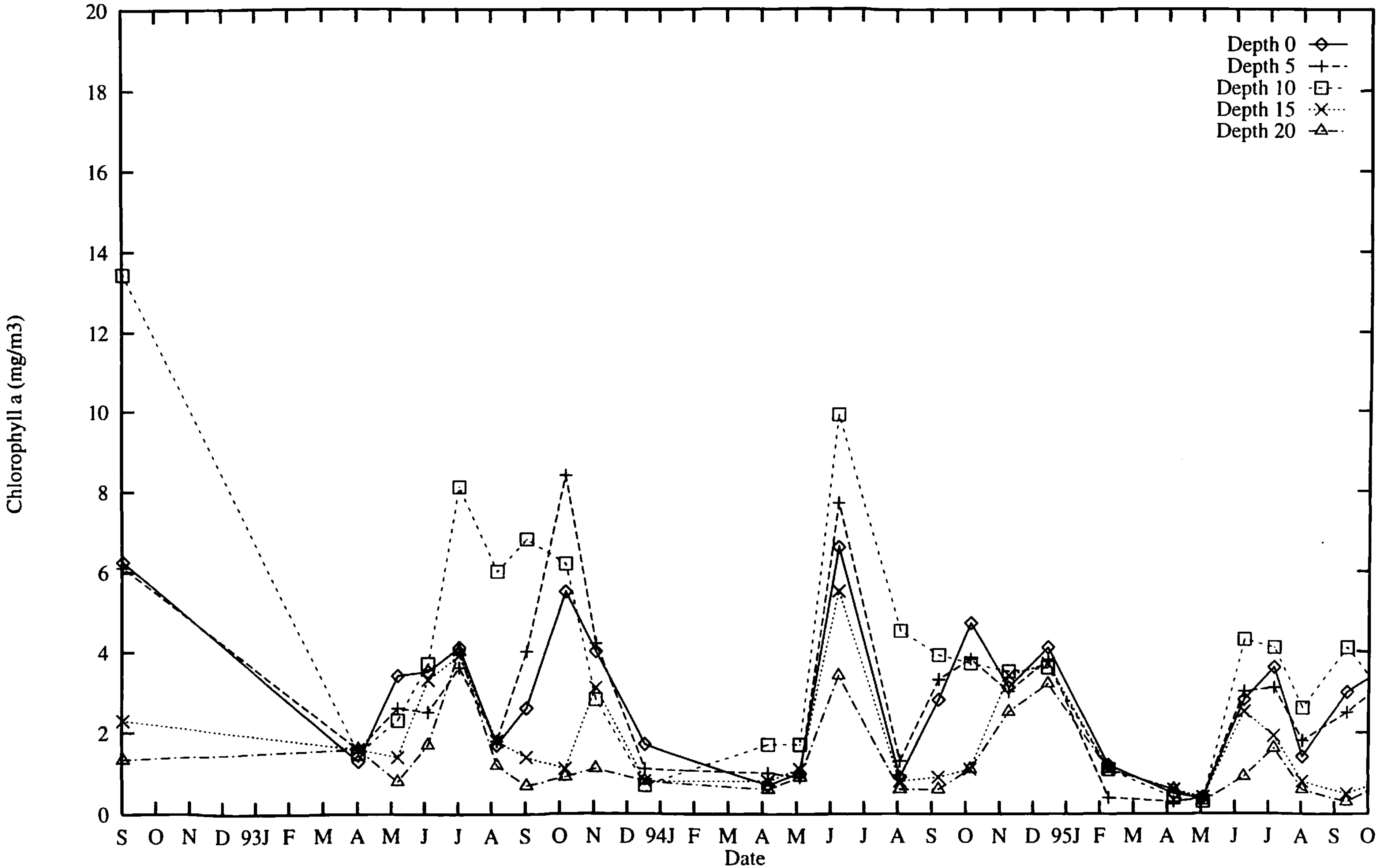


Figure 73: Lake Whatcom chlorophyll data for Site 2, September 1992 through September 1995.

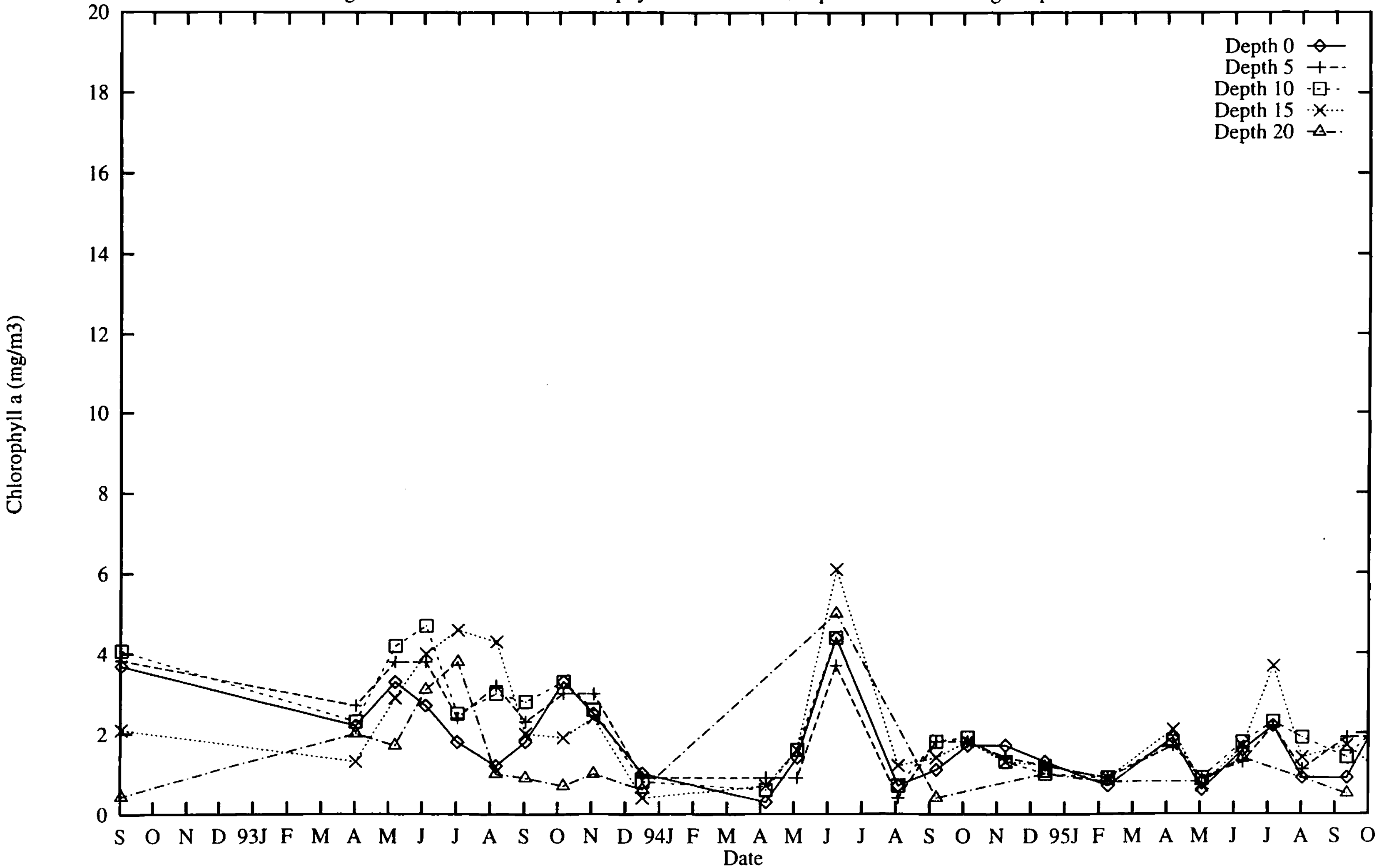


Figure 74: Lake Whatcom chlorophyll data for Intake site (basin 2), September 1992 through September 1995.

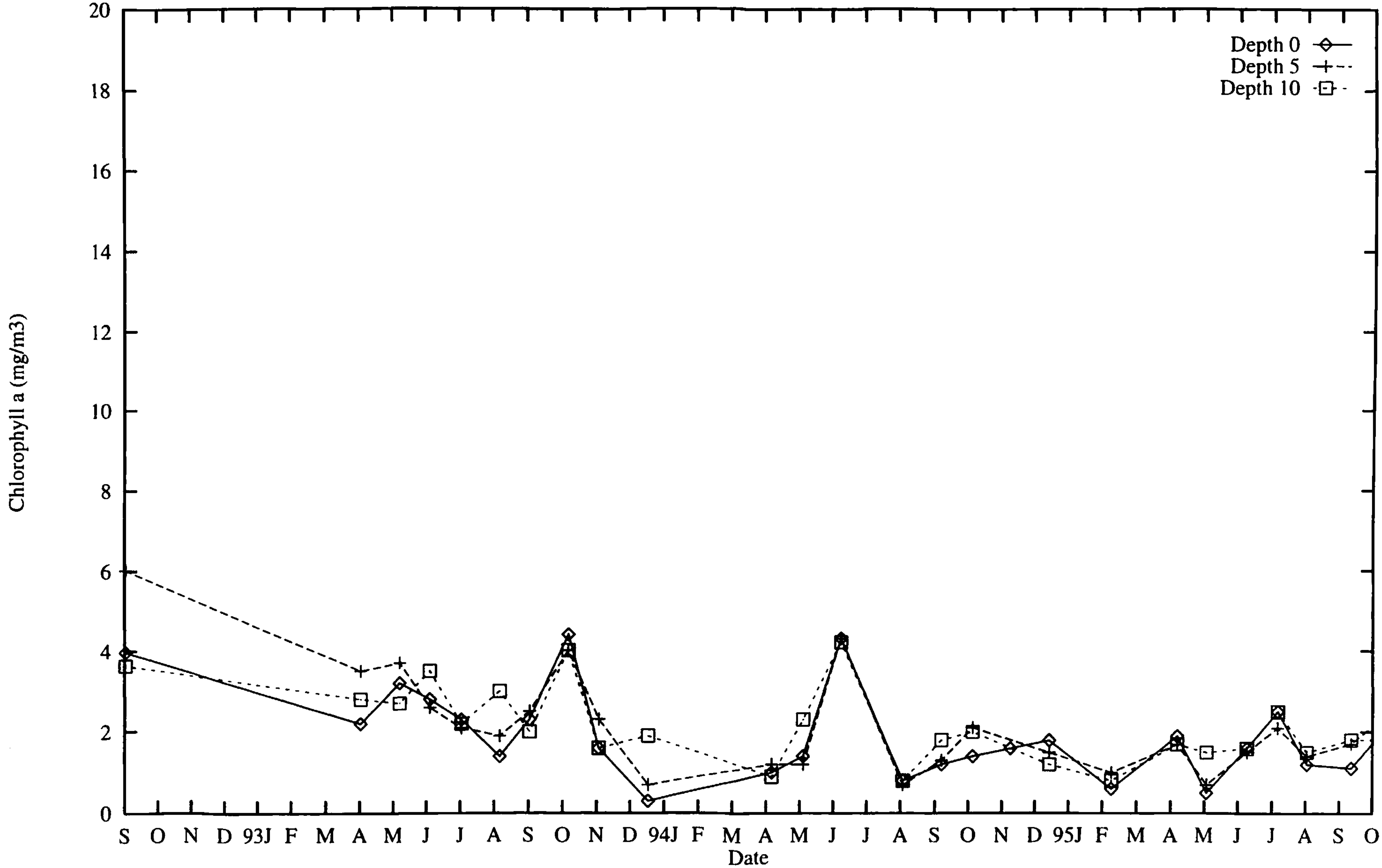


Figure 75: Lake Whatcom chlorophyll data for Site 3, September 1992 through September 1995.

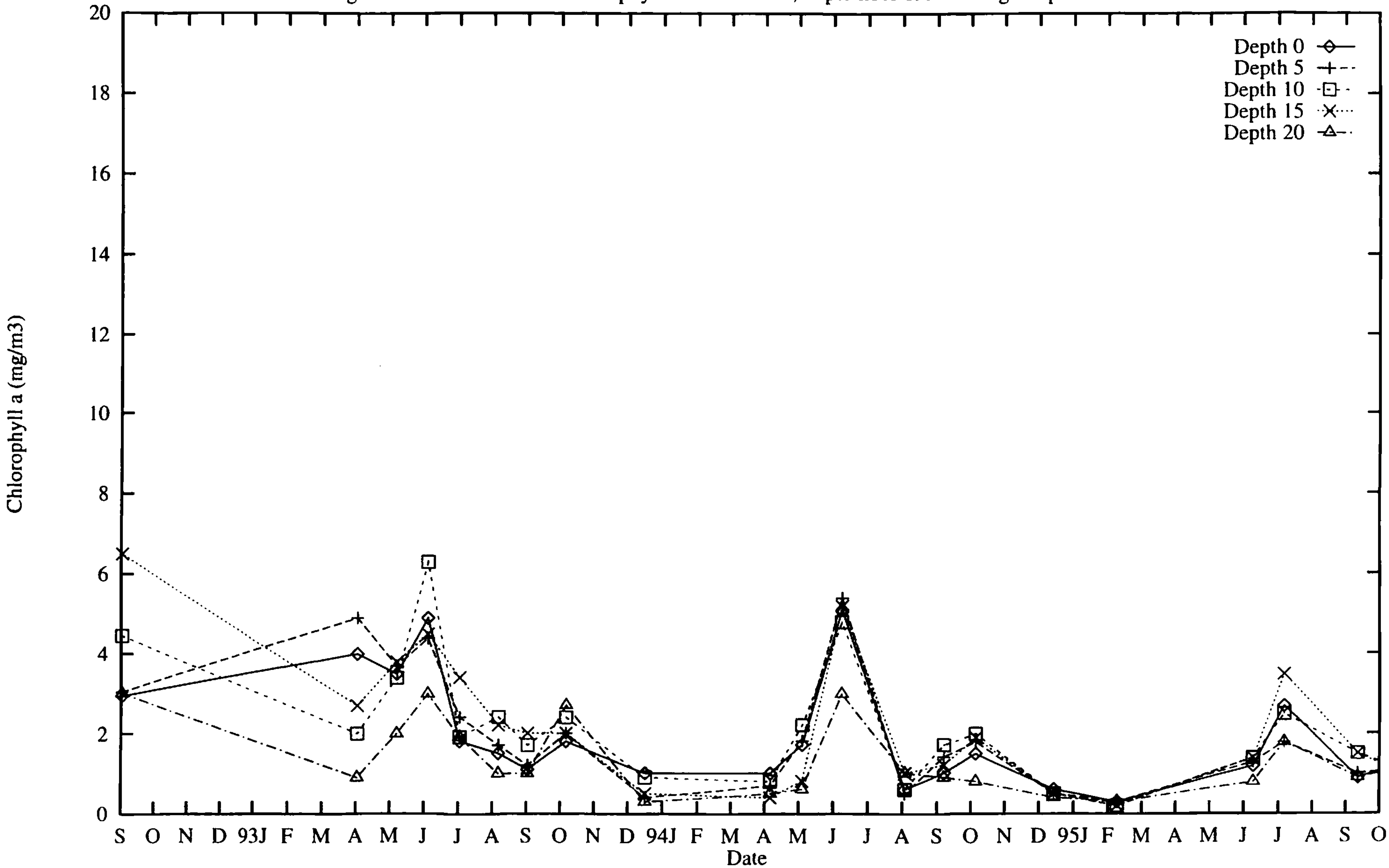


Figure 76: Lake Whatcom chlorophyll data for Site 4, September 1992 through September 1995.

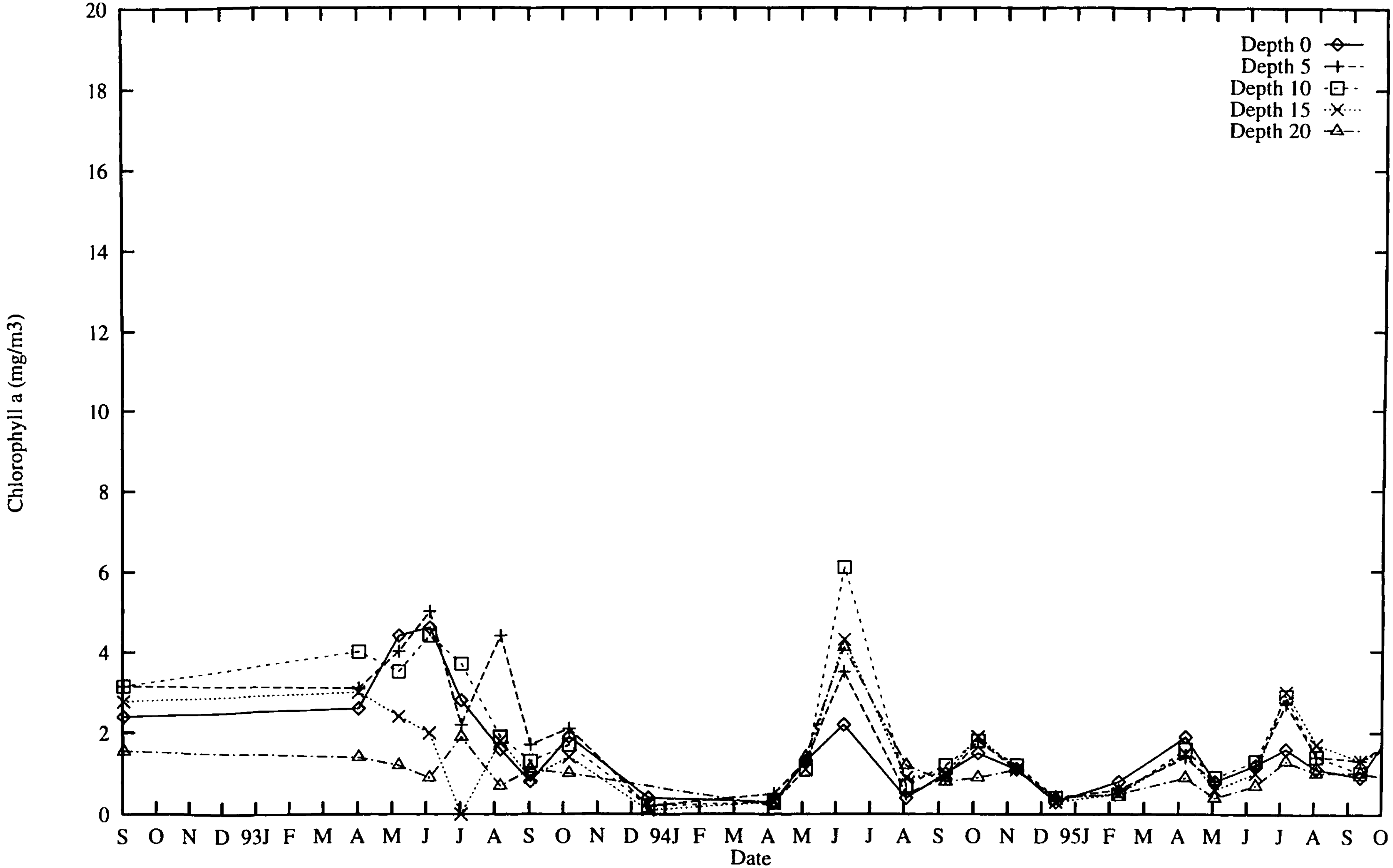


Figure 77: Lake Whatcom total coliform data for Site 1, September 1992 through September 1995.

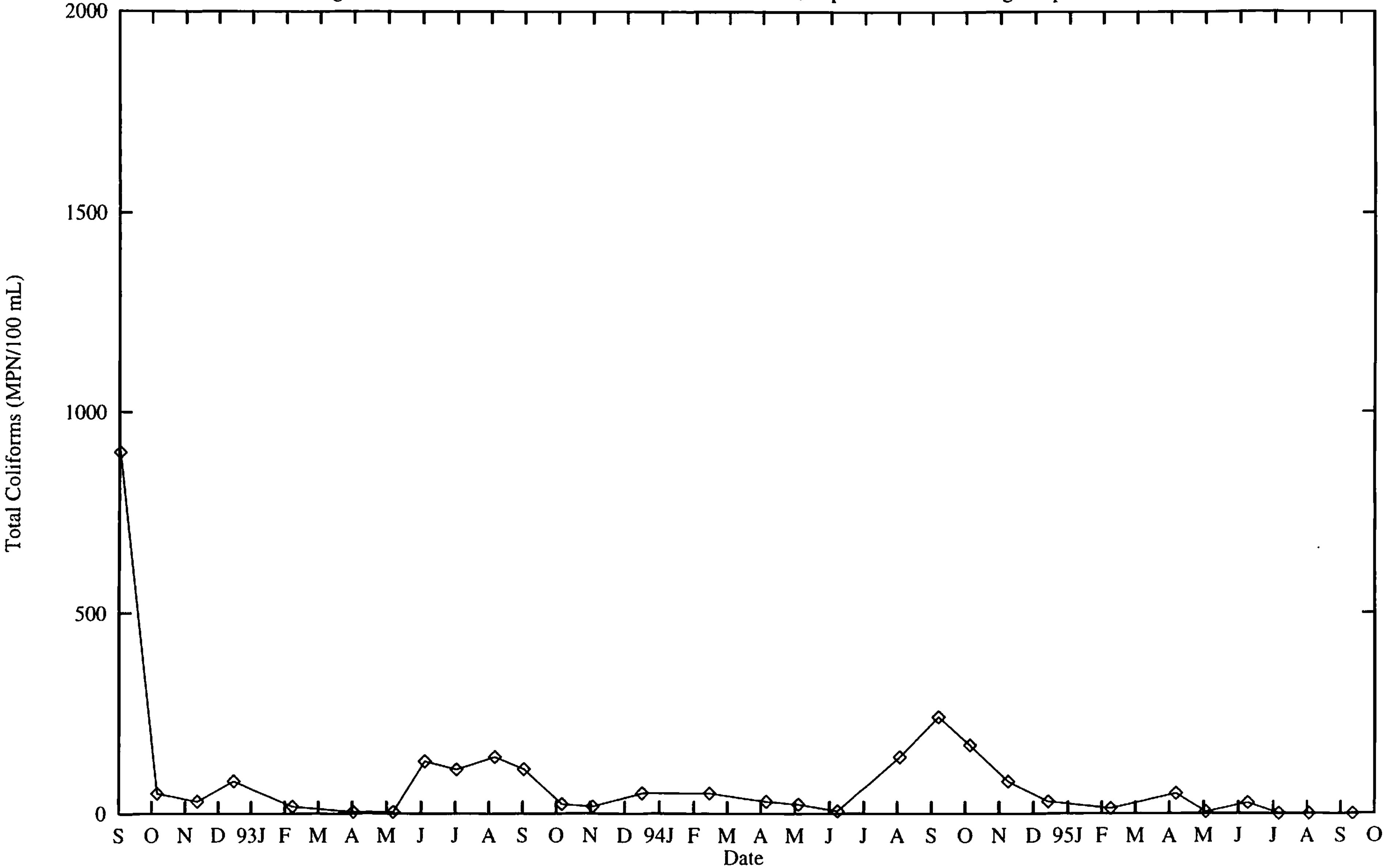


Figure 78: Lake Whatcom total coliform data for Site 2, September 1992 through September 1995.

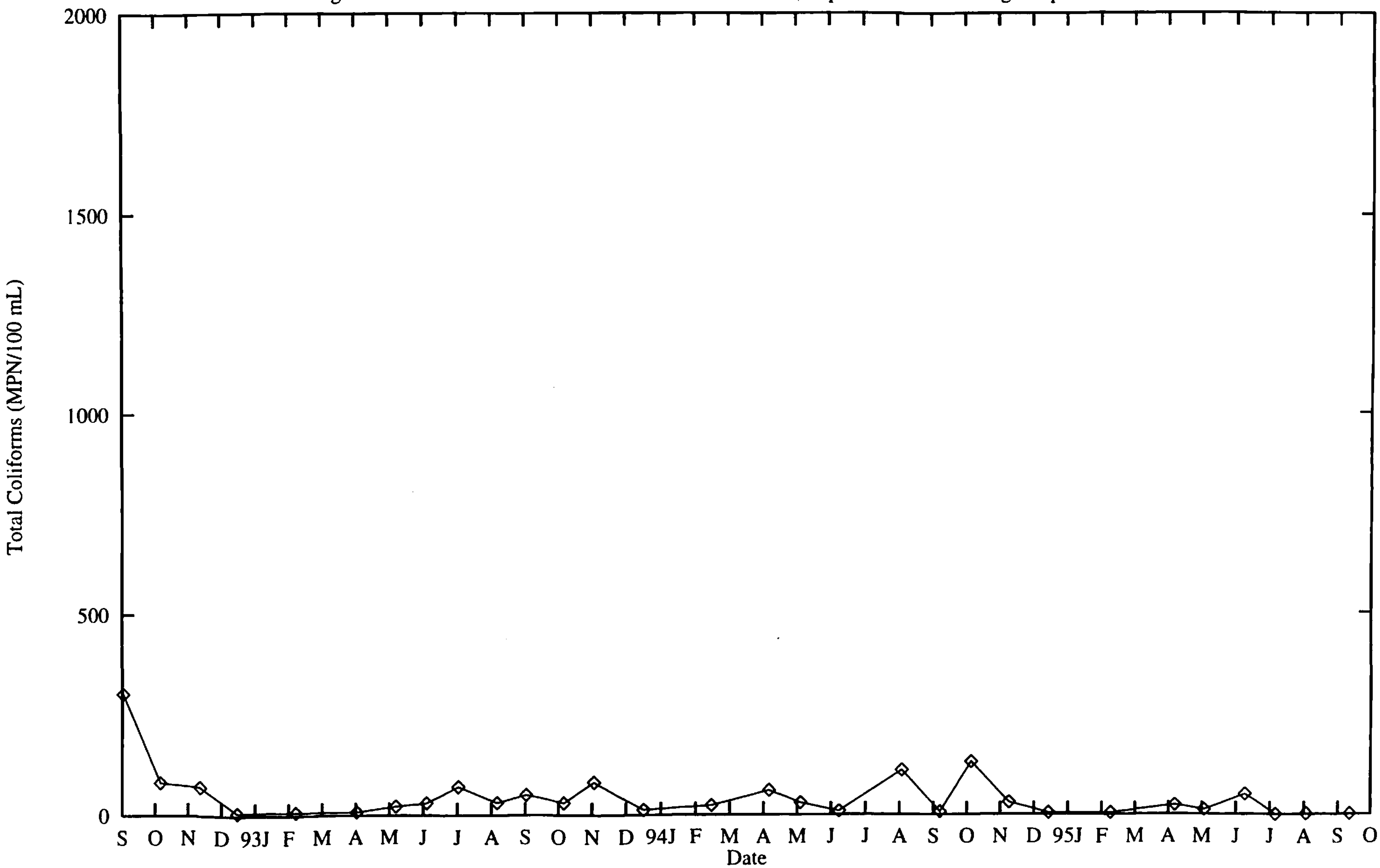


Figure 79: Lake Whatcom total coliform data for Intake site (basin 2), September 1992 through September 1995.

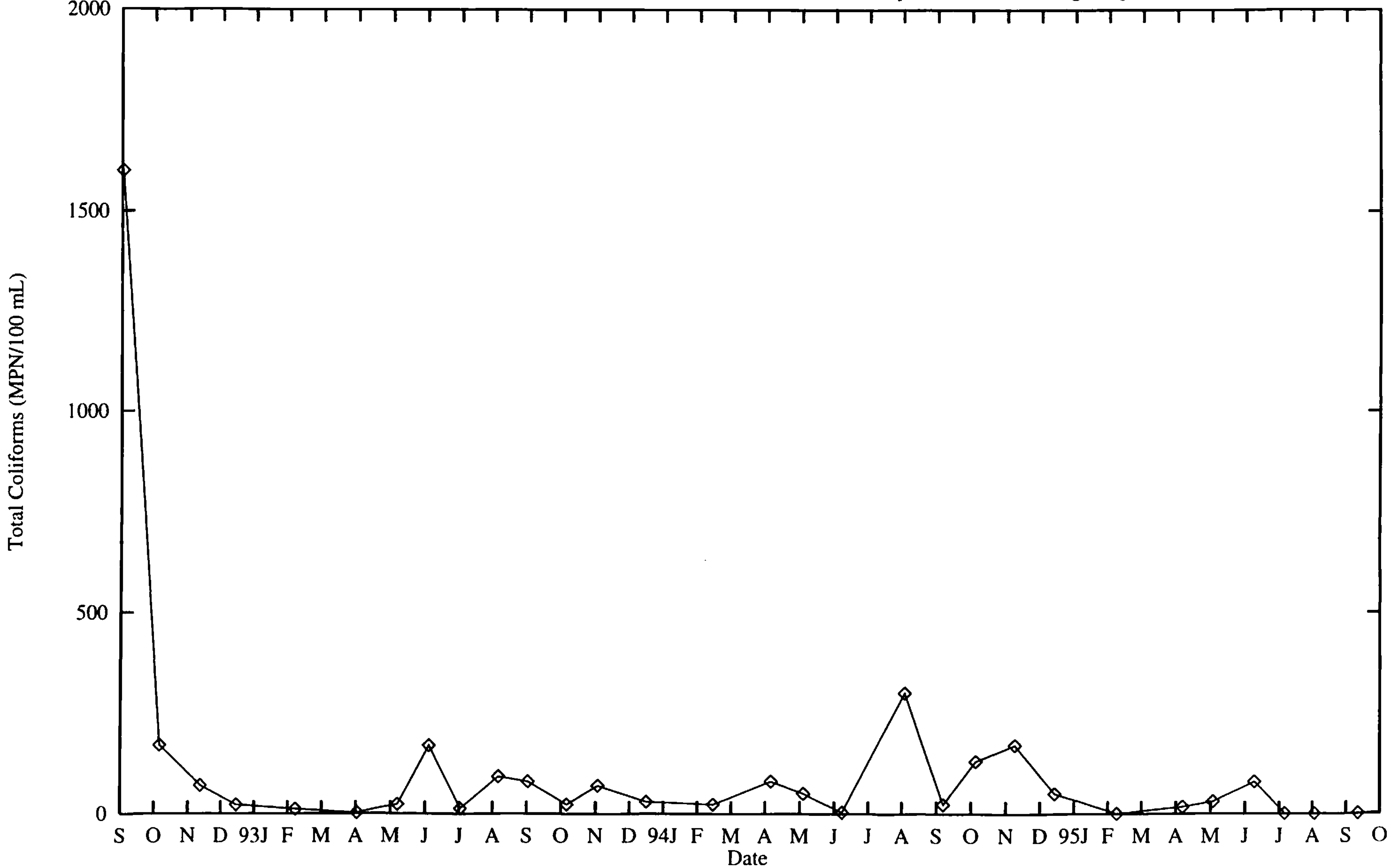


Figure 80: Lake Whatcom total coliform data for Site 3, September 1992 through September 1995.

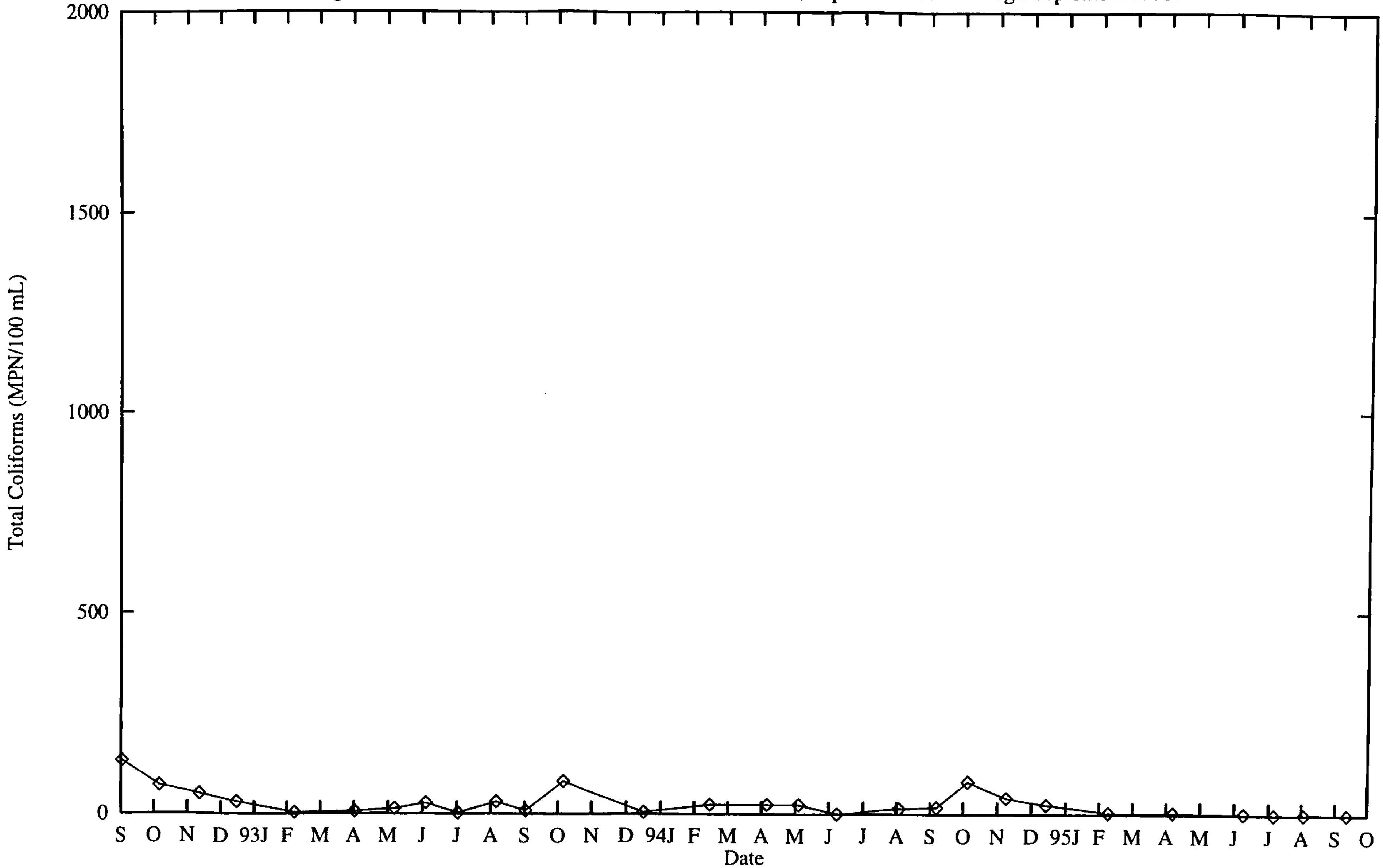


Figure 81: Lake Whatcom total coliform data for Site 4, September 1992 through September 1995.

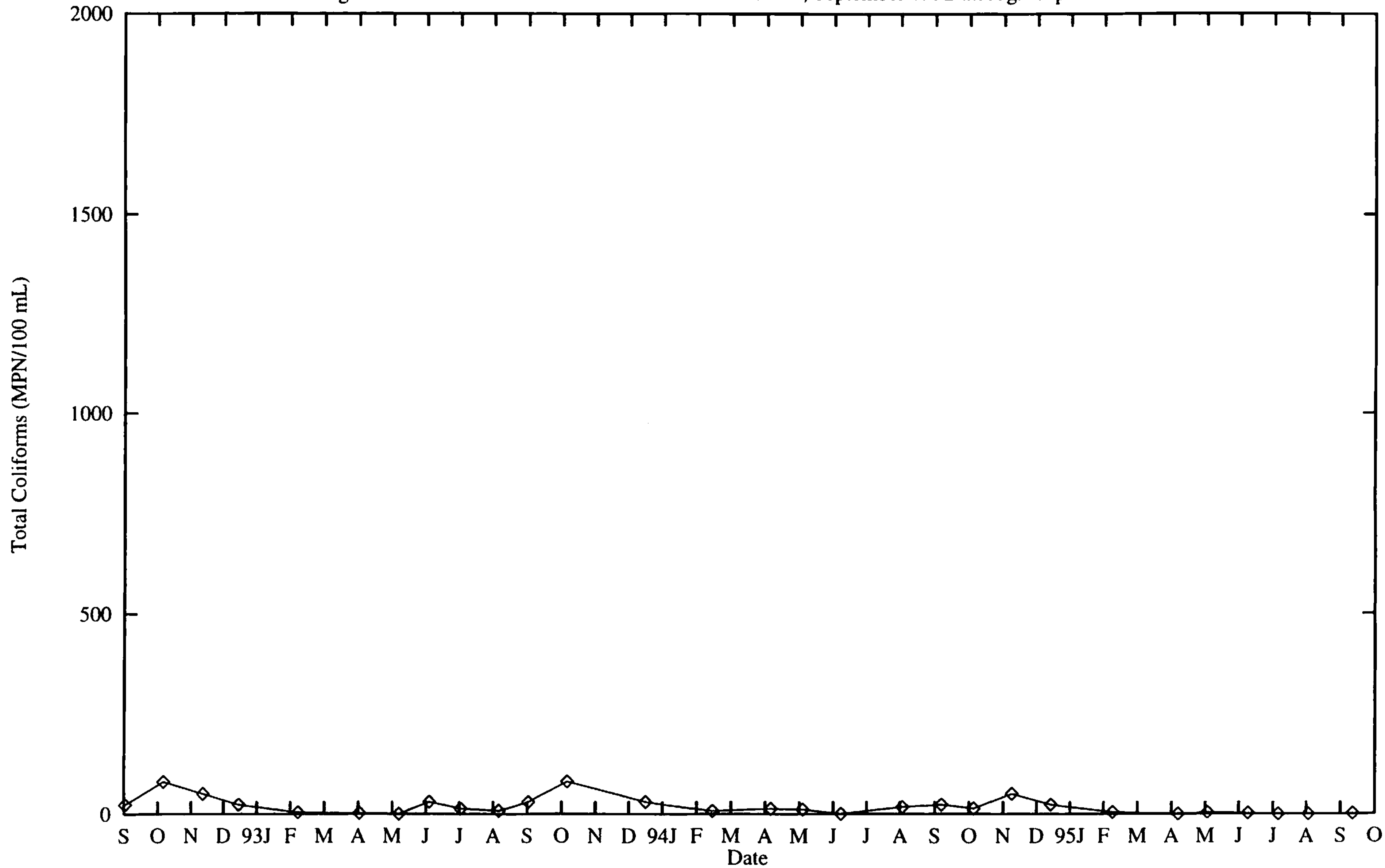


Figure 84: Lake Whatcom fecal coliform data for Intake site (basin 2), September 1992 through September 1995.

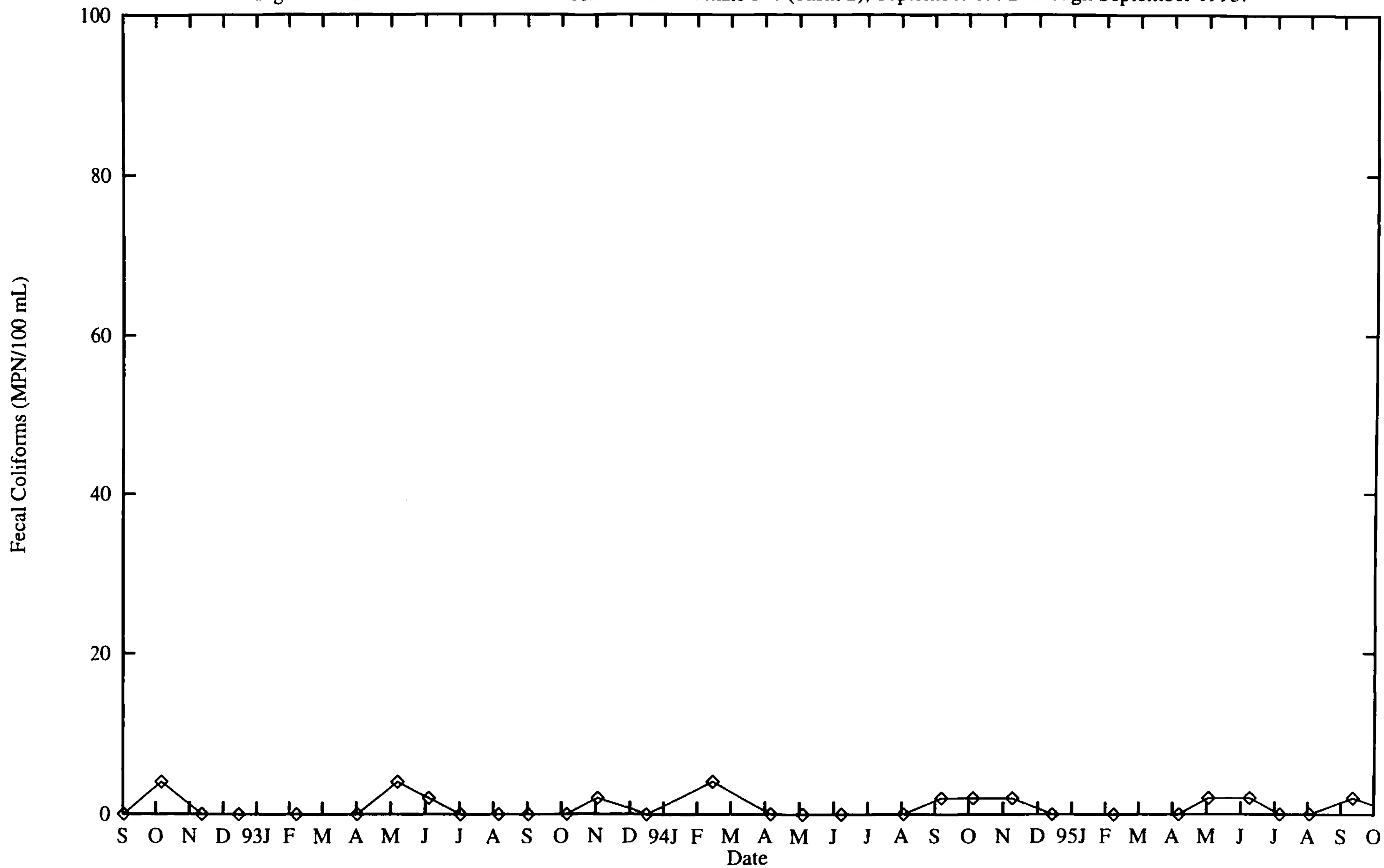


Figure 85: Lake Whatcom fecal coliform data for Site 3, September 1992 through September 1995.

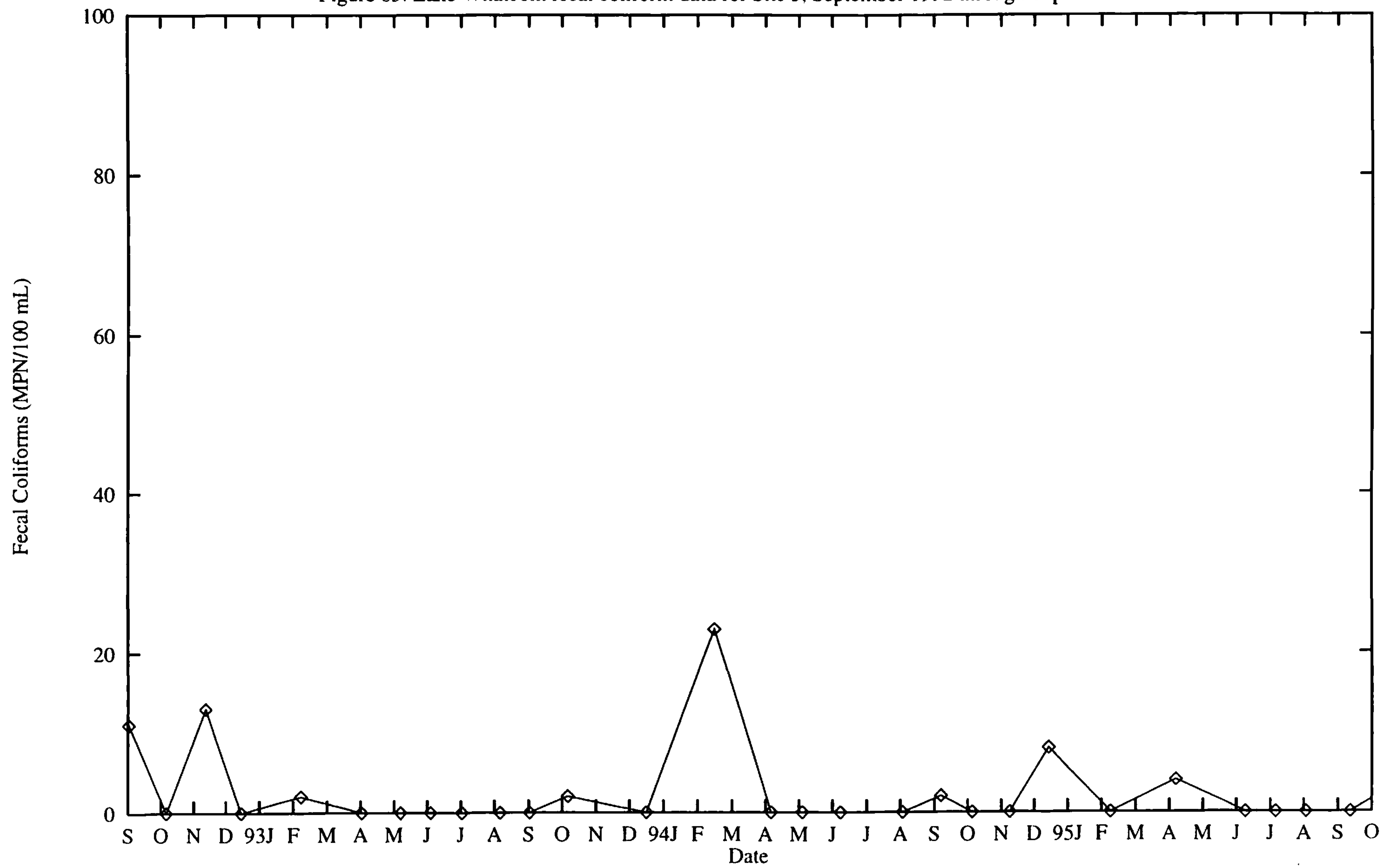


Figure 86: Lake Whatcom fecal coliform data for Site 4, September 1992 through September 1995.

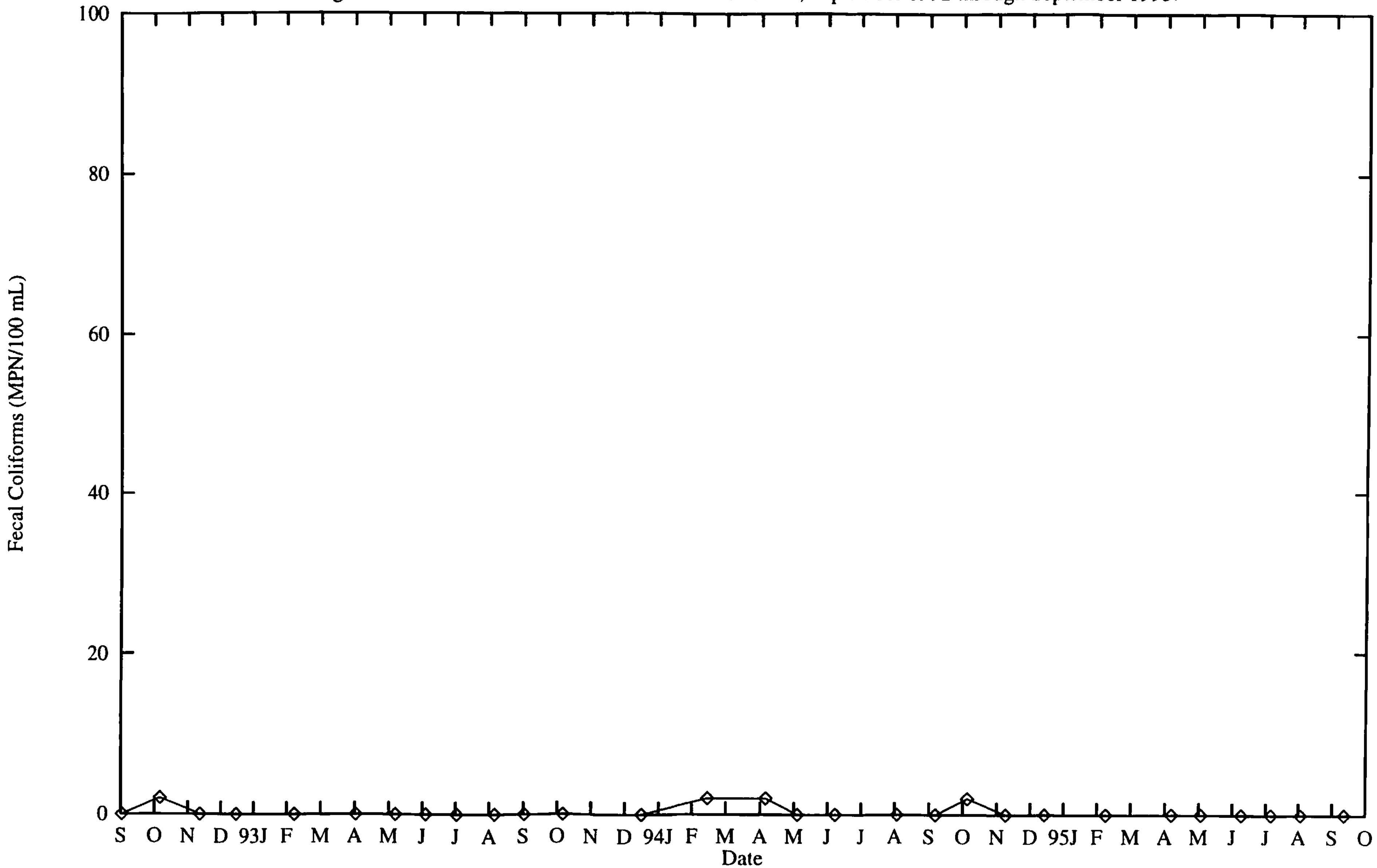


Figure 87: Lake Whatcom Plankton Data, Site 1, September 1992 through September 1995.

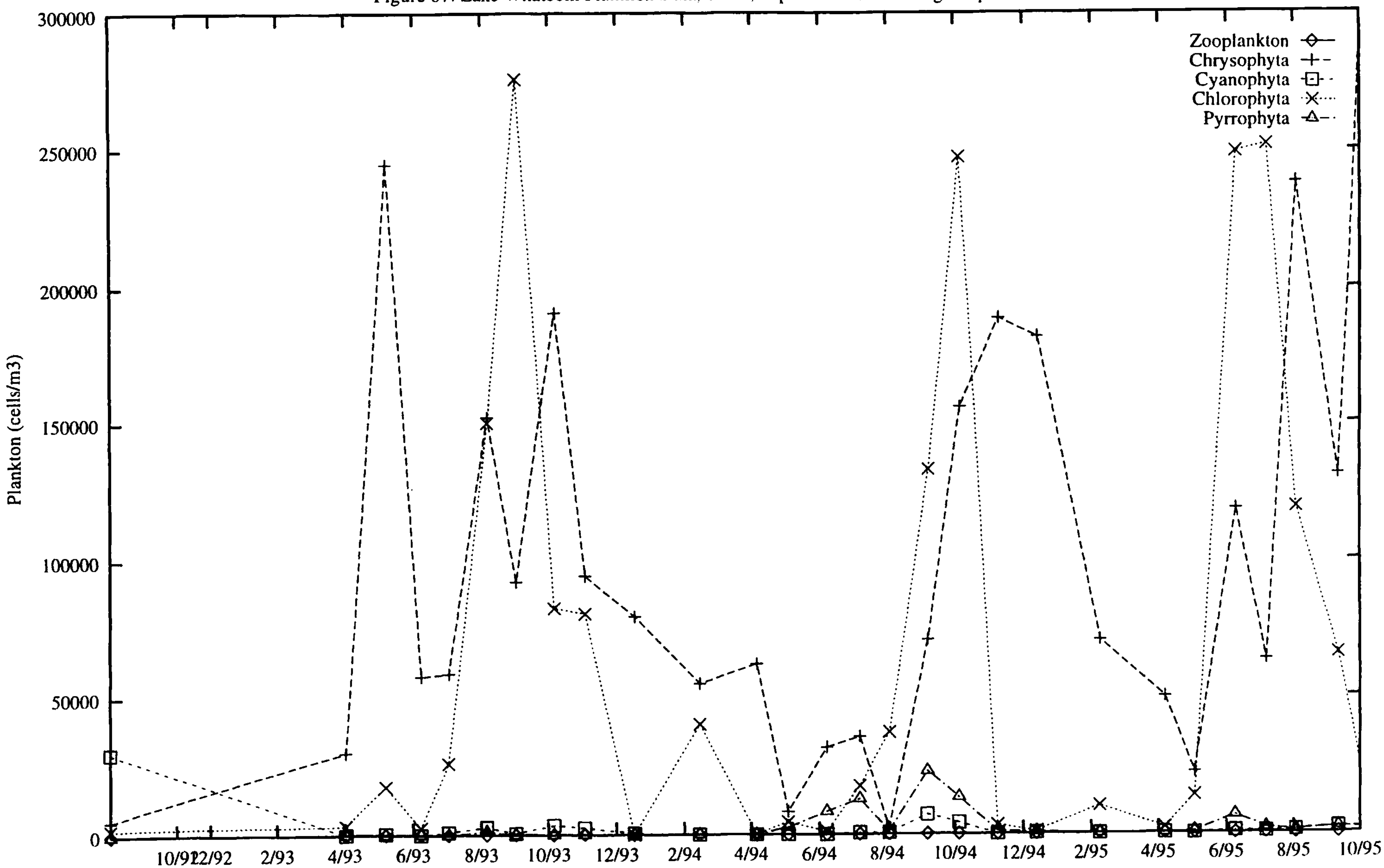


Figure 88: Lake Whatcom Plankton Data, Site 2, September 1992 through September 1995.

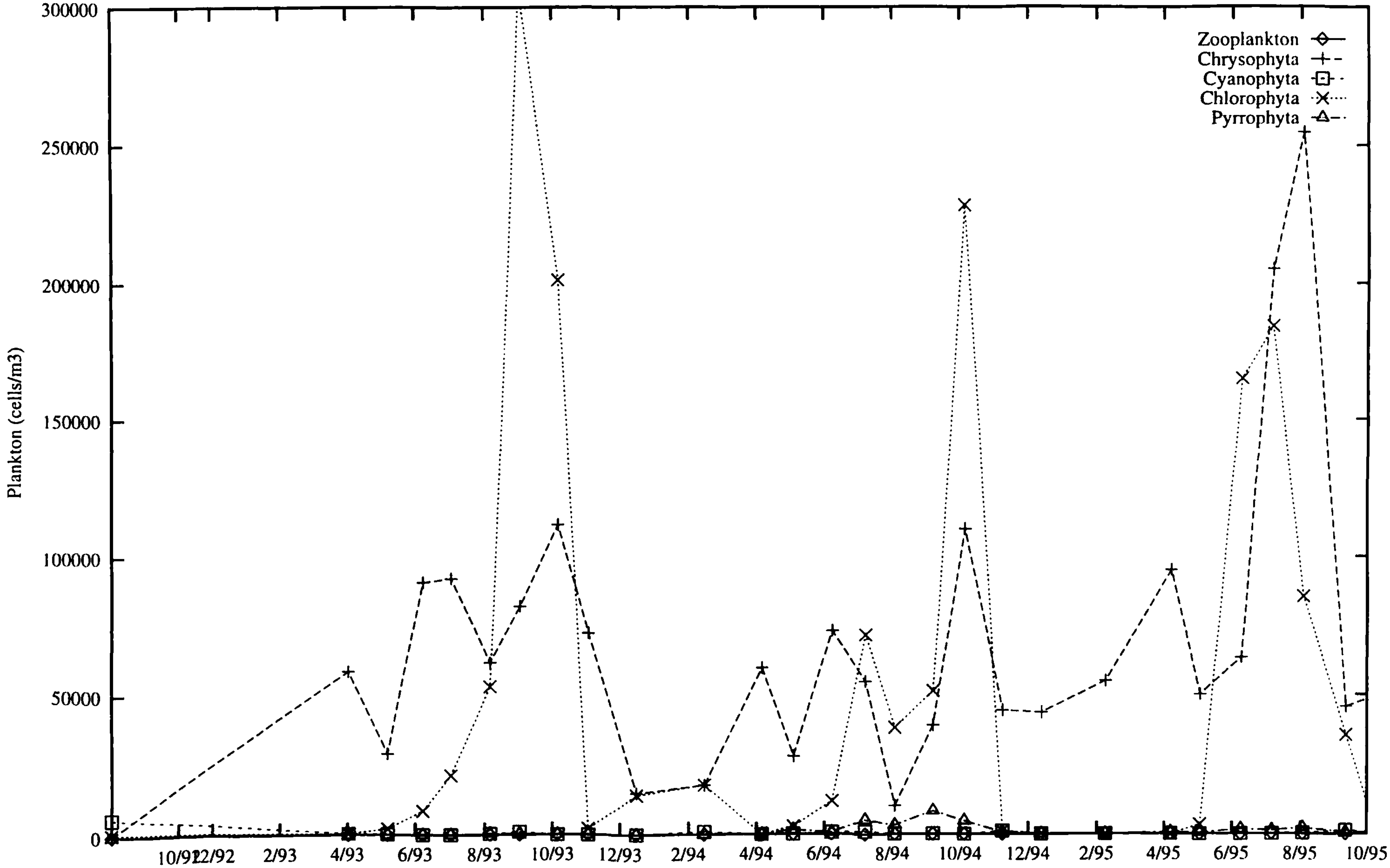


Figure 89: Lake Whatcom Plankton Data, Intake, September 1992 through September 1995.

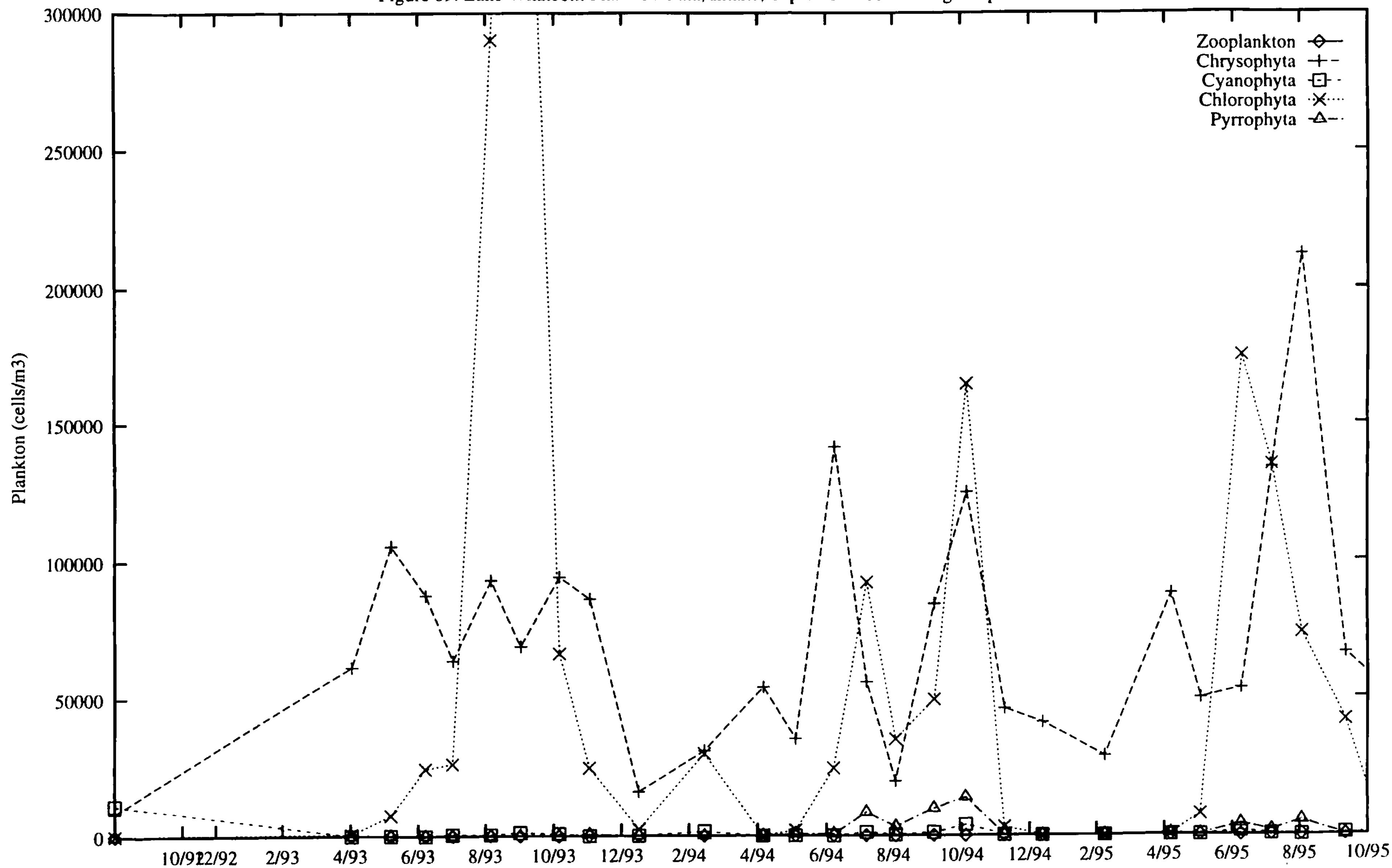


Figure 90: Lake Whatcom Plankton Data, Site 3, September 1992 through September 1995.

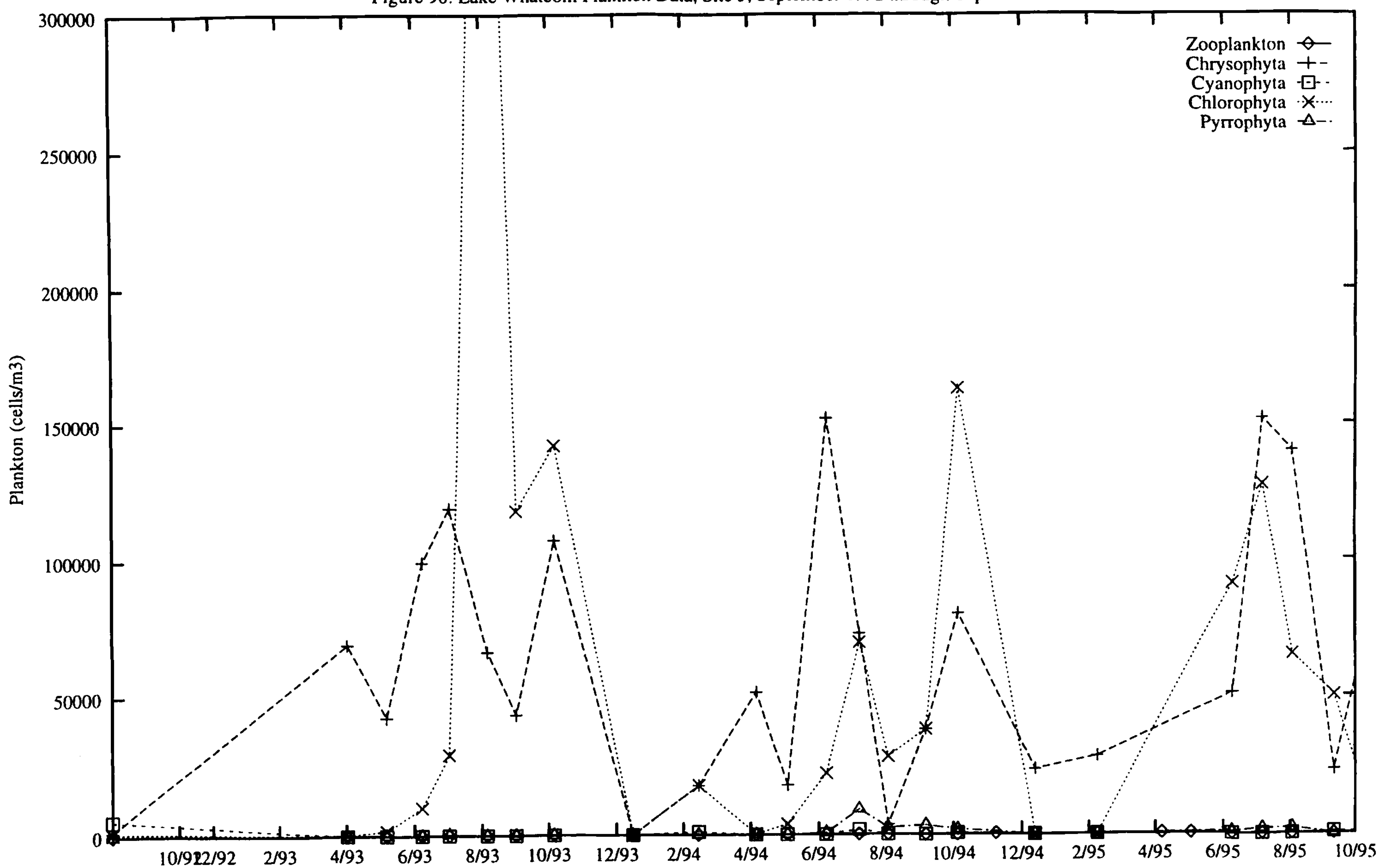


Figure 91: Lake Whatcom Plankton Data, Site 4, September 1992 through September 1995.

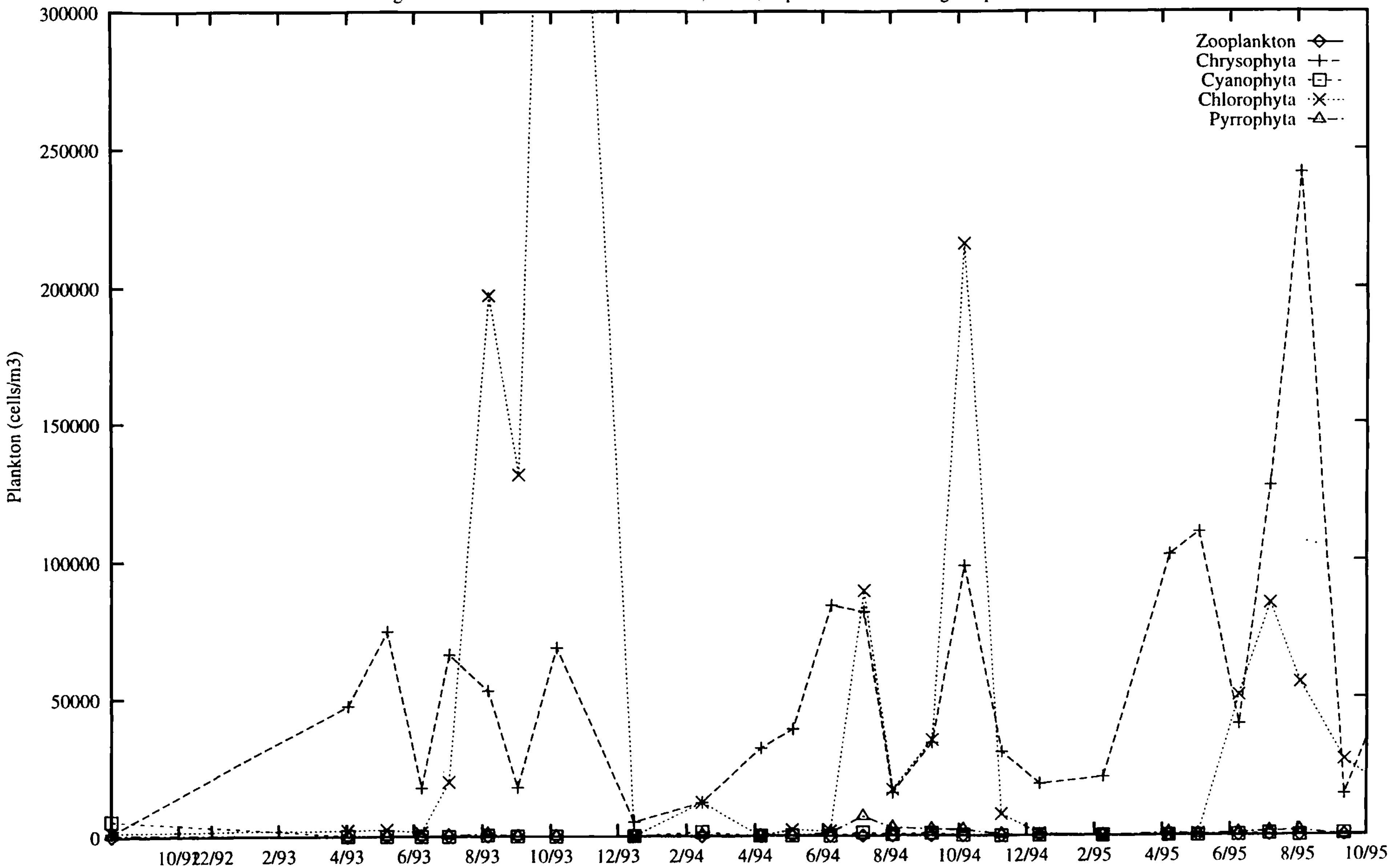


Figure 92: Lake Whatcom Secchi depths for Site 1, September 1992 through September 1995.

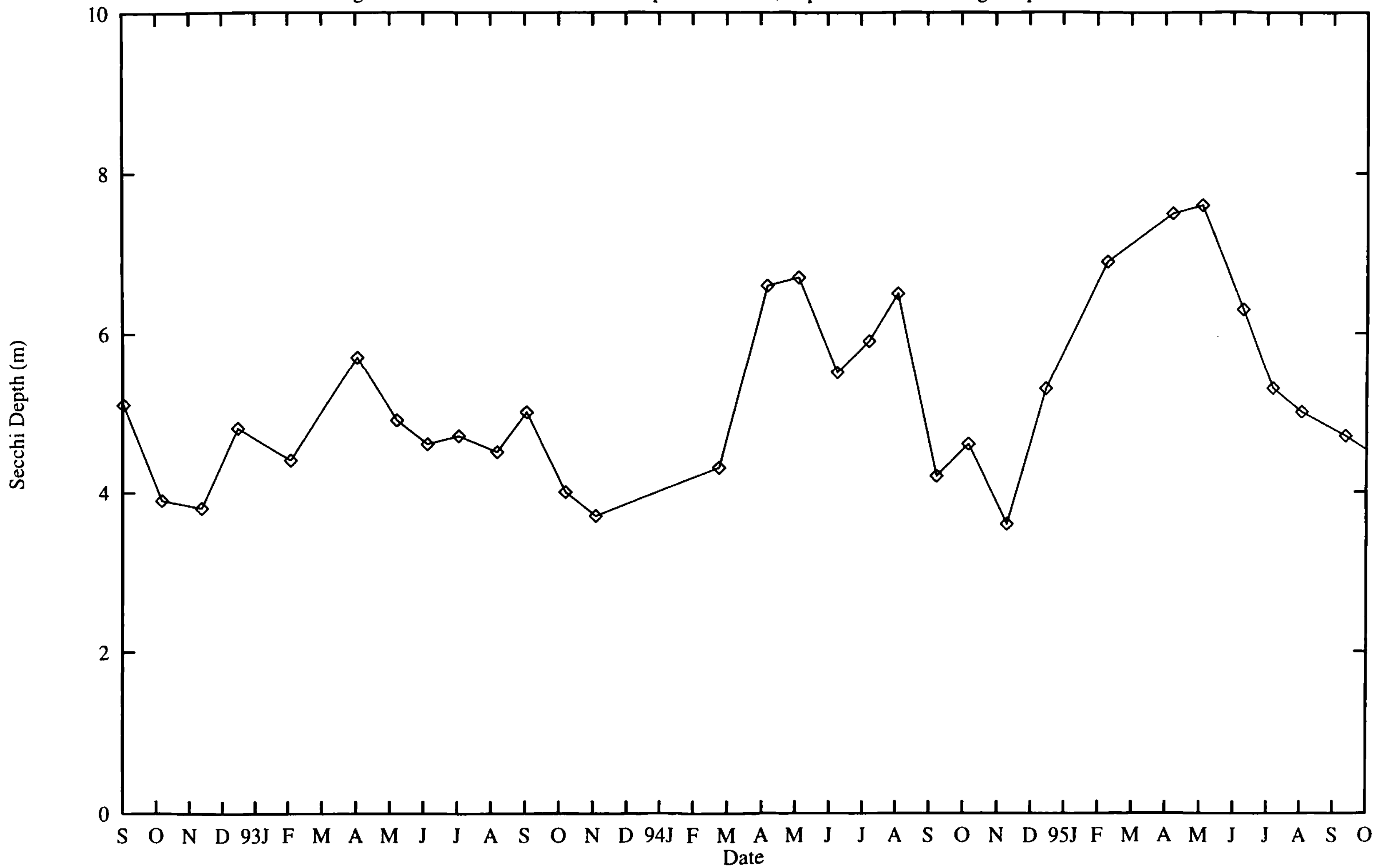


Figure 93: Lake Whatcom Secchi depths for Site 2, September 1992 through September 1995.

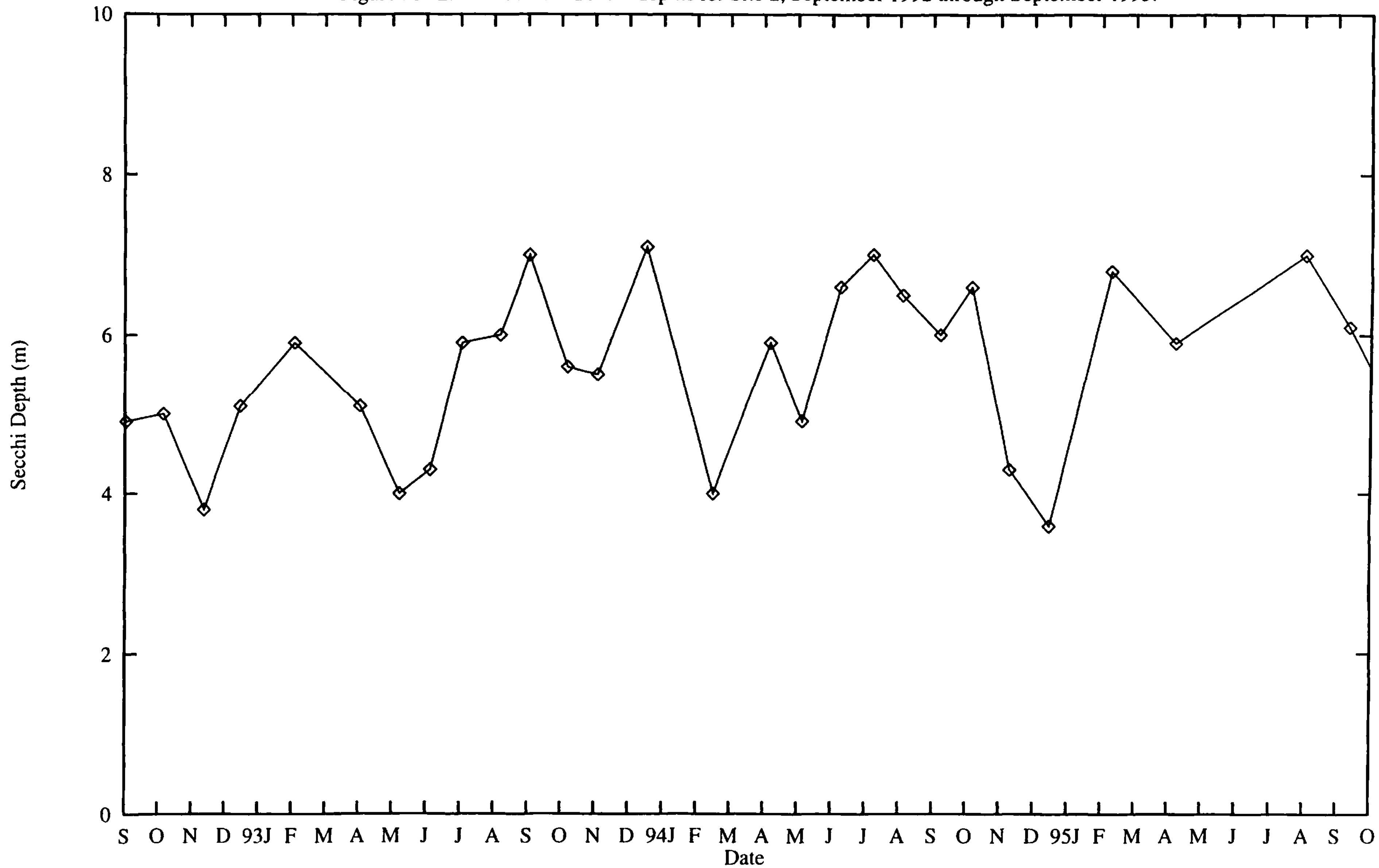


Figure 94: Lake Whatcom Secchi depths for Intake site (basin 2), September 1992 through September 1995.

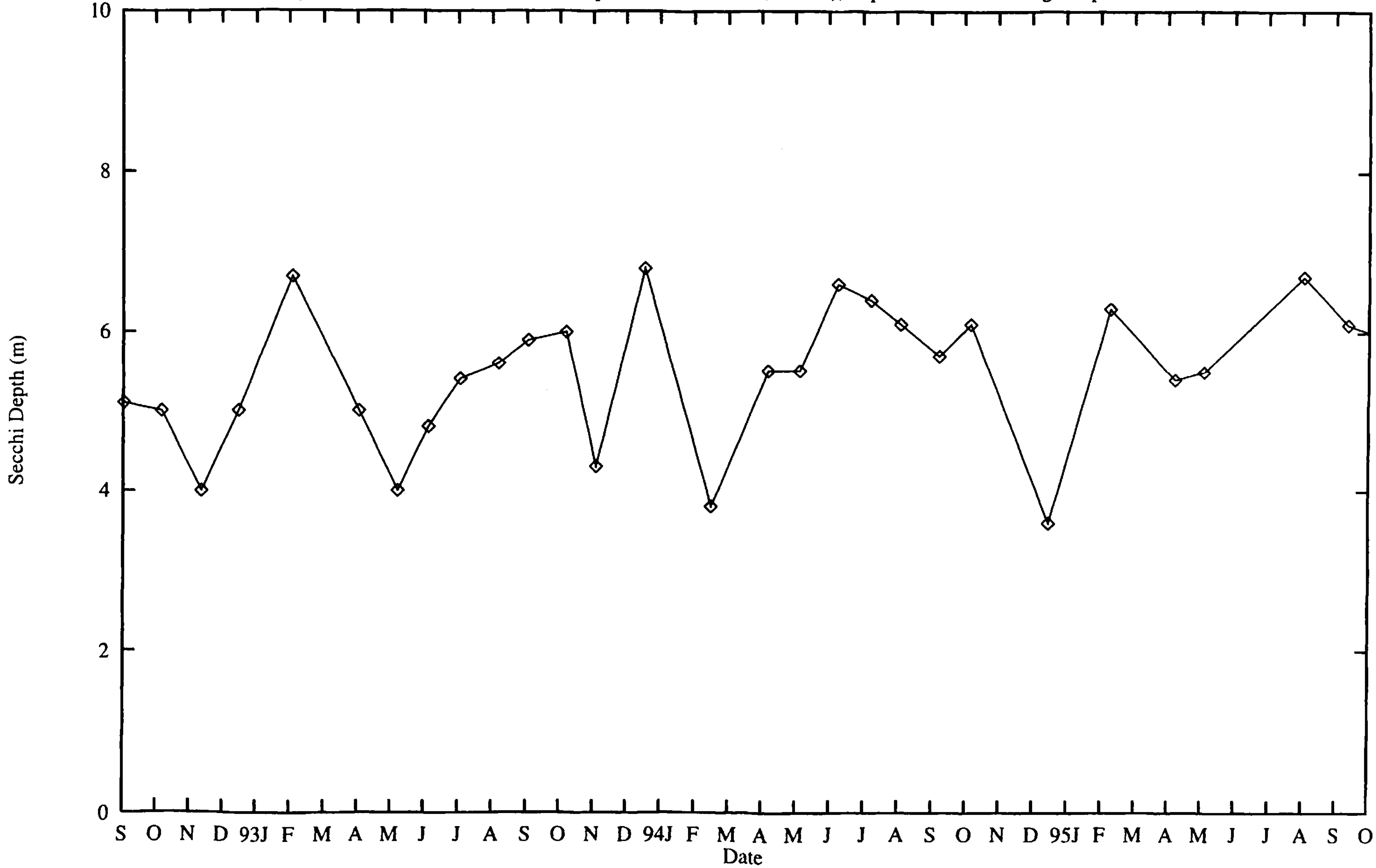


Figure 95: Lake Whatcom Secchi depths for Site 3, September 1992 through September 1995.

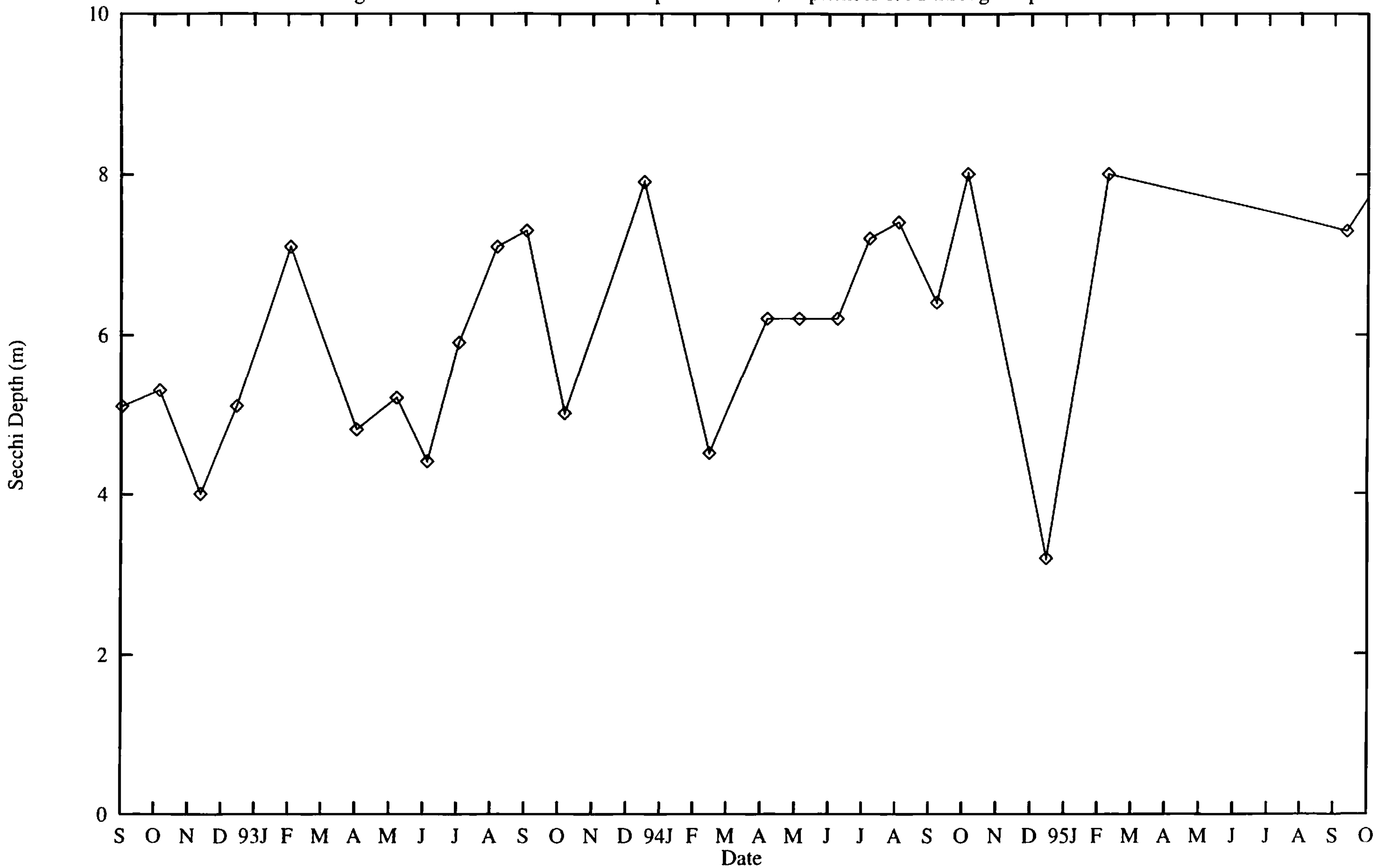
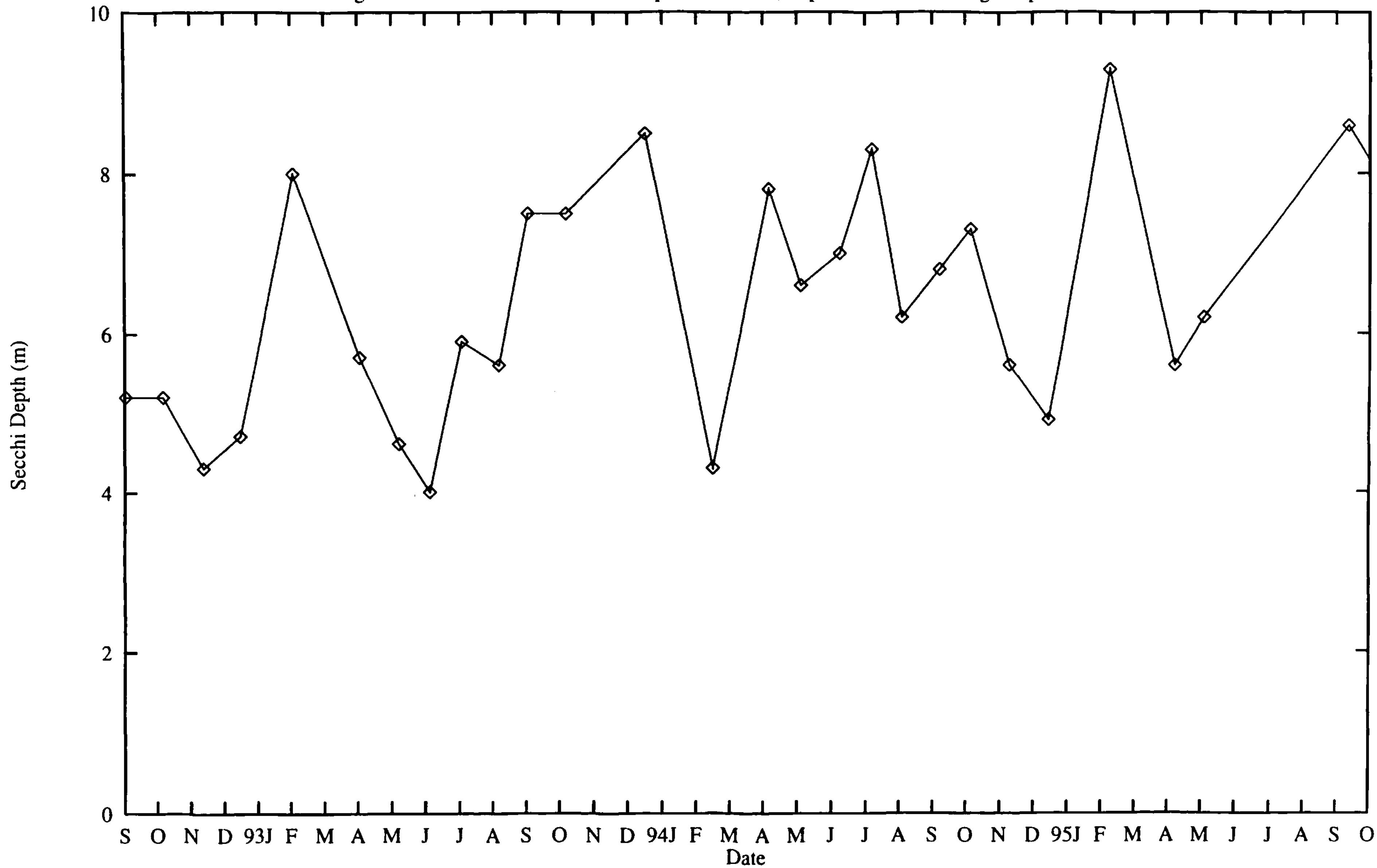


Figure 96: Lake Whatcom Secchi depths for Site 4, September 1992 through September 1995.



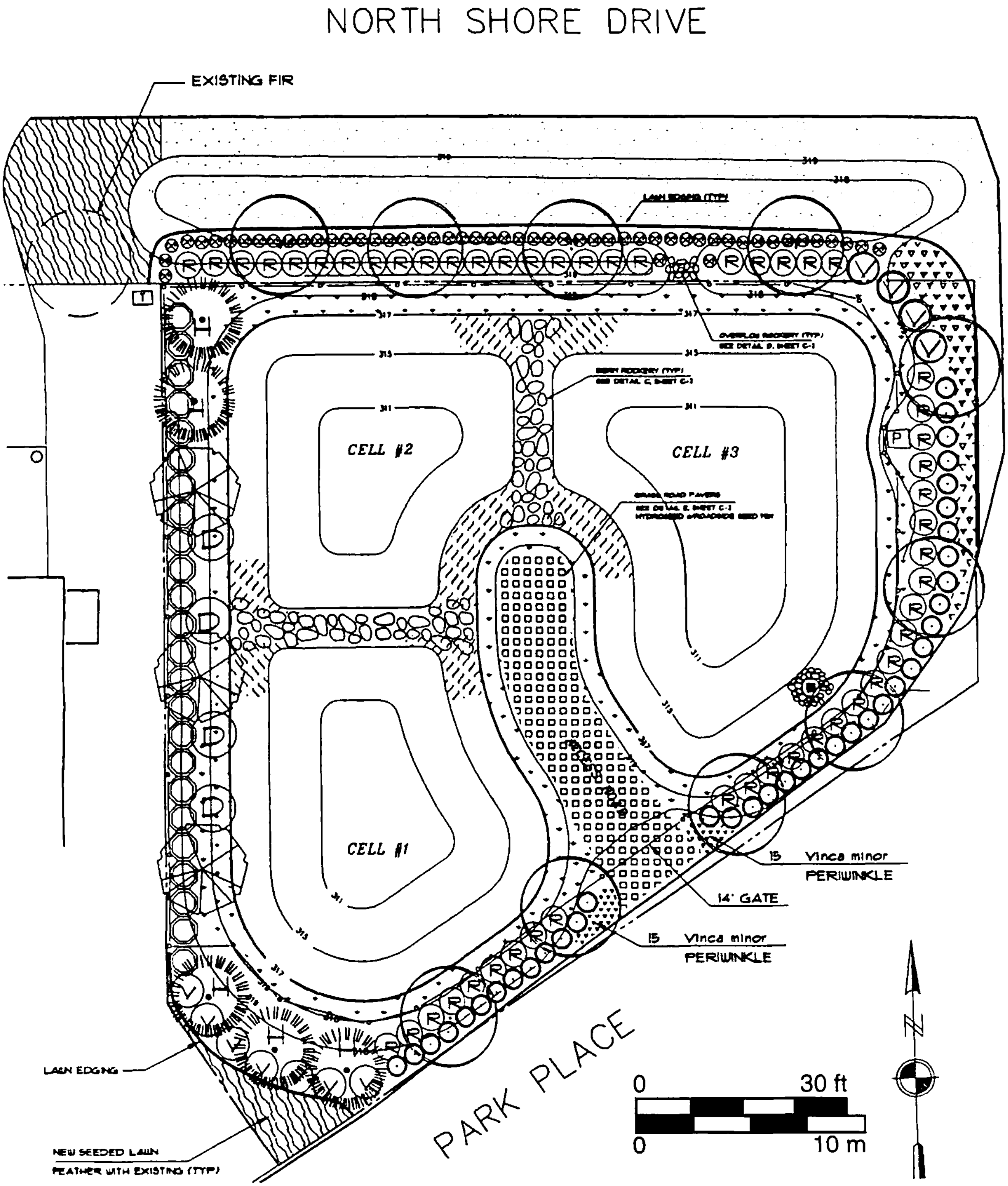


Figure 97: Park Place wet pond engineering design specifications. Scale is estimated from measured fence width; pond cell depths were field verified to be accurate within +/- 0.1 ft..

Figure 98

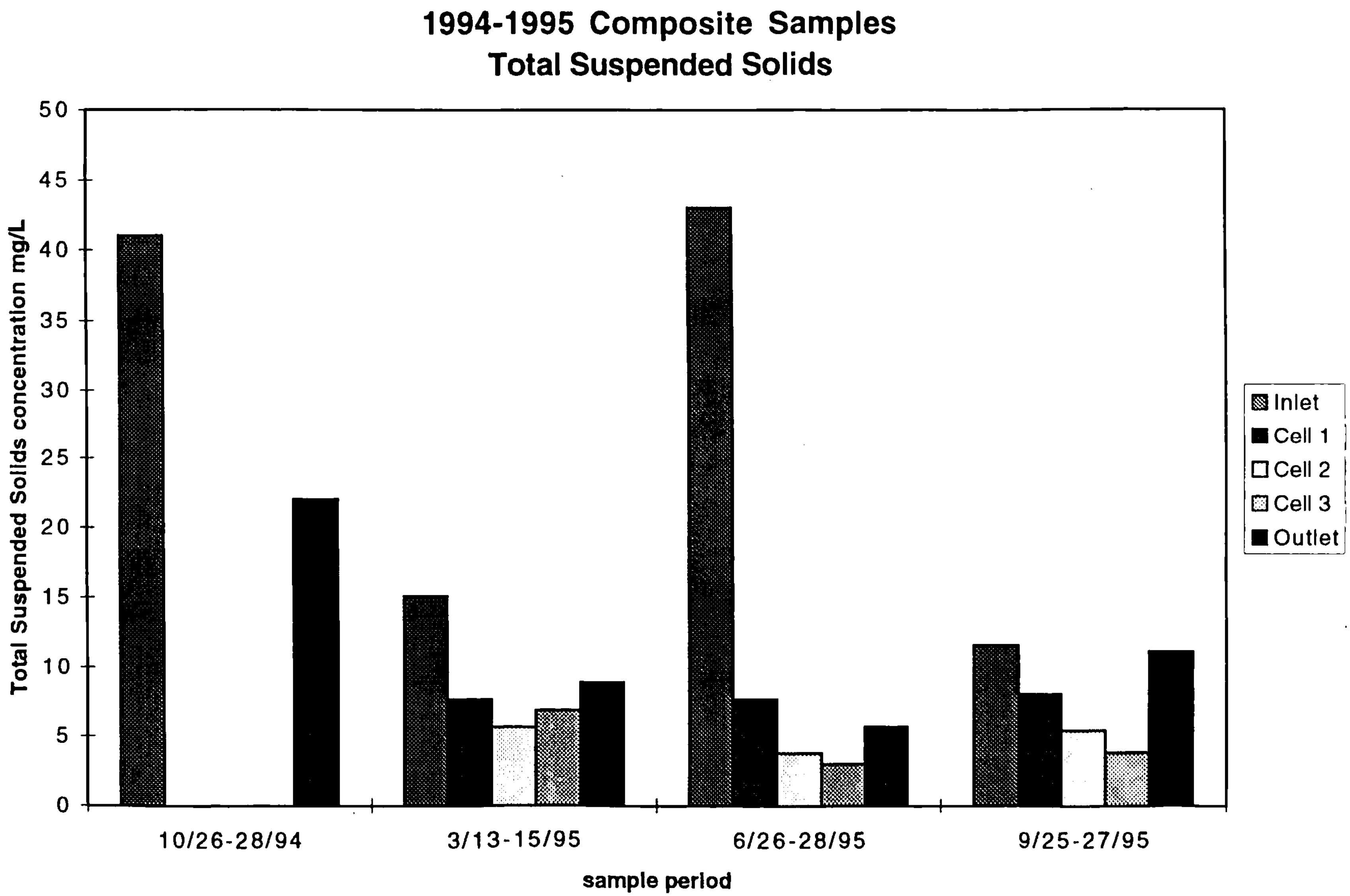

1994-1995 Composite Samples
Total Suspended Solids
Total Suspended Solids concentration mg/L
50
45
40
35
30
25
20
15
10
5
0
10/26-28/94
3/13-15/95
6/26-28/95
9/25-27/95
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 99

1994-1995 Composite Samples
Total Phosphorus

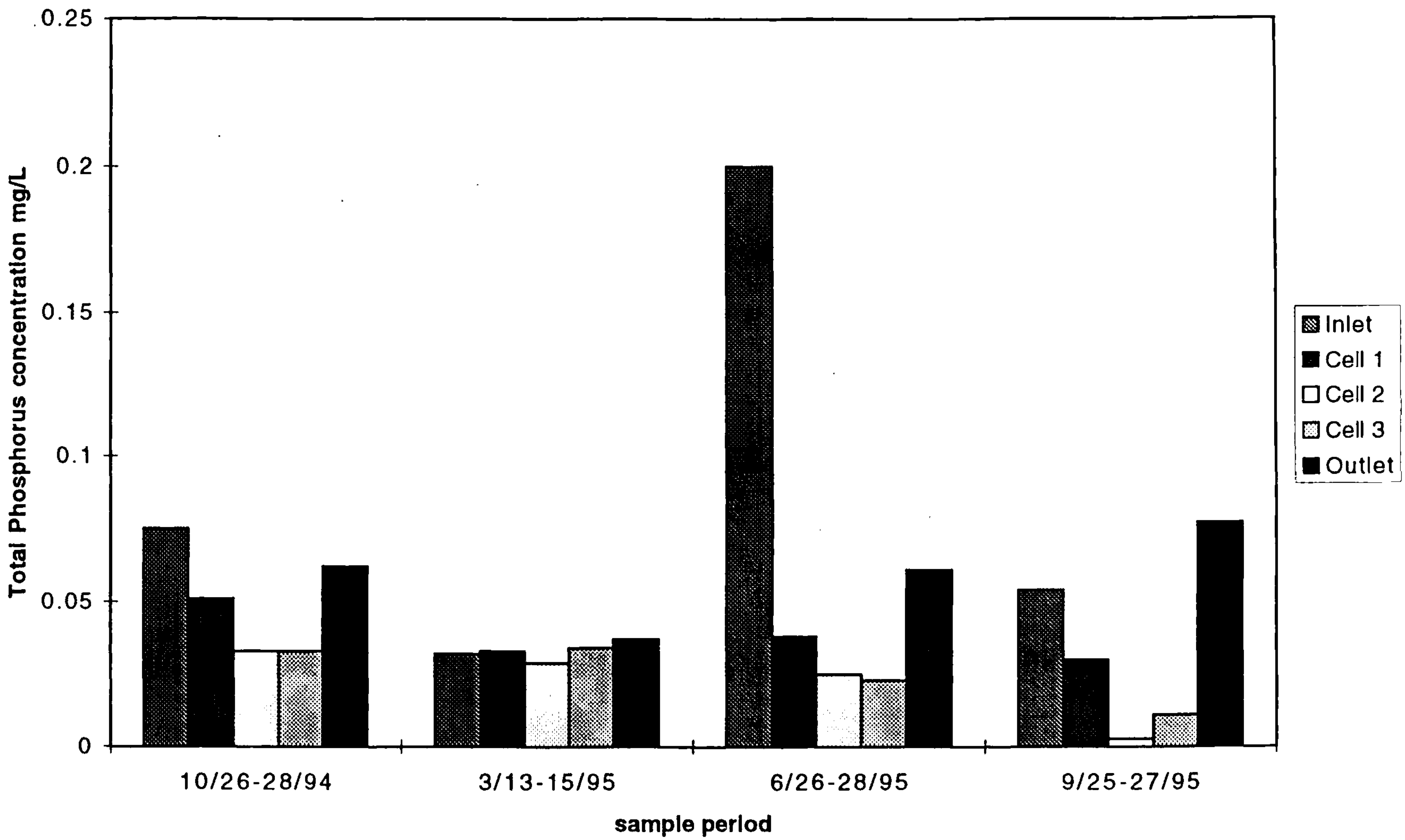


Figure 100

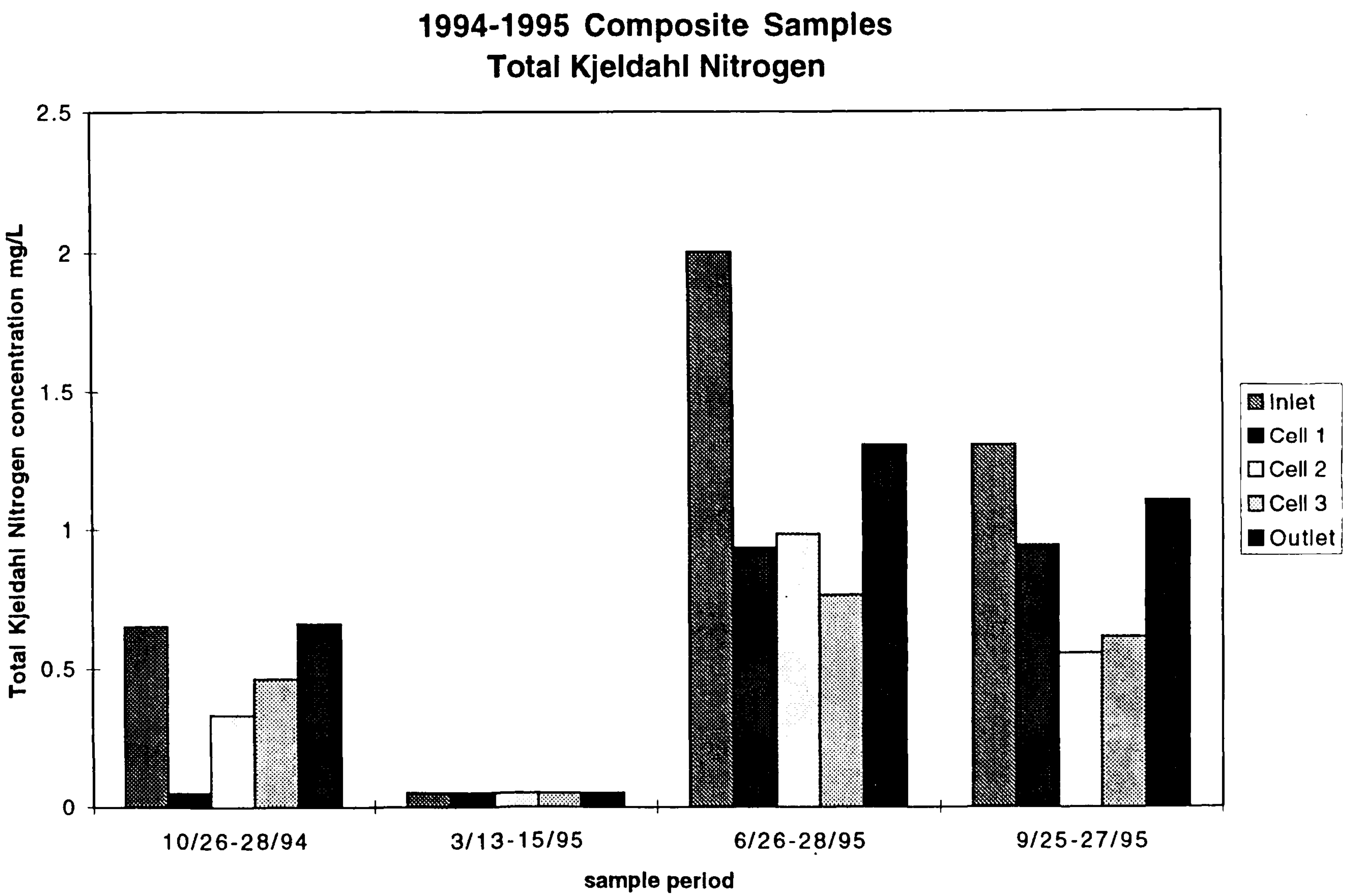

1994-1995 Composite Samples
Total Kjeldahl Nitrogen
Total Kjeldahl Nitrogen concentration mg/L
2.5
2
1.5
1
0.5
0
10/26-28/94
3/13-15/95
6/26-28/95
9/25-27/95
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 101

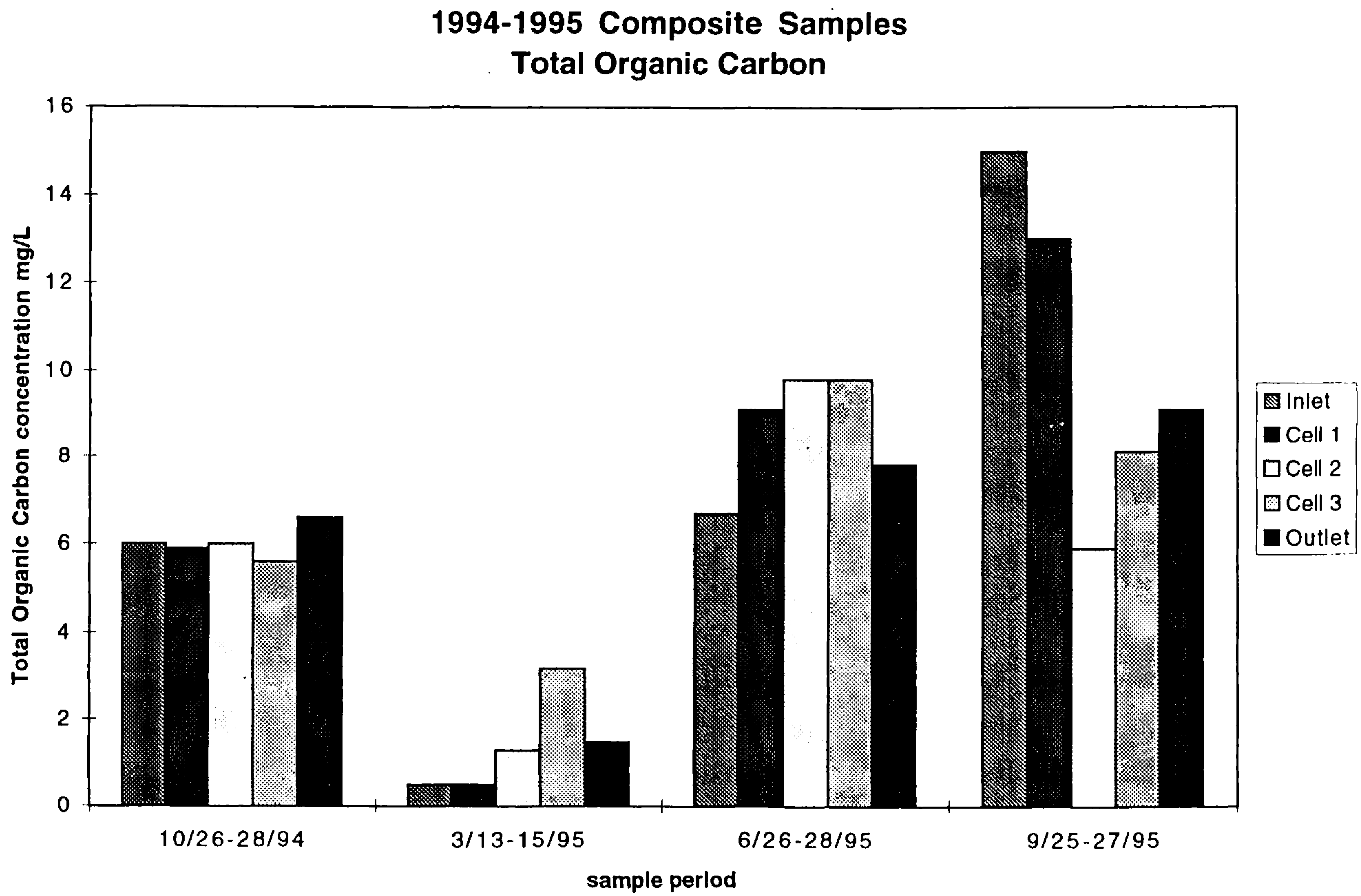

1994-1995 Composite Samples
Total Organic Carbon
Total Organic Carbon concentration mg/L
16
14
12
10
8
6
4
2
0
10/26-28/94
3/13-15/95
6/26-28/95
9/25-27/95
sample perlod
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 102

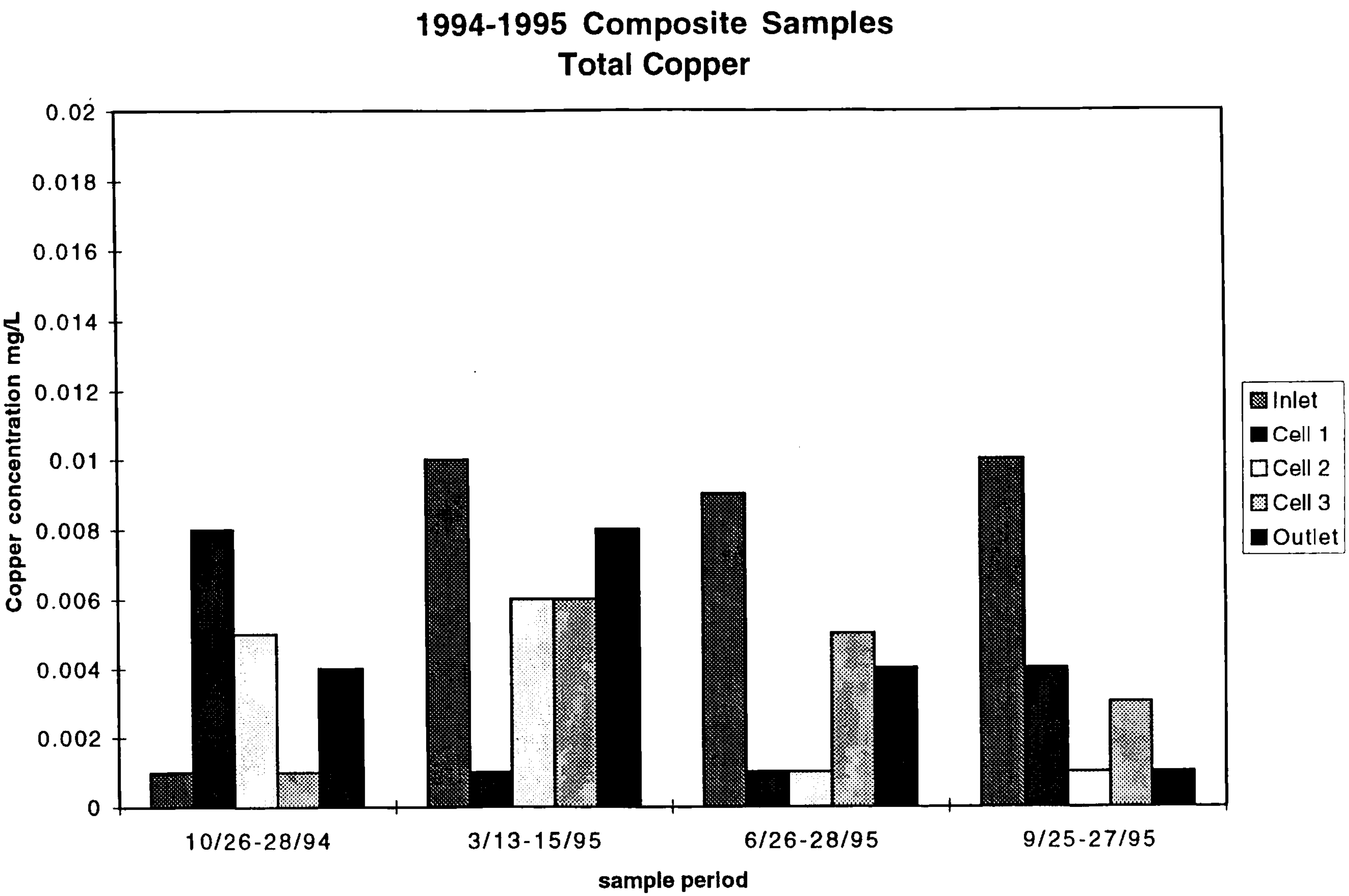

1994-1995 Composite Samples
Total Copper
Copper concentration mg/L
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
10/26-28/94
3/13-15/95
6/26-28/95
9/25-27/95
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 103

1994-1995 Composite Samples
Total Iron

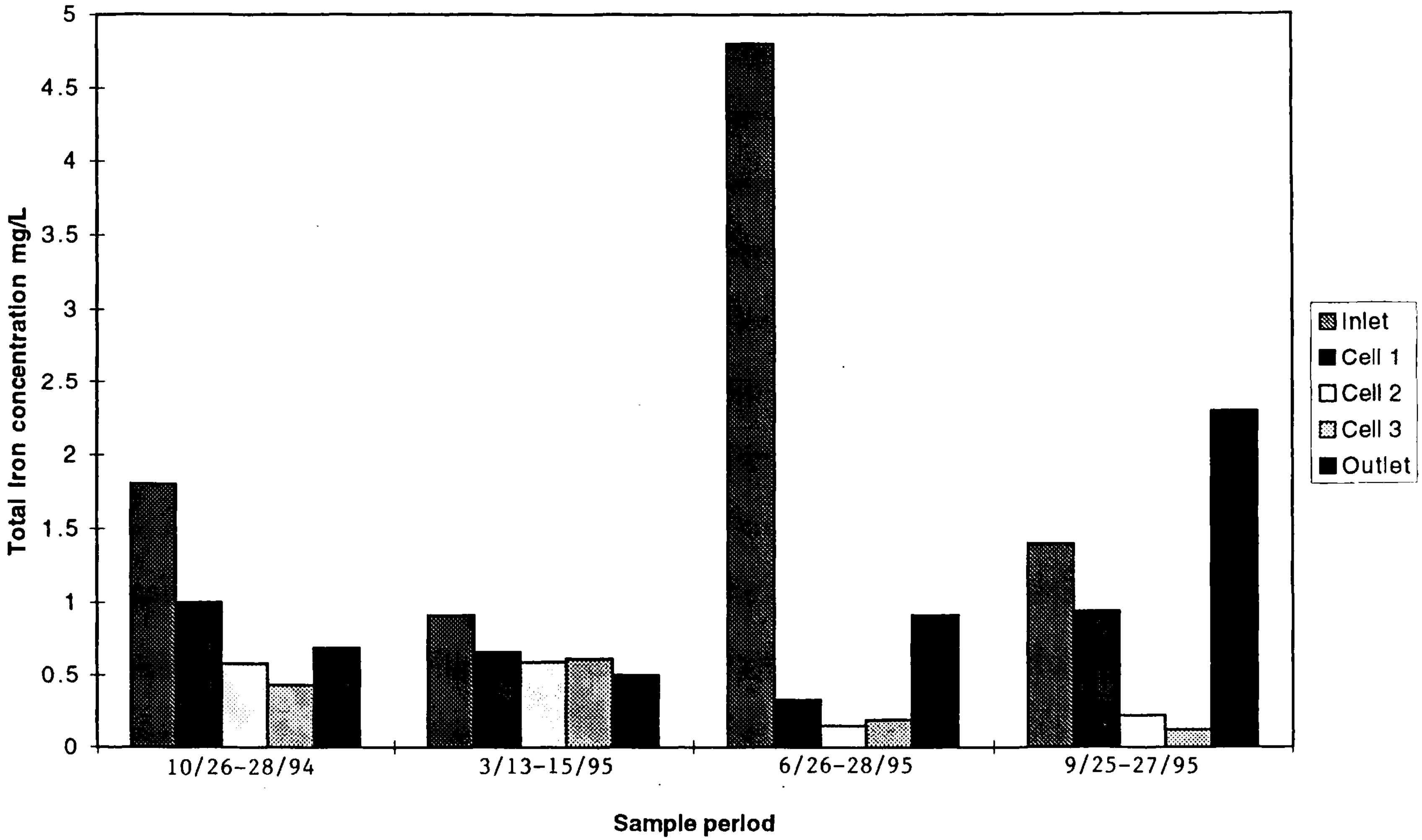


Figure 104

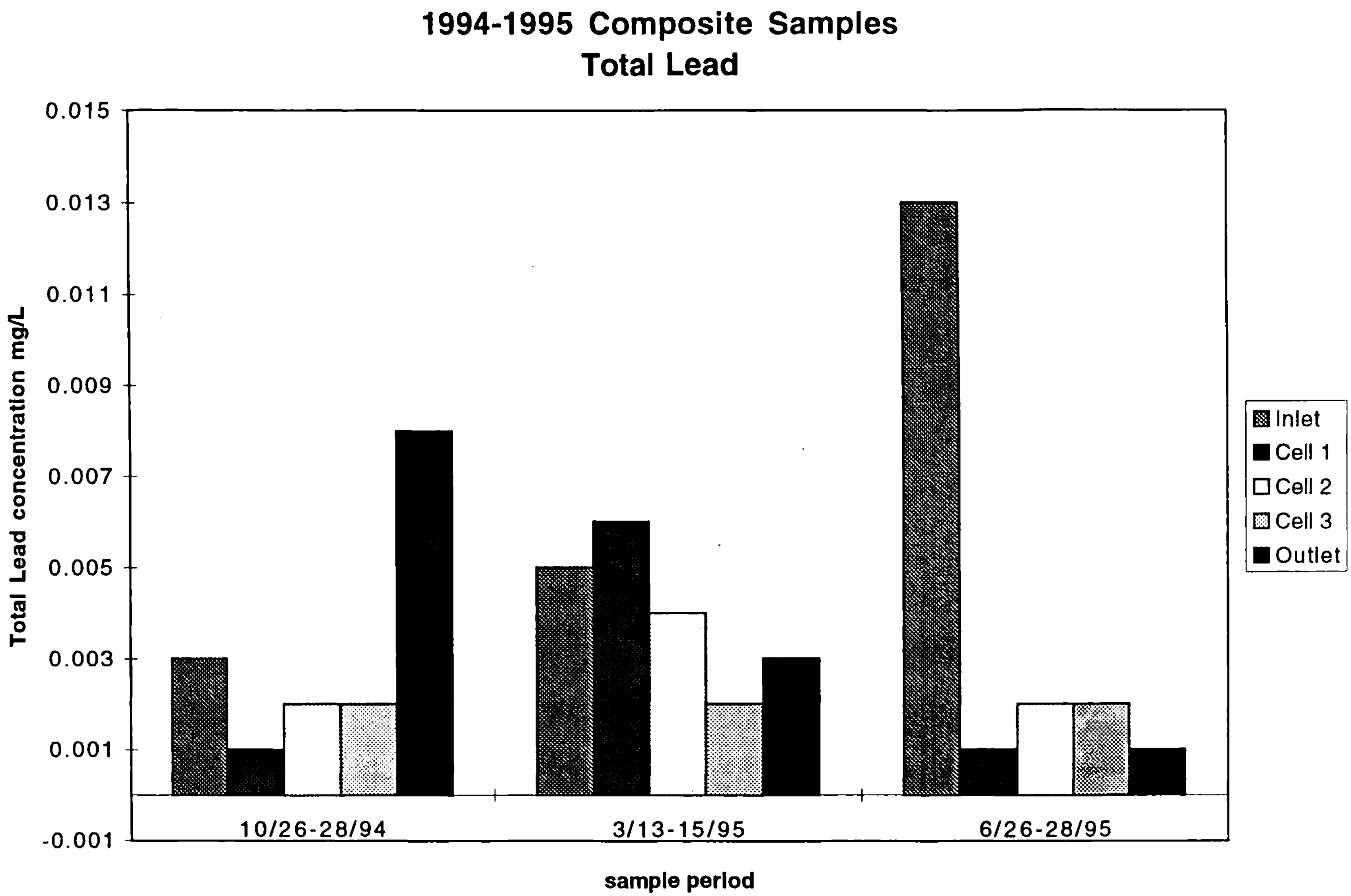

1994-1995 Composite Samples
Total Lead
Total Lead concentration mg/L
0.015
0.013
0.011
0.009
0.007
0.005
0.003
0.001
-0.001
10/26-28/94
3/13-15/95
6/26-28/95
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 105

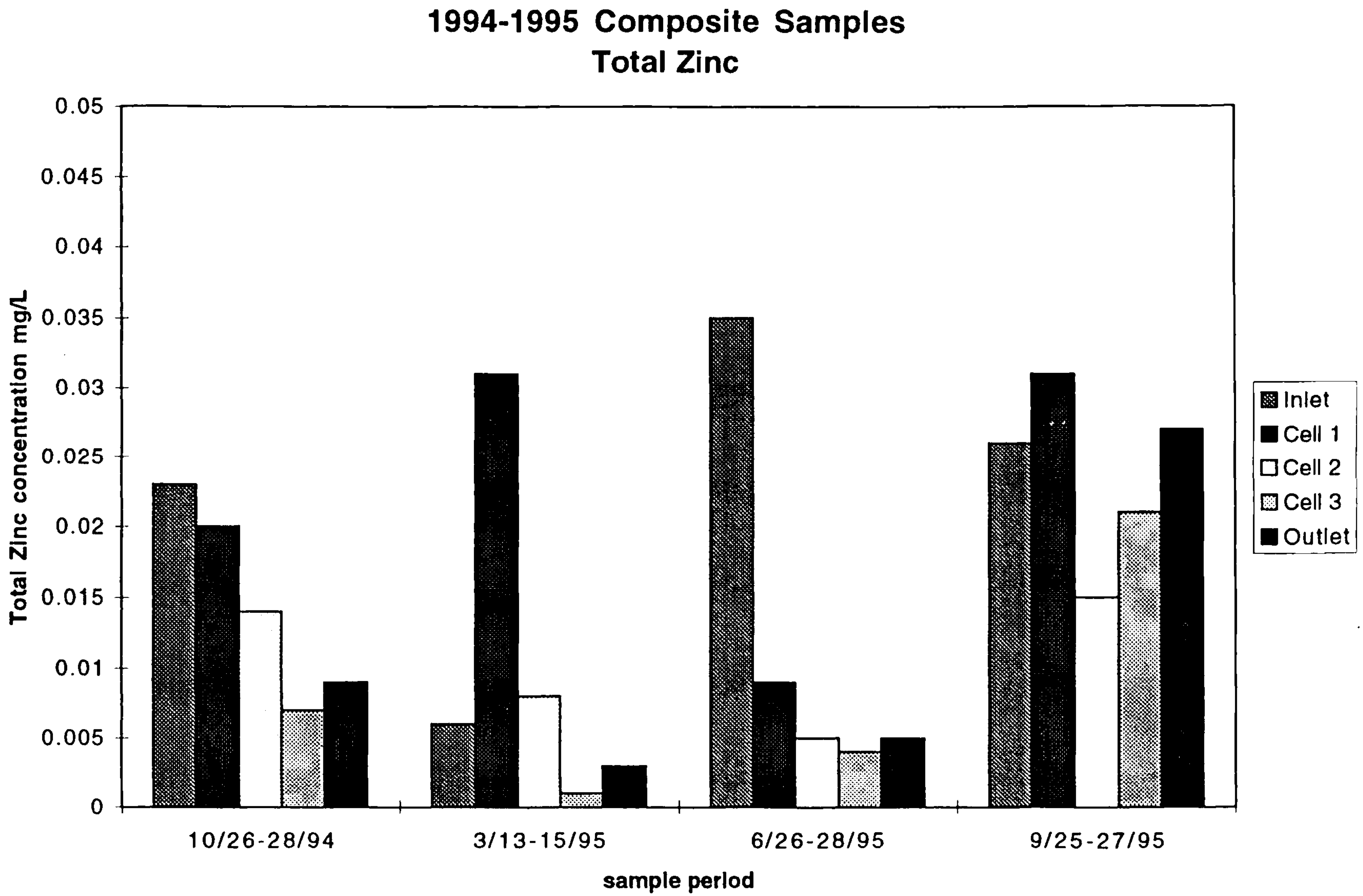
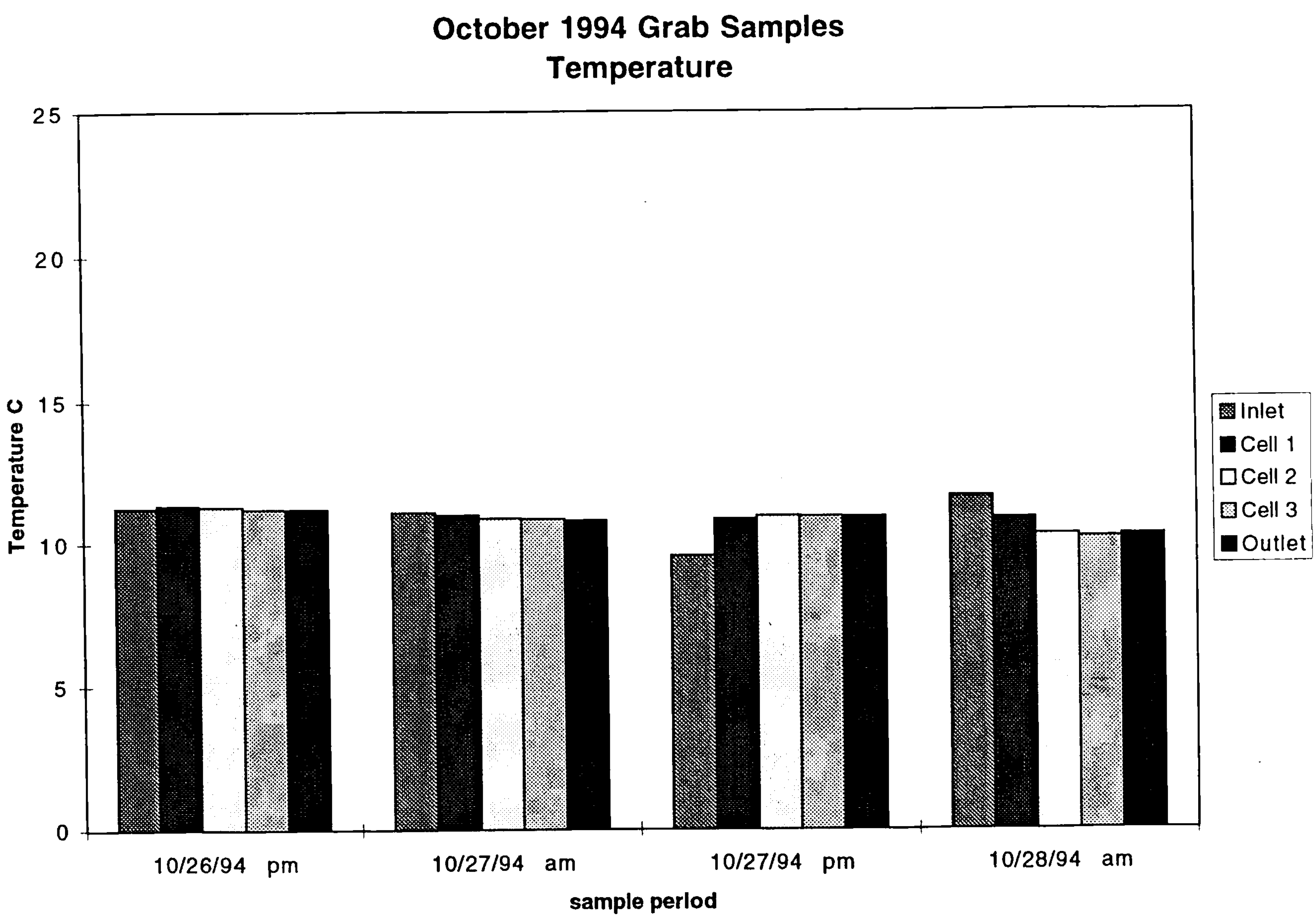

1994-1995 Composite Samples
Total Zinc
Total Zinc concentration mg/L
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
10/26-28/94
3/13-15/95
6/26-28/95
9/25-27/95
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 106



October 1994 Grab Samples
Temperature
Temperature C
25
20
15
10
5
0
10/26/94 pm
10/27/94 am
10/27/94 pm
10/28/94 am
sample perlod
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 107

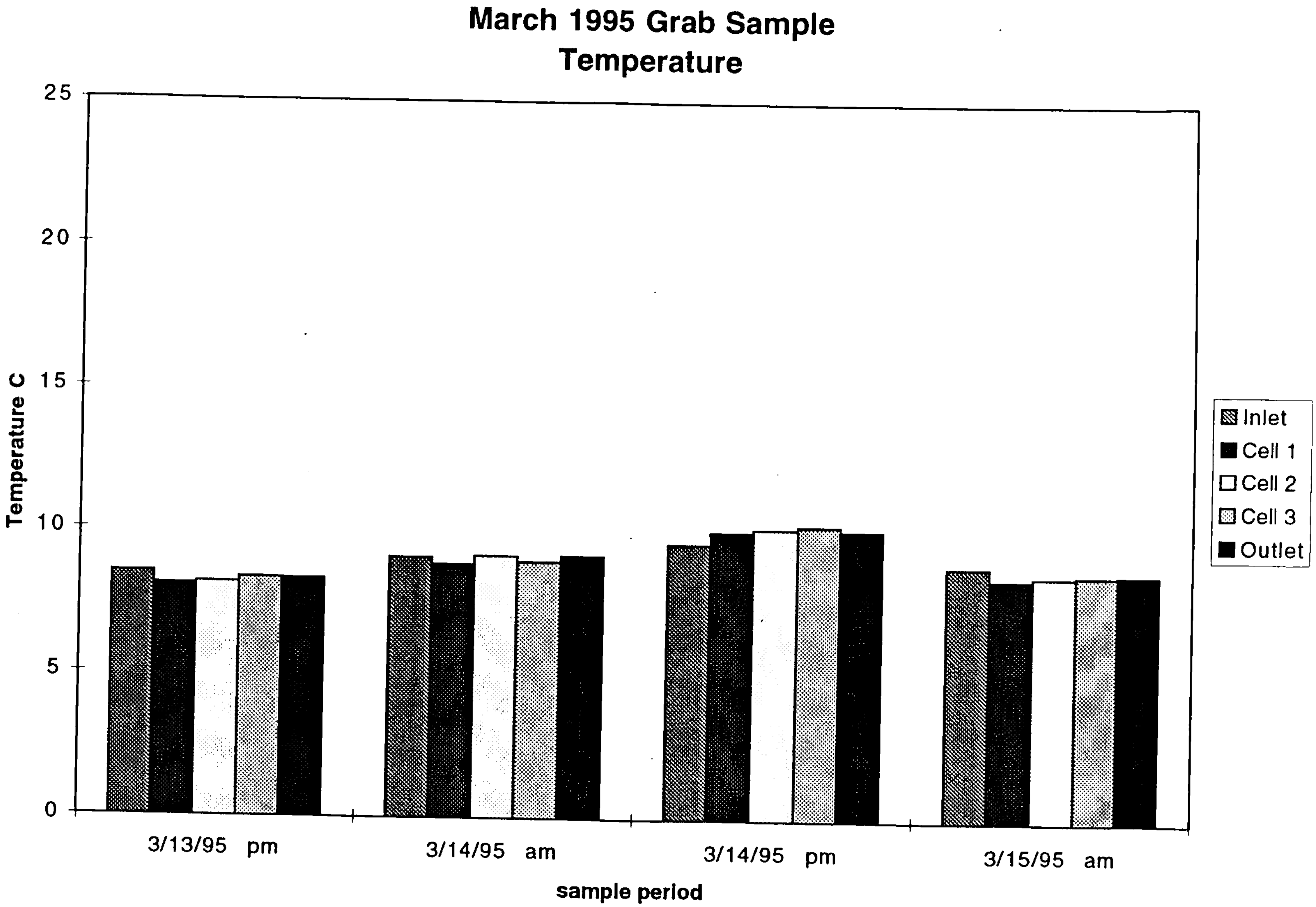

March 1995 Grab Sample
Temperature
Temperature C
25
20
15
10
5
0
3/13/95 pm
3/14/95 am
3/14/95 pm
3/15/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 108

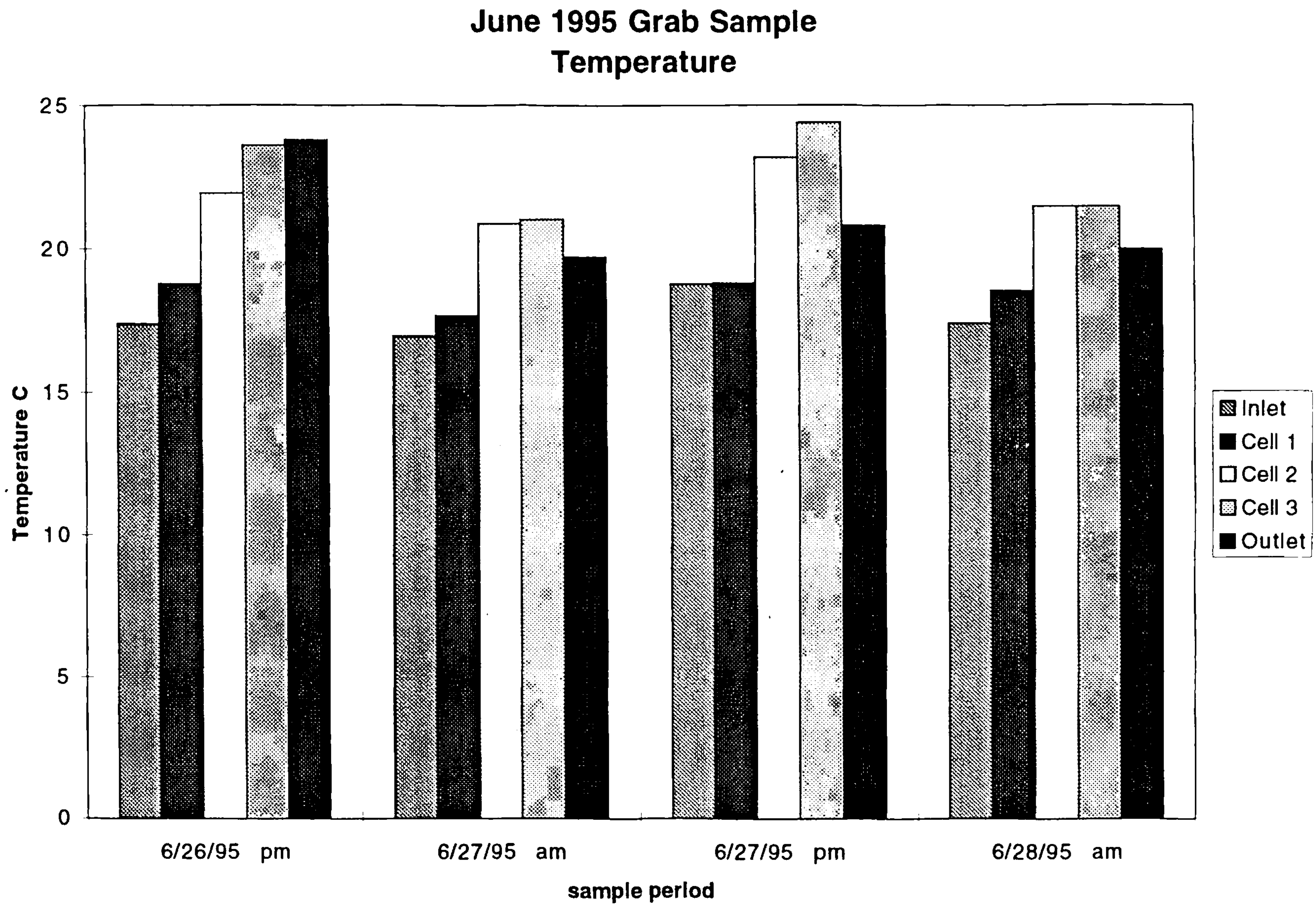

June 1995 Grab Sample
Temperature
Temperature C
25
20
15
10
5
0
6/26/95 pm
6/27/95 am
6/27/95 pm
6/28/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 109

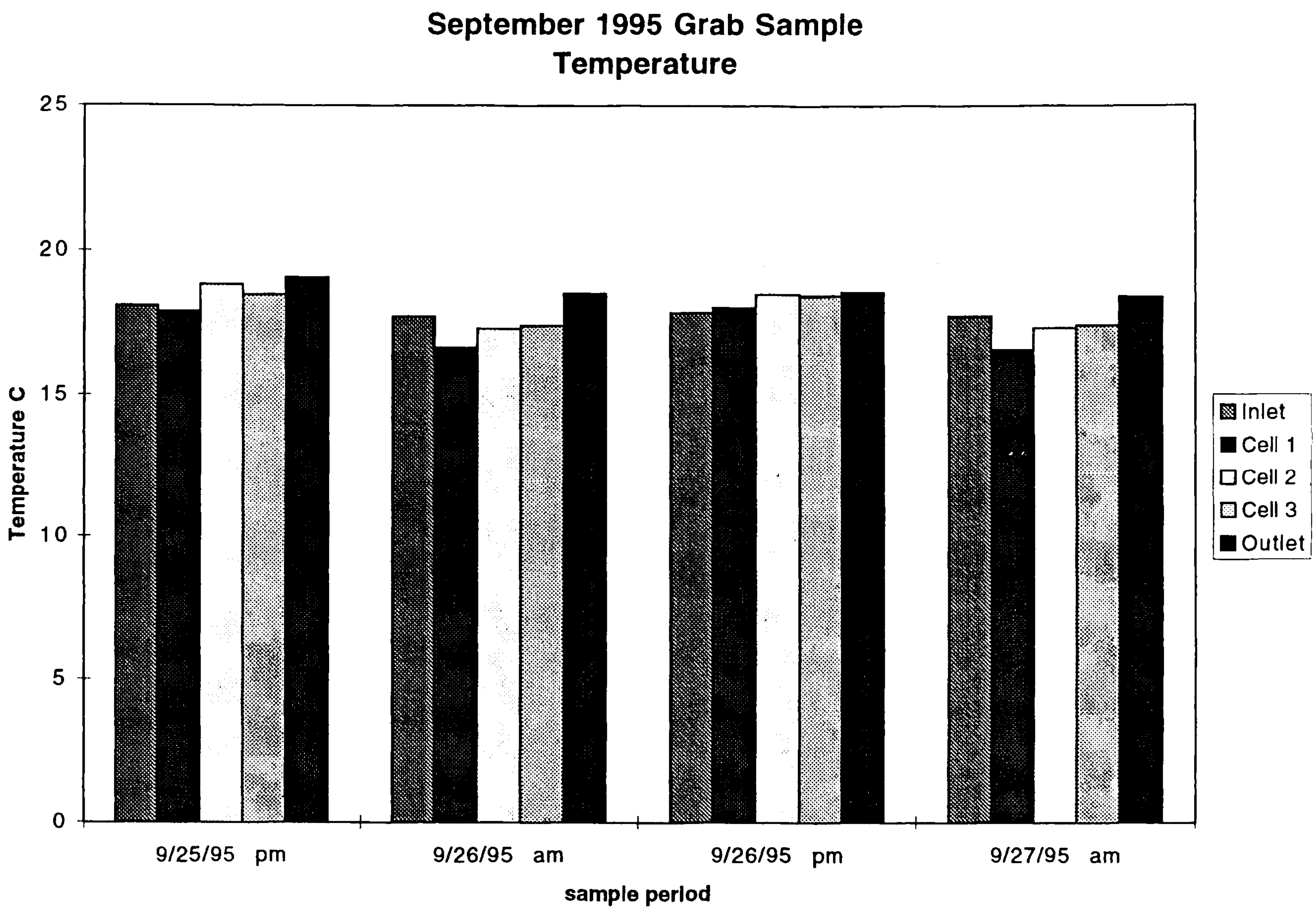

September 1995 Grab Sample
Temperature
Temperature C
25
20
15
10
5
0
9/25/95 pm
9/26/95 am
9/26/95 pm
9/27/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 110

October 1994 Grab Sample
Dissolved Oxygen

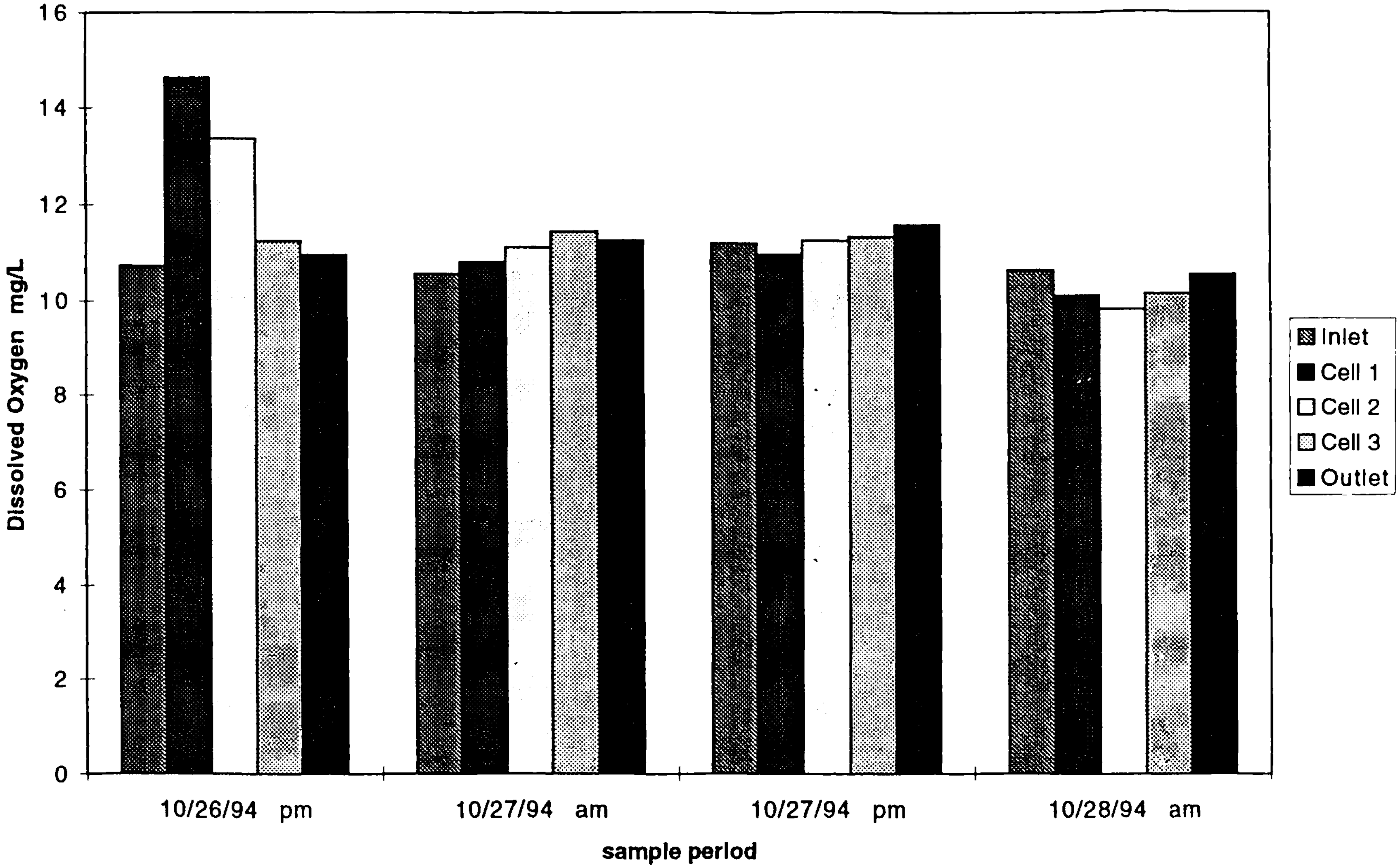
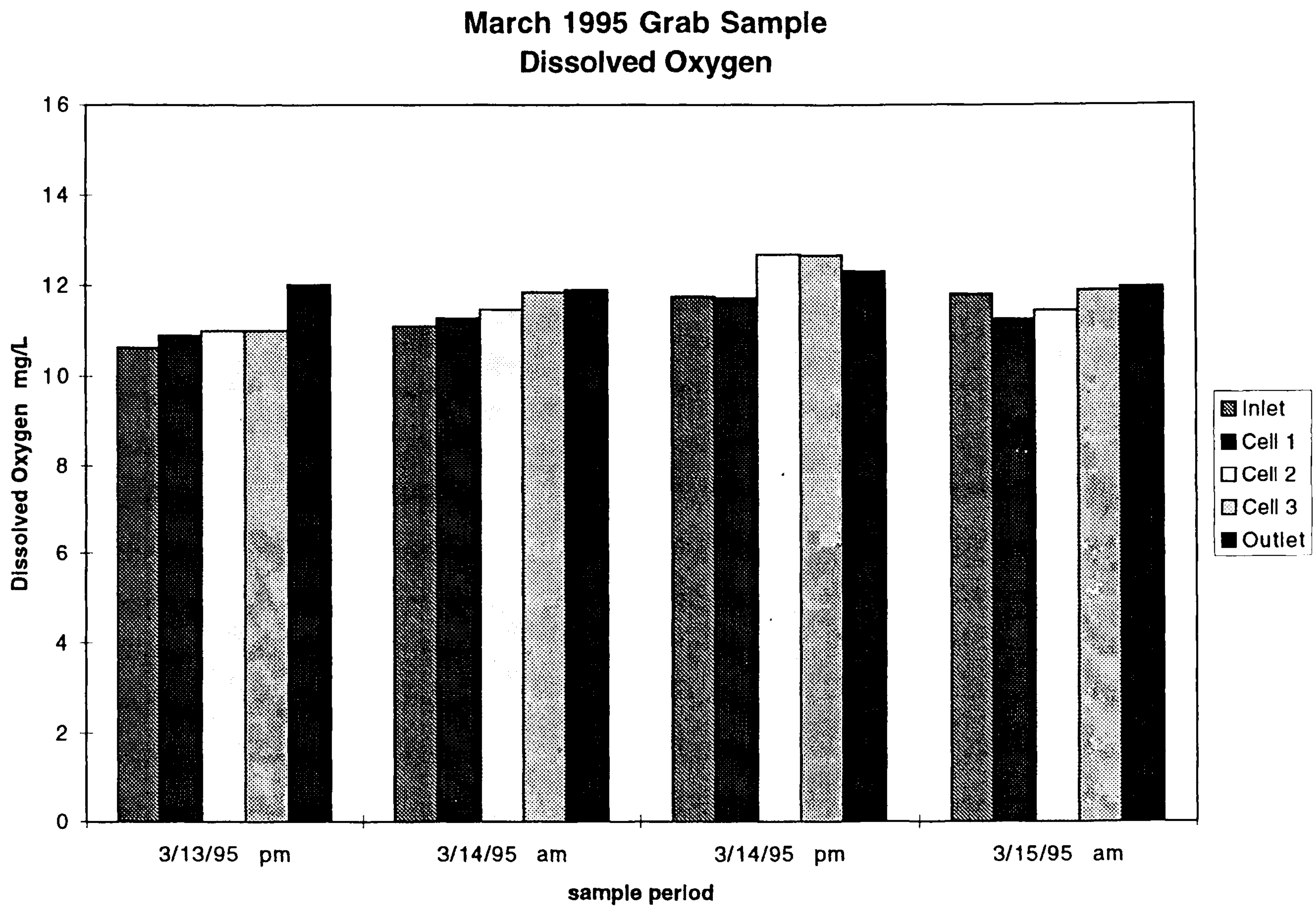


Figure 111



March 1995 Grab Sample
Dissolved Oxygen
Dissolved Oxygen mg/L
16
14
12
10
8
6
4
2
0
3/13/95 pm
3/14/95 am
3/14/95 pm
3/15/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 112

June 1995 Grab Sample
Dissolved Oxygen

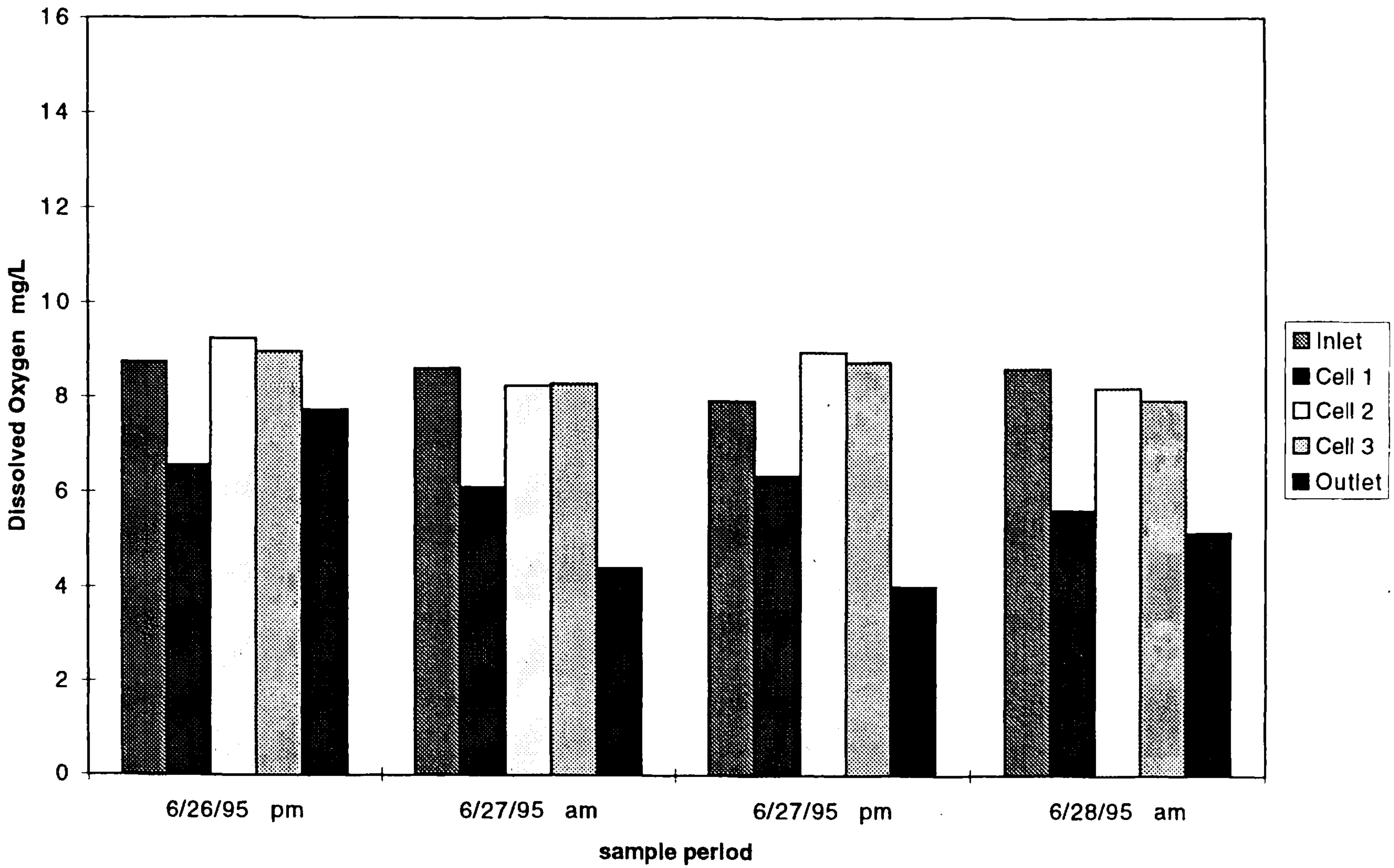


Figure 113

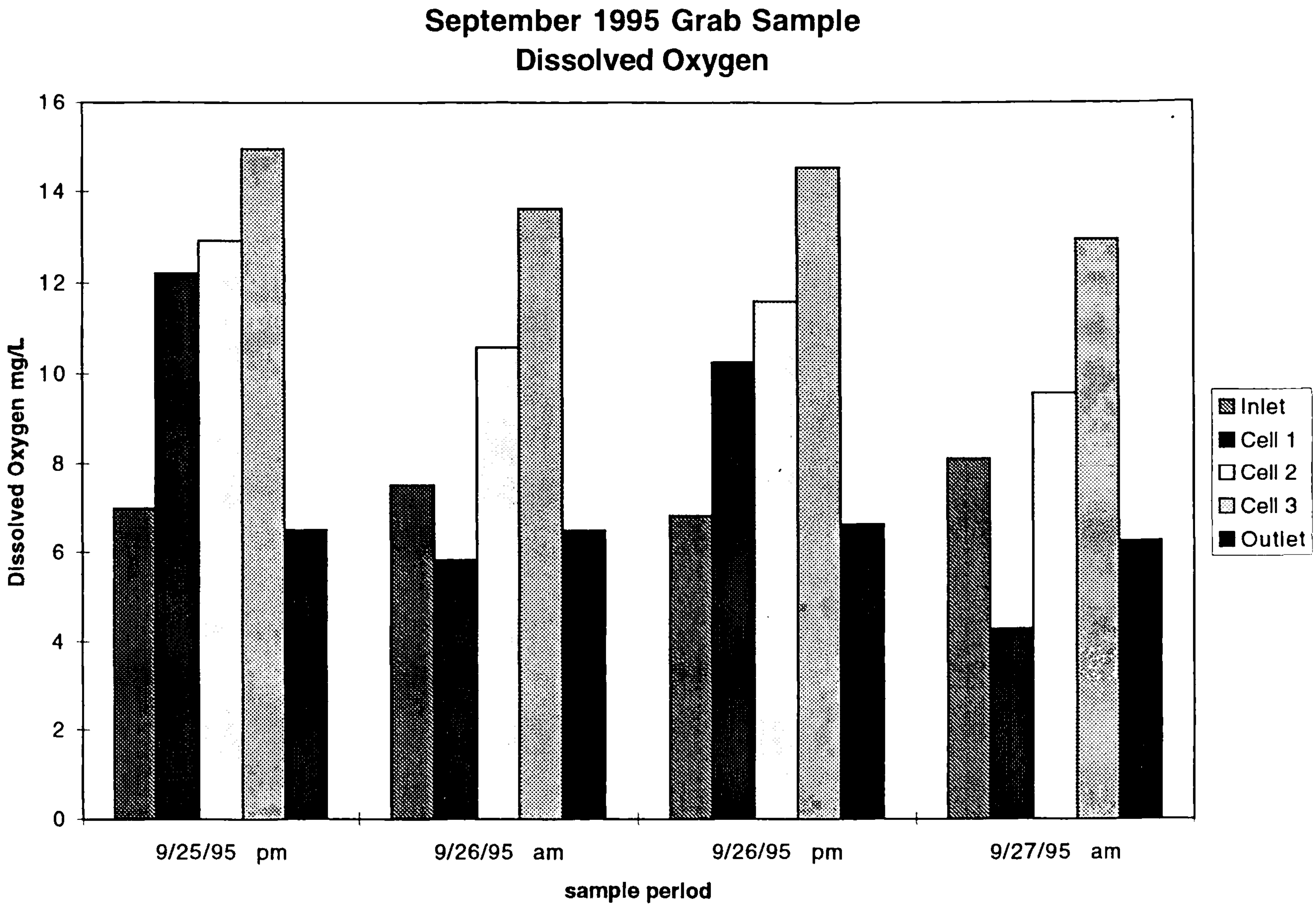
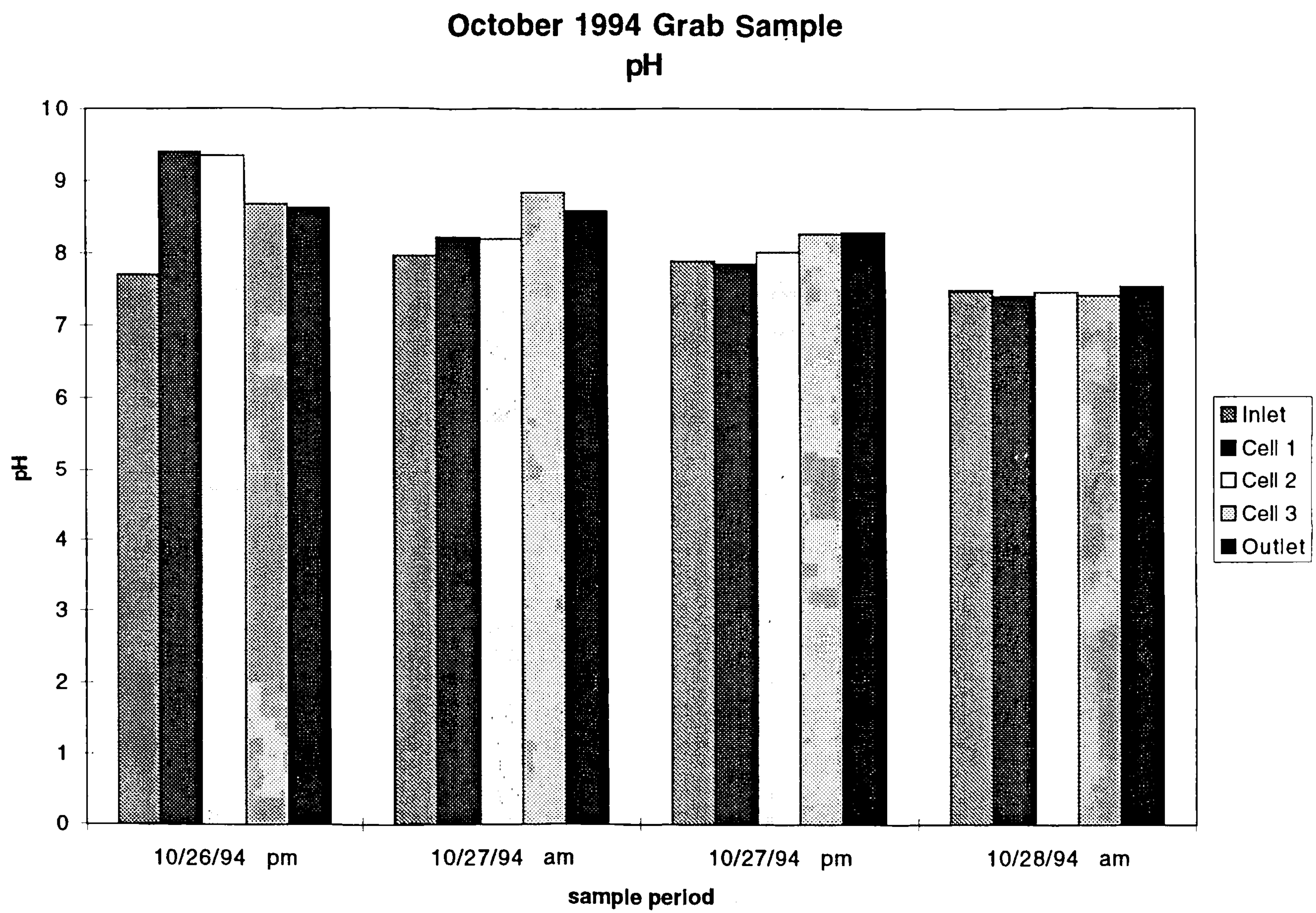

September 1995 Grab Sample
Dissolved Oxygen
Dissolved Oxygen mg/L
16
14
12
10
8
6
4
2
0
9/25/95 pm
9/26/95 am
9/26/95 pm
9/27/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 114



October 1994 Grab Sample
pH
10
9
8
7
6
5
4
3
2
1
0
pH
10/26/94 pm
10/27/94 am
10/27/94 pm
10/28/94 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 115

March 1995 Grab Sample
pH

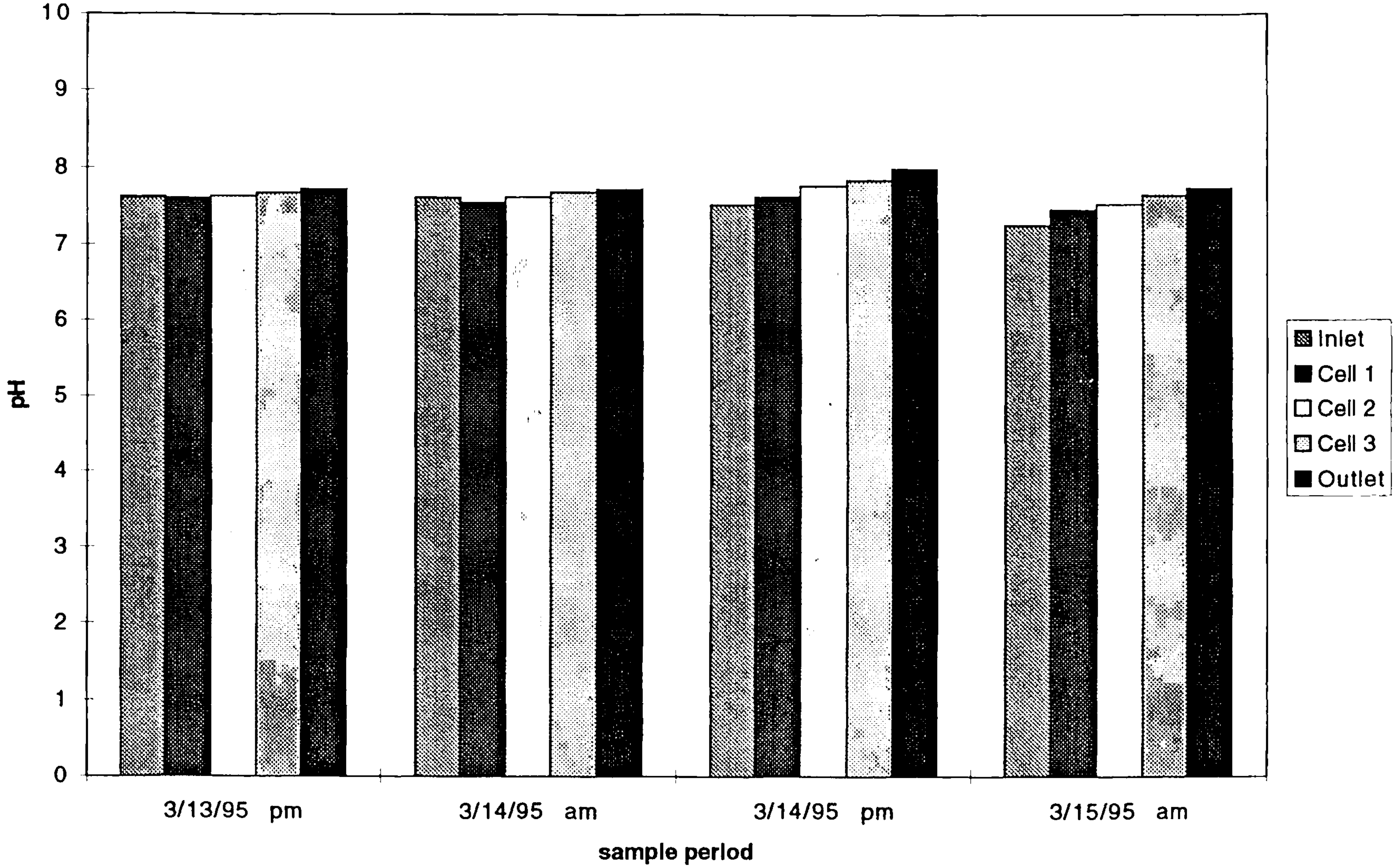


Figure 116

June 1995 Grab Sample
pH

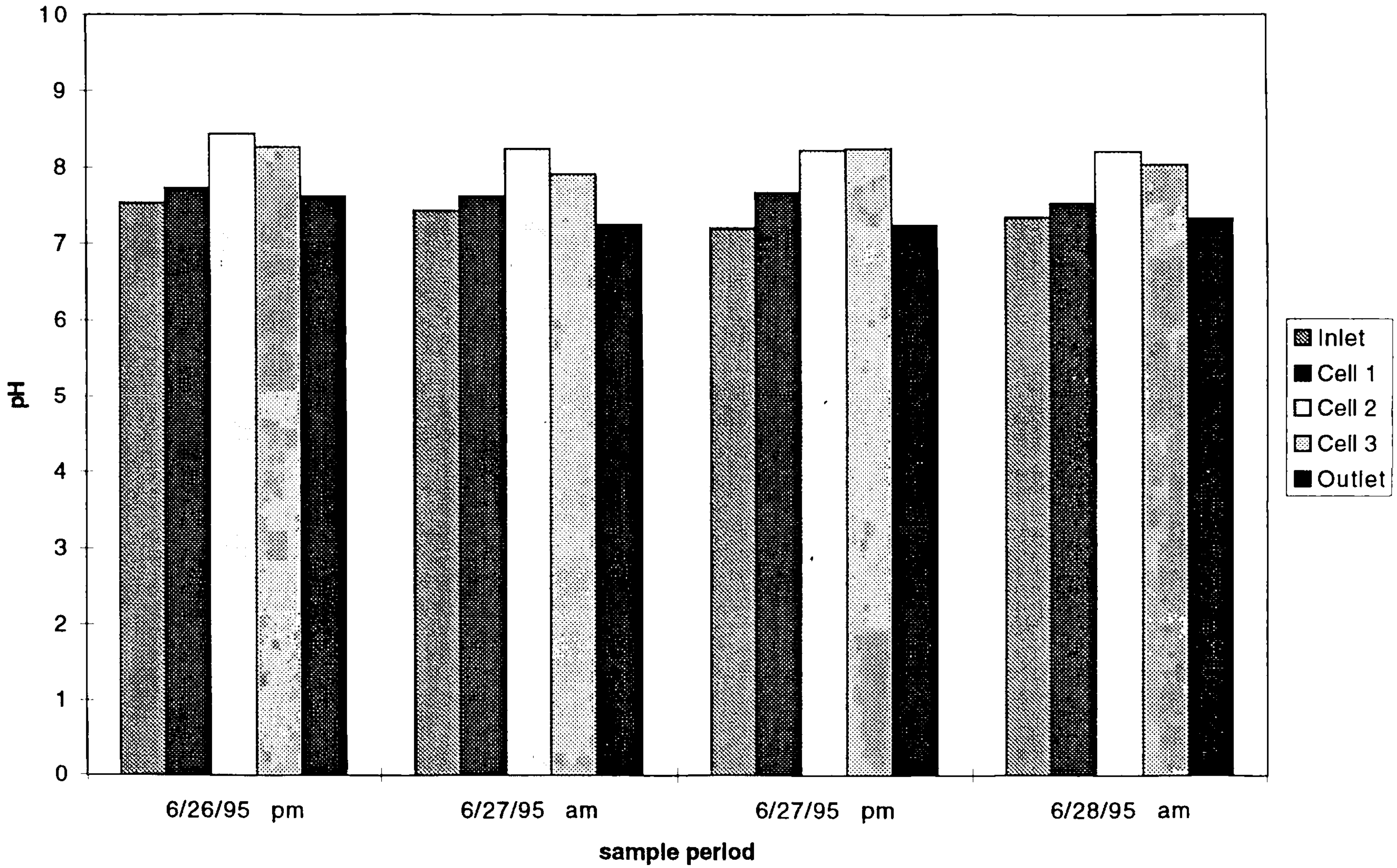


Figure 117

September 1995 Grab Sample

pH

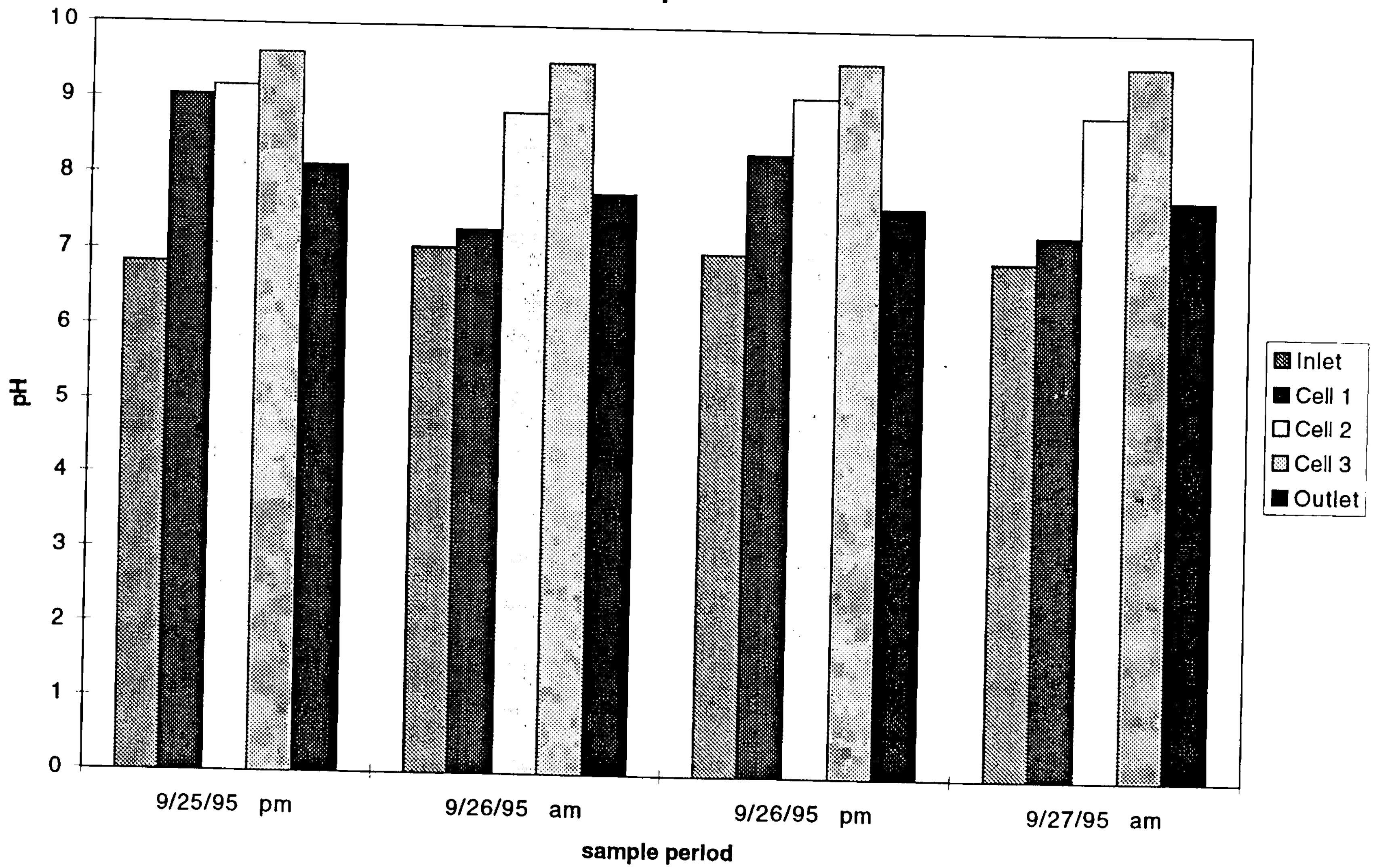


Figure 118

October 1994 Grab Sample Conductivity

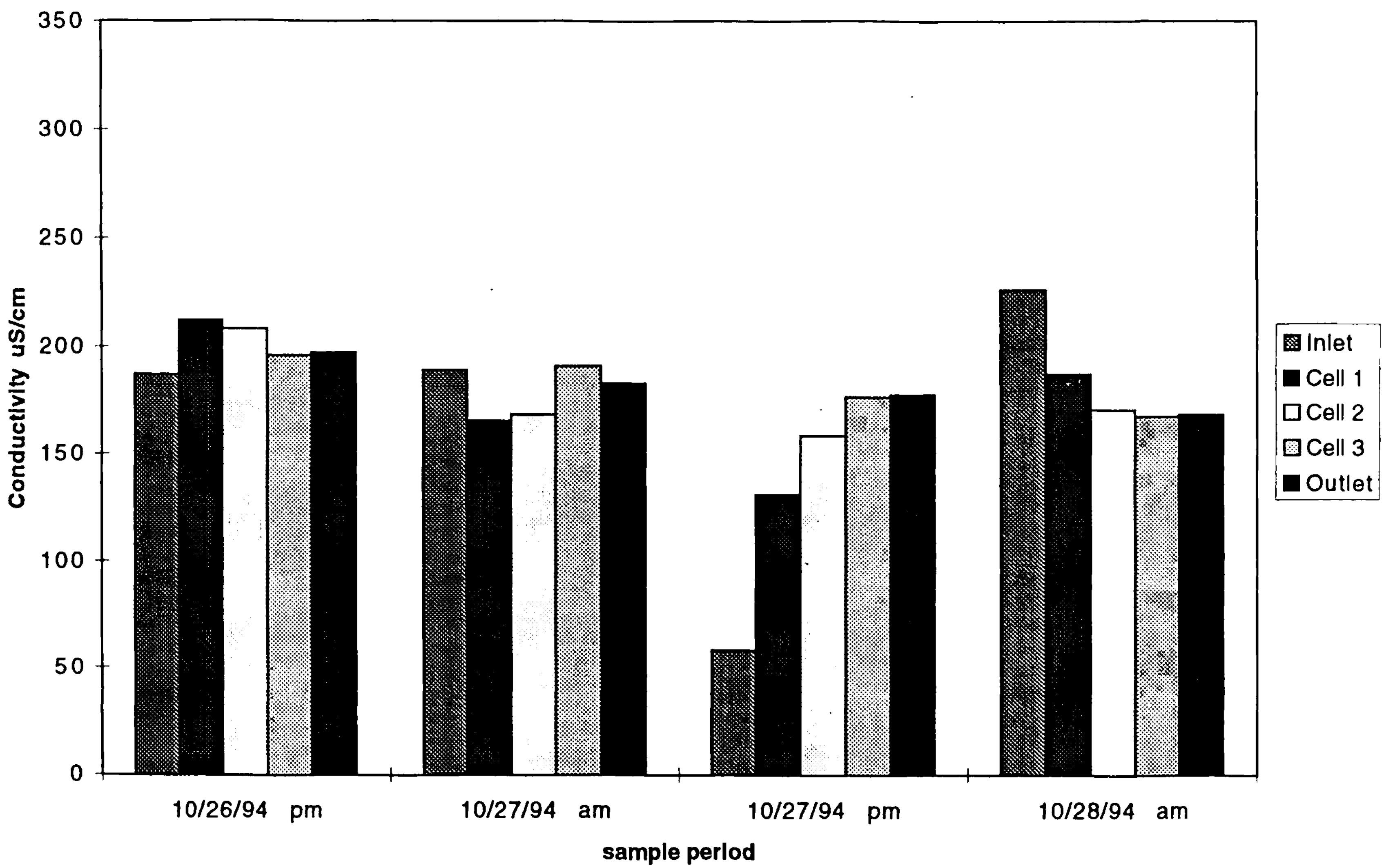


Figure 119

March 1995 Grab Sample Conductivity

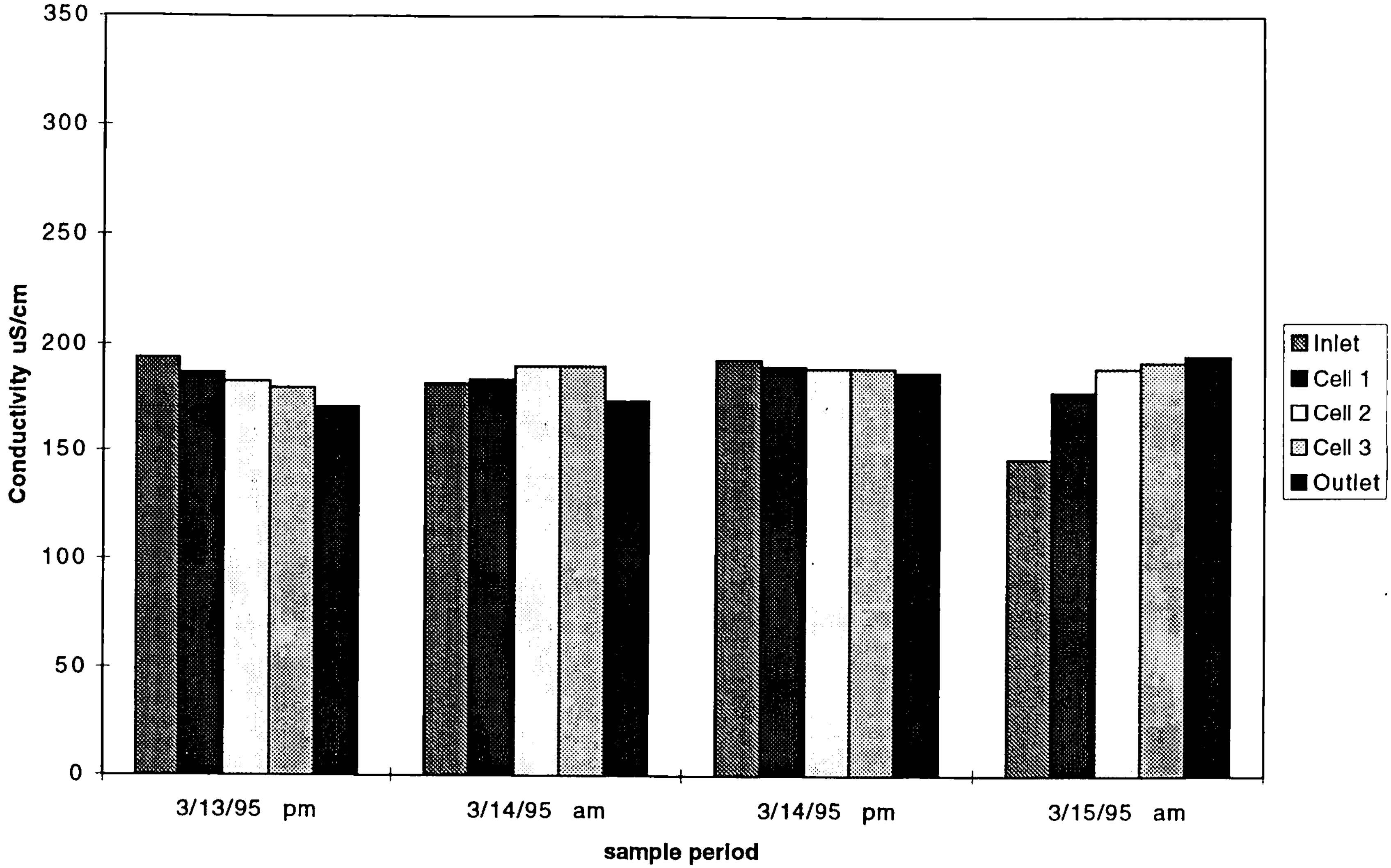


Figure 120

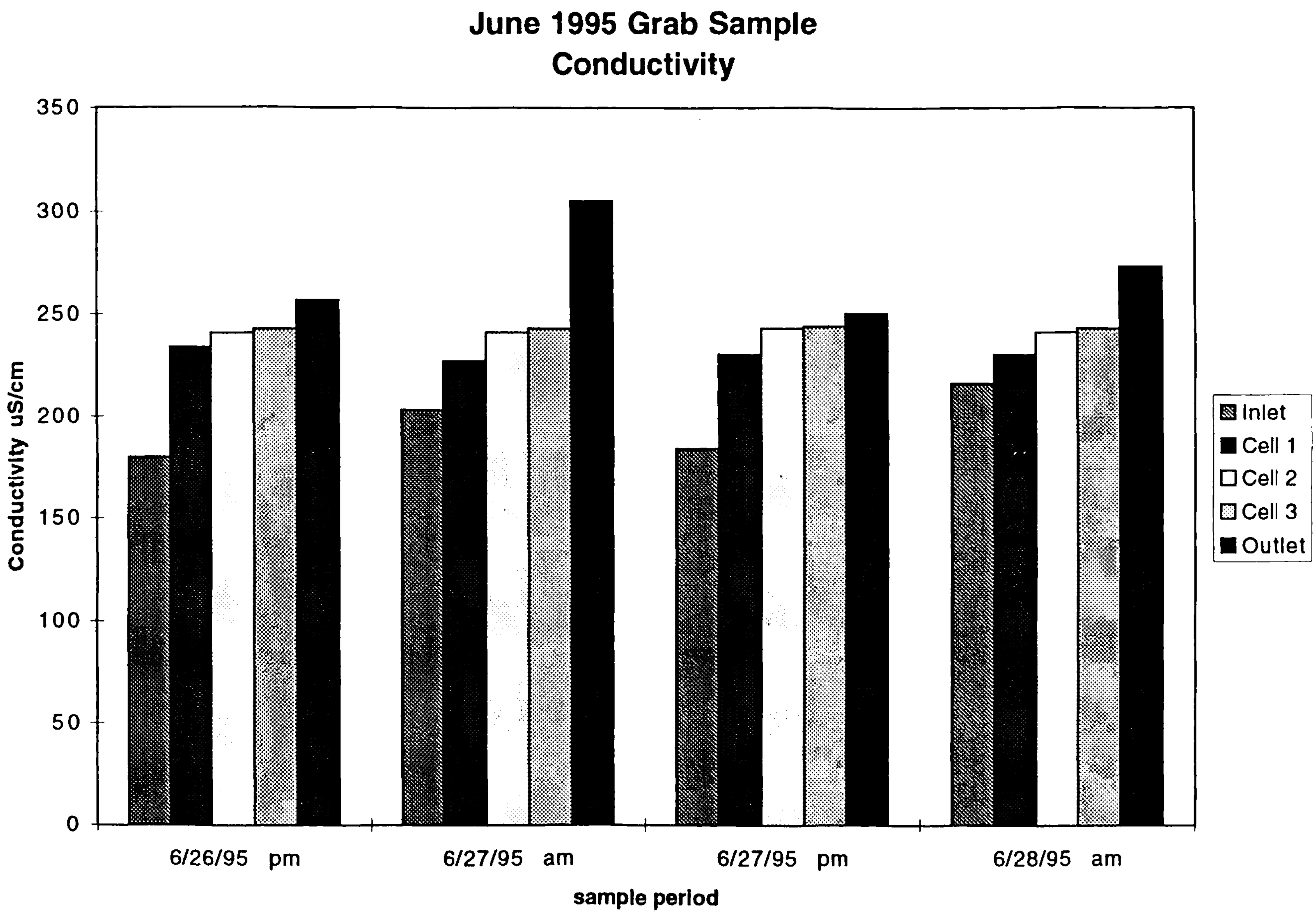

June 1995 Grab Sample
Conductivity
Conductivity uS/cm
350
300
250
200
150
100
50
0
6/26/95 pm
6/27/95 am
6/27/95 pm
6/28/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 121

September 1995 Grab Sample Conductivity

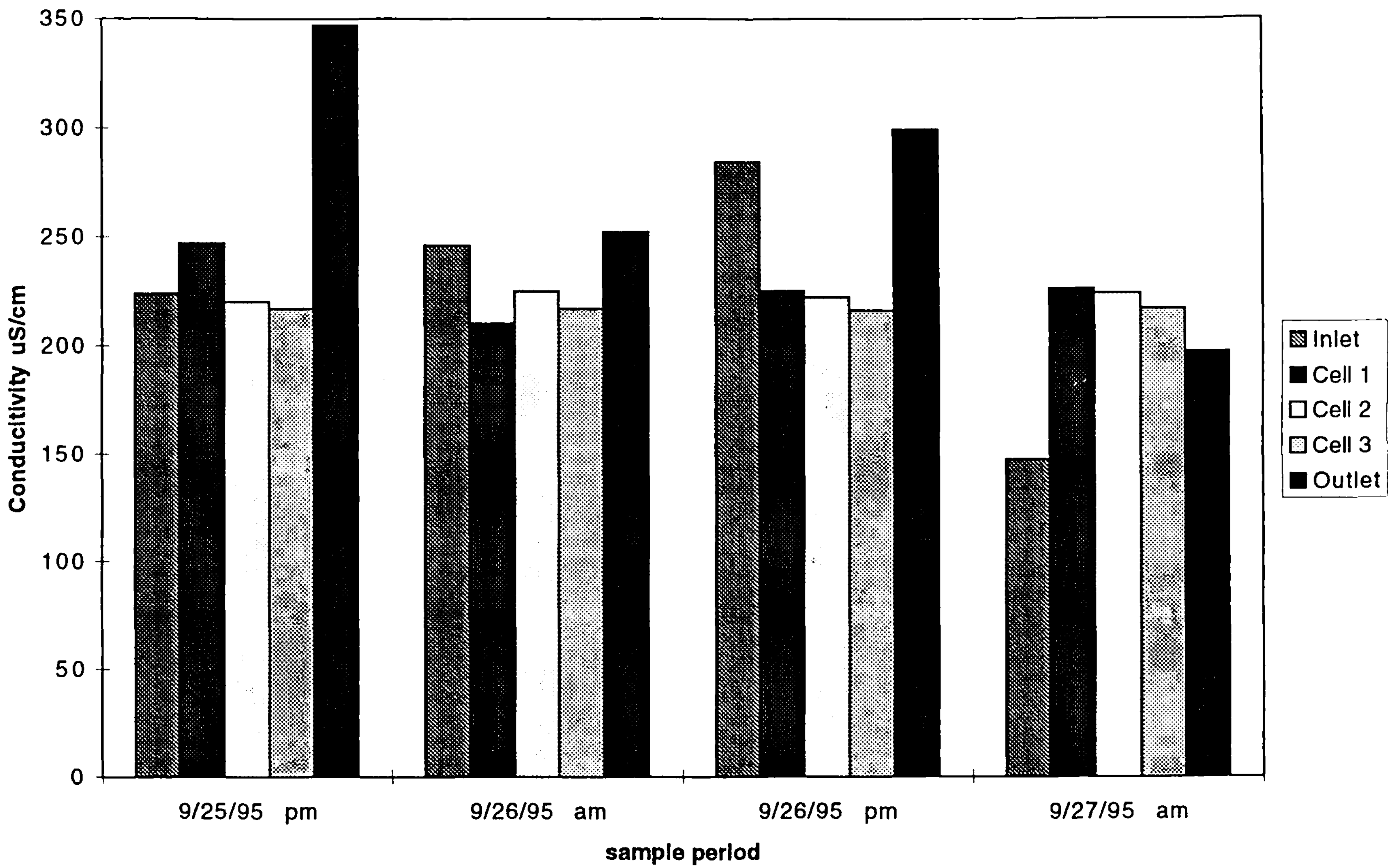


Figure 122

October 1994 Grab Sample
Total Suspended Solids

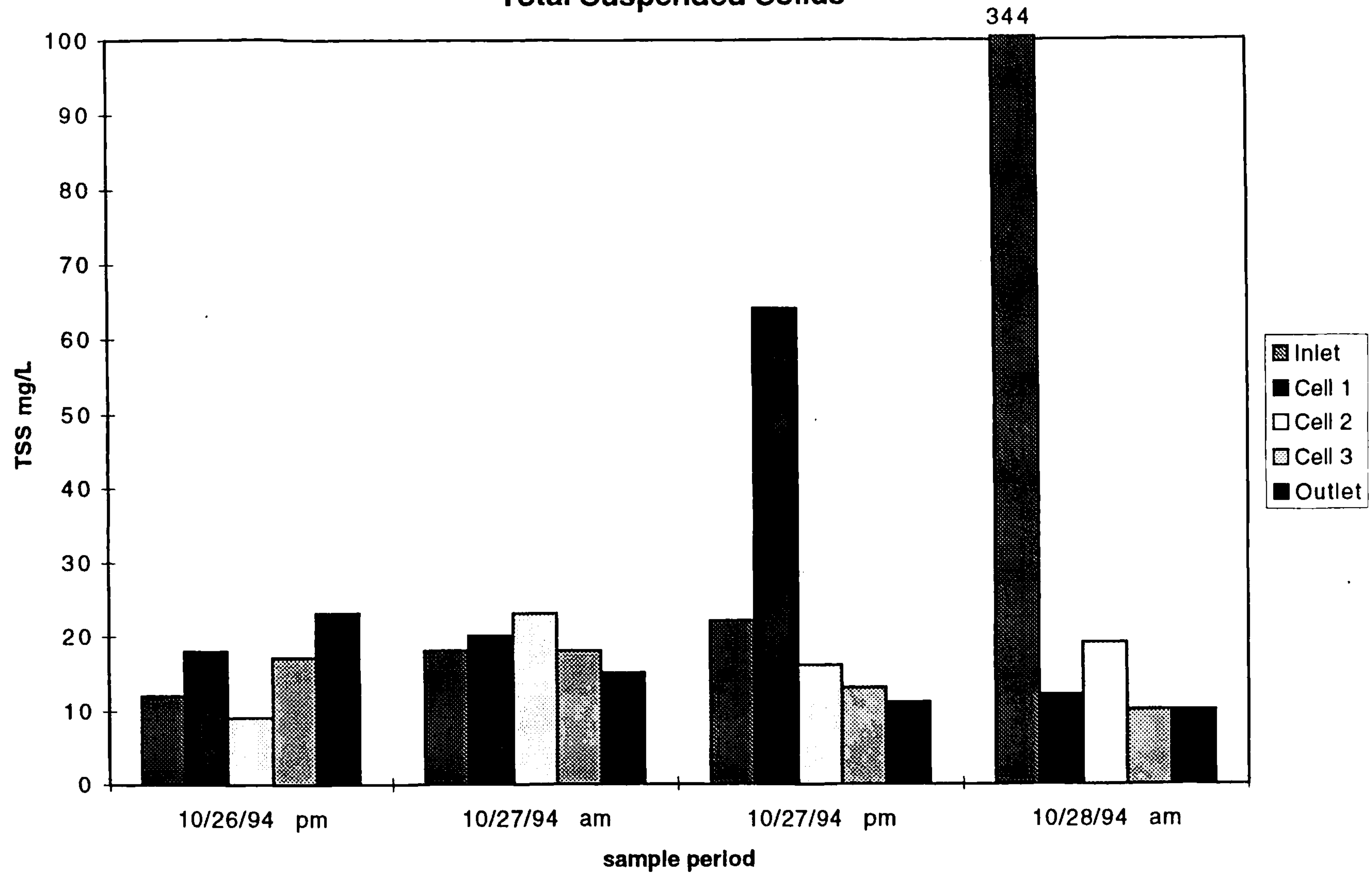


Figure 123

March 1995 Grab Sample Total Suspended Solids

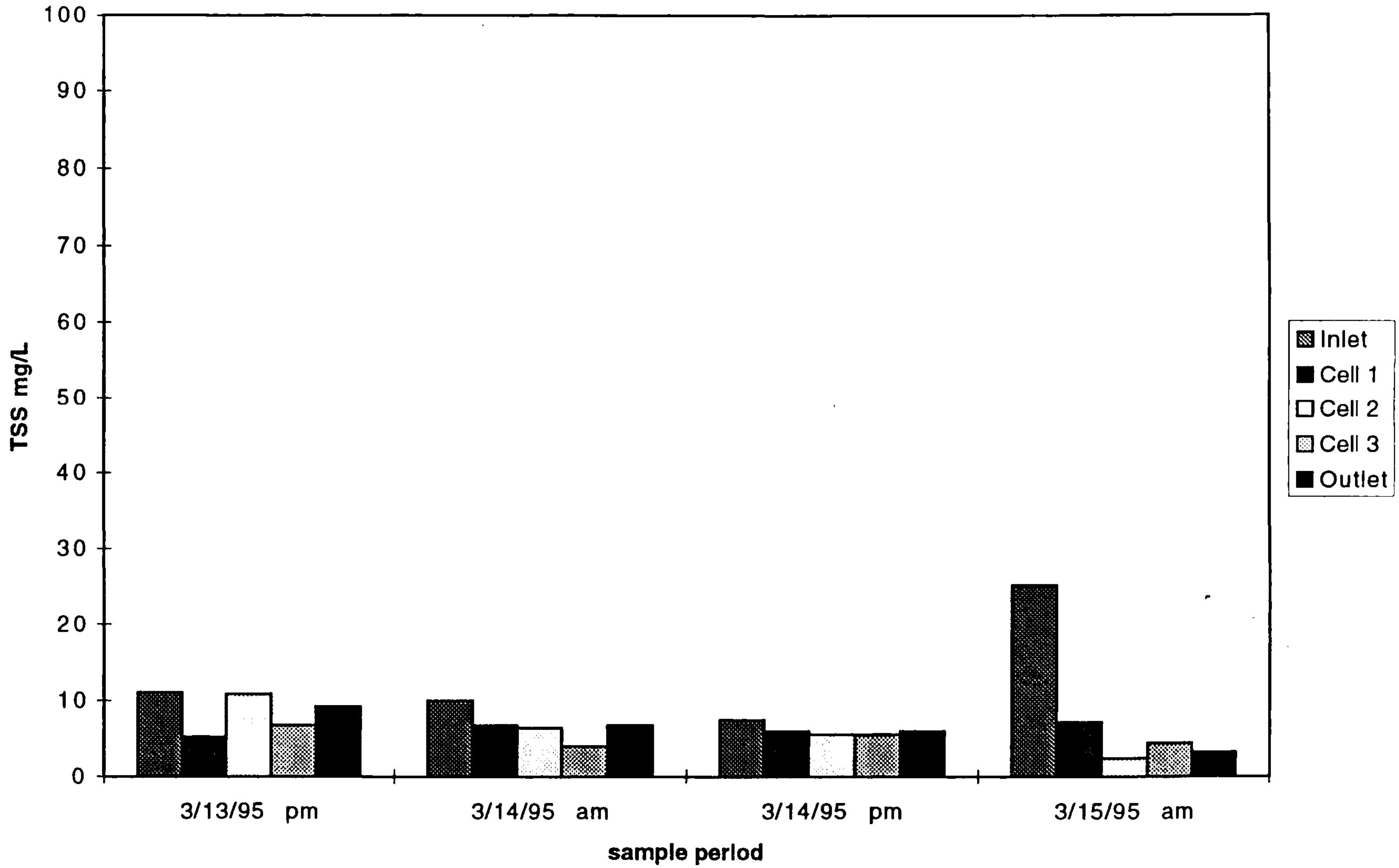


Figure 124

June 1995 Grab Sample
Total Suspended Solids

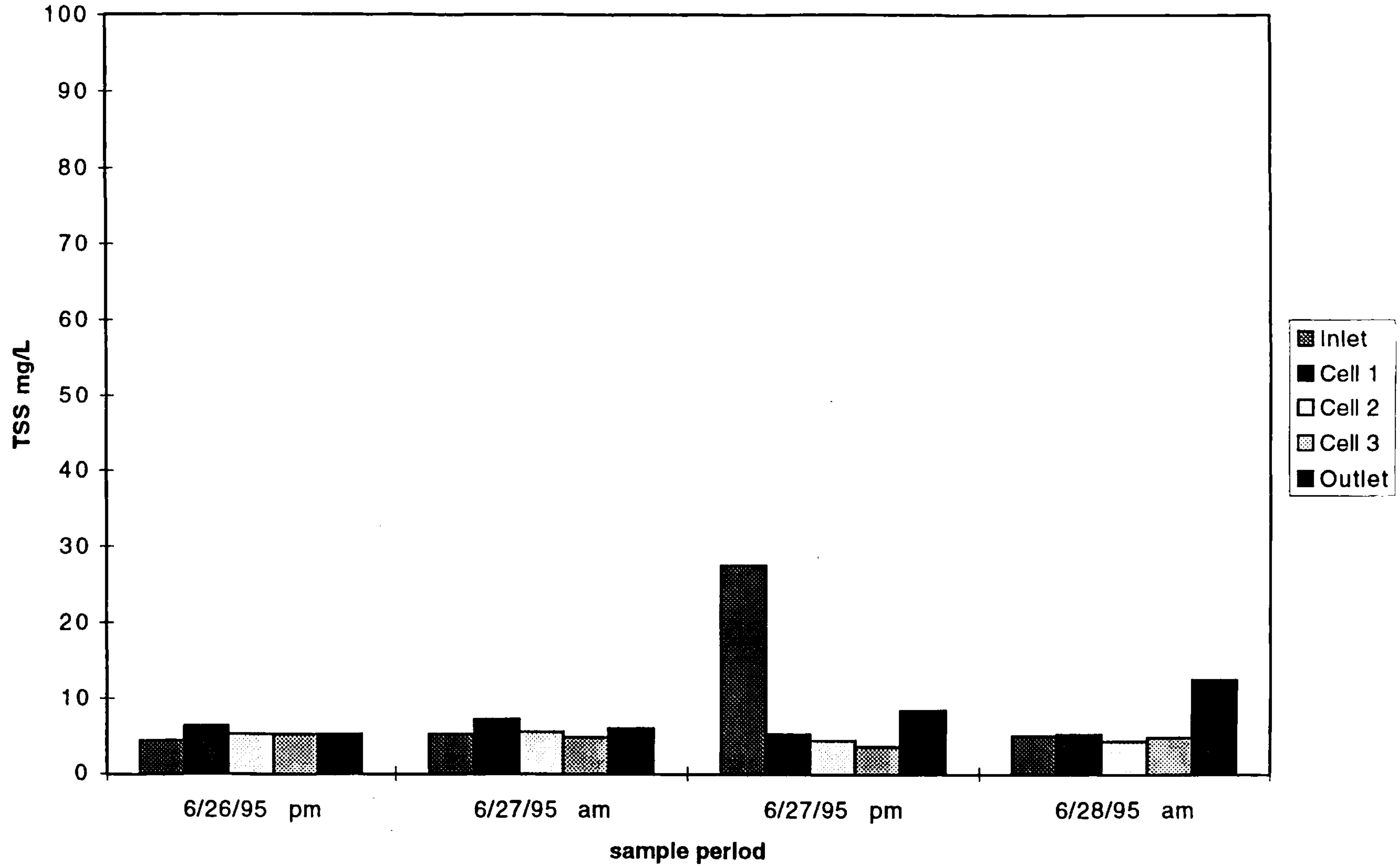


Figure 125
September 1995 Grab Sample
Total Suspended Solids

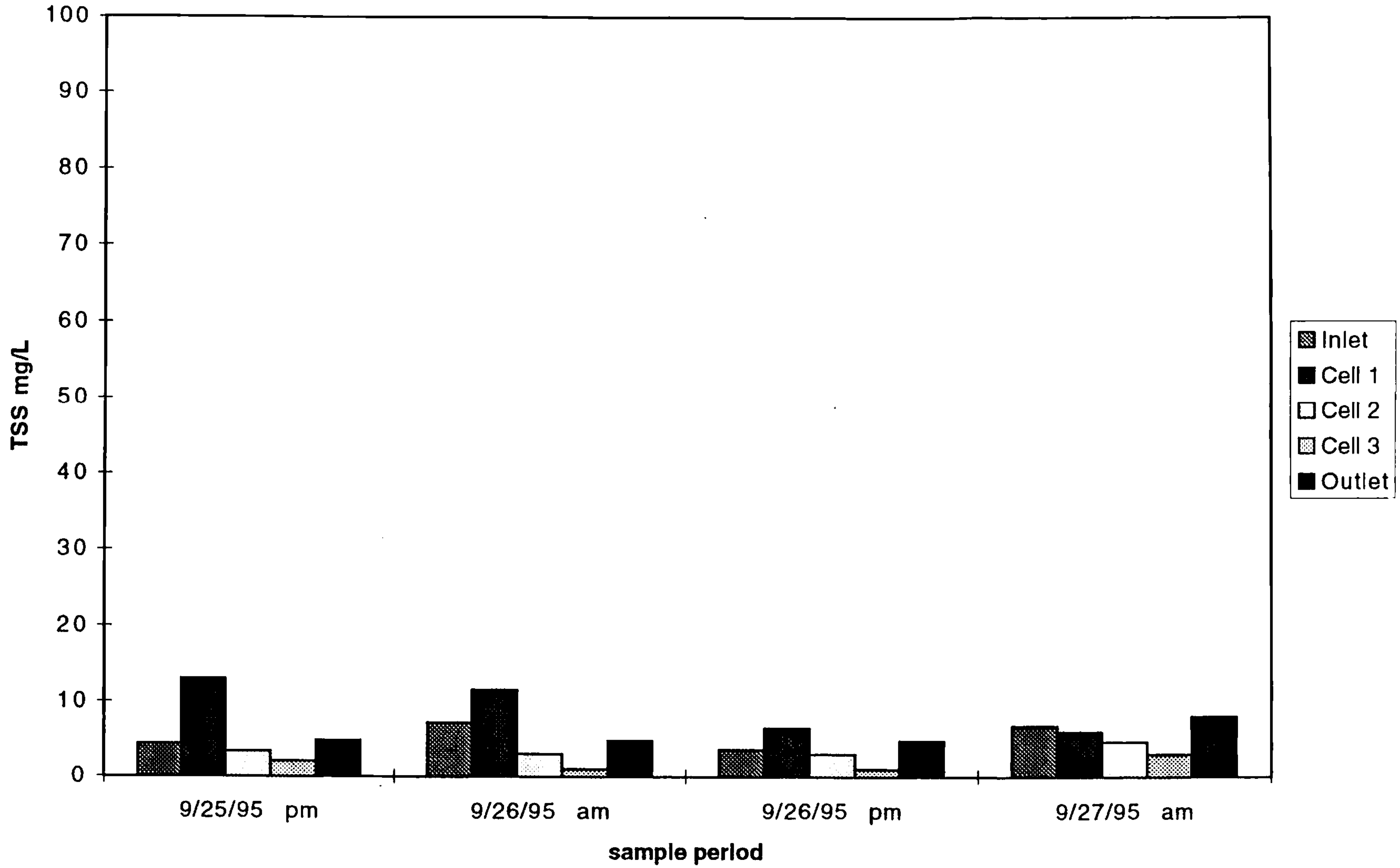


Figure 126

October 1994 Grab Sample
Total Coliforms

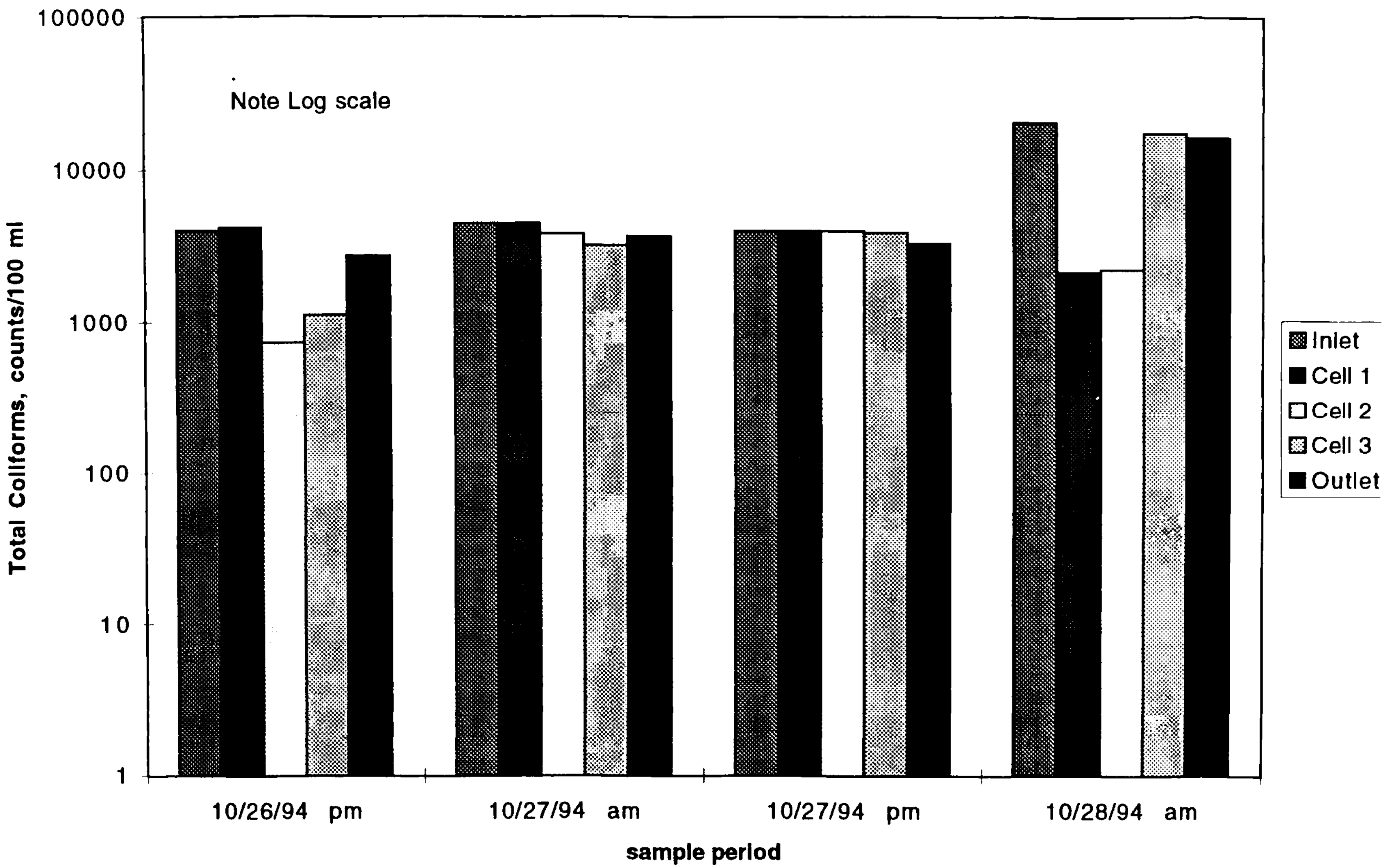


Figure 127

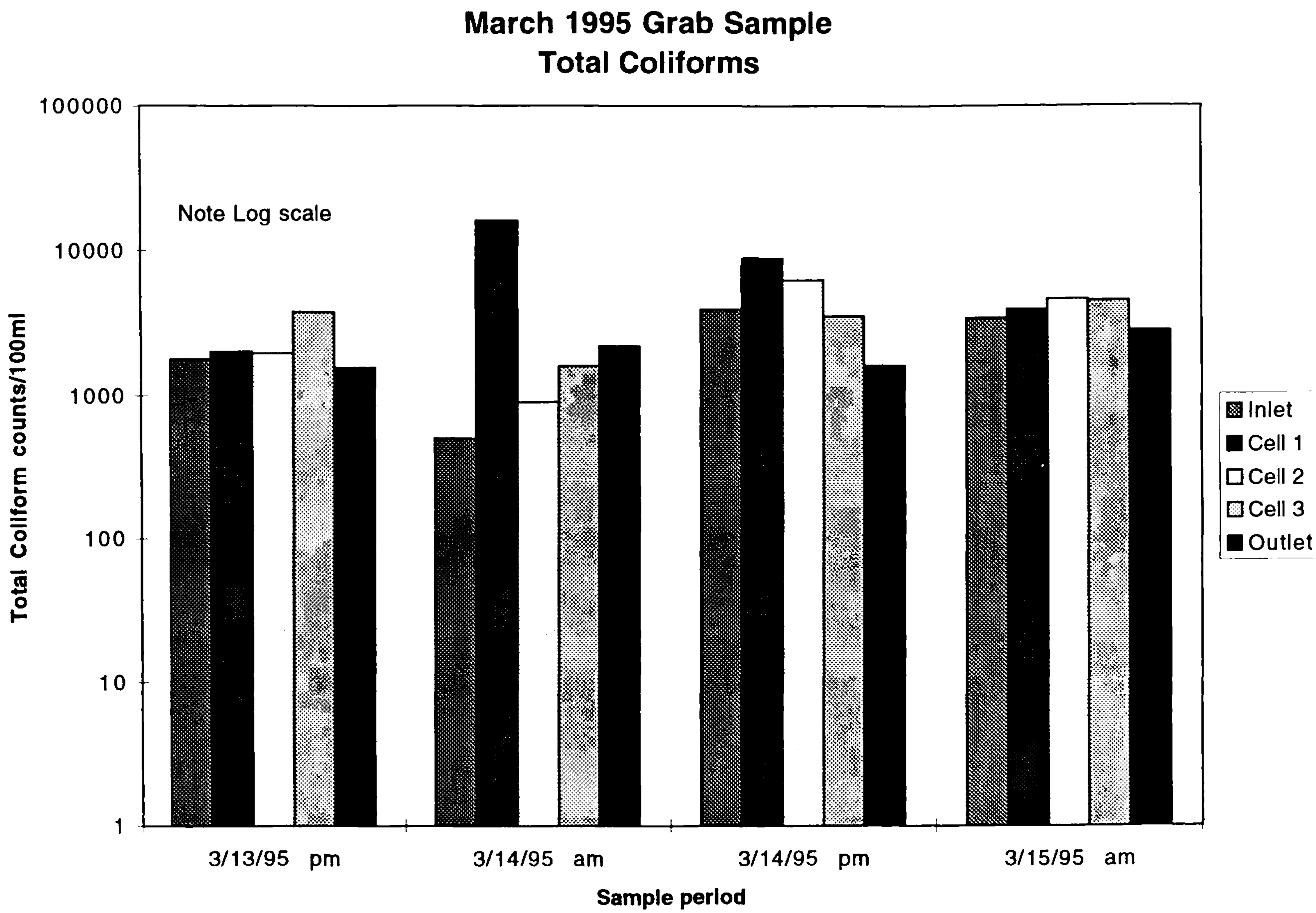
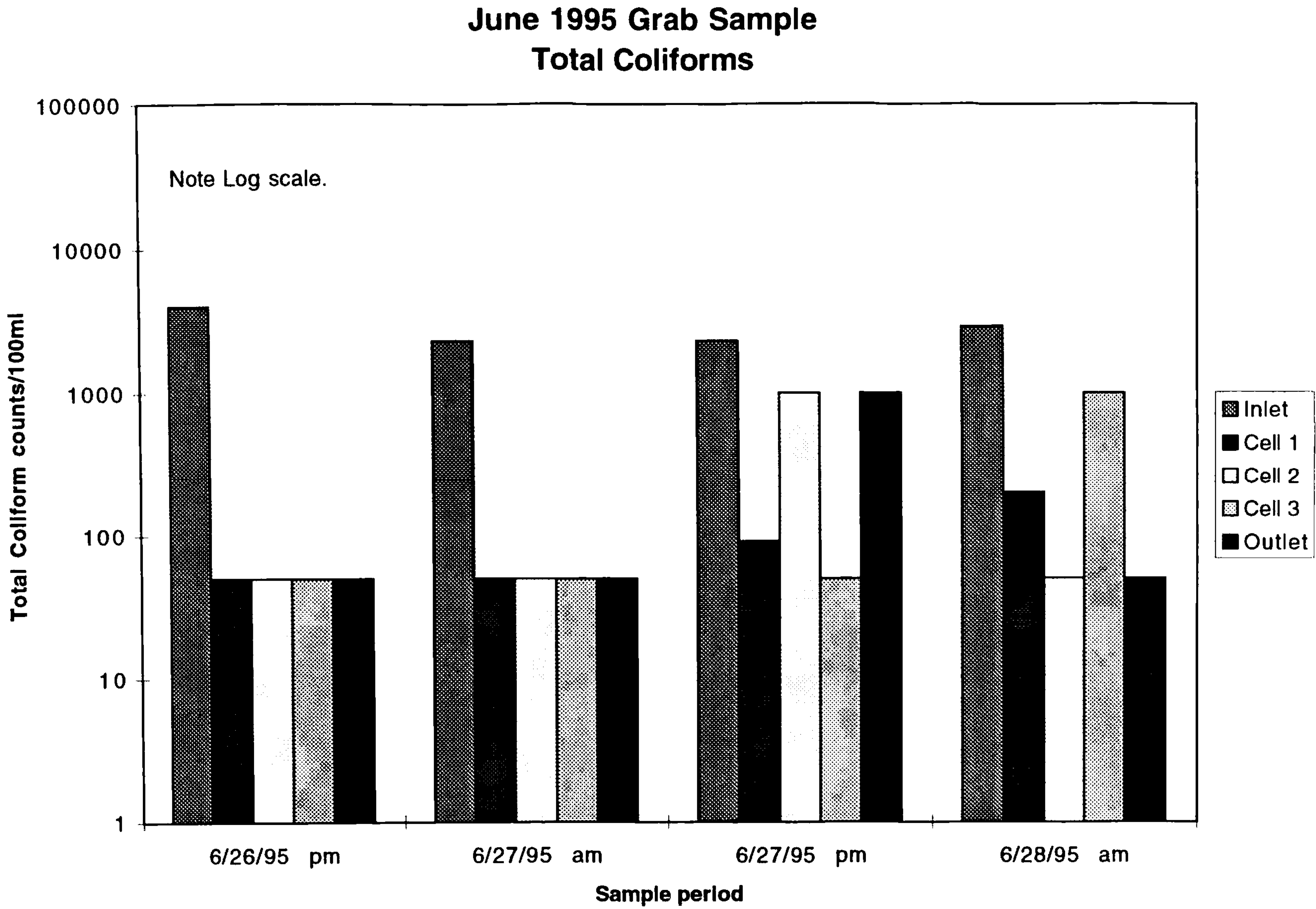

March 1995 Grab Sample
Total Coliforms
Note Log scale
100000
10000
1000
100
10
1
Total Coliform counts/100ml
3/13/95 pm
3/14/95 am
3/14/95 pm
3/15/95 am
Sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 128



June 1995 Grab Sample
Total Coliforms
Note Log scale.
100000
10000
1000
100
10
1
Total Coliform counts/100ml
6/26/95 pm
6/27/95 am
6/27/95 pm
6/28/95 am
Sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 129

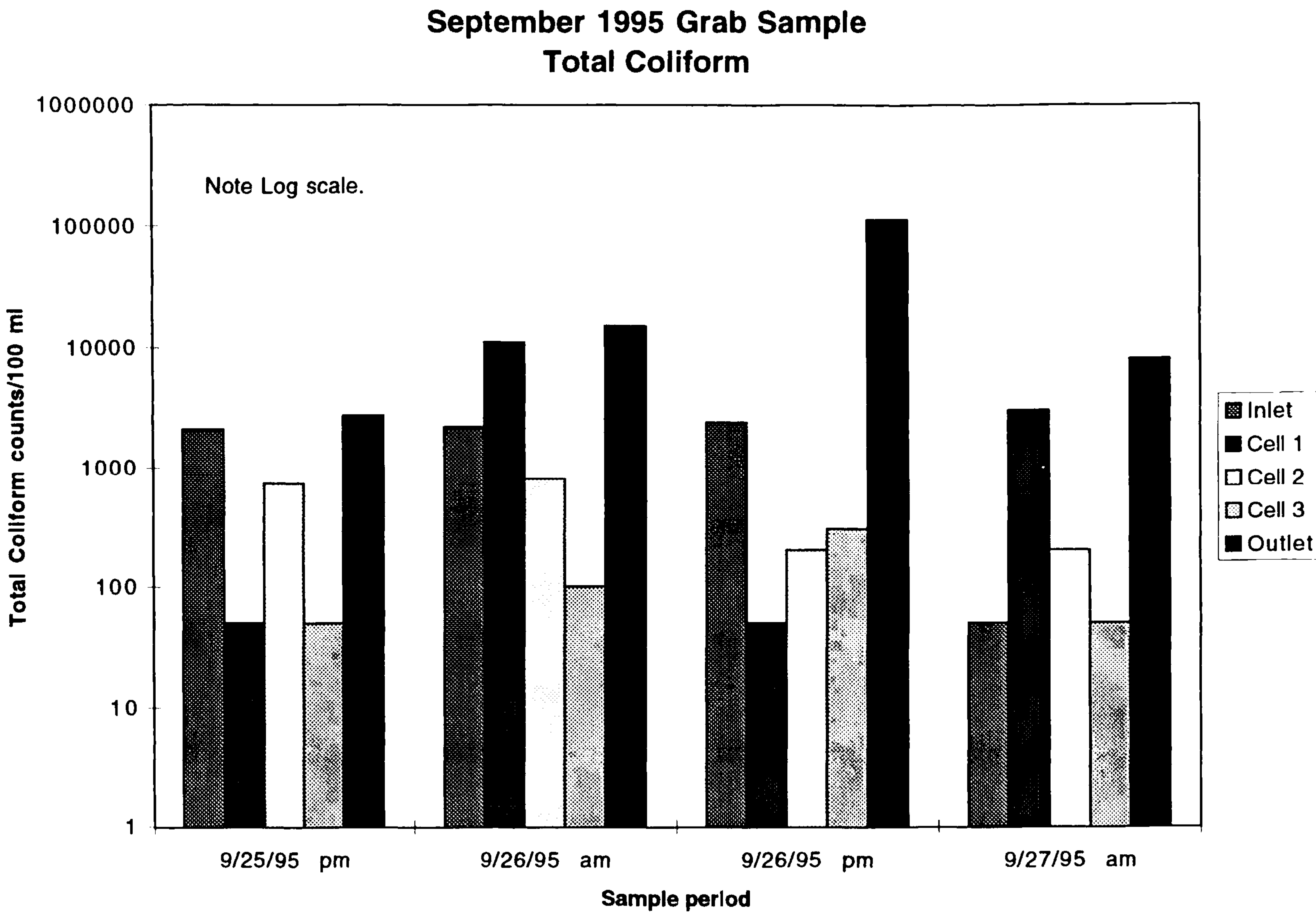

September 1995 Grab Sample
Total Coliform
Note Log scale.
Total Coliform counts/100 ml
1000000
100000
10000
1000
100
10
1
9/25/95 pm
9/26/95 am
9/26/95 pm
9/27/95 am
Sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 130

October 1994 Grab Sample
Fecal Coliforms

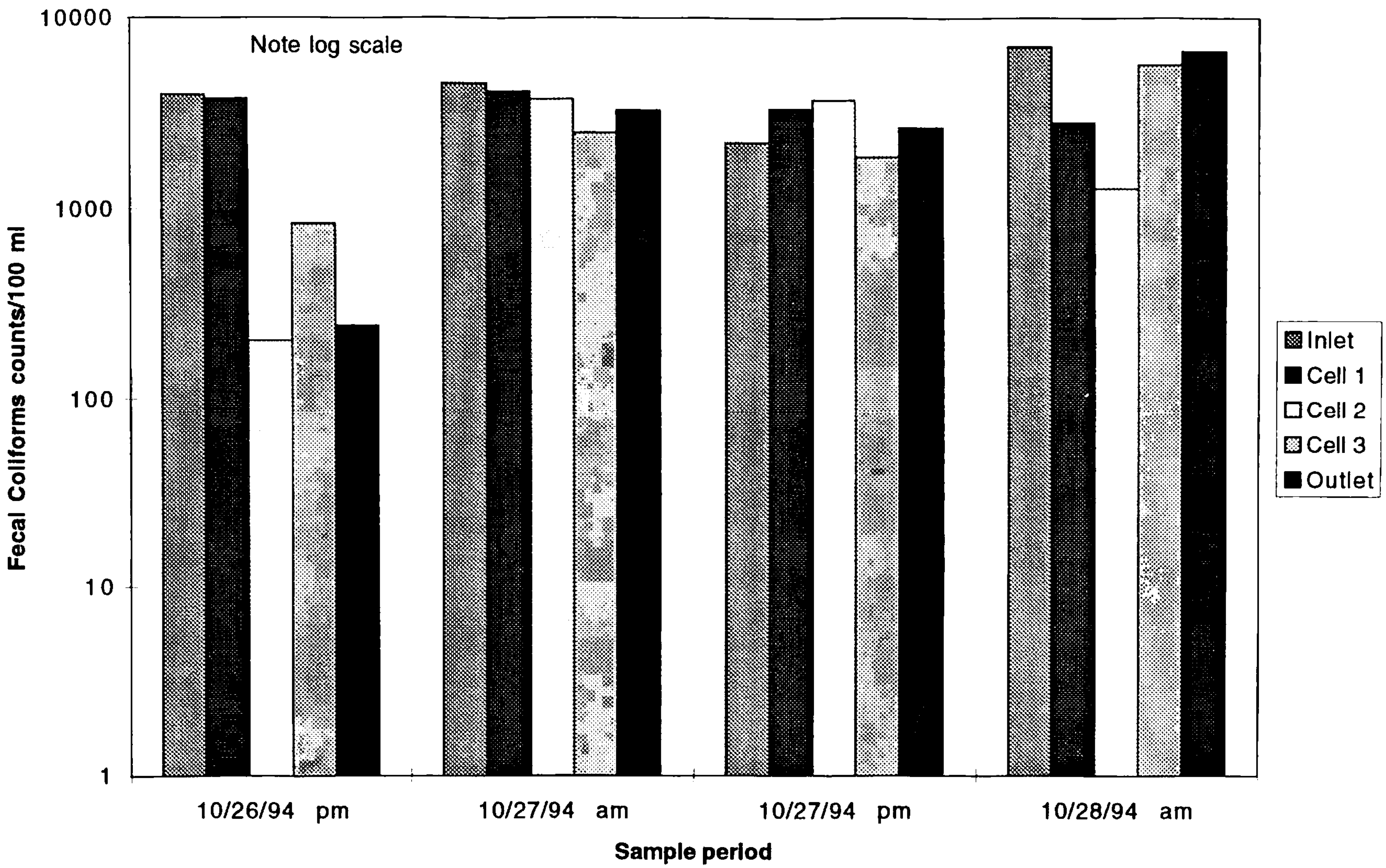


Figure 131

March 1995 Grab Sample
Fecal Coliforms

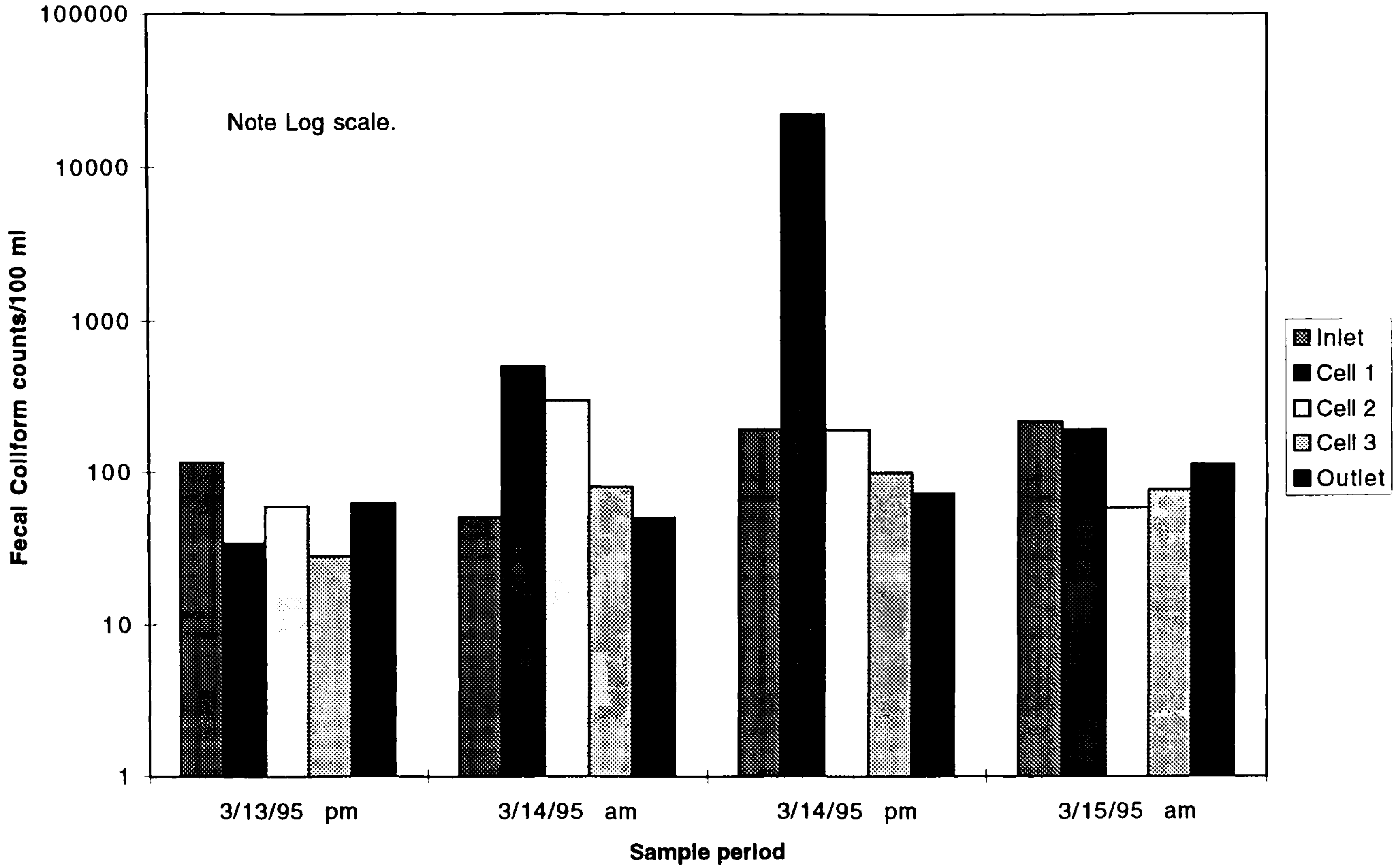
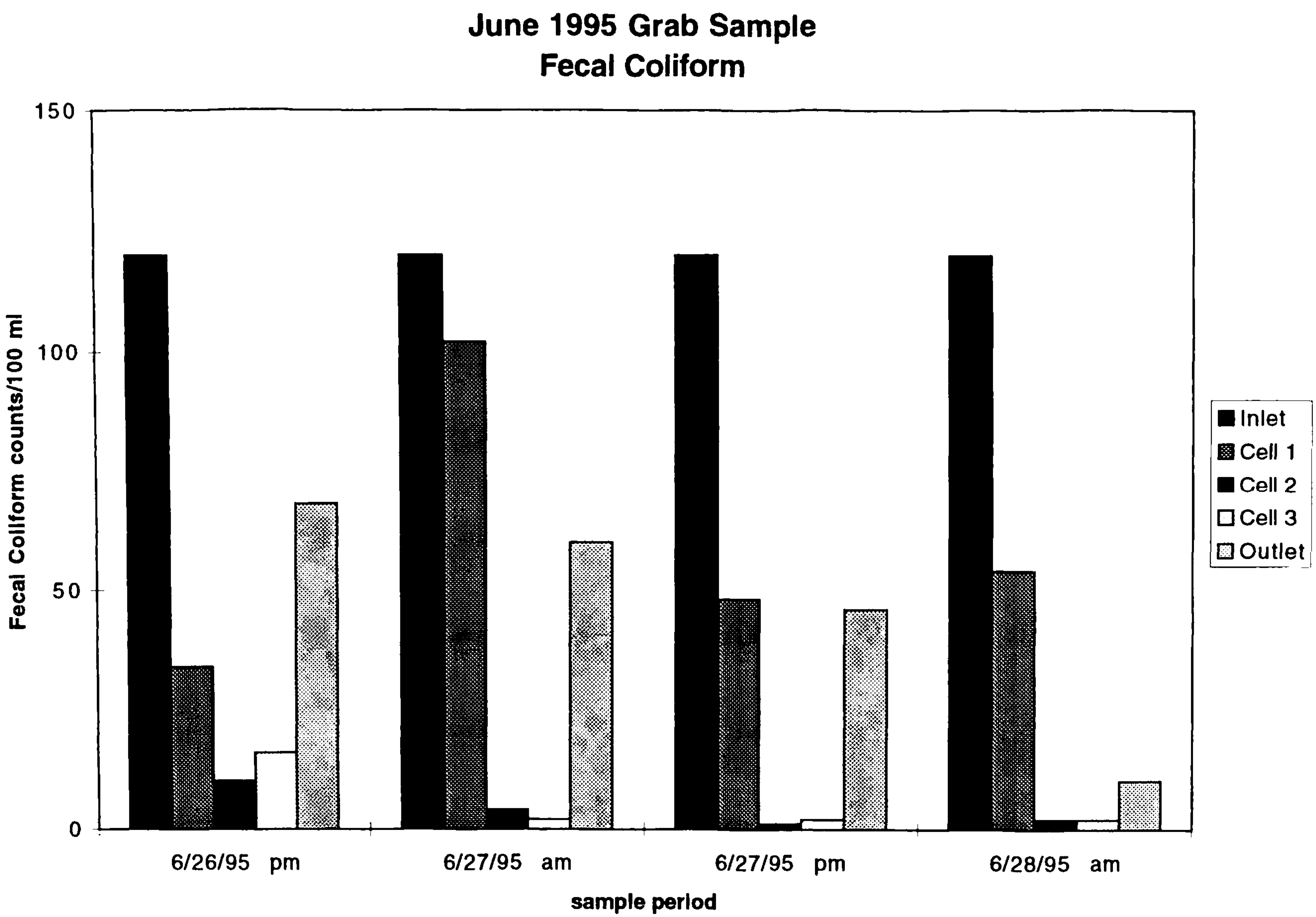


Figure 132



June 1995 Grab Sample
Fecal Coliform
150
100
50
0
Fecal Coliform counts/100 ml
6/26/95 pm
6/27/95 am
6/27/95 pm
6/28/95 am
sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 133

September 1995 Grab Sample
Fecal Coliform

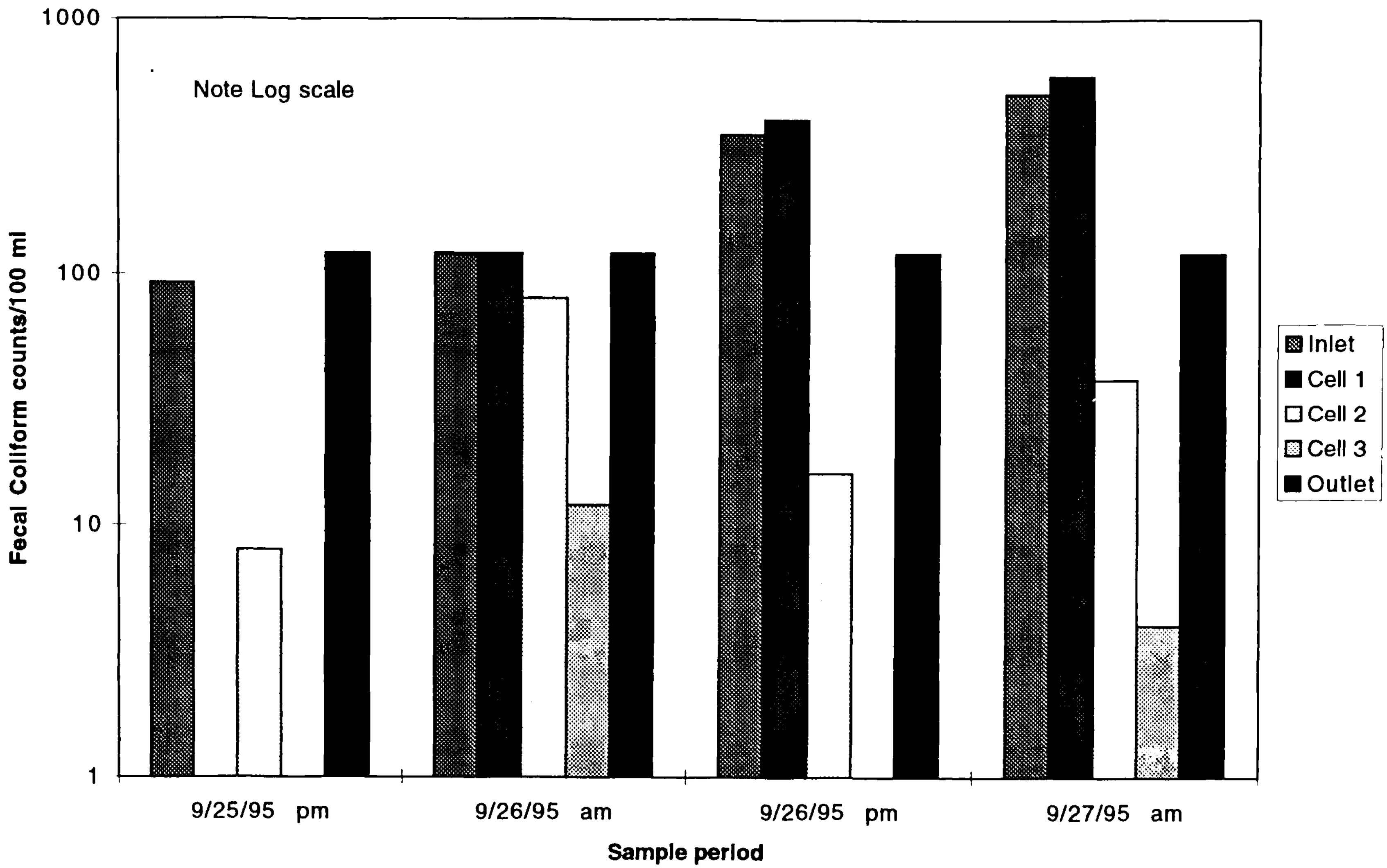


Figure 134

October 1994 Grab Sample
Enterococcus

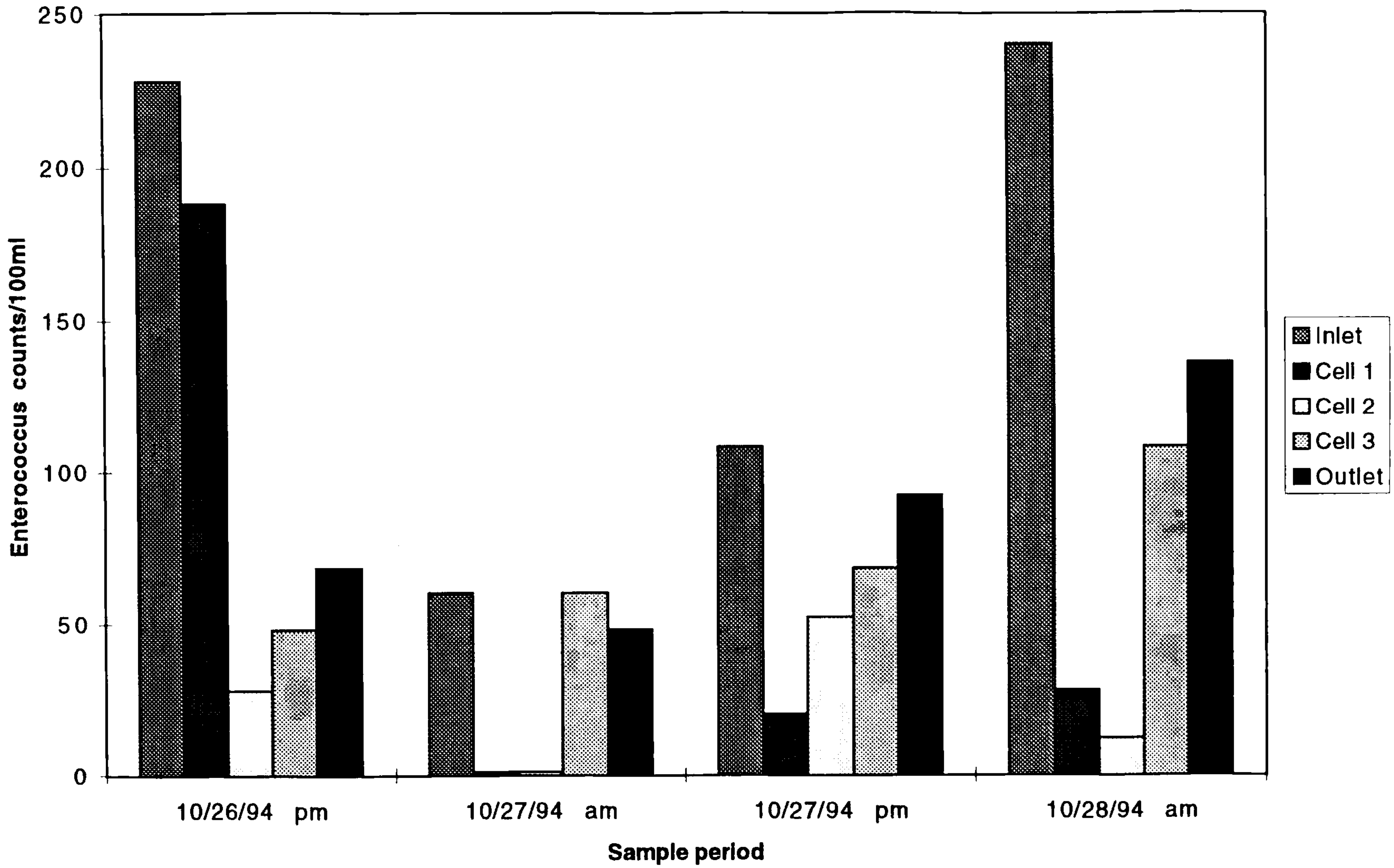
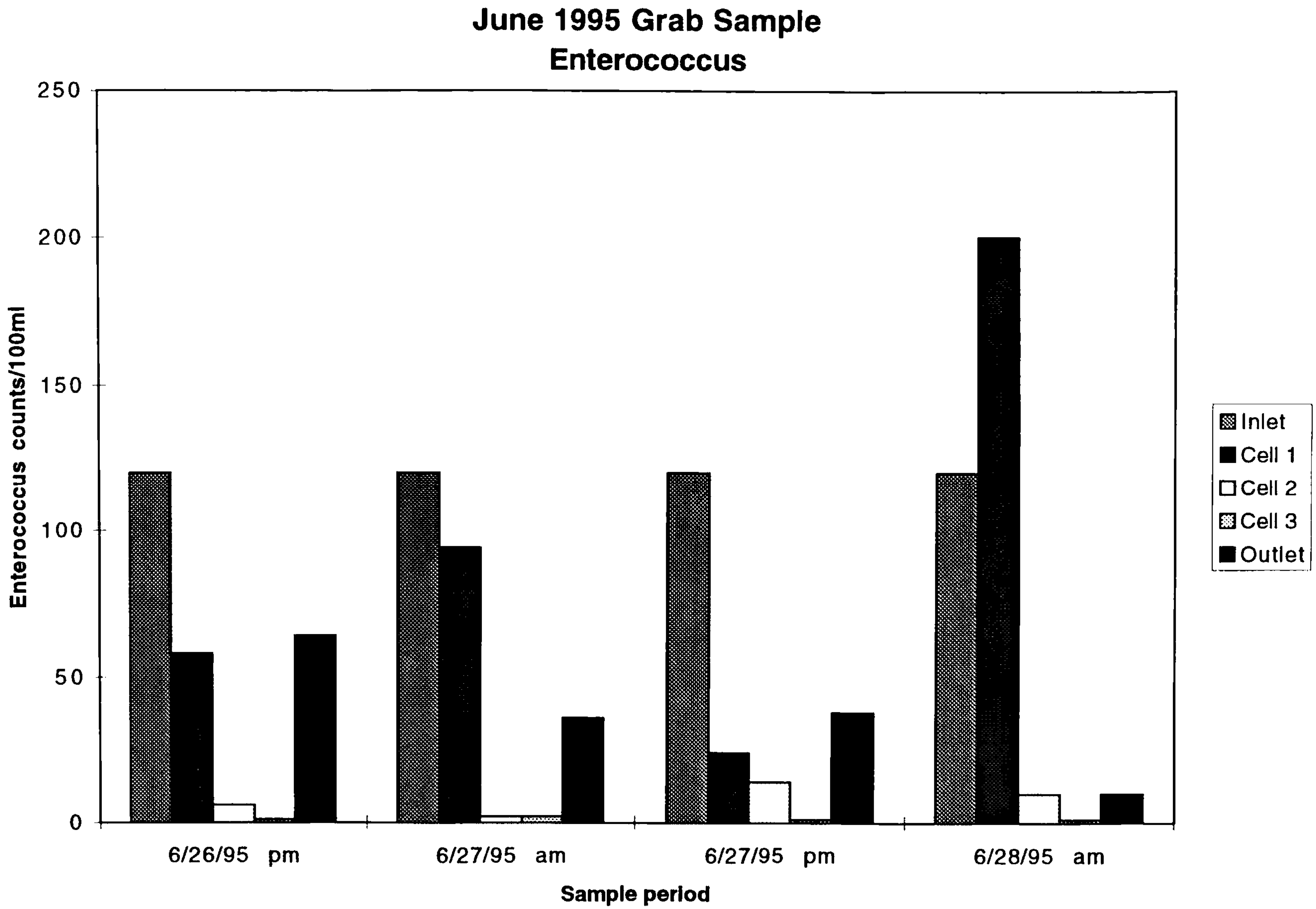


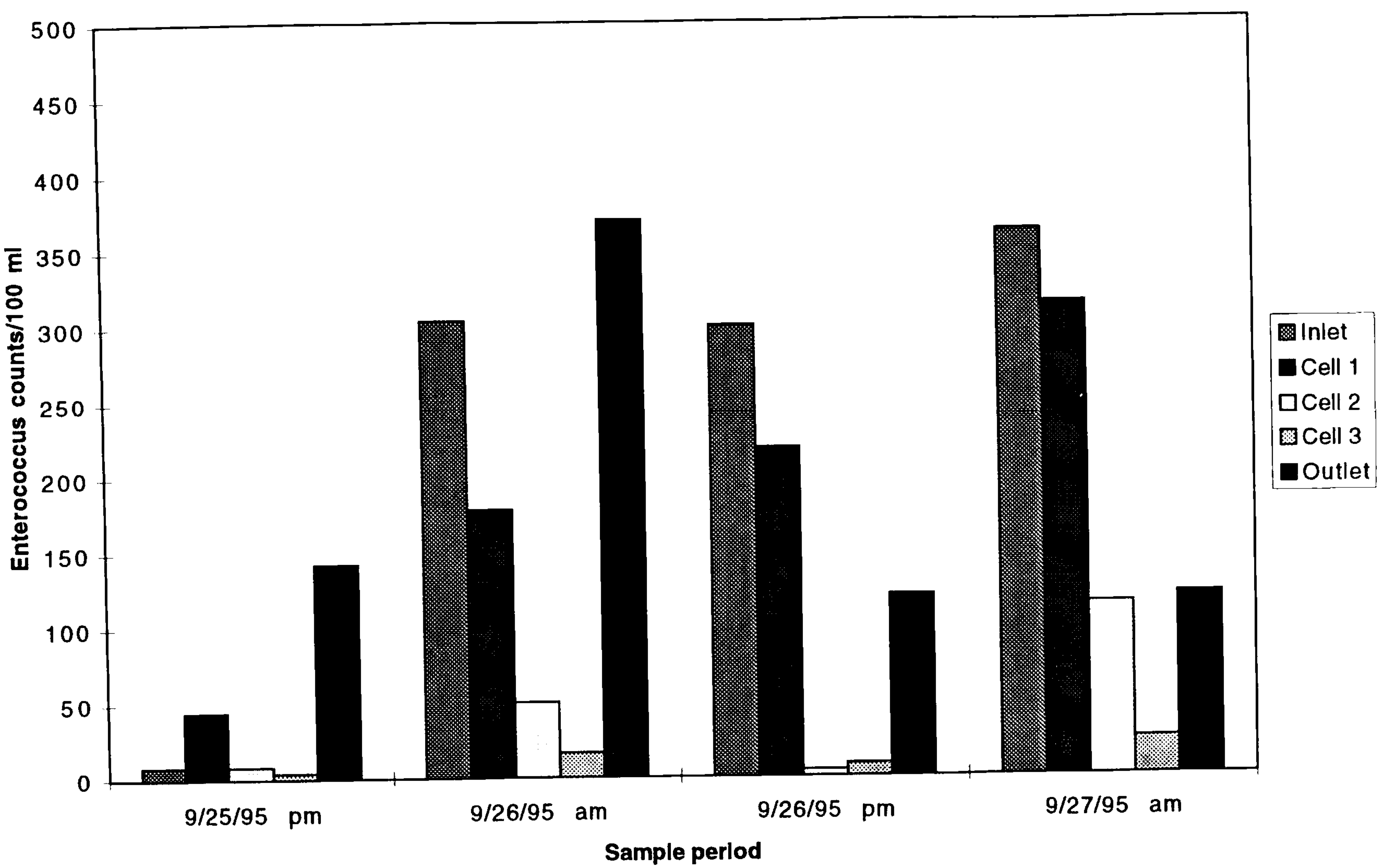
Figure 135



June 1995 Grab Sample
Enterococcus
Enterococcus counts/100ml
250
200
150
100
50
0
6/26/95 pm
6/27/95 am
6/27/95 pm
6/28/95 am
Sample period
Inlet
Cell 1
Cell 2
Cell 3
Outlet

Figure 136

September 1995 Grab Sample
Enterococcus



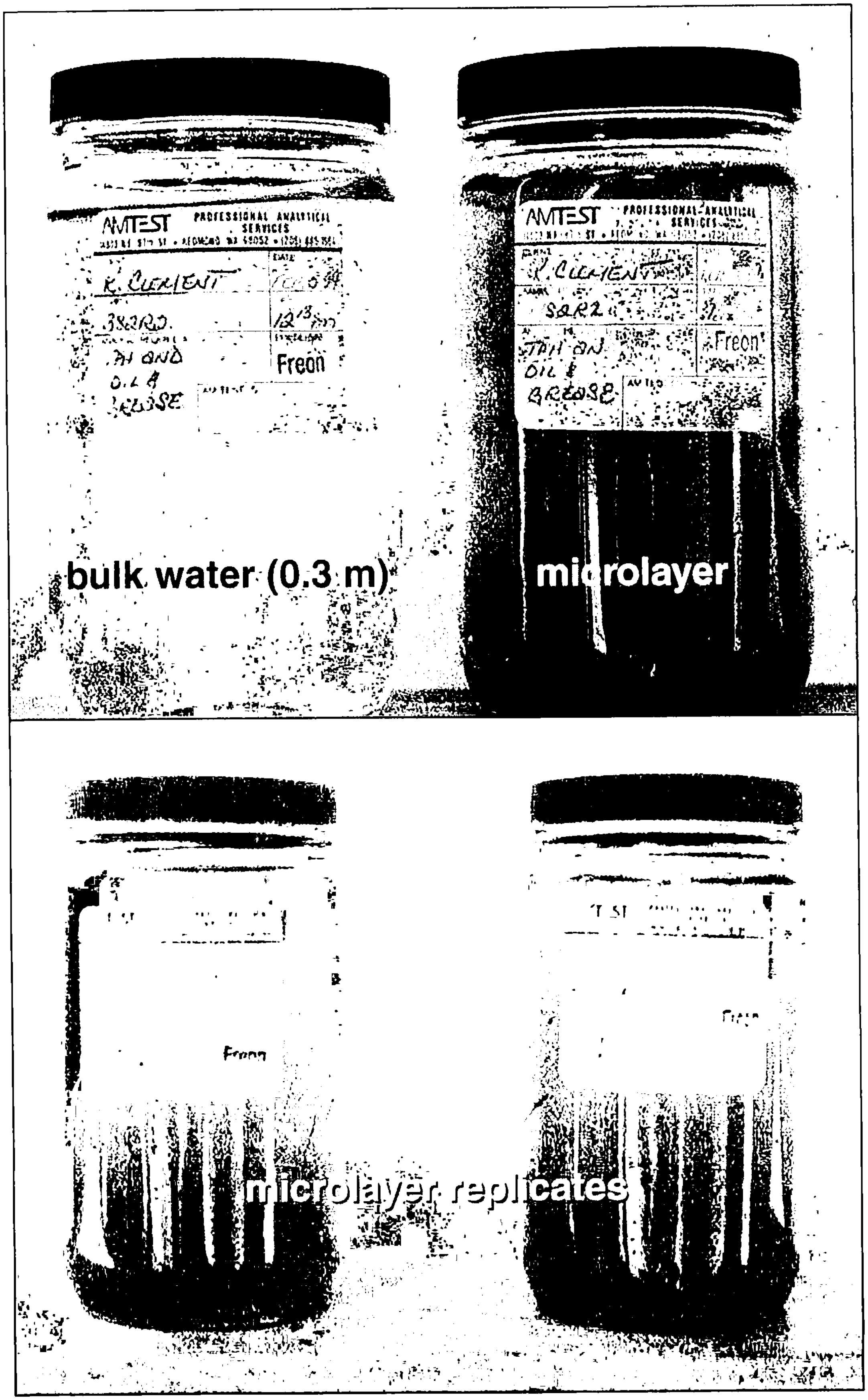


Figure 137. Site 1 bulkwater and microlayer samples from February 5, 1994.

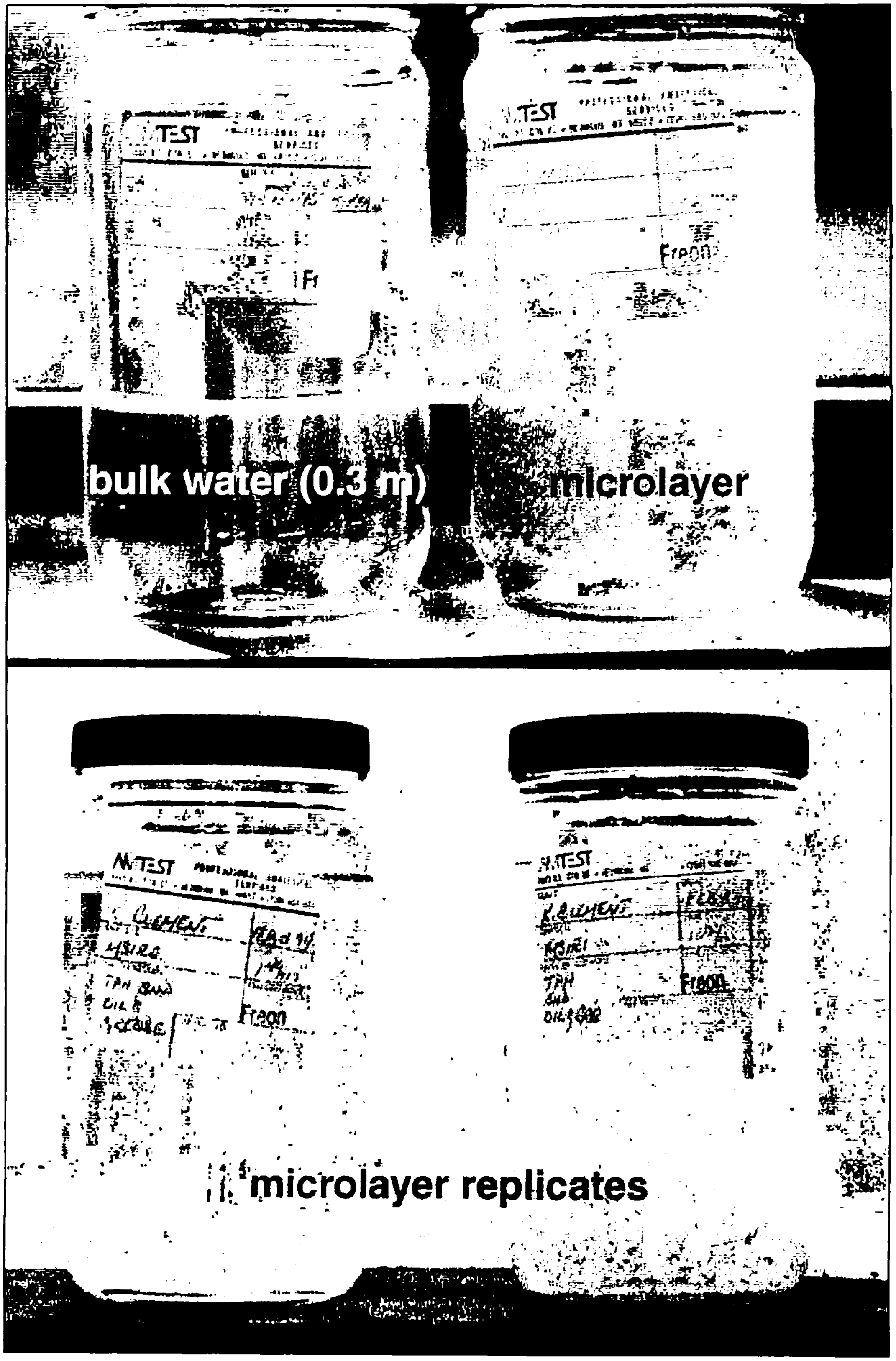


Figure 138. Bloedel-Donovan bulkwater and microlayer samples from February 5, 1994.

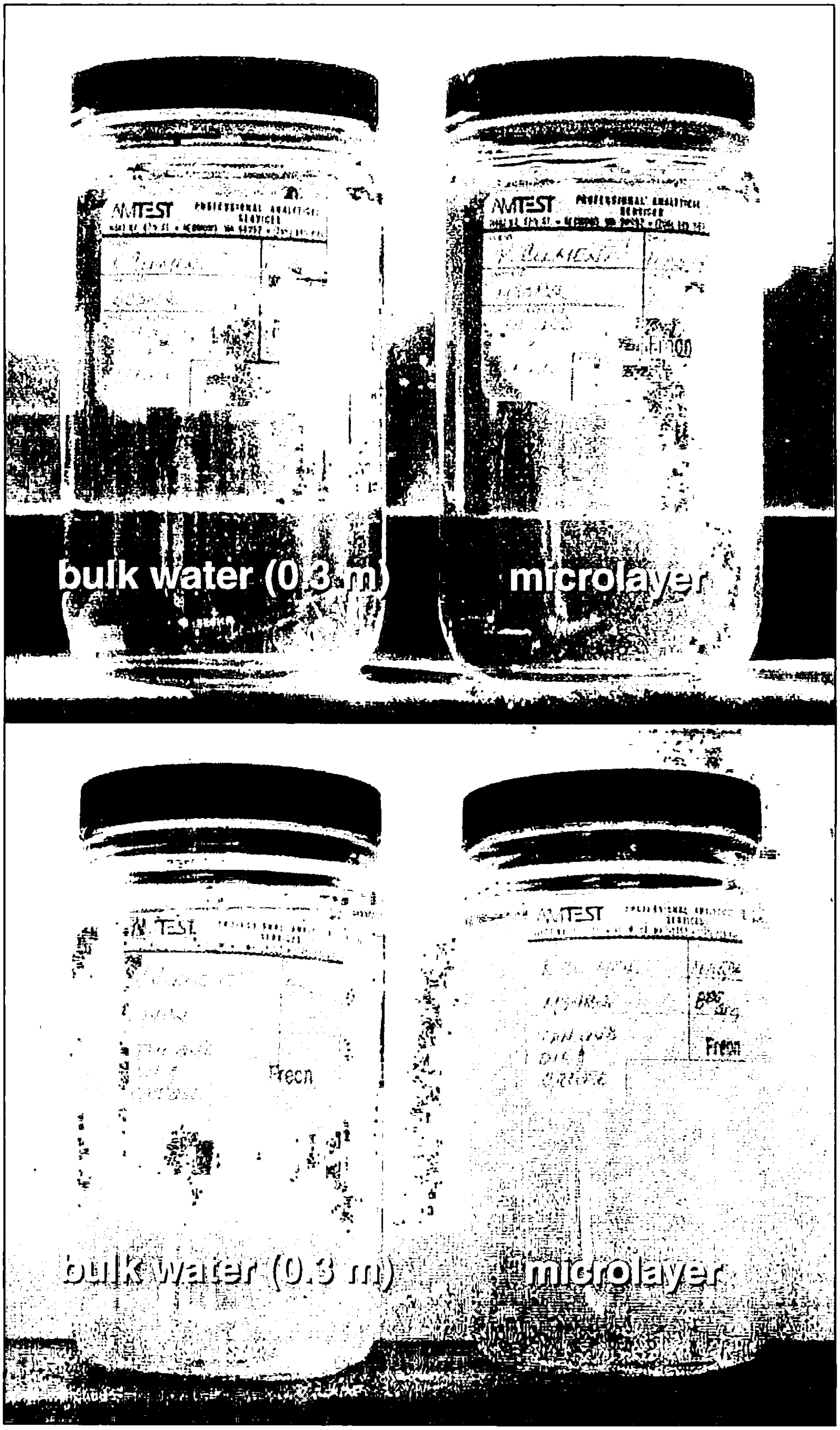
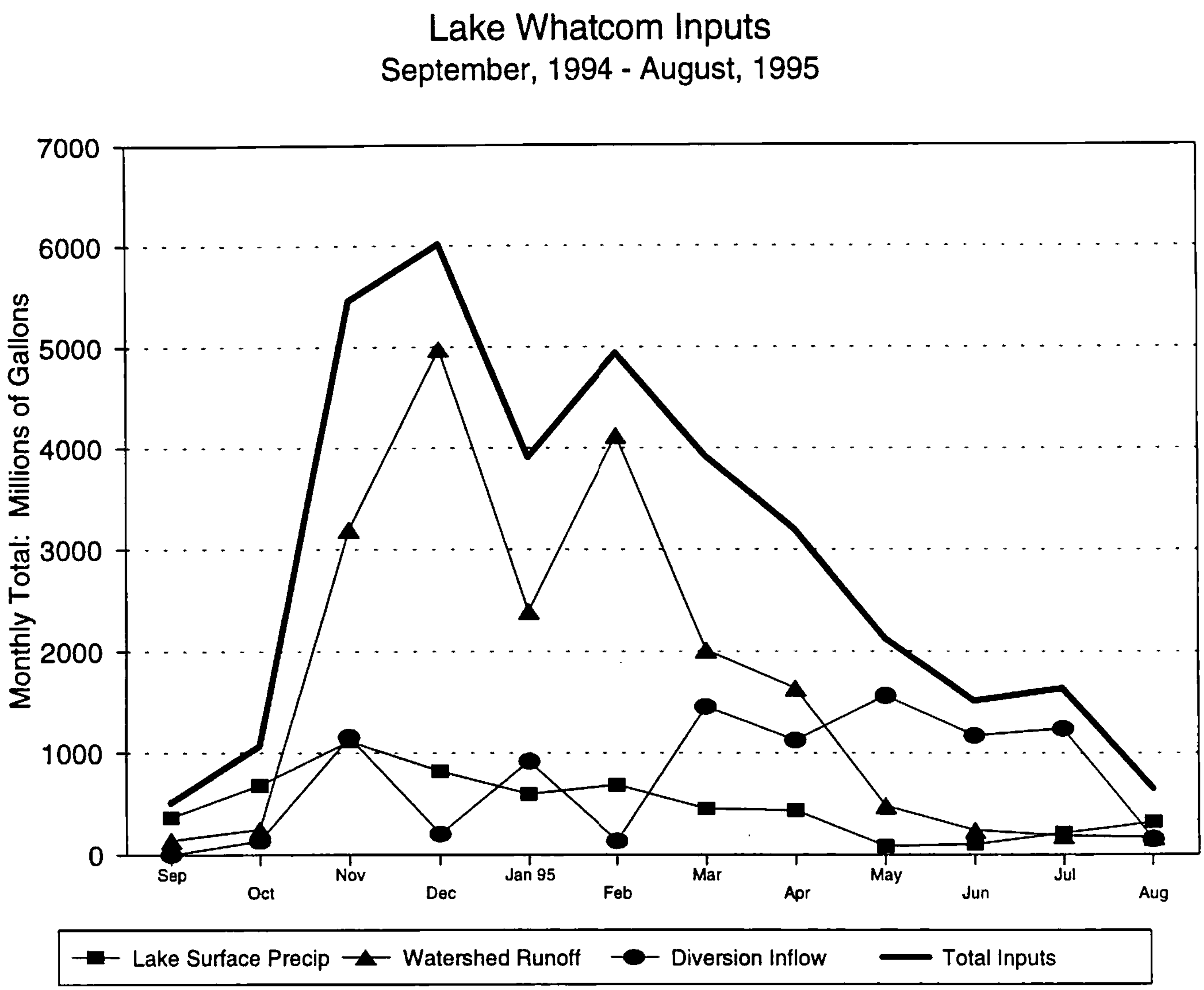


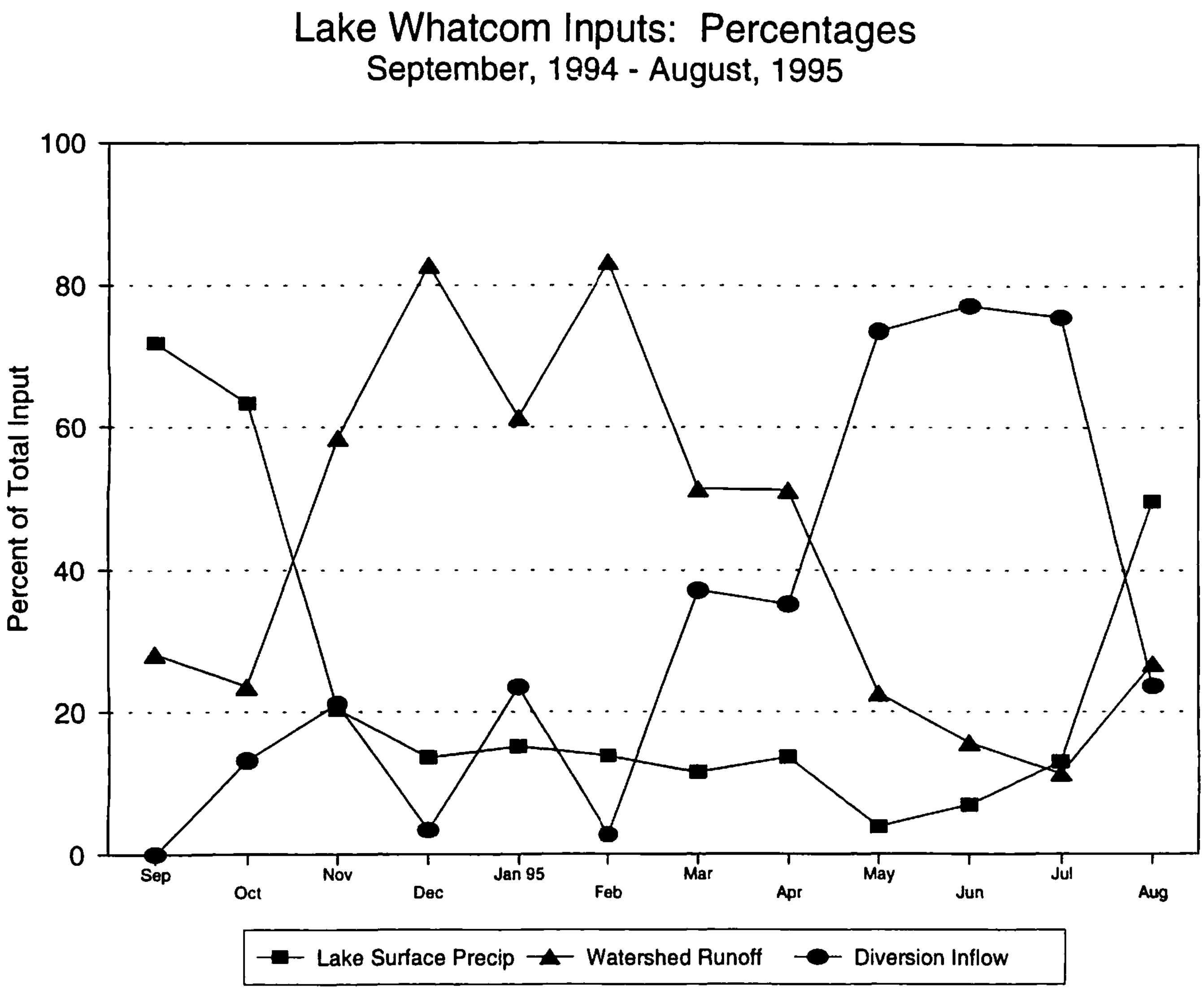
Figure 139. Intake (top) and Site 2 (bottom) bulkwater and microlayer samples from February 5, 1994.

Figure 140:



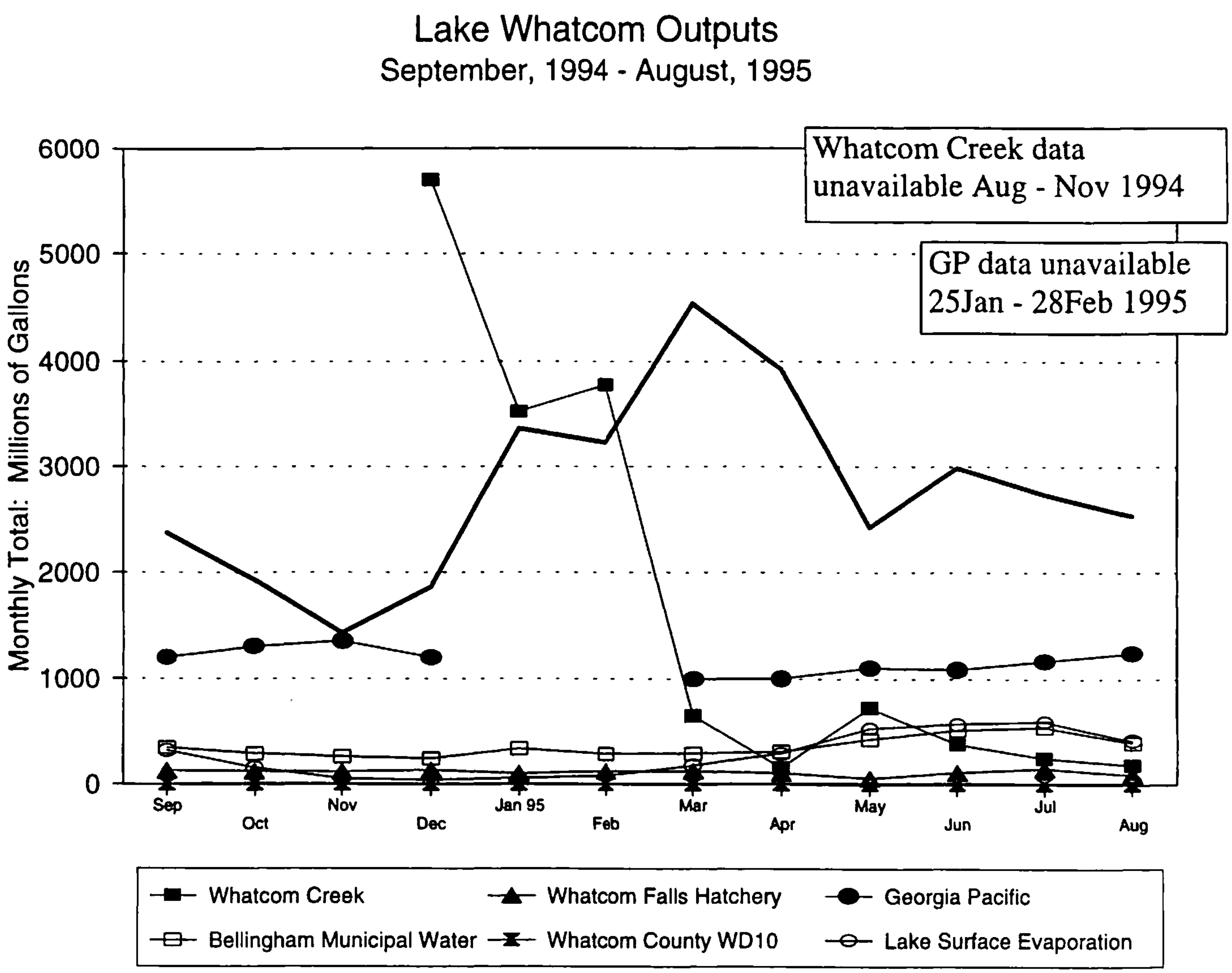
Lake Whatcom Inputs
September, 1994 - August, 1995
Monthly Total: Millions of Gallons
7000
6000
5000
4000
3000
2000
1000
0
Sep
Oct
Nov
Dec
Jan 95
Feb
Mar
Apr
May
Jun
Jul
Aug
Lake Surface Precip
Watershed Runoff
Diversion Inflow
Total Inputs

Figure 141:



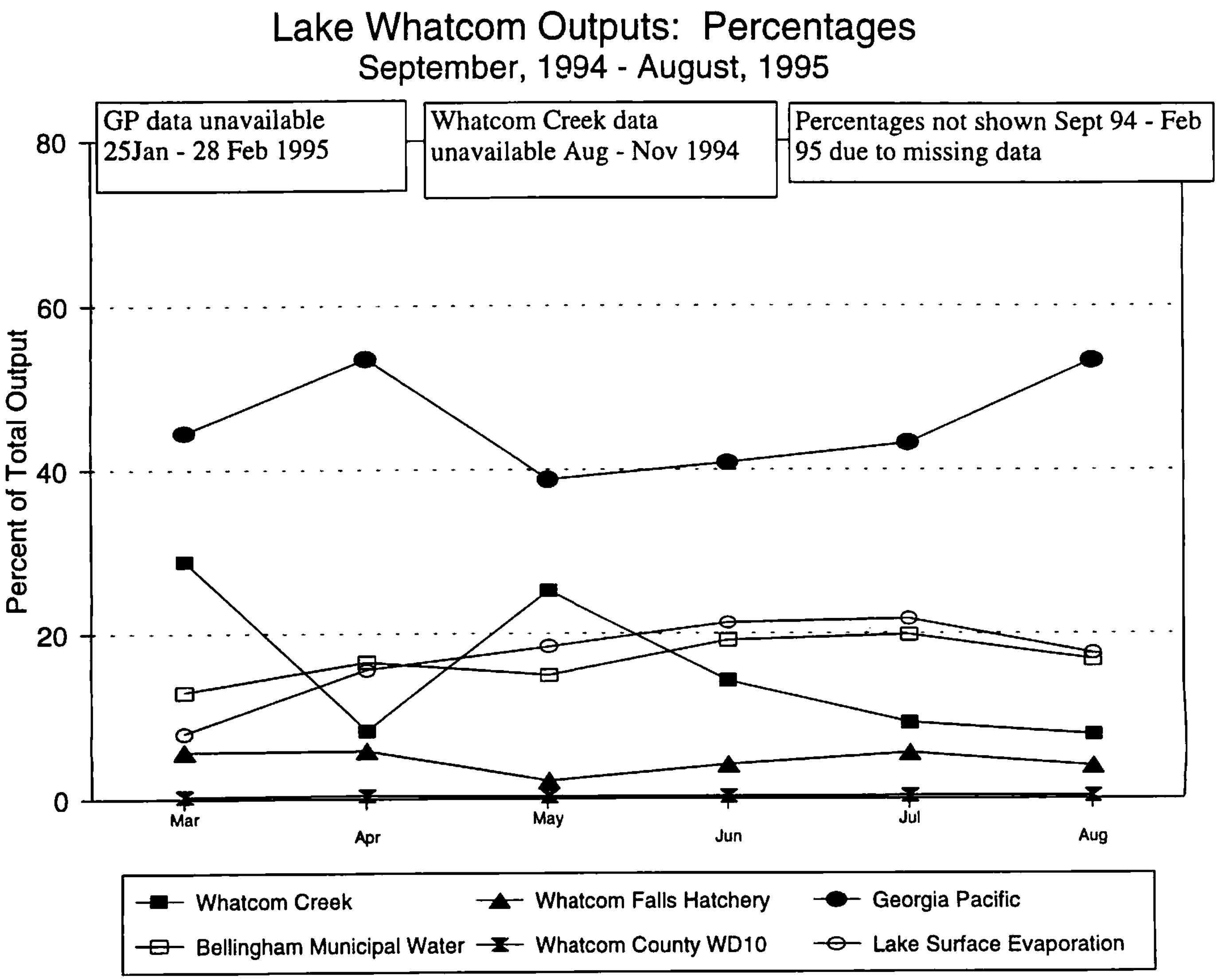
Lake Whatcom Inputs: Percentages
September, 1994 - August, 1995
100
80
60
40
20
0
Percent of Total Input
Sep
Oct
Nov
Dec
Jan 95
Feb
Mar
Apr
May
Jun
Jul
Aug
Lake Surface Precip
Watershed Runoff
Diversion Inflow

Figure 142:



Lake Whatcom Outputs
September, 1994 - August, 1995
Whatcom Creek data unavailable Aug - Nov 1994
GP data unavailable 25Jan - 28Feb 1995
Monthly Total: Millions of Gallons
6000
5000
4000
3000
2000
1000
0
Sep
Oct
Nov
Dec
Jan 95
Feb
Mar
Apr
May
Jun
Jul
Aug
Whatcom Creek
Whatcom Falls Hatchery
Georgia Pacific
Bellingham Municipal Water
Whatcom County WD10
Lake Surface Evaporation

Figure 143:



Lake Whatcom Outputs: Percentages
September, 1994 - August, 1995
GP data unavailable 25Jan - 28 Feb 1995
Whatcom Creek data unavailable Aug - Nov 1994
Percentages not shown Sept 94 - Feb 95 due to missing data
Percent of Total Output
80
60
40
20
0
Mar
Apr
May
Jun
Jul
Aug
Whatcom Creek
Whatcom Falls Hatchery
Georgia Pacific
Bellingham Municipal Water
Whatcom County WD10
Lake Surface Evaporation

Figure 144:

1994/1995 Alkalinity QC Duplicates

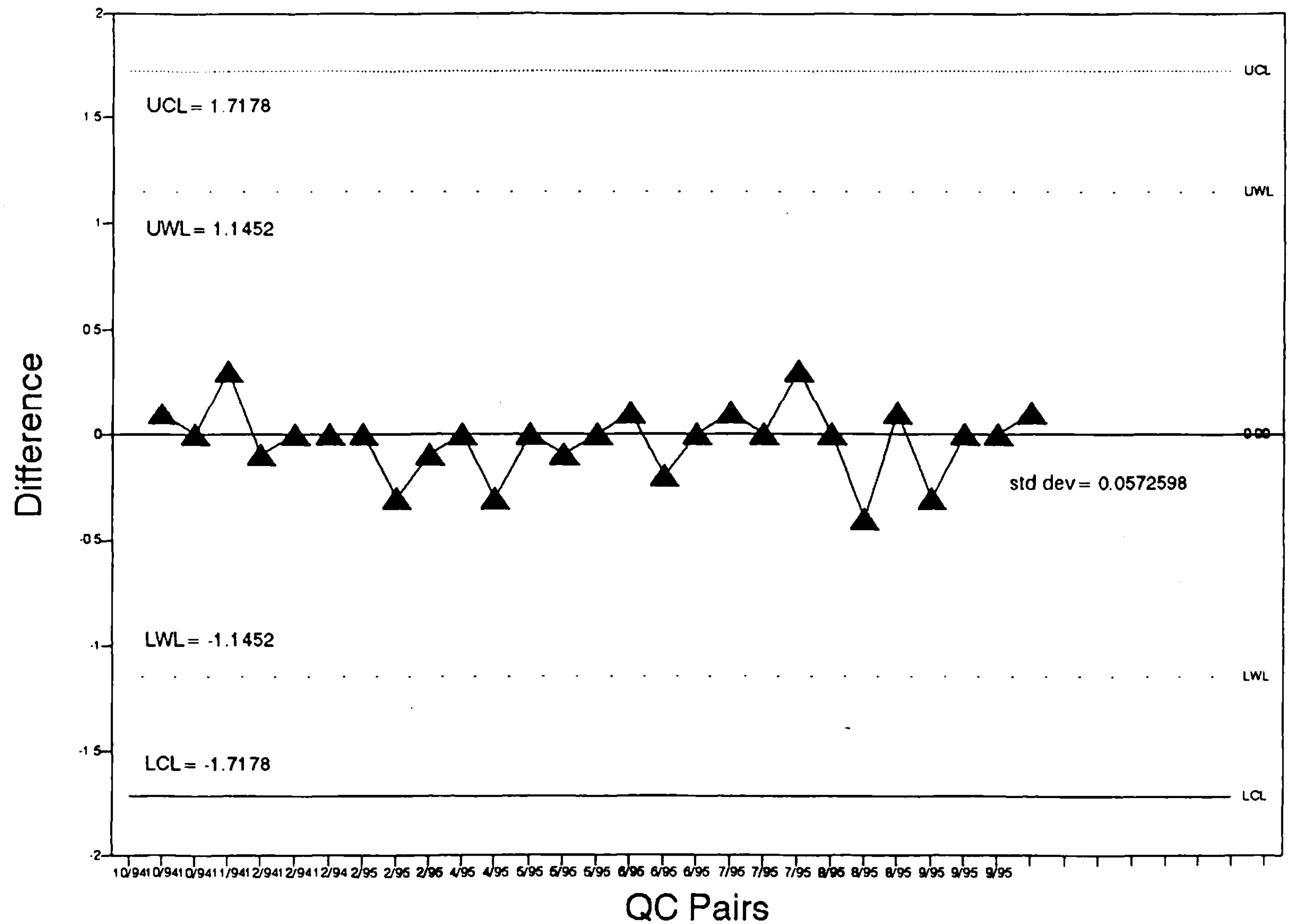


Figure 145:

94/95 Conductivity QC Duplicates

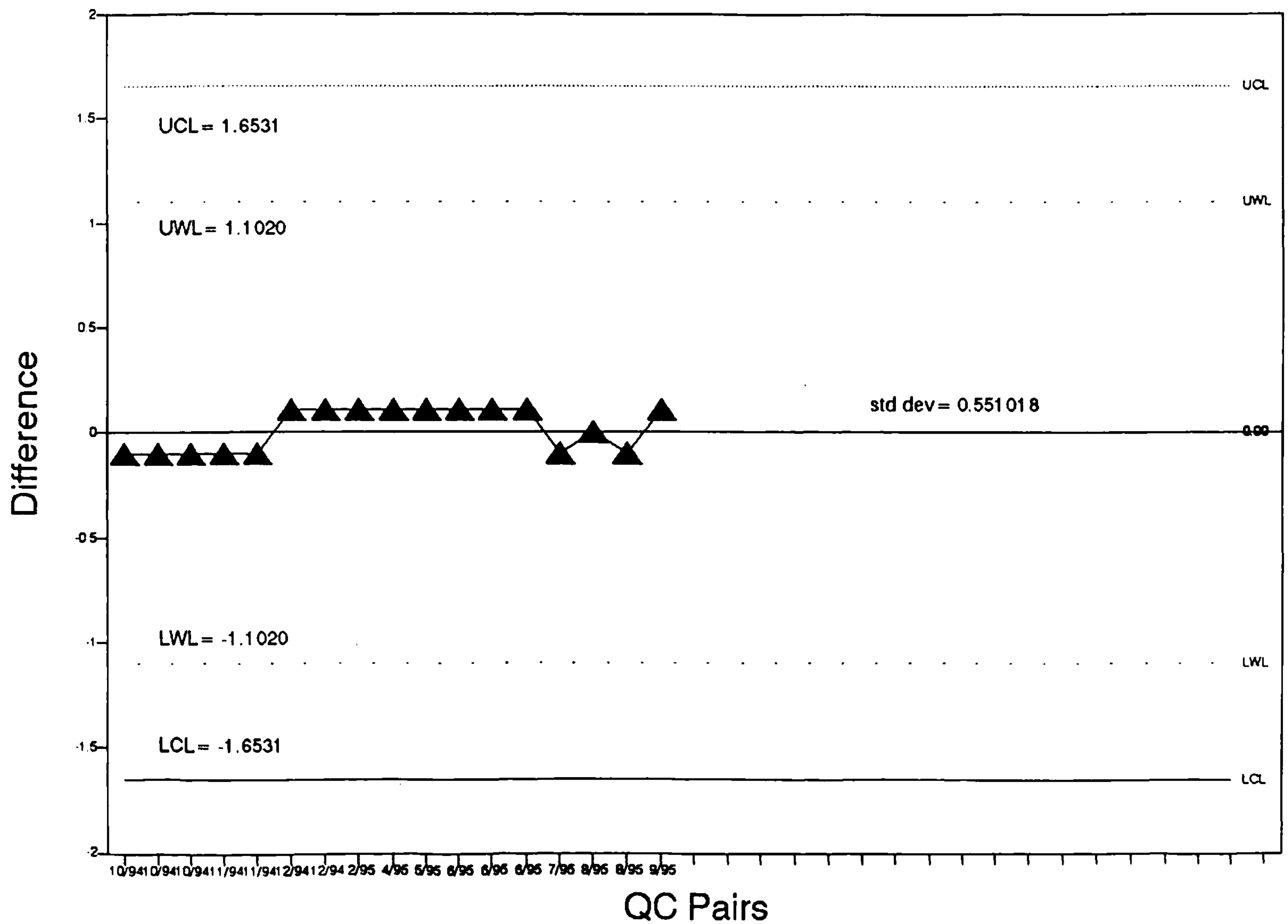


Figure 146:

94/95 DO QC Duplicates

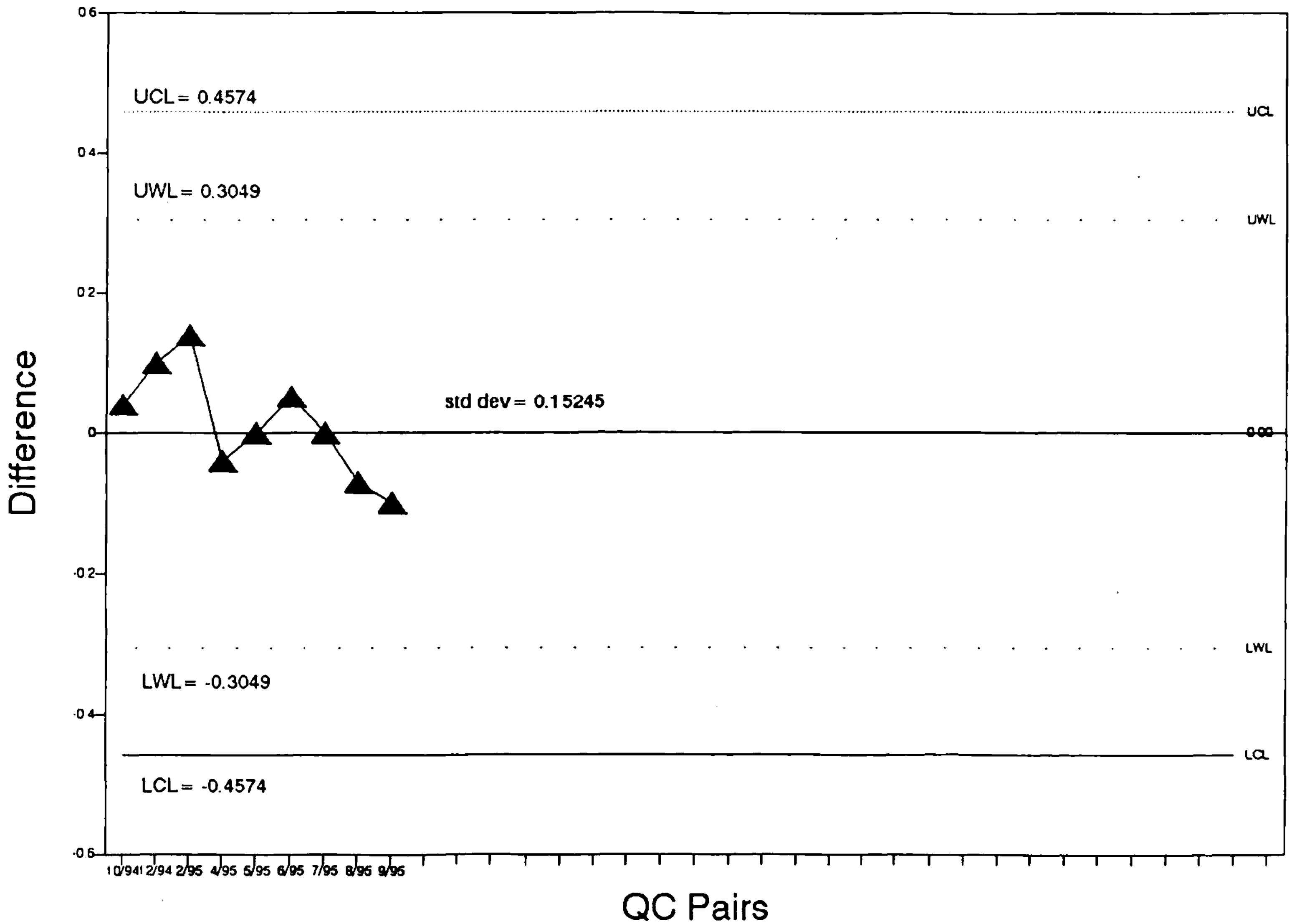


Figure 147:

94/95 NO3/NO2 QC Duplicates

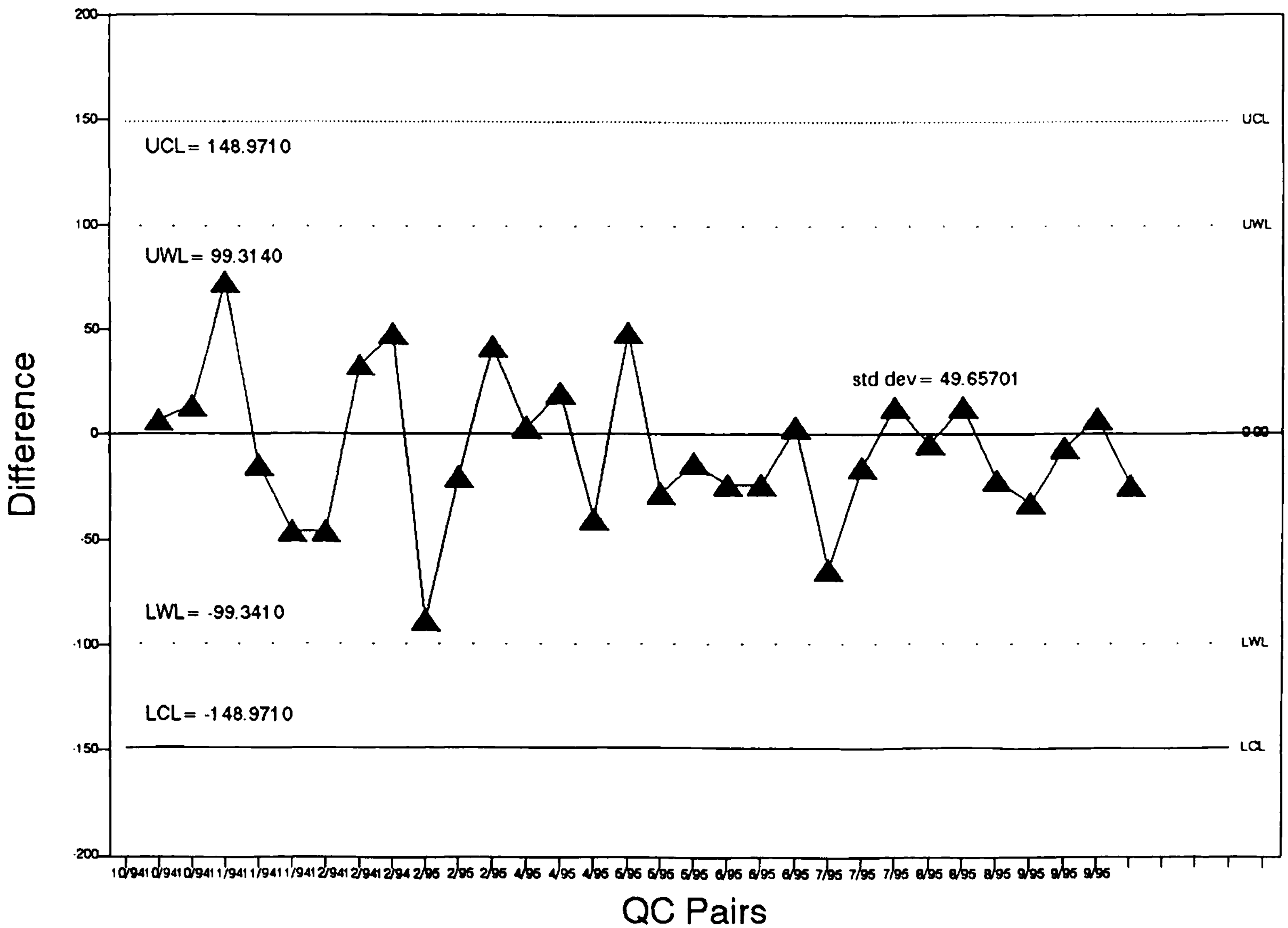


Figure 148:

94/95 pH QC Duplicates

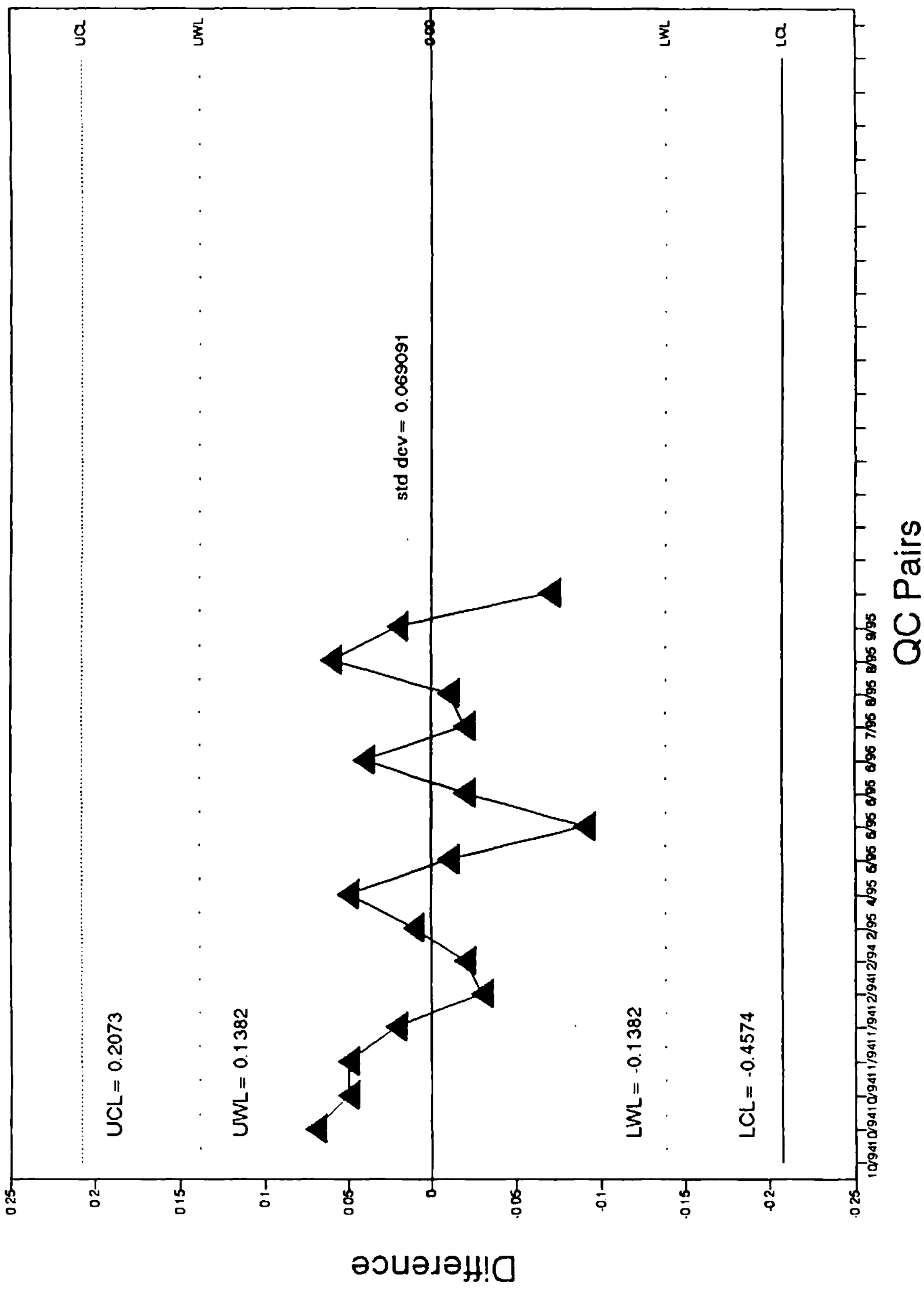


Figure 149:

94/95 Total Nitrogen QC Duplicates

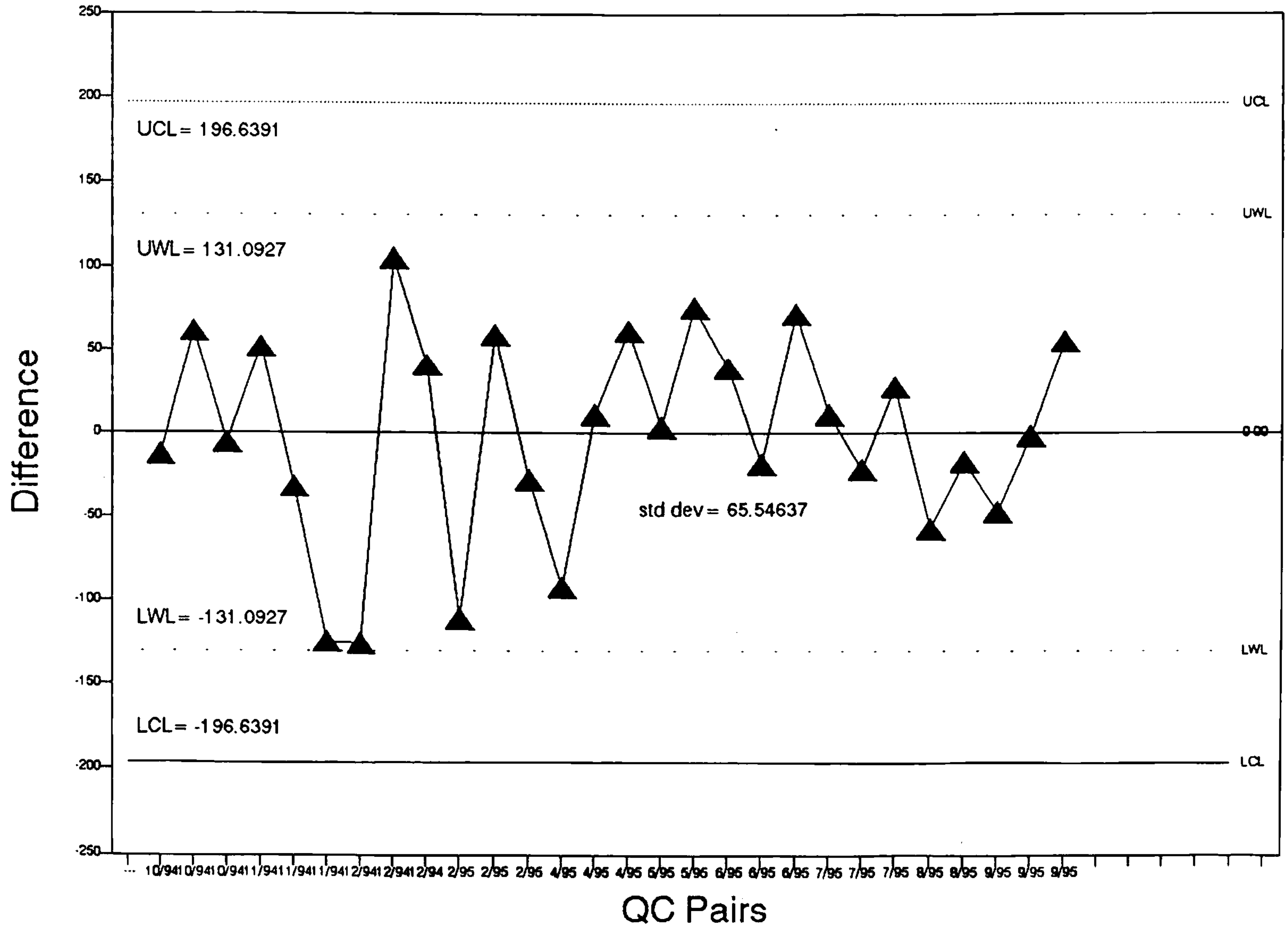
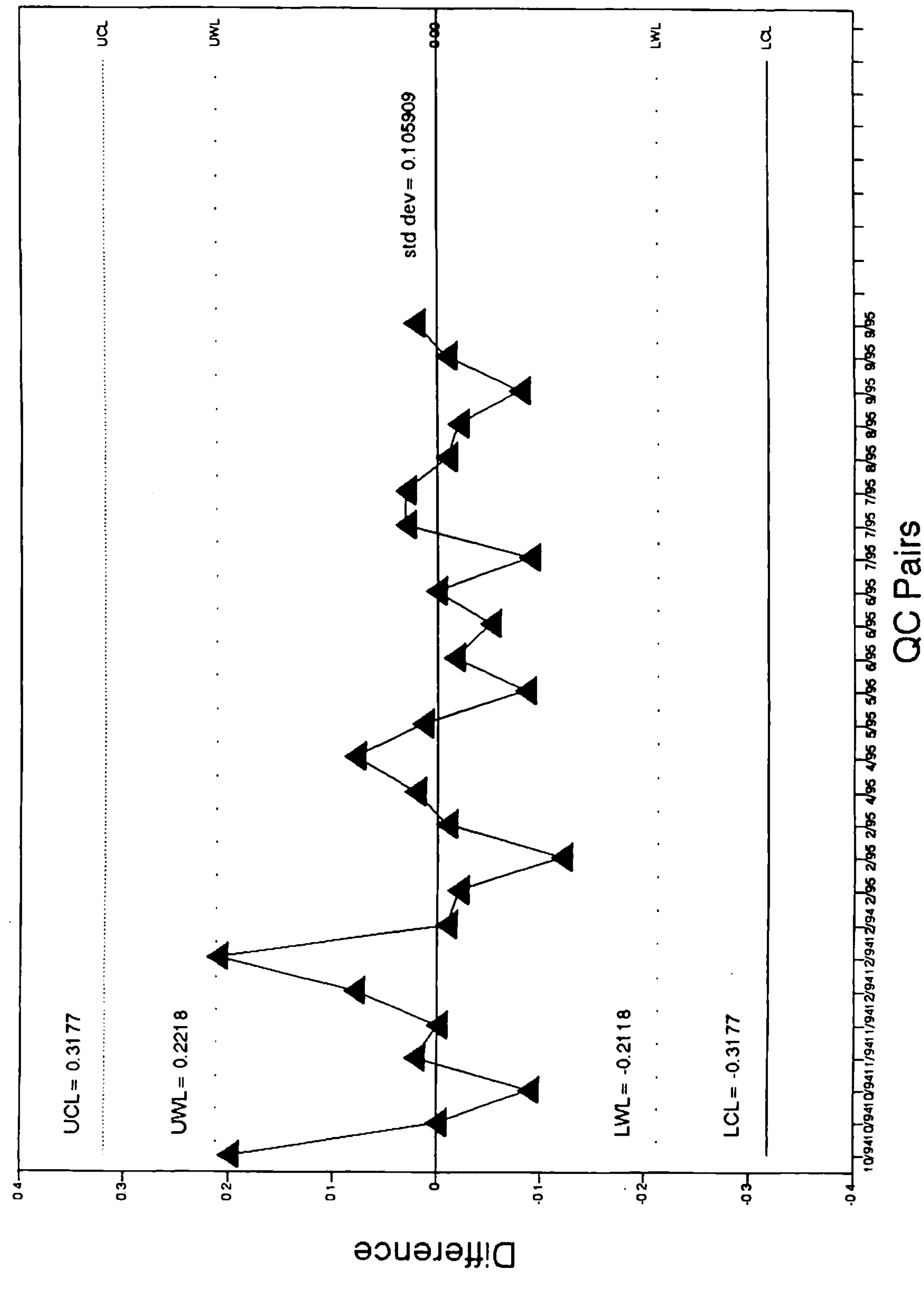


Figure 150:

94/95 Turbidity QC Duplicates



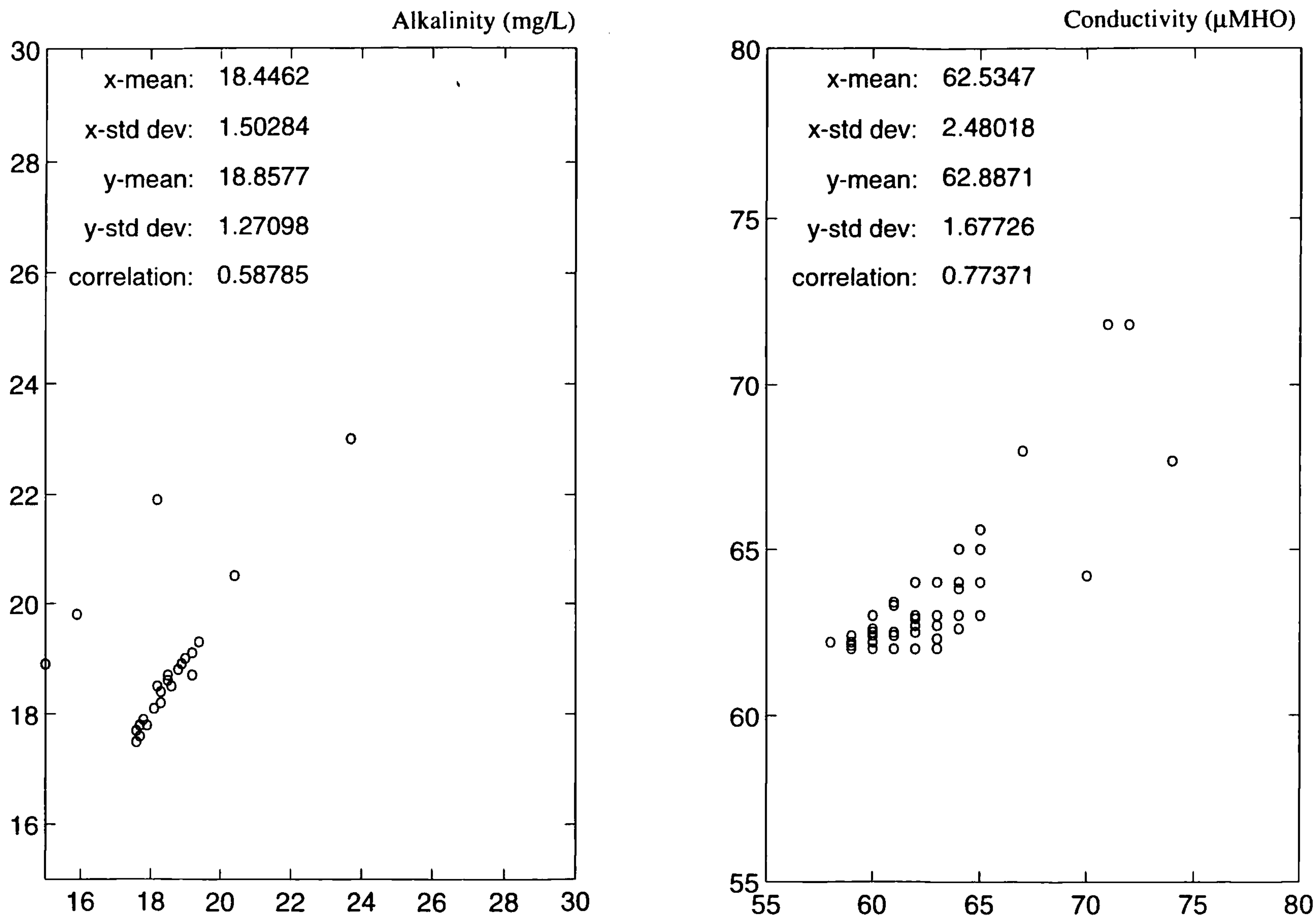


Figure 151. Field duplicate quality control data for alkalinity and conductivity. Each point represents concentrations obtained from paired samples collected at the same site, depth, and time.

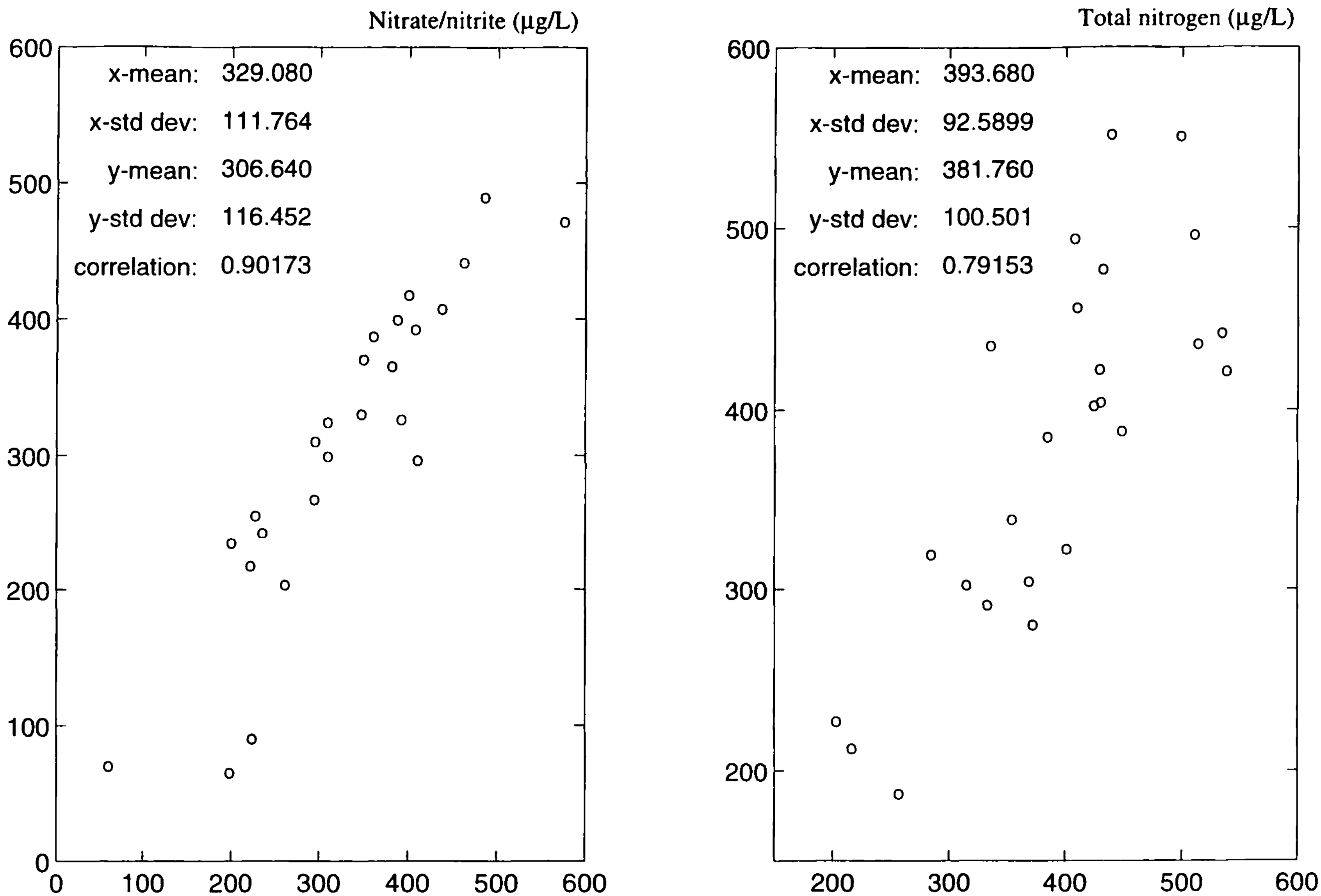


Figure 153. Field duplicate quality control data for nitrate/nitrite and total nitrogen. Each point represents concentrations obtained from paired samples collected at the same site, depth, and time.

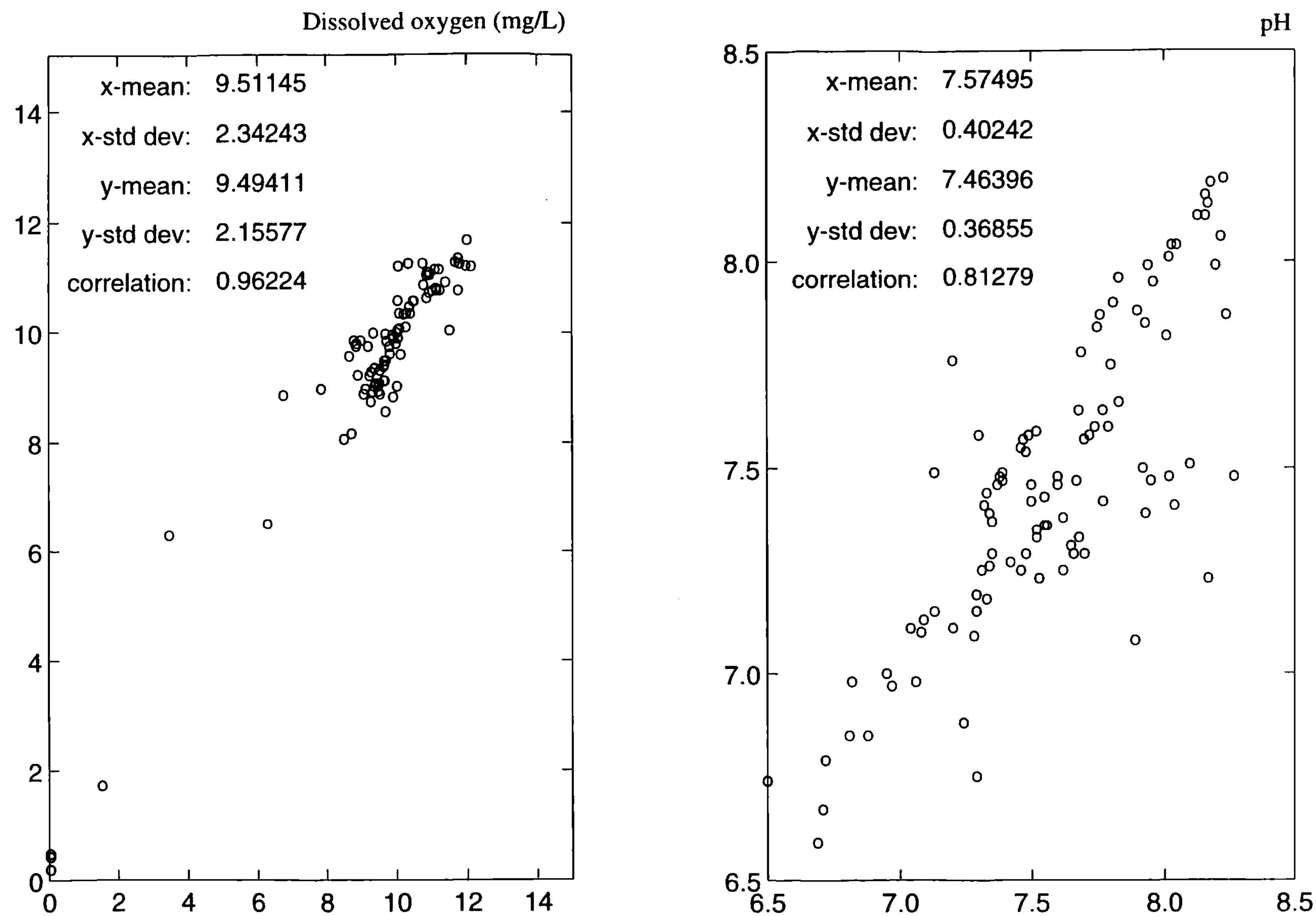


Figure 152. Field duplicate quality control data for dissolved oxygen and pH. Each point represents concentrations obtained from paired samples collected at the same site, depth, and time.

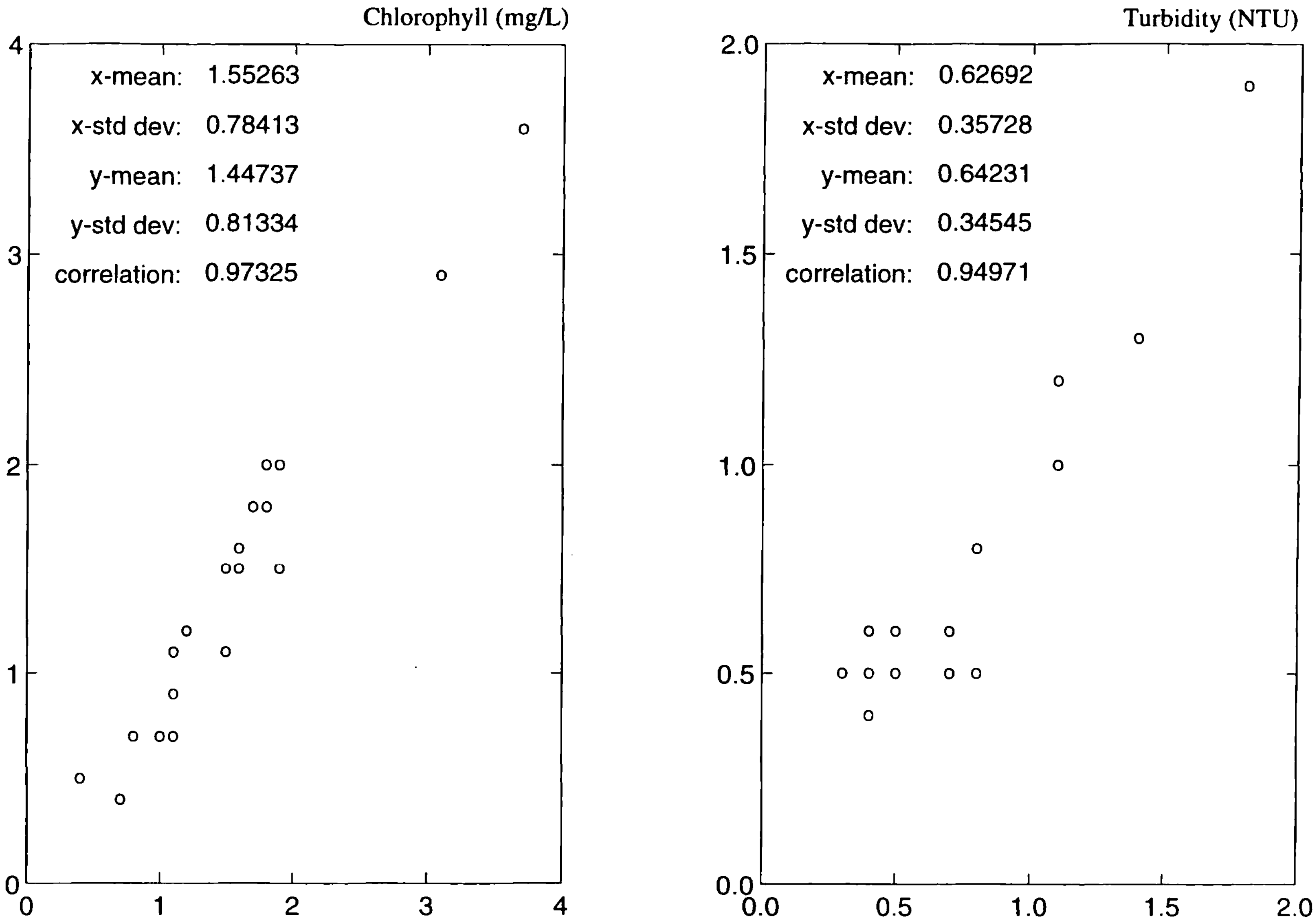


Figure 154. Field duplicate quality control data for chlorophyll and turbidity. Each point represents concentrations obtained from paired samples collected at the same site, depth, and time.

A Site Descriptions

A.1 Lake Whatcom Monitoring Sites

Please refer to Figure 155 and Figure 156 for assistance with locating each site. In the field, each site should be marked with an orange buoy; however, stormy weather or vandalism may have resulted in the movement or loss of a marker buoy. The five major lake sampling sites have been used since the early 1960's. Table 20 shows a summary of the identification codes that have been used for these five sites over time.

During the August 5, 1993 lake sampling, geographical locations for each site were determined using a GPS locater. These coordinates are listed below, but should be used with the caution because site locations in Lake Whatcom have always been approximate.

Site 1
Site 1 is located in basin 1 along a straight line from the Bloedel Donovan boat launch to a square, white house with a dark grey roof that is located about half way up the hillside (171 E. North Shore Rd.) The sampling site is at a point perpendicular to the second group of condominiums in a cluster of four. The depth at Site 1 should be at least 20 m. The GPS coordinates for Site 1 on August 5, 1993 were: 48° 45.74 N, 122° 24.63 W.

Site 2
Site 2 is located in basin 2 just west of the intersection of a line between a boat house with a rust-colored roof (73 Strawberry Point) and the point of Geneva Sill, and a line between three aspen trees on Lake Whatcom Blvd. and a red house on the west side of Strawberry Sill (2170 Delestra Rd.). The depth at Site 2 should be at least 20 m. The GPS coordinates for Site 2 on August 5, 1993 were: 48° 44.55 N, 122° 22.81 W.

Intake Site
The Intake site is located offshore from the City of Bellingham's raw water gatehouse. This site is one of the more difficult sites to locate because the marker buoy is frequently missing. The depth at the Intake site should be at least 13 m deep. The GPS coordinates for the Intake site on August 5, 1993 were: 48° 44.89 N, 122° 23.47 W.

Site 3
Site 3 is located mid-basin just north of a line between the old railroad bridge and Lakewood. The depth at Site 3 should be at least 80 m deep. The GPS coordinates for Site 3 on August 5, 1993 were: 48° 44.27 N, 122° 20.25 W.

Site 4
Site 4 is located at the intersection of a line between two points of land and a line parallel to the north edge of an inlet (see Figure A2). The depth at Site 4 should be at least 90 m deep. The GPS coordinates for Site 4 on August 5, 1993 were: 48° 41.53 N, 122° 18.01 W.

Site Code	Years Used	Site Description
1	1985–present	Located at approximately the deepest
11	1987–present	point in basin 1
A	1982–1984	
14	1982	(14 is near Site 1)
7	1960's–1981	
2	1985–present	Located at approximately the deepest
22	1987–present	point in basin 2
B	1982–1984	
13	1982	
6	1960's–1981	
Intake	1980–present	Located at the intake in basin 2
21	1987–present	
3	1985–present	Located at approximately the deepest
31	1987–present	point in N. sub-basin of basin 3
C	1982–1984	
5	1960's–1981	
4	1985–present	Located at approximately the deepest
32	1987–present	point in S. sub-basin of basin 3
E	1982–1984	
10	1960's–1981	

Table 20: Summary of site codes for Lake Whatcom water quality sampling.

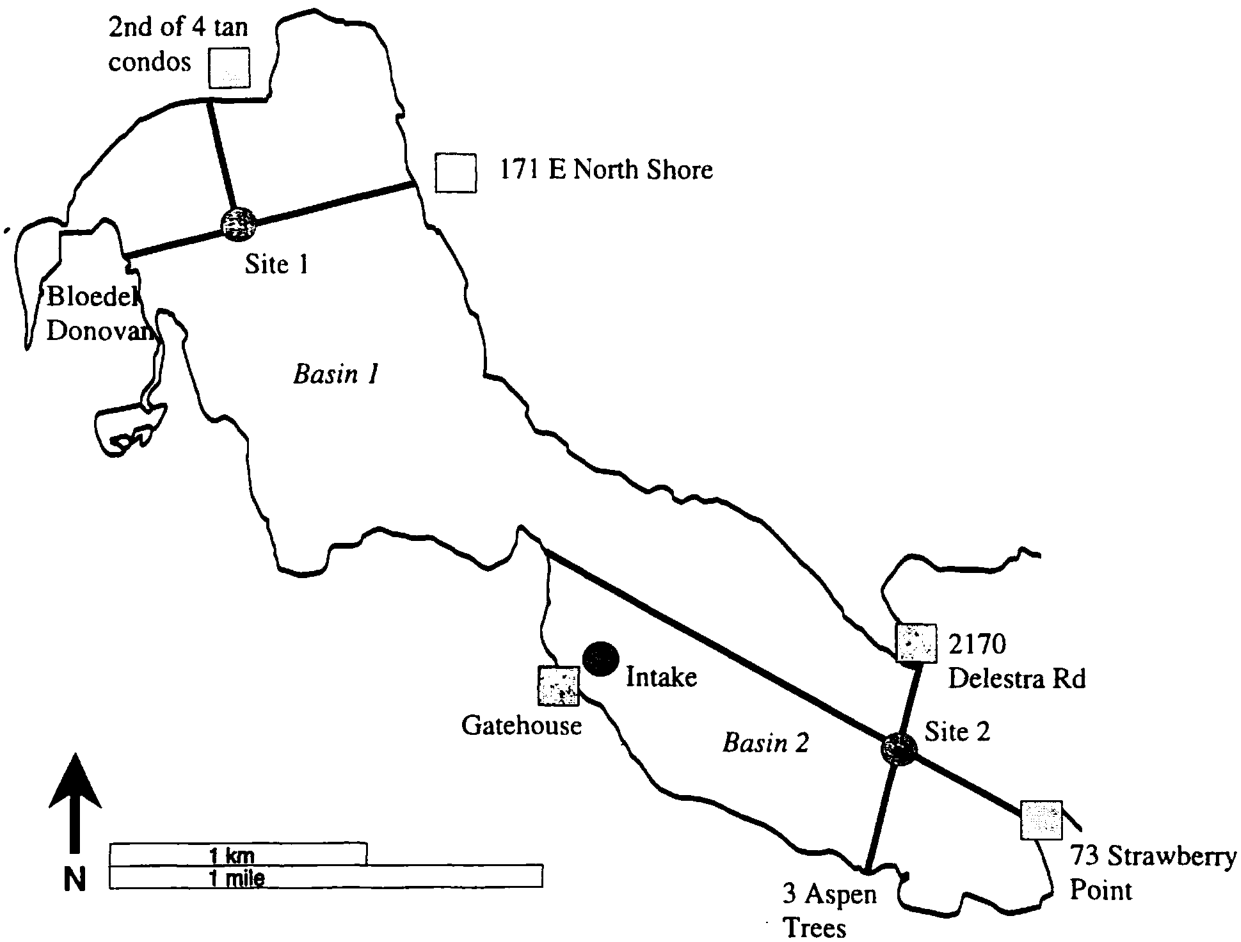


Figure 155: Basin 1 and 2 site locations. See text for descriptions of local landmarks. All distances and locations are approximate.

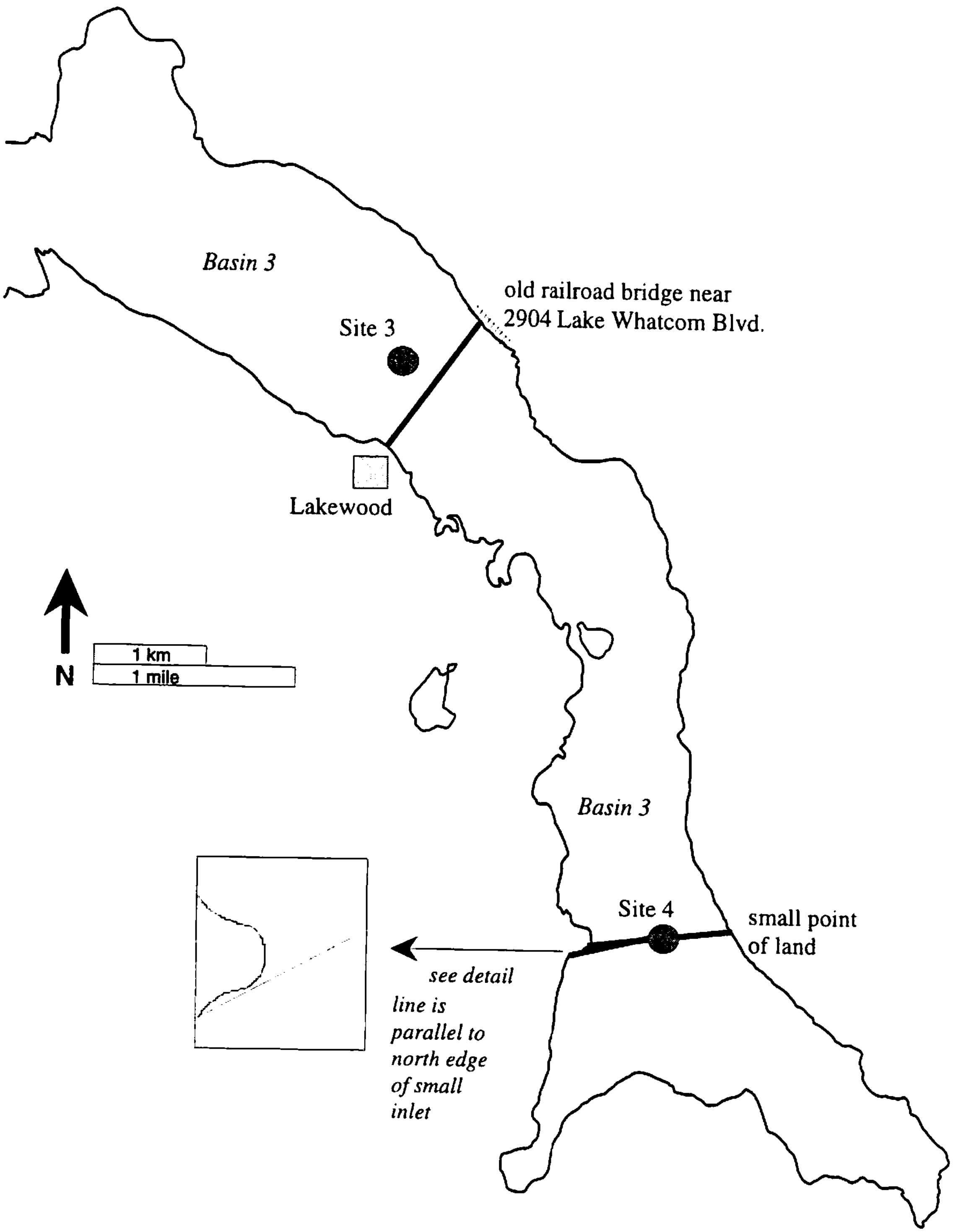


Figure 156: Basin 3 site locations. See text for descriptions of local landmarks. All distances and locations are approximate.

A.2 Creek Monitoring Sites

The routine creek monitoring sites are described in detail by Walker, et al. (1992), and summarized below.

Smith Creek:
Samples are collected approximately 100 yards upstream from Lake Whatcom.

Silver Beach Creek:
All routine monitoring samples are collected immediately upstream from the culvert under North Shore Road.

Park Place storm drain:
Samples are collected inside the storm drain under Park Place (road off of North Shore Drive.) When the lake level is low enough, samples can be collected at the mouth of the outlet pipe flowing into the lake.

Austin Creek:
The site is located at the Sudden Valley golf course approximately 1800 ft upstream from where the creek flows into Lake Whatcom.

Wildwood Creek:
The site is located approximately 30 feet south of the entrance to the Wildwood Resort at the culvert where South Lake Whatcom Boulevard crosses the creek.

Anderson Creek:
The site is located at the bridge where South Bay Drive crosses the creek. Water samples and discharge measurements are collected upstream from the bridge.

Blue Canyon Creek:
This small creek is not shown on the USGS topographic map for the area. However, it is located just north of the two major Blue Canyon streams pictured on the USGS Lake Whatcom 7.5 min. quadrangle (Sect. 22, T 37N, R 4E).. Samples are collected upstream from the culvert crossing the Blue Canyon road.

B Lake and Creek Data

CAUTION! Not all of the raw data contained in this Appendix have been edited to remove "bdl" data, negative values, outliers, or other extreme values. All bdl values are plotted at their detection limit in the report figures; outliers and questionable values are discussed in the text, if appropriate. Therefore, you are cautioned against using these raw data without including the necessary qualifiers.

The 1994/95 Lake Whatcom water quality data, including data from representative creeks and special sampling projects, are included on the following pages. The detection limits for each parameter are shown below. The detection limits for each parameter were estimated based on recommended lower detection ranges (APHA, 1992; EPA 1983), instrument limitations, and analyst judgement on the lowest repeatable concentration for each test. Accordingly, the detection limits used in this report are a conservative estimate of the lowest concentration that we can measure with reasonable certainty.

Variable	Detection Limits (dl) or Sensitivity (±)	Variable	Detection Limits (dl) or Sensitivity (±)
Alkalinity	± 0.1 mg/L	Nitrogen, ammonia	dl = 5 μg/L
Carbon, total organic	± 0.1 mg/L	Nitrogen, nitrate/nitrite	dl = 50 μg/L
Chlorophyll *a*	± 0.1 mg/m^3	Nitrogen, total nitrogen	dl = 100 μg/L
Coliforms, fecal	dl ≤ 2 col/100 mL	Oxygen, Hydrolab	± 0.1 mg/L
Coliforms, total	dl ≤ 2 col/100 mL	Oxygen, Winkler	± 0.1 μg/L
Conductivity, Hydrolab	± 2 μMHO/cm	pH, Hydrolab	± 0.1 pH unit
Conductivity, lab	± 2 μMHO/cm	pH, lab	± 0.1 pH unit
Enterococcus	dl ≤ 2 col/100 mL	Phosphate, soluble reactive	dl = 5 μg/L
Metals, total arsenic*	dl = 30 μg/L	Phosphorus, total	dl = 5 μg/L
Metals, total cadmium*	dl = 2 μg/L	Secchi depth	± 0.1 m
Metals, total chromium*	dl = 6 μg/L	Temperature	± 0.1° C
Metals, total copper*	dl = 2 μg/L	Total Suspended Solids	dl = 2 mg/L
Metals, total iron*	dl = 10 μg/L	Turbidity	± 0.2 NTU
Metals, total lead*	dl = 1 μg/L		
Metals, total mercury*	dl = 10 μg/L		
Metals, total nickel*	dl = 10 μg/L		
Metals, total zinc*	dl = 2 μg/L		

B.1 Lake Whatcom Hydrolab and Lab Conductivity Data

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Gate	00	11	08	94	11.4	7.4	64	10.70	62.8	*
Gate	00	10	04	94	18.2	7.5	63	9.37	62.7	*
Gate	00	12	13	94	7.3	7.9	63	10.63	62.6	*
Gate	00	02	08	95	7.4	8.1	61	10.99	*	*
Gate	00	04	06	95	8.9	7.6	62	11.50	*	*
Gate	00	05	02	95	9.4	7.6	62	11.59	*	*
Gate	00	06	08	95	13.8	7.6	63	10.40	62.2	*
Gate	00	07	05	95	18.1	7.5	63	9.66	*	*
Gate	00	08	01	95	18.2	7.4	62	9.62	62.3	*
Gate	00	09	11	95	19.2	7.4	64	9.75	62.9	*
Site 1	00	10	04	94	17.6	7.3	65	8.98	63.7	4.6
Site 1	01	10	04	94	17.6	7.4	65	8.90	*	*
Site 1	02	10	04	94	17.6	7.4	65	8.79	*	*
Site 1	03	10	04	94	17.6	7.4	64	8.76	*	*
Site 1	04	10	04	94	17.6	7.4	64	8.74	*	*
Site 1	05	10	04	94	17.6	7.4	64	8.73	63.8	*
Site 1	06	10	04	94	17.6	7.4	64	8.71	*	*
Site 1	07	10	04	94	17.6	7.4	64	8.68	*	*
Site 1	08	10	04	94	17.6	7.4	64	8.69	*	*
Site 1	09	10	04	94	17.6	7.4	64	8.64	*	*
Site 1	10	10	04	94	17.5	7.4	64	8.51	63.8	*
Site 1	11	10	04	94	14.4	6.8	77	0.10	*	*
Site 1	12	10	04	94	13.0	6.7	76	0.07	*	*
Site 1	13	10	04	94	11.9	6.7	77	0.03	*	*
Site 1	14	10	04	94	11.6	6.7	76	0.04	*	*
Site 1	15	10	04	94	11.3	6.7	77	0.04	77.4	*
Site 1	16	10	04	94	11.2	6.7	77	0.04	*	*
Site 1	17	10	04	94	11.1	6.7	77	0.04	*	*
Site 1	18	10	04	94	10.9	6.7	77	0.04	*	*
Site 1	19	10	04	94	10.8	6.7	78	0.04	*	*
Site 1	20	10	04	94	10.8	6.7	78	0.04	78.5	*
Site 1	00	11	08	94	10.0	7.3	65	10.70	64.8	3.6
Site 1	01	11	08	94	10.0	7.3	65	10.60	*	*
Site 1	02	11	08	94	10.0	7.4	65	10.56	*	*
Site 1	03	11	08	94	10.0	7.4	64	10.56	*	*
Site 1	04	11	08	94	10.0	7.4	65	10.51	*	*
Site 1	05	11	08	94	10.0	7.4	65	10.51	65.6	*
Site 1	06	11	08	94	10.0	7.4	65	10.46	*	*
Site 1	07	11	08	94	10.0	7.4	65	10.46	*	*
Site 1	08	11	08	94	10.0	7.4	65	10.46	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 1	09	11	08	94	10.0	7.4	65	10.42	*	*
Site 1	10	11	08	94	10.0	7.4	64	10.42	64.9	*
Site 1	11	11	08	94	10.0	7.4	64	10.42	*	*
Site 1	12	11	08	94	9.9	7.4	64	10.44	*	*
Site 1	13	11	08	94	10.0	7.4	64	10.42	*	*
Site 1	14	11	08	94	10.0	7.4	64	10.42	*	*
Site 1	15	11	08	94	10.0	7.4	64	10.42	65.0	*
Site 1	16	11	08	94	10.0	7.4	63	10.47	*	*
Site 1	17	11	08	94	10.0	7.4	63	10.42	*	*
Site 1	18	11	08	94	10.0	7.4	64	10.42	*	*
Site 1	19	11	08	94	9.9	7.4	64	10.51	*	*
Site 1	20	11	08	94	9.9	7.4	63	10.52	64.9	*
Site 1	00	12	13	94	5.7	7.7	65	10.76	64.0	5.3
Site 1	01	12	13	94	5.6	7.8	66	10.65	*	*
Site 1	02	12	13	94	5.6	7.8	65	10.32	*	*
Site 1	03	12	13	94	5.6	7.9	65	10.14	*	*
Site 1	04	12	13	94	5.6	7.9	65	10.40	*	*
Site 1	05	12	13	94	5.6	7.9	66	10.22	63.8	*
Site 1	06	12	13	94	5.6	7.9	65	10.17	*	*
Site 1	07	12	13	94	5.5	8.0	64	10.25	*	*
Site 1	08	12	13	94	5.5	8.0	64	10.25	*	*
Site 1	09	12	13	94	5.5	8.0	64	10.30	*	*
Site 1	10	12	13	94	5.5	8.0	64	10.07	63.9	*
Site 1	11	12	13	94	5.5	8.0	64	10.33	*	*
Site 1	12	12	13	94	5.5	8.0	64	10.20	*	*
Site 1	13	12	13	94	5.5	8.0	64	10.14	*	*
Site 1	14	12	13	94	5.5	7.9	63	9.95	*	*
Site 1	15	12	13	94	5.5	7.9	63	10.35	63.9	*
Site 1	16	12	13	94	5.5	7.9	64	10.30	*	*
Site 1	17	12	13	94	5.5	7.9	63	10.28	*	*
Site 1	18	12	13	94	5.5	7.9	63	10.50	*	*
Site 1	19	12	13	94	5.4	7.9	63	10.49	*	*
Site 1	20	12	13	94	5.4	7.9	64	10.00	63.9	*
Site 1	00	02	08	95	6.8	8.0	65	11.68	65.2	6.9
Site 1	01	02	08	95	6.8	8.1	65	11.50	*	*
Site 1	02	02	08	95	6.7	8.0	65	11.41	*	*
Site 1	03	02	08	95	6.7	8.0	64	11.26	*	*
Site 1	04	02	08	95	6.7	8.0	63	11.28	*	*
Site 1	05	02	08	95	6.6	7.9	64	11.22	63.8	*
Site 1	06	02	08	95	6.6	7.9	64	11.18	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 1	07	02	08	95	6.6	7.9	64	11.20	*	*
Site 1	08	02	08	95	6.6	7.9	64	11.12	*	*
Site 1	09	02	08	95	6.6	7.8	64	11.13	*	*
Site 1	10	02	08	95	6.6	7.8	64	11.14	*	*
Site 1	11	02	08	95	6.5	7.8	64	11.15	*	*
Site 1	12	02	08	95	6.5	7.8	63	11.15	*	*
Site 1	13	02	08	95	6.5	7.8	63	11.16	*	*
Site 1	14	02	08	95	6.5	7.8	63	11.11	*	*
Site 1	15	02	08	95	6.5	7.8	62	11.10	63.9	*
Site 1	16	02	08	95	6.5	7.8	63	11.12	*	*
Site 1	17	02	08	95	6.5	7.7	63	11.07	*	*
Site 1	18	02	08	95	6.4	7.7	63	11.10	*	*
Site 1	19	02	08	95	6.5	7.7	63	11.09	*	*
Site 1	20	02	08	95	6.4	7.7	63	11.04	*	*
Site 1	00	04	06	95	10.3	7.6	64	11.62	*	7.5
Site 1	01	04	06	95	10.2	7.7	65	11.38	*	*
Site 1	02	04	06	95	10.2	7.7	64	11.30	*	*
Site 1	03	04	06	95	10.2	7.7	64	11.28	*	*
Site 1	04	04	06	95	10.2	7.7	64	11.25	*	*
Site 1	05	04	06	95	10.1	7.7	64	11.23	64.1	*
Site 1	06	04	06	95	10.1	7.7	64	11.23	*	*
Site 1	07	04	06	95	9.8	7.7	64	11.25	*	*
Site 1	08	04	06	95	9.6	7.7	64	11.31	*	*
Site 1	09	04	06	95	9.4	7.7	64	11.33	*	*
Site 1	10	04	06	95	8.9	7.6	63	11.28	*	*
Site 1	11	04	06	95	8.6	7.5	64	11.06	*	*
Site 1	12	04	06	95	8.3	7.5	63	11.02	*	*
Site 1	13	04	06	95	8.3	7.5	63	11.00	*	*
Site 1	14	04	06	95	8.2	7.5	64	10.94	*	*
Site 1	15	04	06	95	8.2	7.5	63	10.87	64.1	*
Site 1	16	04	06	95	8.1	7.5	63	10.78	*	*
Site 1	17	04	06	95	8.1	7.4	63	10.80	*	*
Site 1	18	04	06	95	8.0	7.4	63	10.78	*	*
Site 1	19	04	06	95	8.0	7.4	63	10.76	*	*
Site 1	20	04	06	95	8.0	7.4	63	10.77	*	*
Site 1	00	05	02	95	13.5	7.5	65	10.78	64.0	7.6
Site 1	01	05	02	95	13.5	7.6	65	10.77	*	*
Site 1	02	05	02	95	13.6	7.6	66	10.77	*	*
Site 1	03	05	02	95	13.6	7.7	65	10.76	*	*
Site 1	04	05	02	95	13.6	7.7	65	10.72	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 1	05	05	02	95	13.4	7.7	65	10.70	*	*
Site 1	06	05	02	95	12.1	7.7	64	11.24	*	*
Site 1	07	05	02	95	11.6	7.6	64	11.28	*	*
Site 1	08	05	02	95	11.1	7.6	63	11.22	*	*
Site 1	09	05	02	95	10.8	7.5	63	11.01	*	*
Site 1	10	05	02	95	10.4	7.5	63	10.80	*	*
Site 1	11	05	02	95	10.3	7.4	64	10.53	*	*
Site 1	12	05	02	95	10.2	7.3	64	10.44	*	*
Site 1	13	05	02	95	10.0	7.3	63	10.17	*	*
Site 1	14	05	02	95	10.0	7.2	63	10.01	*	*
Site 1	15	05	02	95	9.9	7.2	63	9.81	*	*
Site 1	16	05	02	95	9.8	7.2	64	9.70	*	*
Site 1	17	05	02	95	9.7	7.1	63	9.62	*	*
Site 1	18	05	02	95	9.7	7.1	64	9.45	*	*
Site 1	19	05	02	95	9.6	7.1	64	9.30	*	*
Site 1	20	05	02	95	9.4	7.0	63	9.14	*	*
Site 1	00	06	08	95	19.0	8.0	64	10.10	63.1	6.3
Site 1	01	06	08	95	18.7	8.1	65	10.01	*	*
Site 1	02	06	08	95	18.5	8.1	64	10.00	*	*
Site 1	03	06	08	95	18.4	8.2	64	9.99	*	*
Site 1	04	06	08	95	18.2	8.2	64	10.02	*	*
Site 1	05	06	08	95	18.1	8.2	64	10.08	63.1	*
Site 1	06	06	08	95	17.1	8.2	64	10.64	*	*
Site 1	07	06	08	95	15.6	8.3	63	11.55	*	*
Site 1	08	06	08	95	14.5	8.2	63	11.36	*	*
Site 1	09	06	08	95	13.6	8.1	63	11.19	*	*
Site 1	10	06	08	95	12.9	7.9	64	10.62	62.6	*
Site 1	11	06	08	95	12.2	7.8	63	9.57	*	*
Site 1	12	06	08	95	11.7	7.5	64	8.44	*	*
Site 1	13	06	08	95	11.3	7.4	63	7.20	*	*
Site 1	14	06	08	95	10.9	7.2	64	6.77	*	*
Site 1	15	06	08	95	10.7	7.1	63	6.68	63.8	*
Site 1	16	06	08	95	10.6	7.0	64	6.53	*	*
Site 1	17	06	08	95	10.5	7.0	64	6.47	*	*
Site 1	18	06	08	95	10.5	6.9	64	6.39	*	*
Site 1	19	06	08	95	10.5	6.9	63	6.27	*	*
Site 1	20	06	08	95	10.4	6.9	64	6.29	64.1	*
Site 1	00	07	05	95	19.9	8.0	65	9.70	63.2	5.3
Site 1	01	07	05	95	19.9	8.2	65	9.71	*	*
Site 1	02	07	05	95	19.9	8.2	65	9.71	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 1	03	07	05	95	19.9	8.2	65	9.69	*	*
Site 1	04	07	05	95	19.9	8.3	65	9.70	*	*
Site 1	05	07	05	95	19.8	8.2	65	9.67	63.0	*
Site 1	06	07	05	95	19.8	8.2	64	9.62	*	*
Site 1	07	07	05	95	18.8	8.4	64	10.45	*	*
Site 1	08	07	05	95	17.1	8.3	64	10.50	*	*
Site 1	09	07	05	95	15.1	7.9	63	10.43	*	*
Site 1	10	07	05	95	13.6	7.6	63	8.69	*	*
Site 1	11	07	05	95	12.8	7.5	63	7.80	*	*
Site 1	12	07	05	95	11.8	7.2	64	5.68	*	*
Site 1	13	07	05	95	11.6	7.1	65	5.17	*	*
Site 1	14	07	05	95	11.3	7.0	65	4.51	*	*
Site 1	15	07	05	95	11.0	7.0	65	4.40	*	*
Site 1	16	07	05	95	10.9	6.9	64	4.24	*	*
Site 1	17	07	05	95	10.9	6.9	65	4.19	*	*
Site 1	18	07	05	95	10.9	6.9	64	4.16	*	*
Site 1	19	07	05	95	10.8	6.8	64	4.08	*	*
Site 1	20	07	05	95	10.8	6.8	65	3.86	*	*
Site 1	00	08	01	95	21.5	7.7	64	9.90	63.3	5.0
Site 1	01	08	01	95	21.3	8.0	64	9.56	*	*
Site 1	02	08	01	95	21.1	8.1	64	9.50	*	*
Site 1	03	08	01	95	21.0	8.2	64	9.47	*	*
Site 1	04	08	01	95	21.0	8.2	64	9.46	*	*
Site 1	05	08	01	95	20.9	8.2	64	9.40	63.2	*
Site 1	06	08	01	95	20.9	8.2	64	9.41	*	*
Site 1	07	08	01	95	20.9	8.2	64	9.38	*	*
Site 1	08	08	01	95	20.0	8.0	64	8.98	*	*
Site 1	09	08	01	95	17.2	7.6	63	8.80	*	*
Site 1	10	08	01	95	15.3	7.3	64	7.58	63.5	*
Site 1	11	08	01	95	13.4	7.0	66	4.28	*	*
Site 1	12	08	01	95	12.6	6.8	66	3.07	*	*
Site 1	13	08	01	95	11.9	6.8	65	2.16	*	*
Site 1	14	08	01	95	11.7	6.8	68	1.75	*	*
Site 1	15	08	01	95	11.5	6.7	67	1.54	67.8	*
Site 1	16	08	01	95	11.4	6.7	68	1.46	*	*
Site 1	17	08	01	95	11.3	6.7	67	1.37	*	*
Site 1	18	08	01	95	11.2	6.7	67	1.33	*	*
Site 1	19	08	01	95	11.1	6.7	67	1.25	*	*
Site 1	20	08	01	95	11.0	6.7	66	1.21	67.9	*
Site 1	00	09	11	95	19.9	7.8	65	10.30	*	4.7

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 1	01	09	11	95	19.9	8.3	65	9.91	*	*
Site 1	02	09	11	95	19.9	8.3	65	9.88	*	*
Site 1	03	09	11	95	19.9	8.3	65	9.81	*	*
Site 1	04	09	11	95	19.9	8.3	66	9.76	*	*
Site 1	05	09	11	95	19.8	8.3	65	9.62	63.9	*
Site 1	06	09	11	95	19.8	8.2	65	9.56	*	*
Site 1	07	09	11	95	19.6	8.1	65	9.46	*	*
Site 1	08	09	11	95	19.6	8.0	65	9.52	*	*
Site 1	09	09	11	95	18.3	7.1	65	6.36	*	*
Site 1	10	09	11	95	16.9	6.9	67	3.65	64.1	*
Site 1	11	09	11	95	14.6	6.7	70	0.07	*	*
Site 1	12	09	11	95	12.9	6.7	70	0.08	*	*
Site 1	13	09	11	95	12.3	6.7	70	0.08	*	*
Site 1	14	09	11	95	12.0	6.7	71	0.08	*	*
Site 1	15	09	11	95	11.8	6.7	71	0.08	70.7	*
Site 1	16	09	11	95	11.6	6.7	70	0.08	*	*
Site 1	17	09	11	95	11.5	6.7	70	0.08	*	*
Site 1	18	09	11	95	11.4	6.8	70	0.09	*	*
Site 1	19	09	11	95	11.3	6.7	70	0.04	*	*
Site 1	20	09	11	95	11.3	6.8	70	0.04	70.7	*
Intake	00	10	04	94	18.4	7.2	64	9.92	62.6	6.1
Intake	01	10	04	94	18.4	7.4	62	9.66	*	*
Intake	02	10	04	94	18.2	7.6	62	9.59	*	*
Intake	03	10	04	94	18.1	7.6	63	9.57	*	*
Intake	04	10	04	94	18.1	7.7	63	9.54	*	*
Intake	05	10	04	94	18.0	7.8	62	9.50	62.5	*
Intake	06	10	04	94	18.0	7.8	62	9.46	*	*
Intake	07	10	04	94	18.0	7.8	62	9.44	*	*
Intake	08	10	04	94	18.0	7.8	63	9.42	*	*
Intake	09	10	04	94	17.9	7.8	62	9.40	*	*
Intake	10	10	04	94	17.9	7.7	63	9.39	62.5	*
Intake	00	11	08	94	11.1	7.5	62	11.02	62.7	*
Intake	01	11	08	94	11.1	7.5	63	10.68	*	*
Intake	02	11	08	94	11.1	7.5	63	10.55	*	*
Intake	03	11	08	94	11.1	7.5	62	10.50	*	*
Intake	04	11	08	94	11.1	7.5	63	10.44	*	*
Intake	05	11	08	94	11.1	7.5	63	10.43	*	*
Intake	06	11	08	94	11.2	7.5	63	10.39	*	*
Intake	07	11	08	94	11.2	7.5	63	10.38	*	*
Intake	08	11	08	94	11.2	7.5	62	10.38	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Intake	09	11	08	94	11.2	7.5	63	10.38	*	*
Intake	10	11	08	94	11.2	7.5	62	10.38	*	*
Intake	00	12	13	94	6.9	7.6	62	10.05	62.3	3.6
Intake	01	12	13	94	6.9	7.6	62	9.52	*	*
Intake	02	12	13	94	6.9	7.6	63	9.57	*	*
Intake	03	12	13	94	6.9	7.6	62	9.50	*	*
Intake	04	12	13	94	6.9	7.6	62	9.63	*	*
Intake	05	12	13	94	6.9	7.6	62	9.65	62.3	*
Intake	06	12	13	94	6.9	7.6	62	9.30	*	*
Intake	07	12	13	94	6.9	7.6	62	9.60	*	*
Intake	08	12	13	94	6.8	7.6	61	9.42	*	*
Intake	09	12	13	94	6.8	7.6	62	9.30	*	*
Intake	10	12	13	94	6.8	7.6	62	9.44	62.5	*
Intake	00	02	08	95	7.6	7.7	62	11.80	*	6.3
Intake	01	02	08	95	7.4	7.7	62	11.30	*	*
Intake	02	02	08	95	7.0	7.7	62	11.24	*	*
Intake	03	02	08	95	7.0	7.7	62	11.02	*	*
Intake	04	02	08	95	7.0	7.6	62	10.99	*	*
Intake	05	02	08	95	6.9	7.6	62	10.95	62.4	*
Intake	06	02	08	95	6.9	7.6	62	10.91	*	*
Intake	07	02	08	95	6.9	7.5	62	10.87	*	*
Intake	08	02	08	95	6.8	7.5	62	10.88	*	*
Intake	09	02	08	95	6.8	7.5	61	10.84	*	*
Intake	10	02	08	95	6.8	7.5	62	10.87	62.2	*
Intake	00	04	06	95	9.3	7.8	62	11.96	*	5.4
Intake	01	04	06	95	9.3	7.8	63	11.84	*	*
Intake	02	04	06	95	9.3	7.8	63	11.78	*	*
Intake	03	04	06	95	9.3	7.8	63	11.77	*	*
Intake	04	04	06	95	9.3	7.8	63	11.75	*	*
Intake	05	04	06	95	9.3	7.8	62	11.76	62.3	*
Intake	06	04	06	95	9.3	7.8	63	11.71	*	*
Intake	07	04	06	95	9.2	7.8	62	11.72	*	*
Intake	08	04	06	95	9.2	7.8	61	11.72	*	*
Intake	09	04	06	95	9.2	7.8	63	11.68	*	*
Intake	10	04	06	95	9.2	7.8	63	11.71	*	*
Intake	00	05	02	95	12.8	7.8	64	12.03	*	5.5
Intake	01	05	02	95	12.8	8.0	63	11.61	*	*
Intake	02	05	02	95	12.8	8.0	63	11.51	*	*
Intake	03	05	02	95	12.6	8.1	64	11.60	*	*
Intake	04	05	02	95	12.1	8.2	63	11.84	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Intake	05	05	02	95	11.9	8.2	63	11.92	*	*
Intake	06	05	02	95	11.7	8.1	64	11.86	*	*
Intake	07	05	02	95	11.0	8.1	63	11.87	*	*
Intake	08	05	02	95	10.1	7.9	62	11.88	*	*
Intake	09	05	02	95	9.4	7.8	61	11.64	*	*
Intake	10	05	02	95	9.2	7.7	62	11.52	61.8	*
Intake	00	06	08	95	18.7	7.8	63	10.13	62.6	*
Intake	01	06	08	95	18.3	8.0	63	9.98	*	*
Intake	02	06	08	95	17.5	8.0	63	10.06	*	*
Intake	03	06	08	95	17.3	8.0	62	10.08	*	*
Intake	04	06	08	95	17.1	8.0	62	10.12	*	*
Intake	05	06	08	95	16.9	7.9	63	10.06	62.4	*
Intake	06	06	08	95	16.9	7.9	62	10.06	*	*
Intake	07	06	08	95	16.8	7.9	62	10.08	*	*
Intake	08	06	08	95	16.5	7.9	62	10.03	*	*
Intake	09	06	08	95	15.9	7.8	62	10.20	*	*
Intake	10	06	08	95	15.7	7.8	62	10.28	62.3	*
Intake	00	07	05	95	20.6	8.2	63	9.83	62.7	*
Intake	01	07	05	95	20.3	8.2	63	9.68	*	*
Intake	02	07	05	95	19.8	8.2	62	9.67	*	*
Intake	03	07	05	95	19.7	8.2	62	9.69	*	*
Intake	04	07	05	95	19.6	8.2	62	9.74	*	*
Intake	05	07	05	95	19.5	8.2	62	9.75	*	*
Intake	06	07	05	95	19.4	8.2	62	9.74	*	*
Intake	07	07	05	95	19.4	8.2	62	9.69	*	*
Intake	08	07	05	95	19.3	8.2	63	9.67	*	*
Intake	09	07	05	95	19.1	8.1	62	9.69	*	*
Intake	10	07	05	95	19.0	8.1	63	9.69	*	*
Intake	00	08	01	95	21.1	7.7	63	9.78	62.6	6.7
Intake	01	08	01	95	21.0	7.9	63	9.56	*	*
Intake	02	08	01	95	20.8	8.0	63	9.43	*	*
Intake	03	08	01	95	20.4	8.1	63	9.43	*	*
Intake	04	08	01	95	20.4	8.2	63	9.40	*	*
Intake	05	08	01	95	20.3	8.2	63	9.37	62.5	*
Intake	06	08	01	95	20.2	8.2	63	9.34	*	*
Intake	07	08	01	95	20.1	8.2	63	9.33	*	*
Intake	08	08	01	95	19.7	8.1	63	9.26	*	*
Intake	09	08	01	95	19.5	8.0	63	9.31	*	*
Intake	10	08	01	95	19.3	8.0	63	9.33	62.4	*
Intake	00	09	11	95	20.0	8.0	64	9.44	*	6.1

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Intake	01	09	11	95	20.0	8.0	64	9.43	*	*
Intake	02	09	11	95	19.7	8.1	63	9.44	*	*
Intake	03	09	11	95	19.4	8.2	64	9.51	*	*
Intake	04	09	11	95	19.4	8.2	64	9.50	*	*
Intake	05	09	11	95	19.3	8.2	64	9.50	*	*
Intake	06	09	11	95	19.3	8.2	64	9.51	*	*
Intake	07	09	11	95	19.3	8.2	64	9.51	*	*
Intake	08	09	11	95	19.2	8.2	64	9.45	*	*
Intake	09	09	11	95	19.1	8.0	63	9.27	*	*
Intake	10	09	11	95	19.1	7.8	64	9.12	*	*
Site 2	00	10	04	94	18.5	7.5	63	9.68	62.5	6.6
Site 2	01	10	04	94	18.4	7.6	64	9.58	*	*
Site 2	02	10	04	94	18.2	7.7	63	9.59	*	*
Site 2	03	10	04	94	18.1	7.7	63	9.55	*	*
Site 2	04	10	04	94	18.1	7.8	62	9.54	*	*
Site 2	05	10	04	94	18.1	7.8	63	9.49	62.7	*
Site 2	06	10	04	94	18.1	7.8	62	9.49	*	*
Site 2	07	10	04	94	18.1	7.8	63	9.41	*	*
Site 2	08	10	04	94	18.1	7.7	63	9.39	*	*
Site 2	09	10	04	94	18.1	7.7	63	9.31	*	*
Site 2	10	10	04	94	18.0	7.7	62	9.28	62.5	*
Site 2	11	10	04	94	18.0	7.7	62	9.29	*	*
Site 2	12	10	04	94	18.0	7.6	62	9.21	*	*
Site 2	13	10	04	94	17.8	7.6	62	7.79	*	*
Site 2	14	10	04	94	15.7	6.7	65	0.25	*	*
Site 2	15	10	04	94	13.8	6.5	65	0.03	62.6	*
Site 2	16	10	04	94	12.2	6.5	71	0.03	*	*
Site 2	17	10	04	94	11.4	6.5	74	0.04	67.7	*
Site 2	00	11	08	94	11.1	7.4	63	10.79	62.8	4.3
Site 2	01	11	08	94	11.1	7.4	63	10.64	*	*
Site 2	02	11	08	94	11.1	7.4	63	10.49	*	*
Site 2	03	11	08	94	11.2	7.4	63	10.43	*	*
Site 2	04	11	08	94	11.2	7.4	63	10.43	*	*
Site 2	05	11	08	94	11.2	7.5	63	10.38	62.8	*
Site 2	06	11	08	94	11.2	7.5	63	10.38	*	*
Site 2	07	11	08	94	11.2	7.5	63	10.38	*	*
Site 2	08	11	08	94	11.2	7.5	63	10.37	*	*
Site 2	09	11	08	94	11.2	7.5	63	10.37	*	*
Site 2	10	11	08	94	11.2	7.5	63	10.37	62.7	*
Site 2	11	11	08	94	11.2	7.5	63	10.37	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 2	12	11	08	94	11.2	7.5	62	10.33	*	*
Site 2	13	11	08	94	11.2	7.5	62	10.37	*	*
Site 2	14	11	08	94	11.2	7.5	62	10.32	*	*
Site 2	15	11	08	94	11.2	7.5	62	10.32	62.7	*
Site 2	16	11	08	94	11.1	7.5	63	10.33	*	*
Site 2	17	11	08	94	11.1	7.5	62	10.31	62.9	*
Site 2	00	12	13	94	6.9	7.4	64	10.04	62.3	3.6
Site 2	01	12	13	94	7.0	7.5	63	9.79	*	*
Site 2	02	12	13	94	7.0	7.5	63	9.39	*	*
Site 2	03	12	13	94	7.0	7.5	63	8.80	*	*
Site 2	04	12	13	94	7.0	7.5	63	9.22	*	*
Site 2	05	12	13	94	6.9	7.5	62	9.00	62.4	*
Site 2	06	12	13	94	6.9	7.5	62	9.45	*	*
Site 2	07	12	13	94	6.9	7.5	62	9.58	*	*
Site 2	08	12	13	94	6.9	7.5	62	9.41	*	*
Site 2	09	12	13	94	6.8	7.5	62	9.12	*	*
Site 2	10	12	13	94	6.8	7.5	62	9.23	62.3	*
Site 2	11	12	13	94	6.8	7.5	62	9.36	*	*
Site 2	12	12	13	94	6.8	7.5	62	9.42	*	*
Site 2	13	12	13	94	6.8	7.5	62	9.43	*	*
Site 2	14	12	13	94	6.8	7.4	61	9.61	*	*
Site 2	15	12	13	94	6.8	7.5	61	9.44	62.3	*
Site 2	16	12	13	94	6.8	7.5	62	9.15	*	*
Site 2	17.4	12	13	94	6.8	7.4	62	9.40	62.4	*
Site 2	00	02	08	95	7.9	7.8	62	11.70	*	6.8
Site 2	01	02	08	95	7.7	7.8	62	11.24	*	*
Site 2	02	02	08	95	7.3	7.7	62	11.16	*	*
Site 2	03	02	08	95	7.1	7.7	63	11.08	*	*
Site 2	04	02	08	95	7.0	7.7	62	11.07	*	*
Site 2	05	02	08	95	7.0	7.7	63	11.03	*	*
Site 2	06	02	08	95	7.0	7.6	63	10.97	*	*
Site 2	07	02	08	95	7.0	7.6	62	10.99	*	*
Site 2	08	02	08	95	7.0	7.6	61	10.93	*	*
Site 2	09	02	08	95	6.9	7.6	62	10.93	*	*
Site 2	10	02	08	95	6.9	7.5	61	10.94	62.1	*
Site 2	11	02	08	95	6.9	7.5	62	10.94	*	*
Site 2	12	02	08	95	6.9	7.5	61	10.88	*	*
Site 2	13	02	08	95	6.9	7.5	61	10.88	*	*
Site 2	14	02	08	95	6.9	7.5	61	10.89	*	*
Site 2	15	02	08	95	6.9	7.5	61	10.89	62.1	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 2	16	02	08	95	6.9	7.5	61	10.90	*	*
Site 2	17	02	08	95	6.9	7.5	61	10.84	*	*
Site 2	00	04	06	95	9.2	7.8	63	11.78	62.0	5.9
Site 2	01	04	06	95	9.2	7.8	64	11.78	*	*
Site 2	02	04	06	95	9.2	7.8	63	11.80	*	*
Site 2	03	04	06	95	9.1	7.8	62	11.80	*	*
Site 2	04	04	06	95	9.1	7.8	63	11.81	*	*
Site 2	05	04	06	95	9.0	7.8	62	11.82	*	*
Site 2	06	04	06	95	9.0	7.8	61	11.80	*	*
Site 2	07	04	06	95	9.0	7.8	63	11.78	*	*
Site 2	08	04	06	95	9.0	7.8	62	11.84	*	*
Site 2	09	04	06	95	8.9	7.8	62	11.79	*	*
Site 2	10	04	06	95	8.9	7.8	62	11.76	62.0	*
Site 2	11	04	06	95	7.5	7.6	62	11.25	*	*
Site 2	12	04	06	95	7.3	7.5	62	11.23	*	*
Site 2	13	04	06	95	7.3	7.5	62	11.23	*	*
Site 2	14	04	06	95	7.2	7.4	62	11.20	*	*
Site 2	15	04	06	95	7.1	7.4	62	11.07	*	*
Site 2	16	04	06	95	7.1	7.4	61	11.11	*	*
Site 2	17	04	06	95	7.1	7.4	62	11.03	*	*
Site 2	18	04	06	95	7.0	7.3	61	10.94	62.0	*
Site 2	00	05	02	95	12.8	8.1	64	11.47	*	*
Site 2	01	05	02	95	12.5	8.1	64	11.54	*	*
Site 2	02	05	02	95	12.2	8.1	64	11.73	*	*
Site 2	03	05	02	95	12.1	8.2	63	11.80	*	*
Site 2	04	05	02	95	12.0	8.2	63	11.84	*	*
Site 2	05	05	02	95	11.8	8.2	63	11.98	62.0	*
Site 2	06	05	02	95	11.4	8.1	63	11.95	*	*
Site 2	07	05	02	95	11.0	8.0	63	11.83	*	*
Site 2	08	05	02	95	9.9	7.8	62	11.70	*	*
Site 2	09	05	02	95	9.6	7.8	62	11.70	*	*
Site 2	10	05	02	95	9.3	7.7	62	11.60	*	*
Site 2	11	05	02	95	8.9	7.6	61	11.39	*	*
Site 2	12	05	02	95	8.7	7.6	63	11.36	*	*
Site 2	13	05	02	95	8.6	7.5	62	11.25	*	*
Site 2	14	05	02	95	8.4	7.5	63	11.23	*	*
Site 2	15	05	02	95	8.4	7.5	62	11.15	*	*
Site 2	16	05	02	95	8.3	7.4	61	11.18	*	*
Site 2	17	05	02	95	8.3	7.4	61	11.17	*	*
Site 2	18	05	02	95	8.3	7.4	62	11.13	61.8	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 2	00	06	08	95	18.5	7.8	63	10.00	62.6	*
Site 2	01	06	08	95	18.4	8.0	63	9.98	*	*
Site 2	02	06	08	95	18.2	8.0	63	9.97	*	*
Site 2	03	06	08	95	17.6	8.0	63	9.94	*	*
Site 2	04	06	08	95	17.3	8.0	62	10.02	*	*
Site 2	05	06	08	95	17.1	8.0	62	10.00	62.4	*
Site 2	06	06	08	95	17.0	8.0	63	10.05	*	*
Site 2	07	06	08	95	16.8	8.0	63	10.06	*	*
Site 2	08	06	08	95	16.5	7.9	62	10.13	*	*
Site 2	09	06	08	95	16.1	7.9	62	10.09	*	*
Site 2	10	06	08	95	15.9	7.9	62	10.20	62.2	*
Site 2	11	06	08	95	14.9	7.9	62	10.35	*	*
Site 2	12	06	08	95	13.1	7.8	61	10.37	*	*
Site 2	13	06	08	95	11.8	7.7	62	10.28	*	*
Site 2	14	06	08	95	11.1	7.6	60	10.05	*	*
Site 2	15	06	08	95	10.8	7.5	62	9.90	62.1	*
Site 2	16	06	08	95	10.5	7.5	61	9.57	*	*
Site 2	17	06	08	95	10.2	7.4	61	8.83	*	*
Site 2	18	06	08	95	10.1	7.3	60	8.95	*	*
Site 2	19	06	08	95	10.0	7.3	61	8.51	*	*
Site 2	20	06	08	95	10.0	7.3	62	8.26	62.2	*
Site 2	00	07	05	95	20.5	8.1	62	9.65	62.5	*
Site 2	01	07	05	95	20.5	8.1	62	9.60	*	*
Site 2	02	07	05	95	20.2	8.1	63	9.63	*	*
Site 2	03	07	05	95	19.8	8.2	63	9.70	*	*
Site 2	04	07	05	95	19.7	8.2	63	9.68	*	*
Site 2	05	07	05	95	19.6	8.2	63	9.69	*	*
Site 2	06	07	05	95	19.6	8.2	62	9.70	*	*
Site 2	07	07	05	95	19.5	8.2	62	9.85	*	*
Site 2	08	07	05	95	19.3	8.2	63	9.69	*	*
Site 2	09	07	05	95	19.3	8.1	63	9.68	*	*
Site 2	10	07	05	95	19.3	8.1	62	9.72	61.8	*
Site 2	11	07	05	95	19.0	8.0	63	9.63	*	*
Site 2	12	07	05	95	17.1	8.0	62	10.17	*	*
Site 2	13	07	05	95	15.5	7.8	62	9.91	*	*
Site 2	14	07	05	95	12.4	7.5	62	8.87	*	*
Site 2	15	07	05	95	11.8	7.3	62	8.66	63.1	*
Site 2	16	07	05	95	11.3	7.2	61	7.73	*	*
Site 2	17	07	05	95	10.6	7.0	62	5.80	*	*
Site 2	18	07	05	95	10.4	7.0	62	5.54	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 2	00	08	01	95	21.1	7.8	63	9.59	62.4	7.0
Site 2	01	08	01	95	21.1	7.9	63	9.41	*	*
Site 2	02	08	01	95	20.7	8.0	63	9.36	*	*
Site 2	03	08	01	95	20.5	8.1	63	9.40	*	*
Site 2	04	08	01	95	20.4	8.2	63	9.38	*	*
Site 2	05	08	01	95	20.3	8.2	63	9.38	62.6	*
Site 2	06	08	01	95	20.3	8.2	63	9.37	*	*
Site 2	07	08	01	95	20.2	8.2	63	9.35	*	*
Site 2	08	08	01	95	20.1	8.2	63	9.31	*	*
Site 2	09	08	01	95	19.9	8.1	63	9.29	*	*
Site 2	10	08	01	95	19.6	8.0	63	9.24	62.4	*
Site 2	11	08	01	95	19.2	7.9	62	9.32	*	*
Site 2	12	08	01	95	16.8	7.7	62	9.48	*	*
Site 2	13	08	01	95	15.2	7.5	62	9.05	*	*
Site 2	14	08	01	95	14.2	7.4	62	8.57	*	*
Site 2	15	08	01	95	12.5	7.1	63	6.76	62.4	*
Site 2	16	08	01	95	11.7	7.0	63	5.17	*	*
Site 2	17	08	01	95	11.1	6.9	63	3.85	*	*
Site 2	18	08	01	95	10.9	6.8	63	3.45	63.7	*
Site 2	00	09	11	95	20.0	8.0	64	9.78	*	6.1
Site 2	01	09	11	95	20.0	8.1	64	9.60	*	*
Site 2	02	09	11	95	19.5	8.2	64	9.60	*	*
Site 2	03	09	11	95	19.4	8.2	63	9.62	*	*
Site 2	04	09	11	95	19.3	8.3	64	9.62	*	*
Site 2	05	09	11	95	19.2	8.3	63	9.62	62.6	*
Site 2	06	09	11	95	19.2	8.3	63	9.60	*	*
Site 2	07	09	11	95	19.2	8.2	63	9.57	*	*
Site 2	08	09	11	95	19.1	8.2	63	9.54	*	*
Site 2	09	09	11	95	19.1	8.1	63	9.39	*	*
Site 2	10	09	11	95	19.1	8.1	63	9.38	*	*
Site 2	11	09	11	95	18.8	7.9	63	9.17	*	*
Site 2	12	09	11	95	18.2	7.6	63	8.53	*	*
Site 2	13	09	11	95	17.7	7.4	64	8.18	*	*
Site 2	14	09	11	95	16.0	7.1	64	5.45	*	*
Site 2	15	09	11	95	14.1	6.8	66	2.45	*	*
Site 2	16	09	11	95	12.0	6.6	67	0.21	*	*
Site 2	17	09	11	95	11.3	6.6	68	0.09	*	*
Site 2	18	09	11	95	11.1	6.6	69	0.04	*	*
Site 3	00	10	04	94	18.4	7.3	65	10.01	62.6	8.0
Site 3	01	10	04	94	18.3	7.5	64	9.81	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	02	10	04	94	18.2	7.7	63	9.76	*	*
Site 3	03	10	04	94	18.2	7.8	62	9.73	*	*
Site 3	04	10	04	94	18.2	7.9	62	9.71	*	*
Site 3	05	10	04	94	18.1	7.9	62	9.69	62.6	*
Site 3	06	10	04	94	18.1	7.9	63	9.66	*	*
Site 3	07	10	04	94	18.1	7.9	63	9.66	*	*
Site 3	08	10	04	94	18.1	7.9	62	9.61	*	*
Site 3	09	10	04	94	18.1	7.9	63	9.61	*	*
Site 3	10	10	04	94	18.1	7.9	63	9.57	62.5	*
Site 3	15	10	04	94	17.2	7.7	63	8.96	*	*
Site 3	20	10	04	94	11.4	7.6	62	8.70	62.1	*
Site 3	25	10	04	94	8.3	7.4	60	9.03	*	*
Site 3	30	10	04	94	7.7	7.3	60	9.24	*	*
Site 3	00	11	08	94	11.4	7.2	62	11.22	*	*
Site 3	01	11	08	94	11.4	7.3	62	10.75	*	*
Site 3	02	11	08	94	11.4	7.3	63	10.54	*	*
Site 3	03	11	08	94	11.4	7.4	62	10.34	*	*
Site 3	04	11	08	94	11.5	7.4	62	10.29	*	*
Site 3	05	11	08	94	11.5	7.4	62	10.29	*	*
Site 3	06	11	08	94	11.5	7.4	61	10.29	*	*
Site 3	07	11	08	94	11.5	7.4	62	10.29	*	*
Site 3	08	11	08	94	11.5	7.4	62	10.37	*	*
Site 3	09	11	08	94	11.5	7.4	61	10.23	*	*
Site 3	10	11	08	94	11.5	7.4	61	10.23	*	*
Site 3	15	11	08	94	11.5	7.4	63	10.23	*	*
Site 3	20	11	08	94	11.5	7.4	61	10.23	*	*
Site 3	25	11	08	94	9.3	7.3	60	8.74	*	*
Site 3	30	11	08	94	7.7	7.2	60	8.91	*	*
Site 3	35	11	08	94	7.5	7.2	61	8.90	*	*
Site 3	40	11	08	94	7.3	7.1	60	8.93	62.5	*
Site 3	45	11	08	94	7.2	7.1	60	8.94	*	*
Site 3	50	11	08	94	7.1	7.0	61	8.92	*	*
Site 3	55	11	08	94	7.0	7.0	62	8.88	*	*
Site 3	60	11	08	94	6.9	7.0	62	8.17	62.7	*
Site 3	65	11	08	94	6.8	6.9	62	7.66	*	*
Site 3	70	11	08	94	6.8	6.9	62	7.55	*	*
Site 3	75	11	08	94	6.8	6.9	61	7.56	*	*
Site 3	79	11	08	94	6.8	6.8	61	7.51	63.3	*
Site 3	00	12	13	94	7.2	7.5	63	9.96	62.4	3.2
Site 3	01	12	13	94	7.3	7.6	63	9.43	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	02	12	13	94	7.3	7.6	63	9.36	*	*
Site 3	03	12	13	94	7.3	7.7	63	9.25	*	*
Site 3	04	12	13	94	7.3	7.7	63	9.30	*	*
Site 3	05	12	13	94	7.3	7.7	63	9.35	62.3	*
Site 3	06	12	13	94	7.3	7.7	63	9.29	*	*
Site 3	07	12	13	94	7.3	7.7	62	9.23	*	*
Site 3	08	12	13	94	7.3	7.7	63	9.23	*	*
Site 3	09	12	13	94	7.3	7.7	62	9.20	*	*
Site 3	10	12	13	94	7.3	7.6	61	9.23	62.3	*
Site 3	15	12	13	94	7.3	7.6	62	9.11	*	*
Site 3	20	12	13	94	7.3	7.6	62	8.88	62.4	*
Site 3	25	12	13	94	7.3	7.6	62	9.16	*	*
Site 3	30	12	13	94	7.3	7.6	61	9.16	*	*
Site 3	35	12	13	94	7.3	7.5	60	9.00	*	*
Site 3	40	12	13	94	7.3	7.5	60	8.99	62.3	*
Site 3	45	12	13	94	7.3	7.5	61	8.99	*	*
Site 3	50	12	13	94	7.3	7.5	61	8.93	*	*
Site 3	55	12	13	94	7.3	7.5	60	8.70	*	*
Site 3	60	12	13	94	7.2	7.4	61	8.74	62.4	*
Site 3	65	12	13	94	7.2	7.4	61	8.69	*	*
Site 3	70	12	13	94	7.2	7.4	62	8.24	*	*
Site 3	75	12	13	94	7.1	7.3	61	7.97	*	*
Site 3	79.4	12	13	94	7.2	7.3	60	7.85	62.5	*
Site 3	00	02	08	95	7.5	7.8	63	11.11	*	8.0
Site 3	01	02	08	95	7.2	7.7	63	10.80	*	*
Site 3	02	02	08	95	7.0	7.7	62	10.59	*	*
Site 3	03	02	08	95	6.9	7.6	61	10.55	*	*
Site 3	04	02	08	95	6.9	7.6	62	10.51	*	*
Site 3	05	02	08	95	6.8	7.6	62	10.48	62.2	*
Site 3	06	02	08	95	6.8	7.5	62	10.49	*	*
Site 3	07	02	08	95	6.8	7.5	62	10.49	*	*
Site 3	08	02	08	95	6.8	7.5	62	10.51	*	*
Site 3	09	02	08	95	6.8	7.5	62	10.51	*	*
Site 3	10	02	08	95	6.7	7.5	62	10.46	*	*
Site 3	15	02	08	95	6.7	7.4	62	10.46	*	*
Site 3	20	02	08	95	6.7	7.4	61	10.48	*	*
Site 3	25	02	08	95	6.7	7.4	61	10.48	*	*
Site 3	30	02	08	95	6.7	7.4	59	10.48	*	*
Site 3	35	02	08	95	6.7	7.4	61	10.43	*	*
Site 3	40	02	08	95	6.7	7.4	61	10.42	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	45	02	08	95	6.7	7.3	61	10.43	*	*
Site 3	50	02	08	95	6.7	7.3	61	10.43	*	*
Site 3	55	02	08	95	6.7	7.3	60	10.37	*	*
Site 3	60	02	08	95	6.7	7.3	61	10.38	62.2	*
Site 3	65	02	08	95	6.7	7.3	61	10.39	*	*
Site 3	70	02	08	95	6.6	7.3	61	10.21	*	*
Site 3	75	02	08	95	6.6	7.3	60	10.16	*	*
Site 3	80	02	08	95	6.6	7.3	61	10.10	*	*
Site 3	00	04	06	95	*	*	*	*	*	*
Site 3	01	04	06	95	*	*	*	*	*	*
Site 3	02	04	06	95	*	*	*	*	*	*
Site 3	03	04	06	95	*	*	*	*	*	*
Site 3	04	04	06	95	*	*	*	*	*	*
Site 3	05	04	06	95	*	*	*	*	*	*
Site 3	06	04	06	95	*	*	*	*	*	*
Site 3	07	04	06	95	*	*	*	*	*	*
Site 3	08	04	06	95	*	*	*	*	*	*
Site 3	09	04	06	95	*	*	*	*	*	*
Site 3	10	04	06	95	*	*	*	*	*	*
Site 3	15	04	06	95	*	*	*	*	*	*
Site 3	20	04	06	95	*	*	*	*	*	*
Site 3	25	04	06	95	*	*	*	*	*	*
Site 3	30	04	06	95	*	*	*	*	*	*
Site 3	35	04	06	95	*	*	*	*	*	*
Site 3	40	04	06	95	*	*	*	*	*	*
Site 3	45	04	06	95	*	*	*	*	*	*
Site 3	50	04	06	95	*	*	*	*	*	*
Site 3	55	04	06	95	*	*	*	*	*	*
Site 3	60	04	06	95	*	*	*	*	*	*
Site 3	65	04	06	95	*	*	*	*	*	*
Site 3	70	04	06	95	*	*	*	*	*	*
Site 3	75	04	06	95	*	*	*	*	*	*
Site 3	80	04	06	95	*	*	*	*	*	*
Site 3	35	10	04	94	7.4	7.3	60	9.29	*	*
Site 3	40	10	04	94	7.3	7.2	60	9.35	62.2	*
Site 3	45	10	04	94	7.2	7.2	59	9.43	*	*
Site 3	50	10	04	94	7.1	7.2	60	9.34	*	*
Site 3	55	10	04	94	7.1	7.1	59	9.30	*	*
Site 3	60	10	04	94	7.0	7.1	59	9.08	62.4	*
Site 3	65	10	04	94	7.0	7.1	60	8.90	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	70	10	04	94	7.0	7.0	60	8.47	*	*
Site 3	75	10	04	94	6.8	7.0	61	7.70	*	*
Site 3	79.6	10	04	94	6.8	6.8	70	3.47	64.2	*
Site 3	00	05	02	95	*	*	*	*	*	*
Site 3	01	05	02	95	*	*	*	*	*	*
Site 3	02	05	02	95	*	*	*	*	*	*
Site 3	03	05	02	95	*	*	*	*	*	*
Site 3	04	05	02	95	*	*	*	*	*	*
Site 3	05	05	02	95	*	*	*	*	*	*
Site 3	06	05	02	95	*	*	*	*	*	*
Site 3	07	05	02	95	*	*	*	*	*	*
Site 3	08	05	02	95	*	*	*	*	*	*
Site 3	09	05	02	95	*	*	*	*	*	*
Site 3	10	05	02	95	*	*	*	*	*	*
Site 3	15	05	02	95	*	*	*	*	*	*
Site 3	20	05	02	95	*	*	*	*	*	*
Site 3	25	05	02	95	*	*	*	*	*	*
Site 3	30	05	02	95	*	*	*	*	*	*
Site 3	35	05	02	95	*	*	*	*	*	*
Site 3	40	05	02	95	*	*	*	*	*	*
Site 3	45	05	02	95	*	*	*	*	*	*
Site 3	50	05	02	95	*	*	*	*	*	*
Site 3	55	05	02	95	*	*	*	*	*	*
Site 3	60	05	02	95	*	*	*	*	*	*
Site 3	65	05	02	95	*	*	*	*	*	*
Site 3	70	05	02	95	*	*	*	*	*	*
Site 3	75	05	02	95	*	*	*	*	*	*
Site 3	80	05	02	95	*	*	*	*	*	*
Site 3	00	06	08	95	18.0	7.8	63	10.00	62.4	*
Site 3	01	06	08	95	18.0	7.9	63	9.93	*	*
Site 3	02	06	08	95	17.9	7.9	63	9.93	*	*
Site 3	03	06	08	95	17.6	8.0	63	9.94	*	*
Site 3	04	06	08	95	17.4	8.0	63	9.96	*	*
Site 3	05	06	08	95	17.3	8.0	63	10.03	62.4	*
Site 3	06	06	08	95	16.9	8.0	63	10.03	*	*
Site 3	07	06	08	95	16.9	8.0	62	10.06	*	*
Site 3	08	06	08	95	16.9	7.9	62	10.05	*	*
Site 3	09	06	08	95	16.8	8.0	62	10.07	*	*
Site 3	10	06	08	95	16.6	7.9	63	10.06	62.3	*
Site 3	15	06	08	95	12.6	7.8	61	10.61	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	20	06	08	95	9.5	7.7	60	10.66	62.0	*
Site 3	25	06	08	95	8.4	7.5	61	10.55	*	*
Site 3	30	06	08	95	7.8	7.5	60	10.45	*	*
Site 3	35	06	08	95	7.5	7.5	60	10.42	*	*
Site 3	40	06	08	95	7.3	7.4	61	10.42	62.2	*
Site 3	45	06	08	95	7.2	7.4	61	10.33	*	*
Site 3	50	06	08	95	7.1	7.4	60	10.30	*	*
Site 3	55	06	08	95	7.1	7.3	61	10.33	*	*
Site 3	60	06	08	95	7.0	7.3	60	10.29	62.2	*
Site 3	65	06	08	95	7.0	7.3	61	10.22	*	*
Site 3	70	06	08	95	6.9	7.3	59	9.91	*	*
Site 3	75	06	08	95	6.9	7.3	59	9.58	*	*
Site 3	80	06	08	95	6.9	7.2	62	9.20	62.4	*
Site 3	00	07	05	95	20.1	8.2	63	9.93	62.0	*
Site 3	01	07	05	95	19.9	8.2	63	9.75	*	*
Site 3	02	07	05	95	19.5	8.2	62	9.73	*	*
Site 3	03	07	05	95	19.4	8.3	63	9.72	*	*
Site 3	04	07	05	95	19.4	8.3	63	9.72	*	*
Site 3	05	07	05	95	19.3	8.2	63	9.70	61.7	*
Site 3	06	07	05	95	19.3	8.2	63	9.63	*	*
Site 3	07	07	05	95	19.3	8.2	63	9.67	*	*
Site 3	08	07	05	95	19.2	8.2	63	9.69	*	*
Site 3	09	07	05	95	19.1	8.2	63	9.70	*	*
Site 3	10	07	05	95	18.4	8.2	63	9.81	62.0	*
Site 3	15	07	05	95	14.5	8.0	62	10.24	*	*
Site 3	20	07	05	95	10.3	7.8	61	10.42	*	*
Site 3	25	07	05	95	8.5	7.5	61	10.37	*	*
Site 3	30	07	05	95	7.7	7.4	59	10.25	*	*
Site 3	35	07	05	95	7.4	7.3	60	10.24	*	*
Site 3	40	07	05	95	7.3	7.3	60	10.28	*	*
Site 3	45	07	05	95	7.2	7.3	60	10.30	*	*
Site 3	50	07	05	95	7.1	7.3	61	10.29	*	*
Site 3	55	07	05	95	7.1	7.3	60	10.25	*	*
Site 3	60	07	05	95	7.0	7.2	61	10.22	*	*
Site 3	65	07	05	95	7.0	7.2	60	10.12	*	*
Site 3	70	07	05	95	6.9	7.2	60	9.93	*	*
Site 3	75	07	05	95	6.9	7.2	60	9.70	*	*
Site 3	80	07	05	95	6.9	7.1	61	8.91	62.2	*
Site 3	00	08	02	95	20.6	7.5	63	9.70	*	*
Site 3	01	08	02	95	20.5	7.8	63	9.39	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	02	08	02	95	20.4	7.9	64	9.33	*	*
Site 3	03	08	02	95	20.3	8.0	64	9.30	*	*
Site 3	04	08	02	95	20.2	8.0	64	9.29	*	*
Site 3	05	08	02	95	20.2	8.1	64	9.27	*	*
Site 3	06	08	02	95	20.1	8.1	64	9.29	*	*
Site 3	07	08	02	95	19.9	8.1	63	9.35	*	*
Site 3	08	08	02	95	19.8	8.1	63	9.38	*	*
Site 3	09	08	02	95	19.4	8.0	63	9.40	*	*
Site 3	10	08	02	95	18.9	8.0	63	9.41	*	*
Site 3	15	08	02	95	14.4	7.6	63	9.79	*	*
Site 3	20	08	02	95	10.6	7.5	62	9.80	*	*
Site 3	25	08	02	95	8.7	7.3	62	9.79	*	*
Site 3	30	08	02	95	8.0	7.3	62	9.76	*	*
Site 3	35	08	02	95	7.6	7.2	62	9.79	*	*
Site 3	40	08	02	95	7.4	7.2	63	9.80	*	*
Site 3	45	08	02	95	7.3	7.2	63	9.86	*	*
Site 3	50	08	02	95	7.2	7.2	62	9.84	*	*
Site 3	55	08	02	95	7.2	7.1	62	9.73	*	*
Site 3	60	08	02	95	7.1	7.1	61	9.69	*	*
Site 3	65	08	02	95	7.1	7.1	62	9.48	*	*
Site 3	70	08	02	95	7.0	7.1	61	9.59	*	*
Site 3	75	08	02	95	7.0	7.1	62	9.38	*	*
Site 3	80	08	02	95	6.9	6.9	62	6.83	*	*
Site 3	00	09	11	95	19.5	7.8	63	9.81	62.6	7.3
Site 3	01	09	11	95	19.5	7.9	63	9.61	*	*
Site 3	02	09	11	95	19.5	7.9	63	9.51	*	*
Site 3	03	09	11	95	19.5	7.9	63	9.52	*	*
Site 3	04	09	11	95	19.4	8.0	64	9.46	*	*
Site 3	05	09	11	95	19.2	8.0	64	9.48	*	*
Site 3	06	09	11	95	19.2	8.0	64	9.47	*	*
Site 3	07	09	11	95	19.2	8.0	63	9.45	*	*
Site 3	08	09	11	95	19.1	8.0	64	9.46	*	*
Site 3	09	09	11	95	19.1	8.0	63	9.44	*	*
Site 3	10	09	11	95	19.0	8.0	63	9.42	*	*
Site 3	15	09	11	95	15.9	7.5	63	9.08	*	*
Site 3	20	09	11	95	10.2	7.3	62	9.09	62.3	*
Site 3	25	09	11	95	8.7	7.2	62	9.18	*	*
Site 3	30	09	11	95	7.9	7.2	61	9.26	*	*
Site 3	35	09	11	95	7.6	7.2	60	9.46	*	*
Site 3	40	09	11	95	7.4	7.1	61	9.36	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 3	45	09	11	95	7.3	7.2	60	9.35	*	*
Site 3	50	09	11	95	7.2	7.1	62	9.33	*	*
Site 3	55	09	11	95	7.1	7.1	61	9.36	*	*
Site 3	60	09	11	95	7.1	7.1	61	8.98	*	*
Site 3	65	09	11	95	7.0	7.1	61	9.07	*	*
Site 3	70	09	11	95	7.0	7.1	62	8.96	*	*
Site 3	75	09	11	95	7.0	7.1	61	8.64	*	*
Site 3	80	09	11	95	6.9	7.0	64	6.47	63.1	*
Site 4	00	10	04	94	18.0	7.3	64	9.75	62.5	7.3
Site 4	01	10	04	94	18.0	7.5	63	9.60	*	*
Site 4	02	10	04	94	18.0	7.5	62	9.53	*	*
Site 4	03	10	04	94	18.0	7.6	62	9.52	*	*
Site 4	04	10	04	94	18.0	7.6	63	9.51	*	*
Site 4	05	10	04	94	18.0	7.7	63	9.47	62.5	*
Site 4	06	10	04	94	18.0	7.7	62	9.47	*	*
Site 4	07	10	04	94	18.0	7.7	62	9.44	*	*
Site 4	08	10	04	94	18.0	7.7	62	9.44	*	*
Site 4	09	10	04	94	18.0	7.7	62	9.43	*	*
Site 4	10	10	04	94	18.0	7.7	62	9.42	62.4	*
Site 4	15	10	04	94	17.9	7.7	62	9.42	*	*
Site 4	20	10	04	94	10.8	7.3	61	8.64	62.1	*
Site 4	25	10	04	94	8.3	7.2	60	9.07	*	*
Site 4	30	10	04	94	7.6	7.2	60	9.37	*	*
Site 4	35	10	04	94	7.3	7.1	61	9.56	*	*
Site 4	40	10	04	94	7.2	7.1	60	9.54	62.2	*
Site 4	45	10	04	94	7.1	7.1	59	9.62	*	*
Site 4	50	10	04	94	7.1	7.0	60	9.76	*	*
Site 4	55	10	04	94	7.0	7.0	60	10.00	*	*
Site 4	60	10	04	94	6.9	7.0	59	10.03	62.1	*
Site 4	65	10	04	94	6.9	7.0	59	9.99	*	*
Site 4	70	10	04	94	6.9	7.0	60	9.89	*	*
Site 4	75	10	04	94	6.9	7.0	61	9.76	*	*
Site 4	80	10	04	94	6.8	7.0	60	9.77	62.4	*
Site 4	85	10	04	94	6.8	7.0	60	9.56	*	*
Site 4	90	10	04	94	6.8	7.0	61	8.94	62.8	*
Site 4	00	11	08	94	11.1	7.3	63	10.40	62.3	5.6
Site 4	01	11	08	94	11.1	7.3	62	10.35	*	*
Site 4	02	11	08	94	11.1	7.3	63	10.21	*	*
Site 4	03	11	08	94	11.1	7.3	63	10.20	*	*
Site 4	04	11	08	94	11.2	7.3	63	10.21	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 4	05	11	08	94	11.2	7.3	63	10.16	62.3	*
Site 4	06	11	08	94	11.2	7.3	63	10.16	*	*
Site 4	07	11	08	94	11.2	7.3	62	10.16	*	*
Site 4	08	11	08	94	11.2	7.3	63	10.16	*	*
Site 4	09	11	08	94	11.2	7.3	62	10.16	*	*
Site 4	10	11	08	94	11.2	7.3	63	10.16	62.3	*
Site 4	15	11	08	94	11.2	7.4	62	10.11	*	*
Site 4	20	11	08	94	11.2	7.3	62	10.11	62.3	*
Site 4	25	11	08	94	11.1	7.3	61	10.08	*	*
Site 4	30	11	08	94	7.9	7.2	60	8.93	*	*
Site 4	35	11	08	94	7.5	7.1	61	9.07	*	*
Site 4	40	11	08	94	7.3	7.1	61	9.14	62.4	*
Site 4	45	11	08	94	7.1	7.1	61	9.28	*	*
Site 4	50	11	08	94	7.0	7.0	60	9.46	*	*
Site 4	55	11	08	94	7.0	7.0	60	9.31	*	*
Site 4	60	11	08	94	6.9	7.0	61	9.26	62.5	*
Site 4	65	11	08	94	6.9	7.0	62	9.28	*	*
Site 4	70	11	08	94	6.9	7.0	59	9.35	*	*
Site 4	75	11	08	94	6.9	7.0	60	9.30	*	*
Site 4	80	11	08	94	6.8	7.0	60	9.25	62.4	*
Site 4	85	11	08	94	6.8	6.9	60	9.20	*	*
Site 4	90	11	08	94	6.8	6.9	60	9.09	62.6	*
Site 4	00	12	13	94	7.2	7.6	65	9.10	62.3	4.9
Site 4	01	12	13	94	7.2	7.6	63	8.99	*	*
Site 4	02	12	13	94	7.2	7.6	63	8.99	*	*
Site 4	03	12	13	94	7.2	7.7	63	8.93	*	*
Site 4	04	12	13	94	7.2	7.7	63	8.88	*	*
Site 4	05	12	13	94	7.2	7.7	63	8.87	62.3	*
Site 4	06	12	13	94	7.2	7.7	63	8.94	*	*
Site 4	07	12	13	94	7.2	7.7	63	8.70	*	*
Site 4	08	12	13	94	7.2	7.7	63	8.64	*	*
Site 4	09	12	13	94	7.2	7.6	63	8.75	*	*
Site 4	10	12	13	94	7.2	7.6	63	8.86	62.4	*
Site 4	15	12	13	94	7.2	7.6	62	8.63	*	*
Site 4	20	12	13	94	7.2	7.6	61	8.75	62.3	*
Site 4	25	12	13	94	7.2	7.6	61	8.80	*	*
Site 4	30	12	13	94	7.2	7.6	61	8.74	*	*
Site 4	35	12	13	94	7.2	7.5	61	8.80	*	*
Site 4	40	12	13	94	7.2	7.5	61	8.80	62.3	*
Site 4	45	12	13	94	7.2	7.5	60	8.86	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 4	50	12	13	94	7.2	7.5	60	8.74	*	*
Site 4	55	12	13	94	7.2	7.5	61	8.57	*	*
Site 4	60	12	13	94	7.2	7.5	61	8.79	62.3	*
Site 4	65	12	13	94	7.2	7.5	61	7.94	*	*
Site 4	70	12	13	94	7.1	7.4	60	7.74	*	*
Site 4	75	12	13	94	7.1	7.4	60	7.69	*	*
Site 4	80	12	13	94	7.1	7.3	60	7.70	62.6	*
Site 4	85	12	13	94	7.1	7.3	60	7.54	*	*
Site 4	90	12	13	94	7.0	7.3	60	7.49	62.6	*
Site 4	00	02	08	95	7.0	7.9	63	11.03	*	9.3
Site 4	01	02	08	95	6.9	7.8	63	10.80	*	*
Site 4	02	02	08	95	6.8	7.8	63	10.70	*	*
Site 4	03	02	08	95	6.8	7.7	63	10.67	*	*
Site 4	04	02	08	95	6.8	7.7	62	10.62	*	*
Site 4	05	02	08	95	6.8	7.7	62	10.57	*	*
Site 4	06	02	08	95	6.8	7.6	62	10.56	*	*
Site 4	07	02	08	95	6.8	7.6	62	10.51	*	*
Site 4	08	02	08	95	6.7	7.6	62	10.51	*	*
Site 4	09	02	08	95	6.8	7.6	62	10.52	*	*
Site 4	10	02	08	95	6.7	7.5	62	10.51	62.2	*
Site 4	15	02	08	95	6.7	7.5	62	10.52	*	*
Site 4	20	02	08	95	6.7	7.5	61	10.52	*	*
Site 4	25	02	08	95	6.7	7.5	61	10.53	*	*
Site 4	30	02	08	95	6.7	7.5	61	10.53	*	*
Site 4	35	02	08	95	6.7	7.5	60	10.47	*	*
Site 4	40	02	08	95	6.7	7.5	60	10.47	*	*
Site 4	45	02	08	95	6.7	7.4	60	10.47	*	*
Site 4	50	02	08	95	6.7	7.4	60	10.42	*	*
Site 4	55	02	08	95	6.7	7.4	60	10.42	*	*
Site 4	60	02	08	95	6.7	7.4	60	10.42	*	*
Site 4	65	02	08	95	6.7	7.4	60	10.42	*	*
Site 4	70	02	08	95	6.7	7.4	60	10.42	*	*
Site 4	75	02	08	95	6.7	7.3	61	10.37	*	*
Site 4	80	02	08	95	6.6	7.3	60	10.27	*	*
Site 4	85	02	08	95	6.6	7.3	60	10.27	*	*
Site 4	90	02	08	95	6.6	7.3	59	10.22	62.2	*
Site 4	00	04	06	95	8.2	7.7	63	12.13	62.0	5.6
Site 4	01	04	06	95	8.1	7.8	63	11.93	*	*
Site 4	02	04	06	95	8.1	7.8	64	11.88	*	*
Site 4	03	04	06	95	8.1	7.8	63	11.84	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 4	04	04	06	95	8.1	7.7	62	11.81	*	*
Site 4	05	04	06	95	8.1	7.7	61	11.81	62.0	*
Site 4	06	04	06	95	8.1	7.7	62	11.83	*	*
Site 4	07	04	06	95	8.1	7.7	62	11.83	*	*
Site 4	08	04	06	95	8.1	7.7	62	11.83	*	*
Site 4	09	04	06	95	8.1	7.7	61	11.80	*	*
Site 4	10	04	06	95	8.0	7.7	61	11.81	*	*
Site 4	15	04	06	95	7.3	7.6	62	11.48	*	*
Site 4	20	04	06	95	7.0	7.5	61	11.40	62.0	*
Site 4	25	04	06	95	6.9	7.5	62	11.30	*	*
Site 4	30	04	06	95	6.8	7.4	61	11.26	*	*
Site 4	35	04	06	95	6.8	7.4	61	11.30	*	*
Site 4	40	04	06	95	6.7	7.4	61	11.26	*	*
Site 4	45	04	06	95	6.7	7.4	61	11.22	*	*
Site 4	50	04	06	95	6.7	7.4	61	11.23	*	*
Site 4	55	04	06	95	6.7	7.3	59	11.24	*	*
Site 4	60	04	06	95	6.7	7.3	61	11.15	62.1	*
Site 4	65	04	06	95	6.7	7.3	60	11.16	*	*
Site 4	70	04	06	95	6.7	7.3	59	11.11	*	*
Site 4	75	04	06	95	6.7	7.3	61	11.12	*	*
Site 4	80	04	06	95	6.7	7.3	61	11.12	*	*
Site 4	85	04	06	95	6.6	7.3	59	11.04	*	*
Site 4	90	04	06	95	6.6	7.3	59	10.75	*	*
Site 4	00	05	02	95	11.7	7.8	64	12.50	*	6.2
Site 4	01	05	02	95	11.6	8.0	64	12.18	*	*
Site 4	02	05	02	95	11.6	8.0	63	12.10	*	*
Site 4	03	05	02	95	11.6	8.0	63	12.06	*	*
Site 4	04	05	02	95	11.6	8.0	63	12.01	*	*
Site 4	05	05	02	95	11.6	8.0	63	12.01	61.8	*
Site 4	06	05	02	95	11.5	8.0	62	12.05	*	*
Site 4	07	05	02	95	11.4	8.0	62	12.03	*	*
Site 4	08	05	02	95	11.3	8.0	63	12.06	*	*
Site 4	09	05	02	95	11.2	8.0	63	12.07	*	*
Site 4	10	05	02	95	10.3	8.0	62	12.18	*	*
Site 4	15	05	02	95	8.5	7.8	62	11.75	*	*
Site 4	20	05	02	95	8.0	7.7	62	11.58	*	*
Site 4	25	05	02	95	7.5	7.6	61	11.44	*	*
Site 4	30	05	02	95	7.2	7.5	61	11.26	*	*
Site 4	35	05	02	95	7.1	7.5	60	11.26	*	*
Site 4	40	05	02	95	7.0	7.5	61	11.24	61.9	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 4	45	05	02	95	6.9	7.5	60	11.24	*	*
Site 4	50	05	02	95	6.9	7.4	60	11.22	*	*
Site 4	55	05	02	95	6.8	7.4	61	11.22	*	*
Site 4	60	05	02	95	6.8	7.4	61	11.19	*	*
Site 4	65	05	02	95	6.8	7.4	61	11.14	*	*
Site 4	70	05	02	95	6.8	7.4	62	11.16	*	*
Site 4	75	05	02	95	6.8	7.4	62	11.10	*	*
Site 4	80	05	02	95	6.8	7.3	61	11.04	62.1	*
Site 4	85	05	02	95	6.7	7.4	61	11.12	*	*
Site 4	90	05	02	95	6.7	7.4	61	11.12	*	*
Site 4	00	06	08	95	17.6	7.8	62	10.18	62.2	*
Site 4	01	06	08	95	17.5	7.8	62	10.07	*	*
Site 4	02	06	08	95	17.5	7.9	62	10.06	*	*
Site 4	03	06	08	95	17.5	7.9	62	10.05	*	*
Site 4	04	06	08	95	17.5	7.9	63	10.01	*	*
Site 4	05	06	08	95	17.4	7.9	63	10.02	62.4	*
Site 4	06	06	08	95	17.2	7.9	63	10.05	*	*
Site 4	07	06	08	95	17.0	7.9	63	10.08	*	*
Site 4	08	06	08	95	16.9	8.0	62	10.04	*	*
Site 4	09	06	08	95	16.8	7.9	62	10.09	*	*
Site 4	10	06	08	95	16.6	7.7	63	10.11	62.3	*
Site 4	15	06	08	95	12.0	7.7	62	10.72	*	*
Site 4	20	06	08	95	9.1	7.7	62	10.52	62.1	*
Site 4	25	06	08	95	8.0	7.5	61	10.45	*	*
Site 4	30	06	08	95	7.6	7.5	60	10.34	*	*
Site 4	35	06	08	95	7.3	7.4	60	10.35	*	*
Site 4	40	06	08	95	7.2	7.4	60	10.36	62.1	*
Site 4	45	06	08	95	7.1	7.3	60	10.37	*	*
Site 4	50	06	08	95	7.1	7.3	60	10.39	*	*
Site 4	55	06	08	95	7.0	7.3	60	10.41	*	*
Site 4	60	06	08	95	7.0	7.3	60	10.41	62.1	*
Site 4	65	06	08	95	7.0	7.3	60	10.36	*	*
Site 4	70	06	08	95	6.9	7.3	60	10.40	*	*
Site 4	75	06	08	95	6.9	7.3	61	10.39	*	*
Site 4	80	06	08	95	6.9	7.3	61	10.24	62.2	*
Site 4	85	06	08	95	6.8	7.3	61	10.43	*	*
Site 4	90	06	08	95	6.8	7.3	61	10.43	62.2	*
Site 4	00	07	05	95	19.0	8.1	63	10.02	*	*
Site 4	01	07	05	95	18.6	8.3	62	10.05	*	*
Site 4	02	07	05	95	18.4	8.4	63	10.09	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 4	03	07	05	95	18.3	8.4	63	10.08	*	*
Site 4	04	07	05	95	18.2	8.4	63	10.07	*	*
Site 4	05	07	05	95	18.1	8.4	63	10.05	*	*
Site 4	06	07	05	95	18.1	8.4	63	10.08	*	*
Site 4	07	07	05	95	18.1	8.3	63	10.06	*	*
Site 4	08	07	05	95	18.1	8.3	63	10.06	*	*
Site 4	09	07	05	95	18.1	8.3	63	9.93	*	*
Site 4	10	07	05	95	17.6	8.2	62	10.09	*	*
Site 4	15	07	05	95	14.3	8.0	62	10.31	*	*
Site 4	20	07	05	95	9.2	7.9	62	10.21	*	*
Site 4	25	07	05	95	8.2	7.7	61	9.99	*	*
Site 4	30	07	05	95	7.7	7.6	60	10.20	*	*
Site 4	35	07	05	95	7.5	7.6	60	10.30	*	*
Site 4	40	07	05	95	7.4	7.5	61	10.38	*	*
Site 4	45	07	05	95	7.3	7.5	61	10.40	*	*
Site 4	50	07	05	95	7.2	7.5	60	10.33	*	*
Site 4	55	07	05	95	7.2	7.5	60	10.28	*	*
Site 4	60	07	05	95	7.1	7.4	60	10.27	*	*
Site 4	65	07	05	95	7.1	7.4	60	10.34	*	*
Site 4	70	07	05	95	7.1	7.4	60	10.37	*	*
Site 4	75	07	05	95	7.0	7.4	60	10.33	*	*
Site 4	80	07	05	95	7.0	7.4	60	10.35	*	*
Site 4	85	07	05	95	7.0	7.3	60	9.92	*	*
Site 4	90	07	05	95	6.9	7.3	60	9.73	61.9	*
Site 4	00	08	02	95	20.0	7.6	63	9.72	*	*
Site 4	01	08	02	95	20.0	7.9	63	9.39	*	*
Site 4	02	08	02	95	20.0	7.9	63	9.34	*	*
Site 4	03	08	02	95	20.0	7.9	63	9.31	*	*
Site 4	04	08	02	95	20.0	7.9	63	9.30	*	*
Site 4	05	08	02	95	20.0	7.9	63	9.31	*	*
Site 4	06	08	02	95	19.9	7.9	63	9.29	*	*
Site 4	07	08	02	95	19.9	7.9	63	9.28	*	*
Site 4	08	08	02	95	19.9	7.9	64	9.26	*	*
Site 4	09	08	02	95	19.8	7.9	63	9.29	*	*
Site 4	10	08	02	95	19.8	7.9	63	9.29	62.3	*
Site 4	15	08	02	95	15.3	7.6	63	9.84	*	*
Site 4	20	08	02	95	10.1	7.4	62	9.65	*	*
Site 4	25	08	02	95	8.3	7.3	62	9.80	*	*
Site 4	30	08	02	95	7.7	7.3	61	9.82	*	*
Site 4	35	08	02	95	7.5	7.3	62	9.88	*	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	Lab Cond	Secchi
Site 4	40	08	02	95	7.4	7.3	62	9.86	*	*
Site 4	45	08	02	95	7.3	7.3	62	9.90	*	*
Site 4	50	08	02	95	7.2	7.3	62	9.93	*	*
Site 4	55	08	02	95	7.2	7.3	61	10.05	*	*
Site 4	60	08	02	95	7.1	7.3	60	10.10	62.3	*
Site 4	65	08	02	95	7.1	7.3	61	10.07	*	*
Site 4	70	08	02	95	7.1	7.3	61	10.03	*	*
Site 4	75	08	02	95	7.0	7.3	62	9.93	*	*
Site 4	80	08	02	95	7.0	7.3	62	9.90	62.3	*
Site 4	85	08	02	95	7.0	7.3	61	9.90	*	*
Site 4	90	08	02	95	7.0	7.3	61	9.80	*	*
Site 4	00	09	11	95	19.6	7.7	63	9.87	*	8.6
Site 4	01	09	11	95	19.6	7.8	63	9.60	*	*
Site 4	02	09	11	95	19.4	7.9	63	9.51	*	*
Site 4	03	09	11	95	19.4	7.9	63	9.49	*	*
Site 4	04	09	11	95	19.3	7.9	63	9.45	*	*
Site 4	05	09	11	95	19.3	7.9	63	9.46	62.5	*
Site 4	06	09	11	95	19.3	8.0	64	9.41	*	*
Site 4	07	09	11	95	19.3	8.0	64	9.41	*	*
Site 4	08	09	11	95	19.3	8.0	64	9.42	*	*
Site 4	09	09	11	95	19.2	8.0	63	9.41	*	*
Site 4	10	09	11	95	19.2	8.0	63	9.40	*	*
Site 4	15	09	11	95	15.5	7.5	62	9.20	*	*
Site 4	20	09	11	95	11.3	7.4	62	9.16	*	*
Site 4	25	09	11	95	9.0	7.3	62	9.15	*	*
Site 4	30	09	11	95	8.2	7.3	61	9.29	*	*
Site 4	35	09	11	95	7.8	7.3	62	9.36	*	*
Site 4	40	09	11	95	7.5	7.3	61	9.41	62.5	*
Site 4	45	09	11	95	7.4	7.2	62	9.43	*	*
Site 4	50	09	11	95	7.3	7.2	61	9.53	*	*
Site 4	55	09	11	95	7.3	7.3	61	9.76	*	*
Site 4	60	09	11	95	7.2	7.3	61	9.73	*	*
Site 4	65	09	11	95	7.2	7.3	62	9.70	*	*
Site 4	70	09	11	95	7.1	7.2	61	9.64	*	*
Site 4	75	09	11	95	7.1	7.2	62	9.56	*	*
Site 4	80	09	11	95	7.1	7.2	63	9.47	*	*
Site 4	85	09	11	95	7.0	7.2	60	9.30	*	*
Site 4	90	09	11	95	7.1	7.2	61	9.06	*	*

* indicates missing data; BDL indicates below detection limit.

B.2 Lake Whatcom Laboratory Analysis Data

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Gate	00	10	04	94	19.2	0.5	BDL	333	189	BDL	BDL	*
Gate	00	11	08	94	19.0	0.5	14	291	244	BDL	7	*
Gate	00	12	13	94	18.2	1.3	BDL	375	402	BDL	BDL	*
Gate	00	02	08	95	17.5	0.6	BDL	433	442	BDL	BDL	*
Gate	00	04	06	95	18.4	0.4	BDL	401	340	BDL	BDL	*
Gate	00	05	02	95	18.1	0.4	BDL	424	329	BDL	BDL	*
Gate	00	06	08	95	18.8	0.4	14	340	352	BDL	BDL	*
Gate	00	07	05	95	19.0	0.5	14	378	275	BDL	BDL	*
Gate	00	08	01	95	19.2	0.6	BDL	335	93	BDL	BDL	*
Gate	00	09	11	95	19.6	0.8	BDL	512	166	BDL	7	*
Site 1	00	10	04	94	20.6	1.2	23	289	65	BDL	9	4.7
Site 1	05	10	04	94	20.6	0.7	20	230	67	BDL	7	3.8
Site 1	10	10	04	94	20.4	0.8	18	216	60	BDL	7	3.7
Site 1	15	10	04	94	26.5	2.1	307	385	53	BDL	14	1.1
Site 1	20	10	04	94	27.0	2.2	302	395	59	31	43	1.1
Site 1	00	11	08	94	20.7	0.8	50	234	86	BDL	29	3.1
Site 1	05	11	08	94	20.7	1.1	59	121	98	BDL	10	3.0
Site 1	10	11	08	94	20.7	0.9	50	292	86	BDL	10	3.5
Site 1	15	11	08	94	20.9	1.0	53	314	108	BDL	14	3.4
Site 1	20	11	08	94	20.7	0.8	52	265	111	BDL	12	2.5
Site 1	00	12	13	94	18.8	0.8	11	404	333	BDL	BDL	4.1
Site 1	05	12	13	94	19.1	0.9	17	367	308	BDL	BDL	3.8
Site 1	10	12	13	94	18.9	0.9	BDL	381	308	BDL	8	3.6
Site 1	15	12	13	94	18.9	0.9	BDL	569	273	BDL	BDL	3.7
Site 1	20	12	13	94	18.9	0.8	BDL	373	308	BDL	BDL	3.2
Site 1	00	02	08	95	18.3	0.7	BDL	440	417	BDL	BDL	1.2
Site 1	05	02	08	95	18.3	0.7	13	441	408	BDL	BDL	0.4
Site 1	10	02	08	95	18.4	0.8	BDL	451	397	BDL	BDL	1.1
Site 1	15	02	08	95	19.2	0.8	BDL	416	368	BDL	BDL	1.1
Site 1	20	02	08	95	18.5	0.8	BDL	477	374	BDL	BDL	1.1
Site 1	00	04	06	95	19.0	0.7	BDL	502	318	BDL	BDL	0.5
Site 1	05	04	06	95	19.1	0.8	BDL	457	329	BDL	BDL	0.3
Site 1	10	04	06	95	18.9	0.6	BDL	542	334	BDL	BDL	0.4
Site 1	15	04	06	95	18.7	1.0	12	502	380	BDL	BDL	0.6
Site 1	20	04	06	95	18.6	1.0	14	444	389	BDL	BDL	0.6
Site 1	00	05	02	95	19.0	0.4	BDL	436	351	BDL	BDL	0.4
Site 1	05	05	02	95	19.0	0.3	44	448	331	BDL	BDL	0.4
Site 1	10	05	02	95	19.0	0.3	10	379	354	BDL	BDL	0.3
Site 1	15	05	02	95	19.0	0.4	12	423	337	BDL	BDL	0.4
Site 1	20	05	02	95	18.8	0.4	15	429	345	BDL	BDL	0.3

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Site 1	00	06	08	95	17.4	0.7	BDL	352	301	BDL	BDL	2.8
Site 1	05	06	08	95	19.3	0.5	BDL	380	287	BDL	6	3.0
Site 1	10	06	08	95	19.2	0.7	BDL	423	259	BDL	BDL	4.3
Site 1	15	06	08	95	19.1	0.4	17	363	312	BDL	6	2.5
Site 1	20	06	08	95	19.4	0.4	40	354	322	BDL	BDL	0.9
Site 1	00	07	05	95	19.8	0.5	BDL	353	188	BDL	BDL	3.6
Site 1	05	07	05	95	15.9	0.7	13	315	222	BDL	BDL	3.1
Site 1	10	07	05	95	19.7	0.6	10	375	184	BDL	BDL	4.1
Site 1	15	07	05	95	19.6	0.6	25	408	288	BDL	BDL	1.9
Site 1	20	07	05	95	19.7	0.6	40	450	291	BDL	BDL	1.6
Site 1	00	08	01	95	20.3	0.5	BDL	309	149	BDL	BDL	1.4
Site 1	05	08	01	95	20.6	0.6	BDL	225	137	BDL	BDL	1.8
Site 1	10	08	01	95	20.3	0.9	12	480	137	BDL	9	2.6
Site 1	15	08	01	95	21.4	1.2	73	465	226	BDL	9	0.8
Site 1	20	08	01	95	21.1	1.6	66	431	277	BDL	9	0.6
Site 1	00	09	11	95	20.8	0.7	BDL	224	*	BDL	6	3.0
Site 1	05	09	11	95	20.9	0.9	BDL	226	*	BDL	6	2.5
Site 1	10	09	11	95	20.9	0.8	16	262	*	BDL	6	4.1
Site 1	15	09	11	95	23.8	5.9	109	280	*	BDL	13	0.5
Site 1	20	09	11	95	23.3	7.9	94	276	*	BDL	14	0.3
Intake	00	10	04	94	19.2	0.4	BDL	287	195	BDL	BDL	1.4
Intake	05	10	04	94	19.3	0.5	BDL	293	188	BDL	BDL	2.1
Intake	10	10	04	94	19.3	0.5	BDL	414	186	BDL	9	2.0
Intake	00	11	08	94	18.9	0.5	13	284	227	BDL	6	1.6
Intake	05	11	08	94	*	*	*	*	*	*	*	*
Intake	10	11	08	94	*	*	*	*	*	*	*	*
Intake	00	12	13	94	18.1	1.4	BDL	535	392	BDL	6	1.8
Intake	05	12	13	94	18.1	1.4	BDL	470	384	BDL	BDL	1.5
Intake	10	12	13	94	18.1	1.4	BDL	381	414	BDL	BDL	1.2
Intake	00	02	08	95	17.9	0.5	BDL	499	442	BDL	BDL	0.6
Intake	05	02	08	95	18.0	0.6	BDL	389	431	BDL	BDL	1.0
Intake	10	02	08	95	17.5	0.6	BDL	420	412	BDL	BDL	0.8
Intake	00	04	06	95	18.2	0.8	BDL	499	360	BDL	BDL	1.9
Intake	05	04	06	95	18.3	0.6	BDL	484	329	BDL	BDL	1.7
Intake	10	04	06	95	18.4	0.5	BDL	454	344	BDL	BDL	1.7
Intake	00	05	02	95	18.7	0.4	BDL	426	343	BDL	BDL	0.5
Intake	05	05	02	95	18.6	0.4	10	419	334	BDL	BDL	0.7
Intake	10	05	02	95	18.3	0.5	BDL	439	349	BDL	BDL	1.5
Intake	00	06	08	95	19.2	0.4	BDL	385	309	BDL	BDL	1.6
Intake	05	06	08	95	19.0	0.4	BDL	378	333	BDL	BDL	1.5

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Intake	10	06	08	95	18.9	0.4	BDL	380	318	BDL	BDL	1.6
Intake	00	07	05	95	19.2	0.4	BDL	318	258	BDL	BDL	2.5
Intake	05	07	05	95	19.1	0.4	BDL	383	246	BDL	BDL	2.1
Intake	10	07	05	95	19.2	0.5	BDL	332	282	BDL	BDL	2.5
Intake	00	08	01	95	19.5	0.4	BDL	395	231	BDL	BDL	1.2
Intake	05	08	01	95	19.5	0.4	BDL	268	231	BDL	BDL	1.4
Intake	10	08	01	95	19.3	0.4	BDL	360	253	BDL	BDL	1.5
Intake	00	09	11	95	19.5	0.5	BDL	264	193	BDL	BDL	1.1
Intake	05	09	11	95	19.5	0.6	BDL	300	196	BDL	BDL	1.7
Intake	10	09	11	95	19.5	0.6	BDL	276	217	BDL	BDL	1.8
Site 2	00	10	04	94	19.1	0.4	BDL	335	185	BDL	BDL	1.7
Site 2	05	10	04	94	19.2	0.4	BDL	372	200	BDL	BDL	1.8
Site 2	10	10	04	94	19.2	0.4	BDL	320	203	BDL	BDL	1.9
Site 2	15	10	04	94	19.1	0.5	BDL	372	62	BDL	BDL	1.8
Site 2	17	10	04	94	23.7	1.8	188	333	198	BDL	13	0.5
Site 2	00	11	08	94	19.4	0.6	12	352	203	BDL	7	1.7
Site 2	05	11	08	94	19.1	0.5	20	336	222	BDL	7	1.4
Site 2	10	11	08	94	19.0	0.5	13	243	233	BDL	7	1.3
Site 2	15	11	08	94	19.1	0.5	12	303	229	BDL	8	1.3
Site 2	17	11	08	94	19.0	0.6	16	282	202	BDL	8	1.4
Site 2	00	12	13	94	18.1	1.4	BDL	478	384	BDL	BDL	1.3
Site 2	05	12	13	94	17.9	1.5	BDL	398	329	BDL	12	1.2
Site 2	10	12	13	94	18.2	1.3	BDL	394	321	BDL	BDL	1.0
Site 2	15	12	13	94	17.9	1.3	BDL	550	362	BDL	BDL	1.2
Site 2	20	12	13	94	18.1	1.1	BDL	288	377	BDL	13	1.0
Site 2	00	02	08	95	*	0.8	BDL	512	410	BDL	BDL	0.7
Site 2	05	02	08	95	17.8	0.8	BDL	405	397	BDL	BDL	0.9
Site 2	10	02	08	95	17.8	0.6	BDL	477	394	BDL	BDL	0.9
Site 2	15	02	08	95	16.6	0.7	BDL	486	*	BDL	BDL	0.9
Site 2	20	02	08	95	17.1	0.7	BDL	440	386	BDL	BDL	0.8
Site 2	00	04	06	95	18.3	0.5	BDL	537	345	BDL	BDL	1.9
Site 2	05	04	06	95	18.4	0.5	BDL	406	333	BDL	BDL	1.7
Site 2	10	04	06	95	18.3	0.7	BDL	511	387	BDL	BDL	1.8
Site 2	15	04	06	95	18.3	0.6	BDL	467	337	BDL	BDL	2.1
Site 2	18	04	06	95	18.8	0.5	BDL	539	380	BDL	BDL	2.2
Site 2	00	05	02	95	18.4	0.5	BDL	482	359	BDL	BDL	0.6
Site 2	05	05	02	95	18.5	0.4	BDL	482	337	BDL	BDL	0.9
Site 2	10	05	02	95	20.5	0.4	BDL	413	375	BDL	BDL	0.9
Site 2	15	05	02	95	18.2	0.4	BDL	416	354	BDL	BDL	0.7
Site 2	20	05	02	95	18.1	0.3	BDL	471	381	BDL	BDL	0.8

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Site 2	00	06	08	95	19.0	0.4	BDL	354	295	BDL	BDL	1.6
Site 2	05	06	08	95	18.9	0.4	BDL	333	325	BDL	BDL	1.3
Site 2	10	06	08	95	18.7	0.4	11	387	342	BDL	BDL	1.8
Site 2	15	06	08	95	18.5	0.5	13	452	*	BDL	BDL	1.7
Site 2	20	06	08	95	18.2	0.7	15	425	370	BDL	BDL	1.4
Site 2	00	07	05	95	19.1	0.4	BDL	375	270	BDL	BDL	2.2
Site 2	05	07	05	95	19.0	0.4	BDL	386	257	BDL	BDL	2.2
Site 2	10	07	05	95	19.0	0.5	10	399	264	BDL	BDL	2.3
Site 2	15	07	05	95	18.8	0.5	17	429	*	BDL	BDL	3.7
Site 2	18	07	05	95	18.7	0.9	44	479	328	BDL	8	2.4
Site 2	00	08	01	95	19.3	0.4	BDL	349	265	BDL	BDL	0.9
Site 2	05	08	01	95	19.4	0.4	BDL	322	203	BDL	BDL	1.1
Site 2	10	08	01	95	19.4	0.4	BDL	369	224	BDL	BDL	1.9
Site 2	15	08	01	95	19.0	0.6	12	489	*	BDL	6	1.4
Site 2	18	08	01	95	19.3	0.6	46	476	319	BDL	8	1.3
Site 2	00	09	11	95	19.7	0.5	BDL	282	186	BDL	BDL	0.9
Site 2	05	09	11	95	19.4	0.6	BDL	298	173	BDL	BDL	1.9
Site 2	10	09	11	95	19.3	0.5	BDL	357	200	BDL	BDL	1.4
Site 2	15	09	11	95	19.2	0.6	13	320	*	BDL	BDL	1.7
Site 2	20	09	11	95	23.3	5.9	168	359	147	BDL	14	0.5
Site 3	00	10	04	94	19.1	0.3	BDL	341	214	BDL	BDL	1.5
Site 3	05	10	04	94	19.1	0.4	BDL	358	241	BDL	BDL	1.8
Site 3	10	10	04	94	19.0	0.3	BDL	341	335	BDL	BDL	2.0
Site 3	15	10	04	94	*	*	*	*	*	*	*	1.9
Site 3	20	10	04	94	20.3	0.3	14	487	183	BDL	BDL	0.8
Site 3	40	10	04	94	17.8	0.3	BDL	545	475	BDL	BDL	*
Site 3	60	10	04	94	17.7	0.3	BDL	522	480	BDL	BDL	*
Site 3	80	10	04	94	18.7	0.6	BDL	599	403	BDL	BDL	*
Site 3	00	11	08	94	*	*	*	*	*	*	*	*
Site 3	05	11	08	94	*	*	*	*	*	*	*	*
Site 3	10	11	08	94	*	*	*	*	*	*	*	*
Site 3	15	11	08	94	*	*	*	*	*	*	*	*
Site 3	20	11	08	94	*	*	*	*	*	*	*	*
Site 3	40	11	08	94	17.8	0.3	BDL	497	539	BDL	BDL	*
Site 3	60	11	08	94	17.7	0.3	BDL	439	496	BDL	8	*
Site 3	79	11	08	94	18.1	0.7	BDL	423	494	BDL	10	*
Site 3	00	12	13	94	18.0	1.5	BDL	358	366	BDL	BDL	0.6
Site 3	05	12	13	94	18.1	1.4	BDL	390	420	BDL	BDL	0.5
Site 3	10	12	13	94	17.9	1.5	BDL	493	389	BDL	6	0.5
Site 3	15	12	13	94	*	*	*	*	*	*	*	0.5

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Site 3	20	12	13	94	17.8	1.5	BDL	445	343	BDL	BDL	0.4
Site 3	40	12	13	94	18.0	1.5	BDL	495	415	BDL	BDL	*
Site 3	60	12	13	94	18.1	1.4	BDL	364	389	BDL	BDL	*
Site 3	79.4	12	13	94	17.8	1.1	BDL	552	447	BDL	BDL	*
Site 3	00	02	08	95	17.2	0.4	BDL	389	425	BDL	BDL	0.3
Site 3	05	02	08	95	17.4	0.5	BDL	433	447	BDL	BDL	0.3
Site 3	10	02	08	95	17.7	0.5	BDL	424	462	BDL	BDL	0.2
Site 3	15	02	08	95	*	*	*	*	*	*	*	0.2
Site 3	20	02	08	95	17.6	0.5	BDL	408	404	BDL	BDL	0.3
Site 3	40	02	08	95	17.6	0.5	BDL	408	407	BDL	BDL	*
Site 3	60	02	08	95	17.7	0.7	BDL	429	368	BDL	BDL	*
Site 3	80	02	08	95	*	0.7	BDL	412	421	BDL	BDL	*
Site 3	00	04	06	95	*	*	*	*	*	*	*	*
Site 3	05	04	06	95	*	*	*	*	*	*	*	*
Site 3	10	04	06	95	*	*	*	*	*	*	*	*
Site 3	15	04	06	95	*	*	*	*	*	*	*	*
Site 3	20	04	06	95	*	*	*	*	*	*	*	*
Site 3	40	04	06	95	*	*	*	*	*	*	*	*
Site 3	60	04	06	95	*	*	*	*	*	*	*	*
Site 3	80	04	06	95	*	*	*	*	*	*	*	*
Site 3	00	05	02	95	*	*	*	*	*	*	*	*
Site 3	05	05	02	95	*	*	*	*	*	*	*	*
Site 3	10	05	02	95	*	*	*	*	*	*	*	*
Site 3	15	05	02	95	*	*	*	*	*	*	*	*
Site 3	20	05	02	95	*	*	*	*	*	*	*	*
Site 3	40	05	02	95	*	*	*	*	*	*	*	*
Site 3	60	05	02	95	*	*	*	*	*	*	*	*
Site 3	80	05	02	95	*	*	*	*	*	*	*	*
Site 3	00	06	08	95	18.7	0.4	BDL	442	292	BDL	BDL	1.2
Site 3	05	06	08	95	18.7	0.4	BDL	471	348	BDL	BDL	1.3
Site 3	10	06	08	95	18.7	0.4	BDL	425	302	BDL	BDL	1.4
Site 3	15	06	08	95	*	*	*	*	*	*	*	1.4
Site 3	20	06	08	95	18.3	0.3	BDL	456	393	BDL	BDL	0.8
Site 3	40	06	08	95	18.1	0.3	BDL	437	435	BDL	BDL	*
Site 3	60	06	08	95	17.8	0.3	BDL	473	403	BDL	BDL	*
Site 3	80	06	08	95	18.1	0.4	BDL	483	414	BDL	BDL	*
Site 3	00	07	05	95	19.0	0.5	BDL	347	275	BDL	BDL	2.7
Site 3	05	07	05	95	19.3	0.4	BDL	413	402	BDL	BDL	1.8
Site 3	10	07	05	95	18.5	0.4	BDL	336	294	BDL	BDL	2.5
Site 3	15	07	05	95	*	*	*	*	*	*	*	3.5

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Site 3	20	07	05	95	18.4	0.4	BDL	420	398	BDL	BDL	1.8
Site 3	40	07	05	95	17.9	0.2	BDL	401	469	BDL	BDL	*
Site 3	60	07	05	95	18.1	0.3	BDL	478	443	BDL	BDL	*
Site 3	80	07	05	95	18.4	0.3	BDL	422	427	BDL	BDL	*
Site 3	00	08	02	95	*	*	*	*	*	*	*	*
Site 3	05	08	02	95	*	*	*	*	*	*	*	*
Site 3	10	08	02	95	*	*	*	*	*	*	*	*
Site 3	15	08	02	95	*	*	*	*	*	*	*	*
Site 3	20	08	02	95	*	*	*	*	*	*	*	*
Site 3	40	08	02	95	*	*	*	*	*	*	*	*
Site 3	60	08	02	95	*	*	*	*	*	*	*	*
Site 3	80	08	02	95	*	*	*	*	*	*	*	*
Site 3	00	09	11	95	19.3	0.4	BDL	262	193	BDL	BDL	0.9
Site 3	05	09	11	95	19.2	0.3	BDL	339	184	BDL	BDL	1.0
Site 3	10	09	11	95	19.2	0.4	BDL	290	194	BDL	BDL	1.5
Site 3	15	09	11	95	*	*	*	*	*	*	*	1.5
Site 3	20	09	11	95	18.1	0.3	BDL	421	355	BDL	BDL	0.9
Site 3	40	09	11	95	18.1	0.2	BDL	494	425	BDL	BDL	*
Site 3	60	09	11	95	18.2	0.3	10	409	444	BDL	BDL	*
Site 3	80	09	11	95	18.3	0.4	BDL	472	427	BDL	BDL	*
Site 4	00	10	04	94	18.9	0.3	BDL	355	207	BDL	BDL	1.5
Site 4	05	10	04	94	18.5	0.3	BDL	301	203	BDL	BDL	1.8
Site 4	10	10	04	94	18.9	0.3	BDL	362	206	BDL	BDL	1.8
Site 4	15	10	04	94	*	*	*	*	*	*	*	1.9
Site 4	20	10	04	94	17.8	0.3	19	534	463	BDL	BDL	0.9
Site 4	40	10	04	94	17.7	0.3	BDL	545	448	BDL	BDL	*
Site 4	60	10	04	94	17.5	0.3	BDL	562	397	BDL	BDL	*
Site 4	80	10	04	94	17.8	0.4	BDL	482	439	BDL	BDL	*
Site 4	90	10	04	94	17.9	0.4	BDL	530	448	BDL	BDL	*
Site 4	00	11	08	94	18.5	0.5	BDL	317	299	BDL	BDL	1.1
Site 4	05	11	08	94	18.4	0.5	BDL	366	292	BDL	22	1.1
Site 4	10	11	08	94	18.4	0.5	BDL	225	353	BDL	BDL	1.2
Site 4	15	11	08	94	*	*	*	*	*	*	*	1.1
Site 4	20	11	08	94	18.5	0.4	BDL	401	410	BDL	6	1.1
Site 4	40	11	08	94	17.6	0.3	BDL	486	522	BDL	BDL	*
Site 4	60	11	08	94	17.6	0.3	BDL	434	454	BDL	BDL	*
Site 4	80	11	08	94	17.8	0.3	BDL	433	445	BDL	BDL	*
Site 4	90	11	08	94	18.0	0.5	BDL	431	472	BDL	BDL	*
Site 4	00	12	13	94	17.7	1.1	BDL	434	455	BDL	BDL	0.3
Site 4	05	12	13	94	17.9	1.0	BDL	404	394	BDL	BDL	0.4

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Site 4	10	12	13	94	17.8	1.1	BDL	539	400	BDL	BDL	0.4
Site 4	15	12	13	94	*	*	*	*	*	*	*	0.3
Site 4	20	12	13	94	17.8	1.1	BDL	449	457	BDL	BDL	0.4
Site 4	40	12	13	94	17.7	1.1	BDL	514	437	BDL	BDL	*
Site 4	60	12	13	94	17.7	1.1	BDL	396	379	BDL	BDL	*
Site 4	80	12	13	94	17.7	0.7	BDL	413	386	BDL	BDL	*
Site 4	90	12	13	94	17.8	0.5	BDL	457	396	BDL	BDL	*
Site 4	00	02	08	95	17.4	0.4	BDL	394	420	BDL	BDL	0.8
Site 4	05	02	08	95	17.7	0.4	BDL	440	439	BDL	BDL	0.6
Site 4	10	02	08	95	17.5	0.5	BDL	376	421	BDL	BDL	0.5
Site 4	15	02	08	95	*	*	*	*	*	*	*	0.5
Site 4	20	02	08	95	17.6	0.4	BDL	466	451	BDL	BDL	0.5
Site 4	40	02	08	95	17.6	0.5	BDL	410	482	BDL	BDL	*
Site 4	60	02	08	95	17.6	0.4	BDL	444	410	BDL	BDL	*
Site 4	80	02	08	95	17.7	0.5	BDL	439	426	BDL	BDL	*
Site 4	90	02	08	95	17.5	0.4	BDL	378	387	BDL	BDL	*
Site 4	00	04	06	95	18.2	0.4	BDL	576	398	BDL	BDL	1.9
Site 4	05	04	06	95	18.2	0.4	BDL	427	356	BDL	BDL	1.4
Site 4	10	04	06	95	18.3	0.6	BDL	462	341	BDL	BDL	1.6
Site 4	15	04	06	95	*	*	*	*	*	*	*	1.5
Site 4	20	04	06	95	18.2	0.3	BDL	512	359	BDL	BDL	0.9
Site 4	40	04	06	95	18.1	0.6	BDL	571	352	BDL	BDL	*
Site 4	60	04	06	95	18.0	0.4	BDL	504	390	BDL	BDL	*
Site 4	80	04	06	95	18.1	0.6	BDL	399	374	BDL	BDL	*
Site 4	90	04	06	95	18.3	0.6	BDL	611	374	BDL	BDL	*
Site 4	00	05	02	95	18.3	0.4	BDL	474	320	BDL	BDL	0.8
Site 4	05	05	02	95	18.2	0.4	BDL	432	347	BDL	BDL	0.8
Site 4	10	05	02	95	18.4	0.5	BDL	467	347	BDL	BDL	0.9
Site 4	15	05	02	95	*	*	*	*	*	*	*	0.6
Site 4	20	05	02	95	18.3	0.4	BDL	495	406	BDL	BDL	0.4
Site 4	40	05	02	95	17.9	0.3	BDL	449	412	BDL	BDL	*
Site 4	60	05	02	95	18.0	0.3	BDL	468	414	BDL	BDL	*
Site 4	80	05	02	95	17.9	0.4	BDL	468	390	BDL	BDL	*
Site 4	90	05	02	95	18.1	0.5	BDL	473	410	BDL	BDL	*
Site 4	00	06	08	95	18.6	0.4	BDL	339	305	BDL	BDL	1.2
Site 4	05	06	08	95	18.6	0.4	BDL	430	309	BDL	BDL	1.2
Site 4	10	06	08	95	18.5	0.4	BDL	311	351	BDL	BDL	1.3
Site 4	15	06	08	95	*	*	*	*	*	*	*	1.0
Site 4	20	06	08	95	18.0	0.3	BDL	445	415	BDL	BDL	0.7
Site 4	40	06	08	95	18.2	0.3	BDL	456	423	BDL	BDL	*

* indicates missing data; BDL indicates below detection limit.

Lake Whatcom 1994/95 Laboratory Analysis Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TKN	NO3	SRP	TP	ChlA
Site 4	60	06	08	95	17.8	0.3	BDL	370	408	BDL	BDL	*
Site 4	80	06	08	95	17.9	0.4	BDL	470	450	BDL	BDL	*
Site 4	90	06	08	95	18.0	0.3	BDL	394	429	BDL	BDL	*
Site 4	00	07	05	95	18.9	0.4	BDL	344	293	BDL	BDL	1.6
Site 4	05	07	05	95	18.9	0.5	BDL	332	275	BDL	BDL	2.7
Site 4	10	07	05	95	19.0	0.6	BDL	362	293	BDL	BDL	2.9
Site 4	15	07	05	95	*	*	*	*	*	*	*	3.0
Site 4	20	07	05	95	18.2	0.2	11	496	408	BDL	BDL	1.3
Site 4	40	07	05	95	18.0	0.3	BDL	488	430	BDL	BDL	*
Site 4	60	07	05	95	18.0	0.2	BDL	456	430	BDL	BDL	*
Site 4	80	07	05	95	17.9	0.2	BDL	479	413	BDL	BDL	*
Site 4	90	07	05	95	18.1	0.5	BDL	502	434	BDL	BDL	*
Site 4	00	08	02	95	19.3	0.6	BDL	345	253	BDL	BDL	1.1
Site 4	05	08	02	95	19.3	0.7	BDL	319	274	BDL	BDL	1.4
Site 4	10	08	02	95	19.1	0.7	BDL	326	253	BDL	BDL	1.4
Site 4	15	08	02	95	*	*	*	*	*	*	*	1.7
Site 4	20	08	02	95	18.7	0.5	15	438	307	BDL	BDL	1.0
Site 4	40	08	02	95	18.2	0.3	BDL	438	447	BDL	BDL	*
Site 4	60	08	02	95	18.1	0.4	BDL	517	435	BDL	BDL	*
Site 4	80	08	02	95	18.2	0.3	BDL	418	364	BDL	BDL	*
Site 4	90	08	02	95	18.2	0.4	BDL	493	103	BDL	BDL	*
Site 4	00	09	11	95	19.3	0.4	BDL	286	173	BDL	BDL	0.9
Site 4	05	09	11	95	19.3	0.4	BDL	318	200	BDL	BDL	1.3
Site 4	10	09	11	95	19.2	0.4	BDL	282	228	BDL	BDL	1.0
Site 4	15	09	11	95	*	*	*	*	*	*	*	*
Site 4	20	09	11	95	18.3	0.3	BDL	556	371	BDL	BDL	*
Site 4	40	09	11	95	21.7	0.2	BDL	548	463	BDL	BDL	*
Site 4	60	09	11	95	18.1	0.2	BDL	476	488	BDL	BDL	*
Site 4	80	09	11	95	18.2	0.2	BDL	439	477	BDL	BDL	*
Site 4	90	09	11	95	18.3	0.3	BDL	514	413	BDL	BDL	*

* indicates missing data; BDL indicates below detection limit.

B.3 Lake Whatcom Plankton Data

1994-1995 Lake Whatcom Plankton Data.

Site	Depth	Month	Day	Year	Zooplankton (#/L)	Chrysophyta (#/L)	Cyanophyta (#/L)	Chlorophyla (#/L)	Pyrrophyta (#/L)
1	5	10	4	94	82	155714	4062	247112	13202
1	5	11	8	94	29	188597	0	3166	989
1	5	12	12	94	49	181782	277	832	555
1	5	2	8	95	52	70806	0	9968	0
1	5	4	6	95	29	49870	131	1969	0
1	5	5	2	95	37	22185	0	13592	469
1	5	6	8	95	20	118478	711	248805	6398
1	5	7	5	95	90	63588	430	251343	1719
1	5	8	2	95	35	237821	896	118911	896
1	5	9	11	95	47	130910	2078	65455	2078
Intake	5	10	4	94	22	124863	3797	164305	13710
Intake	5	11	8	94	26	45933	164	2953	0
Intake	5	12	12	94	17	41059	0	0	0
Intake	5	2	8	95	25	28862	0	0	0
Intake	5	4	6	95	22	88063	96	383	383
Intake	5	5	2	95	18	49925	0	7456	162
Intake	5	6	8	95	31	53479	1312	175202	3937
Intake	5	7	5	95	118	133878	320	134839	1601
Intake	5	8	2	95	57	212063	0	73743	5208
Intake	5	9	11	95	18	66205	586	41598	0

1994-1995 Lake Whatcom Plankton Data.

Site	Depth	Month	Day	Year	Zooplankton (#/L)	Chrysophyta (#/L)	Cyanophyta (#/L)	Chlorophyla (#/L)	Pyrrophyta (#/L)
2	5	10	4	94	27	110146	0	228369	4773
2	5	11	8	94	24	44454	1146	1146	687
2	5	12	12	94	30	43750	90	180	90
2	5	2	8	95	19	54974	0	0	0
2	5	4	6	95	36	95218	133	0	664
2	5	5	2	95	16	50093	0	3369	439
2	5	6	8	95	26	63327	0	164997	1732
2	5	7	5	95	120	205246	0	184407	1180
2	5	8	2	95	55	254843	263	85474	2104
2	5	9	11	95	33	45558	1266	35434	633
3	5	10	4	94	26	80170	448	162802	1791
3	5	11	8	94	268	-10827	-5414	-5414	-5414
3	5	12	12	94	29	23631	98	98	0
3	5	2	8	95	8	28271	0	0	0
3	5	4	6	95	268	-10827	-5414	-5414	-5414
3	5	5	2	95	268	-10827	-5414	-5414	-5414
3	5	6	8	95	40	50769	0	90929	758
3	5	7	5	95	126	151486	0	127113	1875
3	5	8	2	95	21	139513	0	64718	2015
3	5	9	11	95	26	23123	625	49995	0

1994-1995 Lake Whatcom Plankton Data.

Site	Depth	Month	Day	Year	Zooplankton (#/L)	Chrysophyta (#/L)	Cyanophyta (#/L)	Chlorophyla (#/L)	Pyrrophyta (#/L)
4	5	10	4	94	16	98077	211	215558	2109
4	5	11	8	94	13	30101	0	7791	531
4	5	12	12	94	34	18584	0	609	0
4	5	2	8	95	17	21295	0	0	0
4	5	4	6	95	38	102227	0	0	896
4	5	5	2	95	27	110427	0	484	242
4	5	6	8	95	34	40543	234	51089	937
4	5	7	5	95	163	127196	740	84674	1479
4	5	8	2	95	25	241290	0	55682	1719
4	5	9	11	95	28	14827	570	27372	0

B.4 Lake Whatcom Coliform Data

1994-1995 Lake Whatcom Coliform and Enterococcus Data.

Site	Depth	Month	Day	Year	Total Coliforms (cfu/100 mL)	Fecal Coliforms (cfu/100 mL)	Enterococcus (cfu/100 mL)
1	0.3	10	4	94	170	2	
1	0.3	11	8	94	80	<2	
1	0.3	12	13	94	30	<2	
1	0.3	2	8	95	13	2	
1	0.3	4	6	95	50	4	
1	0.3	5	2	95	4	2	
1	0.3	6	8	95	27	<2	1
1	0.3	7	5	95	<2	1	2
1	0.3	8	2	95	<2	<2	2
1	0.3	9	11	95	<1	2	4
Intake	0.3	10	4	94	130	2	
Intake	0.3	11	8	94	170	2	
Intake	0.3	12	13	94	50	<2	
Intake	0.3	2	8	95	<2	<2	
Intake	0.3	4	6	95	17	<2	
Intake	0.3	5	2	95	30	2	
Intake	0.3	6	8	95	80	2	3
Intake	0.3	7	5	95	1	<2	5
Intake	0.3	8	2	95	<2	<2	2
Intake	0.3	9	11	95	1	2	1
2	0.3	10	4	94	130	<2	
2	0.3	11	8	94	30	9	
2	0.3	12	13	94	4	2	
2	0.3	2	8	95	4	<2	
2	0.3	4	6	95	23	<2	
2	0.3	5	2	95	11	2	
2	0.3	6	8	95	50	<2	2
2	0.3	7	5	95	<2	<2	1
2	0.3	8	2	95	1	1	2
2	0.3	9	11	95	1	<1	1
3	0.3	10	4	94	80	<2	
3	0.3	11	8	94	40	<2	
3	0.3	12	13	94	23	8	
3	0.3	2	8	95	4	<2	
3	0.3	4	6	95	4	4	

1994-1995 Lake Whatcom Coliform and Enterococcus Data.

Site	Depth	Month	Day	Year	Total Coliforms (cfu/100 mL)	Fecal Coliforms (cfu/100 mL)	Enterococcus (cfu/100 mL)
3	0.3	5	2	95	-99	-99	
3	0.3	6	8	95	2	<2	8
3	0.3	7	5	95	<2	<2	13
3	0.3	8	2	95	<2	<2	1
3	0.3	9	11	95	<1	<1	4
4	0.3	10	4	94	13	2	
4	0.3	11	8	94	50	<2	
4	0.3	12	13	94	23	<2	
4	0.3	2	8	95	4	<2	
4	0.3	4	6	95	<2	<2	
4	0.3	5	2	95	4	<2	
4	0.3	6	8	95	2	<2	1
4	0.3	7	5	95	<2	<2	2
4	0.3	8	2	95	<2	<2	2
4	0.3	9	11	95	1	<1	90

B.5 Lake Whatcom AmTest Reports

AMTEST AmTest Inc. Professional Analytical Services

14603 N.E. 87th St. Redmond, WA 98052 Fax: 206 883 3495 Tel: 206 885 1664

CHAIN OF CUSTODY RECORD

PROJ. NO. 55812

PROJECT NAME LAKE WHATCOM MONITORING

SAMPLERS: (Signature)

CREEKS

Analysis Requested

AMTEST I.D. NO.	CLIENT SAMPLE I.D. (25 Characters)	DATE	TIME	MATRIX	No. of Containers	TOTAL METALS (ICP)	Pb by GFAA	Remarks
4124	FCW1 Smith Creek	2-23-95			1	✓	✓	
4125	FCW2 Silver Beach ck	2-23-95			1	✓	✓	
4126	FCW3 Park Place Outfall	2-23-95			1	✓	✓	
4127	FCW4 Blue Canyon	2-23-95			1	✓	✓	
4128	FCW5 Anderson Creek	2-23-95			1	✓	✓	
4129	FCW6 Wildwood	2-23-95			1	✓	✓	
4130	FCW7 Austin Creek	2-23-95			1	✓	✓	
4131	FCWFD1 Anderson Creek	2-23-95			1	✓	✓	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	2-27-95 1400	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)
	2-28-95 1230	

Client Name MICHAEL HILLES

Client Address WESTERN WASHINGTON UNIVERSITY HUXLEY COLLEGE/ ES 518 MS 9180/ BELLINGHAM, WA 98225

Client Phone 360-650-6587 Fax

Contact Person MICHAEL HILLES P.O. No. T25385

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

3/10/95

AMTEST

AmTest Inc.

Professional
Analytical
Services

14603 N.E. 87th St
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

Western Washington University
Huxley College
ES 518, MS 9180
Bellingham, Wa 98225
Attention: Michael Hilles

Dear Michael Hilles:

Enclosed you will find the analytical data for the Lake Whatcom Monitor project.

The following is a cross correlation of client and laboratory identification for your convenience.

CLIENT ID	MATRIX	AM TEST ID	TEST
FCW1	Water	95-A004124	MET,
FCW2	Water	95-A004125	MET,
FCW3	Water	95-A004126	MET,
FCW4	Water	95-A004127	MET,
FCW5	Water	95-A004128	MET,
FCW6	Water	95-A004129	MET,
FCW7	Water	95-A004130	MET,
FCWFD1	Water	95-A004131	MET,

Your eight (8) samples were received at AM TEST on 2/28/95. At the time of receipt, the samples were logged in and properly maintained prior to their subsequent analyses.

The analytical procedures used in the laboratory are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers. Following the analytical data you will find the "Methodology Report". This table includes information relative to detection limits, analysis dates and method references.

Please note that the detection limits that are listed in the body of the report refer to Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Kathy Fugiel

Kathy Fugiel
Director of Inorganic Laboratory

Project #: 55812
PO Number: T25385

BACT = Bacteriological CONV = Conventional MET = Metal ORG = Organic

Feb 94
FD @ Wildwood

IS REPORT AMTEST

AmTest Inc
Professional
Analytical
Services
14603 N.E. 87th St.
Redmond, WA
98052
Fax: 206 883 3495
Tel: 206 885 1664

Wes
Hux
ES
Bel
Att

10/3 ^1/3 ^7

9a7pb9
b

Date Received: 2/28/95
Date Reported: 3/10/95

Project Name: Lake Whatcom Monitor
Project #: 55812
PO Number: T25385

SAMPLES

AM 95-A004124
Client Identification FCW1 Smith Ck
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.47		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	0.13		0.10
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	4.8		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.31		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.6		0.10
Manganese (mg/l)	0.006		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	3.0		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	1.2		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	5.8		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.057		0.003
Titanium (mg/l)	0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.004		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.007		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Huxley College
ES 518, MS 9180
Bellingham, Wa 98225
Attention: Michael Hilles

Date Received: 2/28/95
Date Reported: 3/14/95

Project Name: Lake Whatcom Monitor
Project #: 55812
PO Number: T25385

WATER SAMPLES

AM TEST Identification Number 95-A004125
Client Identification FCW2 Silver Beach Ck
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.94		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.030		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	12.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.79		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	5.2		0.10
Manganese (mg/l)	0.044		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	6.2		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.003		0.001
Sulfur (mg/l)	2.9		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	7.0		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.10		0.003
Titanium (mg/l)	0.03		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.003		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.012		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 2/28/95
Date Reported: 3/10/95

WATER SAMPLES

AM TEST Identification Number 95-A004126
Client Identification FCW3 Park Place outfall
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.58		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.034		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	19.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.003		0.002
Iron (mg/l)	0.60		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.3		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.8		0.10
Manganese (mg/l)	0.082		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	8.1		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	6.1		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	7.8		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.16		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.019		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 2/28/95
Date Reported: 3/10/95

WATER SAMPLES

AM TEST Identification Number 95-A004127
Client Identification FCW4 Blue Canyon
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.14		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	0.17		0.10
Barium (mg/l)	0.096		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	31.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.24		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.9		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	9.2		0.10
Manganese (mg/l)	0.017		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	18.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.003		0.001
Sulfur (mg/l)	9.2		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	1.1		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.005		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.015		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Huxley College
ES 518, MS 9180
Bellingham, Wa 98225
Attention: Michael Hilles

Date Received: 2/28/95
Date Reported: 3/14/95

Project Name: Lake Whatcom Monitor
Project #: 55812
PO Number: T25385

WATER SAMPLES

AM TEST Identification Number 95-A004128
Client Identification FCW5 Anderson Ck.
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.50		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.016		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	6.9		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.52		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.3		0.10
Manganese (mg/l)	0.020		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.1		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.9		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.078		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.011		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 2/28/95
Date Reported: 3/14/95

WATER SAMPLES

AM TEST Identification Number 95-A004129
Client Identification FCW6 Wildwood
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.34		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	0.11		0.10
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	4.1		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.27		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.5		0.10
Manganese (mg/l)	0.012		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.9		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	1.0		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	4.5		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.053		0.003
Titanium (mg/l)	0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.003		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.012		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 2/28/95
Date Reported: 3/10/95

WATER SAMPLES

AM TEST Identification Number 95-A004130
Client Identification FCW7 Austin Ck.
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.69		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.014		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	4.4		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.008		0.002
Iron (mg/l)	0.64		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.5		0.10
Manganese (mg/l)	0.029		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	4.2		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	1.5		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	5.4		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.052		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.010		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 2/28/95
Date Reported: 3/10/95

WATER SAMPLES

AM TEST Identification Number 95-A004131
Client Identification FCWFD1 field dup. @ Anderson Ck.
Sampling Date 2/23/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.25		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.016		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	7.2		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.28		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.3		0.10
Manganese (mg/l)	0.018		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.2		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	1.8		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.081		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.017		0.002

AMTEST

METHODOLOGY REPORT

AI TEST ID 95-A004124 — MATRIX : Water

CLIENT ID FCW1 — SAMPLED: 2/23/95

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Silver	mg/l	200.7	EPA	0.01	3/ 6/95
Aluminum	mg/l	200.7	EPA	0.01	3/ 6/95
Arsenic	mg/l	200.7	EPA	0.03	3/ 6/95
Boron	mg/l	200.7	EPA	0.1	3/ 6/95
Barium	mg/l	200.7	EPA	0.003	3/ 6/95
Beryllium	mg/l	200.7	EPA	0.005	3/ 6/95
Calcium	mg/l	200.7	EPA	0.10	3/ 6/95
Cadmium	mg/l	200.7	EPA	0.002	3/ 6/95
Cobalt	mg/l	200.7	EPA	0.003	3/ 6/95
Chromium	mg/l	200.7	EPA	0.006	3/ 6/95
Copper	mg/l	200.7	EPA	0.002	3/ 6/95
Iron	mg/l	200.7	EPA	0.01	3/ 6/95
Mercury	mg/l	200.7	EPA	0.01	3/ 6/95
Potassium	mg/l	200.7	EPA	1.0	3/ 6/95
Lithium	mg/l	200.7	EPA	0.02	3/ 6/95
Magnesium	mg/l	200.7	EPA	0.10	3/ 6/95
Manganese	mg/l	200.7	EPA	0.002	3/ 6/95
Molybdenum	mg/l	200.7	EPA	0.01	3/ 6/95
Sodium	mg/l	200.7	EPA	0.5	3/ 6/95
Nickel	mg/l	200.7	EPA	0.01	3/ 6/95
Phosphorus	mg/l	200.7	EPA	0.05	3/ 6/95
Lead	mg/l	239.2	EPA	0.001	3/ 3/95
Sulfur	mg/l	200.7	EPA	0.10	3/ 6/95
Antimony	mg/l	200.7	EPA	0.02	3/ 6/95
Selenium	mg/l	200.7	EPA	0.03	3/ 6/95
Silicon	mg/l	200.7	EPA	0.1	3/ 6/95
Tin	mg/l	200.7	EPA	0.02	3/ 6/95
Strontium	mg/l	200.7	EPA	0.003	3/ 6/95
Titanium	mg/l	200.7	EPA	0.01	3/ 6/95
Thallium	mg/l	200.7	EPA	0.03	3/ 6/95
Vanadium	mg/l	200.7	EPA	0.002	3/ 6/95
Yttrium	mg/l	200.7	EPA	0.001	3/ 6/95
Zinc	mg/l	200.7	EPA	0.002	3/ 6/95
Acid Dig.(Tot Metals)		3010	EPA		3/ 2/95

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
Instrument Detection Limit

AMTEST

Client: Westem Washington University

Date Received: 2/28/95

Associated
Sample Numbers: 95-A004124 to 4131

Date Analyzed: 3/06/95

QUALITY CONTROL - METHOD BLANK
PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		METHOD BLANK #1 (mg/l)	METHOD BLANK #2 (mg/l)	DETECTION LIMITS (mg/l)
Silver	Ag	ND	ND	0.010
Aluminum	Al	0.04	0.04	0.01
Arsenic	As	0.05	ND	0.03
Boron	B	ND	ND	0.10
Barium	Ba	ND	ND	0.003
Beryllium	Be	ND	ND	0.007
Calcium	Ca	ND	ND	0.10
Cadmium	Cd	ND	ND	0.002
Cobalt	Co	ND	ND	0.003
Chromium	Cr	ND	ND	0.006
Copper	Cu	0.003	ND	0.002
Iron	Fe	ND	ND	0.01
Mercury	Hg	ND	ND	0.010
Potassium	K	ND	ND	1.0
Lithium	Li	ND	ND	0.02
Magnesium	Mg	ND	ND	0.10
Manganese	Mn	ND	ND	0.002
Molybdenum	Mo	ND	ND	0.01
Sodium	Na	ND	ND	0.50
Nickel	Ni	ND	ND	0.01
Phosphorus	P	ND	ND	0.05
Sulfur	S	ND	ND	0.1
Antimony	Sb	ND	0.05	0.02
Selenium	Se	ND	ND	0.03
Silica	Si	0.24	0.21	0.10
Tin	Sn	ND	ND	0.02
Strontium	Sr	ND	ND	0.003
Titanium	Ti	ND	ND	0.01
Thallium	Tl	0.13	ND	0.03
Vanadium	V	ND	ND	0.002
Yttrium	Y	ND	ND	0.001
Zinc	Zn	ND	0.003	0.002

ND= not detected; All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 2/28/95

Associated
Sample Numbers: 95-A004124 to 4131

Date Analyzed: 3/06/95

PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		TRUE VALUE (ppm)	RESULTS (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Silver	Ag	0.2	0.21	105	0.010
Aluminum	Al	10	11.00	110	0.01
Arsenic	As	2	2.00	100	0.03
Barium	Ba	2	1.90	95	0.003
Calcium	Ca	10	9.70	97	0.1
Cadmium	Cd	2	1.93	97	0.002
Chromium	Cr	2	1.95	98	0.006
Copper	Cu	2	1.96	98	0.002
Iron	Fe	2	1.96	98	0.01
Mercury	Hg	1	1.23	123	0.010
Potassium	K	100	96.00	96	1.0
Magnesium	Mg	10	9.60	96	0.10
Manganese	Mn	2	1.90	95	0.002
Molybdenum	Mo	2	1.90	95	0.01
Sodium	Na	20	19.00	95	0.50
Nickel	Ni	2	1.90	95	0.01
Phosphorus	P	10	10.00	100	0.05
Sulfur	S	2	2.03	102	0.1
Antimony	Sb	2	1.80	90	0.02
Selenium	Se	2	1.95	98	0.03
Tin	Sn	2	1.93	97	0.02
Strontium	Sr	2	1.96	98	0.003
Titanium	Ti	2	1.95	98	0.01
Thallium	Tl	2	2.00	100	0.03
Zinc	Zn	2	1.93	97	0.002

ND = not detected; All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 2/28/95

Associated
Sample Numbers: 95-A004124 to 4131

Date Analyzed: 3/06/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7
DUPLICATE ANALYSIS Sample #: 95-A004124

(smith ck)

ELEMENT		REPLICATE #1 (mg/l)	REPLICATE #2 (mg/l)	RELATIVE PERCENT DIFFERENCE (%)	DETECTION LIMITS (mg/l)
Silver	Ag	< 0.010	< 0.010	-	0.010
Aluminum	Al	0.465	0.322	36.34	0.01
Arsenic	As	< 0.03	< 0.03	-	0.03
Boron	B	0.13	< 0.10	-	0.10
Barium	Ba	0.008	0.008	0.00	0.003
Beryllium	Be	< 0.007	< 0.007	-	0.007
Calcium	Ca	4.8	5.3	9.90	0.10
Cadmium	Cd	< 0.002	< 0.002	-	0.002
Cobalt	Co	< 0.003	< 0.003	-	0.003
Chromium	Cr	< 0.006	< 0.006	-	0.006
Copper	Cu	< 0.002	< 0.002	-	0.002
Iron	Fe	0.31	0.25	21.43	0.01
Mercury	Hg	< 0.010	< 0.010	-	0.010
Potassium	K	< 1.0	< 1.0	-	1.0
Lithium	Li	< 0.02	< 0.02	-	0.02
Magnesium	Mg	1.6	1.8	11.76	0.10
Manganese	Mn	0.006	0.006	0.00	0.002
Molybdenum	Mo	< 0.01	< 0.01	-	0.01
Sodium	Na	3	3.2	6.45	0.50
Nickel	Ni	< 0.01	< 0.01	-	0.01
Phosphorus	P	< 0.05	< 0.05	-	0.05
Sulfur	S	1.2	1.4	15.38	0.1
Antimony	Sb	< 0.02	< 0.02	-	0.02
Selenium	Se	< 0.03	< 0.03	-	0.03
Silicon	Si	5.8	5.6	3.51	0.10
Tin	Sn	< 0.02	< 0.02	-	0.02
Strontium	Sr	0.057	0.063	10.00	0.003
Titanium	Ti	0.01	< 0.01	-	0.01
Thallium	Tl	< 0.03	< 0.03	-	0.03
Vanadium	V	0.005	< 0.002	-	0.002
Yttrium	Y	< 0.001	< 0.001	-	0.001
Zinc	Zn	0.007	0.011	44.44	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 2/28/95

Associated
Sample Numbers: 95-A004124 to 4131

Date Analyzed: 3/06/95

INDUCTIVELY COUPLED PLASMA -- EPA METHOD 200.7

SPIKE RECOVERY DATA   Sample #: 95-A004125

ELEMENT		SAMPLE CONC. (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Aluminum	Al	0.94	11	10	100.6	0.01
Arsenic	As	< 0.03	0.52	0.5	104.0	0.03
Barium	Ba	0.03	1.04	1.0	101.0	0.003
Beryllium	Be	< 0.007	1.08	1.0	108.0	0.007
Calcium	Ca	12	22	10	100.0	0.10
Cadmium	Cd	< 0.002	0.527	0.5	105.4	0.002
Chromium	Cr	< 0.006	1.05	1.0	105.0	0.006
Copper	Cu	< 0.002	1.03	1.0	103.0	0.002
Iron	Fe	0.79	1.2	0.5	82.0	0.01
Potassium	K	1.1	12	9.6	113.5	1.0
Magnesium	Mg	5.2	15	10	98.0	0.10
Manganese	Mn	0.044	1.09	1.0	104.6	0.002
Molybdenum	Mo	< 0.01	0.93	1.0	93.0	0.01
Sodium	Na	6.2	16	10	98.0	0.50
Nickel	Ni	< 0.01	1.02	1.0	102.0	0.01
Antimony	Sb	< 0.02	0.53	0.5	106.0	0.02
Selenium	Se	0.09	0.52	0.5	86.0	0.03
Tin	Sn	< 0.02	0.77	1.0	77.0	0.02
Strontium	Sr	0.1	1.16	1.0	106.0	0.003
Thallium	Tl	< 0.03	0.49	0.5	98.0	0.03
Yttrium	Y	< 0.001	0.522	0.5	104.4	0.001
Zinc	Zn	0.012	1.07	1.0	105.8	0.002

All results reported in (mg/l).

ANALYSIS REPORT

AMTEST

Western Washington University
Huxley College
Michael Hilles

Date Received: 02/28/95
Date Reported: 03/10/95
Project: Lake Whatcom Monitor
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - METHOD BLANK

ANALYTE/SAMPLE NO.		UNITS	RESULTS
LEAD	BLANK #1	mg/l	ND

QUALITY CONTROL - DUPLICATE ANALYSIS

ANALYTE/SAMPLE NO.		SAMPLE VALUE (mg/l)	DUPLICATE VALUE (mg/l)	R.P.D.* (%)
LEAD	95-A004124	0.001	0.001	0.

QUALITY CONTROL - SPIKE RECOVERY

ANALYTE/SAMPLE NO.		SAMPLE VALUE (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)
LEAD	95-A004125	0.003	0.027	0.025	96.

STANDARD REFERENCE MATERIAL

ANALYTE/SRM NO.		SRM VALUE (mg/l)	TRUE VALUE (mg/l)	RECOVERY (%)
LEAD	WS 31-2	0.0150	0.0150	100.

ND = Not Detected
*R.P.D. = Relative Percent Difference

REPORTED BY Kathy Fugiel
Kathy Fugiel

KF/pb

AMTEST
AmTest Inc.
Professional Analytical Services
14603 N.E. 87th St.
Redmond, WA
98052
Fax: 206 883 3495
Tel: 206 885 1664

CHAIN OF CUSTODY RECORD

PROJ. NO. 55812

PROJECT NAME LAKE WHATCOM MONITORING

SAMPLERS: (Signature)

LAKE

AMTEST I.D. NO.	CLIENT SAMPLE I.D. (25 Characters)	DATE	TIME	MATRIX	No. of Containers	TOTAL METALS ICP	Pb by GFAA	Remarks
17300	11-0 site 1 - top	9-11-95		FRESH H_2O	1	✓	✓	
01	11-B Site 1 - bottom	9-11-95		FRESH H_2O	1	✓	✓	
02	21-0 Intake - top	9-11-95		FRESH H_2O	1	✓	✓	
03	21-B Intake - bottom	9-11-95		FRESH H_2O	1	✓	✓	
04	22-0 Site 2 - top	9-11-95		FRESH H_2O	1	✓	✓	
05	22-B Site 2 - bottom	9-11-95		FRESH H_2O	1	✓	✓	
06	31-0 site 3 - top	9-11-95		FRESH H_2O	1	✓	✓	
07	31-B site 3 - bottom	9-11-95		FRESH H_2O	1	✓	✓	
08	32-0 site 4 - top	9-11-95		FRESH H_2O	1	✓	✓	
09	32-B site 4 - bottom	9-11-95		FRESH H_2O	1	✓	✓	
10	LWFD site 1 - bottom	9-11-95		FRESH H_2O	1	✓	✓	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	9-13-95 / 1400	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)
	9/14/95 / 14:00	

Client Name ~~HUXLEY/Huxley College MS 9180~~ ~~WESTERN WA. UNIV / BELLING~~ MICHAEL HILLES

Client Address HUXLEY COLLEGE MS 9180
WESTERN WA. UNIVERSITY, BELLINGHAM WA 98225

Client Phone 360 650 6587 Fax

Contact Person MICHAEL HILLES P.O. No. T25385

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

ANALYSIS REPORT

AmTest Inc
Professional Analytical Services
14603 N.E. 87th St
Redmond, WA
98052
Fax: 206 883 3495
Tel: 206 885 1664

Western Washington University
Huxley College
MS 9180
Bellingham, WA 98225
Attention: Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

Project Name: Lake Whatcom Monitor
Project #: SS812
PO Number: T25385

WATER SAMPLES

AM TEST Identification Number 95-A017300
Client Identification 11-O Site 1- top
Sampling Date 9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.06		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	0.18		0.10
Barium (mg/l)	0.005		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	3.8		0.10
Cadmium (mg/l)	< 0.002		0.002
Not→ Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.04		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.4		0.10
Manganese (mg/l)	0.006		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	5.3		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	2.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.037		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.030		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number	95-A017301
Client Identification	11-B site 1 - bottom
Sampling Date	9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.11		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.015		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	6.8		0.10
Cadmium (mg/l)	0.006		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.020		0.002
Iron (mg/l)	0.64		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	2.1		0.10
Manganese (mg/l)	0.21		0.002
Molybdenum (mg/l)	0.02		0.01
Sodium (mg/l)	2.9		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.0		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	0.03		0.02
Strontium (mg/l)	0.072		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	0.001		0.001
Zinc (mg/l)	0.059		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number 95-A017302
Client Identification 21-O Intake - top
Sampling Date 9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.10		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.9		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.03		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	2.0		0.10
Manganese (mg/l)	0.005		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.7		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.7		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	1.7		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.060		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.019		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number 95-A017303
Client Identification 21-B Intake bottom
Sampling Date 9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.09		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.8		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.02		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.9		0.10
Manganese (mg/l)	< 0.002		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.6		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.8		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	1.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.057		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.003		0.002
Yttrium (mg/l)	0.001		0.001
Zinc (mg/l)	0.032		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number	95-A017304	
Client Identification	22-O	Site 2 -Top
Sampling Date	9/11/95	

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.14		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.6		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.11		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.9		0.10
Manganese (mg/l)	< 0.002		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.7		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	1.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	< 0.003		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	0.001		0.001
Zinc (mg/l)	0.018		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number	95-A017305	
Client Identification	22-B	Site 2 - bottom
Sampling Date	9/11/95	

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.12		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	6.0		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.58		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.9		0.10
Manganese (mg/l)	0.15		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.5		0.1
Nickel (mg/l)	0.02		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	2.8		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.061		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.023		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number 95-A017306
Client Identification 31-O Site 3 -Top
Sampling Date 9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.08		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.9		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.02		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	0.03		0.02
Magnesium (mg/l)	2.0		0.10
Manganese (mg/l)	< 0.002		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.8		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.7		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	1.7		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.059		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.003		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.058		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number 95-A017307
Client Identification 31-B Site 3 - bottom
Sampling Date 9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.13		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	6.1		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.05		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	2.0		0.10
Manganese (mg/l)	0.011		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	3.0		0.1
Nickel (mg/l)	0.02		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	1.7		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	2.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.061		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.050		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number	95-A017308
Client Identification	32-O Site 4- top
Sampling Date	9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.07		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.8		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.02		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.9		0.10
Manganese (mg/l)	< 0.002		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.6		0.1
Nickel (mg/l)	0.02		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.8		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	1.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.057		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.041		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number 95-A017309
Client Identification 32-B Site 4- bottom
Sampling Date 9/11/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.12		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.8		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.03		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	0.02		0.02
Magnesium (mg/l)	1.8		0.10
Manganese (mg/l)	0.014		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.8		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	1.7		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	2.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.058		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	0.001		0.001
Zinc (mg/l)	0.034		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hillse

Date Received: 9/14/95
Date Reported: 9/28/95

WATER SAMPLES

AM TEST Identification Number 95-A017310
Client Identification ~~32-B~~ ~~Probably~~ FD@11-B
Sampling Date 9/11/95 Site 1 - bottom

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.11		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.012		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	6.1		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.48		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.9		0.10
Manganese (mg/l)	0.16		0.002
Molybdenum (mg/l)	0.02		0.01
Sodium (mg/l)	2.6		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	0.18		0.02
Strontium (mg/l)	0.061		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.003		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.096		0.002

AMTEST

Client: Westem Washington University

Date Received: 9/14/95

Associated
Sample Numbers: 95-A017300 to 17310

Date Analyzed: 9/22/95

QUALITY CONTROL - METHOD BLANK
PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		METHOD BLANK #1 (mg/l)	METHOD BLANK #2 (mg/l)	DETECTION LIMITS (mg/l)
Silver	Ag	ND	ND	0.010
Aluminum	Al	0.09	ND	0.01
Arsenic	As	ND	ND	0.03
Boron	B	ND	ND	0.10
Barium	Ba	ND	ND	0.003
Beryllium	Be	ND	ND	0.007
Calcium	Ca	ND	ND	0.10
Cadmium	Cd	0.002	ND	0.002
Cobalt	Co	ND	ND	0.003
Chromium	Cr	ND	ND	0.006
Copper	Cu	ND	ND	0.002
Iron	Fe	ND	ND	0.01
Mercury	Hg	ND	ND	0.010
Potassium	K	ND	ND	1.0
Lithium	Li	ND	ND	0.02
Magnesium	Mg	ND	ND	0.10
Manganese	Mn	ND	ND	0.002
Molybdenum	Mo	ND	ND	0.01
Sodium	Na	ND	ND	0.50
Nickel	Ni	ND	ND	0.01
Phosphorus	P	ND	ND	0.05
Sulfur	S	ND	ND	0.1
Antimony	Sb	ND	ND	0.02
Selenium	Se	ND	ND	0.03
Silica	Si	0.47	ND	0.10
Tin	Sn	ND	ND	0.02
Strontium	Sr	ND	ND	0.003
Titanium	Ti	ND	ND	0.01
Thallium	Tl	ND	ND	0.03
Vanadium	V	ND	ND	0.002
Yttrium	Y	ND	ND	0.001
Zinc	Zn	0.012	0.018	0.002

ND= not detected; All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 9/14/95

Associated
Sample Numbers: 95-A017300 to 17310

Date Analyzed: 9/22/95

PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		TRUE VALUE (ppm)	RESULTS (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Silver	Ag	0.2	0.18	90	0.010
Aluminum	Al	10	9.83	98	0.01
Arsenic	As	2	1.96	98	0.03
Barium	Ba	2	1.95	97	0.003
Calcium	Ca	10	9.14	91	0.1
Cadmium	Cd	2	1.98	99	0.002
Chromium	Cr	2	1.93	97	0.006
Copper	Cu	2	1.99	99	0.002
Iron	Fe	2	1.98	99	0.01
Mercury	Hg	1	1.29	129	0.010
Potassium	K	100	99.60	100	1.0
Magnesium	Mg	20	18.21	91	0.10
Manganese	Mn	2	1.95	97	0.002
Molybdenum	Mo	2	2.01	101	0.01
Sodium	Na	20	22.00	110	0.50
Nickel	Ni	2	2.06	103	0.01
Phosphorus	P	10	10.83	108	0.05
Sulfur	S	2	1.98	99	0.1
Antimony	Sb	2	2.06	103	0.02
Selenium	Se	2	2.11	105	0.03
Tin	Sn	2	1.88	94	0.02
Strontium	Sr	2	2.02	101	0.003
Titanium	Ti	2	2.07	103	0.01
Thallium	Tl	2	2.12	106	0.03
Zinc	Zn	2	1.97	99	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 9/14/95

Associated
Sample Numbers: 95-A017300 to 17310

Date Analyzed: 9/22/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7
DUPLICATE ANALYSIS Sample #: 95-A017300

ELEMENT		REPLICATE #1 (mg/l)	REPLICATE #2 (mg/l)	RELATIVE PERCENT DIFFERENCE (%)	DETECTION LIMITS (mg/l)
Silver	Ag	< 0.010	< 0.010	-	0.010
Aluminum	Al	0.06	0.07	15.4	0.01
Arsenic	As	< 0.03	< 0.03	-	0.03
Boron	B	0.18	0.21	15.4	0.10
Beryllium	Be	< 0.007	< 0.007	-	0.007
Calcium	Ca	3.8	3.56	6.5	0.10
Cadmium	Cd	< 0.002	< 0.002	-	0.002
Cobalt	Co	< 0.003	< 0.003	-	0.003
Chromium	Cr	< 0.006	< 0.006	-	0.006
Copper	Cu	0.005	< 0.002	-	0.002
Iron	Fe	0.04	0.03	23.5	0.01
Mercury	Hg	< 0.010	< 0.010	-	0.010
Potassium	K	< 1.0	< 1.0	-	1.0
Lithium	Li	< 02	< 02	-	0.02
Magnesium	Mg	1.4	1.3	7.4	0.10
Manganese	Mn	0.006	0.006	0.0	0.002
Molybdenum	Mo	< 0.01	< 0.01	-	0.01
Sodium	Na	5.3	4.3	20.8	0.50
Nickel	Ni	< 0.01	< 0.01	-	0.01
Phosphorus	P	< 0.05	< 0.05	-	0.05
Sulfur	S	1.6	1.4	13.3	0.1
Antimony	Sb	< 0.02	< 0.02	-	0.02
Selenium	Se	< 0.03	< 0.03	-	0.03
Silicon	Si	2.3	1.6	35.9	0.10
Tin	Sn	< 0.02	< 0.02	-	0.02
Strontium	Sr	0.037	0.035	5.6	0.003
Titanium	Ti	< 0.01	< 0.01	-	0.01
Thallium	Tl	< 0.03	< 0.03	-	0.03
Vanadium	V	< 0.002	< 0.002	-	0.002
Yttrium	Y	< 0.001	< 0.001	-	0.001
Zinc	Zn	0.03	0.024	22.2	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 9/14/95

Associated
Sample Numbers: 95-A017300 to 17310

Date Analyzed: 9/22/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7

SPIKE RECOVERY DATA — Sample #: 95-A017301

ELEMENT		SAMPLE CONC. (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Aluminum	Al	0.11	11	10.4	105	0.01
Arsenic	As	< 0.03	0.5	0.5	100	0.03
Barium	Ba	0.015	1.09	1.0	108	0.003
Beryllium	Be	< 0.007	1.08	1.0	108	0.007
Calcium	Ca	6.8	17	10	102	0.10
Cadmium	Cd	0.006	0.527	0.5	104	0.002
Chromium	Cr	< 0.006	0.997	1.0	100	0.006
Copper	Cu	0.02	1.09	1.0	107	0.002
Iron	Fe	0.64	1.1	0.48	96	0.01
Potassium	K	< 1.0	10	10	100	1.0
Magnesium	Mg	2.1	13	10.1	108	0.10
Manganese	Mn	0.209	1.25	1.0	104	0.002
Molybdenum	Mo	0.02	1.1	1.0	108	0.01
Sodium	Na	2.9	13	10.5	96	0.50
Nickel	Ni	< 0.01	1.1	1.0	110	0.01
Antimony	Sb	0.09	0.52	0.43	100	0.02
Selenium	Se	< 0.03	0.47	0.5	94	0.03
Tin	Sn	0.03	1	1.0	97	0.02
Strontium	Sr	0.072	1.14	1.0	103	0.003
Thallium	Tl	< 0.03	0.5	0.5	100	0.03
Yttrium	Y	0.001	0.529	0.5	106	0.001
Zinc	Zn	0.059	1.11	1.0	105	0.002

All results reported in (mg/l).

AMTEST

METHODOLOGY REPORT

AM TEST ID 95-A017300
CLIENT ID 11-O

MATRIX : Water
SAMPLED: 9/11/95

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Silver	mg/l	200.7	EPA	0.01	9/22/95
Aluminum	mg/l	200.7	EPA	0.01	9/22/95
Arsenic	mg/l	200.7	EPA	0.03	9/22/95
Boron	mg/l	200.7	EPA	0.1	9/22/95
Barium	mg/l	200.7	EPA	0.003	9/22/95
Beryllium	mg/l	200.7	EPA	0.005	9/22/95
Calcium	mg/l	200.7	EPA	0.10	9/22/95
Cadmium	mg/l	200.7	EPA	0.002	9/22/95
Cobalt	mg/l	200.7	EPA	0.003	9/22/95
Chromium	mg/l	200.7	EPA	0.006	9/22/95
Copper	mg/l	200.7	EPA	0.002	9/22/95
Iron	mg/l	200.7	EPA	0.01	9/22/95
Mercury	mg/l	200.7	EPA	0.01	9/22/95
Potassium	mg/l	200.7	EPA	1.0	9/22/95
Lithium	mg/l	200.7	EPA	0.02	9/22/95
Magnesium	mg/l	200.7	EPA	0.10	9/22/95
Manganese	mg/l	200.7	EPA	0.002	9/22/95
Molybdenum	mg/l	200.7	EPA	0.01	9/22/95
Sodium	mg/l	200.7	EPA	0.5	9/22/95
Nickel	mg/l	200.7	EPA	0.01	9/22/95
Phosphorus	mg/l	200.7	EPA	0.05	9/22/95
Lead	mg/l	239.2	EPA	0.001	9/22/95
Sulfur	mg/l	200.7	EPA	0.10	9/22/95
Antimony	mg/l	200.7	EPA	0.02	9/22/95
Selenium	mg/l	200.7	EPA	0.03	9/22/95
Silicon	mg/l	200.7	EPA	0.1	9/22/95
Tin	mg/l	200.7	EPA	0.02	9/22/95
Strontium	mg/l	200.7	EPA	0.003	9/22/95
Titanium	mg/l	200.7	EPA	0.01	9/22/95
Thallium	mg/l	200.7	EPA	0.03	9/22/95
Vanadium	mg/l	200.7	EPA	0.002	9/22/95
Yttrium	mg/l	200.7	EPA	0.001	9/22/95
Zinc	mg/l	200.7	EPA	0.002	9/22/95
Acid Dig.(Tot Metals)		3010	EPA		9/19/95

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
* Instrument Detection Limit

ANALYSIS REPORT AMTEST

Western Washington University
Huxley College
Michael Hillse

Date Received: 09/14/95
Date Reported: 09/25/95
Project: Lake Whatcom Monitor
Project No.: SS812
P.O. No.: T25385

QUALITY CONTROL - BLANK

ANALYTE/SAMPLE NO.		UNITS	RESULTS
LEAD	BLANK #1	mg/l	ND

QUALITY CONTROL - DUPLICATES

ANALYTE/SAMPLE NO.		SAMPLE VALUE (mg/l)	DUPLICATE VALUE (mg/l)	R.P.D.* (%)
LEAD	95-A017300	<0.001	0.001	-

QUALITY CONTROL - SPIKE RECOVERIES

ANALYTE/SAMPLE NO.		SAMPLE VALUE (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)
LEAD	95-A017301	<0.001	0.028	0.025	112.

STANDARD REFERENCE MATERIALS

ANALYTE/SRM NO.		SRM VALUE (mg/l)	TRUE VALUE (mg/l)	RECOVERY (%)
LEAD	WP 32-1	0.0146	0.0150	97.

*R.P.D. = Relative Percent Difference
ND = Not Detected

REPORTED BY Kathy Fugiel
Kathy Fugiel

KF/pb

C Park Place Wet Pond Data

C.1 Park Place Water Quality Data

Park Place Wet Pond composite sample data, October 1994 through September 1995.

Year	Month	Day	Site	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Fe (mg/L)	Ni (mg/L)	Pb (mg/L)	Zn (mg/L)	TOC (mg/L)	TKN (mg/L)	TH (mg/L)	TP (mg/L)	TSS (mg/L)
1994	10	28	1	-88	-88	-88	0.01	1.00	-88	0	0.02	5.90	0.05	-88	0.05	-99
1994	10	28	2	-88	-88	-88	0.01	0.58	-88	0	0.01	6.00	0.33	-88	0.03	-99
1994	10	28	3	-88	-88	-88	0	0.43	-88	0	0.01	5.60	0.46	-88	0.03	-99
1994	10	28	inlet	-88	-88	-88	0	1.80	-88	0	0.02	6.00	0.65	-88	0.08	41.0
1994	10	28	outlet	-88	-88	-88	0	0.69	-88	0.01	0.01	6.60	0.66	-88	0.06	22.0
1995	3	15	1	-88	-88	-88	0	0.66	-88	0.01	0.03	0.50	0.05	-88	0.03	7.60
1995	3	15	2	-88	-88	-88	0.01	0.59	-88	0	0.01	1.30	0.05	-88	0.03	5.60
1995	3	15	3	-88	-88	-88	0.01	0.61	-88	0	0	3.20	0.05	-88	0.03	6.80
1995	3	15	inlet	-88	-88	-88	0.01	0.91	-88	0.01	0.01	0.50	0.05	-88	0.03	15.0
1995	3	15	outlet	-88	-88	-88	0.01	0.50	-88	0	0	1.50	0.05	-88	0.04	8.80
1995	6	28	1	-88	-88	-88	0	0.33	-88	0	0.01	9.10	0.93	-88	0.04	7.60
1995	6	28	2	-88	-88	-88	0	0.15	-88	0	0.01	9.80	0.98	-88	0.03	3.71
1995	6	28	3	-88	-88	-88	0.01	0.19	-88	0	0	9.80	0.76	-88	0.02	2.96
1995	6	28	inlet	-88	-88	-88	0.01	4.80	0.01	0.01	0.04	6.70	2.00	-88	0.2	43.0
1995	6	28	outlet	-88	-88	-88	0	0.91	0.01	0	0.01	7.80	1.30	-88	0.06	5.60
1995	9	27	1	-88	-88	-88	0	0.94	-88	-99	0.03	13.0	0.94	-88	0.03	7.95
1995	9	27	2	-88	-88	-88	0	0.22	-88	-99	0.02	5.90	0.55	-88	0	5.33
1995	9	27	3	-88	-88	-88	0	0.12	-88	-99	0.02	8.10	0.61	-88	0.01	3.75
1995	9	27	inlet	-88	-88	-88	0.01	1.40	-88	-99	0.03	15.0	1.30	-88	0.05	11.5
1995	9	27	outlet	-88	-88	-88	0	2.30	-88	-99	0.03	9.10	1.10	-88	0.08	11.0

Park Place Wet Pond grab sample data, October 1994 through September 1995.

Year	Month	Day	Site	Sample	Temp (C)	pH	DO (mg/ L)	Cond (uS)	TSS (mg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
1994	10	26	1	1	11.32	9.40	14.64	212	18	4180	3820	188
1994	10	26	2	1	11.27	9.35	13.37	208	9	740	204	28
1994	10	26	3	1	11.19	8.69	11.24	196	17	1119	836	48
1994	10	26	inlet	1	11.23	7.70	10.72	187	12	4000	4000	228
1994	10	26	outlet	1	11.19	8.64	10.95	197	23	2740	244	68
1994	10	27	1	2	10.97	8.22	10.80	165	20	4460	4140	1
1994	10	27	1	3	10.81	7.85	10.95	131	64	4000	3340	20
1994	10	27	2	2	10.86	8.20	11.10	168	23	3820	3800	1
1994	10	27	2	3	10.92	8.02	11.24	158	16	4000	3740	52
1994	10	27	3	2	10.83	8.85	11.44	191	18	3220	2520	60
1994	10	27	3	3	10.90	8.27	11.31	176	13	3880	1880	68
1994	10	27	inlet	2	11.06	7.97	10.55	189	18	4460	4560	60
1994	10	27	inlet	3	9.55	7.89	11.18	58	22	4000	2220	108
1994	10	27	outlet	2	10.79	8.59	11.25	183	15	3680	3320	48
1994	10	27	outlet	3	10.88	8.29	11.56	177	11	3280	2680	92
1994	10	28	1	4	10.83	7.40	10.10	187	12	2140	2840	28
1994	10	28	2	4	10.25	7.45	9.82	170	19	2220	1280	12
1994	10	28	3	4	10.15	7.41	10.14	167	10	17500	5700	108
1994	10	28	inlet	4	11.60	7.48	10.62	226	344	20700	7100	240
1994	10	28	outlet	4	10.24	7.54	10.53	168	10	16400	6700	136

Park Place Wet Pond grab sample data, October 1994 through September 1995.

Year	Month	Day	Site	Sample	Temp (C)	pH	DO (mg/ L)	Cond (uS)	TSS (mg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
1995	3	13	1	1	8.08	7.60	10.90	187	5	2020	34	-99
1995	3	13	2	1	8.14	7.63	11.00	183	11	1960	59	-99
1995	3	13	3	1	8.32	7.67	11.00	180	7	3780	28	-99
1995	3	13	inlet	1	8.47	7.62	10.63	194	11	1780	115	-99
1995	3	13	outlet	1	8.30	7.72	12.01	171	9	1560	62	-99
1995	3	14	1	2	8.82	7.55	11.28	184	7	16000	500	-99
1995	3	14	1	3	10.01	7.62	11.71	190	6	8800	21994	-99
1995	3	14	2	2	9.12	7.62	11.47	190	6	900	300	-99
1995	3	14	2	3	10.14	7.77	12.67	189	6	6200	188	-99
1995	3	14	3	2	8.94	7.68	11.85	190	4	1600	80	-99
1995	3	14	3	3	10.24	7.84	12.65	189	6	3500	98	-99
1995	3	14	inlet	2	9.06	7.61	11.10	182	10	500	50	-99
1995	3	14	inlet	3	9.58	7.52	11.75	193	8	3900	190	-99
1995	3	14	outlet	2	9.14	7.72	11.90	174	7	2200	50	-99
1995	3	14	outlet	3	10.09	7.98	12.30	187	6	1600	72	-99
1995	3	15	1	4	8.43	7.45	11.25	178	7	3900	190	-99
1995	3	15	2	4	8.53	7.52	11.44	189	2	4600	58	-99
1995	3	15	3	4	8.59	7.64	11.89	192	4	4500	76	-99
1995	3	15	inlet	4	8.85	7.25	11.80	146	25	3400	214	-99
1995	3	15	outlet	4	8.61	7.73	11.97	195	3	2800	112	-99

Park Place Wet Pond grab sample data, October 1994 through September 1995.

Year	Month	Day	Site	Sample	Temp (C)	pH	DO (mg/ L)	Cond (uS)	TSS (mg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
1995	6	26	1	1	18.77	7.73	6.54	234	6	50	34	58
1995	6	26	2	1	21.94	8.44	9.24	241	5	50	10	6
1995	6	26	3	1	23.60	8.26	8.97	243	5	50	16	1
1995	6	26	inlet	1	17.38	7.54	8.75	180	4	4000	120	120
1995	6	26	outlet	1	23.80	7.62	7.71	257	5	50	68	64
1995	6	27	1	2	17.65	7.62	6.09	227	7	50	102	94
1995	6	27	1	3	18.79	7.67	6.32	230	5	91	48	24
1995	6	27	2	2	20.89	8.24	8.25	241	6	50	4	2
1995	6	27	2	3	23.21	8.22	8.96	243	4	1000	1	14
1995	6	27	3	2	21.02	7.91	8.30	243	5	50	2	2
1995	6	27	3	3	24.41	8.24	8.74	244	4	50	2	1
1995	6	27	inlet	2	16.96	7.43	8.62	203	5	2300	120	120
1995	6	27	inlet	3	18.75	7.20	7.91	184	28	2300	120	120
1995	6	27	outlet	2	19.70	7.25	4.39	305	6	50	60	36
1995	6	27	outlet	3	20.83	7.24	4.00	250	8	1000	46	38
1995	6	28	1	4	18.52	7.52	5.61	230	5	200	54	200
1995	6	28	2	4	21.50	8.20	8.20	241	4	50	2	10
1995	6	28	3	4	21.50	8.03	7.92	243	5	1000	2	1
1995	6	28	inlet	4	17.40	7.34	8.61	216	5	2900	120	120
1995	6	28	outlet	4	20.00	7.33	5.14	273	13	50	10	10

Park Place Wet Pond grab sample data, October 1994 through September 1995.

Year	Month	Day	Site	Sample	Temp (C)	pH	DO (mg/L)	Cond (uS)	TSS (mg/L)	TC (cfu/100 mL)	FC (cfu/100 mL)	EC (cfu/100 mL)
1995	9	25	1	1	17.88	9.04	12.20	247	13	50	1	44
1995	9	25	2	1	18.80	9.16	12.91	220	3	727	8	8
1995	9	25	3	1	18.46	9.61	14.95	217	2	50	1	4
1995	9	25	inlet	1	18.07	6.83	6.97	224	4	2091	92	8
1995	9	25	outlet	1	19.05	8.12	6.49	347	5	2700	120	142
1995	9	26	1	2	16.65	7.30	5.82	210	12	11000	120	178
1995	9	26	1	3	18.02	8.34	10.25	225	7	50	400	218
1995	9	26	2	2	17.29	8.84	10.59	225	3	800	80	50
1995	9	26	2	3	18.47	9.09	11.59	222	3	200	16	4
1995	9	26	3	2	17.40	9.51	13.62	217	1	100	12	16
1995	9	26	3	3	18.43	9.56	14.54	216	1	300	1	8
1995	9	26	inlet	2	17.70	7.06	7.48	246	7	2182	120	304
1995	9	26	inlet	3	17.85	7.02	6.80	284	4	2364	350	300
1995	9	26	outlet	2	18.51	7.79	6.48	252	5	15000	120	370
1995	9	26	outlet	3	18.55	7.65	6.61	299	5	111000	120	120
1995	9	27	1	4	16.58	7.30	4.28	226	6	3000	594	314
1995	9	27	2	4	17.32	8.88	9.56	224	5	200	38	114
1995	9	27	3	4	17.41	9.54	12.94	217	3	50	4	24
1995	9	27	inlet	4	17.72	6.95	8.09	147	7	50	506	362
1995	9	27	outlet	4	18.41	7.78	6.24	197	8	8000	120	120

C.2 Park Place Wet Pond Photographs

Figure 157: Park Place wet pond, cell 1. Photograph taken on March 13, 1995.

Figure 158: Park Place wet pond, cell 1. Photograph taken on June 27, 1995.

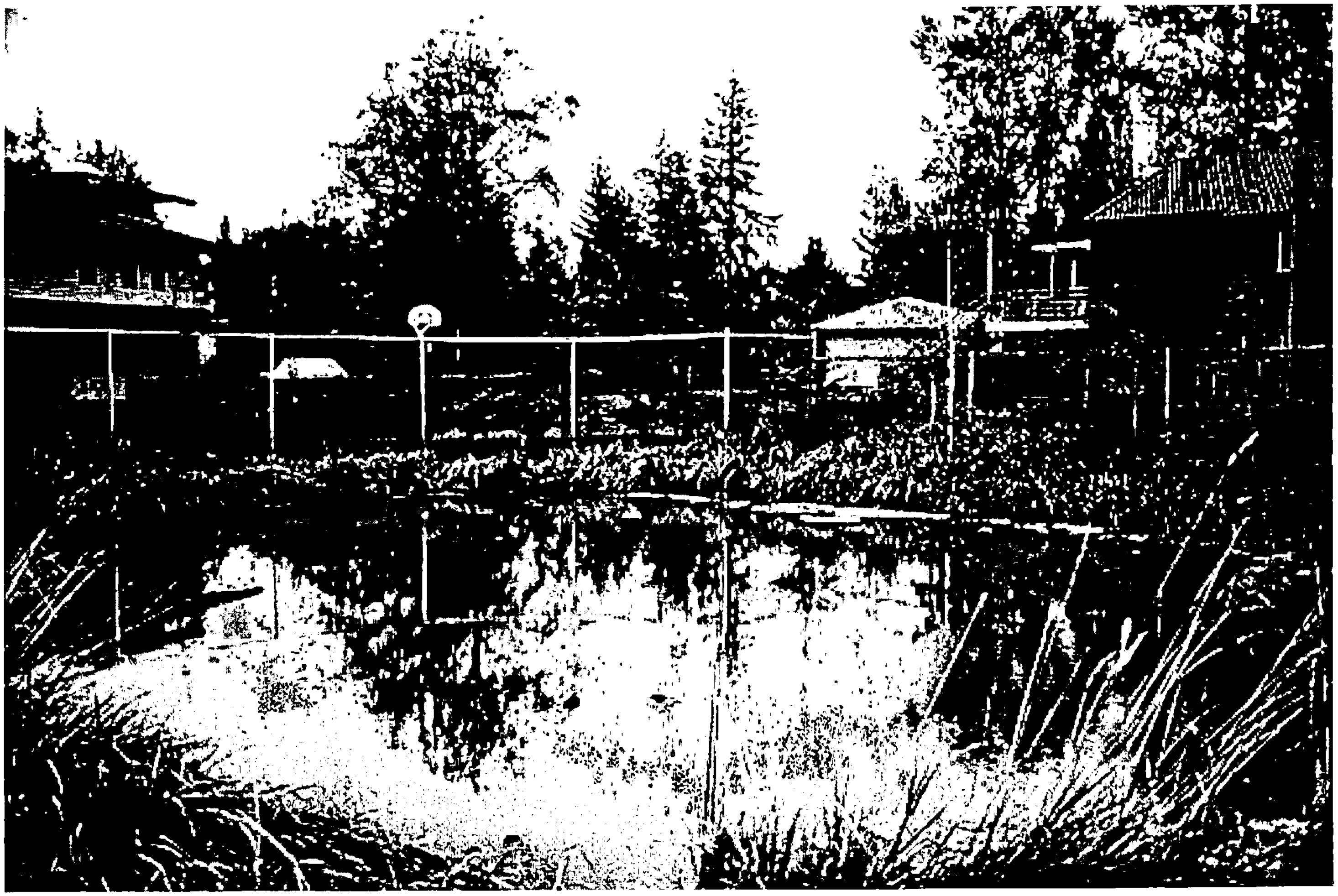


Figure 159: Park Place wet pond, cell 1. Photograph taken on September 25, 1995.

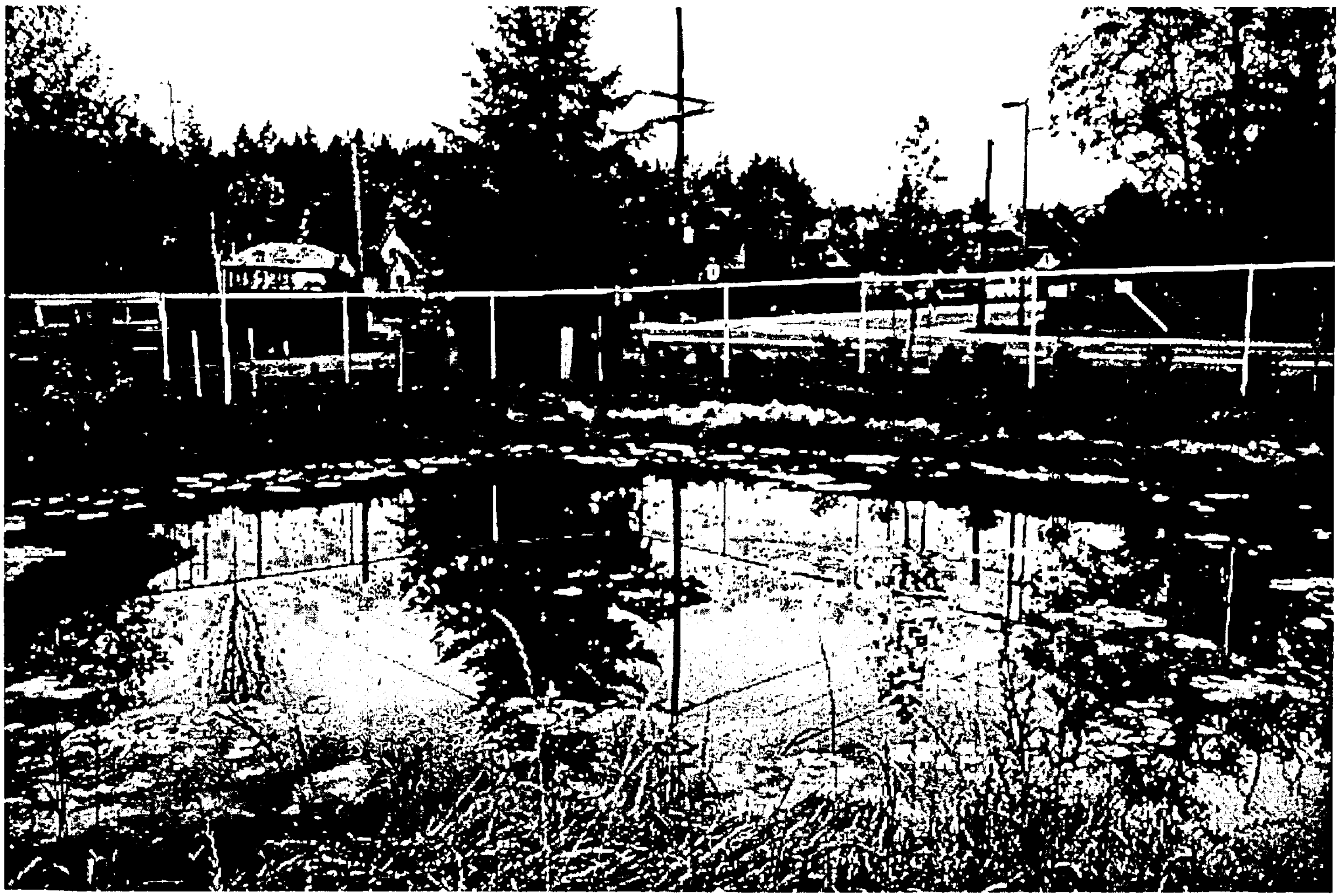


Figure 160: Park Place wet pond, cell 2. Photograph taken on March 13, 1995.

Figure 161: Park Place wet pond, cell 2. Photograph taken on June 27, 1995.

Figure 162: Park Place wet pond, cell 2. Photograph taken on September 25, 1995.

Figure 163: Park Place wet pond, cell 3. Photograph taken on March 13, 1995.

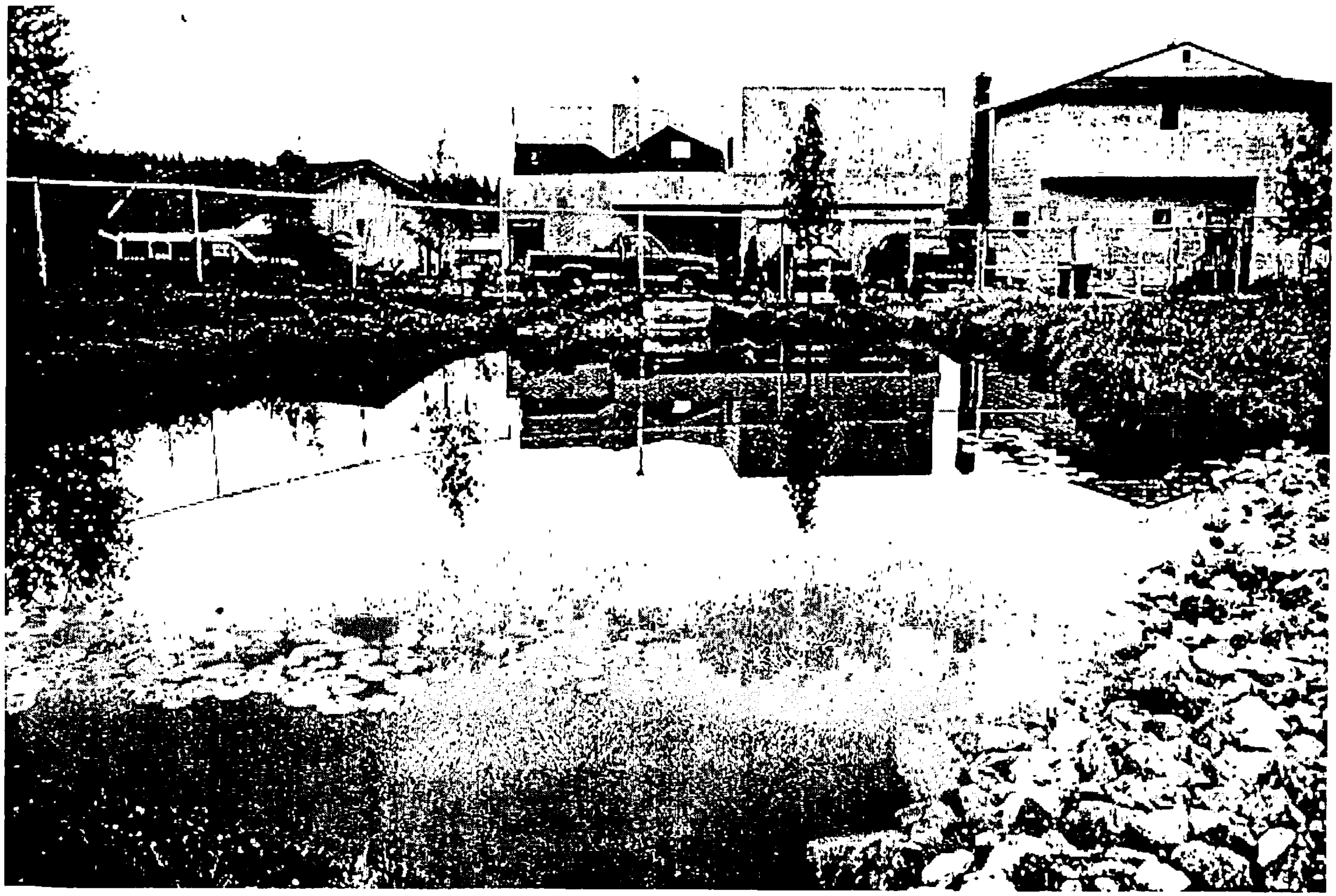


Figure 164: Park Place wet pond, cell 3. Photograph taken on June 27, 1995.

Figure 165: Park Place wet pond, cell 3. Photograph taken on September 25, 1995.

C.3 Park Place Wet Pond Aesthetic Check-lists

Observation Date: 10-26-~~95~~94			
Name of Individual Completing Checklist: MICHAEL HILLES			
Aesthetic Problem (Check all that apply)	Cell #1	Cell #2	Cell #3
Oily sheen	NO	NO	NO
Foaming	NO	NO	NO
Algal bloom	YES	YES	NO
Nuisance grasses	NO	NO	NO
Nuisance aquatic plants	YES - SEE ALGAL BLOOM	YES - SEE ALGAL BLOOM	NO
Odor problem	NO	NO	NO
Insect problem	NO	NO	NO
Vandalism	NO	NO	NO
Other	NO	NO	NO

Table 1: Park Place wet-pond aesthetic qualities checklist.

Observation Date: 3-13-95 Name of Individual Completing Checklist: Michael Hilles			
Aesthetic Problem (Check all that apply)	Cell #1	Cell #2	Cell #3
Oily sheen	NO	NO	NO
Foaming	NO	NO	NO
Algal bloom	NO	NO	NO
Nuisance grasses	NO	NO	NO
Nuisance aquatic plants	NO	NO	NO
Odor problem	NO	NO	NO
Insect problem	NO	NO	NO
Vandalism	NO	NO	NO
Other	NO	NO	NO

Table 1: Park Place wet-pond aesthetic qualities checklist.

Observation Date: 6-25-95 Name of Individual Completing Checklist: Michael Hilles			
Aesthetic Problem (Check all that apply)	Cell #1	Cell #2	Cell #3
Oily sheen	NO	NO	NO
Foaming	NO	NO	NO
Algal bloom	YES	YES	NO
Nuisance grasses	NO	NO	NO
Nuisance aquatic plants	YES - ALGAL	YES ALGAL	NO
Odor problem	NO	NO	NO
Insect problem	NO	NO	NO
Vandalism	NO	NO	NO
Other	NO	NO	NO

Table 1: Park Place wet-pond aesthetic qualities checklist.

Observation Date: 9-25-95			
Name of Individual Completing Checklist: Michael Hillers			
Aesthetic Problem (Check all that apply)	Cell #1	Cell #2	Cell #3
Oily sheen	NO	NO	NO
Foaming	NO	NO	NO
Algal bloom	YES	YES	YES
Nuisance grasses	NO	NO	NO
Nuisance aquatic plants	YES - ALGAE	YES - ALGAE	YES - ALGAE
Odor problem	NO	NO	NO
Insect problem	NO	NO	NO
Vandalism	NO	NO	NO
Other	NO	NO	NO

Table 1: Park Place wet-pond aesthetic qualities checklist.

C.4 Park Place Wet Pond AmTest Reports

ANALYSIS REPORT AMTEST

Western Washington University
Huxley College
ES 518
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 11/ 2/94
Date Reported: 11/16/94

Project Name: Prkplc Biofltrtn Pnd
Project #: 55812

WATER SAMPLES

AM TEST Identification Number 94-A020491
Client Identification PP1-Pond 1 Mid-Surface
Sampling Date 10/31/94

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	5.9		1.0
Total Nitrogen (TKN) (mg/l)	< 0.25		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.051		0.005
Aluminum (mg/l)	0.82		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.031		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	15.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	0.006		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.008		0.002
Iron (mg/l)	1.0		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.6		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	7.0		0.10
Manganese (mg/l)	0.050		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	9.9		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.16		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	3.2		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	4.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.12		0.003
Titanium (mg/l)	0.03		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.020		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 11/ 2/94
Date Reported: 11/16/94

WATER SAMPLES

AM TEST Identification Number 94-A020492
Client Identification PP2-Pond 2 Mid-Surface
Sampling Date 10/31/94

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	6.0		1.0
Total Nitrogen (TKN) (mg/l)	0.33		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.033		0.005
Aluminum (mg/l)	0.50		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.026		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	15.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.005		0.002
Iron (mg/l)	0.58		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.7		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	6.8		0.10
Manganese (mg/l)	0.022		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	10.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.13		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	3.2		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.5		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.12		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.014		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 11/ 2/94
Date Reported: 11/16/94

WATER SAMPLES

AM TEST Identification Number 94-A020493
Client Identification PP3-Pond 3 Mid-Surface
Sampling Date 10/31/94

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	5.6		1.0
Total Nitrogen (TKN) (mg/l)	0.46		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.033		0.005
Aluminum (mg/l)	0.32		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.022		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	15.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.43		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	6.4		0.10
Manganese (mg/l)	0.015		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	10.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	3.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.0		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.12		0.003
Titanium (mg/l)	0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.007		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 11/ 2/94
Date Reported: 11/16/94

WATER SAMPLES

AM TEST Identification Number	94-A020494
Client Identification	PP4-Inlet
Sampling Date	10/31/94

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	6.0		1.0
Total Nitrogen (TKN) (mg/l)	0.65		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.075		0.005
Aluminum (mg/l)	1.6		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.040		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	15.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	1.8		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.9		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	7.1		0.10
Manganese (mg/l)	0.12		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	9.8		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.12		0.05
Lead (mg/l)	0.003		0.001
Sulfur (mg/l)	3.8		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	5.9		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.12		0.003
Titanium (mg/l)	0.06		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.023		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 11/ 2/94
Date Reported: 11/16/94

WATER SAMPLES

AM TEST Identification Number 94-A020495
Client Identification PP5-Outlet
Sampling Date 10/31/94

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	6.6		1.0
Total Nitrogen (TKN) (mg/l)	0.66		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.062		0.005
Aluminum (mg/l)	0.54		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.026		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	17.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.004		0.002
Iron (mg/l)	0.69		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.5		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	7.0		0.10
Manganese (mg/l)	0.039		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	11.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.10		0.05
Lead (mg/l)	0.008		0.001
Sulfur (mg/l)	3.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	3.4		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.13		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.009		0.002

Reported by: Kathy Fugiel

AMTEST

Western Washington University
Huxley College
ES 518
Bellingham, WA 98225

Date Received: 11/02/94

Attention: Michael Hilles

Project Name: Prkplc Biofltrtn Pnd
Project No.: 55812

QUALITY CONTROL - STANDARD REFERENCE MATERIALS
PERCENT RECOVERIES

ANALYTES/SRM NOS.	SRM VALUE (mg/l)	TRUE VALUE (mg/l)	RECOVERY (%)
Total Phosphorus 9945	3.13	3.20	98
Total Nitrogen (TKN) WP 31-3b	11.50	14.00	82
Total Organic Carbon WP 32	46.0	44.0	105
Lead WP 31-2	0.0149	0.0150	99

REPORTED BY Kathy Fugiel
Kathy Fugiel

AMTEST

Client: Western Washington University

Date Received: 11/02/94

Associated
Sample Numbers: 94-A020491 to 20495

Date Analyzed: 11/07/94

PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		TRUE VALUE (ppm)	RESULTS (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Aluminum	Al	10	10.83	108	0.01
Arsenic	As	2	2.10	105	0.03
Barium	Ba	2	2.25	113	0.003
Calcium	Ca	10	10.13	101	0.1
Cadmium	Cd	2	2.10	105	0.002
Chromium	Cr	2	1.85	93	0.006
Copper	Cu	2	2.00	100	0.002
Iron	Fe	2	1.93	96	0.01
Potassium	K	100	99.26	99	1.0
Magnesium	Mg	10	9.90	99	0.10
Manganese	Mn	4	3.85	96	0.002
Molybdenum	Mo	2	1.90	95	0.01
Sodium	Na	20	19.52	98	0.50
Nickel	Ni	2	1.92	96	0.01
Phosphorus	P	10	10.55	106	0.05
Lead	Pb	2	2.11	105	0.02
Sulfur	S	2	1.97	99	0.1
Antimony	Sb	2	1.85	92	0.02
Selenium	Se	2	1.99	99	0.03
Tin	Sn	2	1.94	97	0.02
Strontium	Sr	2	2.01	101	0.003
Titanium	Ti	2	1.89	95	0.01
Thallium	Tl	2	1.95	97	0.03
Zinc	Zn	2	1.94	97	0.002

ND = not detected; All results reported in (mg/l).

AMTEST

Western Washington University
Huxley College
ES 518
Bellingham, WA 98225

Date Received: 11/02/94

Attention: Michael Hilles

Project Name: Prkplc Biofltrtn Pnd
Project No.: 55812

QUALITY CONTROL - MATRIX SPIKE

ANALYTES/SAMPLE NOS.	SAMPLE VALUE (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE CONCENTRATION (mg/l)	RECOVERY (%)
Total Phosphorus				
94-A020492	0.033	0.23	0.200	98
Total Nitrogen (TKN)				
94-A020189	< 0.25	4.2	4.00	105
Total Organic Carbon				
94-A020492	6.0	64.	50.0	116
Lead				
94-A020492	0.002	0.025	0.025	92

< = less than

AMTEST

Western Washington University
Huxley College
ES 518
Bellingham, WA 98225

Date Received: 11/02/94

Attention: Michael Hilles

Project Name: Prkplc Biofltrtn Pnd
Project No.: 55812

QUALITY CONTROL - DUPLICATE ANALYSES

ANALYTES/SAMPLE NOS.	SAMPLE RESULT (mg/l)	DUPLICATE RESULT (mg/l)	RELATIVE PERCENT DIFFERENCE (%)
Total Phosphorus			
94-A020491	0.051	0.047	8.2
Total Nitrogen (TKN)			
94-A020188	0.36	0.43	17.7
Total Organic Carbon			
94-A020491	5.9	6.5	9.7
Lead			
94-A020491	0.001	0.001	0.0

AMTEST

Western Washington University
Huxley College
ES 518
Bellingham, WA 98225

Date Received: 11/02/94

Attention: Michael Hilles

Project Name: Prkplc Biofltrtn Pnd
Project No.: 55812

QUALITY CONTROL - BLANK

ANALYTES	UNITS	RESULTS
Total Phosphorus	mg/l	ND
Total Nitrogen (TKN)	mg/l	ND
Total Organic Carbon	mg/l	ND
Lead	mg/l	ND

ND = not detected

AMTEST

METHODOLOGY REPORT

AM TEST ID 94-A020491
CLIENT ID PP1-Pond 1 Mid-Surface

MATRIX : Water
SAMPLED: 10/31/94

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	11/11/94
Total Nitrogen (TKN)	mg/l	351.3	EPA	0.25	11/ 7/94
Petroleum Hydrocarbon-TPH	mg/l	418.1	EPA	1.0	11/15/94
Total Phosphorus	mg/l	365.2	EPA	0.005	11/ 7/94
Silver	mg/l	200.7	EPA	0.01	11/ 8/94
Aluminum	mg/l	200.7	EPA	0.01	11/ 8/94
Arsenic	mg/l	200.7	EPA	0.03	11/ 8/94
Boron	mg/l	200.7	EPA	0.1	11/ 8/94
Barium	mg/l	200.7	EPA	0.003	11/ 8/94
Beryllium	mg/l	200.7	EPA	0.005	11/ 8/94
Calcium	mg/l	200.7	EPA	0.10	11/ 8/94
Cadmium	mg/l	200.7	EPA	0.002	11/ 8/94
Cobalt	mg/l	200.7	EPA	0.003	11/ 8/94
Chromium	mg/l	200.7	EPA	0.006	11/ 8/94
Copper	mg/l	200.7	EPA	0.002	11/ 8/94
Iron	mg/l	200.7	EPA	0.01	11/ 8/94
Mercury	mg/l	200.7	EPA	0.01	11/ 8/94
Potassium	mg/l	200.7	EPA	1.0	11/ 8/94
Lithium	mg/l	200.7	EPA	0.02	11/ 8/94
Magnesium	mg/l	200.7	EPA	0.10	11/ 8/94
Manganese	mg/l	200.7	EPA	0.002	11/ 8/94
Molybdenum	mg/l	200.7	EPA	0.01	11/ 8/94
Sodium	mg/l	200.7	EPA	0.5	11/ 8/94
Nickel	mg/l	200.7	EPA	0.01	11/ 8/94
Phosphorus	mg/l	200.7	EPA	0.05	11/ 8/94
Lead	mg/l	239.2	EPA	0.001	11/10/94
Sulfur	mg/l	200.7	EPA	0.10	11/ 8/94
Antimony	mg/l	200.7	EPA	0.02	11/ 8/94
Selenium	mg/l	200.7	EPA	0.03	11/ 8/94
Silicon	mg/l	200.7	EPA	0.1	11/ 8/94
Tin	mg/l	200.7	EPA	0.02	11/ 8/94
Strontium	mg/l	200.7	EPA	0.003	11/ 8/94
Titanium	mg/l	200.7	EPA	0.01	11/ 8/94
Thallium	mg/l	200.7	EPA	0.03	11/ 8/94
Vanadium	mg/l	200.7	EPA	0.002	11/ 8/94
Yttrium	mg/l	200.7	EPA	0.001	11/ 8/94
Zinc	mg/l	200.7	EPA	0.002	11/ 8/94
Acid Dig. (Tot Metals)		3010	EPA		11/ 4/94

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
* Instrument Detection Limit

AMTEST

Client: Western Washington University

Date Received: 11/02/94

Associated
Sample Numbers: 94-A020491 to 20495

Date Analyzed: 11/07/94

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7
DUPLICATE ANALYSIS Sample #: 94-A020491

ELEMENT		REPLICATE #1 (mg/l)	REPLICATE #2 (mg/l)	RELATIVE PERCENT DIFFERENCE (%)	DETECTION LIMITS (mg/l)
Silver	Ag	< 0.010	< 0.010	-	0.010
Aluminum	Al	0.82	1.1	29.17	0.01
Arsenic	As	< 0.03	< 0.03	-	0.03
Boron	B	< 0.10	< 0.10	-	0.10
Barium	Ba	0.031	0.031	0.00	0.003
Beryllium	Be	< 0.007	< 0.007	-	0.007
Calcium	Ca	15	15	0.00	0.10
Cadmium	Cd	< 0.002	< 0.002	-	0.002
Cobalt	Co	0.006	0.008	28.57	0.003
Chromium	Cr	< 0.006	< 0.006	-	0.006
Copper	Cu	0.008	0.006	28.57	0.002
Iron	Fe	1	1.2	18.18	0.01
Mercury	Hg	< 0.010	< 0.010	-	0.010
Potassium	K	1.7	1.8	5.71	1.0
Lithium	Li	< 0.02	< 0.02	-	0.02
Magnesium	Mg	6.96	6.94	0.29	0.10
Manganese	Mn	0.05	0.05	0.00	0.002
Molybdenum	Mo	< 0.01	< 0.01	-	0.01
Sodium	Na	9.9	9.8	1.02	0.50
Nickel	Ni	< 0.01	< 0.01	-	0.01
Phosphorus	P	0.16	0.13	20.69	0.05
Sulfur	S	3	3	0.00	0.1
Antimony	Sb	< 0.02	< 0.02	-	0.02
Selenium	Se	< 0.03	< 0.03	-	0.03
Silicon	Si	4.1	4.5	9.30	0.10
Tin	Sn	< 0.02	< 0.02	-	0.02
Strontium	Sr	0.121	0.12	0.83	0.003
Titanium	Ti	0.03	0.04	28.57	0.01
Thallium	Tl	< 0.03	< 0.03	-	0.03
Vanadium	V	< 0.002	< 0.002	-	0.002
Yttrium	Y	< 0.001	< 0.001	-	0.001
Zinc	Zn	0.02	0.022	9.52	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 11/02/94

Associated
Sample Numbers: 94-A020491 to 20495

Date Analyzed: 11/07/94

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7

SPIKE RECOVERY DATA Sample #: 94-A020492

ELEMENT		SAMPLE CONC. (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Aluminum	Al	0.504	9.49	10	89.9	0.010
Arsenic	As	< 0.03	0.49	0.5	98.0	0.03
Barium	Ba	0.026	0.976	1.0	95.0	0.003
Beryllium	Be	< 0.007	0.919	1.0	91.9	0.007
Calcium	Ca	15	25	10	100.0	0.10
Cadmium	Cd	< 0.002	0.486	0.5	97.2	0.002
Chromium	Cr	< 0.006	0.919	1.0	91.9	0.006
Copper	Cu	0.005	0.908	1.0	90.3	0.002
Iron	Fe	0.58	0.97	0.5	78.0	0.01
Potassium	K	1.7	11	10	93.0	1.0
Magnesium	Mg	6.8	16	10	92.0	0.10
Manganese	Mn	0.022	0.95	1.0	92.8	0.002
Molybdenum	Mo	< 0.01	0.88	1.0	88.0	0.01
Sodium	Na	10	20	10	100.0	0.50
Nickel	Ni	< 0.01	0.92	1.0	92.0	0.01
Antimony	Sb	< 0.02	0.41	0.5	82.0	0.02
Selenium	Se	< 0.03	0.39	0.5	78.0	0.03
Tin	Sn	< 0.02	0.74	0.80	92.5	0.02
Strontium	Sr	0.12	1.08	1.0	96.0	0.003
Thallium	Tl	< 0.03	0.48	0.5	96.0	0.03
Yttrium	Y	< 0.001	0.435	0.5	87.0	0.001
Zinc	Zn	0.014	0.997	1.0	98.3	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 11/02/94

Associated
Sample Numbers: 94-A020491 to 20495

Date Analyzed: 11/07/94

QUALITY CONTROL - METHOD BLANK
PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		METHOD BLANK #1 (mg/l)	DETECTION LIMITS (mg/l)
Silver	Ag	ND	0.01
Aluminum	Al	0.02	0.01
Arsenic	As	ND	0.03
Boron	B	ND	0.1
Barium	Ba	ND	0.003
Beryllium	Be	ND	0.007
Calcium	Ca	ND	0.1
Cadmium	Cd	ND	0.002
Cobalt	Co	ND	0.003
Chromium	Cr	ND	0.006
Copper	Cu	ND	0.002
Iron	Fe	ND	0.01
Mercury	Hg	ND	0.01
Potassium	K	ND	1.0
Lithium	Li	ND	0.02
Magnesium	Mg	ND	0.1
Manganese	Mn	ND	0.002
Molybdenum	Mo	ND	0.01
Sodium	Na	ND	0.5
Nickel	Ni	ND	0.01
Phosphorus	P	ND	0.05
Lead	Pb	ND	0.02
Sulfur	S	ND	0.1
Antimony	Sb	ND	0.02
Selenium	Se	ND	0.03
Silica	Si	ND	0.1
Tin	Sn	ND	0.02
Strontium	Sr	ND	0.003
Titanium	Ti	ND	0.01
Thallium	Tl	ND	0.03
Vanadium	V	ND	0.002
Yttrium	Y	ND	0.001
Zinc	Zn	0.007	0.002

ND= not detected; All results reported in (mg/l).

AMTEST

AmTest Inc.
Professional Analytical Services
14603 N.E. 87th St.
Redmond, WA 98052
Fax: 206 883 3495
Tel: 206 885 1664

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
55812	PARK PLACE BIOFILTRATION PONDS

SAMPLERS: (Signature) MICHAEL A. HILLES

Analysis Requested

AMTEST I.D. NO.	CLIENT SAMPLE I.D. (25 Characters)	DATE	TIME	MATRIX	No. of Containers	TOTAL HYDROCARB) TPH	TOTAL ORGANIC CARBON	TKN/TP	TOTAL METALS ICP	Pb by GFAA	Remarks
5183	PP1 Pond 1	3-15-95	1600	FRESH H_2O	4	✓	✓	✓	✓	✓	
4	PP2 Pond 2	3-15-95	1600	FRESH H_2O	4	✓	✓	✓	✓	✓	
5	PP3 Pond 3	3-15-95	1600	FRESH H_2O	4	✓	✓	✓	✓	✓	
6	PP4 INLET	3-15-95	1600	FRESH H_2O	4	✓	✓	✓	✓	✓	
7	PP5 OUTLET	3-15-95	1600	FRESH H_2O	4	✓	✓	✓	✓	✓	

418.1 2330 200.7 239.2

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	3-15-95 1600	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory By: (Signature)
	3-16-95 1400	[signature]

Client Name: IETC / LAKE WHATCOM Western WA Univ.
Client Address: IETC, HUXLEY COLLEGE, WWU, MS 9180 BELLINGHAM WA 98225
Client Phone: 360-650-6587
Fax:
Contact Person: MICHAEL HILLES
P.O. No. T75395

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 3/16/95
Date Reported: 4/ 4/95

WATER SAMPLES

AM TEST Identification Number 95-A005183
Client Identification PP1 Pond 1
Sampling Date 3/15/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.61		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.033		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	18.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.66		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.1		0.10
Manganese (mg/l)	0.048		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	9.3		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.006		0.001
Sulfur (mg/l)	4.9		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	6.9		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.14		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	0.001		0.001
Zinc (mg/l)	0.031		0.002

ANALYSIS REPORT AMTEST

AmTest Inc

Professional
Analytical
Services

14603 N.E. 87th St.
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

Western Washington University
MS 9180
2600 Douglas Street
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 3/16/95
Date Reported: 4/ 4/95

Project Name: Park Pl Bio Ponds
Project #: 55812
PO Number: T25385

WATER SAMPLES

AM TEST Identification Number 95-A005183
Client Identification PP1 Pond 1
Sampling Date 3/15/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Nitrogen (TKN) (mg/l)	< 0.25		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.033		0.005

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 3/16/95
Date Reported: 4/ 4/95

WATER SAMPLES

AM TEST Identification Number	95-A005184	
Client Identification	PP2	Pond 2
Sampling Date	3/15/95	

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.3		1.0
Total Nitrogen (TKN) (mg/l)	< 0.25		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.029		0.005
Total Metals			
Aluminum (mg/l)	0.57		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.033		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	18.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.006		0.002
Iron (mg/l)	0.59		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.4		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.3		0.10
Manganese (mg/l)	0.042		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	8.8		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.004		0.001
Sulfur (mg/l)	5.0		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	6.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.15		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.004		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.008		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 3/16/95
Date Reported: 4/ 4/95

WATER SAMPLES

AM TEST Identification Number 95-A005185
Client Identification PP3 Pond 3
Sampling Date 3/15/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	3.2		1.0
Total Nitrogen (TKN) (mg/l)	< 0.25		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.034		0.005
Total Metals			
Aluminum (mg/l)	0.53		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	0.12		0.10
Barium (mg/l)	0.038		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	19.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.006		0.002
Iron (mg/l)	0.61		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.3		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.5		0.10
Manganese (mg/l)	0.039		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	9.3		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	5.1		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	6.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.15		0.003
Titanium (mg/l)	0.02		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	< 0.002		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michaeil Hilles

Date Received: 3/16/95
Date Reported: 4/ 4/95

WATER SAMPLES

AM TEST Identification Number 95-A005186
Client Identification PP4 Inlet
Sampling Date 3/15/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Nitrogen (TKN) (mg/l)	< 0.25		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.032		0.005
Total Metals			
Aluminum (mg/l)	0.80		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.036		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	18.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	0.017		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.010		0.002
Iron (mg/l)	0.91		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.6		0.10
Manganese (mg/l)	0.068		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	9.2		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.005		0.001
Sulfur (mg/l)	5.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	7.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.15		0.003
Titanium (mg/l)	0.03		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.004		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.006		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 3/16/95
Date Reported: 4/ 4/95

WATER SAMPLES

AM TEST Identification Number 95-A005187
Client Identification PP5 Outlet
Sampling Date 3/15/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.5		1.0
Total Nitrogen (TKN) (mg/l)	< 0.25		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.037		0.005
Total Metals			
Aluminum (mg/l)	0.36		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.030		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	17.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.008		0.002
Iron (mg/l)	0.50		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.3		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	7.8		0.10
Manganese (mg/l)	0.037		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	8.3		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	< 0.05		0.05
Lead (mg/l)	0.003		0.001
Sulfur (mg/l)	4.6		0.1
Selenium (mg/l)	0.07		0.03
Silicon (mg/l)	5.4		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.14		0.003
Titanium (mg/l)	0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.004		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.003		0.002

AMTEST

METHODOLOGY REPORT

AM TEST ID 95-A005183 MATRIX : Water
CLIENT ID PP1 SAMPLED: 3/15/95

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	4/ 3/95
Total Nitrogen (TKN)	mg/l	351.3	EPA	0.25	3/22/95
Total Oil and Grease	mg/l	413.2	EPA	1.0	3/22/95
Petroleum Hydrocarbon-TPH	mg/l	418.1	EPA	1.0	3/22/95
Total Phosphorus	mg/l	365.2	EPA	0.005	3/24/95
Silver	mg/l	200.7	EPA	0.01	3/24/95
Aluminum	mg/l	200.7	EPA	0.01	3/24/95
Arsenic	mg/l	200.7	EPA	0.03	3/24/95
Boron	mg/l	200.7	EPA	0.1	3/24/95
Barium	mg/l	200.7	EPA	0.003	3/24/95
Beryllium	mg/l	200.7	EPA	0.005	3/24/95
Calcium	mg/l	200.7	EPA	0.10	3/24/95
Cadmium	mg/l	200.7	EPA	0.002	3/24/95
Cobalt	mg/l	200.7	EPA	0.003	3/24/95
Chromium	mg/l	200.7	EPA	0.006	3/24/95
Copper	mg/l	200.7	EPA	0.002	3/24/95
Iron	mg/l	200.7	EPA	0.01	3/24/95
Mercury	mg/l	200.7	EPA	0.01	3/24/95
Potassium	mg/l	200.7	EPA	1.0	3/24/95
Lithium	mg/l	200.7	EPA	0.02	3/24/95
Magnesium	mg/l	200.7	EPA	0.10	3/24/95
Manganese	mg/l	200.7	EPA	0.002	3/24/95
Molybdenum	mg/l	200.7	EPA	0.01	3/24/95
Sodium	mg/l	200.7	EPA	0.5	3/24/95
Nickel	mg/l	200.7	EPA	0.01	3/24/95
Phosphorus	mg/l	200.7	EPA	0.05	3/24/95
Lead	mg/l	239.2	EPA	0.001	3/24/95
Sulfur	mg/l	200.7	EPA	0.10	3/24/95
Antimony	mg/l	200.7	EPA	0.02	3/24/95
Selenium	mg/l	200.7	EPA	0.03	3/24/95
Silicon	mg/l	200.7	EPA	0.1	3/24/95
Tin	mg/l	200.7	EPA	0.02	3/24/95
Strontium	mg/l	200.7	EPA	0.003	3/24/95
Titanium	mg/l	200.7	EPA	0.01	3/24/95
Thallium	mg/l	200.7	EPA	0.03	3/24/95
Vanadium	mg/l	200.7	EPA	0.002	3/24/95
Yttrium	mg/l	200.7	EPA	0.001	3/24/95
Zinc	mg/l	200.7	EPA	0.002	3/24/95
Acid Dig.(Tot Metals)		3010	EPA		3/22/95

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
* Instrument Detection Limit

AMTEST

Client: Western Washington University

Date Received: 3/16/95

Associated
Sample Numbers: 95-A005183 to 5187

Date Analyzed: 3/24/95

QUALITY CONTROL - METHOD BLANK
PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		METHOD BLANK #1 (mg/l)	METHOD BLANK #2 (mg/l)	DETECTION LIMITS (mg/l)
Silver	Ag	ND	ND	0.010
Aluminum	Al	0.05	0.1	0.01
Arsenic	As	0.04	ND	0.03
Boron	B	0.2	0.1	0.10
Barium	Ba	ND	ND	0.003
Beryllium	Be	ND	ND	0.007
Calcium	Ca	ND	ND	0.10
Cadmium	Cd	ND	ND	0.002
Cobalt	Co	ND	0.006	0.003
Chromium	Cr	ND	ND	0.006
Copper	Cu	ND	0.002	0.002
Iron	Fe	0.014	0.022	0.01
Mercury	Hg	ND	ND	0.010
Potassium	K	ND	ND	1.0
Lithium	Li	ND	ND	0.02
Magnesium	Mg	ND	ND	0.10
Manganese	Mn	ND	ND	0.002
Molybdenum	Mo	ND	ND	0.01
Sodium	Na	ND	ND	0.50
Nickel	Ni	ND	ND	0.01
Phosphorus	P	ND	0.07	0.05
Sulfur	S	ND	ND	0.1
Antimony	Sb	0.14	0.06	0.02
Selenium	Se	ND	0.07	0.03
Silica	Si	ND	0.54	0.10
Tin	Sn	0.08	0.09	0.02
Strontium	Sr	ND	ND	0.003
Titanium	Ti	ND	ND	0.01
Thallium	Tl	ND	ND	0.03
Vanadium	V	0.004	0.004	0.002
Yttrium	Y	ND	ND	0.001
Zinc	Zn	0.006	0.004	0.002

ND= not detected; All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 3/16/95

Associated
Sample Numbers: 95-A005183 to 5187

Date Analyzed: 3/24/95

PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		TRUE VALUE (ppm)	RESULTS (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Silver	Ag	0.2	0.22	110	0.010
Aluminum	Al	10	10.50	105	0.01
Arsenic	As	2	2.20	110	0.03
Barium	Ba	2	2.00	100	0.003
Calcium	Ca	10	10.50	105	0.1
Cadmium	Cd	2	2.08	104	0.002
Chromium	Cr	2	2.00	100	0.006
Copper	Cu	2	2.10	105	0.002
Iron	Fe	2	2.00	100	0.01
Mercury	Hg	1	2.00	200	0.010
Potassium	K	100	106.00	106	1.0
Magnesium	Mg	10	10.40	104	0.10
Manganese	Mn	2	2.09	105	0.002
Molybdenum	Mo	2	1.97	99	0.01
Sodium	Na	20	21.50	108	0.50
Nickel	Ni	2	2.10	105	0.01
Phosphorus	P	10	11.00	110	0.05
Sulfur	S	2	2.10	105	0.1
Antimony	Sb	2	1.70	85	0.02
Selenium	Se	2	1.90	95	0.03
Tin	Sn	2	1.90	95	0.02
Strontium	Sr	2	2.10	105	0.003
Titanium	Ti	2	2.00	100	0.01
Thallium	Tl	2	2.20	110	0.03
Zinc	Zn	2	1.99	100	0.002

ND = not detected; All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 3/16/95

Associated
Sample Numbers: 95-A005183 to 5187

Date Analyzed: 3/24/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7
DUPLICATE ANALYSIS Sample #: 95-A005183

ELEMENT		REPLICATE #1 (mg/l)	REPLICATE #2 (mg/l)	RELATIVE PERCENT DIFFERENCE (%)	DETECTION LIMITS (mg/l)
Silver	Ag	< 0.010	< 0.010	-	0.010
Aluminum	Al	0.61	0.55	10.34	0.01
Arsenic	As	< 0.03	< 0.03	-	0.03
Boron	B	< 0.10	< 0.10	-	0.10
Barium	Ba	0.033	0.033	0.00	0.003
Beryllium	Be	< 0.007	< 0.007	-	0.007
Calcium	Ca	18	17	5.71	0.10
Cadmium	Cd	< 0.002	< 0.002	-	0.002
Cobalt	Co	< 0.003	< 0.003	-	0.003
Chromium	Cr	< 0.006	< 0.006	-	0.006
Copper	Cu	< 0.002	< 0.002	-	0.002
Iron	Fe	0.66	0.67	1.50	0.01
Mercury	Hg	< 0.010	< 0.010	-	0.010
Potassium	K	1.1	1.2	8.70	1.0
Lithium	Li	< 0.02	< 0.02	-	0.02
Magnesium	Mg	8.1	7.8	3.77	0.10
Manganese	Mn	0.048	0.046	4.26	0.002
Molybdenum	Mo	< 0.01	< 0.01	-	0.01
Sodium	Na	9.3	8.8	5.52	0.50
Nickel	Ni	< 0.01	< 0.01	-	0.01
Phosphorus	P	< 0.05	< 0.05	-	0.05
Sulfur	S	4.9	4.5	8.51	0.1
Antimony	Sb	< 0.02	< 0.02	-	0.02
Selenium	Se	< 0.03	< 0.03	-	0.03
Silicon	Si	6.9	6.6	4.44	0.10
Tin	Sn	< 0.02	< 0.02	-	0.02
Strontium	Sr	0.141	0.138	2.15	0.003
Titanium	Ti	0.02	0.02	0.00	0.01
Thallium	Tl	< 0.03	< 0.03	-	0.03
Vanadium	V	< 0.002	0.005	-	0.002
Yttrium	Y	0.001	< 0.001	-	0.001
Zinc	Zn	0.031	0.031	0.00	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 3/16/95

Associated
Sample Numbers: 95-A005183 to 5187

Date Analyzed: 3/24/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7

SPIKE RECOVERY DATA   Sample #: 95-A005184

ELEMENT		SAMPLE CONC. (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Aluminum	Al	0.57	10	10	94.3	0.01
Arsenic	As	< 0.03	0.42	0.5	84.0	0.03
Barium	Ba	0.033	1.01	1.0	97.7	0.003
Beryllium	Be	< 0.007	0.996	1.0	99.6	0.007
Calcium	Ca	18	28	10	100.0	0.10
Cadmium	Cd	< 0.002	0.503	0.5	100.6	0.002
Chromium	Cr	< 0.006	0.999	1.0	99.9	0.006
Copper	Cu	0.006	0.989	1.0	98.3	0.002
Iron	Fe	0.59	1	0.5	82.0	0.01
Potassium	K	1.4	12	10	106.0	1.0
Magnesium	Mg	8.3	18	10	97.0	0.10
Manganese	Mn	0.042	1.05	1.0	100.8	0.002
Molybdenum	Mo	< 0.01	0.93	0.8	116.3	0.01
Sodium	Na	8.8	19	10.5	97.1	0.50
Nickel	Ni	< 0.01	0.96	0.9	106.7	0.01
Lead	Pb	< 0.02	0.99	1.0	99.0	0.02
Antimony	Sb	< 0.02	0.49	0.5	98.0	0.02
Selenium	Se	< 0.03	0.48	0.5	96.0	0.03
Tin	Sn	< 0.02	0.81	1.0	81.0	0.02
Strontium	Sr	0.146	1.19	1.0	104.4	0.003
Thallium	Tl	< 0.03	0.51	0.6	85.0	0.03
Yttrium	Y	< 0.001	0.502	0.5	100.4	0.001
Zinc	Zn	0.008	0.979	1.0	97.1	0.002

All results reported in (mg/l).

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 03/16/95
Date Reported: 04/04/95
Project: Park Pl Bio Ponds
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - BLANK

AM TEST Sample Number	BLANK
Client Identification	-----

ANALYTES	UNITS	RESULTS
Total Phosphorus	mg/l	ND
Lead	mg/l	ND
Total Organic Carbon	mg/l	ND
Oil & Grease/Total Petroleum Hydrocarbon	mg/l	ND

ND = Not Detected

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 03/16/95
Date Reported: 04/04/95
Project: Park Pl Bio Ponds
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - DUPLICATES

ANALYTES/SAMPLE NOS.		SAMPLE VALUE (mg/l)	DUPLICATE VALUE (mg/l)	RELATIVE PERCENT DIFFERENCE (%)
Total Nitrogen - TKN	95-A005045	1.0	1.0	0.
Total Phosphorus	95-A005183	0.033	0.032	3.1
Lead	95-A005416	0.001	0.001	0.

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 03/16/95
Date Reported: 04/04/95
Project: Park Pl Bio Ponds
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - MATRIX SPIKES

ANALYTES/SAMPLE NOS.	SAMPLE VALUE (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE CONCENTRATION (mg/l)	RECOVERY (%)
Total Nitrogen - TKN 95-A005046	<0.25	1.4	2.0	70.
Total Phosphorus 95-A005184	0.029	0.23	0.20	100.
Lead 95-A005417	0.002	0.025	0.025	92.

< = less than

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 03/16/95
Date Reported: 04/04/95
Project: Park Pl Bio Ponds
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - STANDARD REFERENCE MATERIALS

ANALYTES/SRM NOS.		SRM VALUE (mg/l)	TRUE VALUE (mg/l)	RECOVERY (%)
Total Nitrogen - TKN	WP 31-3b	12.77	14.00	91.
Total Phosphorus	9945	3.24	3.20	101.
Lead	WP 31-2	0.0143	0.0150	95.
Total Organic Carbon	9946	87.7	84.3	104.

REPORTED BY Kathy Fugiel
Kathy Fugiel

KF/pb

4/ 4/95

AMTEST

AmTest Inc.
Professional
Analytical
Services

14603 N.E. 87th St
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

Western Washington University
MS 9180
2600 Douglas Street
Bellingham, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

Enclosed you will find the analytical data for the Park Pl Bio Ponds project.

The following is a cross correlation of client and laboratory identification for your convenience.

CLIENT ID	MATRIX	AM TEST ID	TEST
PP1	Water	95-A005183	CONV, MET,
PP2	Water	95-A005184	CONV, MET,
PP3	Water	95-A005185	CONV, MET,
PP4 Inlet	Water	95-A005186	CONV, MET,
PP5 Outlet	Water	95-A005187	CONV, MET,

Your five (5) samples were received at AM TEST on 3/16/95. At the time of receipt, the samples were logged in and properly maintained prior to their subsequent analyses.

The analytical procedures used in the laboratory are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers. Following the analytical data you will find the "Methodology Report". This table includes information relative to detection limits, analysis dates and method references.

Please note that the detection limits that are listed in the body of the report refer to Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Kathy Fugiel
Director of Inorganic Laboratory

Project #: 55812
PO Number: T25385

BACT = Bacteriological CONV = Conventional MET = Metal ORG = Organic

AMTEST
AmTest Inc.
Professional
Analytical
Services
14603 N.E. 87th St.
Redmond, WA
98052
Fax: 206 883 3495
Tel: 206 885 1664

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
55812	LAKE WHATCOM MONITORING, PACKPLACE BIOFILTRATION

SAMPLERS: (Signature)

AMTEST I.D. NO.	CLIENT SAMPLE I.D. (25 Characters)	DATE	TIME	MATRIX	No. of Containers	TOTAL METALS/ICP	Pb BY GFAA	TOC	TKN/TP	TOTAL HYDROCARBON						Remarks
12063	3PP1 Pond 1	6-28-95	1515	FRESH H_2O	4	✓	✓	✓	✓	✓						
64	3PP2 Pond 2	6-28-95	1515	FRESH H_2O	4	✓	✓	✓	✓	✓						
65	3PP3 Pond 3	6-28-95	1515	FRESH H_2O	4	✓	✓	✓	✓	✓						
66	3PP4 Inlet	6-28-95	1515	FRESH H_2O	4	✓	✓	✓	✓	✓						
67	3PP5 Outlet	6-28-95	1515	FRESH H_2O	4	✓	✓	✓	✓	✓						

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	6-28-95 1515	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)
	6/30 1000	

Client Name: MICHAEL HILLES
Client Address: HUXLEY COLLEGE / IETC ES 518 MS 9180
BELLINGHAM, WA 98225
Client Phone: 360 650 6587
Fax:
Contact Person: MICHAEL HILLES
P.O. No. T25385

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

7/18/95

AMTEST

AmTest Inc.
Professional Analytical Services
14603 N.E. 87th St.
Redmond, WA
98052
Fax: 206 883 3495
Tel: 206 885 1664

Western Washington U-Huxley
IETC ES 518 MS 9180
2600 Douglas Street
Bellingham, WA 98225
Attention: Dennis Smith

Dear Dennis Smith:

Enclosed you will find the analytical data for the Lk. Whatcom Monitor. project.

The following is a cross correlation of client and laboratory identification for your convenience.

CLIENT ID	MATRIX	AM TEST ID	TEST
3PP1	Water	95-A012063	CONV, MET,
3PP2	Water	95-A012064	CONV, MET,
3PP3	Water	95-A012065	CONV, MET,
3PP4	Water	95-A012066	CONV, MET,
3PP5	Water	95-A012067	CONV, MET,

Your five (5) samples were received at AM TEST on 6/30/95. At the time of receipt, the samples were logged in and properly maintained prior to their subsequent analyses.

The analytical procedures used in the laboratory are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers. Following the analytical data you will find the "Methodology Report". This table includes information relative to detection limits, analysis dates and method references.

Please note that the detection limits that are listed in the body of the report refer to Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Kathy Fugiel

Kathy Fugiel
Director of Inorganic Laboratory

Project #: 55812
PO Number: T25385

BACT = Bacteriological CONV = Conventional MET = Metal ORG = Organic

ANALYSIS REPORT AMTEST

Western Washington U-Huxley
Dennis Smith

Date Received: 6/30/95
Date Reported: 7/18/95

WATER SAMPLES

AM TEST Identification Number 95-A012063
Client Identification 3PP1 Pond 1
Sampling Date 6/28/95

PARAMETER	RESULT	Q	D.L.
Total Metals			
Aluminum (mg/l)	0.04		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.034		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	22.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.33		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	10.		0.10
Manganese (mg/l)	0.10		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	14.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.08		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	2.7		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	4.5		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.18		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.009		0.002

ANALYSIS REPORT AMTEST

AmTest Inc.
Professional Analytical Services
14603 N.E. 87th St.
Redmond, WA 98052
Fax: 206 883 3495
Tel: 206 885 1664

Western Washington U-Huxley
IETC ES 518 MS 9180
2600 Douglas Street
Bellingham, WA 98225
Attention: Dennis Smith

Date Received: 6/30/95
Date Reported: 7/18/95

Project Name: Lk. Whatcom Monitor.
Project #: 55812
PO Number: T25385

WATER SAMPLES

AM TEST Identification Number 95-A012063
Client Identification 3PP1 Pond 1
Sampling Date 6/28/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	9.1		1.0
Total Nitrogen (TKN) (mg/l)	0.93		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.038		0.005

ANALYSIS REPORT AMTEST

Western Washington U-Huxley
Dennis Smith

Date Received: 6/30/95
Date Reported: 7/18/95

WATER SAMPLES

AM TEST Identification Number 95-A012064
Client Identification 3PP2 Pond 2
Sampling Date 6/28/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	9.8		1.0
Total Nitrogen (TKN) (mg/l)	0.98		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.025		0.005
Total Metals			
Aluminum (mg/l)	0.02		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.032		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	23.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.15		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.0		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	10.		0.10
Manganese (mg/l)	0.049		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	14.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.07		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	2.0		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.6		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.18		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.005		0.002

ANALYSIS REPORT AMTEST

Western Washington U-Huxley
Dennis Smith

Date Received: 6/30/95
Date Reported: 7/18/95

WATER SAMPLES

AM TEST Identification Number 95-A012065
Client Identification 3PP3 Pond 3
Sampling Date 6/28/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	9.8		1.0
Total Nitrogen (TKN) (mg/l)	0.76		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.023		0.005
Total Metals			
Aluminum (mg/l)	0.03		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.037		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	25.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.005		0.002
Iron (mg/l)	0.19		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	11.		0.10
Manganese (mg/l)	0.093		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	15.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.09		0.05
Lead (mg/l)	0.002		0.001
Sulfur (mg/l)	2.1		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.7		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	0.02		0.02
Strontium (mg/l)	0.19		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.004		0.002

ANALYSIS REPORT AMTEST

Western Washington U-Huxley
Dennis Smith

Date Received: 6/30/95
Date Reported: 7/18/95

WATER SAMPLES

AM TEST Identification Number 95-A012066
Client Identification 3PP4 Inlet
Sampling Date 6/28/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	6.7		1.0
Total Nitrogen (TKN) (mg/l)	2.0		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.20		0.005
Total Metals			
Aluminum (mg/l)	1.2		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.075		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	22.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.009		0.002
Iron (mg/l)	4.8		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.7		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	7.7		0.10
Manganese (mg/l)	0.73		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	10.		0.1
Nickel (mg/l)	0.01		0.01
Phosphorus (mg/l)	0.48		0.05
Lead (mg/l)	0.013		0.001
Sulfur (mg/l)	4.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	8.4		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	0.03		0.02
Strontium (mg/l)	0.17		0.003
Titanium (mg/l)	0.05		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.035		0.002

ANALYSIS REPORT AMTEST

Western Washington U-Huxley
Dennis Smith

Date Received: 6/30/95
Date Reported: 7/18/95

WATER SAMPLES

AM TEST Identification Number 95-A012067
Client Identification 3PP5 Outlet
Sampling Date 6/28/95

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	7.8		1.0
Total Nitrogen (TKN) (mg/l)	1.3		0.25
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.061		0.005
Total Metals			
Aluminum (mg/l)	0.08		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.10
Barium (mg/l)	0.053		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	29.		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.004		0.002
Iron (mg/l)	0.91		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.9		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	10.		0.10
Manganese (mg/l)	0.76		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	14.		0.1
Nickel (mg/l)	0.01		0.01
Phosphorus (mg/l)	0.20		0.05
Lead (mg/l)	0.001		0.001
Sulfur (mg/l)	1.7		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	2.8		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.22		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.005		0.002

AMTEST

METHODOLOGY REPORT

AM TEST ID 95-A012063
CLIENT ID 3PP1 Pond 1

MATRIX : Water
SAMPLED: 6/28/95

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	7/11/95
Total Nitrogen (TKN)	mg/l	351.3	EPA	0.25	7/10/95
Petroleum Hydrocarbon-TPH	mg/l	418.1	EPA	1.0	7/ 6/95
Total Phosphorus	mg/l	365.2	EPA	0.005	7/ 6/95
Silver	mg/l	200.7	EPA	0.01	7/17/95
Aluminum	mg/l	200.7	EPA	0.01	7/17/95
Arsenic	mg/l	200.7	EPA	0.03	7/17/95
Boron	mg/l	200.7	EPA	0.1	7/17/95
Barium	mg/l	200.7	EPA	0.003	7/17/95
Beryllium	mg/l	200.7	EPA	0.005	7/17/95
Calcium	mg/l	200.7	EPA	0.10	7/17/95
Cadmium	mg/l	200.7	EPA	0.002	7/17/95
Cobalt	mg/l	200.7	EPA	0.003	7/17/95
Chromium	mg/l	200.7	EPA	0.006	7/17/95
Copper	mg/l	200.7	EPA	0.002	7/17/95
Iron	mg/l	200.7	EPA	0.01	7/17/95
Mercury	mg/l	200.7	EPA	0.01	7/17/95
Potassium	mg/l	200.7	EPA	1.0	7/17/95
Lithium	mg/l	200.7	EPA	0.02	7/17/95
Magnesium	mg/l	200.7	EPA	0.10	7/17/95
Manganese	mg/l	200.7	EPA	0.002	7/17/95
Molybdenum	mg/l	200.7	EPA	0.01	7/17/95
Sodium	mg/l	200.7	EPA	0.5	7/17/95
Nickel	mg/l	200.7	EPA	0.01	7/17/95
Phosphorus	mg/l	200.7	EPA	0.05	7/17/95
Lead	mg/l	239.2	EPA	0.001	7/14/95
Sulfur	mg/l	200.7	EPA	0.10	7/17/95
Antimony	mg/l	200.7	EPA	0.02	7/17/95
Selenium	mg/l	200.7	EPA	0.03	7/17/95
Silicon	mg/l	200.7	EPA	0.1	7/17/95
Tin	mg/l	200.7	EPA	0.02	7/17/95
Strontium	mg/l	200.7	EPA	0.003	7/17/95
Titanium	mg/l	200.7	EPA	0.01	7/17/95
Thallium	mg/l	200.7	EPA	0.03	7/17/95
Vanadium	mg/l	200.7	EPA	0.002	7/17/95
Yttrium	mg/l	200.7	EPA	0.001	7/17/95
Zinc	mg/l	200.7	EPA	0.002	7/17/95
Acid Dig.(Tot Metals)		3010	EPA		7/10/95

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
* Instrument Detection Limit

AMTEST

Client: Western Washington University

Date Received: 6/30/95

Associated
Sample Numbers: 95-A012063 to 12067

Date Analyzed: 7/17/95

QUALITY CONTROL - METHOD BLANK
PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		METHOD BLANK #1 (mg/l)	METHOD BLANK #2 (mg/l)	DETECTION LIMITS (mg/l)
Silver	Ag	ND	ND	0.010
Aluminum	Al	ND	ND	0.01
Arsenic	As	ND	ND	0.03
Boron	B	ND	ND	0.10
Barium	Ba	ND	ND	0.003
Beryllium	Be	ND	ND	0.007
Calcium	Ca	ND	ND	0.10
Cadmium	Cd	ND	ND	0.002
Cobalt	Co	ND	ND	0.003
Chromium	Cr	ND	ND	0.006
Copper	Cu	ND	ND	0.002
Iron	Fe	ND	ND	0.01
Mercury	Hg	ND	ND	0.010
Potassium	K	ND	ND	1.0
Lithium	Li	ND	ND	0.02
Magnesium	Mg	ND	ND	0.10
Manganese	Mn	ND	ND	0.002
Molybdenum	Mo	ND	ND	0.01
Sodium	Na	ND	ND	0.50
Nickel	Ni	ND	ND	0.01
Phosphorus	P	ND	ND	0.05
Sulfur	S	ND	ND	0.1
Antimony	Sb	ND	ND	0.02
Selenium	Se	ND	ND	0.03
Silica	Si	ND	ND	0.10
Tin	Sn	ND	ND	0.02
Strontium	Sr	ND	ND	0.003
Titanium	Ti	ND	ND	0.01
Thallium	Tl	ND	ND	0.03
Vanadium	V	ND	ND	0.002
Yttrium	Y	ND	ND	0.001
Zinc	Zn	ND	ND	0.002

ND= not detected; All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 6/30/95

Associated
Sample Numbers: 95-A012063 to 12067

Date Analyzed: 7/17/95

PLASMA SPECTROGRAPHIC ANALYSIS BY EPA METHOD 200.7

ELEMENTS		TRUE VALUE (ppm)	RESULTS (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Silver	Ag	0.2	0.21	104	0.010
Aluminum	Al	10	9.60	96	0.01
Arsenic	As	2	1.87	94	0.03
Barium	Ba	2	1.92	96	0.003
Calcium	Ca	10	9.69	97	0.1
Cadmium	Cd	2	2.00	100	0.002
Chromium	Cr	2	1.70	85	0.006
Copper	Cu	2	2.00	100	0.002
Iron	Fe	2	1.90	95	0.01
Mercury	Hg	1	0.96	96	0.010
Potassium	K	100	97.00	97	1.0
Magnesium	Mg	10	9.40	94	0.10
Manganese	Mn	2	1.90	95	0.002
Molybdenum	Mo	2	1.90	95	0.01
Sodium	Na	20	17.00	85	0.50
Nickel	Ni	2	1.90	95	0.01
Phosphorus	P	10	12.00	120	0.05
Sulfur	S	2	2.10	105	0.1
Antimony	Sb	2	1.80	90	0.02
Selenium	Se	2	1.70	85	0.03
Tin	Sn	2	1.90	95	0.02
Strontium	Sr	2	1.90	95	0.003
Titanium	Ti	2	1.70	85	0.01
Thallium	Tl	2	1.80	90	0.03
Zinc	Zn	2	1.90	95	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 6/30/95

Associated
Sample Numbers: 95-A012063 to 12067

Date Analyzed: 7/17/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7
DUPLICATE ANALYSIS Sample #: 95-A012063

ELEMENT		REPLICATE #1 (mg/l)	REPLICATE #2 (mg/l)	RELATIVE PERCENT DIFFERENCE (%)	DETECTION LIMITS (mg/l)
Silver	Ag	< 0.010	< 0.010	-	0.010
Aluminum	Al	0.04	0.05	22.2	0.01
Arsenic	As	< 0.03	< 0.03	-	0.03
Boron	B	< 0.10	< 0.10	-	0.10
Barium	Ba	0.035	0.033	5.9	0.003
Beryllium	Be	< 0.007	< 0.007	-	0.007
Calcium	Ca	22	20	9.5	0.10
Cadmium	Cd	< 0.002	< 0.002	-	0.002
Cobalt	Co	< 0.003	< 0.003	-	0.003
Chromium	Cr	< 0.006	< 0.006	-	0.006
Copper	Cu	< 0.002	0.002	-	0.002
Iron	Fe	0.33	0.32	3.1	0.01
Mercury	Hg	< 0.010	< 0.010	-	0.010
Potassium	K	< 1.0	1.2	-	1.0
Lithium	Li	< 0.02	< 0.02	-	0.02
Magnesium	Mg	10	9.3	7.3	0.10
Manganese	Mn	0.1	0.091	9.4	0.002
Molybdenum	Mo	< 0.01	< 0.01	-	0.01
Sodium	Na	14	13	7.4	0.50
Nickel	Ni	< 0.01	< 0.01	-	0.01
Phosphorus	P	0.08	0.07	13.3	0.05
Sulfur	S	2.7	2.5	7.7	0.1
Antimony	Sb	< 0.02	< 0.02	-	0.02
Selenium	Se	< 0.03	< 0.03	-	0.03
Silicon	Si	4.5	4.2	6.9	0.10
Tin	Sn	< 0.02	< 0.02	-	0.02
Strontium	Sr	0.178	0.163	8.8	0.003
Titanium	Ti	< 0.01	< 0.01	-	0.01
Thallium	Tl	< 0.03	< 0.03	-	0.03
Vanadium	V	< 0.002	< 0.002	-	0.002
Yttrium	Y	< 0.001	< 0.001	-	0.001
Zinc	Zn	0.009	0.007	25.0	0.002

All results reported in (mg/l).

AMTEST

Client: Western Washington University

Date Received: 6/30/95

Associated
Sample Numbers: 95-A012063 to 12067

Date Analyzed: 7/17/95

INDUCTIVELY COUPLED PLASMA – EPA METHOD 200.7

SPIKE RECOVERY DATA Sample #: 95-A012064

ELEMENT		SAMPLE CONC. (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE ADDED (mg/l)	RECOVERY (%)	DETECTION LIMITS (mg/l)
Aluminum	Al	0.02	9.5	10	95	0.01
Arsenic	As	< 0.03	0.48	0.5	96	0.03
Barium	Ba	0.032	1.03	1.0	100	0.003
Beryllium	Be	< 0.007	0.987	1.0	99	0.007
Calcium	Ca	23	34	10	110	0.10
Cadmium	Cd	< 0.002	0.487	0.5	97	0.002
Chromium	Cr	< 0.006	0.944	1.0	94	0.006
Copper	Cu	< 0.002	0.94	1.0	94	0.002
Iron	Fe	0.15	0.64	0.5	98	0.01
Potassium	K	1	10	10	90	1.0
Magnesium	Mg	10	20	10	100	0.10
Manganese	Mn	0.049	1.02	1.0	97	0.002
Molybdenum	Mo	< 0.01	0.91	0.8	114	0.01
Sodium	Na	14	25	10.5	105	0.50
Nickel	Ni	< 0.01	0.92	0.9	102	0.01
Antimony	Sb	< 0.02	0.58	0.5	116	0.02
Selenium	Se	< 0.03	0.48	0.5	96	0.03
Tin	Sn	< 0.02	0.79	0.9	88	0.02
Strontium	Sr	0.179	1.18	1.0	100	0.003
Thallium	Tl	< 0.03	0.51	0.6	85	0.03
Yttrium	Y	< 0.001	0.472	0.5	94	0.001
Zinc	Zn	0.005	0.974	1.0	97	0.002

All results reported in (mg/l).

ANALYSIS REPORT AMTEST

Western Washington U. - Huxley
Dennis Smith

Date Received: 06/30/95
Date Reported: 07/18/95
Project: Lk. Whatcom Monitor.
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - BLANK

AM TEST Sample Number		BLANK
Client Identification		-----
ANALYTES	**UNITS**	**RESULTS**
Total Phosphorus	mg/l	ND
Total Nitrogen - TKN	mg/l	ND
Total Organic Carbon	mg/l	ND
Lead	mg/l	ND

ND = Not Detected

ANALYSIS REPORT AMTEST

Western Washington U. - Huxley
Dennis Smith

Date Received: 06/30/95
Date Reported: 07/18/95
Project: Lk. Whatcom Monitor.
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - DUPLICATES

ANALYTES/SAMPLE NOS.		SAMPLE VALUE (mg/l)	DUPLICATE VALUE (mg/l)	RELATIVE PERCENT DIFFERENCE (%)
Total Phosphorus				
	95-A012063	0.038	0.037	2.7
Total Nitrogen - TKN				
	95-A011772	20.	18.	10.5
Total Organic Carbon				
	95-A012063	9.1	8.8	3.4
Lead	95-A012063	0.001	0.001	0.

ANALYSIS REPORT AMTEST

Western Washington U. - Huxley
Dennis Smith

Date Received: 06/30/95
Date Reported: 07/18/95
Project: Lk. Whatcom Monitor.
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - MATRIX SPIKES

ANALYTES/SAMPLE NOS.	SAMPLE VALUE (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE CONCENTRATION (mg/l)	RECOVERY (%)
Total Phosphorus				
95-A012064	0.025	0.23	0.20	102.
Total Nitrogen - TKN				
95-A011772	20.	72.	50.	104.
Total Organic Carbon				
95-A012064	9.8	55.	50.	90.
Lead 95-A012064	0.002	0.024	0.025	88.

ANALYSIS REPORT AMTEST

Western Washington U. - Huxley
Dennis Smith

Date Received: 06/30/95
Date Reported: 07/18/95
Project: Lk. Whatcom Monitor.
Project No.: 55812
P.O. No.: T25385

QUALITY CONTROL - CONVENTIONALS - STANDARD REFERENCE MATERIALS

ANALYTES/SRM NOS.	SRM VALUE (mg/l)	TRUE VALUE (mg/l)	RECOVERY (%)
Total Phosphorus 9945	3.23	3.20	101.
Total Nitrogen - TKN WP 31	13.3	14.0	95.
Total Organic Carbon 8035	73.9	72.8	102.
Lead WP 32-1	0.0155	0.0150	103.

REPORTED BY Kathy Fugiel

KF/pb

Oct 18 1995

AMTEST

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98052

Fax: 206 883 3495

Tel: 206 885 1664

Western Washington University
Huxley College/IETC
ES-518 MS-9180
Bellingham, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

Enclosed please find the analytical data for your Lake Whatcom Mon. project.

The following is a cross correlation of client and laboratory identification for your convenience.

CLIENT ID		MATRIX	AM TEST ID	TEST
4PP1	Pond 1	Water	95-A018557	CONV, MET,
4PP2	Pond 2	Water	95-A018558	CONV, MET,
4PP3	Pond 3	Water	95-A018559	CONV, MET,
4PP4	inlet	Water	95-A018560	CONV, MET,
4PP5	outlet	Water	95-A018561	CONV, MET,

Your five (5) samples were received on Friday, September 29 1995. This was a total of 48 hours (2 days) after sample collection (9/27/95). At the time of receipt, the samples were logged in and properly maintained prior to their subsequent analyses.

The analytical procedures used at Am Test are well documented, and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the QC results and "Methodology Report". This table includes information relative to the detection limits, analyses dates and method references.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Kathy Fugiel

Kathy Fugiel
Director of Inorganic Laboratory

Project #: 55812
PO Number: T25385

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics

ANALYSIS REPORT AMTEST

AmTest Inc
Professional Analytical Services
14603 N.E. 87th St
Redmond, WA 98052
Fax: 206 883 3495
Tel: 206 885 1664

Western Washington University
Huxley College/IETC
ES-518 MS-9180
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 9/29/95
Date Reported: 10/18/95

Project Name: Lake Whatcom Mon.
Project #: 55812
PO Number: T25385

WATER SAMPLES

AM TEST Identification Number 95-A018557
Client Identification 4PP1 ~~[illegible]~~ Pond 1
Sampling Date 9/27/95

PARAMETER	RESULT	Q	D.L.
ICP Metals by EPA Method 200.7			
Aluminum (mg/l)	0.12		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.1
Barium (mg/l)	0.028		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	21.		0.1
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.004		0.002
Iron (mg/l)	0.94		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.4		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.4		0.1
Manganese (mg/l)	0.077		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	12.		0.5
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.10		0.05
Sulfur (mg/l)	3.1		0.1
Selenium (mg/l)	0.04		0.03
Silicon (mg/l)	1.5		0.1
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.17		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	0.003		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.031		0.002
Conventionals			
Total Organic Carbon mg [illegible]	3		[illegible]

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 9/29/95
Date Reported: 10/18/95

WATER SAMPLES

AM TEST Identification Number 95-A018557
Client Identification 4PP1 Pond 1
Sampling Date 9/27/95

PARAMETER	RESULT	Q	D.L.
Total Nitrogen (TKN) (mg/l)	0.94		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.030		0.005

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 9/29/95
Date Reported: 10/18/95

WATER SAMPLES

AM TEST Identification Number 95-A018558
Client Identification 4PP2 Pond 2
Sampling Date 9/27/95

PARAMETER	RESULT	Q	D.L.
ICP Metals by EPA Method 200.7			
Aluminum (mg/l)	0.08		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.1
Barium (mg/l)	0.011		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	19.		0.1
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.22		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	< 1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.5		0.1
Manganese (mg/l)	0.032		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	12.		0.5
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.09		0.05
Sulfur (mg/l)	2.5		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.4		0.1
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.15		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.015		0.002
Conventionals			
Total Organic Carbon (mg/l)	5.9		1.0
Total Nitrogen (TKN) (mg/l)	0.55		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	< 0.005		0.005

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 9/29/95
Date Reported: 10/18/95

WATER SAMPLES

AM TEST Identification Number 95-A018559
Client Identification 4PP3 Pond3
Sampling Date 9/27/95

PARAMETER	RESULT	Q	D.L.
ICP Metals by EPA Method 200.7			
Aluminum (mg/l)	0.09		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.1
Barium (mg/l)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	16.		0.1
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.003		0.002
Iron (mg/l)	0.12		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.1		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	8.0		0.1
Manganese (mg/l)	0.012		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	11.		0.5
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.06		0.05
Sulfur (mg/l)	2.2		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.2		0.1
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.14		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.021		0.002
Conventionals			
Total Organic Carbon (mg/l)	8.1		1.0
Total Nitrogen (TKN) (mg/l)	0.61		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0.011		0.005

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 9/29/95
Date Reported: 10/18/95

WATER SAMPLES

AM TEST Identification Number 95-A018560
Client Identification 4PP4 Inlet
Sampling Date 9/27/95

PARAMETER	RESULT	Q	D.L.
ICP Metals by EPA Method 200.7			
Aluminum (mg/l)	0.22		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.1
Barium (mg/l)	0.033		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	20.		0.1
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	0.004		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	0.010		0.002
Iron (mg/l)	1.4		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	1.9		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	6.5		0.1
Manganese (mg/l)	0.18		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	10.		0.5
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.15		0.05
Lead (mg/l)	< 0.02		0.02
Sulfur (mg/l)	3.5		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	5.6		0.1
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.16		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	0.03		0.03
Vanadium (mg/l)	0.004		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.026		0.002
Conventionals			
Total Organic Carbon (mg/l)	15.		1.0
Total Nitrogen (TKN) (mg/l)	1.3		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0 054		0 005

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 9/29/95
Date Reported: 10/18/95

WATER SAMPLES

AM TEST Identification Number 95-A018561
Client Identification 4PP5 Outlet
Sampling Date 9/27/95

PARAMETER	RESULT	Q	D.L.
ICP Metals by EPA Method 200.7			
Aluminum (mg/l)	0.09		0.01
Antimony (mg/l)	< 0.02		0.02
Arsenic (mg/l)	< 0.03		0.03
Boron (mg/l)	< 0.1		0.1
Barium (mg/l)	0.040		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	26.		0.1
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	< 0.003		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	2.3		0.01
Mercury (mg/l)	< 0.01		0.01
Potassium (mg/l)	2.8		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	7.3		0.1
Manganese (mg/l)	0.71		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	11.		0.5
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.20		0.05
Lead (mg/l)	< 0.02		0.02
Sulfur (mg/l)	1.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	5.2		0.1
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.18		0.003
Titanium (mg/l)	< 0.01		0.01
Thallium (mg/l)	< 0.03		0.03
Vanadium (mg/l)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.027		0.002
Conventionals			
Total Organic Carbon (mg/l)	9.1		1.0
Total Nitrogen (TKN) (mg/l)	1.1		0.25
Total Oil and Grease (mg/l)	< 1		1.0
Total Petroleum Hydrocarbon (mg/l)	< 1		1.0
Total Phosphorus (mg/l)	0 077		0.005

AMTEST

METHODOLOGY REPORT

AM TEST ID 95-A018557 — MATRIX : Water
CLIENT ID 4PP1 — SAMPLED: 9/27/95

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	10/17/95
Total Nitrogen (TKN)	mg/l	351.3	EPA	0.25	10/10/95
Total Oil and Grease	mg/l	413.2	EPA	1.0	10/10/95
Petroleum Hydrocarbon-TPH	mg/l	418.1	EPA	1.0	10/10/95
Total Phosphorus	mg/l	365.2	EPA	0.005	10/ 6/95
Silver	mg/l	200.7	EPA	0.01	10/ 6/95
Aluminum	mg/l	200.7	EPA	0.01	10/ 6/95
Arsenic	mg/l	200.7	EPA	0.03	10/ 6/95
Boron	mg/l	200.7	EPA	0.10	10/ 6/95
Barium	mg/l	200.7	EPA	0.003	10/ 6/95
Beryllium	mg/l	200.7	EPA	0.005	10/ 6/95
Calcium	mg/l	200.7	EPA	0.10	10/ 6/95
Cadmium	mg/l	200.7	EPA	0.002	10/ 6/95
Cobalt	mg/l	200.7	EPA	0.003	10/ 6/95
Chromium	mg/l	200.7	EPA	0.006	10/ 6/95
Copper	mg/l	200.7	EPA	0.002	10/ 6/95
Iron	mg/l	200.7	EPA	0.01	10/ 6/95
Mercury	mg/l	200.7	EPA	0.010	10/ 6/95
Potassium	mg/l	200.7	EPA	1.0	10/ 6/95
Lithium	mg/l	200.7	EPA	0.02	10/ 6/95
Magnesium	mg/l	200.7	EPA	0.10	10/ 6/95
Manganese	mg/l	200.7	EPA	0.002	10/ 6/95
Molybdenum	mg/l	200.7	EPA	0.01	10/ 6/95
Sodium	mg/l	200.7	EPA	0.5	10/ 6/95
Nickel	mg/l	200.7	EPA	0.01	10/ 6/95
Phosphorus	mg/l	200.7	EPA	0.05	10/ 6/95
Lead	mg/l	239.2	EPA	0.001	10/13/95
Sulfur	mg/l	200.7	EPA	0.1	10/ 6/95
Antimony	mg/l	200.7	EPA	0.02	10/ 6/95
Selenium	mg/l	200.7	EPA	0.03	10/ 6/95
Silicon	mg/l	200.7	EPA	0.1	10/ 6/95
Tin	mg/l	200.7	EPA	0.02	10/ 6/95
Strontium	mg/l	200.7	EPA	0.003	10/ 6/95
Titanium	mg/l	200.7	EPA	0.01	10/ 6/95
Thallium	mg/l	200.7	EPA	0.03	10/ 6/95
Vanadium	mg/l	200.7	EPA	0.002	10/ 6/95
Yttrium	mg/l	200.7	EPA	0.001	10/ 6/95
Zinc	mg/l	200.7	EPA	0.002	10/ 6/95
Acid Dig. (Tot Metals)		3010	EPA		10/ 2/95

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
* Instrument Detection Limit

AMTEST

METHODOLOGY REPORT

AM TEST ID 95-A019421
CLIENT ID Effluent sample

MATRIX : Water
SAMPLED: 10/11/95

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Biochemical Oxygen Demand	mg/l	405.1	EPA	10.	10/12/95

SM = Standard Methods for the Examination of Water and Wastewater 18th ed.
SW-846 = Test Methods for Evaluating Solid Waste Physical/Chemical Methods
EPA = Methods for Chemical Analysis of Water and Wastes 1983
* Instrument Detection Limit

AMTEST

Quality Control Summary

QC for 9500027
95-A018557
95-A018558
95-A018559
95-A018560
95-A018561

DUPLICATES		sample value	duplicate value	RPD %
95-A018416 DUP: Total Organic Carbon	mg/l	< 1	< 1	
95-A018520 DUP: Total Organic Carbon	mg/l	190	210	10.
95-A018557 DUP: Total Organic Carbon	mg/l	13.	13.	0.00
95-A018958 DUP: Total Organic Carbon	mg/l	4.5	5.5	20.
95-A019541 DUP: Total Organic Carbon	mg/l	2.6	2.7	3.8
95-A018307 DUP: Total Nitrogen (TKN)	mg/l	1.4	1.4	0.00
95-A018557 DUP: Total Nitrogen (TKN)	mg/l	0.94	0.96	2.1
95-A017363 DUP: Total Phosphorus	mg/l	0.12	0.13	8.0
95-A018307 DUP: Total Phosphorus	mg/l	4.1	4.0	2.5
95-A018557 DUP: Total Phosphorus	mg/l	0.030	0.027	11.
95-A018756 DUP: Total Phosphorus	mg/l	0.006	< 0.005	
95-A018557 DUP: Silver	mg/l	< 0.01	< 0.01	
95-A018557 DUP: Aluminum	mg/l	0.12	0.11	8.7
95-A018557 DUP: Arsenic	mg/l	< 0.03	< 0.03	
95-A018557 DUP: Boron	mg/l	< 0.1	< 0.1	
95-A018557 DUP: Barium	mg/l	0.028	0.026	7.4
95-A018557 DUP: Beryllium	mg/l	< 0.005	< 0.005	
95-A018557 DUP: Calcium	mg/l	20.7	18.9	9.1
95-A018557 DUP: Cadmium	mg/l	< 0.002	< 0.002	
95-A018557 DUP: Cobalt	mg/l	< 0.003	< 0.003	
95-A018557 DUP: Chromium	mg/l	< 0.006	< 0.006	
95-A018405 DUP: Copper	mg/l	0.046	0.045	2.2
95-A018557 DUP: Copper	mg/l	0.004	0.003	29.
95-A018423 DUP: Iron	mg/l	0.01	0.02	67.
95-A018557 DUP: Iron	mg/l	0.94	0.86	8.9
95-A018557 DUP: Mercury	mg/l	< 0.01	< 0.01	
95-A018405 DUP: Potassium	mg/l	2.0	1.8	11.
95-A018557 DUP: Potassium	mg/l	1.4	1.8	25.
95-A018557 DUP: Lithium	mg/l	< 0.02	< 0.02	
95-A018557 DUP: Magnesium	mg/l	8.42	7.69	9.1
95-A018423 DUP: Manganese	mg/l	0.002	< 0.002	
95-A018557 DUP: Manganese	mg/l	0.077	0.070	9.5
95-A018557 DUP: Molybdenum	mg/l	< 0.01	< 0.01	
95-A018557 DUP: Sodium	mg/l	12.4	11.2	10.
95-A018557 DUP: Nickel	mg/l	< 0.01	< 0.01	
95-A018557 DUP: Phosphorus	mg/l	0.10	0.10	0.00
95-A018481 DUP: Lead	mg/l	0.006	0.005	18.
95-A018557 DUP: Lead	mg/l	< 0.001	< 0.001	
95-A018557 DUP: Sulfur	mg/l	3.1	2.9	6.7
95-A018557 DUP: Antimony	mg/l	< 0.02	< 0.02	
95-A018557 DUP: Selenium	mg/l	0.04	< 0.03	
95-A018557 DUP: Silicon	mg/l	1.5	1.4	6.9
95-A018557 DUP: Tin	mg/l	< 0.02	< 0.02	
95-A018557 DUP: Strontium	mg/l	0 17	0 15	[illegible]
[illegible] DUP: [illegible]	[illegible]	[illegible]	[illegible]	[illegible]

AMTEST

Quality Control Summary
(continued)

QC for 9500027

95-A018557 DUP: Thallium	mg/l	< 0.03	< 0.03	
95-A018557 DUP: Vanadium	mg/l	0.003	< 0.002	
95-A018557 DUP: Yttrium	mg/l	< 0.001	< 0.001	
95-A018423 DUP: Zinc	mg/l	0.025	0.026	3.9
95-A018557 DUP: Zinc	mg/l	0.031	0.023	30.

MATRIX SPIKES		sample value	sample+spk value	spike value	Recovery %
95-A018417 SPIKE: Total Organic Carbon	mg/l	< 1	50.	50.	100.
95-A018558 SPIKE: Total Organic Carbon	mg/l	5.9	54.	50.	96.2
95-A018959 SPIKE: Total Organic Carbon	mg/l	6.6	52.	50.	90.8
95-A019542 SPIKE: Total Organic Carbon	mg/l	2.3	51.	50.	97.4
95-A018308 SPIKE: Total Nitrogen (TKN)	mg/l	0.32	0.86	0.50	108.
95-A018558 SPIKE: Total Nitrogen (TKN)	mg/l	0.55	1.1	0.50	110.
95-A017364 SPIKE: Total Phosphorus	mg/l	0.008	0.20	0.20	96.0
95-A018308 SPIKE: Total Phosphorus	mg/l	0.033	0.22	0.20	93.5
95-A018757 SPIKE: Total Phosphorus	mg/l	< 0.005	0.17	0.20	85.0
95-A018558 SPIKE: Aluminum	mg/l	0.08	9.02	10.0	89.4
95-A018558 SPIKE: Arsenic	mg/l	< 0.03	0.42	0.47	89.4
95-A018558 SPIKE: Barium	mg/l	0.011	0.995	0.991	99.3
95-A018558 SPIKE: Beryllium	mg/l	< 0.005	0.939	1.07	87.8
95-A018558 SPIKE: Calcium	mg/l	18.7	29.2	10.2	103.
95-A018558 SPIKE: Cadmium	mg/l	< 0.002	0.473	0.492	96.1
95-A018558 SPIKE: Chromium	mg/l	< 0.006	0.858	0.991	86.6
95-A018406 SPIKE: Copper	mg/l	0.010	0.998	0.986	100.
95-A018558 SPIKE: Copper	mg/l	< 0.002	0.929	0.986	94.2
95-A018558 SPIKE: Iron	mg/l	0.22	0.76	0.51	106.
95-A018406 SPIKE: Potassium	mg/l	1.5	10.5	10.0	90.0
95-A018558 SPIKE: Potassium	mg/l	< 1	9.7	10.0	97.0
95-A018558 SPIKE: Magnesium	mg/l	8.46	18.5	10.2	98.4
95-A018424 SPIKE: Manganese	mg/l	0.151	1.01	1.01	84.7
95-A018558 SPIKE: Manganese	mg/l	0.032	0.978	1.01	93.7
95-A018558 SPIKE: Molybdenum	mg/l	< 0.01	0.87	1.03	84.5
95-A018558 SPIKE: Sodium	mg/l	12.1	23.2	11.0	101.
95-A018558 SPIKE: Nickel	mg/l	< 0.01	0.93	0.89	104.
95-A018482 SPIKE: Lead	mg/l	0.007	0.030	0.025	92.0
95-A018558 SPIKE: Lead	mg/l	< 0.001	0.024	0.025	96.0
95-A018558 SPIKE: Antimony	mg/l	< 0.02	0.88	1.00	88.0
95-A018558 SPIKE: Selenium	mg/l	< 0.03	0.49	0.49	100.
95-A018558 SPIKE: Thallium	mg/l	< 0.03	0.44	0.50	88.0
95-A018424 SPIKE: Zinc	mg/l	0.019	0.907	1.02	87.1
95-A018558 SPIKE: Zinc	mg/l	0.015	0.916	1.00	90.1

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	42.	49.	85.7
Known	SRM: Total Organic Carbon	mg/l	42.	49.	85.7
Known	SRM: Total Organic Carbon	mg/l	50.	49.	102.
Known	SRM: Total Organic Carbon	mg/l	48.	49.	98.0
Known	SRM: Total Organic Carbon	mg/l	130	150	86.7

AMTEST

Quality Control Summary
(continued)

QC for 9500027

Known	SRM: Total Nitrogen (TKN)	mg/l	24.	29.	82.8
Known	SRM: Total Nitrogen (TKN)	mg/l	24.	29.	82.8
Known	SRM: Total Nitrogen (TKN)	mg/l	24.	29.	82.5
Known	SRM: Total Phosphorus	mg/l	3.0	3.2	93.8
Known	SRM: Total Phosphorus	mg/l	3.2	3.2	100.
Known	SRM: Total Phosphorus	mg/l	3.2	3.2	100.
Known	SRM: Total Phosphorus	mg/l	3.2	3.2	100.
Known	SRM: Silver	mg/l	0.19	0.20	95.0
Known	SRM: Aluminum	mg/l	9.07	10.0	90.7
Known	SRM: Aluminum	mg/l	8.50	10.0	85.0
Known	SRM: Aluminum	mg/l	9.44	10.0	94.4
Known	SRM: Arsenic	mg/l	1.98	2.00	99.0
Known	SRM: Arsenic	mg/l	1.88	2.00	94.0
Known	SRM: Arsenic	mg/l	1.95	2.00	97.5
Known	SRM: Barium	mg/l	1.96	2.00	98.0
Known	SRM: Barium	mg/l	1.95	2.00	97.5
Known	SRM: Barium	mg/l	1.97	2.00	98.5
Known	SRM: Calcium	mg/l	9.09	10.0	90.9
Known	SRM: Calcium	mg/l	8.80	10.0	88.0
Known	SRM: Calcium	mg/l	9.23	10.0	92.3
Known	SRM: Cadmium	mg/l	2.00	2.00	100.
Known	SRM: Cadmium	mg/l	1.94	2.00	97.0
Known	SRM: Cadmium	mg/l	1.97	2.00	98.5
Known	SRM: Chromium	mg/l	1.84	2.00	92.0
Known	SRM: Chromium	mg/l	1.69	2.00	84.5
Known	SRM: Chromium	mg/l	1.87	2.00	93.5
Known	SRM: Copper	mg/l	1.97	2.00	98.5
Known	SRM: Copper	mg/l	1.89	2.00	94.5
Known	SRM: Copper	mg/l	2.00	2.00	100.
Known	SRM: Iron	mg/l	1.93	2.00	96.5
Known	SRM: Iron	mg/l	1.89	2.00	94.5
Known	SRM: Iron	mg/l	1.93	2.00	96.5
Known	SRM: Potassium	mg/l	85.0	100.	85.0
Known	SRM: Potassium	mg/l	80.0	100.	80.0
Known	SRM: Potassium	mg/l	98.7	100.	98.7
Known	SRM: Magnesium	mg/l	18.0	20.0	90.0
Known	SRM: Magnesium	mg/l	16.9	20.0	84.5
Known	SRM: Magnesium	mg/l	18.2	20.0	91.0
Known	SRM: Manganese	mg/l	1.90	21.0	9.05
Known	SRM: Manganese	mg/l	1.75	2.00	87.5
Known	SRM: Manganese	mg/l	1.92	2.00	96.0
Known	SRM: Molybdenum	mg/l	1.87	2.00	93.5
Known	SRM: Molybdenum	mg/l	1.90	2.00	95.0
Known	SRM: Sodium	mg/l	19.3	20.0	96.5
Known	SRM: Sodium	mg/l	19.7	20.0	98.5
Known	SRM: Sodium	mg/l	21.1	20.0	106.
Known	SRM: Nickel	mg/l	2.04	2.00	102.
Known	SRM: Nickel	mg/l	1.97	2.00	98.5
Known	SRM: Nickel	mg/l	2.01	2.00	100.
Known	SRM: Phosphorus	mg/l	10.6	10.0	106.
Known	SRM: Phosphorus	mg/l	10.8	[illegible]	108

AMTEST

Quality Control Summary
(continued)

QC for 9500027

Known	SRM: Lead	mg/l	2.00	2.00	100.
Known	SRM: Lead	mg/l	1.84	2.00	92.0
Known	SRM: Lead	mg/l	1.98	2.00	99.0
Known	SRM: Lead	mg/l	0.014	0.015	93.3
Known	SRM: Lead	mg/l	0.014	0.015	93.3
Known	SRM: Sulfur	mg/l	2.0	2.0	100.
Known	SRM: Sulfur	mg/l	1.9	2.0	95.0
Known	SRM: Sulfur	mg/l	1.9	2.0	95.0
Known	SRM: Antimony	mg/l	2.25	2.00	112.
Known	SRM: Antimony	mg/l	2.13	2.00	106.
Known	SRM: Antimony	mg/l	2.21	21.0	10.5
Known	SRM: Selenium	mg/l	1.99	2.00	99.5
Known	SRM: Selenium	mg/l	2.00	2.00	100.
Known	SRM: Selenium	mg/l	1.92	2.00	96.0
Known	SRM: Tin	mg/l	2.4	2.0	120.
Known	SRM: Tin	mg/l	2.2	2.0	110.
Known	SRM: Tin	mg/l	2.2	2.0	110.
Known	SRM: Strontium	mg/l	2.0	2.0	100.
Known	SRM: Strontium	mg/l	1.9	2.0	95.0
Known	SRM: Strontium	mg/l	2.0	2.0	100.
Known	SRM: Titanium	mg/l	1.91	2.00	95.5
Known	SRM: Titanium	mg/l	1.85	2.00	92.5
Known	SRM: Titanium	mg/l	1.99	2.00	99.5
Known	SRM: Thallium	mg/l	1.91	2.00	95.5
Known	SRM: Thallium	mg/l	1.75	2.00	87.5
Known	SRM: Thallium	mg/l	1.94	2.00	97.0
Known	SRM: Zinc	mg/l	1.95	2.00	97.5
Known	SRM: Zinc	mg/l	1.83	2.00	91.5
Known	SRM: Zinc	mg/l	1.95	2.00	97.5

BLANKS			Result
	BLANK: Total Organic Carbon	mg/l	< 1
	BLANK: Total Organic Carbon	mg/l	< 1
	BLANK: Total Organic Carbon	mg/l	< 1
	BLANK: Total Organic Carbon	mg/l	< 1
	BLANK: Total Organic Carbon	mg/l	< 1
	BLANK: Total Nitrogen (TKN)	mg/l	< 0.25
	BLANK: Total Nitrogen (TKN)	mg/l	< 0.25
	BLANK: Total Nitrogen (TKN)	mg/l	< 0.25
	BLANK: Total Phosphorus	mg/l	< 0.005
	BLANK: Total Phosphorus	mg/l	< 0.005
	BLANK: Total Phosphorus	mg/l	< 0.005
	BLANK: Total Phosphorus	mg/l	< 0.005
	BLANK: Silver	mg/l	< 0.01
	BLANK: Silver	mg/l	< 0.01
	BLANK: Silver	mg/l	< 0.01
	BLANK: Aluminum	mg/l	0.06
	BLANK: Aluminum	mg/l	0.08
	BLANK: Aluminum	mg/l	0.02
	BLANK: Arsenic	mg/l	< 0.03
	BLANK: Arsenic	mg/l	< 0.03

AMTEST

Quality Control Summary
(continued)

QC for 9500027

BLANK: Boron	mg/l	< 0.1
BLANK: Boron	mg/l	< 0.1
BLANK: Boron	mg/l	< 0.1
BLANK: Barium	mg/l	< 0.003
BLANK: Barium	mg/l	< 0.003
BLANK: Barium	mg/l	< 0.003
BLANK: Beryllium	mg/l	< 0.005
BLANK: Beryllium	mg/l	< 0.005
BLANK: Beryllium	mg/l	< 0.005
BLANK: Calcium	mg/l	< 0.1
BLANK: Calcium	mg/l	< 0.1
BLANK: Calcium	mg/l	< 0.1
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cobalt	mg/l	0.003
BLANK: Cobalt	mg/l	< 0.003
BLANK: Cobalt	mg/l	< 0.003
BLANK: Chromium	mg/l	< 0.006
BLANK: Chromium	mg/l	< 0.006
BLANK: Chromium	mg/l	< 0.006
BLANK: Copper	mg/l	< 0.002
BLANK: Copper	mg/l	< 0.002
BLANK: Copper	mg/l	< 0.002
BLANK: Iron	mg/l	< 0.01
BLANK: Iron	mg/l	< 0.01
BLANK: Iron	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Potassium	mg/l	< 1
BLANK: Potassium	mg/l	< 1
BLANK: Potassium	mg/l	< 1
BLANK: Lithium	mg/l	< 0.02
BLANK: Lithium	mg/l	< 0.02
BLANK: Lithium	mg/l	< 0.02
BLANK: Magnesium	mg/l	< 0.1
BLANK: Magnesium	mg/l	< 0.1
BLANK: Magnesium	mg/l	< 0.1
BLANK: Manganese	mg/l	< 0.002
BLANK: Manganese	mg/l	< 0.002
BLANK: Manganese	mg/l	< 0.002
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Sodium	mg/l	< 0.5
BLANK: Sodium	mg/l	< 0.5
BLANK: Sodium	mg/l	< 0.5
BLANK: Nickel	mg/l	< 0.01
BLANK: Nickel	mg/l	< 0.01
BLANK: Nickel	mg/l	[illegible]

AMTEST

Quality Control Summary
(continued)

QC for 9500027

BLANK: Phosphorus	mg/l	< 0.05
BLANK: Phosphorus	mg/l	< 0.05
BLANK: Phosphorus	mg/l	< 0.05
BLANK: Lead	mg/l	< 0.02
BLANK: Lead	mg/l	< 0.02
BLANK: Lead	mg/l	< 0.02
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Sulfur	mg/l	< 0.1
BLANK: Sulfur	mg/l	< 0.1
BLANK: Sulfur	mg/l	< 0.1
BLANK: Antimony	mg/l	< 0.02
BLANK: Antimony	mg/l	< 0.02
BLANK: Antimony	mg/l	< 0.02
BLANK: Selenium	mg/l	< 0.03
BLANK: Selenium	mg/l	< 0.03
BLANK: Selenium	mg/l	< 0.03
BLANK: Silicon	mg/l	< 0.1
BLANK: Silicon	mg/l	< 0.1
BLANK: Silicon	mg/l	< 0.1
BLANK: Tin	mg/l	< 0.02
BLANK: Tin	mg/l	< 0.02
BLANK: Tin	mg/l	< 0.02
BLANK: Strontium	mg/l	< 0.003
BLANK: Strontium	mg/l	< 0.003
BLANK: Strontium	mg/l	< 0.003
BLANK: Titanium	mg/l	< 0.01
BLANK: Titanium	mg/l	< 0.01
BLANK: Titanium	mg/l	< 0.01
BLANK: Thallium	mg/l	< 0.03
BLANK: Thallium	mg/l	< 0.03
BLANK: Thallium	mg/l	< 0.03
BLANK: Vanadium	mg/l	< 0.002
BLANK: Vanadium	mg/l	< 0.002
BLANK: Vanadium	mg/l	< 0.002
BLANK: Yttrium	mg/l	< 0.001
BLANK: Yttrium	mg/l	< 0.001
BLANK: Yttrium	mg/l	< 0.001
BLANK: Zinc	mg/l	0.003
BLANK: Zinc	mg/l	0.006
BLANK: Zinc	mg/l	< 0.002