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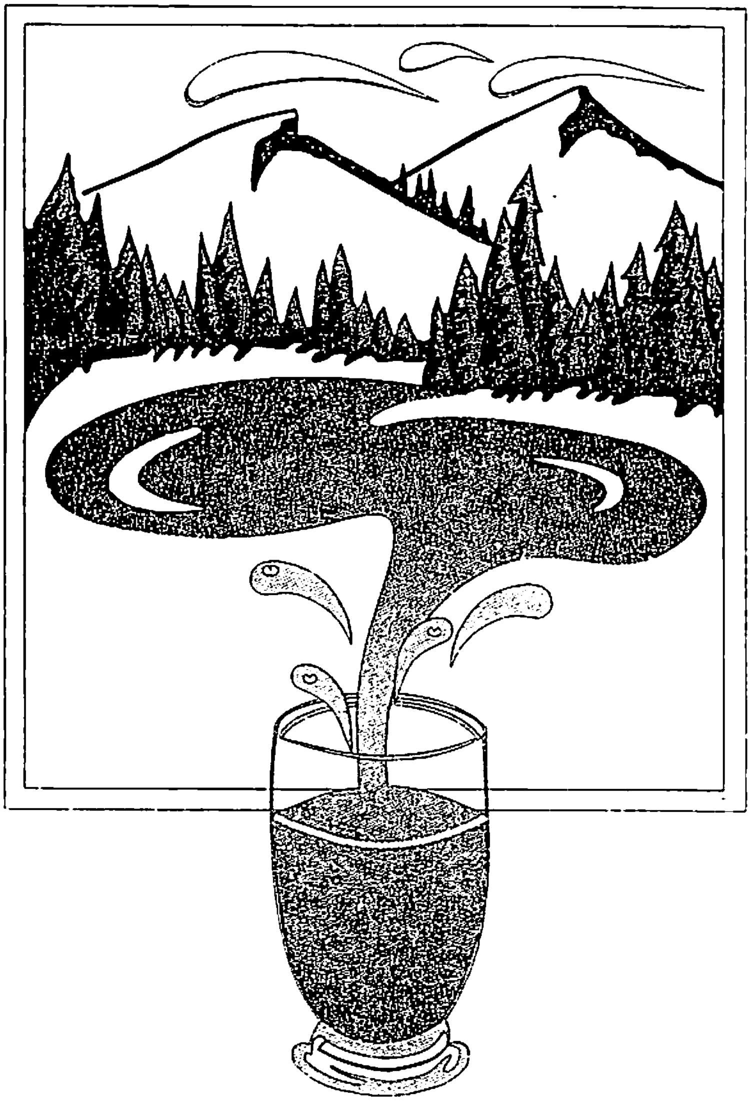
Lake Whatcom Monitoring Project 1996/1997 Report

Robin A. Matthews
Western Washington University, robin.matthews@wwu.edu

Michael Hilles
Western Washington University, michael.hilles@wwu.edu

Geoffrey B. Matthews
Western Washington University, geoffrey.matthews@wwu.edu

Lake Whatcom Monitoring



1996/97 Final Report

February, 1998

Lake Whatcom Monitoring Project
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Dr. R. A. Matthews,
Mr. M. Hilles
Institute for Watershed Studies,
Huxley College of Environmental Studies
and
Dr. G. B. Matthews
Computer Science Department
Western Washington University*

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Executive Summary

This report describes the results from the 1996/97 Lake Whatcom monitoring program. The objectives of this program were to continue long-term baseline water quality monitoring in Lake Whatcom and selected tributary streams; to continue collecting supplemental water quality data from basin 3 near Strawberry sill; to update the hydrologic model for Lake Whatcom; and to continue monitoring the effectiveness of the Park Place wet pond.

The lake was sampled on October 8, November 12, December 3/12, 1996, and on February 12, April 22, May 15/21, June 10/12, July 10/14, August 13/21, and September 10/18, 1997. The summer of 1996/97 was unusually warm compared to the previous two summers. It was also warmer than usual compared to 30-year temperature averages for Lake Whatcom[1]. Sites 1 and 2 developed severe oxygen deficits by mid-summer. Historic data show that the bottom of basin 1 has experienced low oxygen conditions for at least 30 years. Until the early 1990's the oxygen profiles from Site 1 followed predictable, climate-related patterns. Data from Site 1 for the past eleven years, however, show increasing problems with oxygen depletion at 9–13 meters. The oxygen depletion does not appear to be strongly linked to antecedent weather conditions.

The primary cause of deteriorating oxygen conditions in basin 1 is most likely residential runoff, which contains elevated concentrations of nutrients. In addition, the thin buffer between the hypolimnion and epilimnion at Site 1 allows dissolved nutrients, metals, and other compounds that leak from the sediments under low oxygen conditions to 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.

The remaining 1996/97 water quality data mostly followed patterns consistent for Lake Whatcom. Site 1 (basin 1) was more productive that the rest of the lake, as indicated by the nutrient, chlorophyll, and oxygen data. The total plankton counts were relatively high throughout the lake during the summer of 1997. The summer plankton blooms including an unusually large number of bluegreen bacteria, which are often associated with taste and odor problems in drinking water. Site 2 (basin 2) shared some of the water quality characteristics of basin 1 (e.g., very low oxygen concentrations), but because of its rapid flushing rate and proximity to basin 3, the overall water quality was slightly better than Site 1. Sites 3–4 (basin 3) had excellent water quality, typical for the oligotrophic conditions in basin 3. The water quality along Strawberry sill was similar to the water quality at Site 3 except for minor temperature differences.

Coliform and *Enterococcus* counts were low at nearly all sites in the lake ($\leq$ 50 cfu/100 mL for total coliforms, $\leq$ 10 cfu/100 mL for fecal coliforms and *Enterococcus*). Arsenic, chromium, chromium, copper, mercury, nickel, and lead were at, or below, detection limits at most sites. Zinc concentrations were detectable, but low, throughout the lake. Iron concentrations were detectable and within the range that is typical for Lake Whatcom. Cadmium was detectable at the bottom of Site 2 and the Intake (3 μg/L). This cadmium concentration is less than the Drinking Water

[1]IWS unpublished data, 1965–1997.

Standard of 10 $\mu g/L$ but higher than the freshwater aquatic criteria of 0.66–1.8 $\mu g/L$ (4-day and 1-hr averages; EPA, 1986). The source of the elevated cadmium is unknown. The cadmium value is very close to the analytical detection limit of 2 $\mu g/L$ and may reflect analytical variance.

Seven creeks were sampled during February and August, 1997: 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 having poor water quality compared to the creeks in forested areas. The residential creeks had higher conductivities, higher concentrations of ammonia, phosphorus, and total suspended solids concentrations, and much higher total and fecal coliform counts. These differences are typical for streams receiving urban runoff.

Austin and Silver Beach Creeks, and the Park Place drain exceeded the Class A standards for fecal coliforms and may constitute a public health risk. An independent study by Smith (1997) found *Giardia* and *Cryptosporidium* cysts in water samples from Austin and Brannian Creeks. Cyst densities were found to be correlated with fecal coliform counts and other water quality indicators of agricultural and residential development in watersheds. *Cryptosporidium*, in particular, is of concern in public water supplies because of its resistance to conventional water treatment techniques. In 1993, an outbreak of cryptosporidiosis caused illness in almost 400,000 people in Milwaukee[2]. Whenever feasible, the recommended approach for reducing risks associated with *Giardia* and *Cryptosporidium* is watershed protection.

As an alternative to the overly complex HSPF model, a simple water balance model was developed using measured withdrawals from Lake Whatcom (Whatcom Creek, City of Bellingham Municipal Supply, Whatcom Falls fish hatchery, Georgia-Pacific Corp., and Water District #10), the Middle Fork diversion data, and the lake level. Whatcom Creek was shown to be the major withdrawal from the lake. Georgia Pacific and the City of Bellingham were also important withdrawals during periods of low flow in Whatcom Creek. During the winter there were large quantities of water moving through the lake, and the relative contribution of the diversion was small. During the summer the total withdrawals decreased, the lake level dropped, and the relative contribution of the diversion was higher.

The Park Place wet pond was sampled on February 17–19, 1997 during the wet season at high flow and September 15–17, 1997 during the dry season at nominal flow. We were unable to collect samples during the wet season at nominal flow because the flows remained high throughout the winter and spring. Pond construction and vegetation planting was completed by the fall of 1994. Photographs from the summer of 1997 show extensive macrophyte growth around the edges of the pond. The pond performed poorly for most types of contaminants, with no consistent reduction in sediments, nutrients, total organic carbon, or metals concentrations between the inlet and outlet. In addition, the pond was bypassed much of the fall, winter, and spring of this year because the flow exceeded the pond's capacity. When bypassed, the stormwater flow discharges directly into Lake Whatcom and does not receive any treatment by the wet pond.

[2]For more information see the Cryptosporidium White Paper, http://www.ci.sf.ca.us/puc/crypto.htm.

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. 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 1996/97 Lake Whatcom monitoring program were to continue long-term baseline water quality monitoring in Lake Whatcom and selected tributary streams, to continue collecting supplemental water quality data from basin 3 near Strawberry sill, to update the hydrologic model for Lake Whatcom, and to continue monitoring the effectiveness of the Park Place wet pond.

This report will be subdivided into the following sections:

Section 1: Introduction
Section 2: Lake Whatcom Monitoring
Section 3: Creek Monitoring
Section 4: Lake Whatcom Water Budget
Section 5: Park Place Wet Pond Monitoring
Section 6: Quality Control
Section 7: References
Section 8: Tables
Section 9: Figures
Appendix A: Site Descriptions
Appendix B: Lake Whatcom Data
Appendix C: AmTest Reports

Note that all of the tables and figures are located at the end of the report in Sections 8–9 (pages 17 and 42, respectively). Detailed site descriptions and raw data are included in the Appendices.

2 Lake Whatcom Monitoring

2.1 Site Descriptions

Water quality samples were collected at five long-term monitoring sites in Lake Whatcom (see Figure 1, page 43; Appendix A, page 170). 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.

In October 1996 three additional sites were monitored on a transect across Strawberry sill (Appendix A, Figure 129, page 174). These sites are located on the 40-meter depth contour as described 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 8, November 12, December 3/12, 1996, and on February 12, April 22, May 15/21, June 10/12, July 10/14, August 13/21, and September 10/18, 1997[3]. The water quality parameters measured for the 1996/97 lake monitoring program are shown in Table 1 on page 18 (see Section 8, 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, page 19 (APHA, 1992; EPA, 1983; Lind, 1985). The total metals analyses (arsenic, cadmium, chromium, copper, iron, mercury, nickel, lead, and zinc) were done by AmTest[4]. 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.

[3]Multiple dates are needed because of added time required to sample Strawberry sill.

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

2.3 Results and Discussion

2.3.1 Hydrolab data

Lake Whatcom Hydrolab data for temperature, dissolved oxygen, conductivity, and pH are illustrated in Figures 2–34 (pages 44–76).

Single-day Hydrolab profiles from mid-winter (February 12, 1997) and late-summer (September 10/18, 1997) are illustrated in Figures 5–14 (pages 47–56). Single-day Hydrolab profiles are sent to the City of Bellingham Public Works Department approximately monthly as part of the reporting process for this project. These figures show typical winter and late summer vertical (depth) profiles for temperature, dissolved oxygen, pH, and conductivity.

The February Hydrolab profiles (Figures 5–9) and the multi-year temperature profiles (Figures 15–19) show that the water column mixes during the fall, winter, and early spring. As a result, temperatures, dissolved oxygen concentrations, pH, and conductivities are fairly uniform from the surface to the bottom of the lake, even at Site 4, which is over 300 ft. (100 meters) deep.

During the summer the lake stratifies into a warm surface layer (the epilimnion) and a cool bottom layer (the hypolimnion). When stratified, the Hydrolab profiles show distinct differences between surface and bottom temperatures (Figures 10–14 and 15–19). Climatic differences alter the timing of lake stratification: if the spring is cool, cloudy, and windy, the lake will stratify later than when it has been hot and sunny. In Lake Whatcom stratification usually occurs in April or May at all sites except the Intake, which is too shallow to develop a stable stratification. Destratification occurs in early fall or winter. The two shallow basins (Sites 1–2) cool quickly and destratification usually occurs by late October or early November. Basin 3 (Sites 3–4), which cools slowly because of its large volume, may not destratify until December or later.

Figures 2–3 (pages 44–45) compare the 1996/97 epilimnion and hypolimnion temperatures to 30-year averages from 1965–1996. The epilimnion and hypolimnion depth classes were defined as follows:

Site	Epilimnion	Hypolimnion
1	0–7 meters	≥ 15 meters
2	0–10 meters	≥ 16 meters
3	0–10 meters	≥ 31 meters
4	0–10 meters	≥ 31 meters

Figures 2–3 show that although the winter and spring temperatures were close to the 30-year average, May, August, and September were much warmer. Similarly, Figures 15–16 reveal that the summer of 1997 was much warmer than 1995 and 1996.

Sites 1 and 2 developed severe hypolimnetic oxygen deficits by mid-summer (Figures 10–11 and 20–21, pages 52–53 and 62–63). Hypolimnetic oxygen depletion, if it occurs, only becomes apparent after stratification, at which time the lower waters of the basin are isolated from the lake's surface and biological respiration consumes the oxygen dissolved in the water. In Lake Whatcom, although climate influences the timing of stratification, the rate of biological activity in the lake is more influenced by nutrient availability. In basin 3, which has very low concentrations of essential nutrients such as phosphorus, biological respiration had little influence on hypolimnetic oxygen concentrations (e.g., Figures 14 and 24, pages 56 and 66). In contrast, Site 1, which is located in nutrient-enriched waters, showed rapid depletion of the hypolimnetic oxygen concentrations following stratification (Figures 10 and 20).

Historic data show that the bottom of basin 1 has experienced low oxygen conditions for at least 30 years. Until recently the oxygen profiles from Site 1 have followed predictable, climate-related patterns. It now appears that since about 1992-1993 the loss of hypolimnetic oxygen at Site 1 has been getting worse. This trend does not appear to be strongly linked to antecedent weather conditions.

The upper portion of the hypolimnion at Site 1 shows the most dramatic shift in oxygen concentrations over time. Table 3 (page 20) shows early September oxygen data from Site 1 for the past eleven years. From 1987 through 1992 the September oxygen concentrations in the upper hypolimnion rarely fell below 1–2 mg/L, maintaining a 3–4 meter "buffer" of oxygenated waters between the hypolimnion and epilimnion. Since 1993 this buffer has thinned to as little as 1 meter.

A scatterplot of the Site 1 oxygen data from 10 meters revealed that all of the September oxygen concentrations since 1993 were lower than the 11-year average (Figure 4, page 46). To examine the strength of this pattern the September 10-meter oxygen and temperature data from all sites were coded into two groups, 1987–1992 and 1993–1997, and tested for statistical differences. The Site 1 1993–1997 oxygen values were significantly lower than the 1987–1992 values, based on the Student's t-test (p=0.027) and nonparametric Kolmogorov-Smirnov test of two independent samples (p=0.0285). None of the other sites showed significant differences for the 10-meter oxygen data. None of the sites had significant temperature differences between the two groups, confirming that the low oxygen in the 1993–1997 group was not just the result of warmer water temperatures.

The primary cause of deteriorating oxygen conditions in basin 1 is most likely residential runoff, which contains elevated concentrations of nutrients (see Section 3). In addition, the thin buffer between the hypolimnion and epilimnion at Site 1 allows dissolved nutrients, metals, and other compounds that leak from the sediments under low oxygen conditions to 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.

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. The summer pH values were relatively high at all sites because of phytoplankton blooms throughout the lake (see Figures 80–84 and 105–109, pages 122–126 and 147–151). Hypolimnetic pH values decreased and conductivity values increased due to decomposition and the release of dissolved compounds from the sediments.

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 35–109 (pages 77–151) and summarized in Tables 4–8 (pages 21–25). Because of the large amount of data presented in these graphs, only the important patterns will be discussed in the text.

The raw data are listed in Appendix B, beginning on page 176. 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. The metals data from 1995/97 are listed in Table 10 (page 27). The AmTest data reports for the metals analyses are included in Appendix C (page 221).

The alkalinity values remained fairly low at most sites and depths (Figures 35–39, pages 77–81). During the summer the alkalinity and conductivity values at the bottom of Sites 1–2 increase due to decomposition and the release of dissolved compounds in the lower waters. The turbidity values were mostly <1–2 NTU except during late summer samples at the lower depths at Sites 1 and 2 (Figures 40–44, pages 82–86). The late summer turbidity pattern is an indication of increasing turbulence in the lower hypolimnion as the lake nears turn-over. The influence of winter storms on turbidity can be seen in the samples from December 1996. Because the water in the shallow basins of the lake was mixing in December, higher turbidities were measured at all depths. Basin 3 was still stratified below 40-50 meters so higher turbidities were only measured in the epilimnetic samples.

The nutrient data from Site 1 continue to show that basin 1 is more productive than the rest of Lake Whatcom (Figures 45–64, pages 87–106). The late summer ammonia concentrations at Site 1 were high at both 15 and 20 meter depths (Figure 50, page 92). This has been a common occurrence at Site 1 for at least the past eleven years:

Late summer ammonia conc. (μg/L)

Site	Year	15 m	20 m
1	1987	196	248
1	1988	375	386
1	1989	14	161
1	1990	27	na
1	1991	137	97
1	1992	154	159
1	1993	na	na
1	1994	307	302
1	1995	183	174
1	1996	194	182
1	1997	116	128

In oxygenated water, ammonia is rapidly converted to nitrite and nitrate through biological and chemical processes. In the low oxygen environments at the bottom of basins 1 and 2, however, ammonia diffuses throughout the hypolimnion. When the buffer between the hypolimnion is thin, the soluble ammonia can move to within a few meters of the epilimnion, making nitrogen more available for phytoplankton. This may play an important role in phytoplankton population growth, especially in basin 1, because nitrogen and phosphorus are probably co-limiting algal growth during late summer.

The summer nitrate depletion rates at Sites 1 and 2 were about the same in 1997 as in 1994-1996 (Figures 55–59, pages 97–101). Nitrogen is an essential nutrient for plankton, and the depletion of nitrate during the summer is an indirect measure of phytoplankton productivity. Site 1 nitrate concentrations often fall below 50 μg-N/L in the late summer. As a result, both nitrogen and phosphate are probably limiting the algal growth in basin 1 during at least part of the year. Epilimnetic nitrate concentrations decrease during the summer at Sites 2–4, but seldom fall below 150 μg/L, making it less likely that nitrogen is co-limiting at these sites.

Soluble phosphate concentrations remained low at all sites and depths (Figures 70–74, pages 112–116). Unlike the October 1994 and 1995, there were no soluble phosphate peaks measured at the lowest depths at Sites 1 and 2 during late summer. The peaks are caused by the release of phosphorus from the sediments and increased turbulence in the hypolimnion just prior to fall overturn, and do not persist long because of the intense competition for phosphorus by algae.

It should be noted that although the soluble phosphate concentrations were low in the water column, basins 1 and 2 are biological productive, as indicated earlier by the oxygen data. Soluble phosphate is rapidly removed from the water column by biota, so even productive lakes may have relatively low concentrations in the water column. If the biota were uniformly suspended in the water column, we would expect to see high total phosphorus concentrations in basins 1–2 due to conversion of soluble phosphorus into biomass. We do find higher concentrations of total phosphorus in basins 1–2, but mostly at the lower depths rather than uniformly suspended in the water column (Figures 75–76, pages 117–118). This is due to the following factors: a) living biota are not uniformly distributed in the water, but rather form strata or bands that are often missed when sampling the epilimnion; b) dead biota "rain" down into the lower depths, increasing the phosphorus concentration in the hypolimnion; c) late summer turbulence in the hypolimnion resuspends phosphorus-rich sediments; d) low oxygen conditions release sediment-bound phosphorus, which moves into the hypolimnion.

Site 1 continued to have the highest chlorophyll concentrations (Figures 80–84, pages 122–126). The summer plankton counts were exceptionally high throughout the lake (Figure 105–109, pages 147–151), which was probably caused by the warm sunny weather in August and September. The dominant phytoplankton at all sites continued to be diatoms and other Chrysophyta. Green algae (Chlorophyta) and dinoflagellates (Pyrrophyta) contributed to periodic algal blooms. Bluegreen bacteria (Cyanophyta) were unusually abundant throughout the lake during August and September, 1997. Bluegreens are often common in late-summer plankton samples, and may be associated with taste and odor problems in drinking water. Because of their small cell size they are counted as colonies rather than single cells, while most other algae are counted as single cells. As a result, the Cyanophyta colony counts are considerably lower than the counts for other algal taxa in Lake Whatcom.

Many species of bluegreens have specialized abilities that allow them to continue growing when phosphorus and nitrogen concentrations are limiting the growth of other algae. These specializations include the ability to take up excess phosphorus when it is available and store it until needed for growth. Many bluegreens also have the ability to use the lake's abundant supply of dissolved N_2 gas as a nitrogen source[5]. The unusual growth of bluegreens during 1997 may have originated with the winter storms of 1996/97 (see turbidity data, Figures 40–44, pages 82–86) that carried large amounts of nutrients into the lake. Cyanophytes grow slowly, so their populations peaks did not occur until late summer. Diatoms (Chrysophyta) responded quickly to the nutrients in the storm runoff with a winter bloom. Additional diatom blooms developed during the summer as more nutrients washed in from the watershed or were released from internal sources (low-oxygen sediments, decomposition of biota, etc.).

Total organic carbon concentrations were low (1-2 mg/L) at most sites, especially in February when biological activity is low (Table 9, page 26). Secchi depths (Figures 85–89, pages 127–131) 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.

Coliform and *Enterococcus* counts were low at all sites, $\leq$ 50 cfu/100 mL for total coliforms[6], and $\leq$ 10 cfu/100 mL for fecal coliforms and *Enterococcus* (Figures 90–104, pages 132–146; raw data are listed in Appendix B). The total and fecal coliform counts were slightly higher during October, November, and December, which was probably related to stormwater runoff. In addition to our regularly sampled lake sites, in November, 1994, we began collecting monthly bacteria samples from the Bloedel-Donovan area (Appendix B). The Bloedel-Donovan bacteria counts were slightly higher than mid-basin counts, ranging from 6–50 cfu/100 mL, 2–37 cfu/100 mL, and < 2–8 cfu/100 mL for total coliforms, fecal coliforms, and *Enterococcus*, respectively.

The September 1996 metals concentrations were similar to those from previous years (Table 10, page 27). Arsenic, chromium, chromium, copper, mercury, nickel, and lead were at, or below, detection limits at most sites. Zinc concentrations were detectable, but low, throughout the lake. Iron concentrations were detectable and within the range that is typical for Lake Whatcom. Cadmium was detectable at the bottom of Site 2 and the Intake (3 μg/L). This cadmium concentration is less than the Drinking Water Standard of 10 μg/L but higher than the freshwater aquatic criteria of 0.66–1.8 μg/L (4-day and 1-hr averages; EPA, 1986). The source of the elevated cadmium is unknown. The cadmium value is very close to the analytical detection limit of 2 μg/L and may reflect analytical variance.

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[5]Most other algae can't use N_2 directly.
[6]cfu = colony forming unit

2.3.3 Strawberry sill data

The Strawberry sill hydrolab, water quality, and metals data are summarized in Tables 11 through 13 (pages 28–30) and listed in Appendix B (page 176). The AmTest data reports for the metals analyses are included in Appendix C (page 221).

Strawberry sill was sampled on October 22, 1996 and January 16, February 10, April 29, May 21, June 12, July 14, and September 18, 1997. The water quality values along the sill was mostly similar to those from Site 3. The water temperatures were within 1–2° C compared to Site 3. The temperature differences were probably caused by more rapid heating and cooling along the shallow sill compared to mid-basin. The total nitrogen concentrations were higher along the sill during October, but the other nutrient concentrations were about the same. Metals concentrations were all low, as were the total organic carbon concentrations.

Two data entry errors were noted in the January AmTest results; therefore, these data were omitted from Table 13 and Appendix B. AmTest is investigating the problem and will forward their findings to IWS.

3 Creek Monitoring

3.1 Site Descriptions

Seven creeks were sampled biannually during the 1996/97 monitoring program, including Austin Creek, Anderson Creek[7], 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 (page 170).

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 in February and August, 1997. The water quality parameters measured for the 1996/97 creek monitoring program are shown in Table 14 (page 31). The analytical procedures are summarized in Table 2 (page 19). 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 project (Walker, et al., 1992). Tables 15–20 (pages 32–37) show the recent creek water quality data compared to

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

the 1990 average water quality values for each creeks. Wildwood Creek was dry in August so no samples were collected. Discharge measurements were made when feasible, but a number of sites had excessively high flows in February and excessively low flows in August.

Most of the 1996/97 creek data fell within expected ranges. Compared to the streams in forested areas, the residential streams typically had poorer water quality, with higher conductivities; higher ammonia, phosphorus, and total suspended solids concentrations; and much higher total and fecal coliform counts. These differences are typical for streams receiving urban runoff.

The nitrite/nitrate and total nitrogen concentrations were higher in the winter samples than in the summer samples due to leaching of soluble nitrogen compounds during the wet season. Ammonia concentrations were highest in samples from the residential areas. 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.). The August dissolved oxygen concentration was low in the Park Place drain. The metals concentrations at all sites were at or near their detection levels except for iron and zinc, which were within normal ranges for the creeks.

The soluble phosphate concentrations continued to be high in all samples from Silver Beach Creek and the Park Place drain. The Park Place drain has had a stormwater treatment pond in place for three years, which does not appear to be reducing the phosphate concentrations in the drain. Total organic carbon concentrations were low in all the creeks during February, but were high in the residential creeks in August (Table 21, page 38).

Austin and Silver Beach Creeks, and the Park Place drain exceeded the Class A standards[8] for fecal coliforms, and may constitute a public health risk (Table 22, page 39). Smith (1997) sampled Austin and Brannian Creeks for *Giardia* and *Cryptosporidium*. He reported that cysts were present and cyst densities were correlated with fecal coliform counts. Other researchers have demonstrated that *Giardia* and *Cryptosporidium* densities are correlated with agricultural and residential development in watersheds (e.g., Hansen and Ongerth, 1991; Ongerth, 1989). Both *Giardia* and *Cryptosporidium* may pass through conventional drinking water treatment systems, especially systems that are not functioning properly or are overburdened due to high turbidities or cyst densities. The City of Bellingham[9] recently upgraded its filtration and disinfection processes to remove and inactivate *Giardia* cysts. *Cryptosporidium*, in particular, is of concern in public water supplies because of its resistance to conventional water treatment techniques. In 1993, an outbreak of cryptosporidiosis[10] caused illness in almost 400,000 people in Milwaukee. Whenever feasible, the recommended approach for reducing risks associated with *Giardia* and *Cryptosporidium* is watershed protection (see literature review by Smith, 1997).

[8]"Freshwater - fecal coliform organism levels shall both not exceed a geometric mean value of 100 colonies/100 mL, and not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 200 colonies/100 mL" (WAC 173-201A-030).

[9]Personal communications, Bill McCourt, City of Bellingham Public Works Department.

[10]For more information see the Cryptosporidium White Paper, http://www.ci.sf.ca.us/puc/crypto.htm.

4 Lake Whatcom Water Budget

The HSPF water budget model information for water year 1996 was not included in the Lake Whatcom Monitoring Project 1995/1996 Final Report (Matthews, et al., 1997). The HSPF approach was subsequently abandoned in favor of a simpler water balance model. This report includes data for the 1996 water year (October 1, 1995 to September 30, 1996) and the 1997 water year (October 1, 1996 to September 30, 1997) produced using the simple model.

The reasons for abandoning the HSPF model were primarily the loss of technical expertise in assessing data validity and HSPF operation, and the relatively large errors associated with using the model in its current configuration for Lake Whatcom. The HSPF model used time series data from gauged Lake Whatcom discharges (Whatcom Creek, City of Bellingham Municipal Supply, Whatcom Falls fish hatchery, Georgia-Pacific Corp., and Water District #10), the Middle Fork diversion, and Post Point evaporation to generate monthly estimates of lake surface precipitation, evaporation, and watershed runoff. The measured data and HSPF-generated data were plotted by month to show water balance inputs and outputs. The errors associated with the application of the HSPF model to the Lake Whatcom watershed are discussed by Walker (1995). Some of the most important problems were the paucity of stream discharge data, the location and number of precipitation gauging sites, and the simplification of watershed hydrological response units. In abandoning the HSPF approach, we give up the HSPF estimates of runoff from individual creeks in the watershed, estimates of lake surface evaporation, and estimates of watershed precipitation. It should be noted, however, that these were estimated parameters based on model input. The simple water balance model is based on entirely on measured time series data.

As an alternative to the overly complex HSPF model, a simple water balance model was developed using the measured withdrawals from Lake Whatcom (Whatcom Creek, City of Bellingham Municipal Supply, Whatcom Falls fish hatchery, Georgia-Pacific Corp., and Water District #10), the Middle Fork diversion data, and the lake level. In this simple water balance model, it is assumed that all watershed hydrologic processes (precipitation, runoff, stream discharge, evaporation) are reflected in the difference between known inputs and outputs and the change in lake level.

Daily lake level change was determined by subtracting each day's lake level by the subsequent day's level. This resulted in negative values when the lake level was decreasing and positive values when it was increasing. This net level change was multiplied by lake surface area and the resulting volume was converted to gallons. Changes in surface area due to change in lake level were ignored. Daily changes in lake volume were totaled for each month. Measured daily withdrawals and diversion input were also totaled for each month. Monthly net storage change were determined by subtracting monthly diversion totals from monthly change in lake level and adding monthly cumulative withdrawal totals.

The resulting data were used to generate three types of plots: withdrawals, percentage withdrawals, and hydraulic totals (Figures 110–115, pages 152–157). Whatcom Creek was the major withdrawal from the lake during both years (Figures 110 and 113). Georgia Pacific and the City of Bellingham were also important withdrawals during periods of low flow in Whatcom Creek. Figures 112 and

115 summarize the hydrologic patterns for the lake. During the winter there were large quantities of water moving through the lake (as indicated by the total withdrawals), and the relative contribution of the diversion was small. During the summer the total withdrawals decreased (largely due to reduced discharges into Whatcom Creek), the lake level dropped, and the relative contribution of the diversion was higher.

5 Park Place Wet Pond Monitoring

This portion of the project was designed to monitor the water treatment efficiencies for the Park Place wet-pond that has been constructed to treat stormwater runoff prior to its release into the northern basin of Lake Whatcom.

5.1 Sampling procedures

Water quality samples were collected on February 17–19, 1997 during the wet season at high flow and September 16–17, 1997 during the dry season at nominal flow. We were unable to collect samples during the wet season at nominal flow because the flows remained high throughout the winter and spring.

During each sampling period two sites (one inflow and one outflow) were sampled for 48 hrs using composite samplers. 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. The composite samples were analyzed for total suspended solids, heavy metals (cadmium, chromium, copper, iron, nickel, lead, and zinc), total organic carbon, total nitrogen, and total phosphorus. In addition, both sites were sampled four times during the 48-hr period to measure pH, temperature, dissolved oxygen, conductivity, and total and fecal coliforms. We photographed the pond in September, 1997 and collected field notes to describe the apparent health of the aquatic vegetation, including any nuisance growth of algae or aquatic macrophytes.

Grab samples were collected at the inlet and the outlet. Inlet grab samples were collected from the manhole at the northwest corner of North Shore Drive and Britton road. Outlet grab samples were collected from the casement in the middle of Park Place. 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 the Hydrolab Surveyor.

5.2 Results and Discussion

Pond construction and vegetation planting was completed by the fall of 1994 and preliminary water quality data were presented in an earlier report (Matthews, et al., 1996). At that time the pond was probably only functioning as a sediment trap; it is unlikely that there was much biofiltration occurring. By September 1995, however, the aquatic macrophytes were well established and were expanding their coverage. Photographs of the pond cells show the extent of macrophyte coverage around the pond (Figures 116–118, pages 158–160). A similar series of photographs was included in last two annual reports (Matthews, et al., 1996; 1997).

The efficiency of the pond in removing sediments and other pollutants is shown in Table 23. The composite samples, which collect a series of samples over the 48-hr sampling period, are a better indicator of the actual removal efficiency than grab samples. The February data showed a reduction in total suspended solids (-30%) from the inlet to the outlet. This reduction was not consistent; the sediment concentration increased between the inlet and outlet in September (+27%). Furthermore, the pond was bypassed much of this year because of high flows in the Park Place drain. The total capacity of the wet pond is only 23,610 ft^3 (David Evans and Associates, 1994). Even under low-flow conditions, the daily discharge from the Park Place drain is much greater than the capacity of the pond. For example, the August 1997 discharge was 0.046 m^3/sec (Table 15, page 32), which amounts to 140,296 ft^3 per day. During storm events the stormwater is often diverted before it reaches the pond, discharging into Lake Whatcom instead.

There were reductions in total nitrogen and total phosphorus during September, but not February. This is to be expected because there is little biological activity in February and the higher flows cause water to move through the ponds quickly. Total organic carbon and metals concentrations were virtually unchanged between the inlet and outlet. (The 100% increase in nickel concentrations is an artifact of the measurement units, which increase in increments of 10 μg/L.) There was little change in temperature, pH, dissolved oxygen, or conductivity between the inlet and outlet. The 5% increase in temperature in September, accompanied by a decrease in pH and dissolved oxygen, was probably due to warming and biological activity in the ponds.

In summary, the pond performed poorly for most types of contaminants, with no consistent reduction in sediments, nutrients, total organic carbon, or metals concentrations between the inlet and outlet. In addition, the pond was bypassed much of the fall, winter, and spring of this year because the flow exceeded the pond's capacity. When bypassed, the stormwater flow discharges directly into Lake Whatcom and does not receive any treatment by the wet pond.

6 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 standard operating procedures for the methods listed in Table 2 (page 19). Single-blind quality control tests were conducted during August, 1996, and the results are presented in Table 24 (page 41). 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 Hydrolab data). Separate field duplicates were collected and analyzed for at least 10% of all of the water quality parameters (except Hydrolab). To check the Hydrolab measurements, duplicate samples were analyzed for at least 10% of the Hydrolab measurements using water samples collected from the same depth as the Hydrolab measurement. The Hydrolab field duplicate results are shown in Figure 119 (page 161). Most duplicates were in close agreement, given that they came from different water samples. The greatest differences were seen in dissolved oxygen values in the 2-6 mg/L range. These samples came from the thermocline, which is a region of rapidly changing oxygen concentrations. The Hydrolab samples are measured with a depth meter, whereas the water samples are measured with a marked line. Small differences between sample depths would account for the differences in oxygen concentrations.

The water quality duplicates were used to create control charts [11] using a minimum of 10 replicates for each chart. The control charts are used to check the replicability of samples and to identify analytical problems that require corrective action. The control charts for the Lake Whatcom project are presented in Figures 120–126 (pages 162–168). Values that exceeded ± 3 standard deviations from the mean are discussed below:

Values ± 3 STD			Reason
pH, Table 123	4/22/97	11-0	Unknown, first sample of batch,
Alkalinity, Table 120	12/3/96	11-15	Analyst error (new analyst)
	19/10/97	11-15	Analyst error (new analyst)
Conductivity, Table 121	2/4/97	Park Place	Sample values higher than higher than those normally used in for control limits
Turbidity, Table 126	9/10/96	32-20	Analyst error, unusually low value

[11] Analyses that generate mostly below-detection values may not produce enough QC data to develop a control chart.

7 References

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8 Tables

Parameter	1996 Oct	Nov	Dec	1997 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;
Turbidity	•	•	•		•		•	•	•	•	•	•	Gatehouse
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					•							•	Sites 1, 2, 3, 4, Intake -
													0.3 m and bottom only
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 1996/97 lake monitoring schedule.

Parameter	Method	Description	Detection Limits (dl) or Sensitivity (±)
Conductivity-field	Field meter	Hydrolab	± 2 μS/cm
Conductivity-lab	APHA 2510	Low-level	± 2 μS/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 = 10 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	na
Total coliform	APHA 9222 B	Membrane filter	na
Fecal coliform	APHA 9222 D	Membrane filter	na
Enterococcus	APHA 9223 A (mod.)	MPN-methylumbel.	na

Table 2: Summary of analytical methods.

Depth	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
0	9.2	9.6	9.7	9.6	9.5	9.2	9.7	9.7	10.3	10.0	9.9
1			9.6	9.6	9.4		10.1	9.6	9.9	10.0	9.9
2	9.1	9.7	9.6	9.7	9.4		10.0	9.6	9.9	10.0	9.8
3			9.6	9.6	9.3		9.9	9.5	9.8	9.9	9.8
4	9.0	9.8	9.5	9.6	9.3		9.9	9.5	9.8	9.9	9.6
5			9.5	9.6	9.2	9.2	9.8	9.4	9.6	9.8	9.6
6	9.0	9.6	9.5	9.5	9.0		9.7	9.1	9.6	9.8	9.1
7			9.4	9.2	8.7		9.6	9.3	9.5	9.7	8.5
8	9.0	8.5	9.0	8.2	8.7		9.3	9.0	9.5	9.2	6.3
9			7.8	6.2	8.3		4.9	4.5	6.4	8.2	4.2
10	4.3	2.4	5.6	4.7	6.8	5.2	3.4	0.1	3.7	3.1	2.0
11			3.0	2.2	5.4		< 2*	0.1	0.1	1.2	0.6
12	0.0	1.2	1.7	1.7	2.1		< 2*	0.0	0.1	0.2	0.5
13			0.8	1.1	1.1		< 2*	0.0	0.1	0.2	0.5
14	0.0	0.7	0.6	0.8	0.6		< 2*	0.0	0.1	0.2	0.5
15			0.6	0.8	0.6	0.7	< 2*	0.0	0.1	0.2	0.4
16	0.0	0.4	0.5	0.8	0.6		< 2*	0.0	0.1	0.2	0.4
17			0.5	0.8	0.6		< 2*	0.0	0.1	0.2	0.4
18	0.0	0.4	0.5	0.9	0.6		< 2*	0.0	0.1	0.2	0.4
19			0.5	0.9	0.6		< 2*	0.0	0.0	0.2	0.4
20	0.0			0.9	0.7	1.1	< 2*	0.0	0.0	0.2	0.4
21				0.8							

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

Table 3: Early September dissolved oxygen concentrations (mg/L) at Site 1.

Variable	Mean* (10/96-9/97)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	19.7	1.6	18.1	25.8
Conductivity - lab (μS)	63.7	3.5	60.7	72.6
Conductivity - Hydrolab (μS)	63.7	2.9	60.0	76.0
Dissolved oxygen (mg/L)	8.4	3.8	0.19	12.4
pH	7.6	0.4	6.7	8.9
Temperature (°C)	12.1	4.6	5.2	23.2
Turbidity (NTU)	1.4	1.4	0.53	8.7
Nitrogen, ammonia (μg/L)	25	42	<10	194
Nitrogen, nitrate/nitrite (μg/L)	224	122	14	418
Nitrogen, total (μg/L)	358	121	135	623
Phosphorus, sol. phosphate (μg/L)	<5	1	<5	<5
Phosphorus, total (μg/L)	6	4	<5	21
Chlorophyll a (mg/m^3)	2.4	1.7	0.36	8.4
Secchi depth (m)	4.8	1.2	2.30	6.8
Coliforms, total (cfu/100 mL)**	4.4	na	<2	40
Coliforms, fecal (cfu/100 mL)**	<2	na	<2	8
Enterococcus (cfu/100 mL)**	<2	na	<2	2

* Arithmetic means were calculated for all parameters except bacteria;
**Geometric means were calculated for coliform and *Enterococcus* data

Table 4: Site 1 average ambient water quality data.

Variable	Mean* (10/96-9/97)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.4	0.6	17.5	19.5
Conductivity - lab (μS)	60.7	0.8	59.7	61.8
Conductivity - Hydrolab (μS)	61.3	1.5	59.0	71.0
Dissolved oxygen (mg/L)	9.6	2.2	0.1	12.8
pH	7.7	0.3	6.8	8.4
Temperature (°C)	12.6	4.8	5.8	22.5
Turbidity (NTU)	0.7	0.3	0.4	1.6
Nitrogen, ammonia (μg/L)	10	11	<10	58
Nitrogen, nitrate/nitrite (μg/L)	293	83	130	440
Nitrogen, total (μg/L)	377	114	85	605
Phosphorus, sol. phosphate (μg/L)	<5	1	<5	<5
Phosphorus, total (μg/L)	<5	3	<5	14
Chlorophyll a (mg/m^3)	1.8	0.7	0.9	4.0
Secchi depth (m)	5.6	1.3	3.7	7.6
Coliforms, total (cfu/100 mL)**	3.1	na	<2	20
Coliforms, fecal (cfu/100 mL)**	<2	na	<2	6
Enterococcus (cfu/100 mL)**	<2	na	<2	2

* Arithmetic means were calculated for all parameters except bacteria;
**Geometric means were calculated for coliform and *Enterococcus* data

Table 5: Site 2 average ambient water quality data.

Variable	Mean* (10/96-9/97)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.4	0.6	17.6	20.2
Conductivity - lab (μS)	60.6	0.8	59.3	61.8
Conductivity - Hydrolab (μS)	61.4	1.0	60.0	63.0
Dissolved oxygen (mg/L)	10.2	1.1	8.5	12.6
pH	7.8	0.3	7.3	8.5
Temperature (°C)	14.0	5.2	5.8	22.6
Turbidity (NTU)	0.7	0.4	0.4	1.8
Nitrogen, ammonia (μg/L)	<10	4	<10	21
Nitrogen, nitrate/nitrite (μg/L)	268	81	132	437
Nitrogen, total (μg/L)	348	112	184	629
Phosphorus, sol. phosphate (μg/L)	<5	1	<5	<5
Phosphorus, total (μg/L)	<5	1	<5	6
Chlorophyll a (mg/m^3)	2.0	0.9	0.8	3.7
Secchi depth (m)	5.4	1.2	3.4	7.0
Coliforms, total (cfu/100 mL)**	3.8	na	<2	53
Coliforms, fecal (cfu/100 mL)**	<2	na	<2	8
Enterococcus (cfu/100 mL)**	<2	na	<2	2

* Arithmetic means were calculated for all parameters except bacteria;
**Geometric means were calculated for coliform and *Enterococcus* data

Table 6: Intake average ambient water quality data.

Variable	Mean* (10/96-9/97)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.1	0.5	17.4	19.9
Conductivity - lab (μS)	61.1	1.1	59.0	63.4
Conductivity - Hydrolab (μS)	60.7	1.3	57.0	64.0
Dissolved oxygen (mg/L)	9.8	1.2	5.0	12.2
pH	7.6	0.3	7.0	8.4
Temperature (°C)	10.3	4.7	6.1	21.8
Turbidity (NTU)	0.5	0.2	0.2	1.2
Nitrogen, ammonia (μg/L)	<10	4	<10	17
Nitrogen, nitrate/nitrite (μg/L)	348	89	156	532
Nitrogen, total (μg/L)	427	116	161	635
Phosphorus, sol. phosphate (μg/L)	<5	1	<5	<5
Phosphorus, total (μg/L)	<5	1	<5	5
Chlorophyll a (mg/m^3)	1.7	0.9	0.4	3.7
Secchi depth (m)	6.0	1.6	4.0	8.2
Coliforms, total (cfu/100 mL)**	2.8	na	<2	28
Coliforms, fecal (cfu/100 mL)**	<2	na	<2	8
Enterococcus (cfu/100 mL)**	<2	na	<2	4

* Arithmetic means were calculated for all parameters except bacteria;
**Geometric means were calculated for coliform and *Enterococcus* data

Table 7: Site 3 average ambient water quality data.

Variable	Mean* (10/96-9/97)	Std. Dev.	Min.	Max.
Alkalinity (mg/L $CaCO_3$)	18.0	0.4	17.5	19.0
Conductivity - lab (μS)	61.1	1.1	59.4	63.2
Conductivity - Hydrolab (μS)	60.7	1.3	57.0	64.0
Dissolved oxygen (mg/L)	10.1	0.9	8.0	11.5
pH	7.5	0.3	7.1	8.5
Temperature (°C)	9.3	3.7	6.0	18.4
Turbidity (NTU)	0.4	0.2	0.2	1.0
Nitrogen, ammonia (μg/L)	<10	3	<10	16
Nitrogen, nitrate/nitrite (μg/L)	350	68	191	483
Nitrogen, total (μg/L)	437	129	189	683
Phosphorus, sol. phosphate (μg/L)	<5	1	<5	5
Phosphorus, total (μg/L)	<5	1	<5	6
Chlorophyll a (mg/m^3)	1.5	0.8	0.4	3.7
Secchi depth (m)	6.3	1.1	4.5	9.0
Coliforms, total (cfu/100 mL)**	2.4	na	<2	22
Coliforms, fecal (cfu/100 mL)**	<2	na	<2	4
Enterococcus (cfu/100 mL)**	<2	na	<2	2

* Arithmetic means were calculated for all parameters except bacteria;
**Geometric means were calculated for coliform and *Enterococcus* data

Table 8: Site 4 average ambient water quality data.

Site	Date	Depth	TOC (mg/L)	Date	Depth	TOC (mg/L)
Site 1	Feb 13, 1997	0	< 1	Sep 18, 1997	0	1.2
	Feb 13, 1997	20	< 1	Sep 18, 1997	20	< 1
Intake	Feb 13, 1997	0	< 1	Sep 18, 1997	0	1.8
	Feb 13, 1997	10	< 1	Sep 18, 1997	10	1.2
Site 2	Feb 13, 1997	0	< 1	Sep 18, 1997	0	1.6
	Feb 13, 1997	20	< 1	Sep 18, 1997	20	1.4
Site 3	Feb 13, 1997	0	< 1	Sep 18, 1997	0	2.9
	Feb 13, 1997	80	< 1	Sep 18, 1997	80	< 1
Site 4	Feb 13, 1997	0	< 1	Sep 18, 1997	0	< 1
	Feb 13, 1997	90	< 1	Sep 18, 1997	90	< 1

Table 9: Lake Whatcom total organic carbon 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)
Site 1	Sep 11, 1995	0	< 30	<2	< 6	<2	40	<10	<10	< 1	30
	Sep 10, 1996	0	< 30	<2	< 6	<2	<10	<10	<10	< 1	10
	Sep 18, 1997	0	< 30	<2	< 6	<2	10	<10	<10	< 1	13
Site 1	Sep 11, 1995	20	< 30	6	< 6	20	640	<10	<10	< 1	59
	Sep 10, 1996	20	< 30	<2	< 6	<2	55	<10	<10	< 1	8
	Sep 18, 11997	20	< 30	<2	< 6	<2	910	<10	<10	< 1	13
Intake	Sep 11, 1995	0	< 30	<2	< 6	<2	30	<10	<10	< 1	19
	Sep 10, 1996	0	< 30	<2	< 6	<2	<10	<10	<10	2	8
	Sep 18, 1997	0	< 30	<2	< 6	<2	<10	<10	<10	< 1	11
Intake	Sep 11, 1995	10	< 30	<2	< 6	<2	20	<10	<10	< 1	32
	Sep 10, 1996	10	< 30	<2	< 6	<2	<10	<10	<10	2	16
	Sep 18, 1997	10	< 30	3	< 6	<2	20	<10	<10	< 1	7
Site 2	Sep 11, 1995	0	< 30	<2	< 6	<2	110	<10	<10	< 1	18
	Sep 10, 1996	0	< 30	<2	< 6	<2	<10	<10	<10	1	5
	Sep 18, 1997	0	< 30	<2	< 6	<2	<10	<10	<10	< 1	13
Site 2	Sep 11, 1995	20	< 30	<2	< 6	<2	580	<10	20	< 1	23
	Sep 10, 1996	20	< 30	<2	< 6	<2	100	<10	<10	1	7
	Sep 18, 1997	20	< 30	3	< 6	<2	120	<10	<10	< 1	11
Site 3	Sep 11, 1995	0	< 30	<2	< 6	<2	20	<10	<10	< 1	58
	Sep 10, 1996	0	< 30	<2	< 6	<2	<10	<10	<10	1	5
	Sep 18, 1997	0	< 30	<2	< 6	<2	10	<10	<10	< 1	21
Site 3	Sep 11, 1995	80	< 30	<2	< 6	<2	50	<10	20	2	50
	Sep 10, 1996	80	< 30	<2	< 6	<2	<10	<10	<10	< 1	8
	Sep 18, 1997	80	< 30	<2	< 6	<2	20	<10	<10	< 1	8
Site 4	Sep 11, 1995	0	< 30	<2	< 6	<2	20	<10	20	< 1	41
	Sep 10, 1996	0	< 30	<2	< 6	<2	<10	<10	<10	2	6
	Sep 18, 1997	0	< 30	<2	< 6	<2	<10	<10	<10	< 1	12
Site 4	Sep 11, 1995	90	< 30	<2	< 6	<2	30	<10	<10	2	34
	Sep 10, 1996	90	< 30	<2	< 6	<2	<10	<10	<10	< 1	7
	Sep 18, 1997	90	< 30	<2	< 6	<2	<10	<10	<10	< 1	10

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

Table 10: Lake Whatcom metals data, 1995–1997.

Site	Date	Depth (m)	Temp (C)	pH	Cond (μS)	DO (mg/L)
Site 3	Oct 08, 1996	0–35	14.4	7.9	62	9.3
Site s1	Oct 22, 1996	0–35	12.3	7.6	63	9.4
Site s2	Oct 22, 1996	0–35	12.2	7.6	63	9.3
Site s3	Oct 22, 1996	0–35	12.4	7.6	62	9.4
Site 3	na	na	na	na	na	na
Site s1	Jan 16, 1997	0–35	6.4	7.5	61	10.6
Site s2	Jan 16, 1997	0–35	6.2	7.5	61	10.6
Site s3	Jan 16, 1997	0–35	6.3	7.5	61	10.5
Site 3	Feb 12, 1997	0–35	6.1	7.4	61	11.2
Site s1	Feb 12, 1997	0–35	6.2	7.5	62	11.1
Site s2	Feb 12, 1997	0–35	6.1	7.5	61	11.0
Site s3	Feb 12, 1997	0–35	6.1	7.5	62	11.0
Site 3	Apr 22, 1997	0–35	8.5	7.6	60	11.9
Site s1	Apr 29, 1997	0–35	9.6	7.9	60	11.7
Site s2	Apr 29, 1997	0–35	9.6	7.9	60	11.5
Site s3	Apr 29, 1997	0–35	9.5	7.8	60	11.5
Site 3	May 21, 1997	0–20	13.2	7.8	60	10.9
Site s1	May 21, 1997	0–35	11.7	7.7	60	11.0
Site s2	May 21, 1997	0–35	11.7	7.6	60	11.0
Site s3	May 21, 1997	0–35	11.3	7.6	60	11.0
Site 3	Jun 12, 1997	0–35	14.2	8.2	60	10.2
Site s1	Jun 12, 1997	0–35	14.5	8.2	61	10.4
Site s2	Jun 12, 1997	0–35	14.6	8.3	61	10.3
Site s3	Jun 12, 1997	0–35	14.5	8.3	60	10.2
Site 3	Jul 10, 1997	0–35	14.5	7.9	60	9.4
Site s1	Jul 14, 1997	0–35	15.4	8.0	60	9.8
Site s2	Jul 14, 1997	0–35	15.5	7.9	60	9.9
Site s3	Jul 14, 1997	0–35	15.3	8.0	60	9.8
Site 3	Sep 18, 1997	0–35	15.5	7.7	61	9.3
Site s1	Sep 18, 1997	0–35	15.7	7.7	60	9.2
Site s2	Sep 18, 1997	0–35	15.6	7.6	60	9.1
Site s3	Sep 18, 1997	0–35	15.5	7.6	61	9.1

Table 11: Strawberry sill hydrolab data summary compared to Site 3.

Site	Date	Depth (m)	Alk (mg/L)	Turb (NTU)	NH3 (μg/L)	TN (μg/L)	NO3 (μg/L)	SRP (μg/L)	TP (μg/L)
Site 3	Oct 08, 1996	0–40	18.5	0.4	5	406	261	< 5	< 5
Site s1	Oct 22, 1996	0–35	18.5	0.3	< 5	699	288	< 5	< 5
Site s2	Oct 22, 1996	0–35	18.7	0.4	5	730	308	< 5	< 5
Site s3	Oct 22, 1996	0–35	18.6	0.3	< 5	694	319	< 5	< 5
Site 3	na	na	na	na	na	na	na	na	na
Site s1	Jan 16, 1997	0–35	17.9	0.8	< 5	430	340	< 5	< 5
Site s2	Jan 16, 1997	0–35	17.9	0.8	< 5	481	343	< 5	< 5
Site s3	Jan 16, 1997	0–35	17.8	0.8	< 5	434	368	< 5	< 5

Table 12: Strawberry sill water quality data summary compared to Site 3.

Site	Depth	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)
Site 3	0	Sep 18, 1997	< 30	< 2	< 6	< 2	10	< 10	< 10	< 1	21
Site s1	0	Oct 22, 1997	< 30	< 2	< 6	< 2	< 10	< 10	< 10	< 1	5
Site s1	35	Oct 22, 1997	< 30	< 2	< 6	< 2	< 10	< 10	< 10	< 1	2
Site s2	0	Oct 22, 1997	< 30	< 2	< 6	< 2	< 10	< 10	< 10	< 1	11
Site s2	35	Oct 22, 1997	< 30	< 2	< 6	< 2	< 10	< 10	< 10	< 1	3
Site s3	0	Oct 22, 1997	< 30	< 2	< 6	< 2	< 10	< 10	< 10	< 1	5
Site s3	35	Oct 22, 1997	< 30	< 2	< 6	< 2	< 10	< 10	< 10	< 1	4

Table 13: Strawberry sill metals and total organic carbon data compared to Site 3.

	1996			1997								
Parameter	Oct	Nov	Dec	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 14: Lake Whatcom 1996/97 creek monitoring schedule.

Site	Date	pH	Cond. (μS)	DO (mg/L)	TSS (mg/L)	Alk. (mg/L)	Disch. (m^3/sec)	Temp. (°C)	Turb. (ntu)
Blue Canyon	1990 min	8.1	250	9.0	<2	na	na	4.0	na
	1990 avg	8.4	344	10.5	5	na	na	10.9	na
	1990 max	8.6	409	12.3	29	na	na	17.0	na
	Feb 1995	8.3	302	9.6	9	123.0	0.18	9.5	4.39
	Feb 1996	8.4	287	11.3	4	124.1	na	7.2	2.84
	Feb 1997	8.3	222	12.8	5	88.6	0.74	na	7.39
	Aug 1995	8.4	369	10.7	4	35.4	0.071	12	1.51
	Jul 1996	8.5	315	10.1	4	147.2	0.074	13.5	3.43
	Aug 1997	8.4	305	10.1	5	148.4	0.039	na	3.96
Park Place	1990 min	7.1	118	6.4	3	na	na	4.5	na
	1990 avg	7.7	245	9.1	13	na	na	13.7	na
	1990 max	8.1	410	11.8	57	na	na	23.0	na
	Feb 1995	7.5	194	9.5	10	63.4	0.83	8.6	6.75
	Feb 1996	7.5	177	11.0	7	59.9	na	8	14.0
	Feb 1997	7.5	184	12.7	2	64.4	0.50	na	5.52
	Aug 1995	7.9	317	8.1	5	25.8	0.025	19	3.56
	Jul 1996	8.0	268	4.5	<2	113.2	0.037	18.5	2.16
	Aug 1997	7.6	262	6.6	3	106.2	0.046	na	3.78
Silver Beach	1990 min	7.4	103	6.9	<2	na	na	4.2	na
	1990 avg	7.9	187	9.8	6	na	na	11.1	na
	1990 max	8.1	290	12.1	12	na	na	17.0	na
	Feb 1995	7.6	128	9.9	9	31.1	6	7	10.6
	Feb 1996	7.6	110	11.1	13	33.9	8.5	7	20.4
	Feb 1997	7.7	117	13.7	2	37.7	1.31	na	11.8
	Aug 1995	8.3	257	9.3	4	22.8	0.25	16	2.67
	Jul 1996	8.1	269	5.5	<2	118.4	0.24	15.5	3.22
	Aug 1997	8.0	312	9.2	2	139.8	0.22	na	2.00
Wildwd	1990 min	6.7	34	6.9	<2	na	na	4.0	na
	1990 avg	7.2	54	10.0	2	na	na	10.0	na
	1990 max	7.6	126	12.3	11	na	na	16.5	na
	Feb 1995	7.0	50	10.7	11	15.3	na	8.3	1.22
	Feb 1996	7.3	40	11.6	<2	6.4	na	6.2	0.60
	Feb 1997	7.4	41	13.5	<2	5.5	1.21	na	0.82
	Aug 1995	na - creek dry		na	na	na	na	na	na
	Jul 1996	7.3	56	8.8	<2	13.5	na	13.5	0.11
	Aug 1997	na - creek dry		na	na	na	na	na	na

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

Cond = conductivity
DO = dissolved oxygen
TSS = total susp. solids
ALK = alkalinity
Disch = discharge
Temp. = temperature
Turb. = turbidity

Table 15: Physical water quality data for Blue Canyon, Wildwood, Park Place, and Silver Beach Creeks.

Site	Date	pH	Cond. (μS)	DO (mg/L)	TSS (mg/L)	Alk. (mg/L)	Disch. (m^3/sec)	Temp. (°C)	Turb. (ntu)
Anderson	1990 min	7.2	37	10.0	4	na	na	3.5	na
	1990 avg	7.4	57	11.3	17	na	na	8.3	na
	1990 max	8.4	71	13.0	48	na	na	12.5	na
	Feb 1995	7.0	55	9.8	9	14.3	27.9	7.8	5.13
	Feb 1996	7.4	48	11.7	6	15.6	28.5	5	6.87
	Feb 1997	7.2	55	13.1	2	14.4	na	na	2.30
	Aug 1995	7.7	63	11.1	8	15.9	66	10	7.40
	Jul 1996	7.8	55	10.5	16	15.1	58.6	13	19.4
	Aug 1997	7.4	51	10.8	44	11.6	na	na	42.8
Austin	1990 min	7.1	50	8.3	<2	na	na	4.5	na
	1990 avg	7.4	81	10.5	3	na	na	10.6	na
	1990 max	7.6	121	12.1	13	na	na	19.5	na
	Feb 1995	7.2	57	10.2	14	12.7	na	7.4	6.49
	Feb 1996	7.2	53	11.5	8	12.5	na	6.2	4.20
	Feb 1997	7.3	54	13.6	3	12.7	57	na	3.30
	Aug 1995	7.5	112	10.2	2	15.6	0.427, 0.391	14.5	1.05
	Jul 1996	7.5	111	8.7	1	31.2	0.55	20	0.83
	Aug 1997	7.4	112	9.1	<2	31.5	0.93	na	1.01
Smith	1990 min	6.6	44	8.7	<2	na	na	3.4	na
	1990 avg	7.5	64	10.5	3	na	na	10.0	na
	1990 max	7.8	90	12.6	10	na	na	17.0	na
	Feb 1995	7.4	54	10.4	9	11.5	30	6.8	2.87
	Feb 1996	7.7	47	11.7	5	11.7	21.5	6.5	3.25
	Feb 1997	7.5	47	13.8	<2	11.2	na	na	2.10
	Aug 1995	8.6	83	10.4	2	28.6	0.125, 0.156	15.6	0.21
	Jul 1996	7.5	80	5.3	0.2	27.2	1.81	15	0.24
	Aug 1997	7.6	79	9.7	<2	26.8	0.85	na	0.28

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

Cond = conductivity
DO = dissolved oxygen
TSS = total susp. solids
ALK = alkalinity
Disch = discharge
Temp. = temperature
Turb. = turbidity

Table 16: Physical water quality data for Anderson, Austin, and Smith Creeks.

Site	Date	NH_3 (μg/L)	TN (μg/L)	NO_{2+3} (μg/L)	SRP (μg/L)	TP (μg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
Blue Canyon	1990 min	10	na	167	<5	<5	90	<2	na
	1990 avg	20	na	336	<5	13	1163	7	na
	1990 max	34	na	545	12	25	9000	27	na
	Feb 1995	11	693	707	<5	<5	1400	4	na
	Feb 1996	14	578	473	<5	7	13	< 4	< 4
	Feb 1997	<10	483	283	<5	9	<4	<2	<2
	Aug 1995	27	176	203	<5	<5	140	28	20
	Jul 1996	16	807	179	<5	11	73	8	2
	Aug 1997	16	155	133	6	13	280	20	17
Park Place	1990 min	22	na	145	6	41	230	8	na
	1990 avg	51	na	357	22	66	8254	1353	na
	1990 max	111	na	549	86	168	> 16000	16000	na
	Feb 1995	20	1187	1235	14	30	114	13	na
	Feb 1996	27	1364	788	21	52	> 2000	116	44
	Feb 1997	76	2285	532	15	24	3317	500	21
	Aug 1995	110	1469	903	46	68	85000	1192	76
	Jul 1996	46	1058	815	25	33	200	324	900
	Aug 1997	28	1201	725	44	76	720	153	60
Silver Beach	1990 min	<10	na	173	<5	27	170	8	na
	1990 avg	19	na	583	16	41	7110	3307	na
	1990 max	43	na	1118	42	61	> 16000	16000	na
	Feb 1995	13	2380	3053	13	33	800	50	na
	Feb 1996	26	1970	832	16	64	650	364	> 800
	Feb 1997	<10	1797	676	11	30	573	100	7
	Aug 1995	24	532	155	36	59	3020	1484	na
	Jul 1996	11	716	361	33	38	200	404	1600
	Aug 1997	14	875	227	21	35	3200	625	220
Wildwd	1990 min	<10	na	755	<5	<5	23	<2	na
	1990 avg	189	na	1790	<5	9	1164	74	na
	1990 max	32	na	4857	9	33	> 16000	1300	na
	Feb 1995	<10	2231	2480	<5	<5	240	<2	na
	Feb 1996	<10	1862	1288	<5	<5	7	< 4	< 4
	Feb 1997	<10	2103	1228	<5	<5	23	<2	<2
	Aug 1995	na - creek dry		na	na	na	na	na	na
	Jul 1996	<10	1131	1155	5	6	20	< 4	<2
	Aug 1997	na - creek dry		na	na	na	na	na	na

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

NH_3 = ammonia
TN = total nitrogen
NO_{2+3} = nitrate/nitrite
SRP = soluble phosphate
TP = total phosphorus
TC = total coliforms
FC = fecal coliforms
EC = *Enterococcus*

Table 17: Chemical and biological water quality data for Blue Canyon, Wildwood, Park Place, and Silver Beach Creeks.

Site	Date	NH_3 (μg/L)	TN (μg/L)	NO_{2+3} (μg/L)	SRP (μg/L)	TP (μg/L)	TC (cfu/ 100 mL)	FC (cfu/ 100 mL)	EC (cfu/ 100 mL)
Anderson	1990 min	10	na	50	<5	6	30	<2	na
	1990 avg	19	na	121	<5	24	344	13	na
	1990 max	32	na	221	8	55	2400	130	na
	Feb 1995	<10	756	956	6	10	110	30	na
	Feb 1996	10	353	219	8	19	7	< 4	< 4
	Feb 1997	21	1116	457	<5	7	16	4	<2
	Aug 1995	10	<100	78	<5	26	100	10	12
	Jul 1996	14	<100	<10	<5	38	20	16	<2
	Aug 1997	<10	<100	38	5	na	100	14	2
Austin	1990 min	<10	na	259	<5	<5	50	7	na
	1990 avg	20	na	441	<5	13	3366	950	na
	1990 max	40	na	658	9	23	16000	5000	na
	Feb 1995	<10	1292	759	<5	15	70	4	na
	Feb 1996	<10	690	491	5	13	53	12	20
	Feb 1997	<10	1125	677	<5	11	17	6	<2
	Aug 1995	<10	304	326	5	14	540	804	172
	Jul 1996	45	335	242	7	12	480	124	110
	Aug 1997	104	298	185	6	18	300	123	17
Smith	1990 min	12	na	396	<5	<5	17	<2	na
	1990 avg	17	na	687	<5	6	1138	14	na
	1990 max	37	na	1025	8	12	9000	170	na
	Feb 1995	<10	1355	1643	<5	<5	240	<2	na
	Feb 1996	<10	1648	841	<5	8	10	< 4	4
	Feb 1997	<10	1490	549	<5	7	<4	<2	<2
	Aug 1995	<10	383	367	<5	<5	88	14	24
	Jul 1996	<10	491	464	<5	<5	40	8	2
	Aug 1997	14	489	486	<5	<5	192	85	2

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

NH_3 = ammonia
TN = total nitrogen
NO_{2+3} = nitrate/nitrite
SRP = soluble phosphate
TP = total phosphorus
TC = total coliforms
FC = fecal coliforms
EC = *Enterococcus*

Table 18: Chemical and biological 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	na	< 0.5	< 0.5	<5	na	na	<5	<5	2
Canyon	1990 min	na	< 0.5	< 0.5	<5	na	na	<5	<5	< 0.2
	1990 max	na	< 0.5	4	9	na	na	4	6	33
	Feb 1995	< 30	<2	< 6	<2	240	<10	<10	3	15
	Feb 1996	< 30	<2	< 6	3	180	<10	<10	< 1	31
	Feb 1997	< 30	<2	< 6	<2	90	<10	<10	< 1	10
Park	1990 avg	na	< 0.5	< 0.5	7	na	na	<5	6	16
Place	1990 min	na	< 0.5	1	<5	na	na	<5	<5	3
	1990 max	na	< 0.5	10	16	na	na	7	20	148
	Feb 1995	< 30	<2	< 6	3	600	<10	<10	2	19
	Feb 1996	< 30	<2	< 6	5	890	<10	<10	< 1	27
	Feb 1997	< 30	<2	< 6	<2	340	<10	<10	< 1	19
Silver	1990 avg	na	< 0.5	< 0.5	<5	na	na	<5	<5	2
Beach	1990 min	na	< 0.5	< 0.5	<5	na	na	<5	<5	0.2
	1990 max	na	<5	3	7	na	na	<5	<5	5
	Feb 1995	< 30	<2	< 6	<2	790	<10	<10	3	12
	Feb 1996	< 30	<2	< 6	5	940	<10	<10	< 1	23
	Feb 1997	< 30	<2	< 6	<2	270	<10	<10	< 1	21
Wildwd	1990 avg	na	< 0.5	< 0.5	<5	na	na	<5	<5	3
	1990 min	na	< 0.5	< 0.5	<5	na	na	<5	<5	0.5
	1990 max	na	< 0.5	2	8	na	na	7	6	10
	Feb 1995	< 30	<2	< 6	<2	270	<10	<10	1	12
	Feb 1996	< 30	<2	< 6	4	60	<10	<10	< 1	38
	Feb 1997	< 30	<2	< 6	<2	10	<10	<10	< 1	17

All 1995–1997 metals samples were analyzed by AmTest for total metals.
The 1990 data are "dissolved" metals, and do not include the November 1990 storm event.

Table 19: 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	na	< 0.5	< 0.5	<5	na	na	<5	<5	1
	1990 min	na	< 0.5	1	<5	na	na	<5	<5	4
	1990 max	na	< 0.5	3	6	na	na	<5	<5	14
	Feb 1995	< 30	<2	< 6	<2	520	<10	<10	1	11
	Feb 1996	< 30	<2	< 6	3	310	<10	<10	< 1	15
	Feb 1997	< 30	<2	< 6	<2	70	<10	<10	< 1	14
Austin	1990 avg	na	< 0.5	< 0.5	<5	na	na	<5	<5	5
	1990 min	na	< 0.5	< 0.5	<5	na	na	<5	<5	0.4
	1990 max	na	< 0.5	7	11	na	na	7	26	21
	Feb 1995	< 30	<2	< 6	8	640	<10	<10	1	10
	Feb 1996	40	<2	< 6	5	240	<10	<10	< 1	26
	Feb 1997	< 30	<2	< 6	<2	130	<10	<10	< 1	36
Smith	1990 avg	na	< 0.5	< 0.5	<5	na	na	<5	<5	2
	1990 min	na	< 0.5	< 0.5	<5	na	na	<5	<5	0.3
	1990 max	na	< 0.5	2	18	na	na	<5	<5	3
	Feb 1995	< 30	<2	< 6	<2	310	<10	<10	1	7
	Feb 1996	< 30	<2	< 6	5	200	<10	<10	< 1	30
	Feb 1997	< 30	<2	< 6	<2	40	<10	<10	< 1	12

All 1995–1997 metals samples were analyzed by AmTest for total metals.
The 1990 data are "dissolved" metals, and do not include the November 1990 storm event.

Table 20: Metals data for Anderson, Austin, and Smith Creeks.

Site	Date	TOC (mg/L)	Date	TOC (mg/L)
Anderson Creek	Feb 10, 1997	< 1	Aug 11, 1997	1.1
Austin Creek	Feb 10, 1997	< 1	Aug 11, 1997	2.4
Blue Canyon Creek	Feb 10, 1997	< 1	Aug 11, 1997	2.1
Park Place drain	Feb 10, 1997	< 1	Aug 11, 1997	7.1
Silver Beach Creek	Feb 10, 1997	< 1	Aug 11, 1997	7.5
Smith Creek	Feb 10, 1997	< 1	Aug 11, 1997	2.3
Wildwood Creek	Feb 10, 1997	< 1	Aug 11, 1997	< 1

Table 21: Total organic carbon data for Lake Whatcom tributaries.

		Min.	Max.	n	$\bar{x}$*
Anderson Creek	total coliforms	20	110	6	36.8
	fecal coliforms	<4	30	6	10.1
	Enterococcus	<2	<4	5	3.29
Austin Creek	total coliforms	17	540	6	130
	fecal coliforms	4	804	6	39.0
	Enterococcus	<2	110	5	26.4
Blue Canyon Creek	total coliforms	<4	1400	6	77.1
	fecal coliforms	<2	20	6	7.23
	Enterococcus	<2	20	5	5.59
Park Place drain	total coliforms	114	85000	6	1449
	fecal coliforms	13	1192	6	188
	Enterococcus	21	90	5	52.0
Silver Beach Creek	total coliforms	200	3200	6	912
	fecal coliforms	50	1484	6	297
	Enterococcus	7	1600	4	211
Smith Creek	total coliforms	<4	240	6	43.2
	fecal coliforms	<2	85	6	7.31
	Enterococcus	<2	24	5	3.78
Wildwood Creek	total coliforms	7	240	4	29.6
	fecal coliforms	<2	<4	3	3.14
	Enterococcus	<2	<4	3	2.50

*3-year geometric means from Feb 1995 to Aug 1997.

Table 22: Average coliform and *Enterococcus* counts for Lake Whatcom tributaries.

Composite Samples (n~36) Site	TN (μg/L)	TP (μg/L)	TSS (mg/L)	TOC (mg/L)	Cd (μg/L)	Cr (μg/L)	Cu (μg/L)	Fe (μg/L)	Ni (μg/L)	Pb (μg/L)	Zn (μg/L)
Feb 17–19, 1997											
inlet	744	39	6.0	< 1	< 2	< 6	< 2	250	< 10	< 1	25
outlet	804	41	4.2	< 1	< 2	< 6	< 2	290	< 10	< 1	27
% change	+8.1	+5.1	-30	0	0	0	0	+16	0	0	+8
Sep 16–17, 1997											
inlet	1186	96	8.3	< 1	< 2	< 6	< 2	470	< 10	< 1	14
outlet	412	68	10.5	< 1	< 2	< 6	< 2	360	20	< 1	12
% change:	-65	-29	+27	0	0	0	0	-23	+100	0	-14

Grab Samples (n = 4) Site	Temp (°C)	pH	DO (mg/L)	Cond (μS)	TC (cfu/100 mL)	FC (cfu/100 mL)	EC (cfu/100 mL)
Feb 17–19, 1997							
inlet	7.1	7.43	12.21	138.3	3400	12	4
inlet	6.2	7.51	12.01	144.7	1200	70	13
inlet	4.0	7.45	12.21	128.2	1550	193	30
inlet	4.2	7.41	12.52	133.0	2050	310	140
outlet	7.3	7.50	na	131.1	800	24	4
outlet	na	7.50	12.07	141.1	10200	< 20	7
outlet	4.5	7.55	12.26	142.5	10200	23	8
outlet	4.0	7.48	12.27	134.9	6200	216	30
% change:	-2.0	+0.8	-0.3	+1.0	+234	-52	-74
Sep 16–17, 1997							
inlet	16.32	7.62	9.86	0.242	6400	1128	300
inlet	15.86	7.81	9.72	0.251	3500	872	140
inlet	14.89	7.83	10.16	0.184	5900	3000	< 2
inlet	14.51	7.54	10.26	0.140	8200	3000	< 2
outlet	17.54	7.54	8.45	0.227	250	176	170
outlet	16.12	7.45	7.48	0.225	130	105	300
outlet	16.08	7.43	8.10	0.210	1000	220	4
outlet	15.05	7.45	8.48	0.160	460	700	2
% change:	+5.2	-3.0	+18.7	+0.6	-92	-85	+7

Table 23: Park Place wet pond water quality summary.

Sample	Date Analyzed	Lab Value	Certified Value	Acceptance Limits
pH	9/24/97	6.81	6.80	6.60–7.00
Conductivity	9/24/97	119.6 μS/cm	119	101–137
Alkalinity	9/24/97	22.6 mg/L as $CaCO_3$, low range 23.2 mg/L as $CaCO_3$, single endpt	22.0	19.6–24.4
Turbidity	9/11/97	0.83 NTU	0.800	0.683–0.922
Total P	10/2/97	17 μg/L TP-P	20.0	17.2–22.8
Orthophosphate	10/9/97	13 μg/L PO_4-P	14.5	12.3–16.7
NO_3+NO_2	10/10/97	155 μg/L NO_3-N	153	136–169
NO_3 replicate	10/10/97	155 μg/L NO_3-N		
Ammonia	10/9/97	49 μg/L NH_3-N	44.9	37.7–52.1
TSS 1st sample	9/11/97	22.9 mg/L	25.2	21.4–29.0
TSS 1st sample rep	9/11/97	22.8 mg/L		
TSS, 2nd sample	9/29/97	14.8 mg/L*	18.6	15.8–21.4

*Lab value outside acceptance limits. First set of samples was within acceptance limits, but near low end of acceptable range. Balance was recalibrated to correct possible bias.

Table 24: Summary of single-blind quality control results.

9 Figures

- Figure 1 (page 43) provides a general map of Lake Whatcom and its tributaries, and shows the current lake sampling sites. Refer to Appendix A (page 170) and Figures 127–129 (pages 172–174) for more detailed information about site locations.
- Figures 2, 3, and 4 (pages 44, 45, and 46) compare the current sampling year with historic temperature and dissolved oxygen data.
- Figures 5–14 (pages 47–56) show single-day Hydrolab profiles from Lake Whatcom for the February and September sampling dates.
- Figures 15–34 show multi-year Hydrolab data for Lake Whatcom. The lines connect data from a single sampling depth through time. 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.
- Figures 35–89 (pages 77–131) show multi-year water quality, chlorophyll, and Secchi depth data for Lake Whatcom.
- Figures 90–109 (pages 132–151) show multi-year coliforms and plankton data for Lake Whatcom.
- Figures 110–115 (pages 152–157) show the water balance data for 1995-96 and 1996-97.
- Figures 116–118 (pages 158–160) contain photographs of the Park Place wet pond cells.
- Figures 119–126 (pages 162– 168) show the quality control results from field and laboratory duplicate samples.

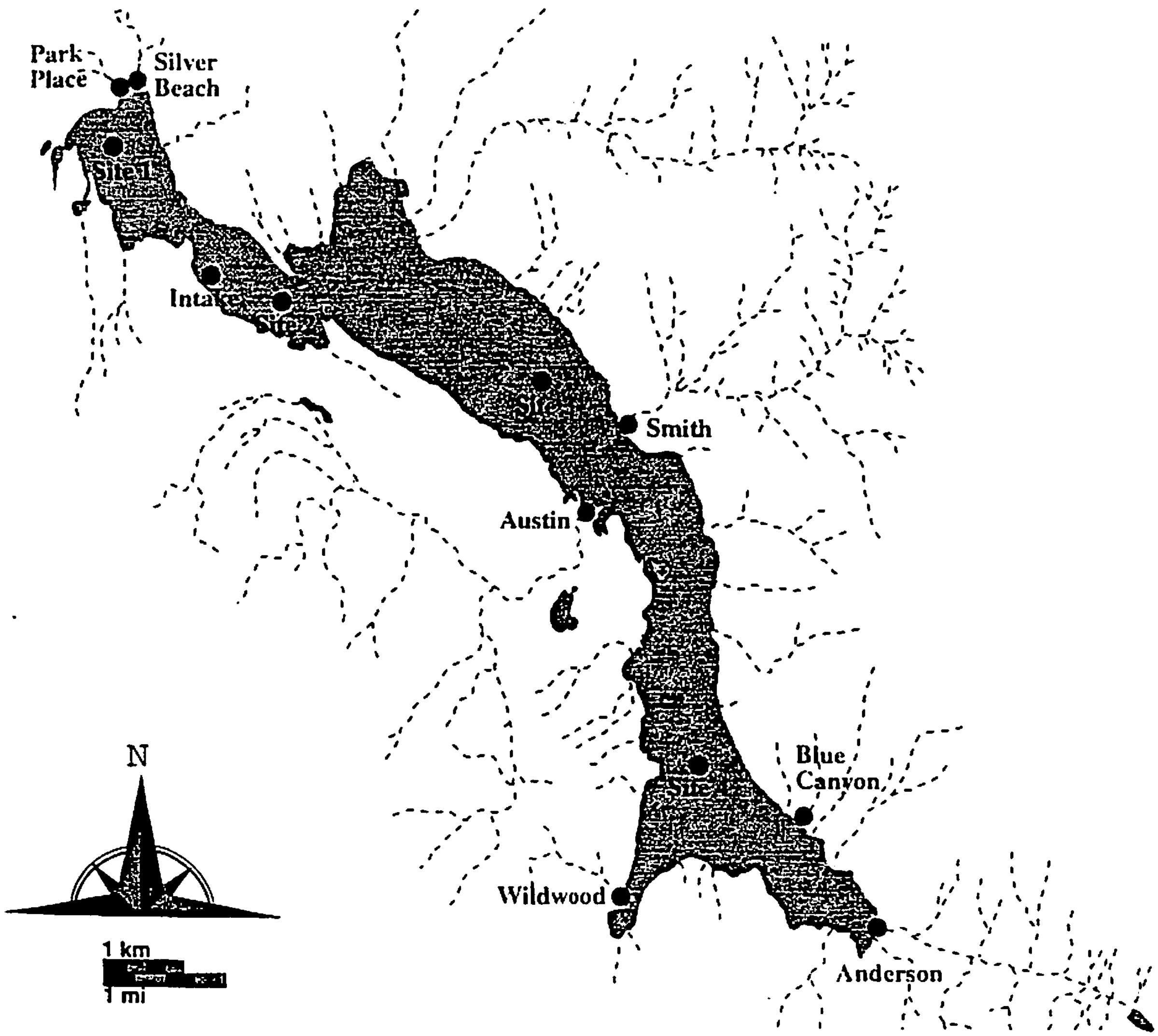


Figure 1: Lake Whatcom 1996/97 sampling sites.

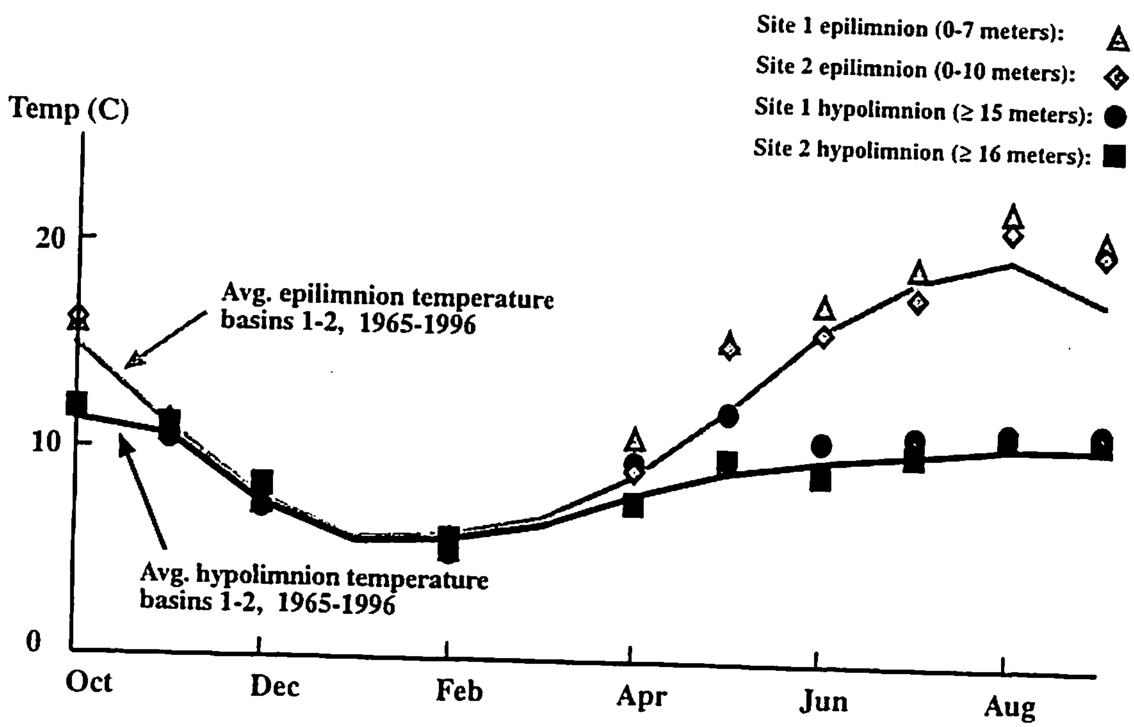
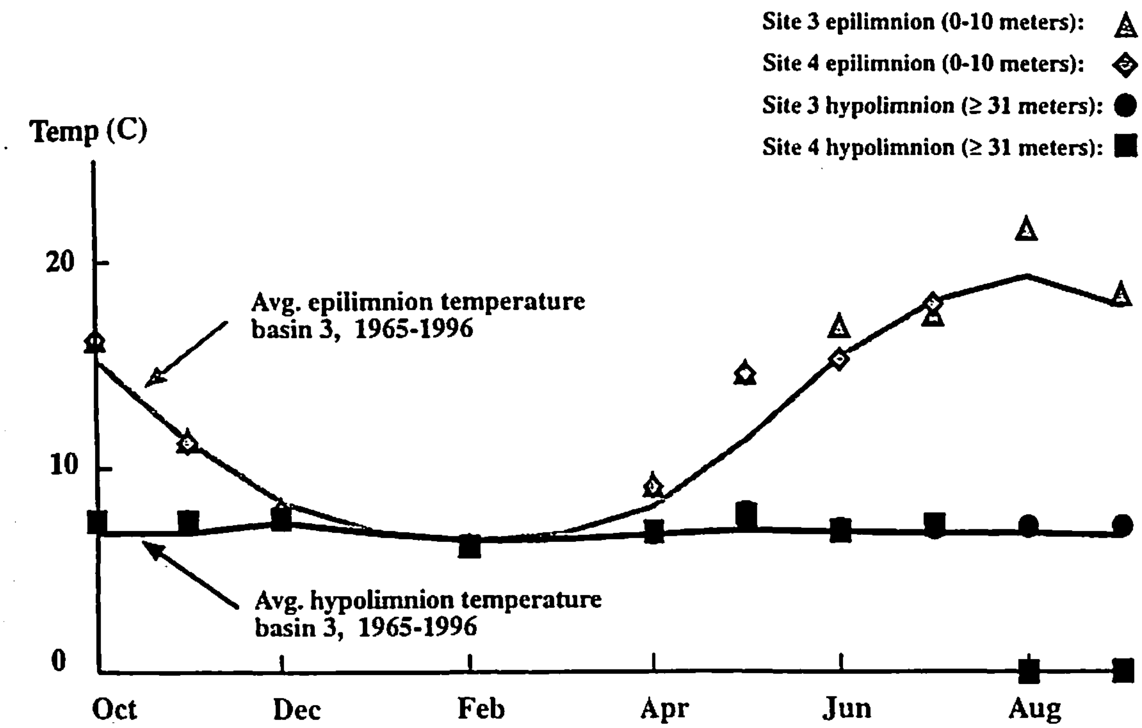


Figure 2: Epilimnion and hypolimnion temperature data from Sites 1–2 compared to 1965–1996 averages.



96 Figure 3: Epilimnion and hypolimnion temperature data from Sites 3–4 compared to 1965–1996 averages.

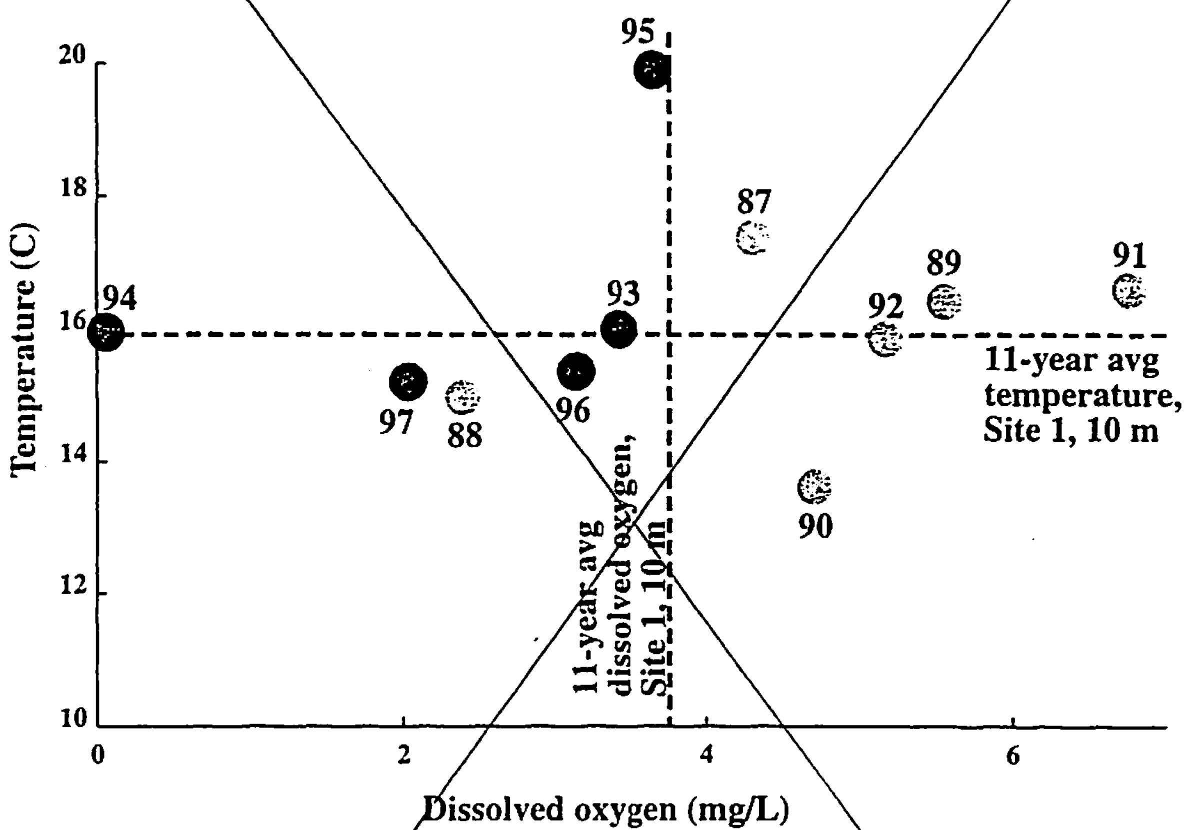


Figure 4: Site 1 dissolved oxygen concentrations at 10 meters, September only, 1987–1997.

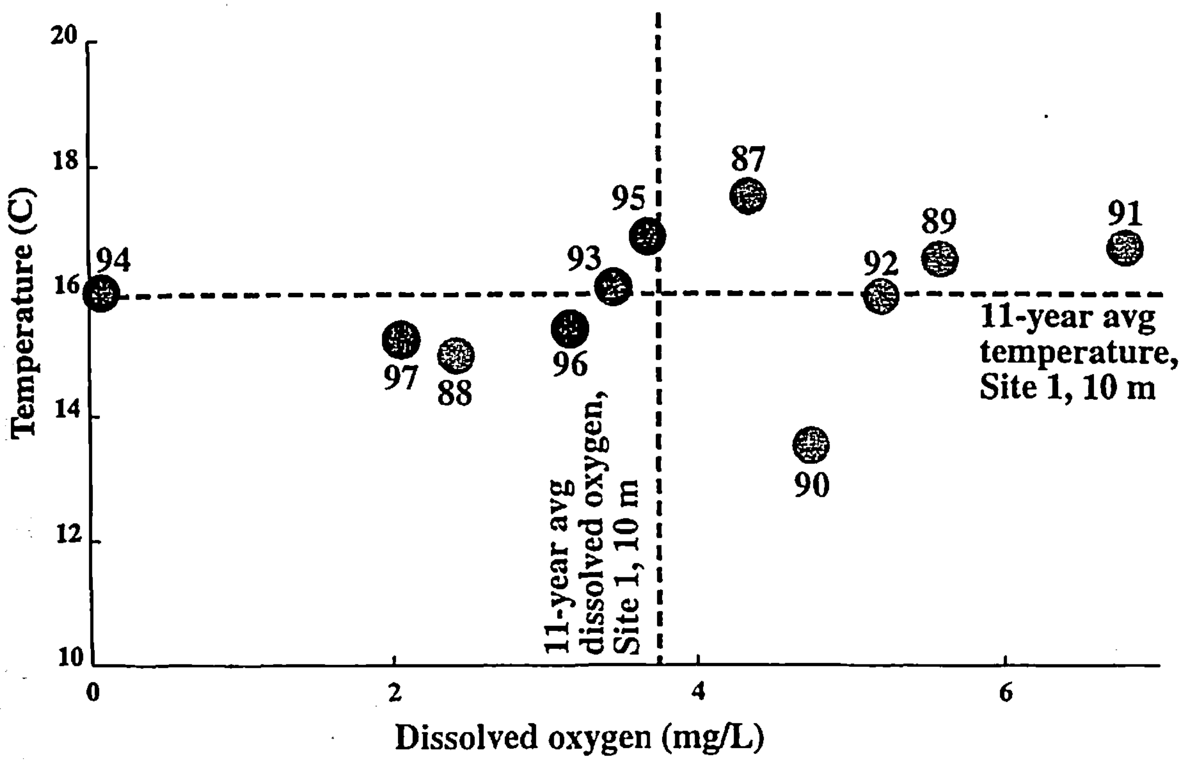


Figure 4: Site 1 dissolved oxygen concentrations at 10 meters, September only, 1987–1997, revised to show corrected 1995 temperature value. Correct data were used for statistical analyses and discussion in text.

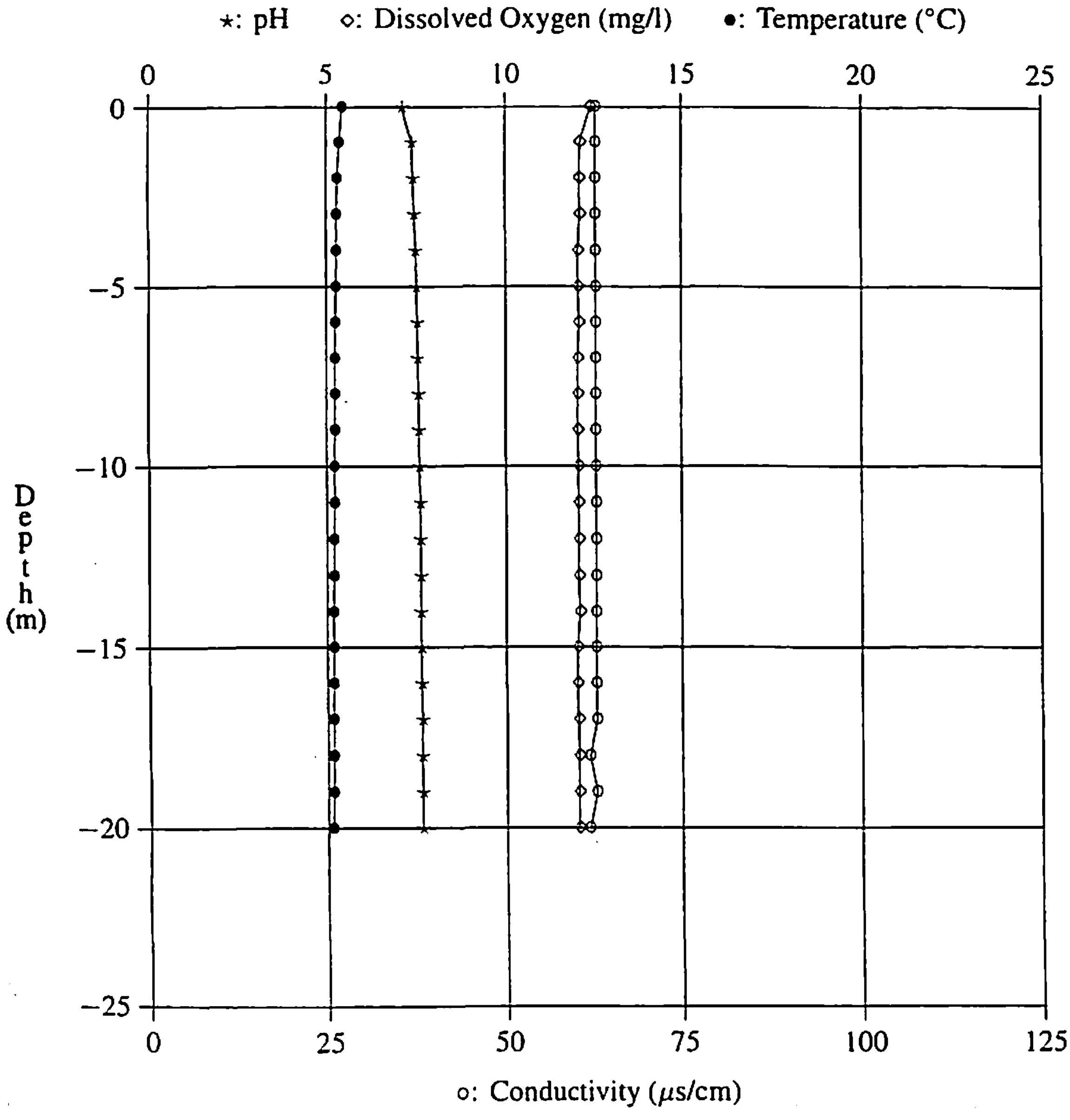


Figure 5: Lake Whatcom Hydrolab profile for Site 1, February 12, 1997.

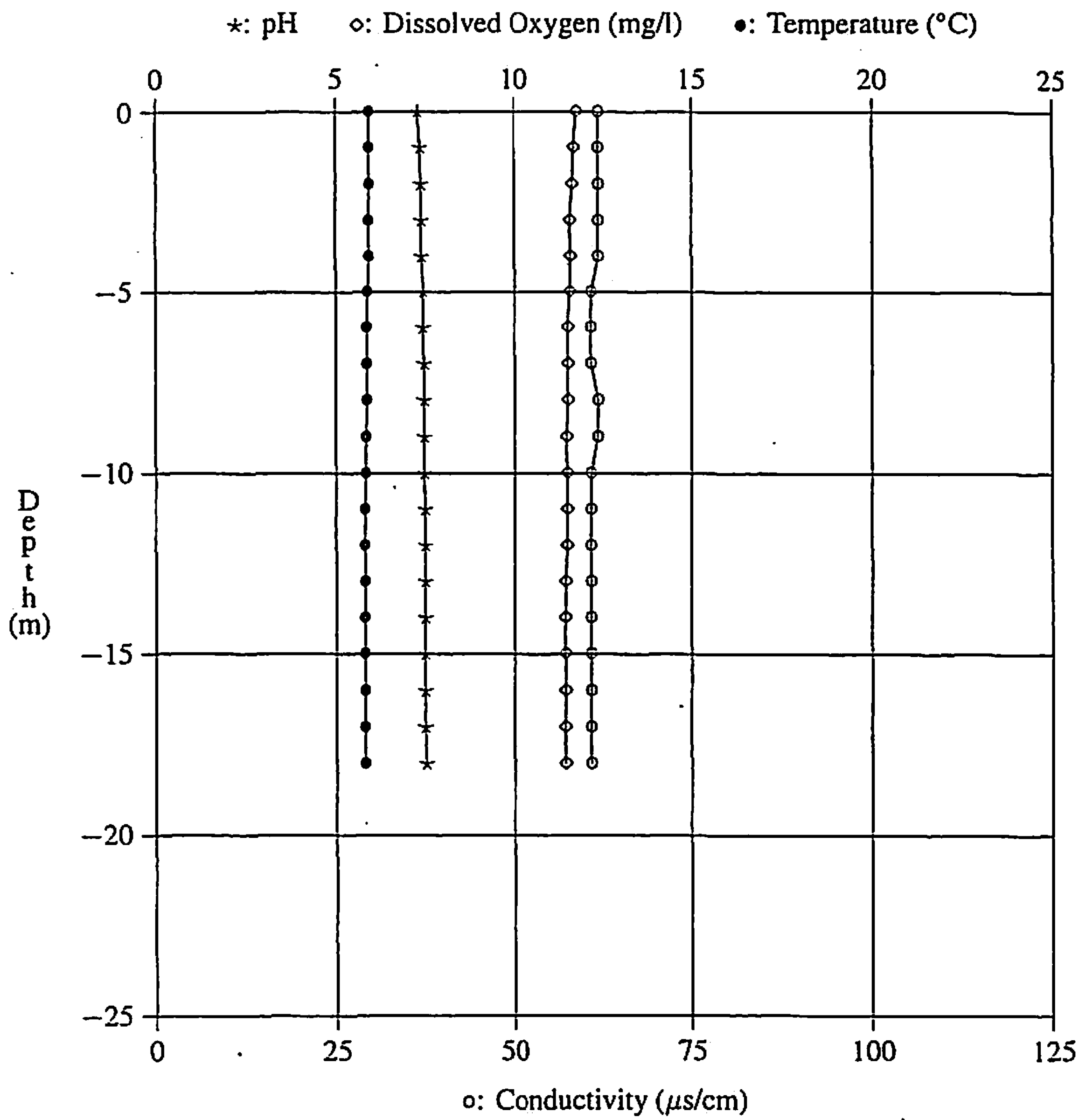


Figure 6: Lake Whatcom Hydrolab profile for Site 2, February 12, 1997.

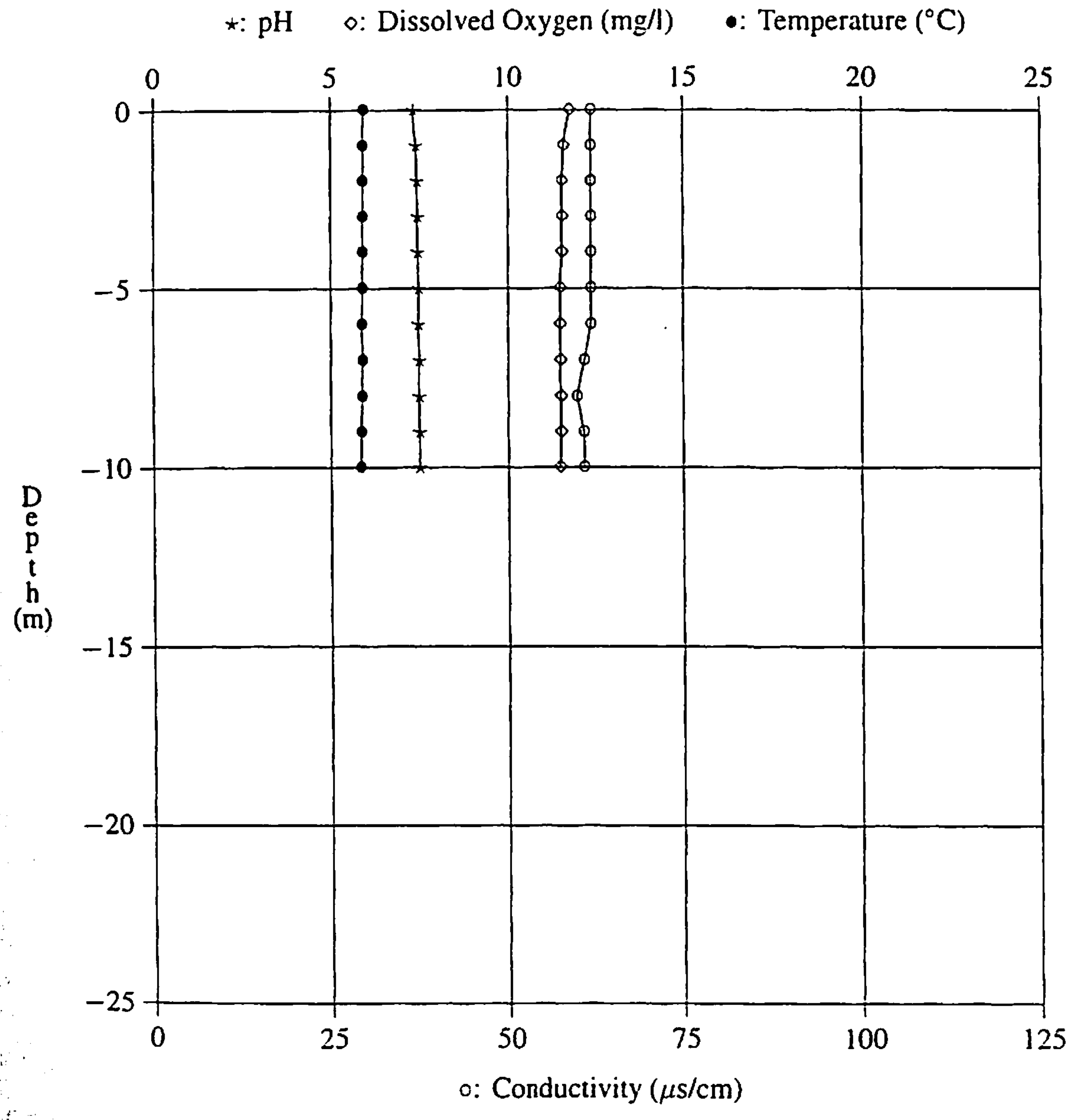


Figure 7: Lake Whatcom Hydrolab profile for the Intake site, February 12, 1997.

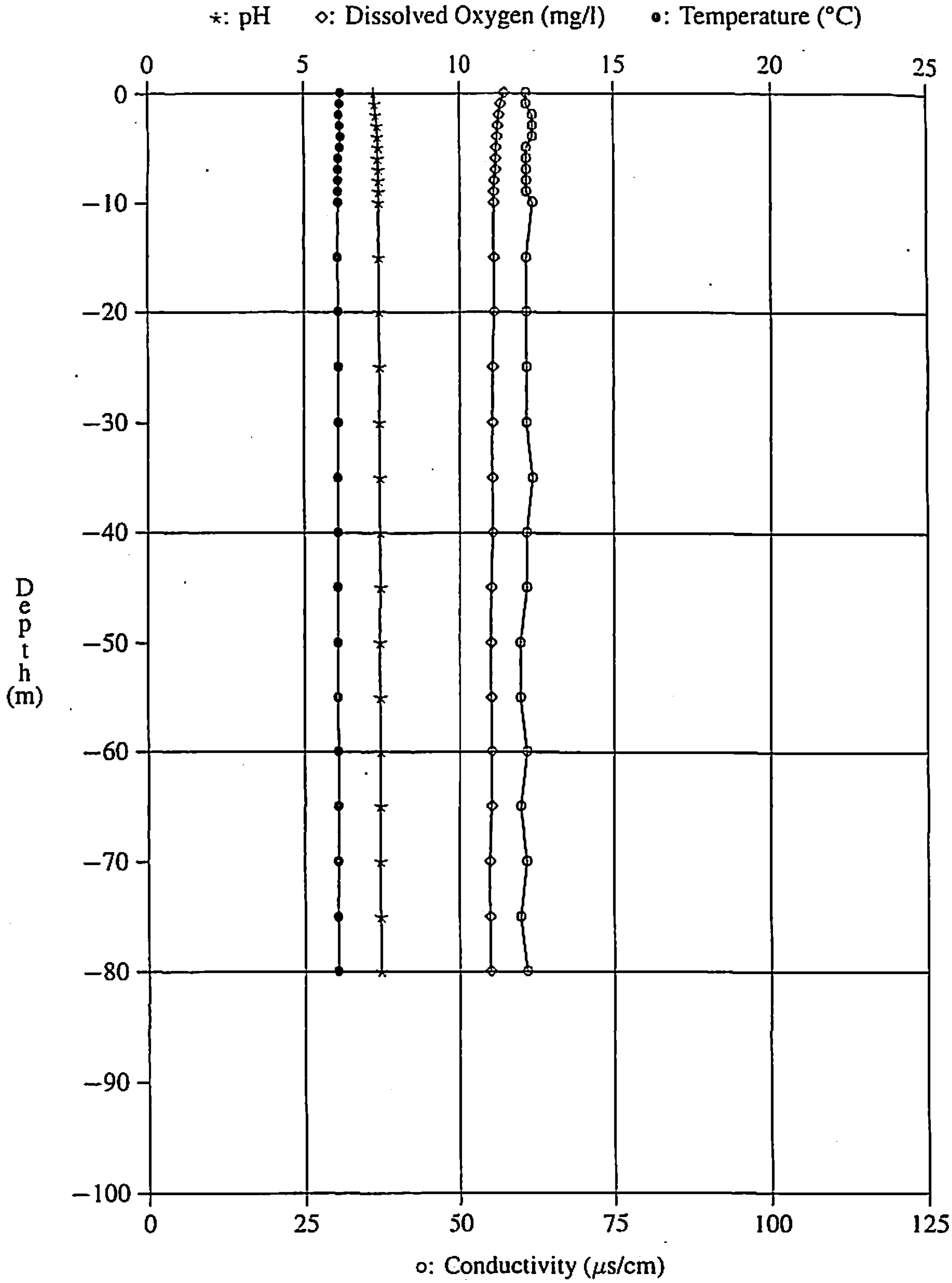


Figure 8: Lake Whatcom Hydrolab profile for Site 3, February 12, 1997.

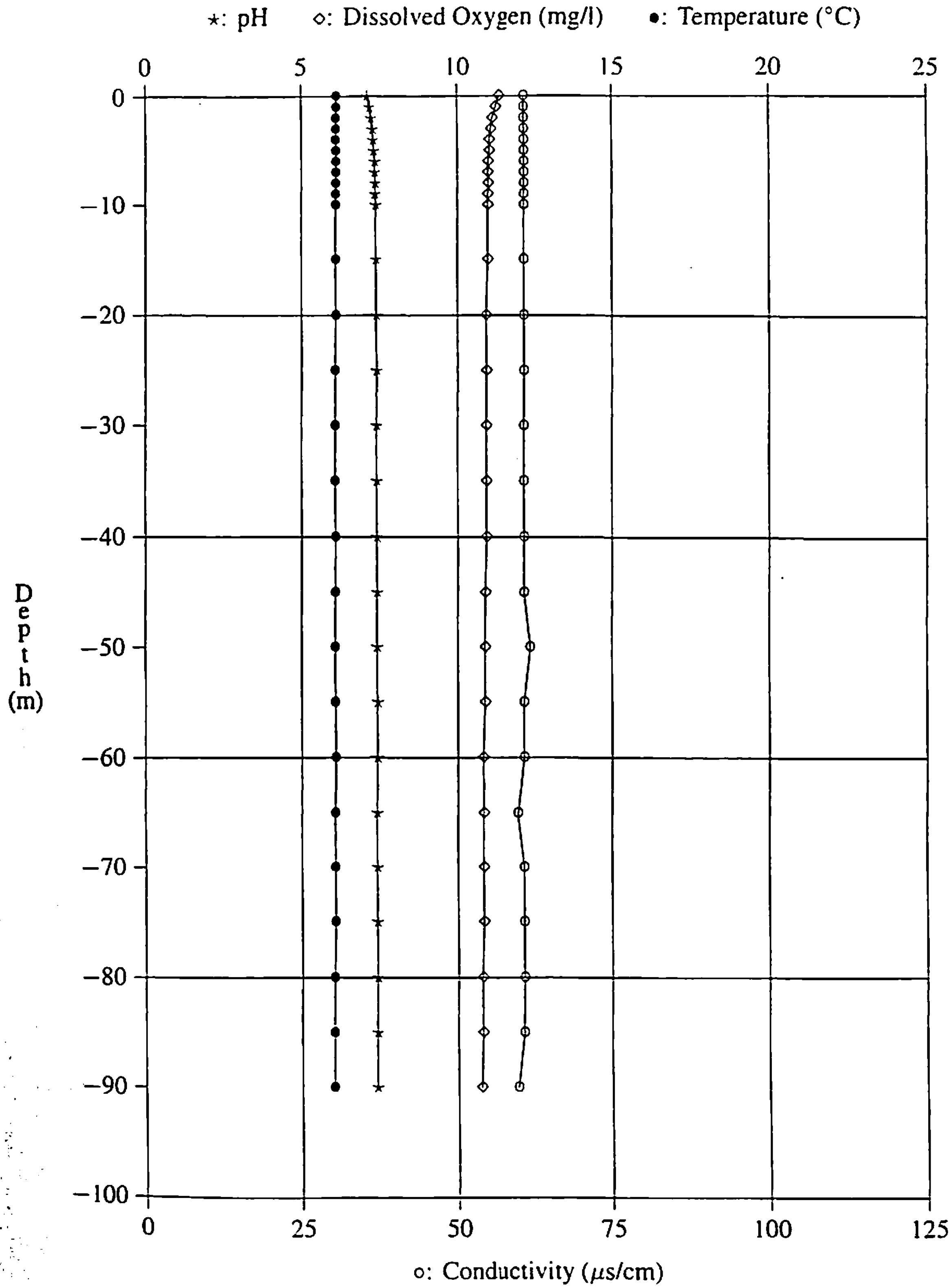


Figure 9: Lake Whatcom Hydrolab profile for Site 4, February 12, 1997.

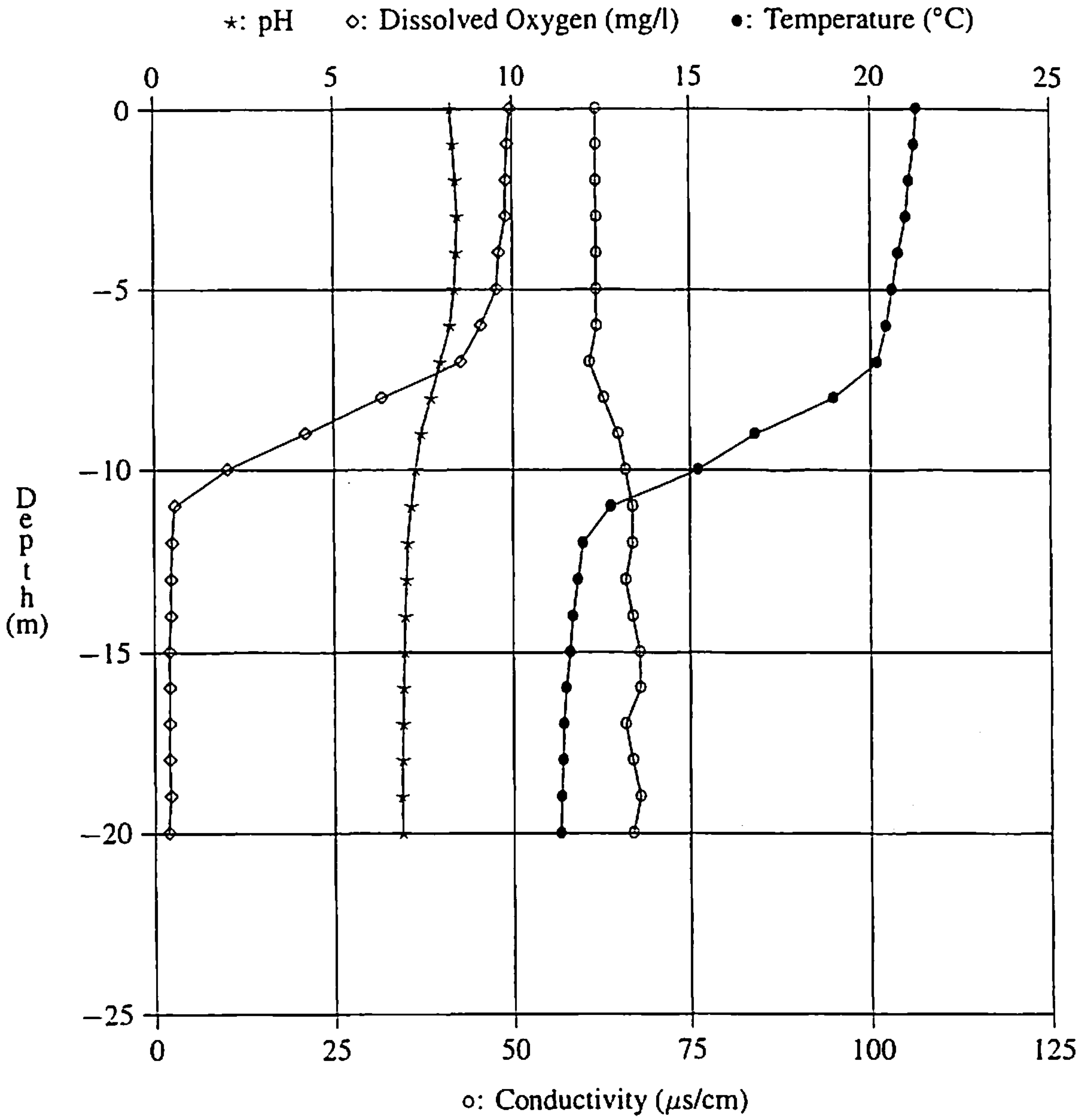


Figure 10: Lake Whatcom Hydrolab profile for Site 1, September 10, 1997.

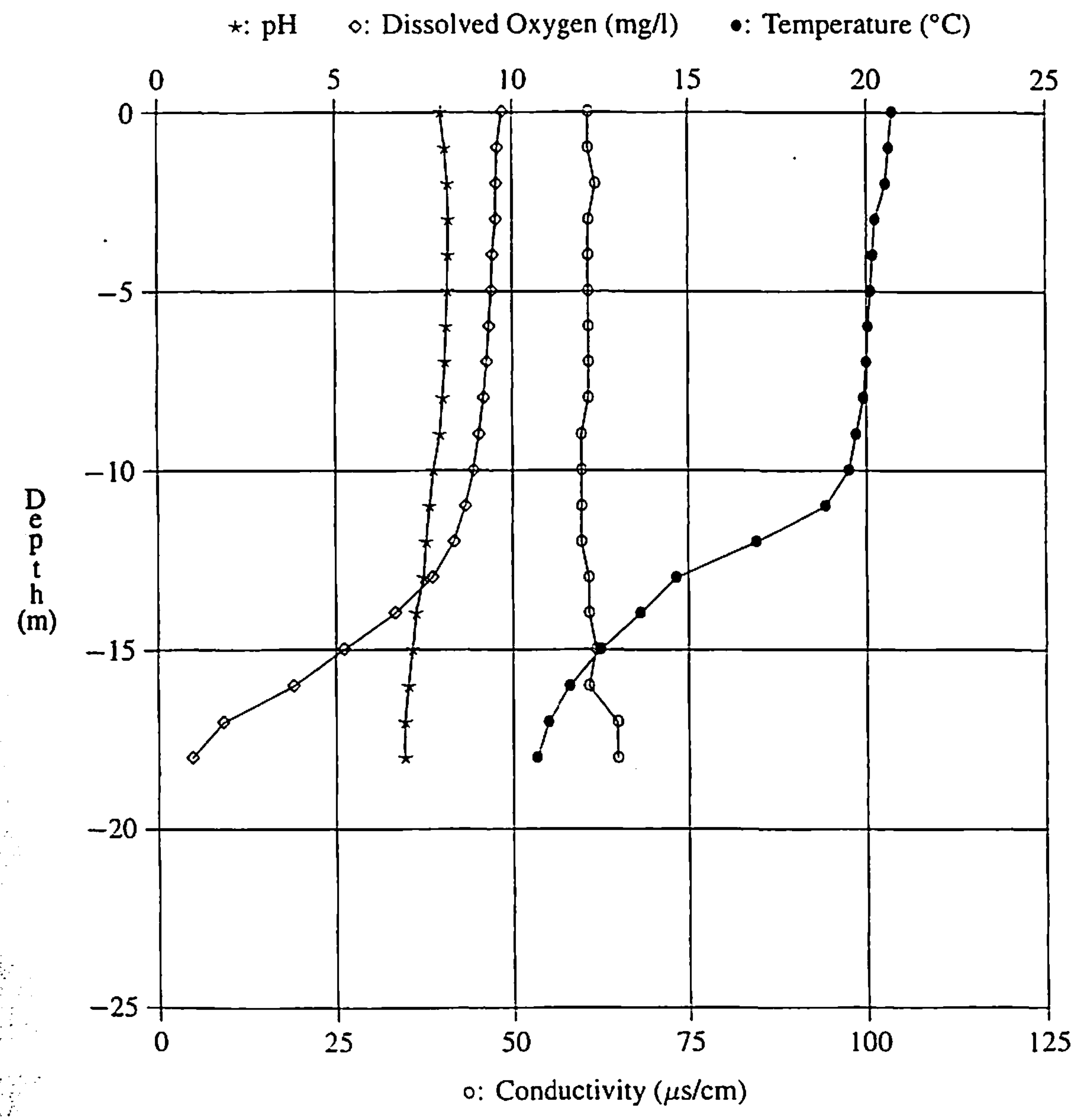


Figure 11: Lake Whatcom Hydrolab profile for Site 2, September 10, 1997.

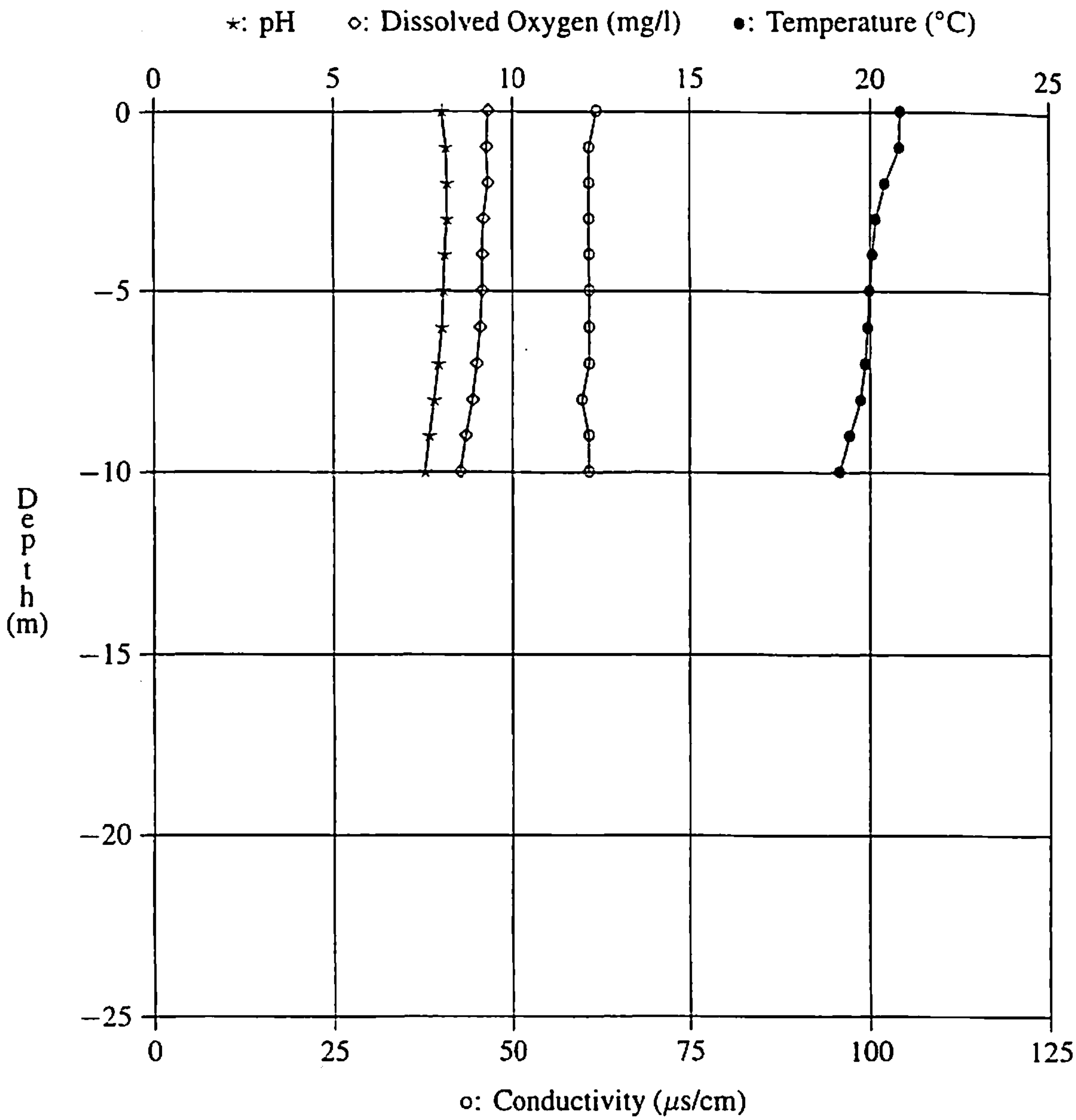


Figure 12: Lake Whatcom Hydrolab profile for the Intake site, September 10, 1997.

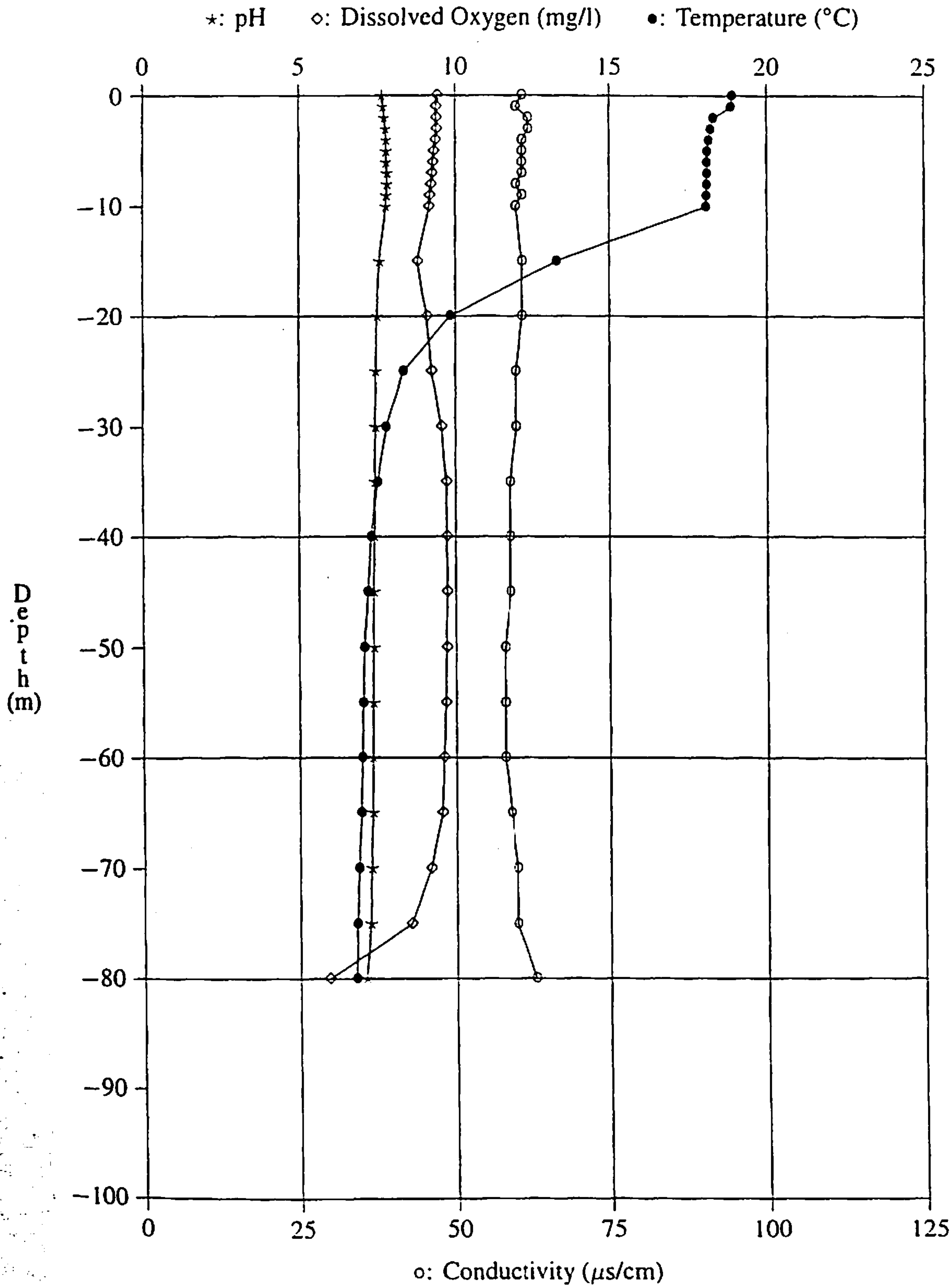


Figure 13: Lake Whatcom Hydrolab profile for Site 3, September 18, 1997.

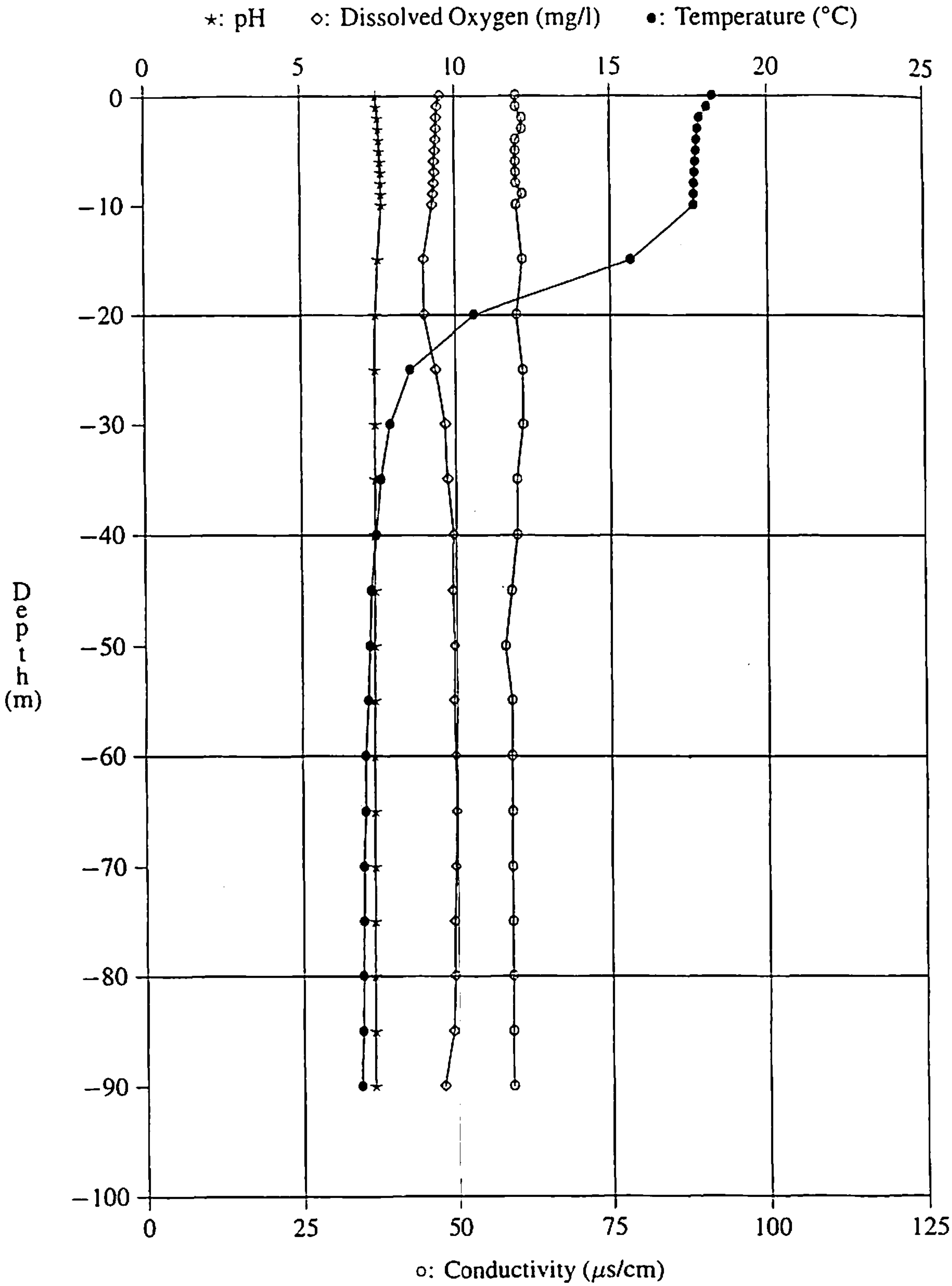


Figure 14: Lake Whatcom Hydrolab profile for Site 4, September 18, 1997.

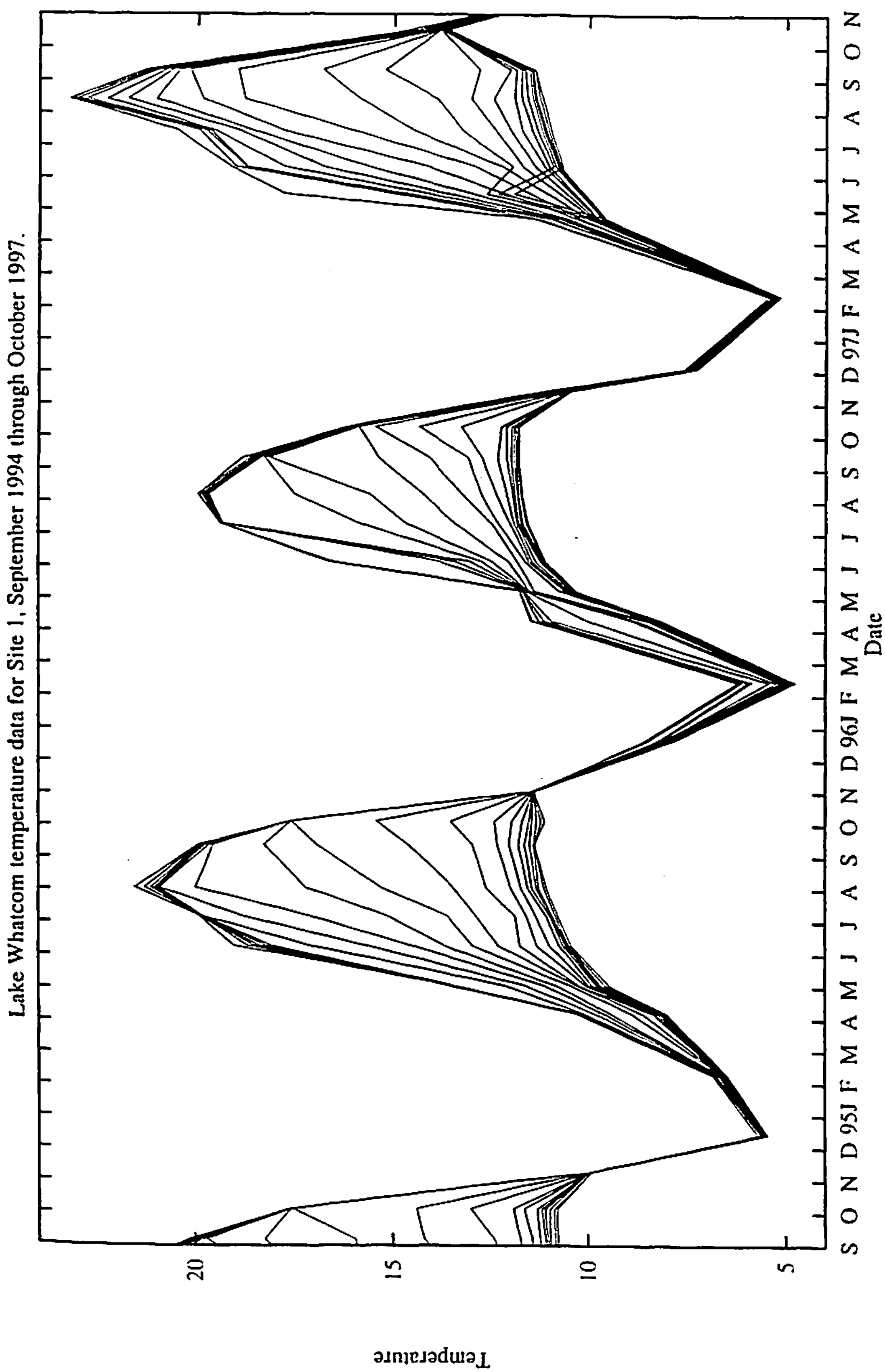


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Figure 15: Lake Whatcom temperature data for Site 1.

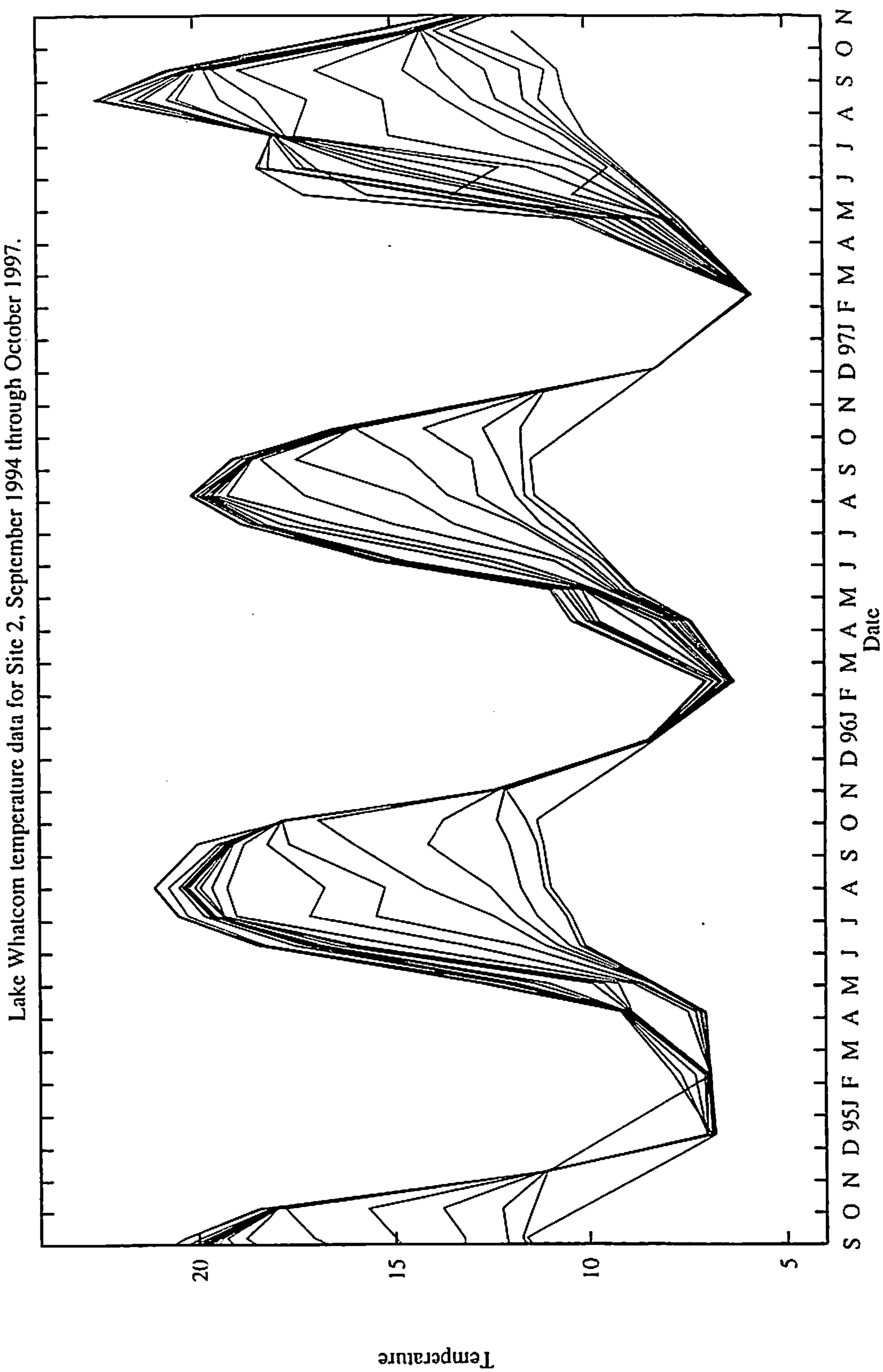


Figure 16: Lake Whatcom temperature data for Site 2.

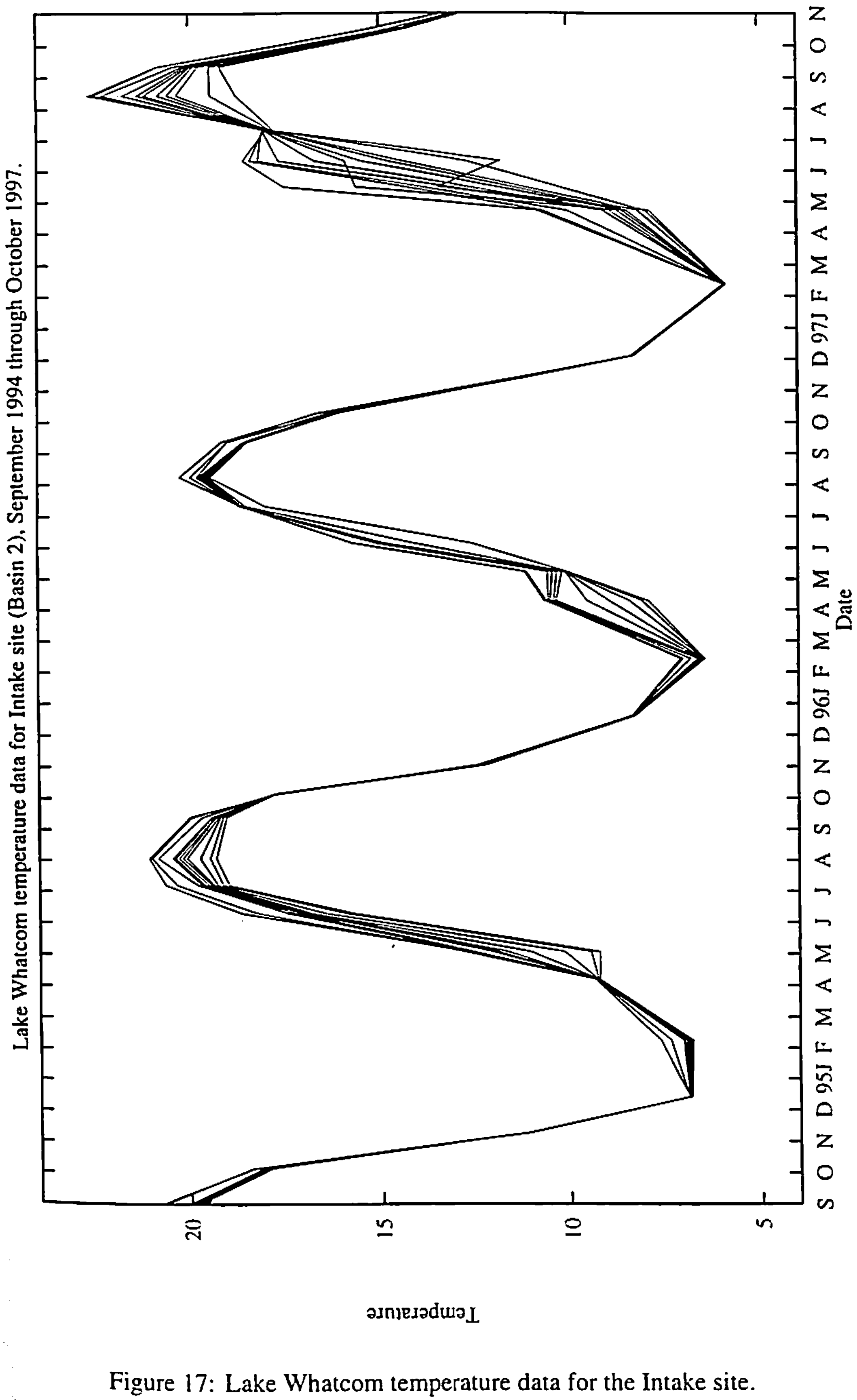


Figure 17: Lake Whatcom temperature data for the Intake site.

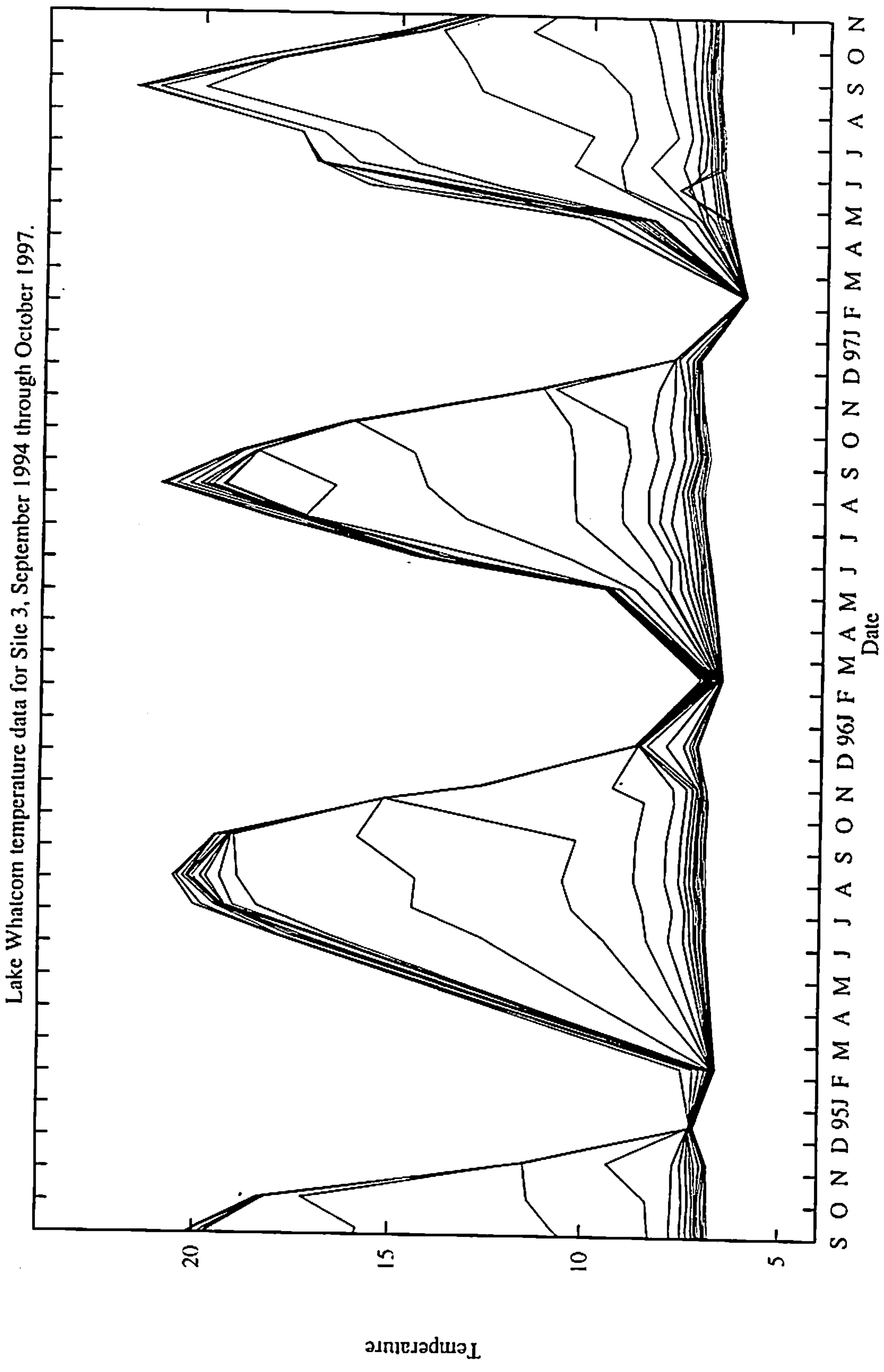


Figure 18: Lake Whatcom temperature data for Site 3.

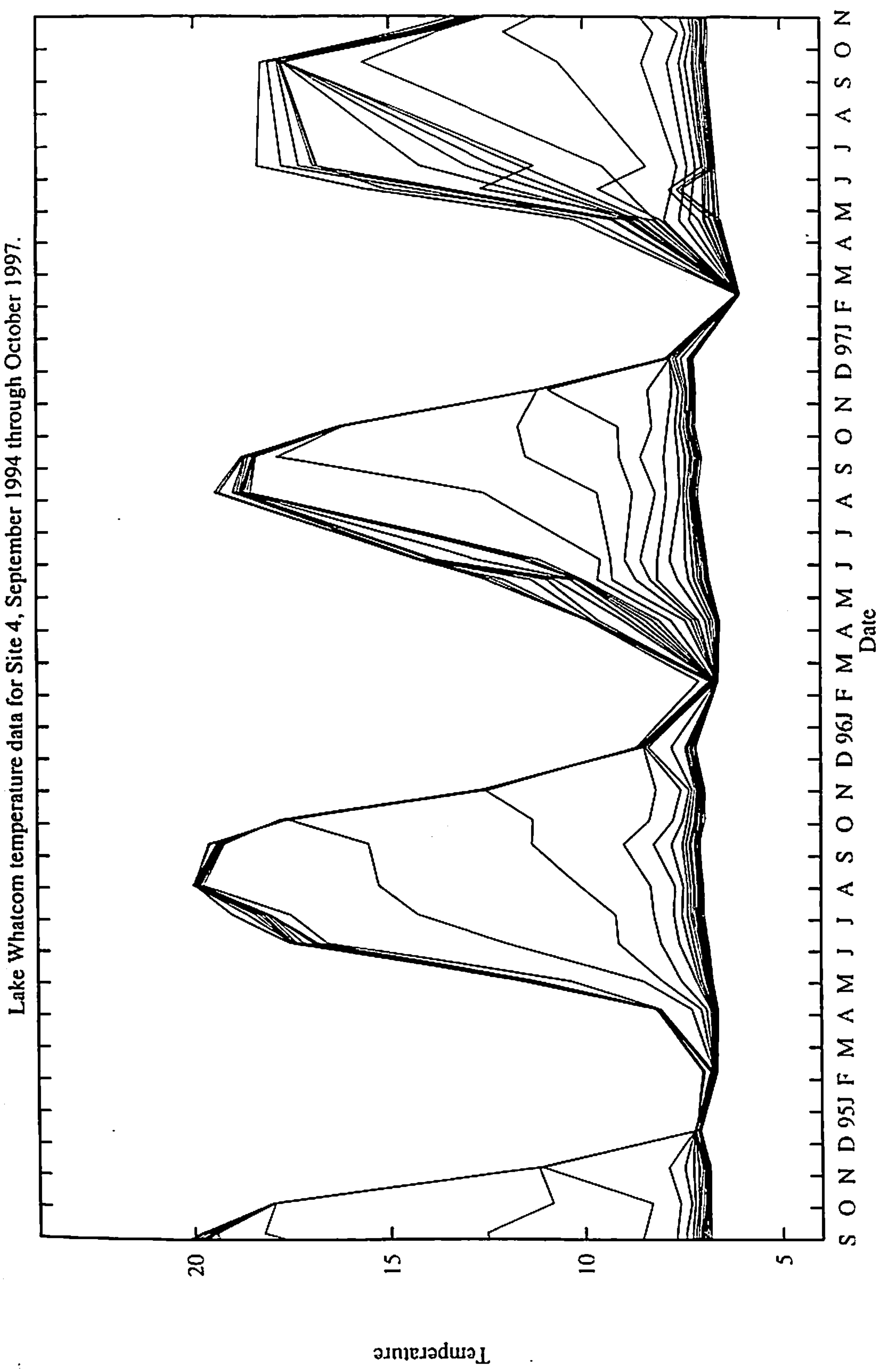


Figure 19: Lake Whatcom temperature data for Site 4.

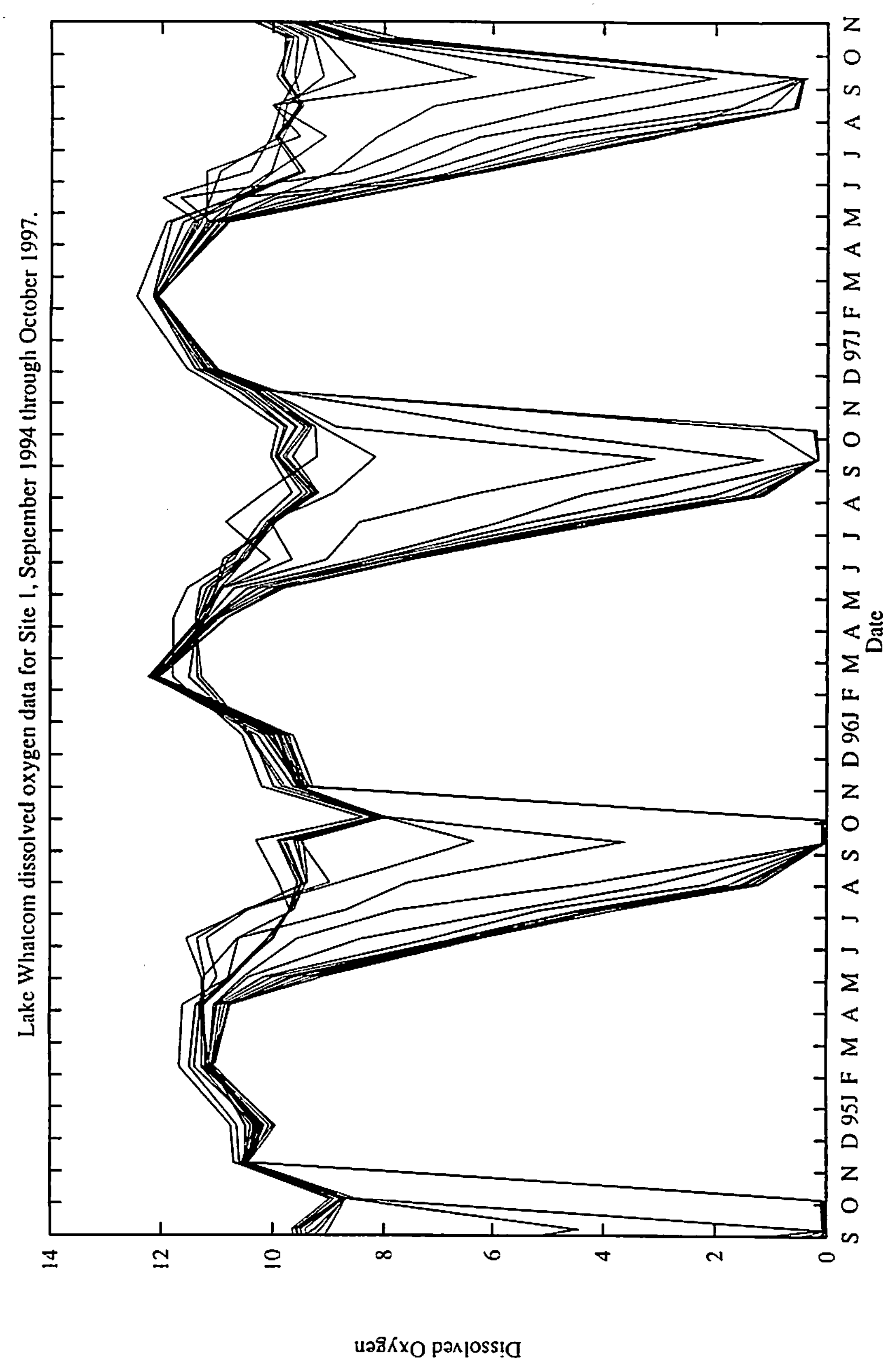


Figure 20: Lake Whatcom dissolved oxygen data for Site 1.

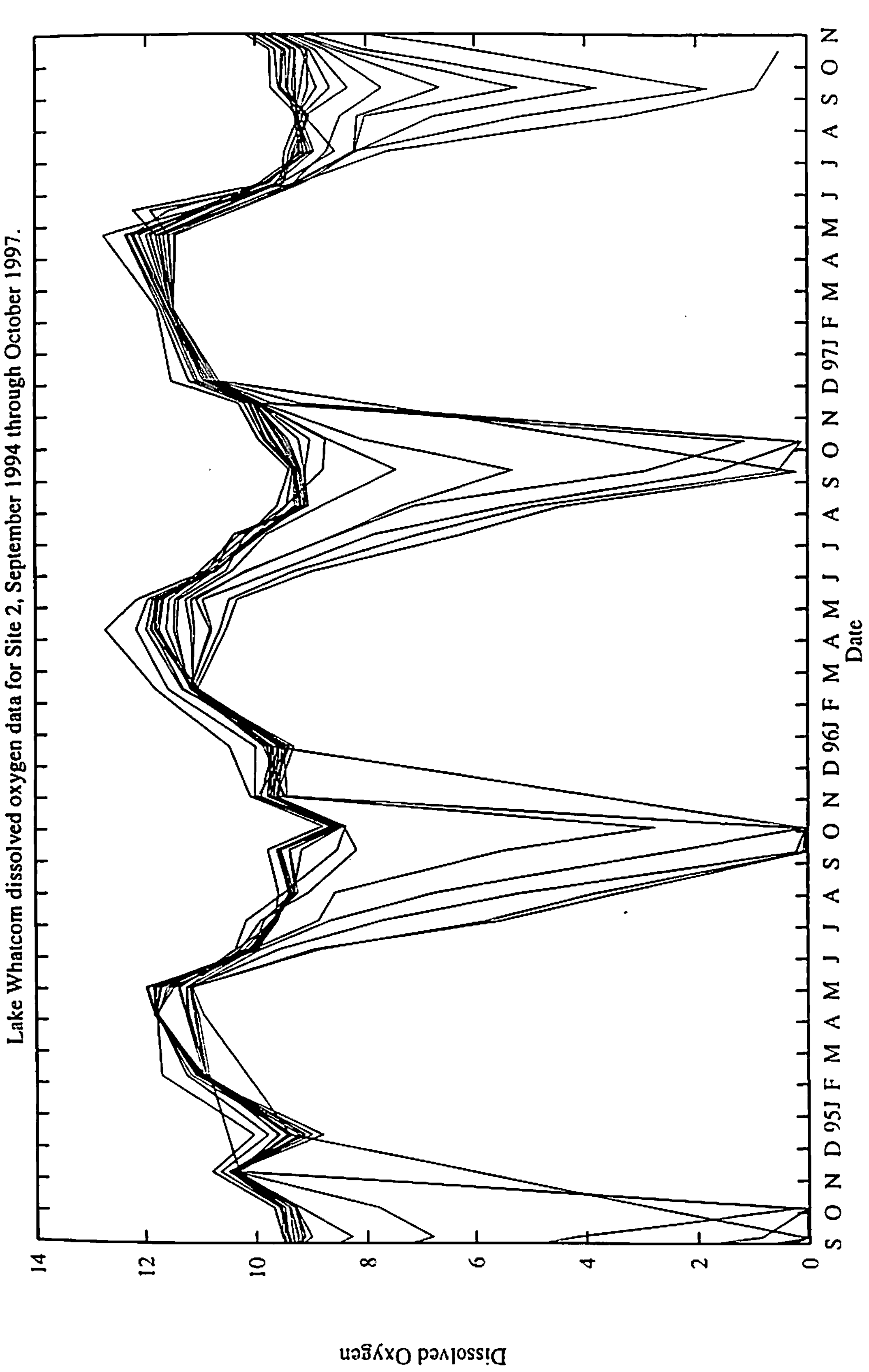


Figure 21: Lake Whatcom dissolved oxygen data for Site 2.

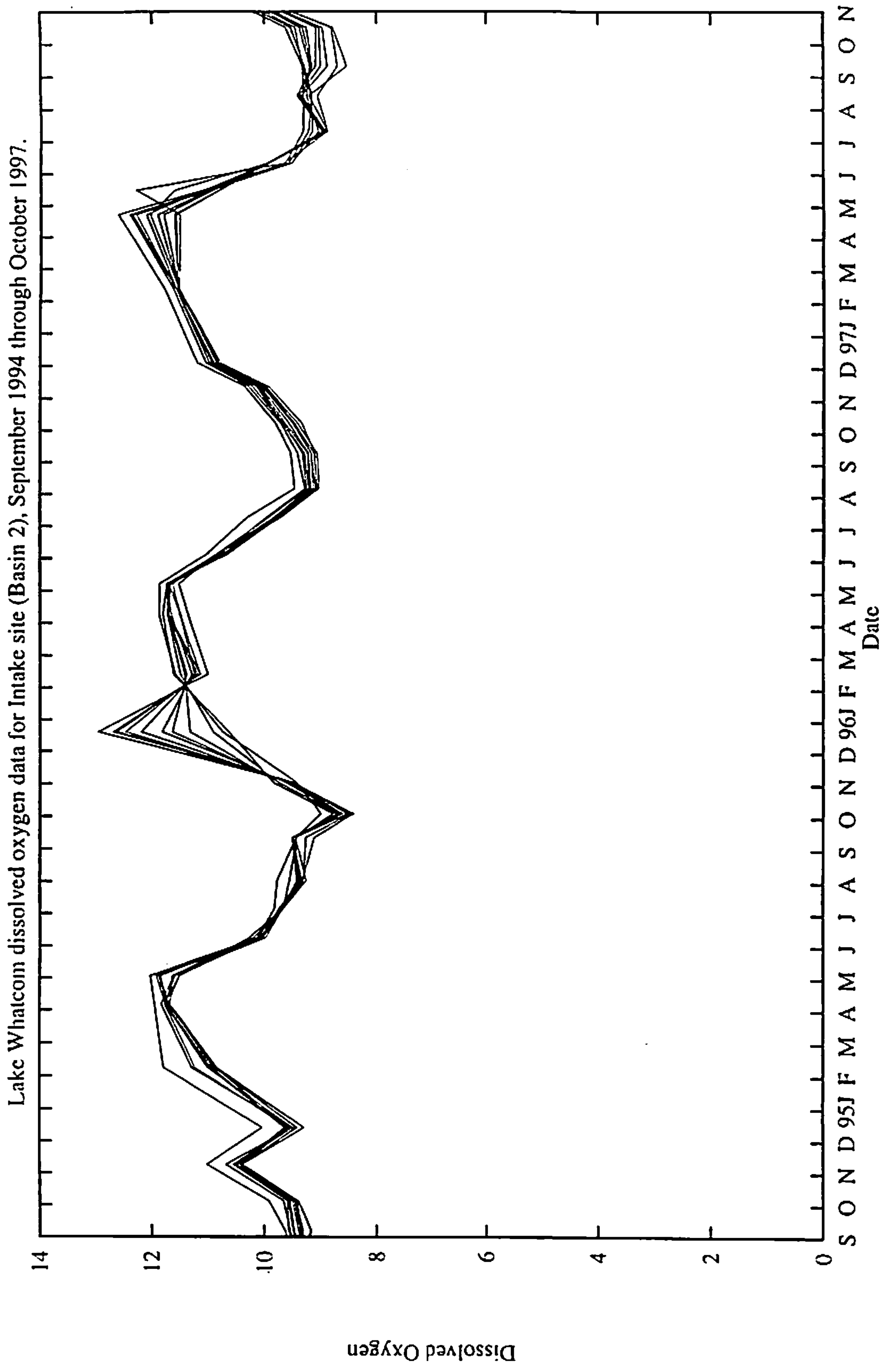


Figure 22: Lake Whatcom dissolved oxygen data for the Intake site.

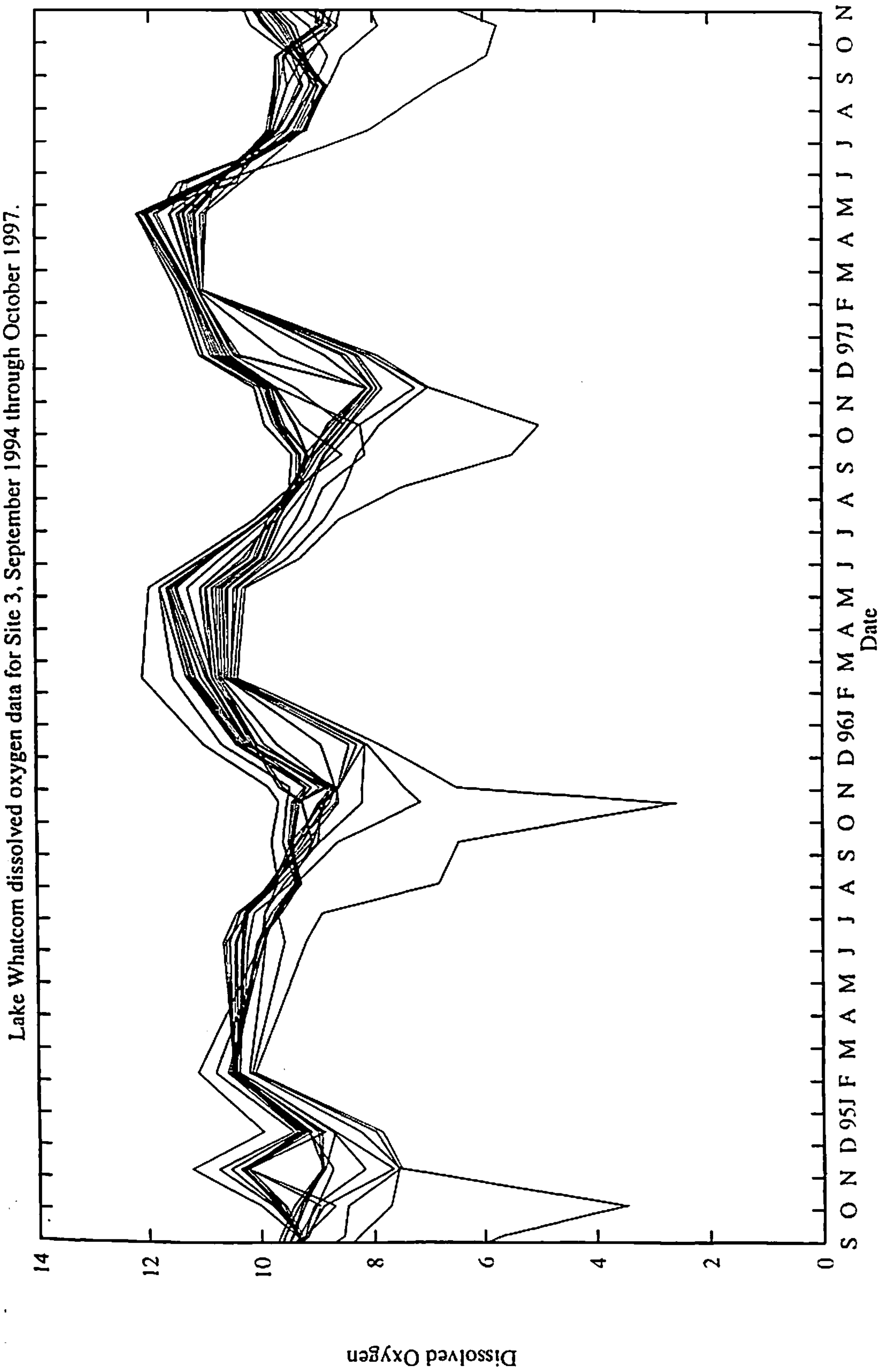


Figure 23: Lake Whatcom dissolved oxygen data for Site 3.

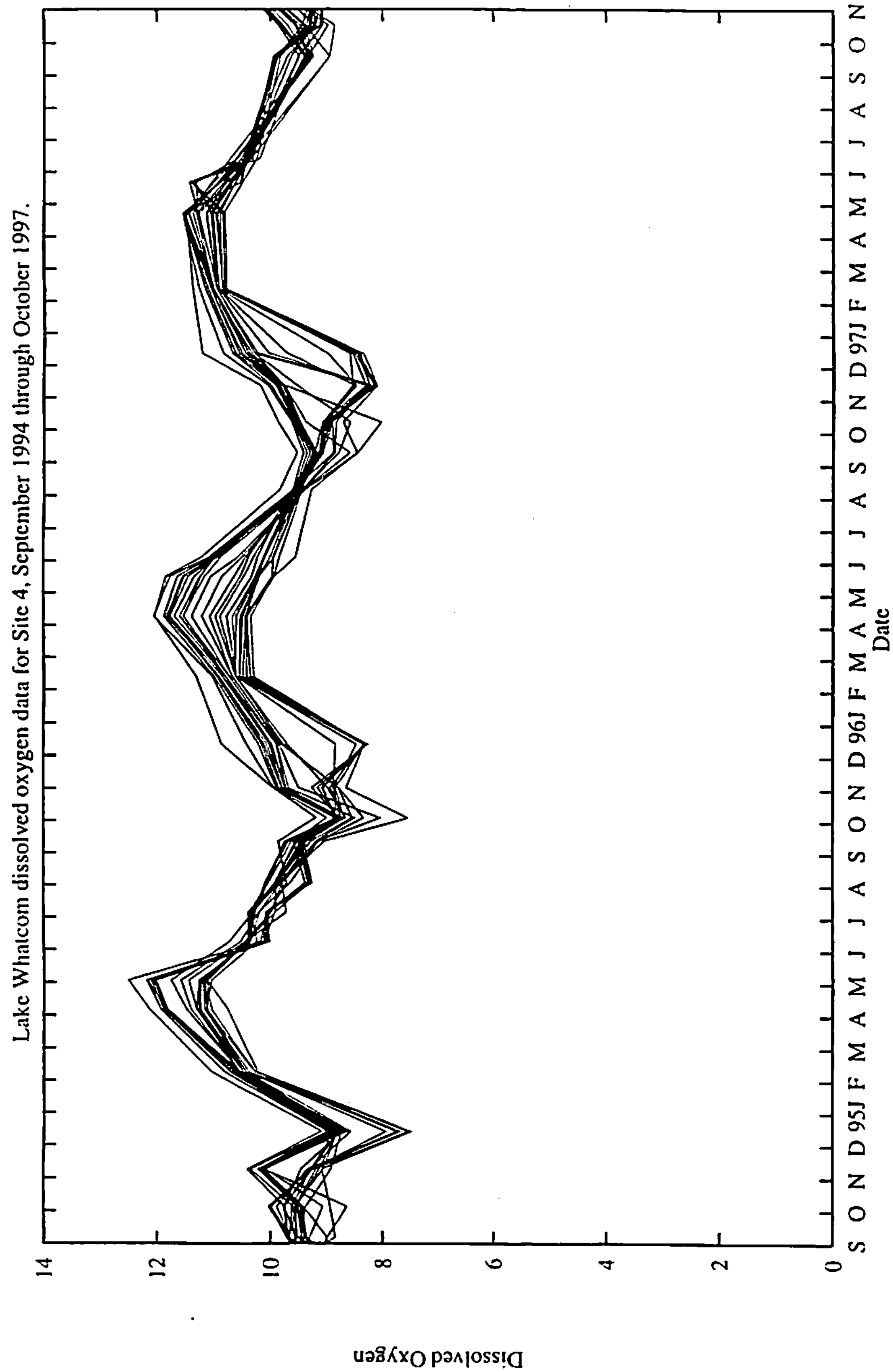


Figure 24: Lake Whatcom dissolved oxygen data for Site 4.

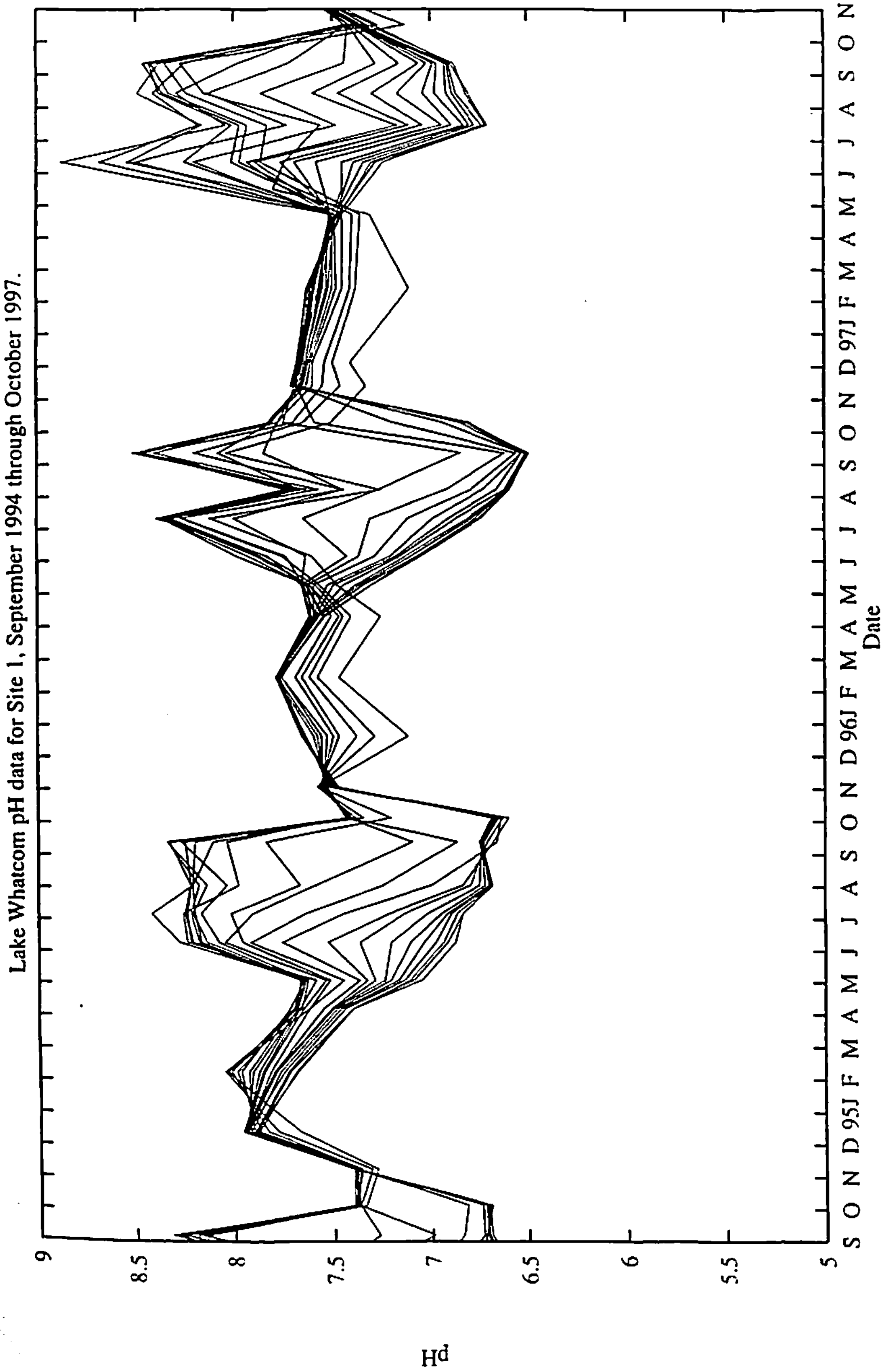


Figure 25: Lake Whatcom pH data for Site 1.

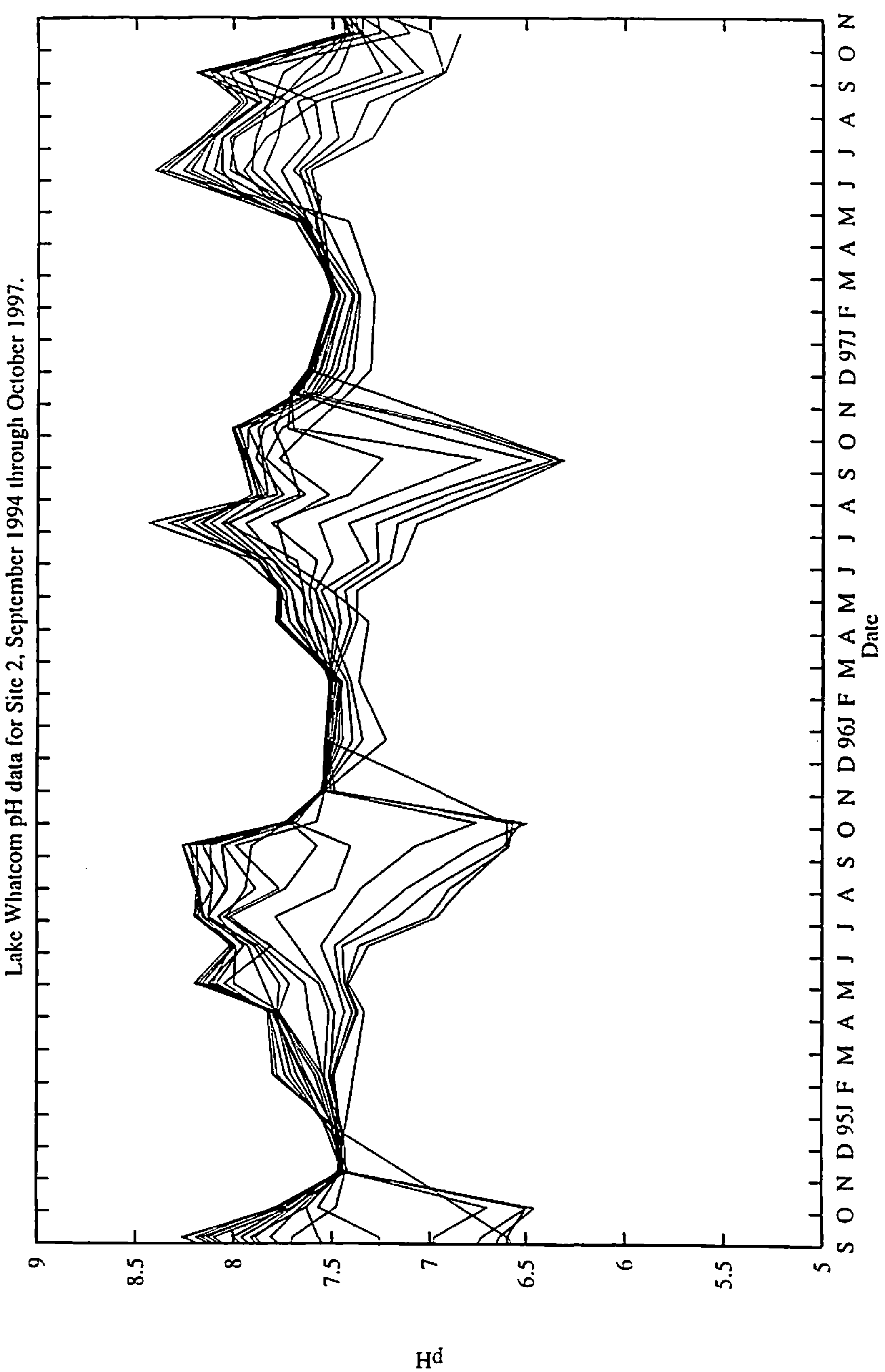


Figure 26: Lake Whatcom pH data for Site 2.

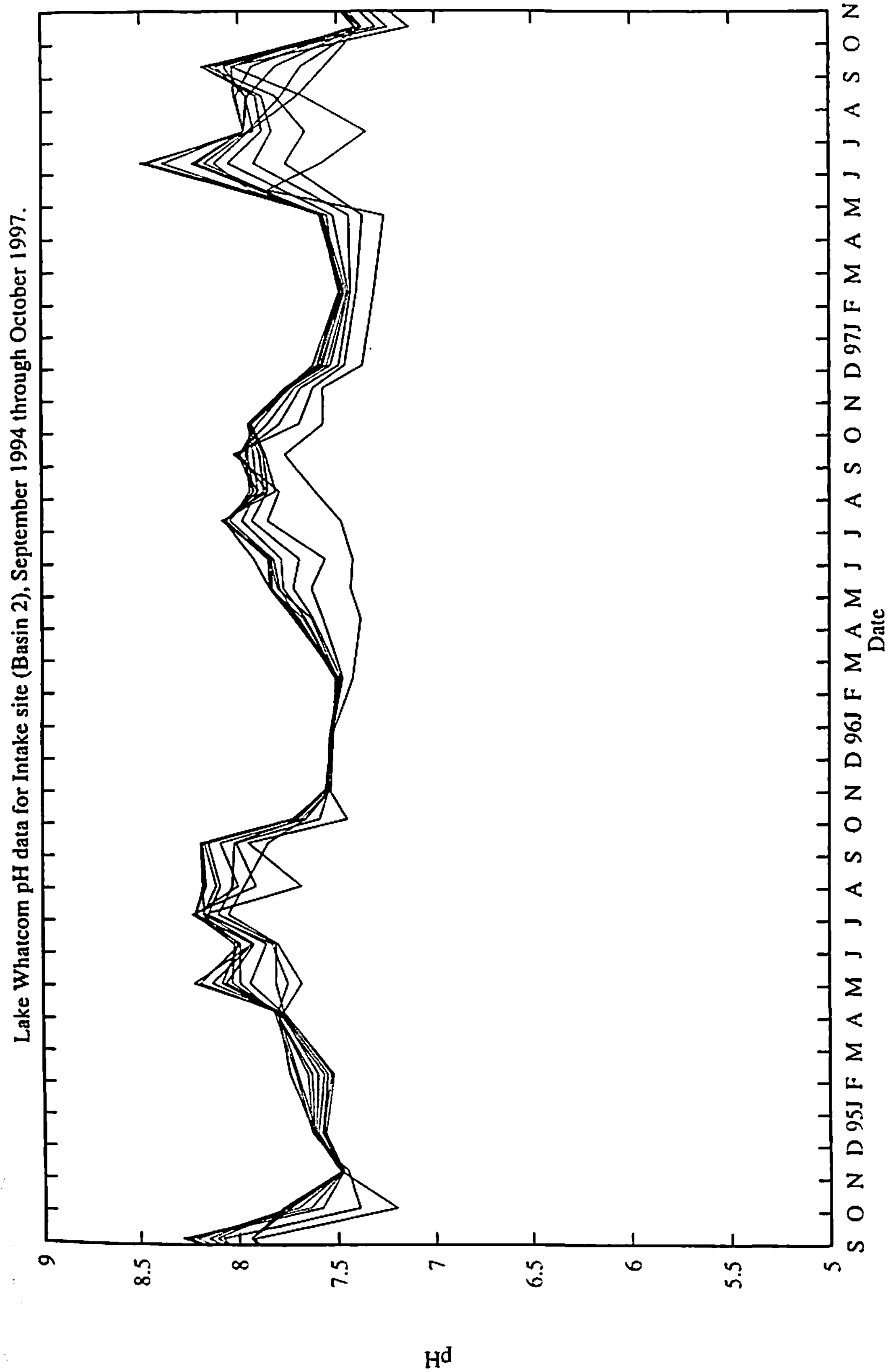


Figure 27: Lake Whatcom pH data for the Intake site.

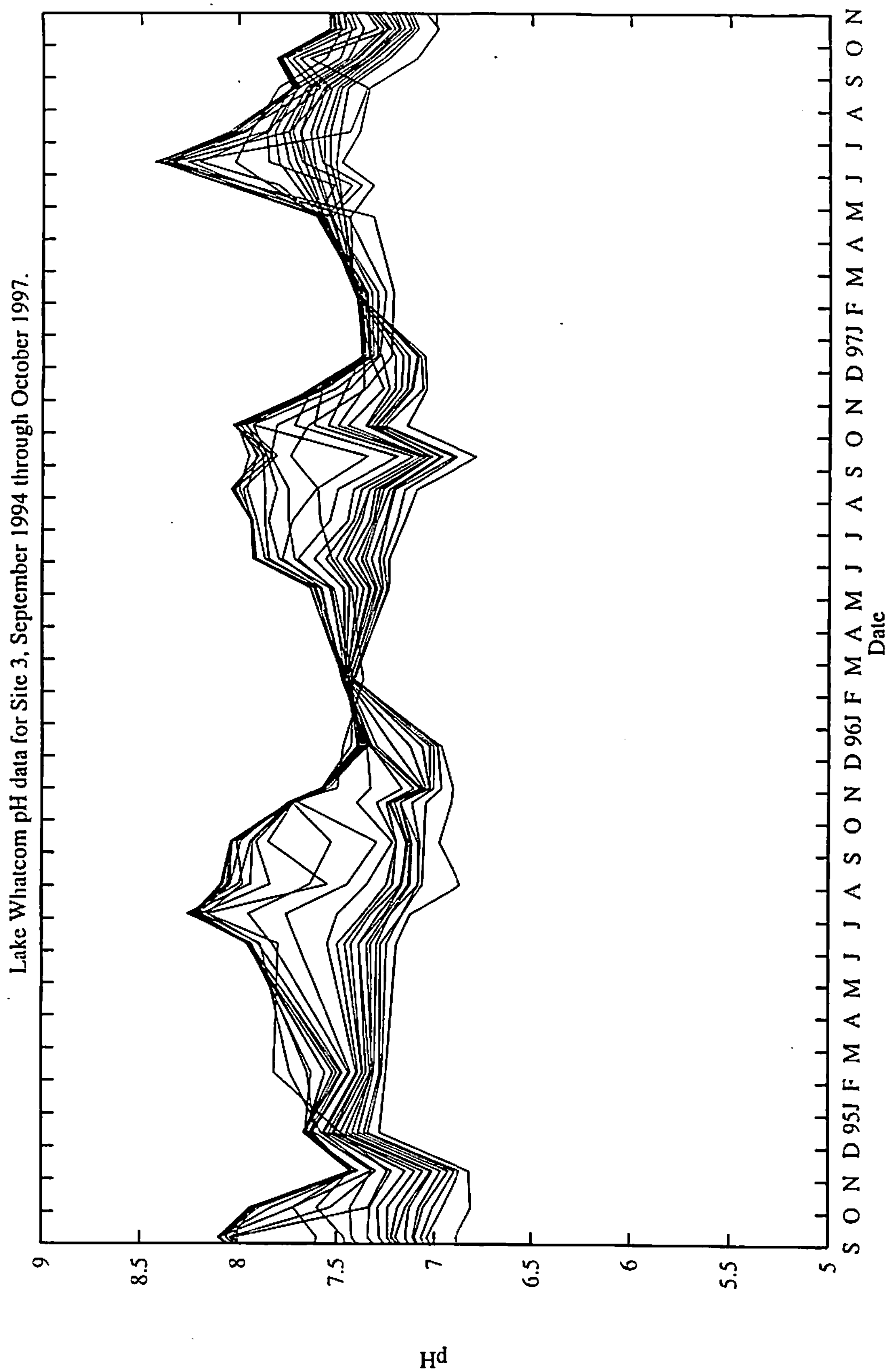


Figure 28: Lake Whatcom pH data for Site 3.

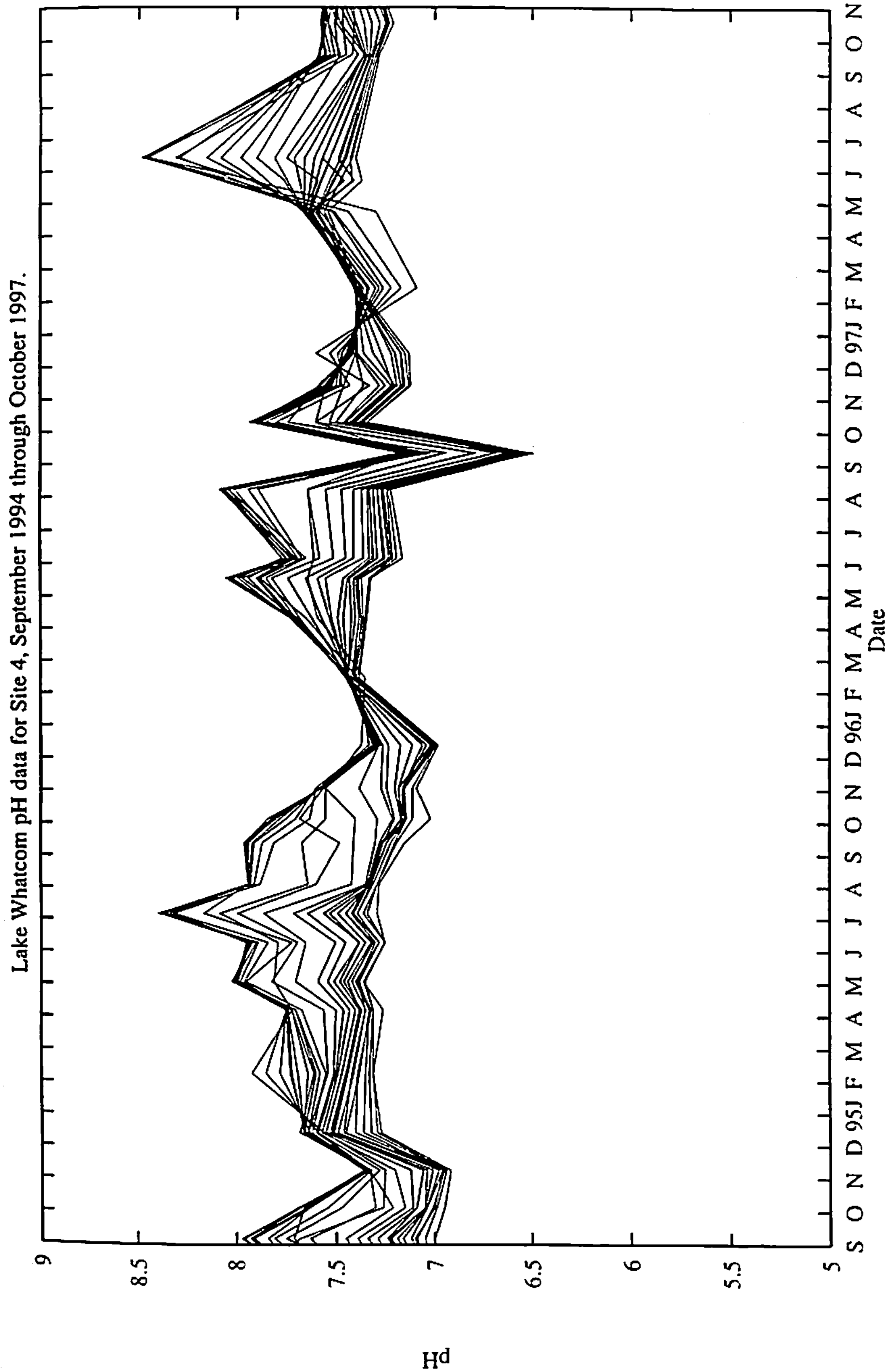


Figure 29: Lake Whatcom pH data for Site 4.

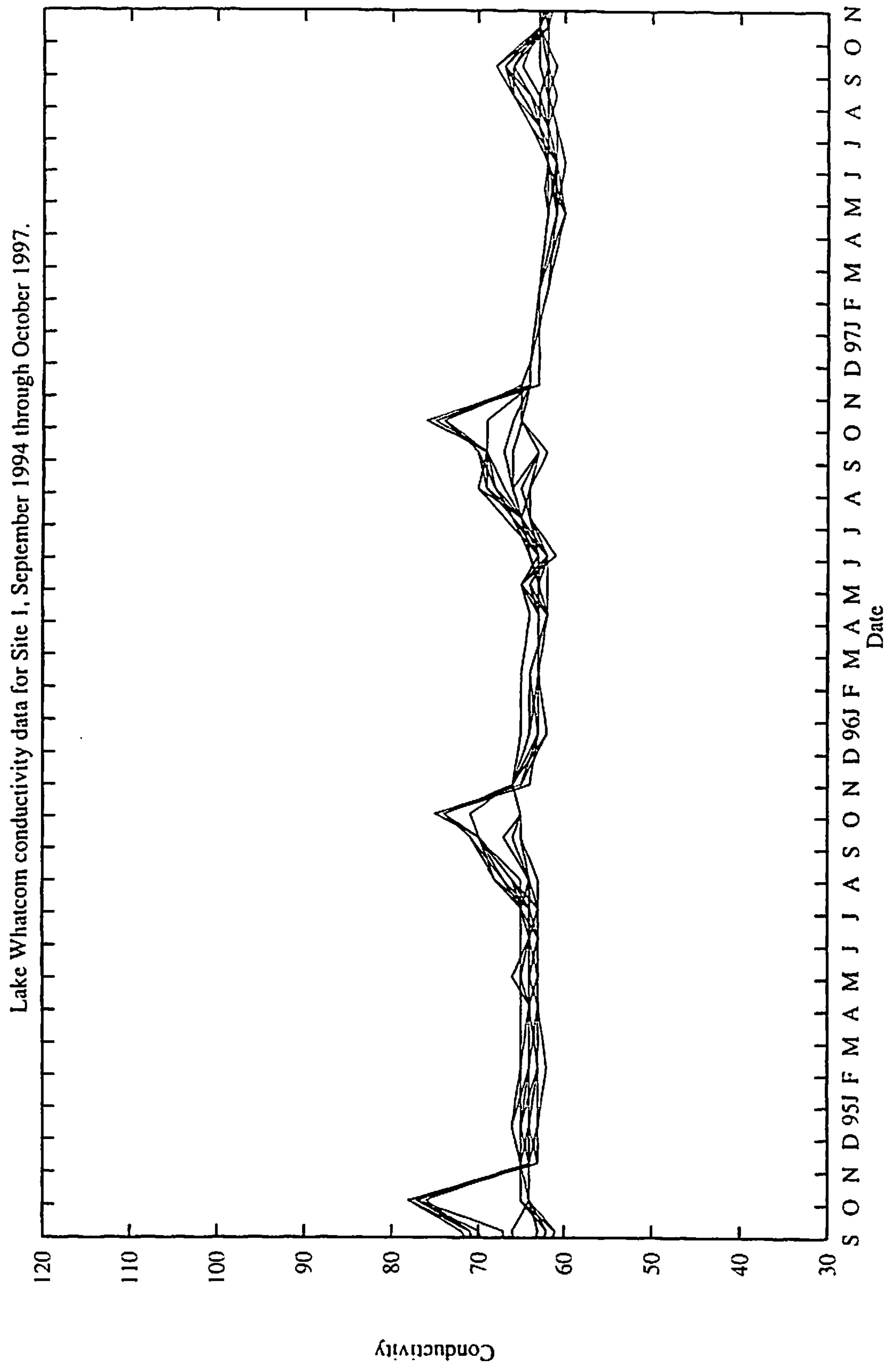


Figure 30: Lake Whatcom conductivity data for Site 1.

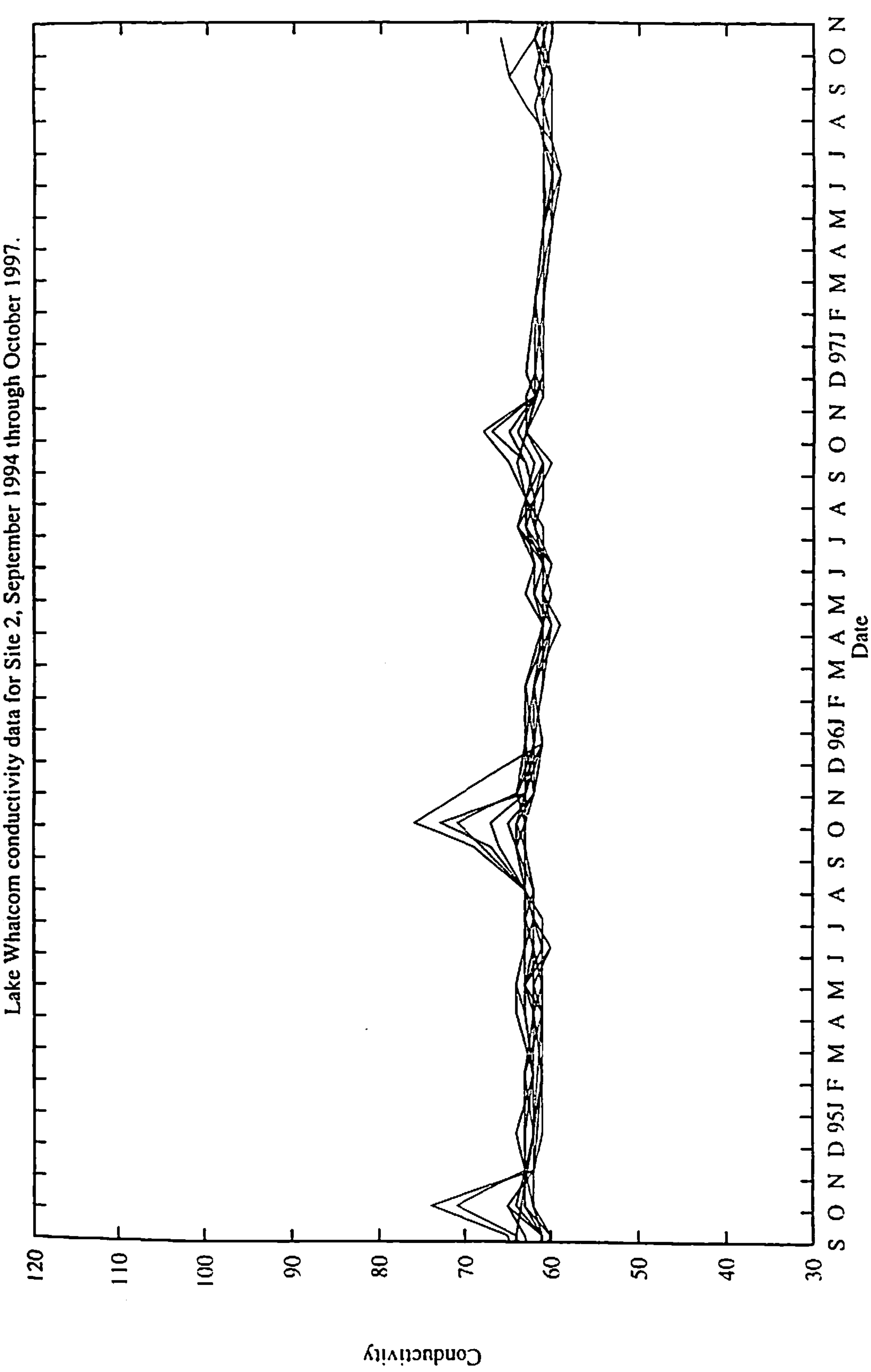


Figure 31: Lake Whatcom conductivity data for Site 2.

Lake Whatcom conductivity data for Intake site (Basin 2), September 1994 through October 1997.

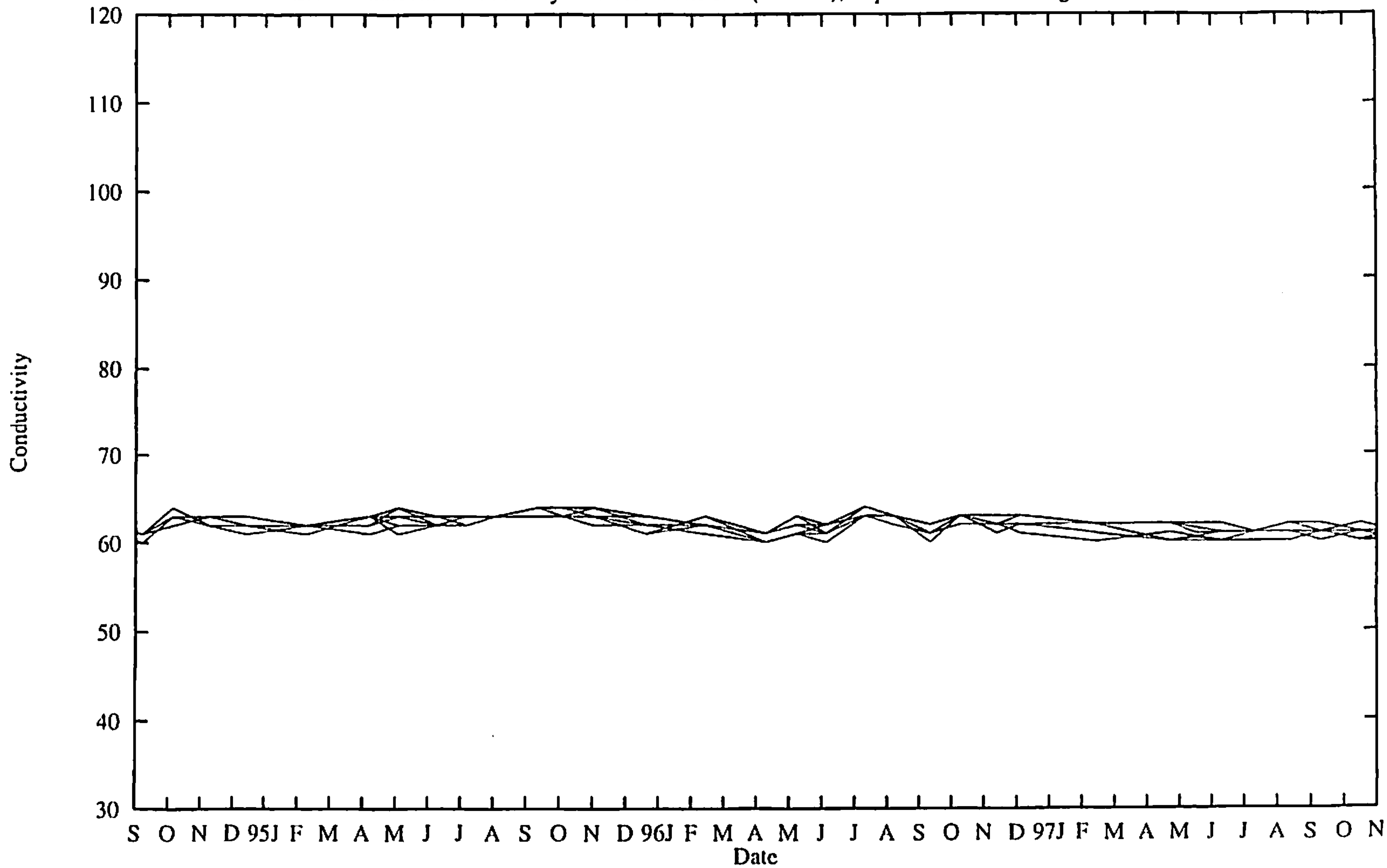


Figure 32: Lake Whatcom conductivity data for the Intake site.

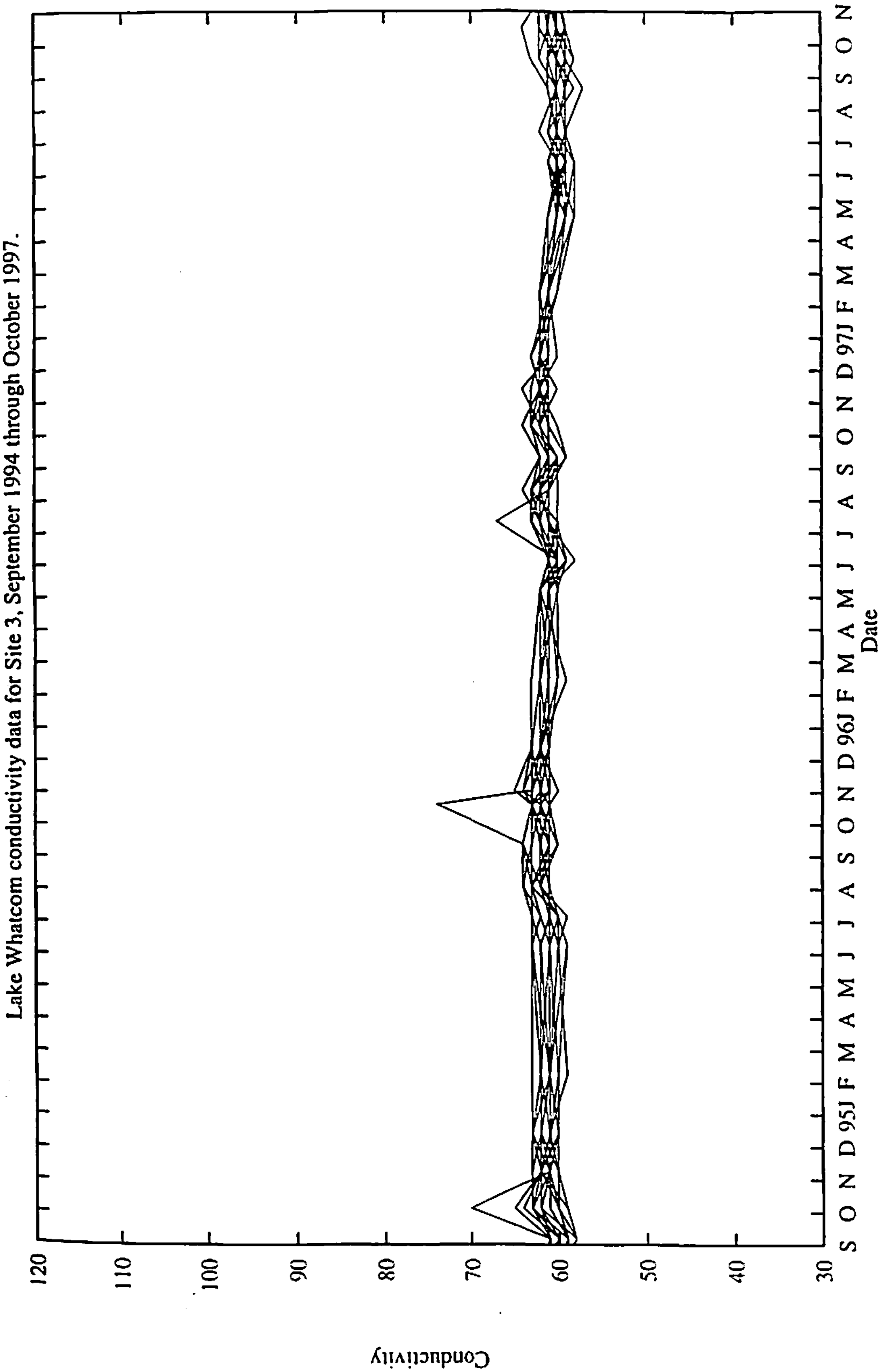


Figure 33: Lake Whatcom conductivity data for Site 3.

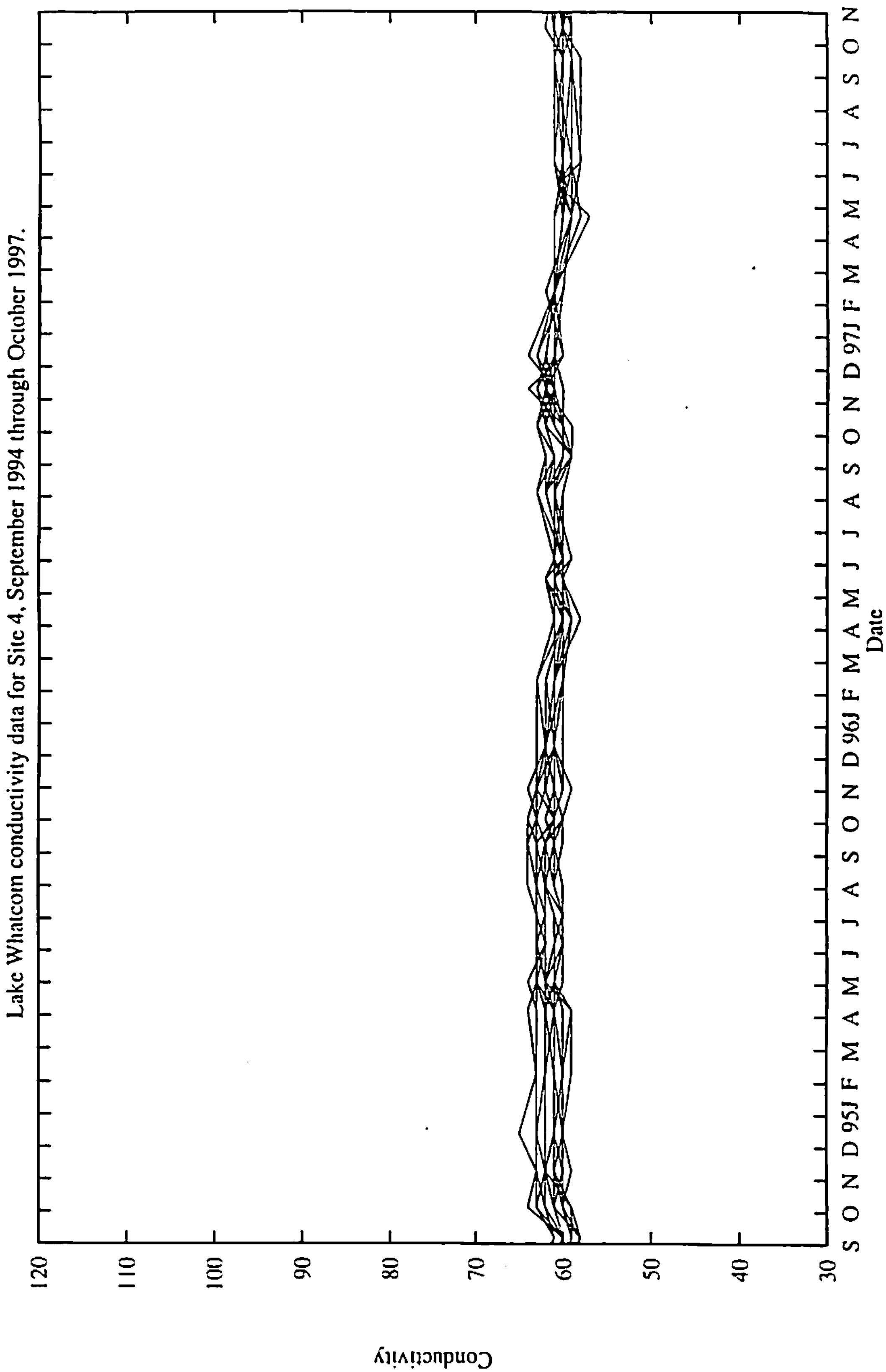


Figure 34: Lake Whatcom conductivity data for Site 4.

Lake Whatcom alkalinity data for Site 1, September 1994 through October 1997.

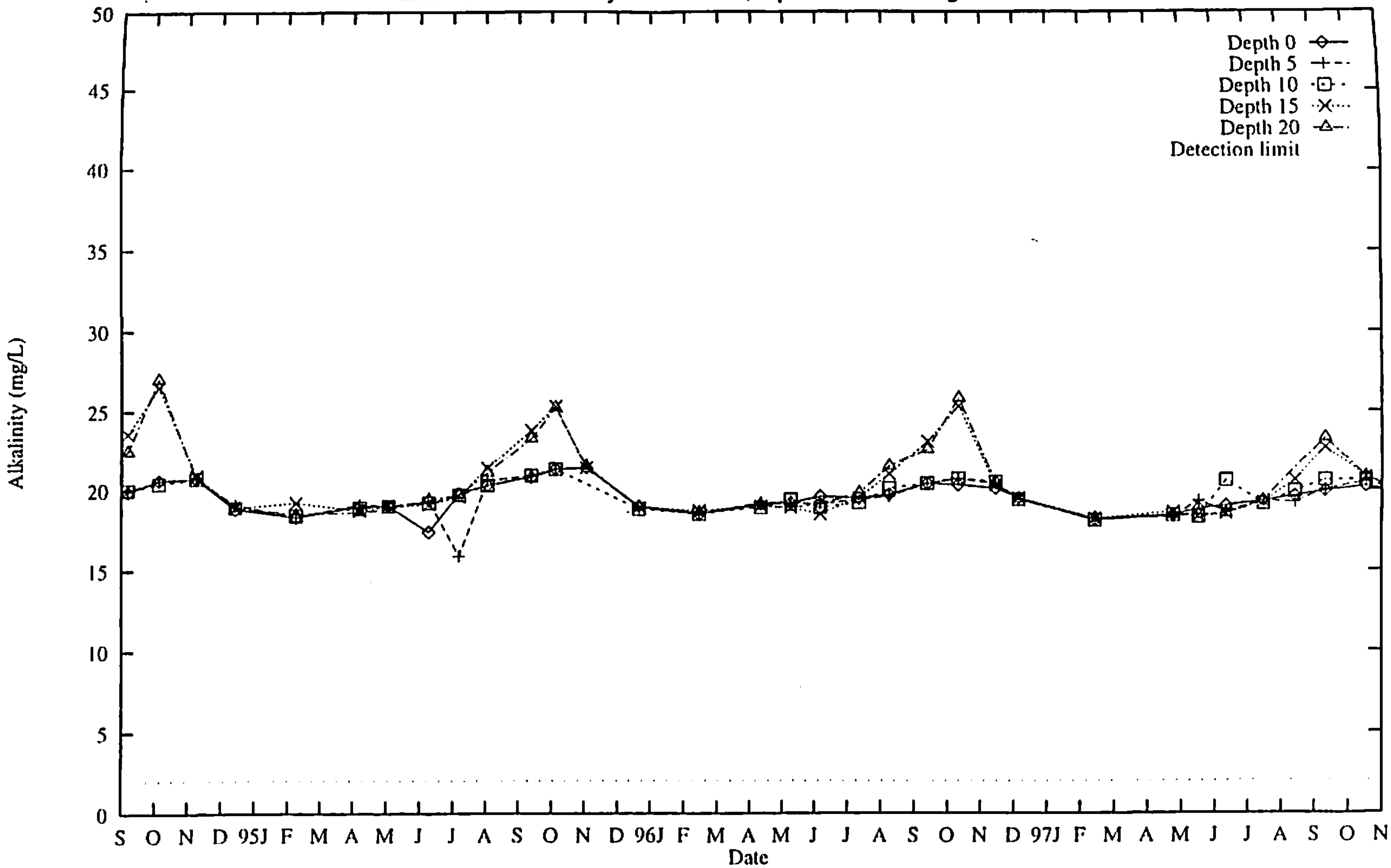


Figure 35: Lake Whatcom alkalinity data for Site 1.

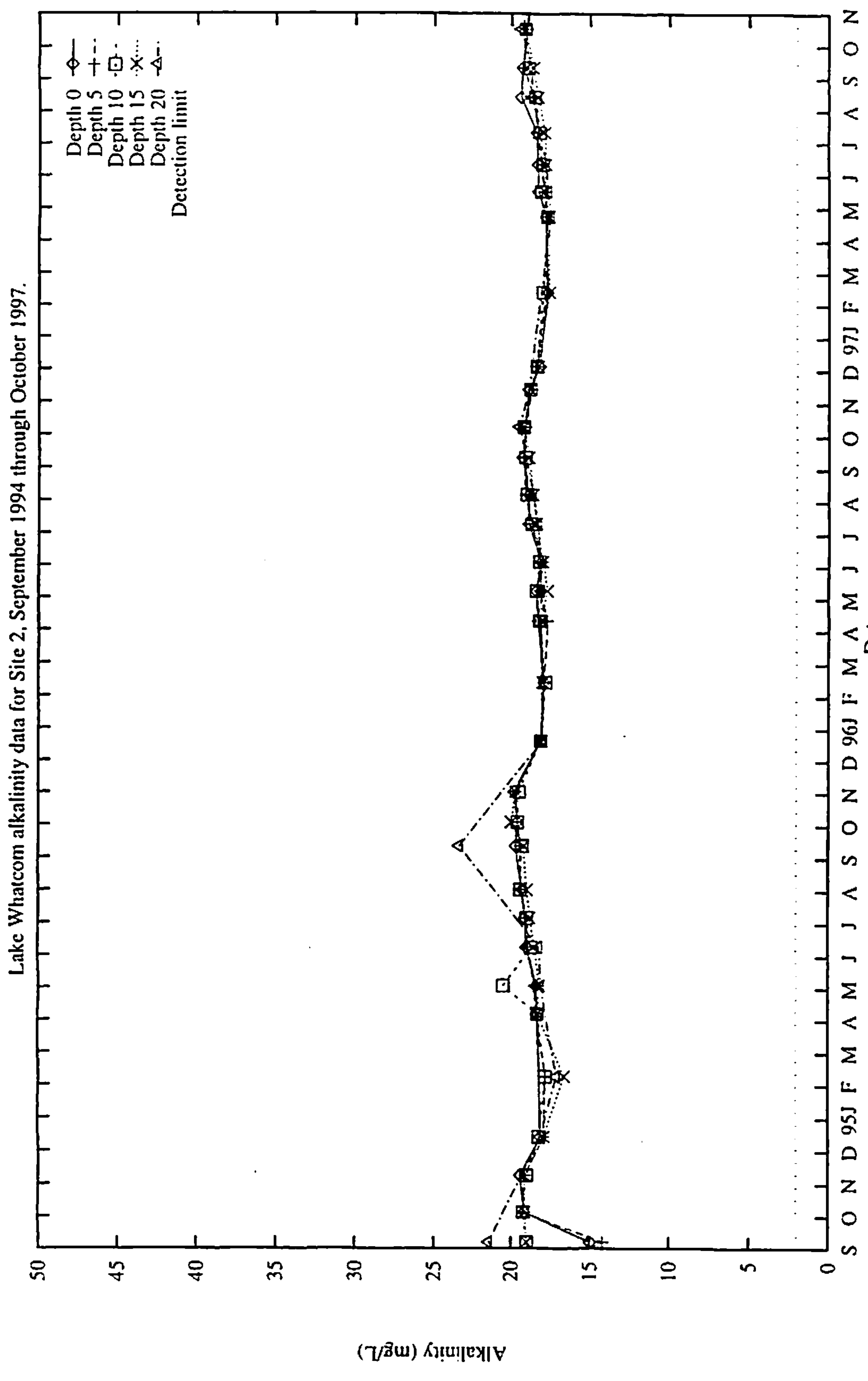


Figure 36: Lake Whatcom alkalinity data for Site 2.

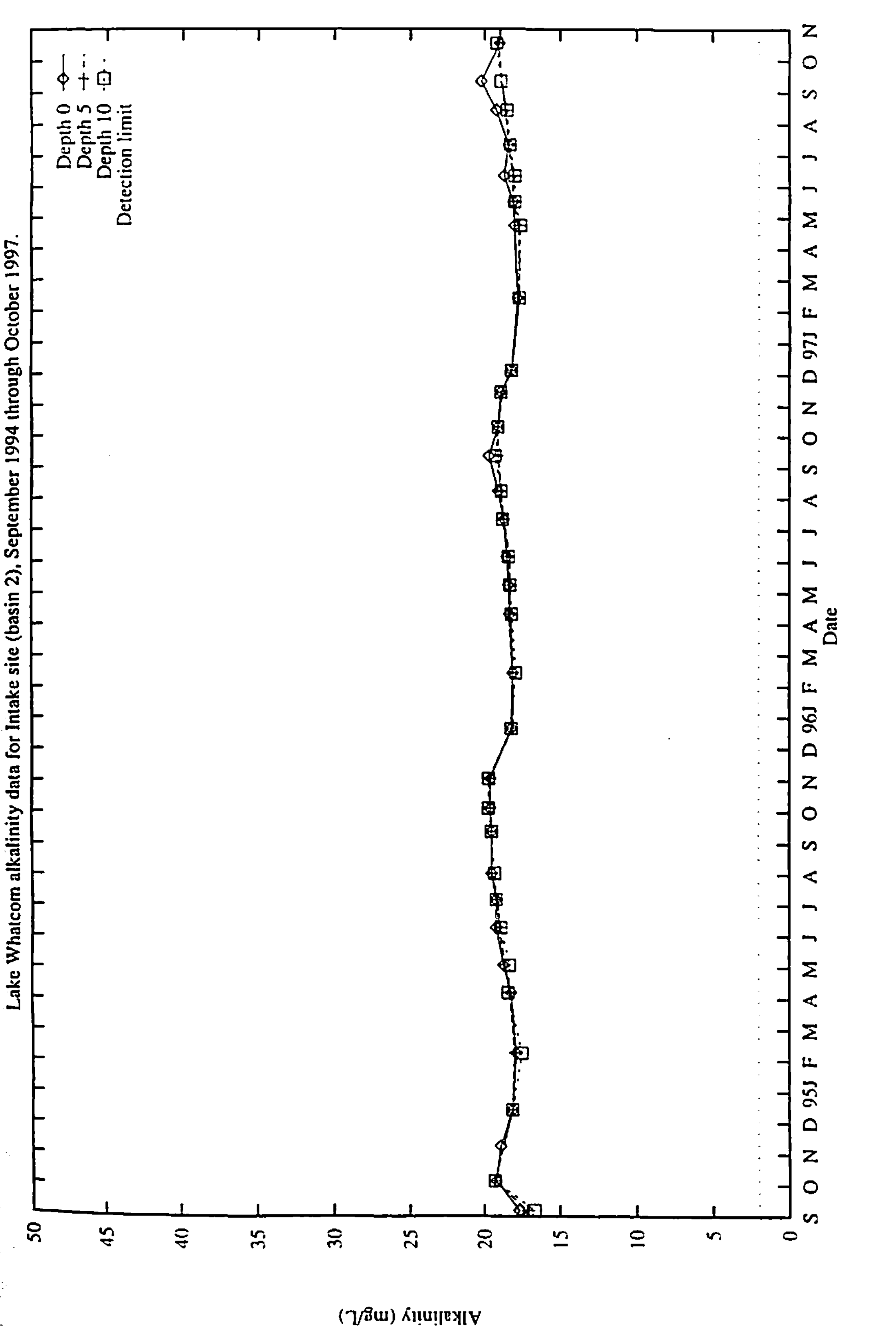


Figure 37: Lake Whatcom alkalinity data for the Intake site.

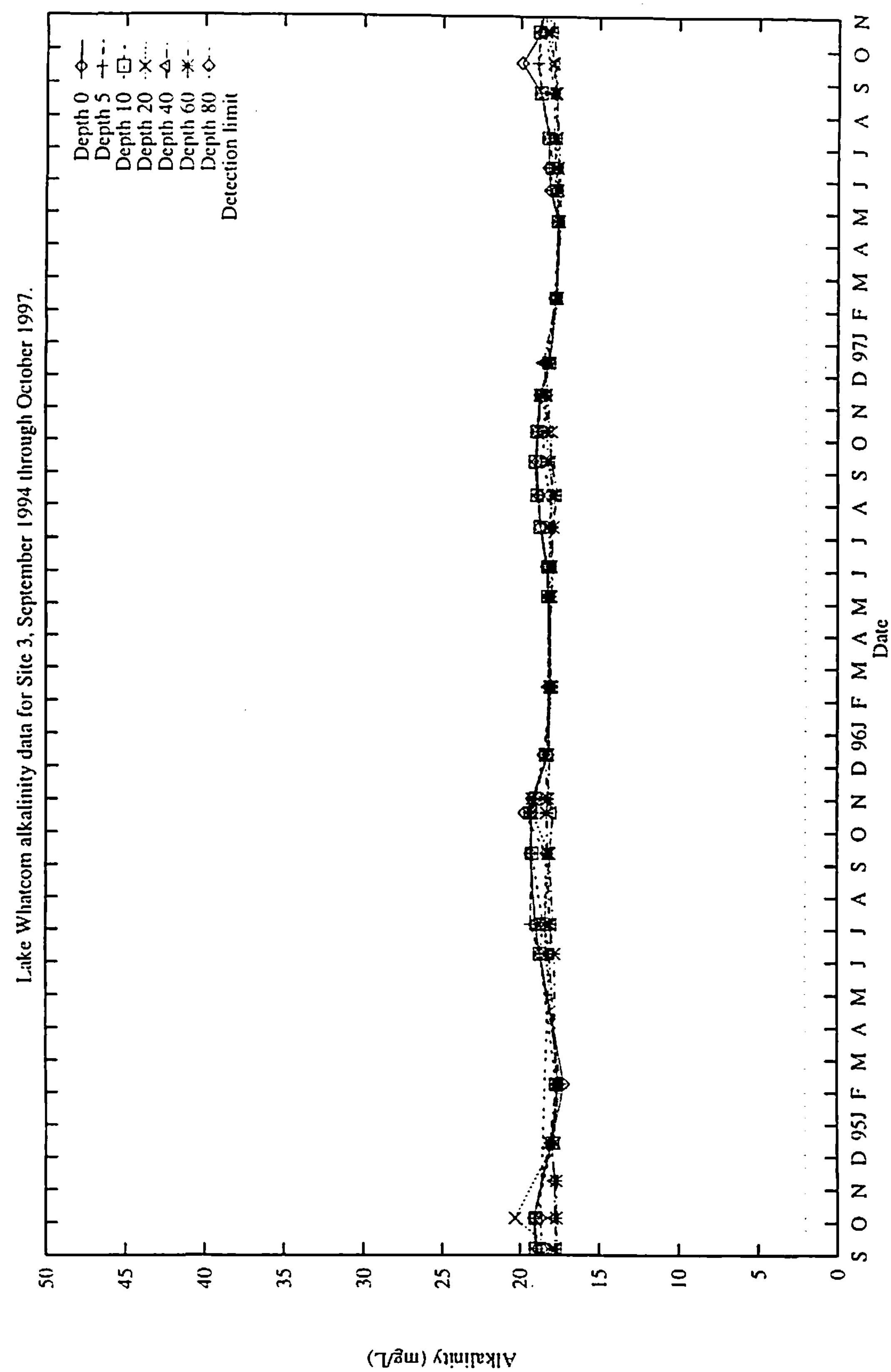


Figure 38: Lake Whatcom alkalinity data for Site 3.

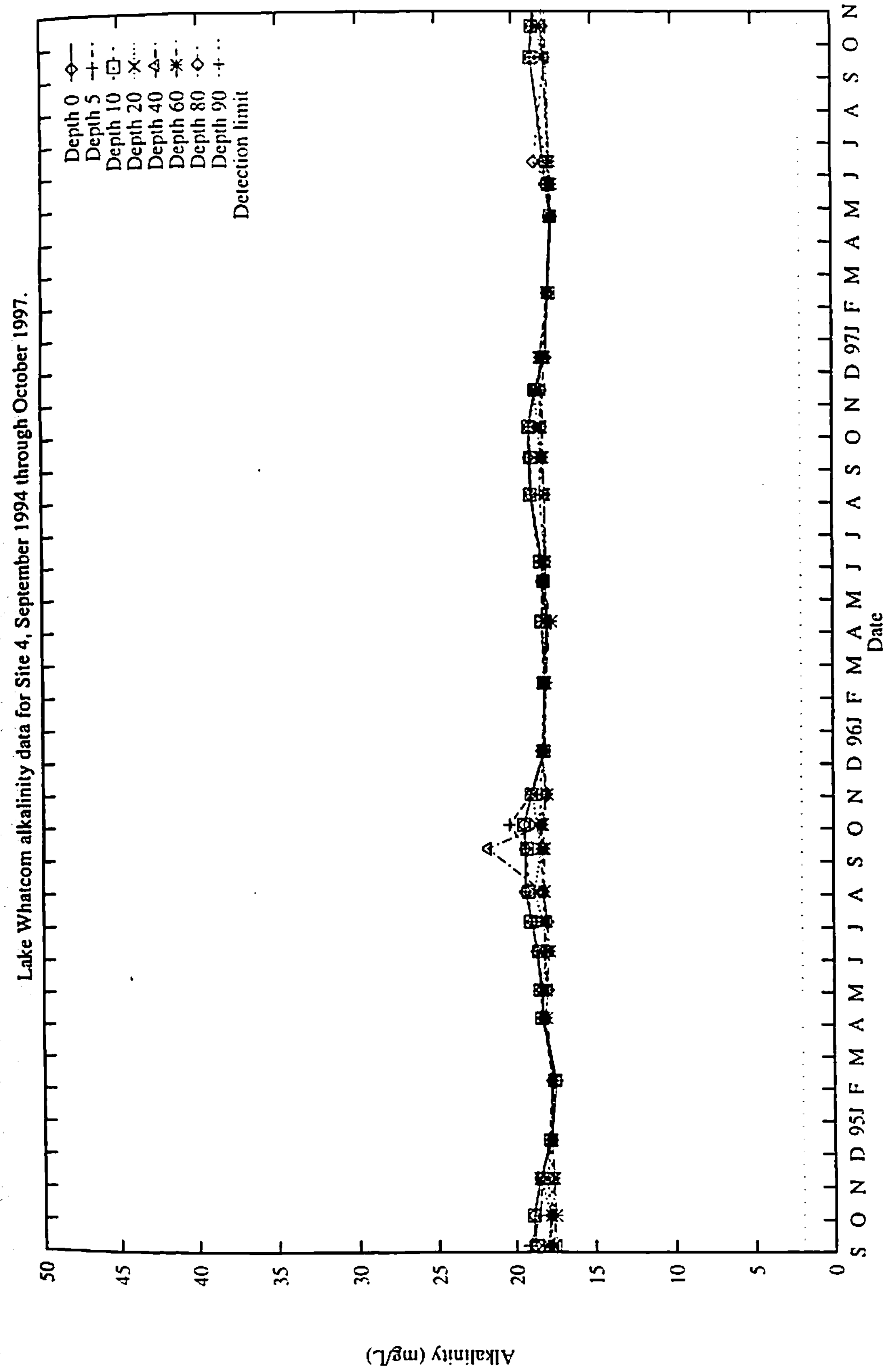


Figure 39: Lake Whatcom alkalinity data for Site 4.

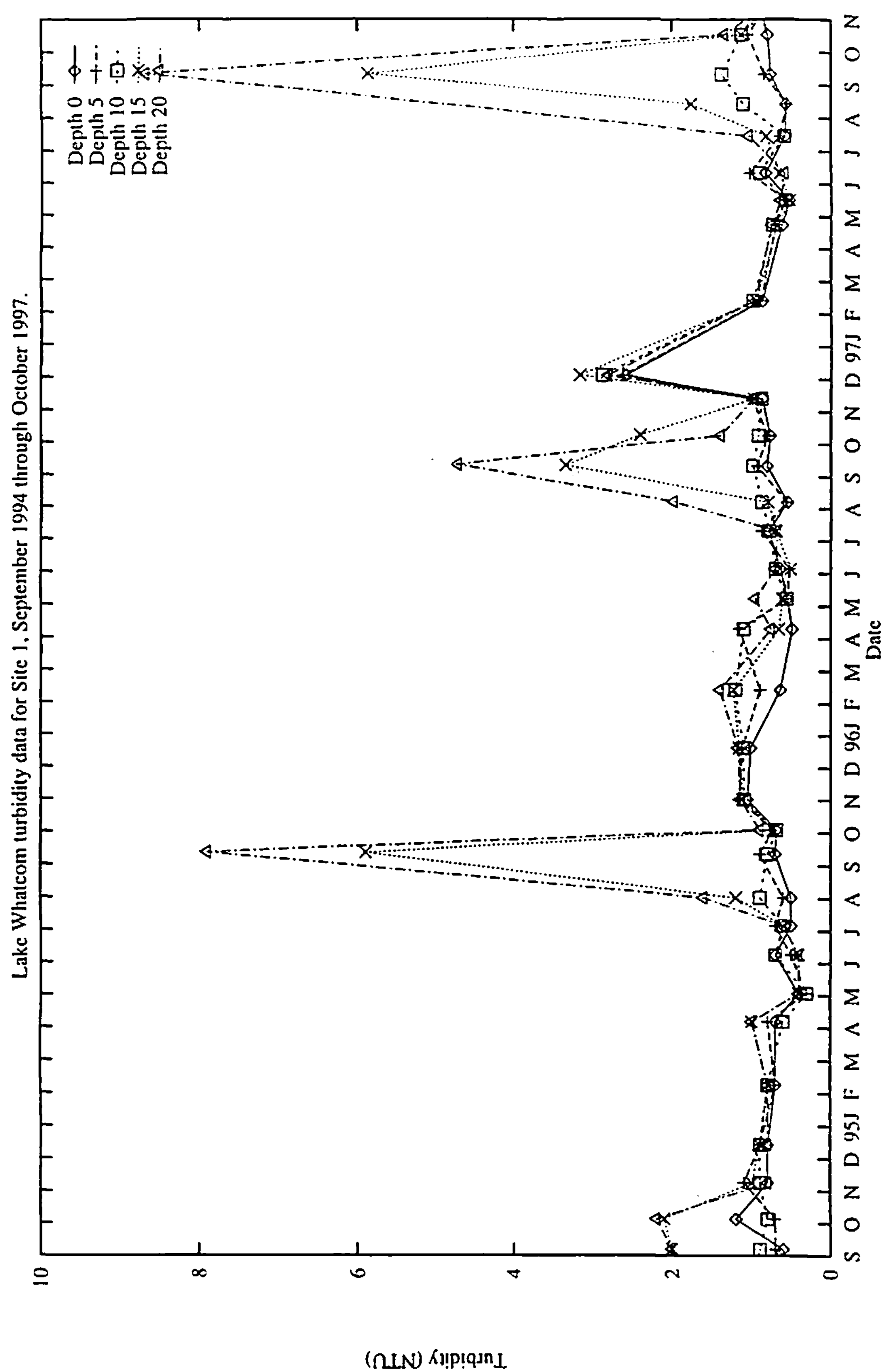


Figure 40: Lake Whatcom turbidity data for Site 1.

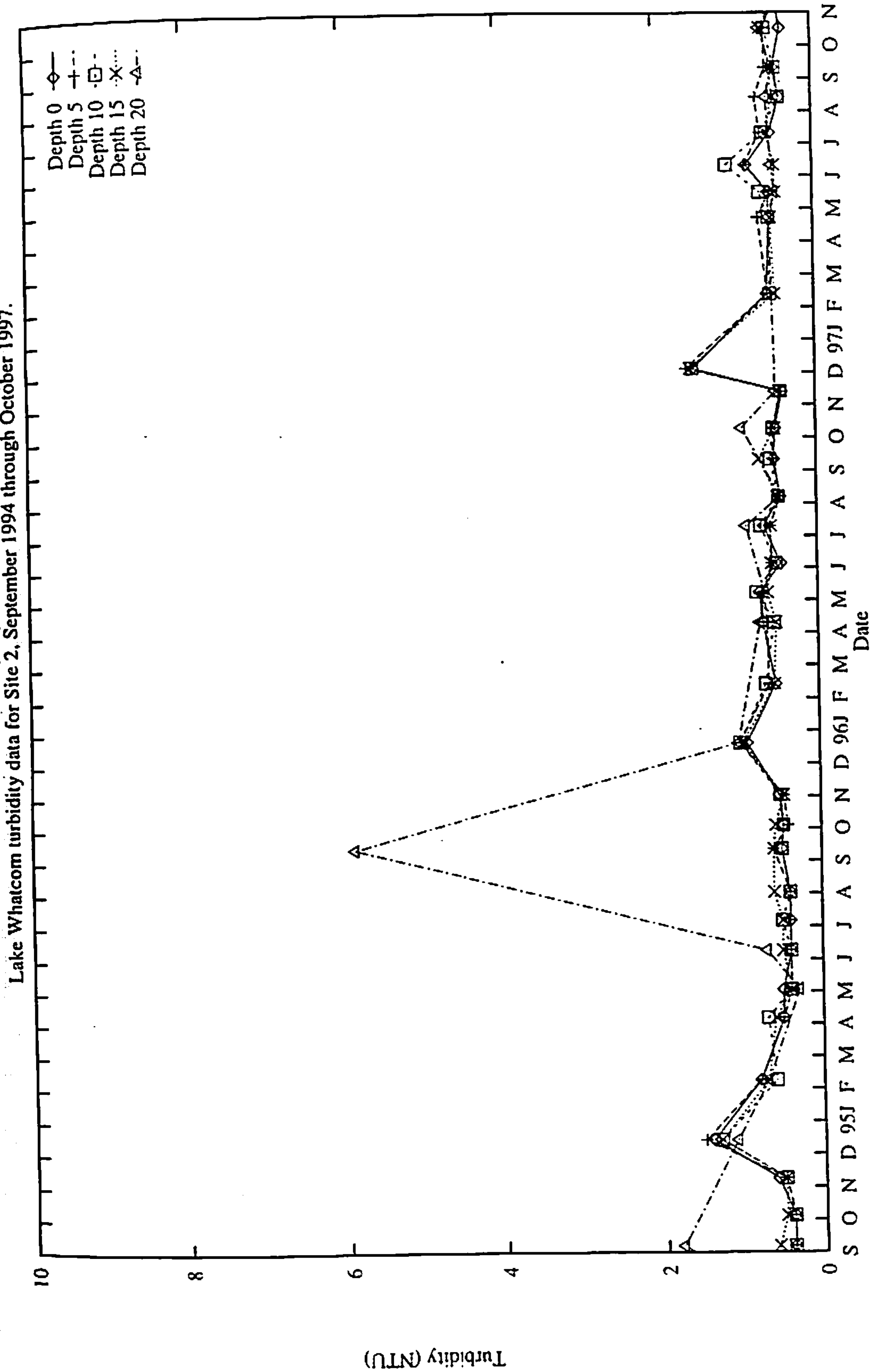


Figure 41: Lake Whatcom turbidity data for Site 2.

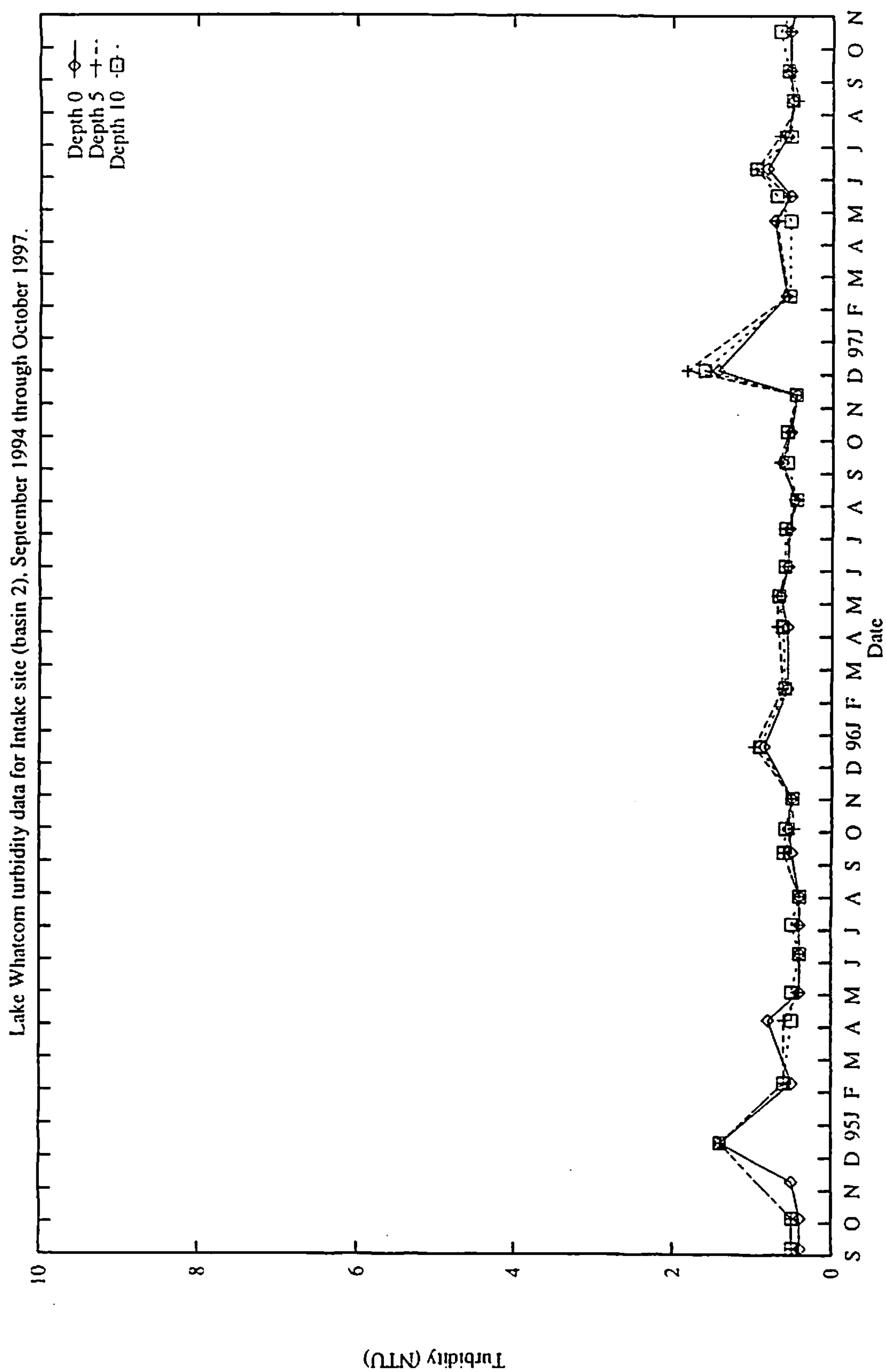


Figure 42: Lake Whatcom turbidity data for the Intake site.

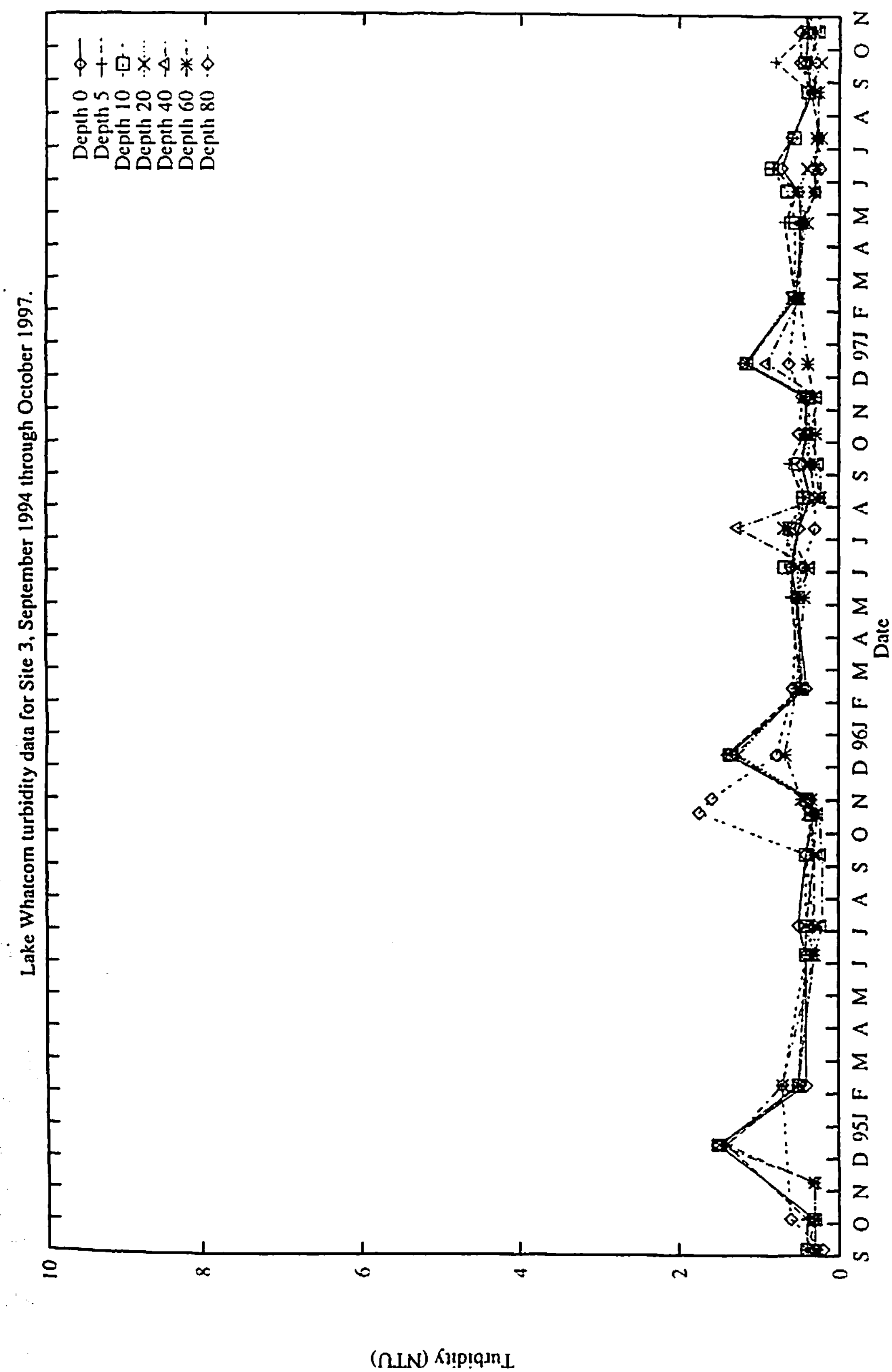


Figure 43: Lake Whatcom turbidity data for Site 3.

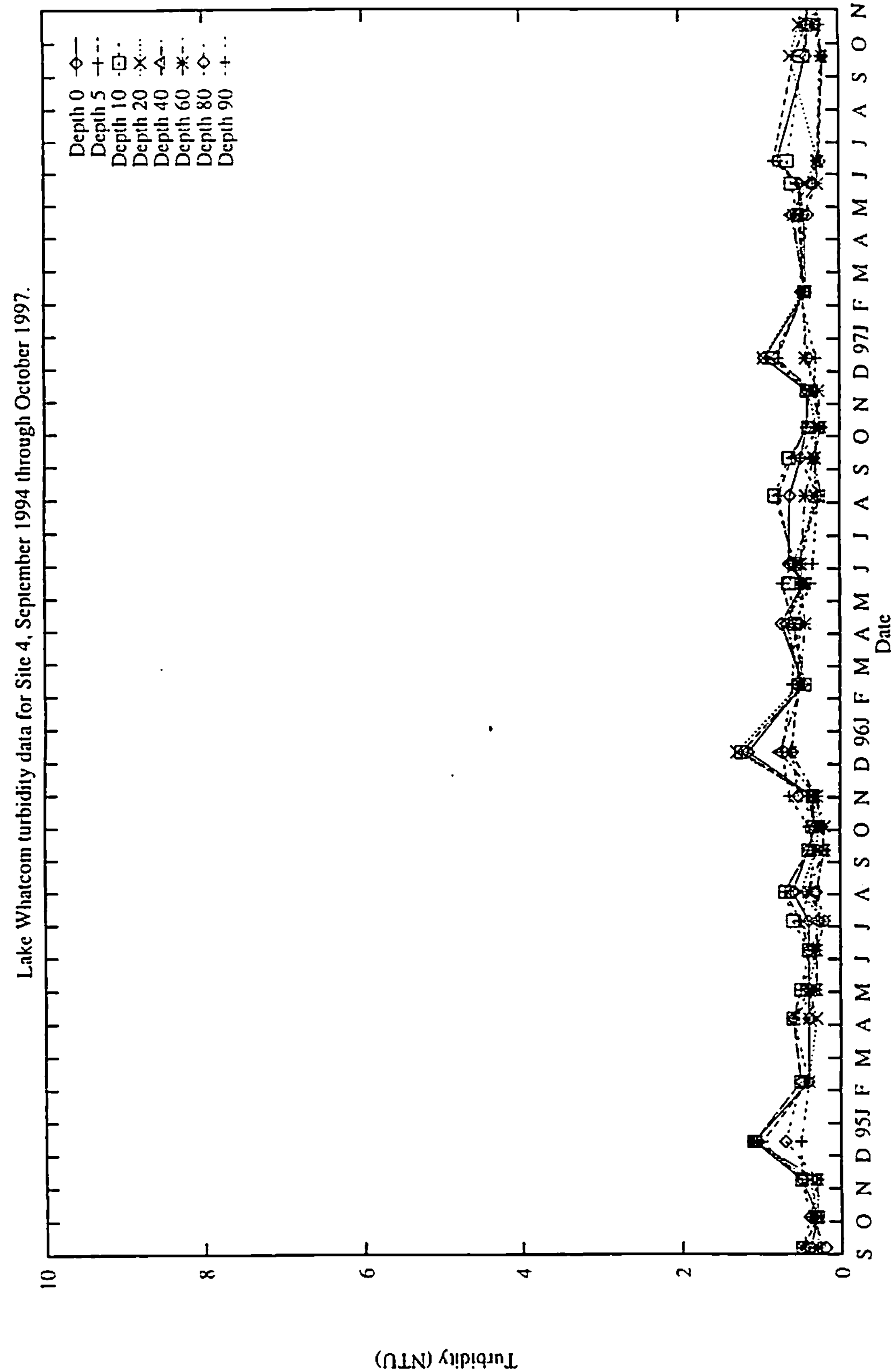


Figure 44: Lake Whatcom turbidity data for Site 4.

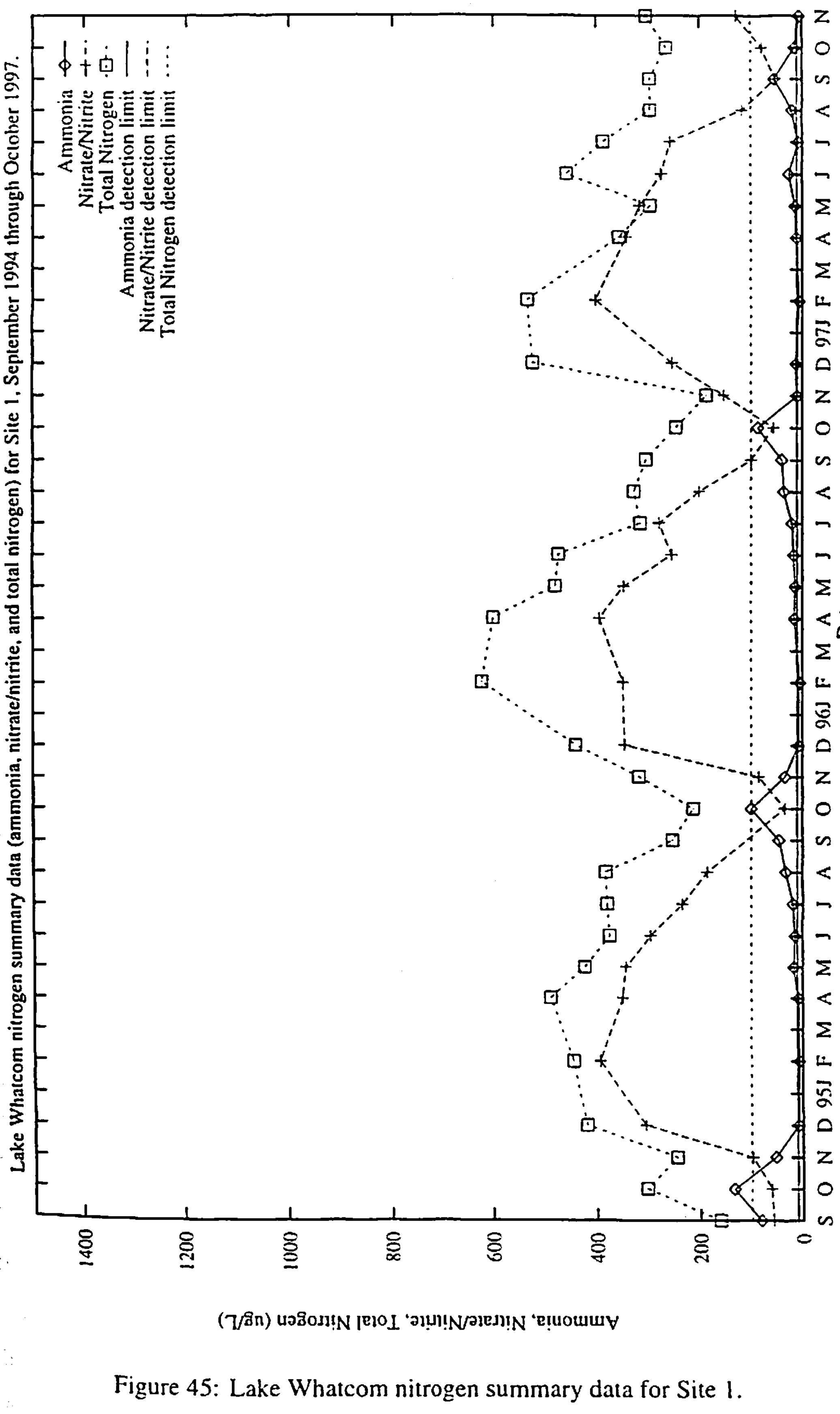


Figure 45: Lake Whatcom nitrogen summary data for Site 1.

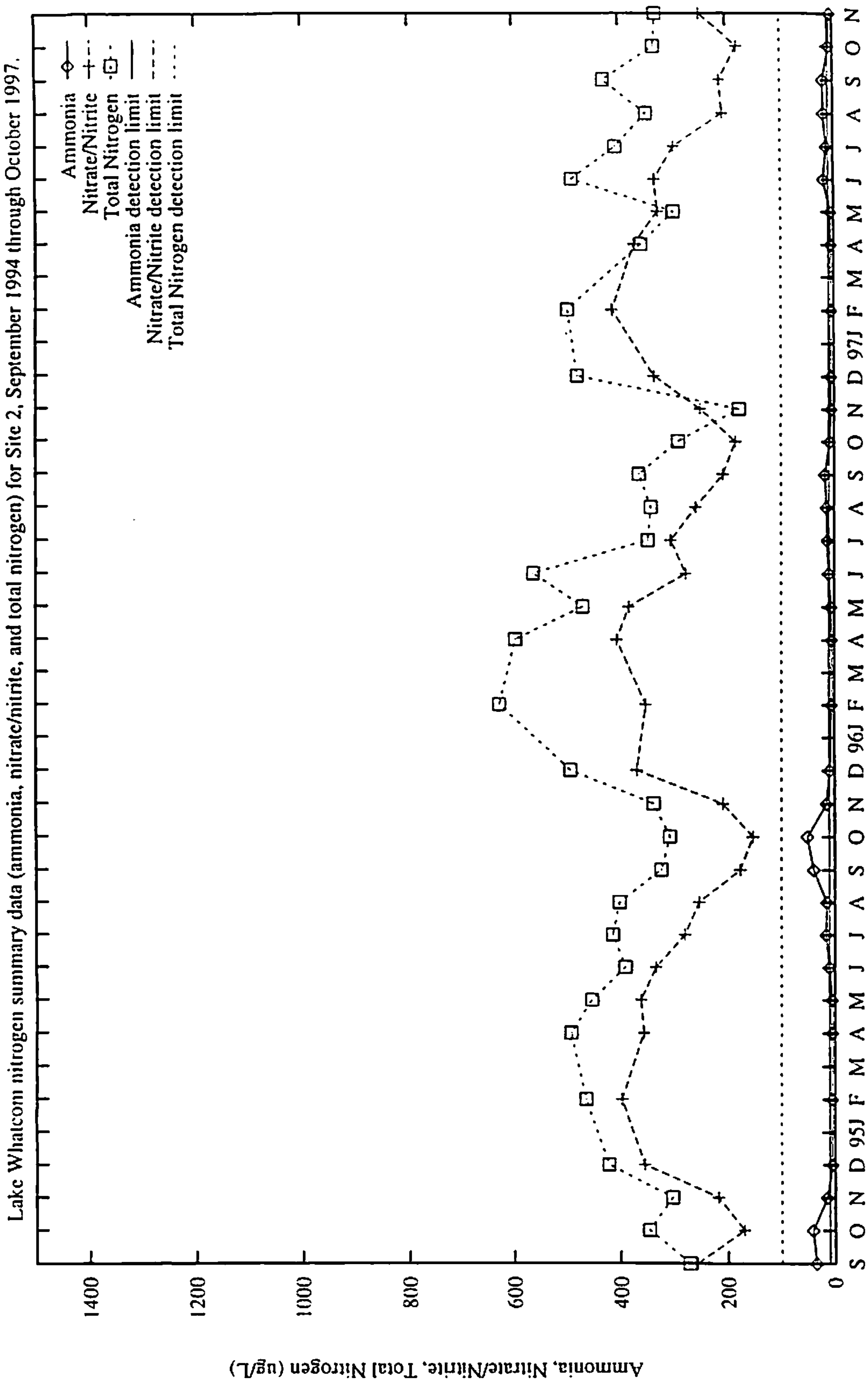


Figure 46: Lake Whatcom nitrogen summary data for Site 2.

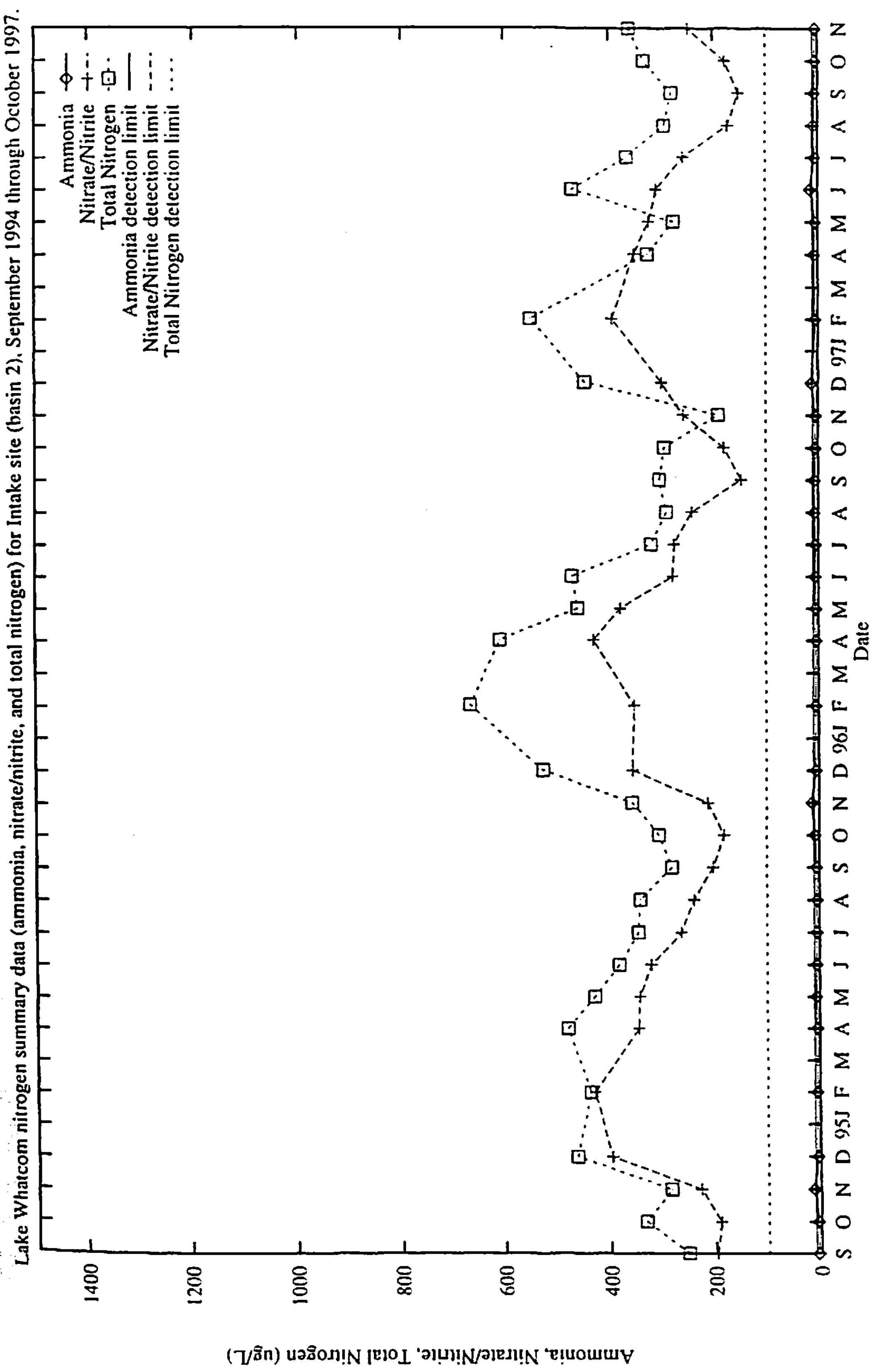


Figure 47: Lake Whatcom nitrogen summary data for the Intake site.

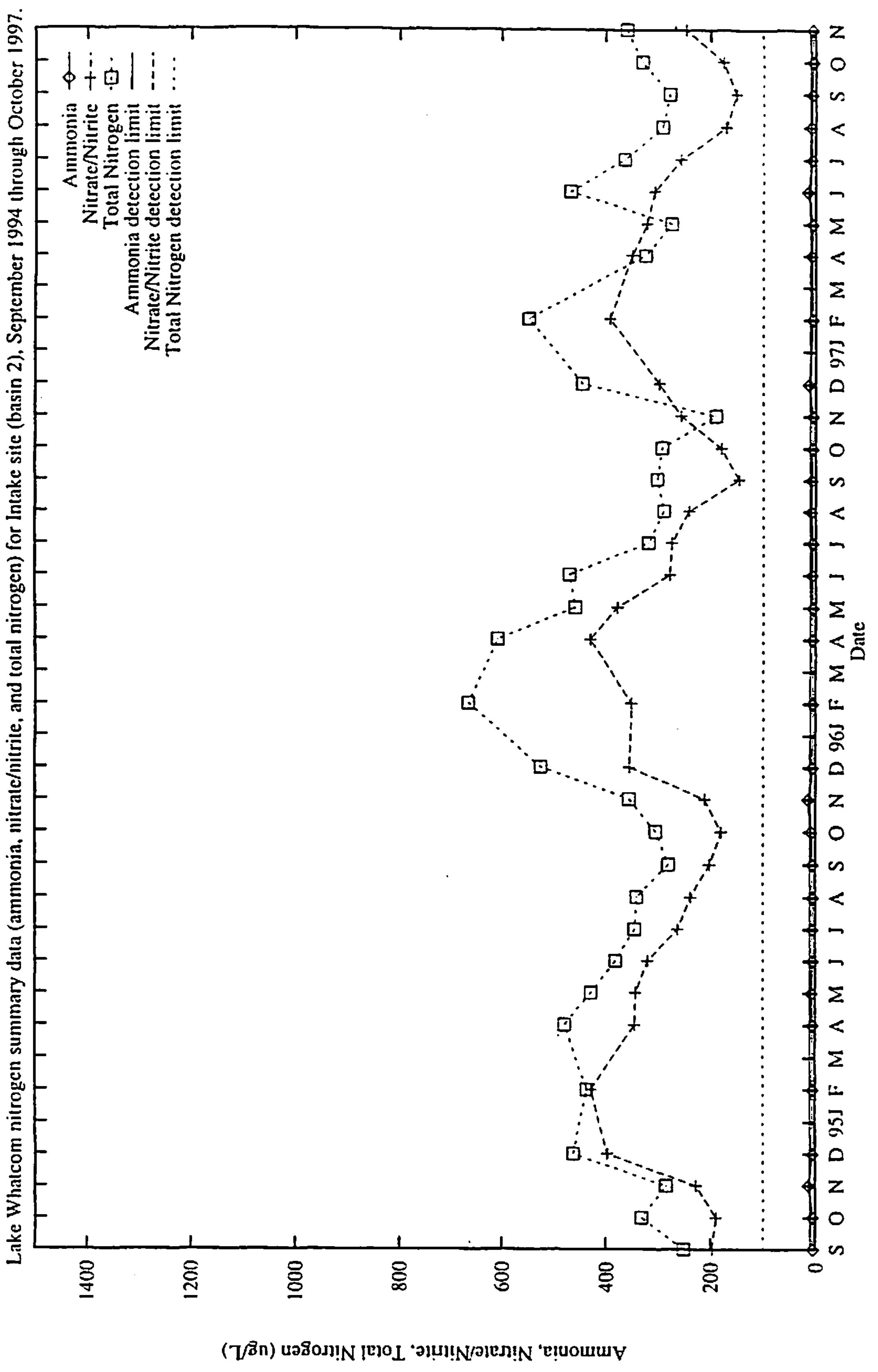


Figure 48: Lake Whatcom nitrogen summary data for Site 3.

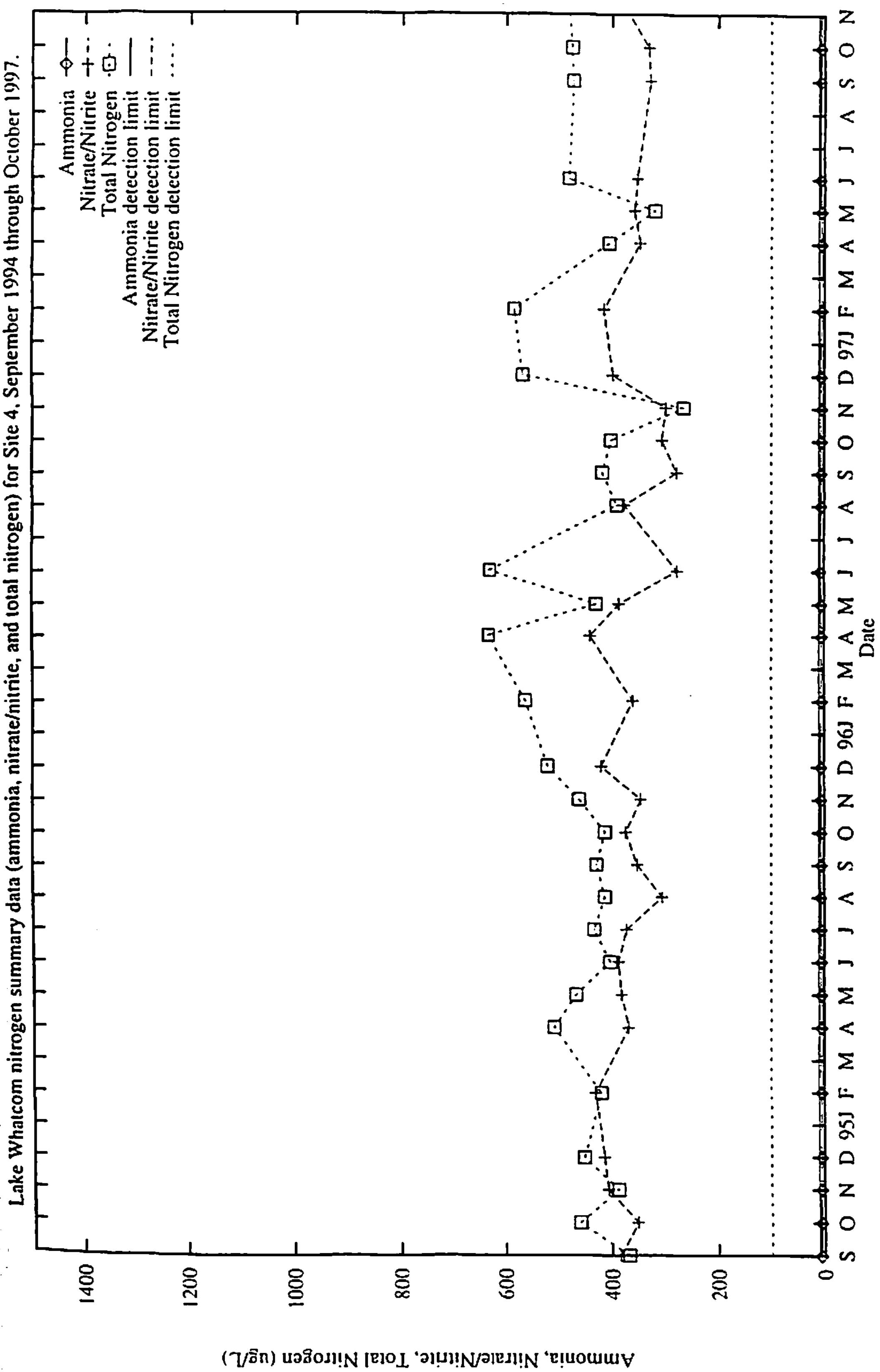


Figure 49: Lake Whatcom nitrogen summary data for Site 4.

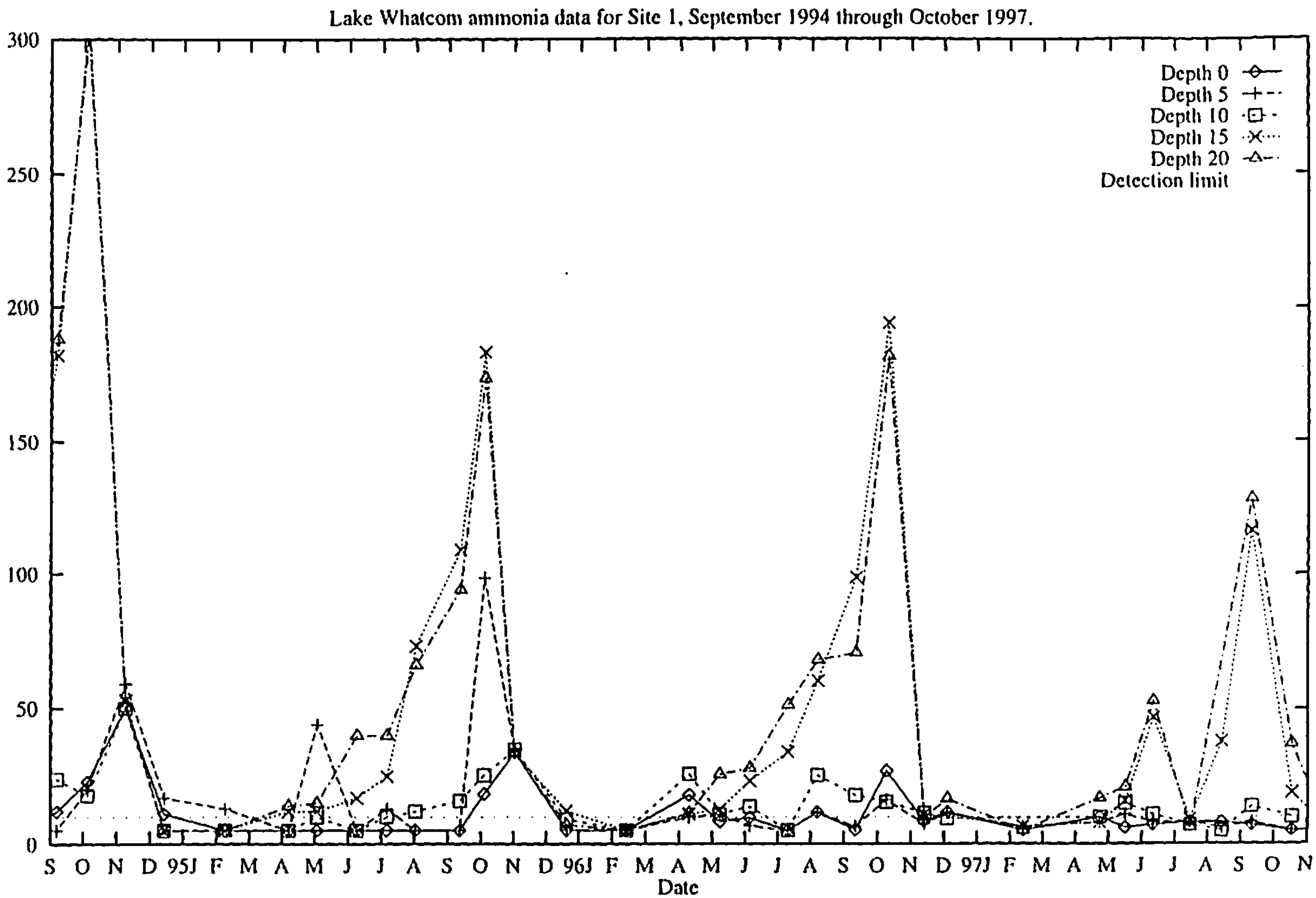


Figure 50: Lake Whatcom ammonia data for Site 1.

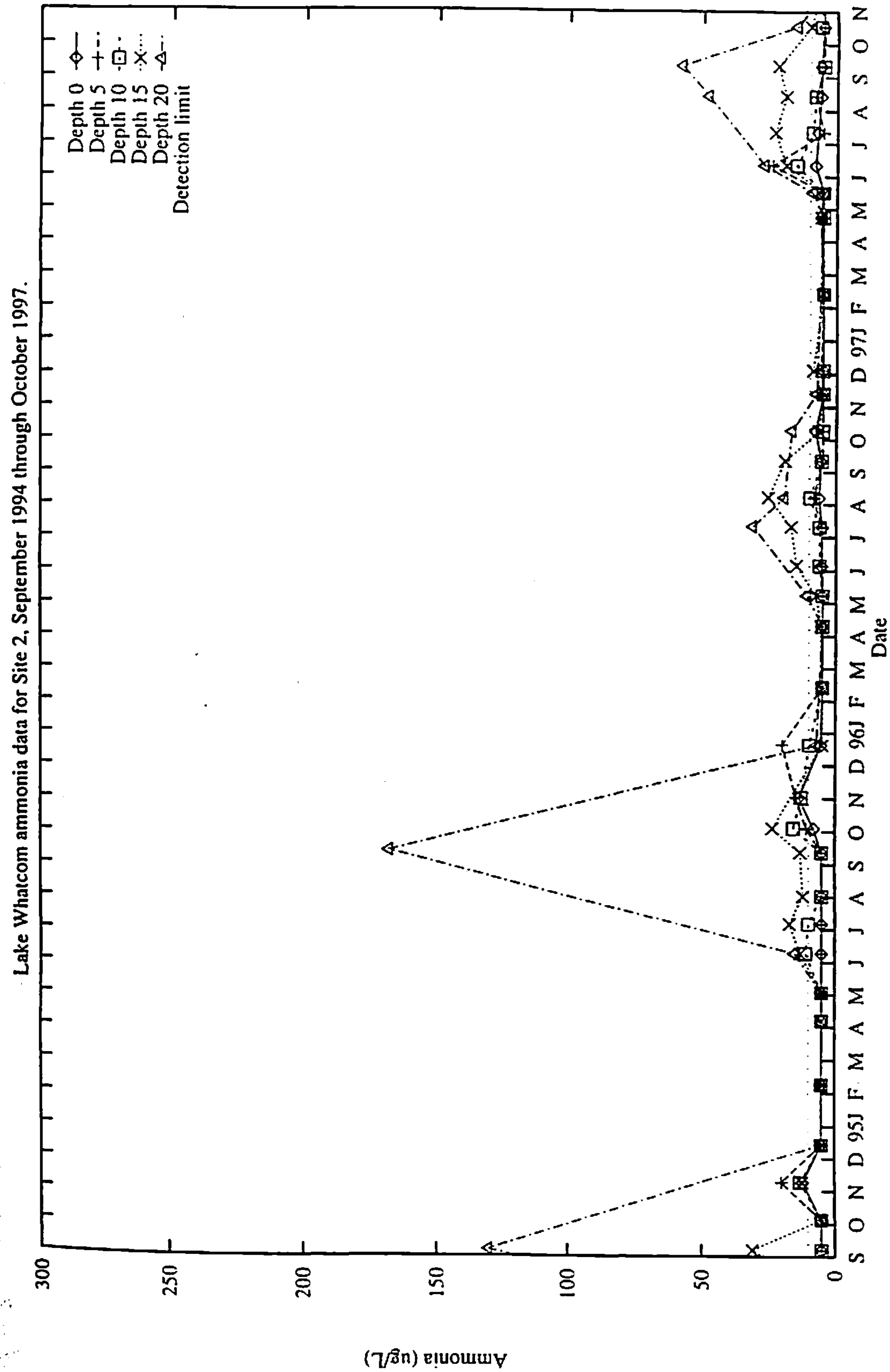


Figure 51: Lake Whatcom ammonia data for Site 2.

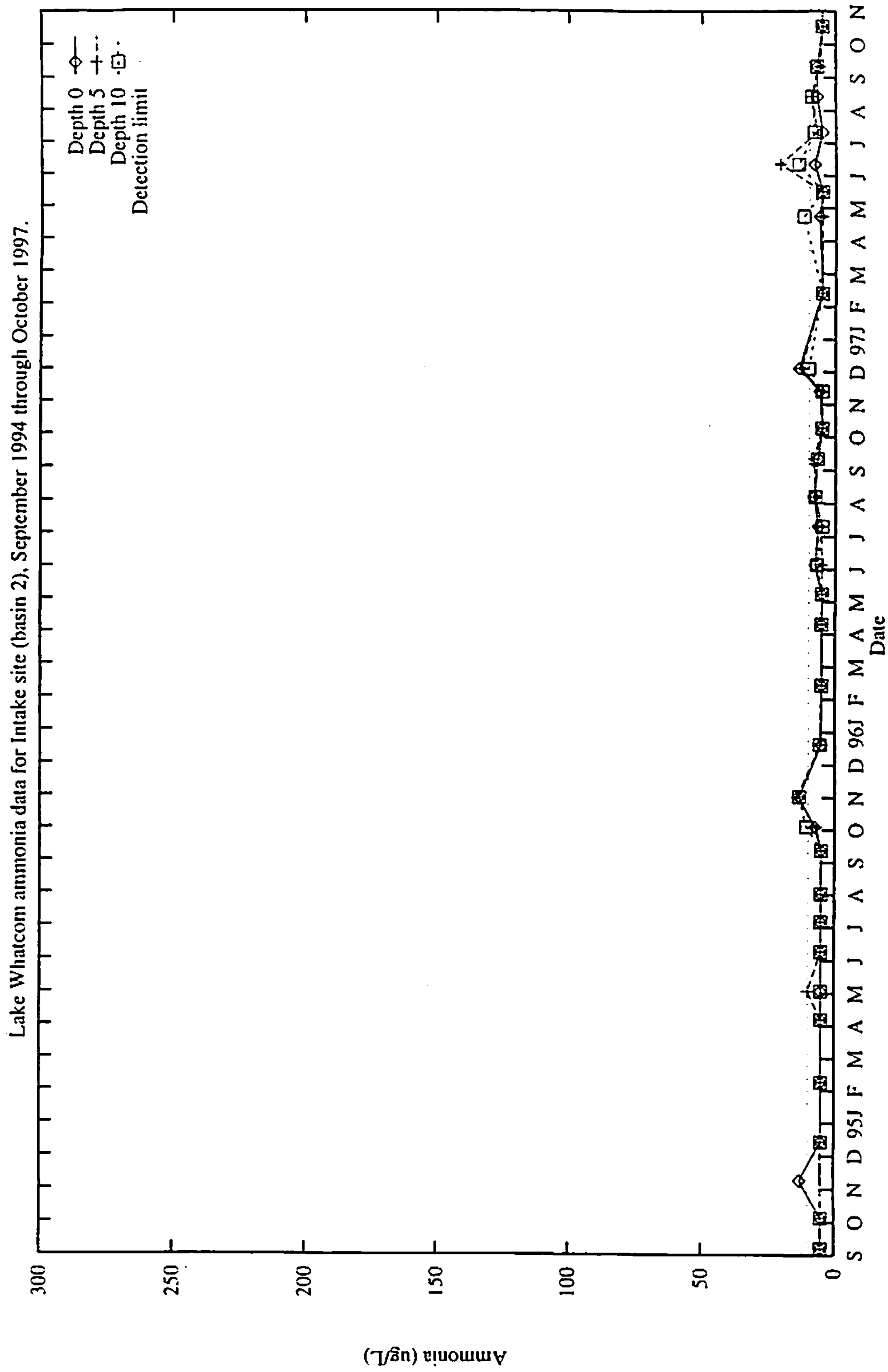


Figure 52: Lake Whatcom ammonia data for the Intake site.

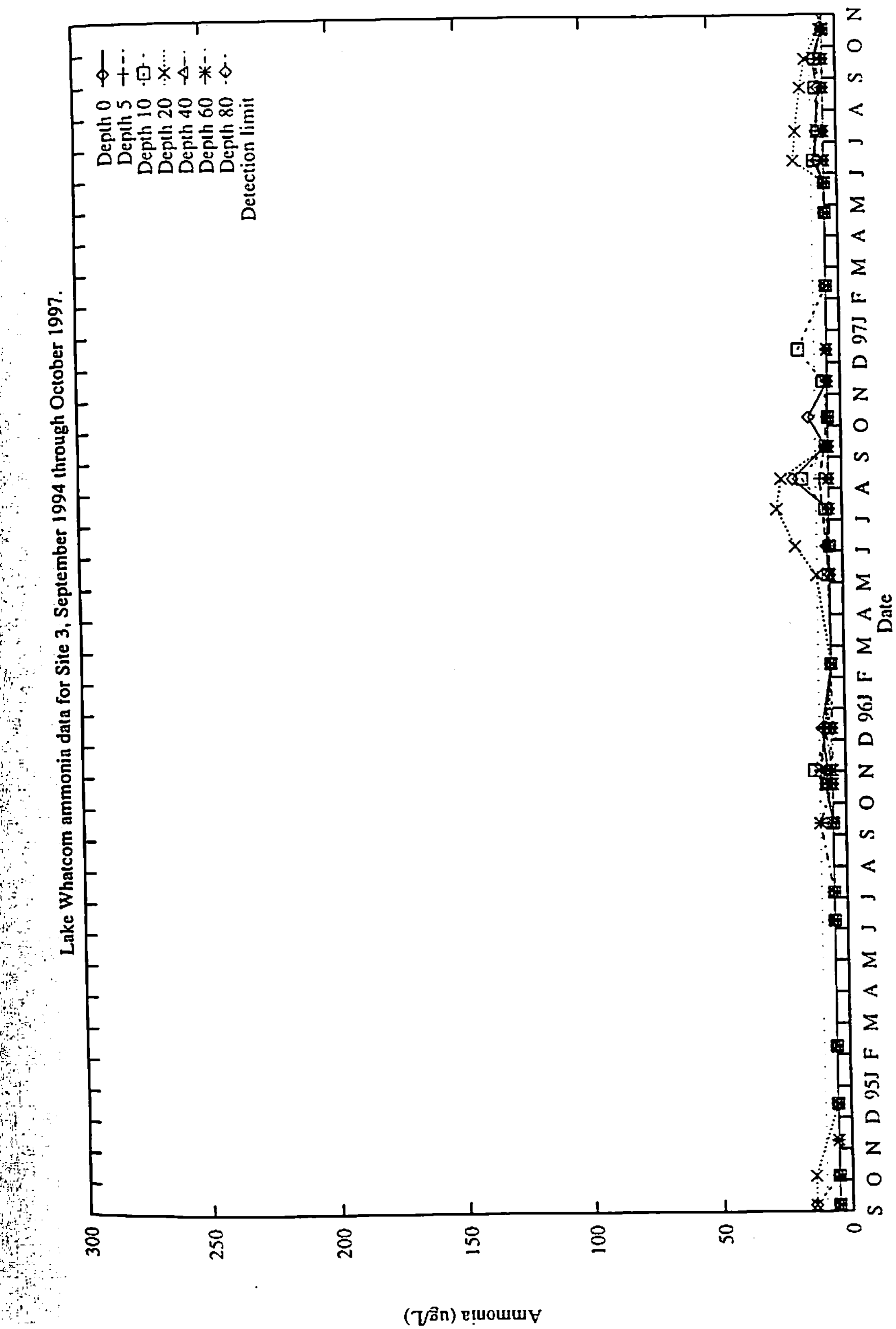


Figure 53: Lake Whatcom ammonia data for Site 3.

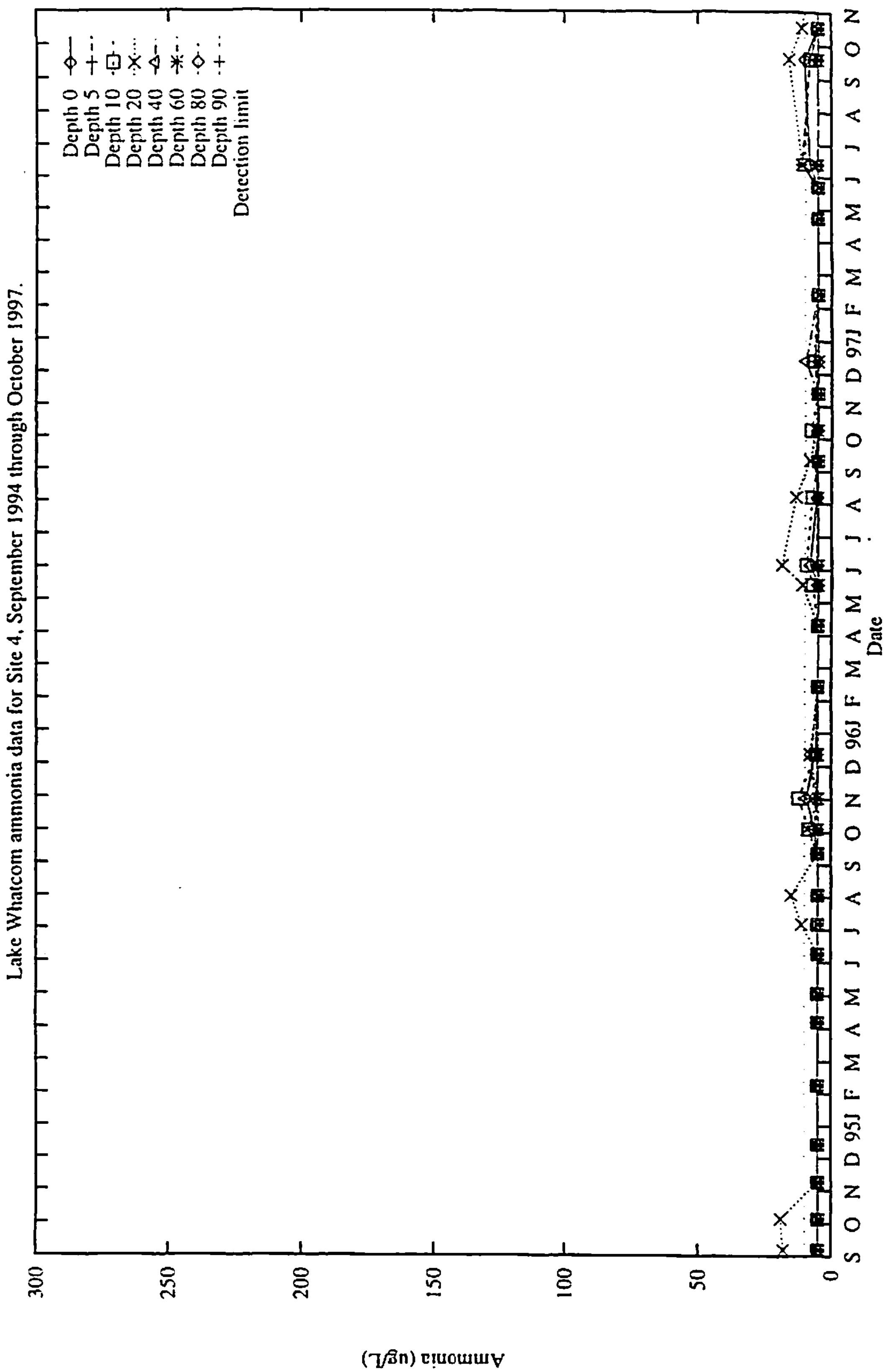


Figure 54: Lake Whatcom ammonia data for Site 4.

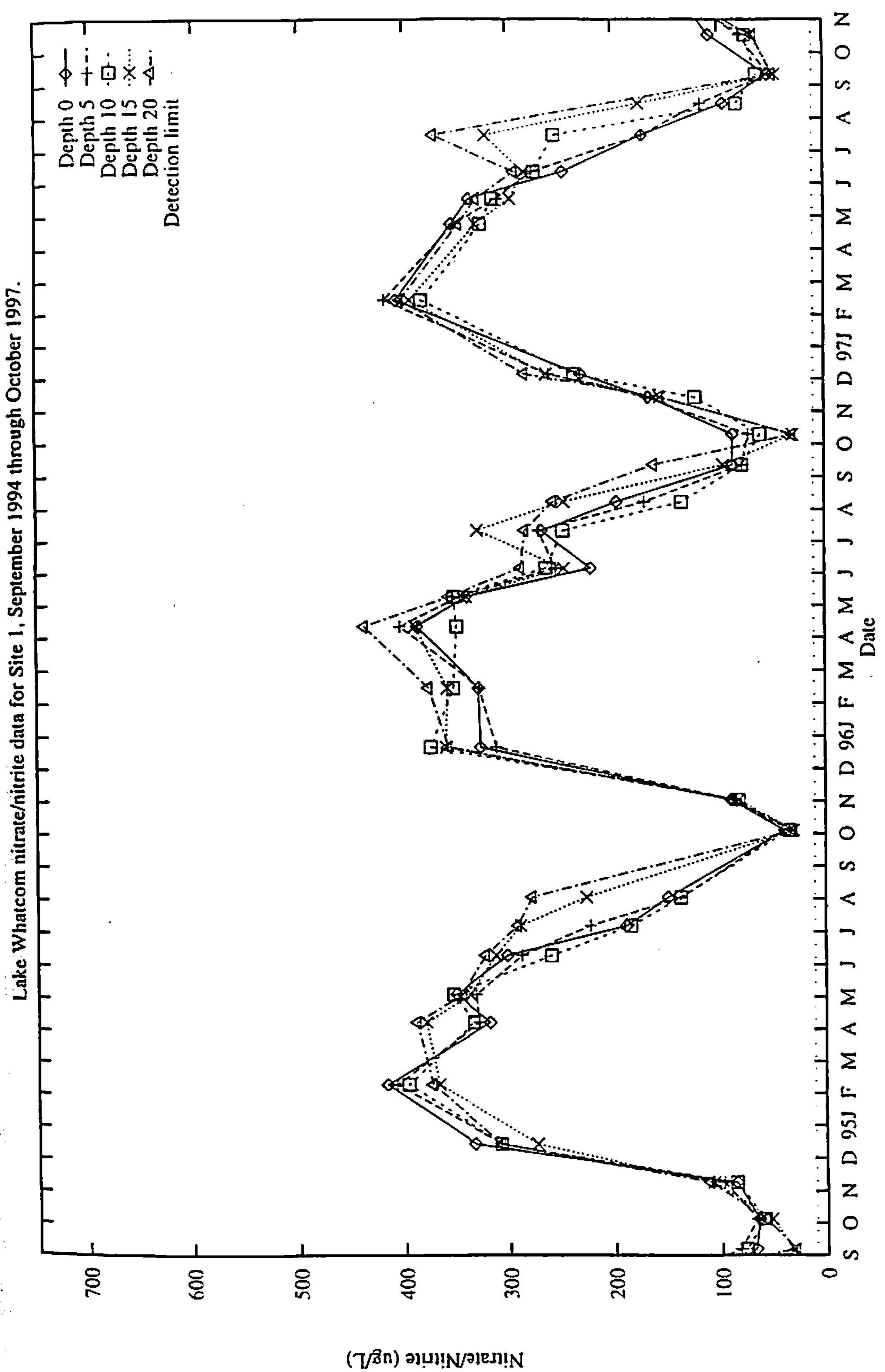


Figure 55: Lake Whatcom nitrate/nitrite data for Site 1.

Lake Whatcom nitrate/nitrite data for Site 2, September 1994 through October 1997.

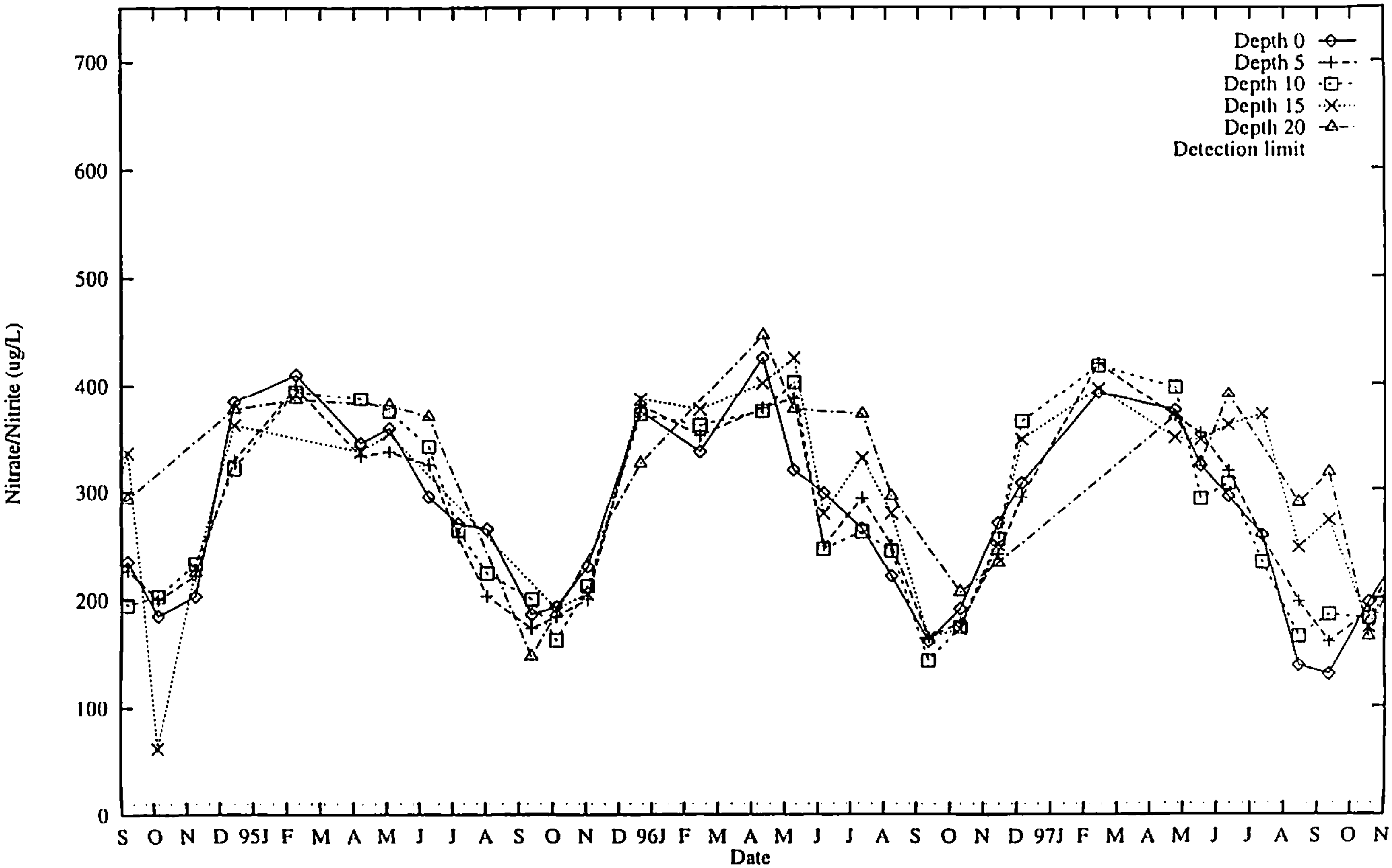


Figure 56: Lake Whatcom nitrate/nitrite data for Site 2.

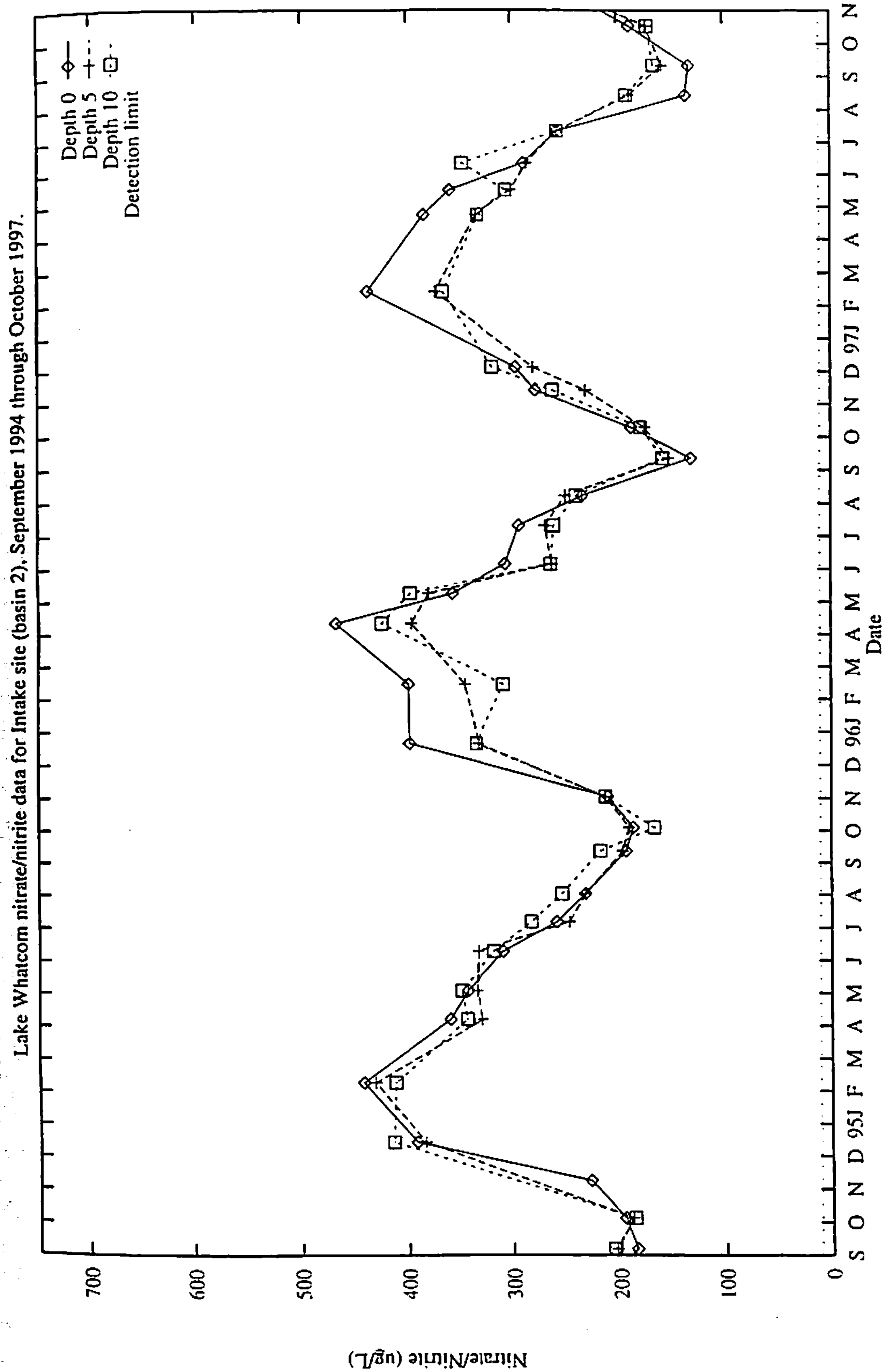


Figure 57: Lake Whatcom nitrate/nitrite data for the Intake site.

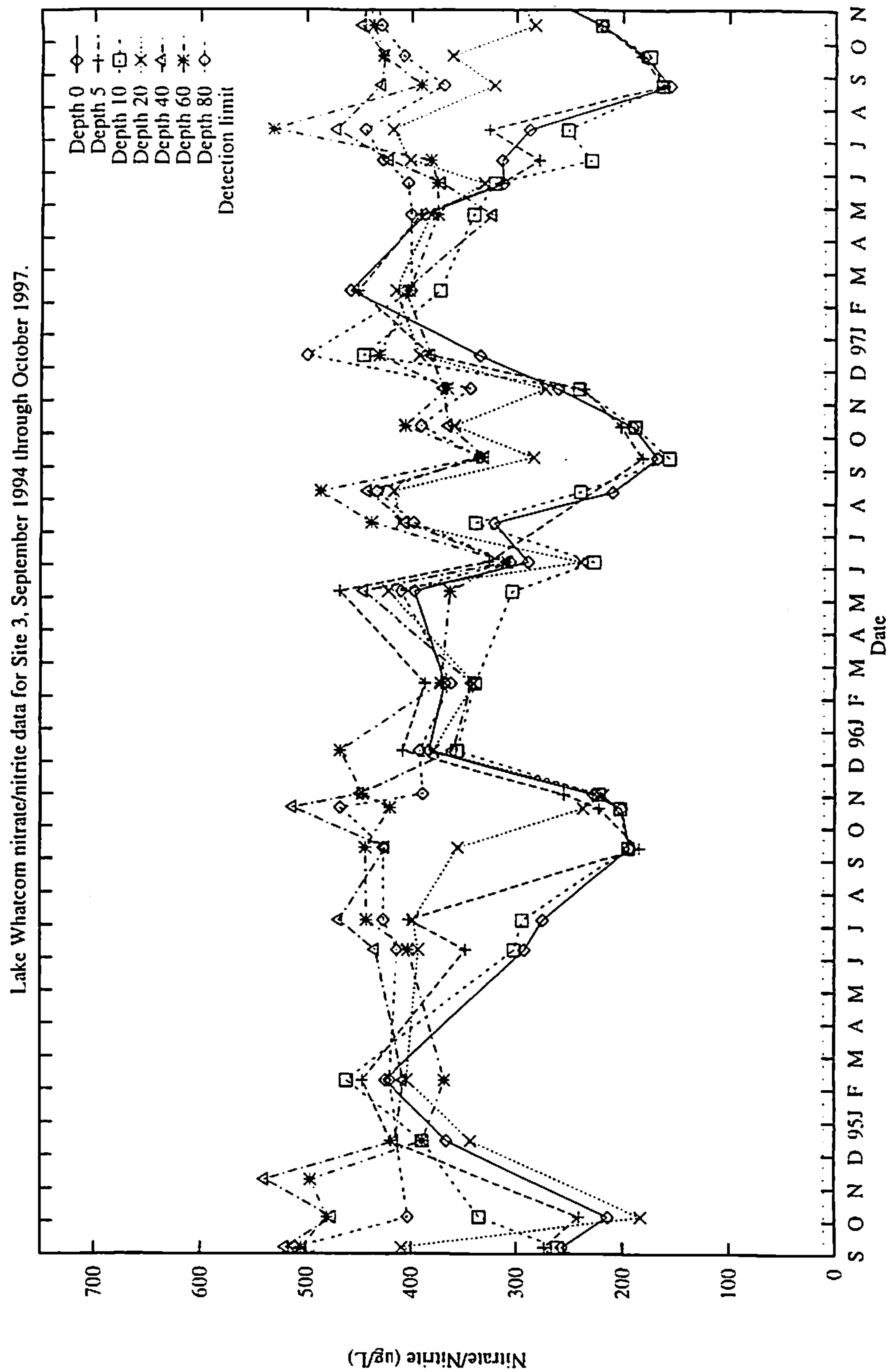


Figure 58: Lake Whatcom nitrate/nitrite data for Site 3.

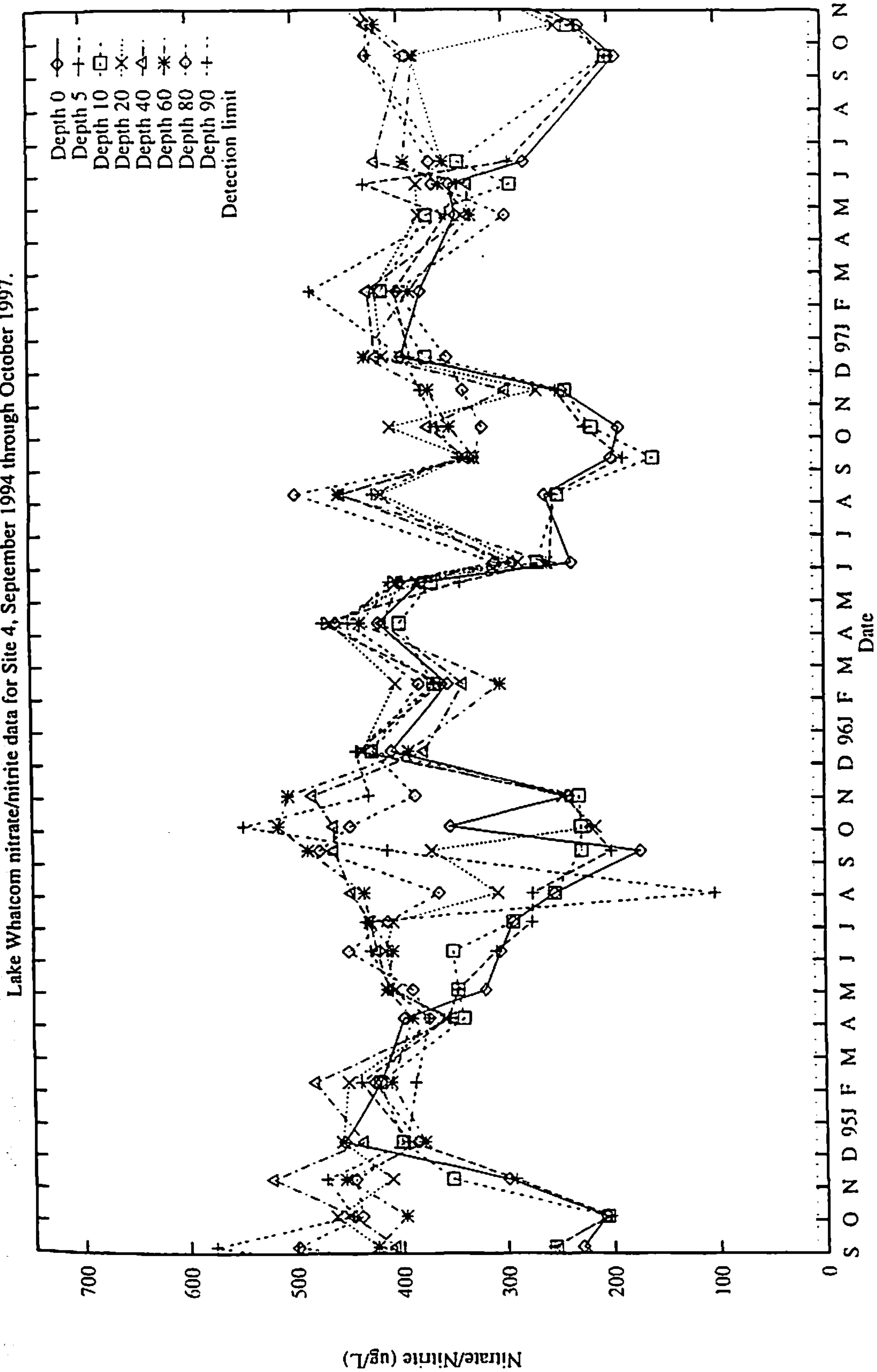


Figure 59: Lake Whatcom nitrate/nitrite data for Site 4.

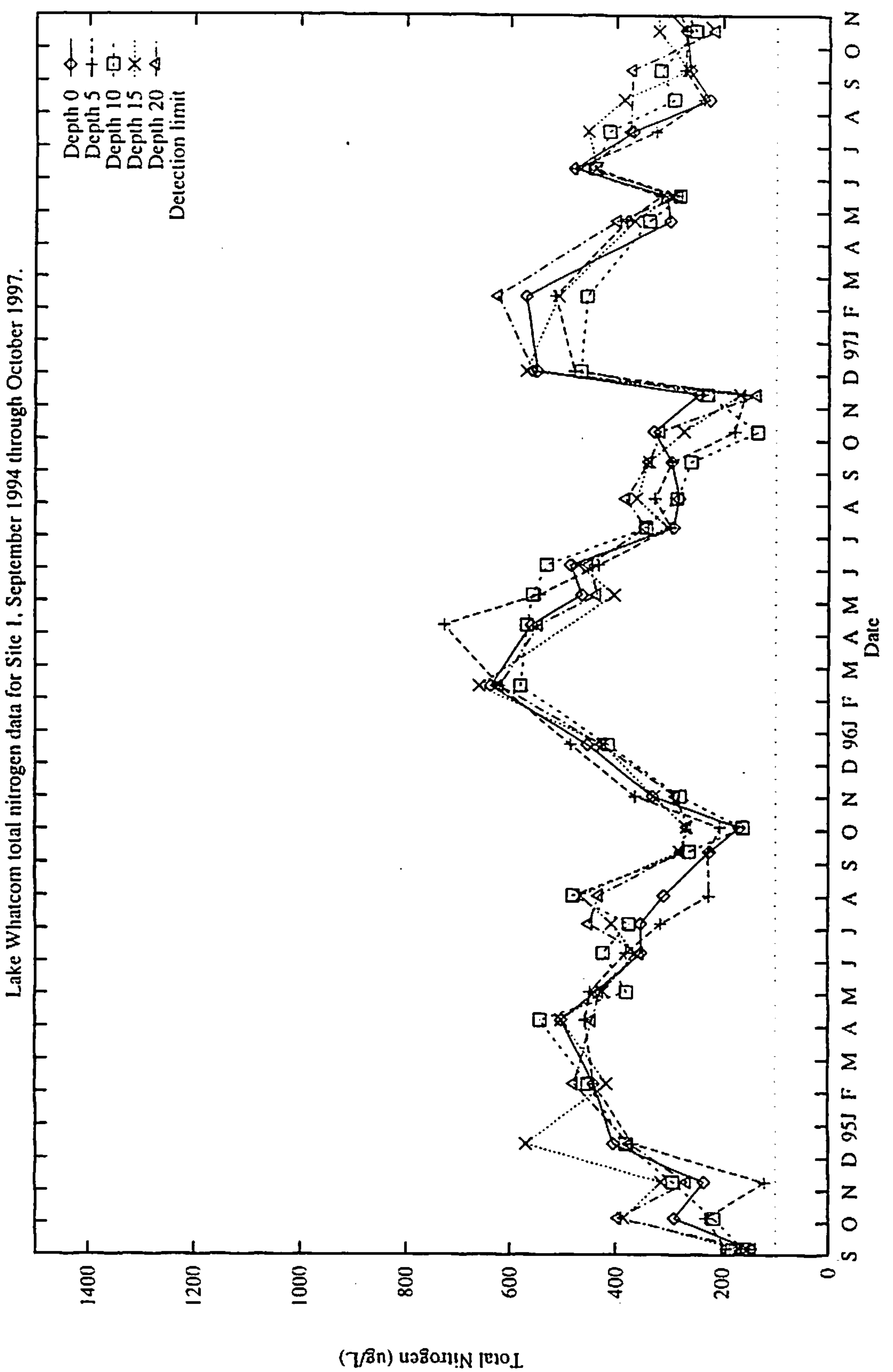


Figure 60: Lake Whatcom total nitrogen data for Site 1.

Lake Whatcom total nitrogen data for Site 2, September 1994 through October 1997.

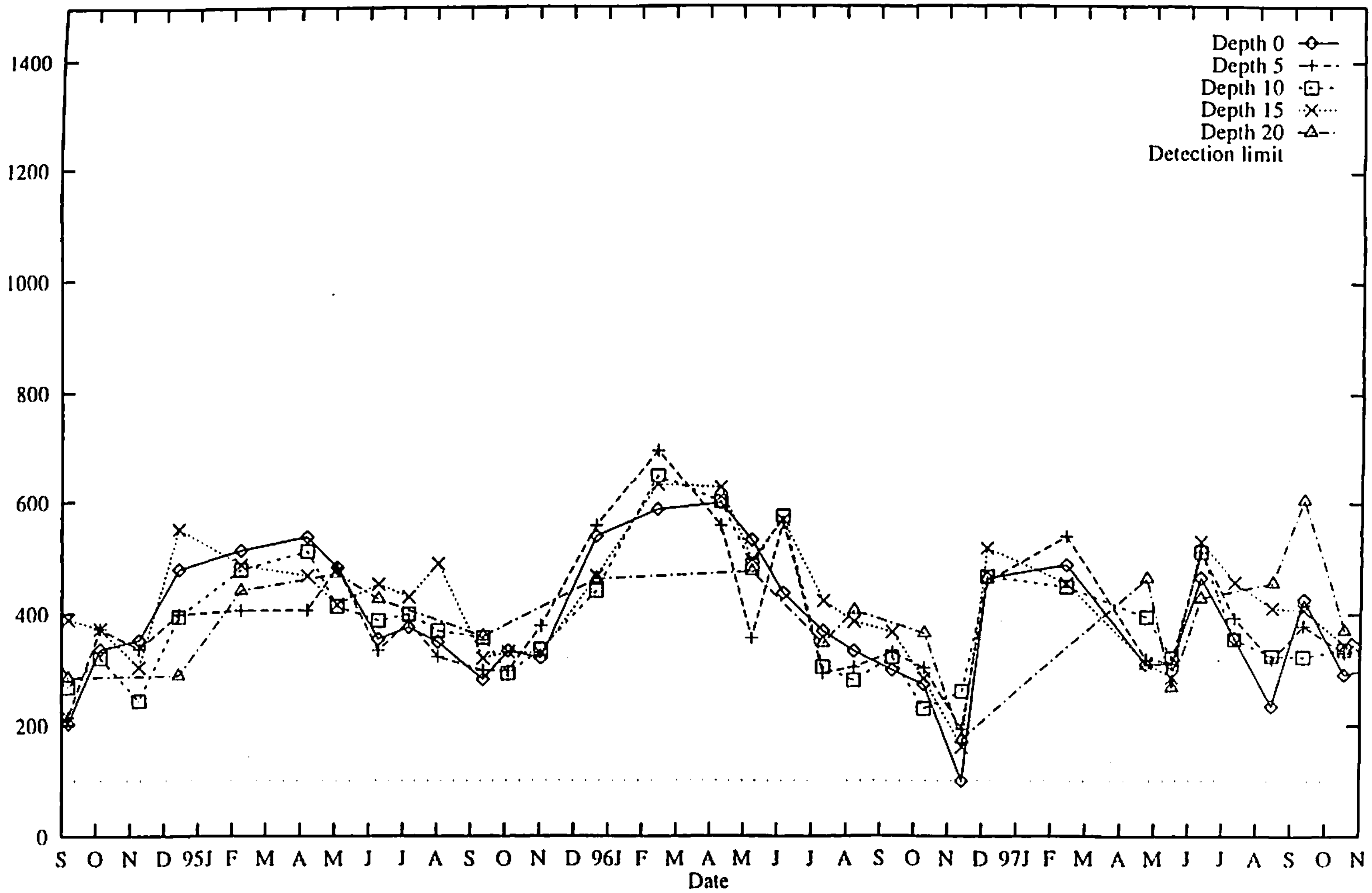


Figure 61: Lake Whatcom total nitrogen data for Site 2.

Lake Whatcom total nitrogen data for Intake site (basin 2), September 1994 through October 1997.

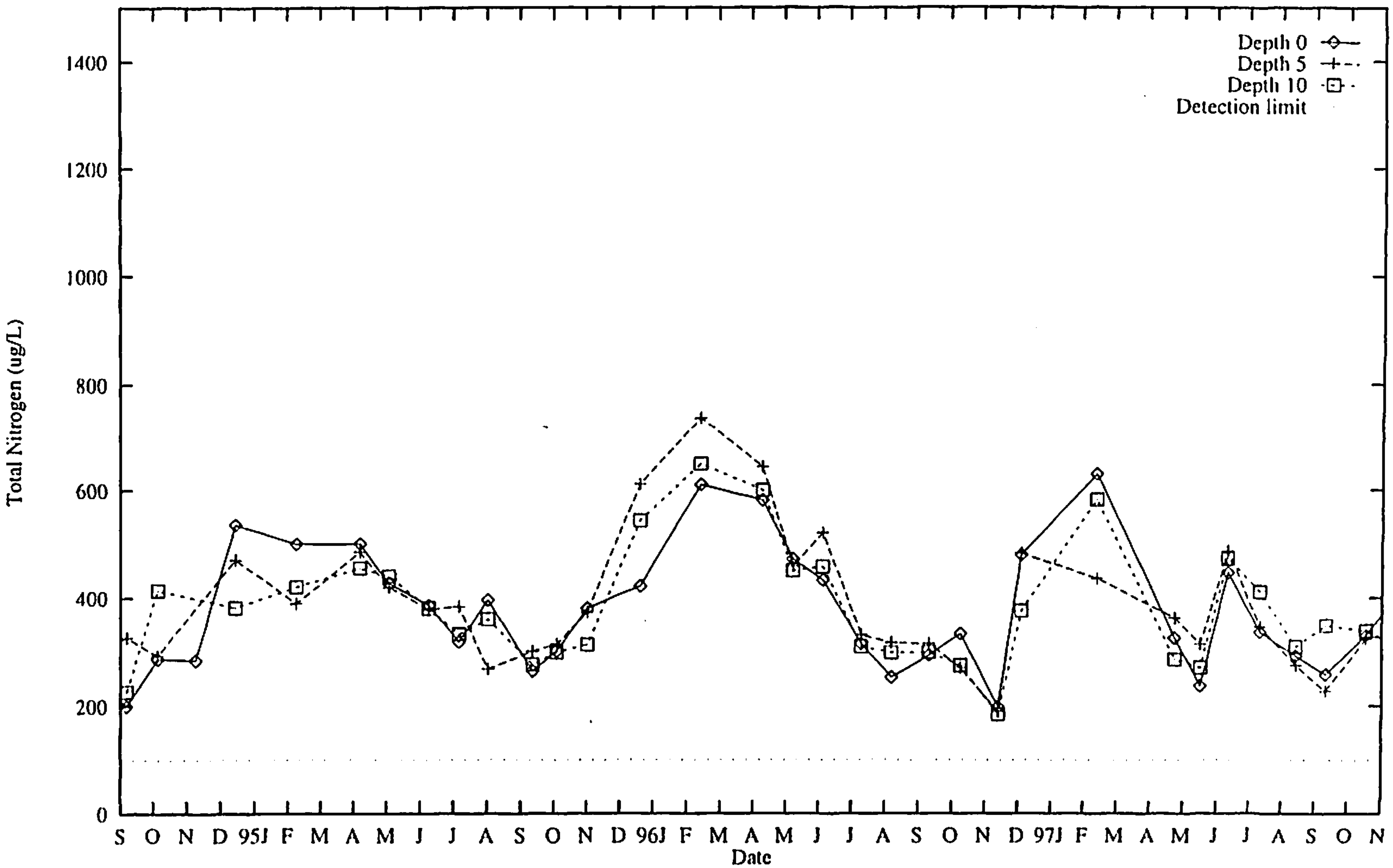


Figure 62: Lake Whatcom total nitrogen data for the Intake site.

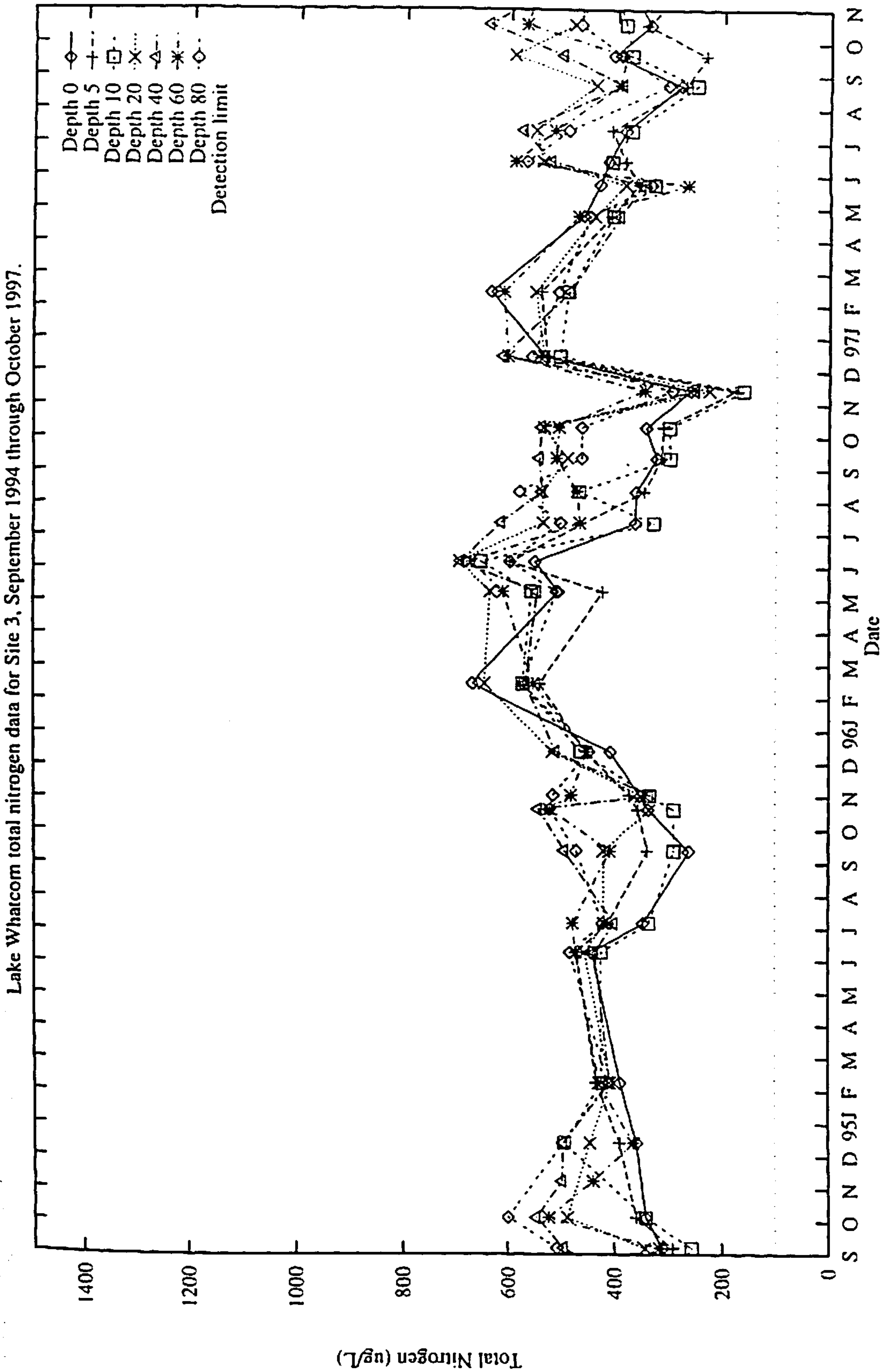


Figure 63: Lake Whatcom total nitrogen data for Site 3.

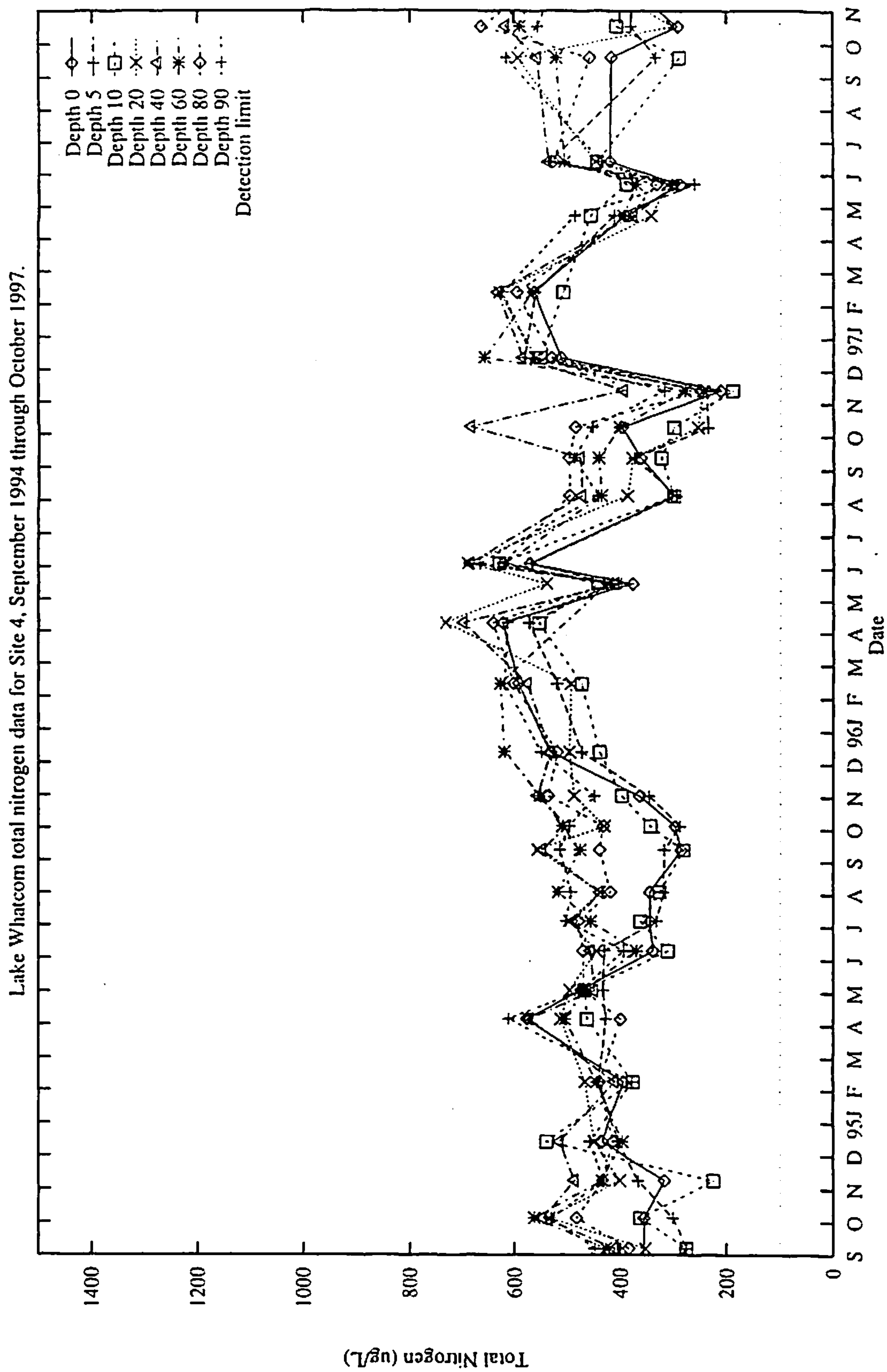


Figure 64: Lake Whatcom total nitrogen data for Site 4.

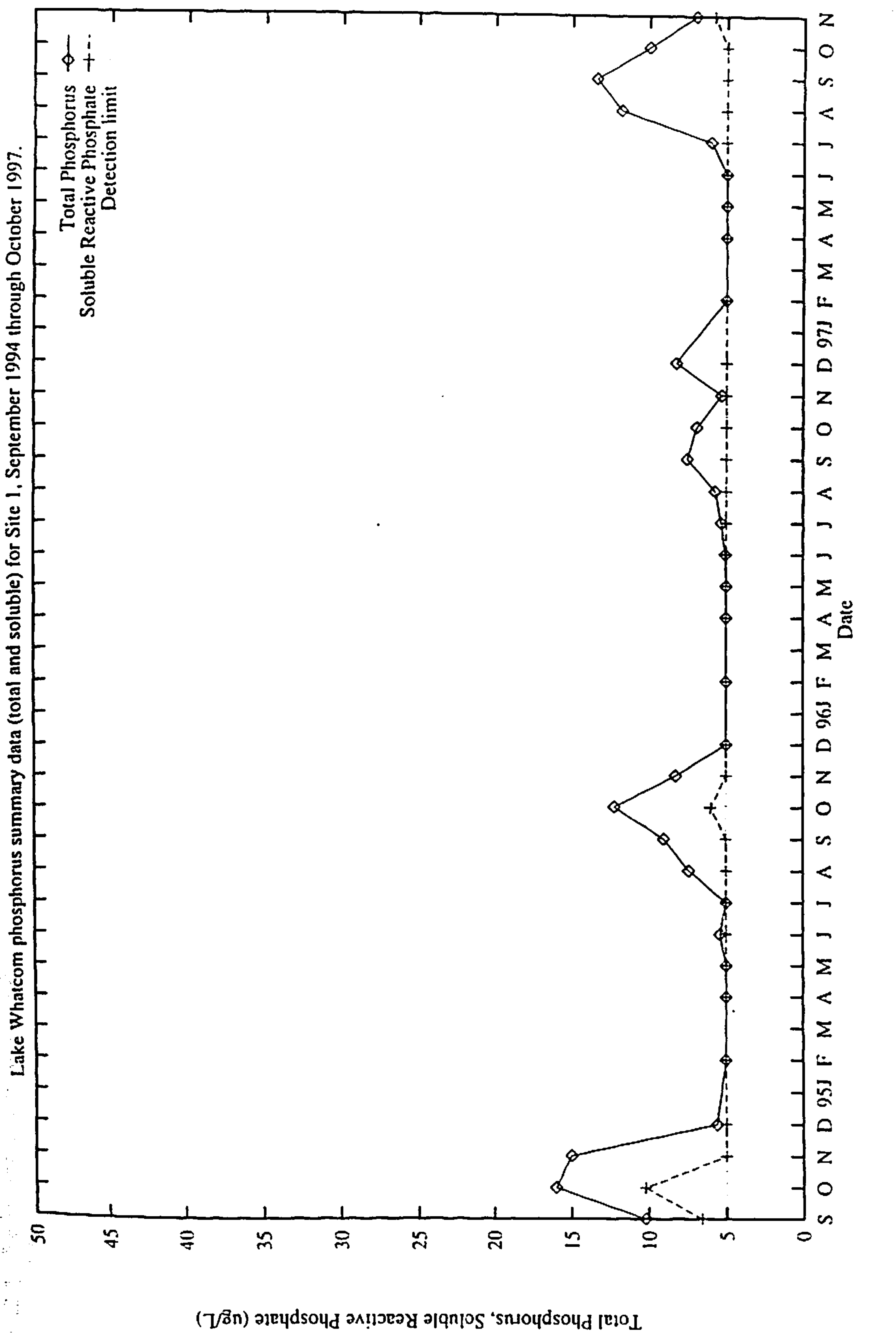


Figure 65: Lake Whatcom phosphorus summary data for Site 1.

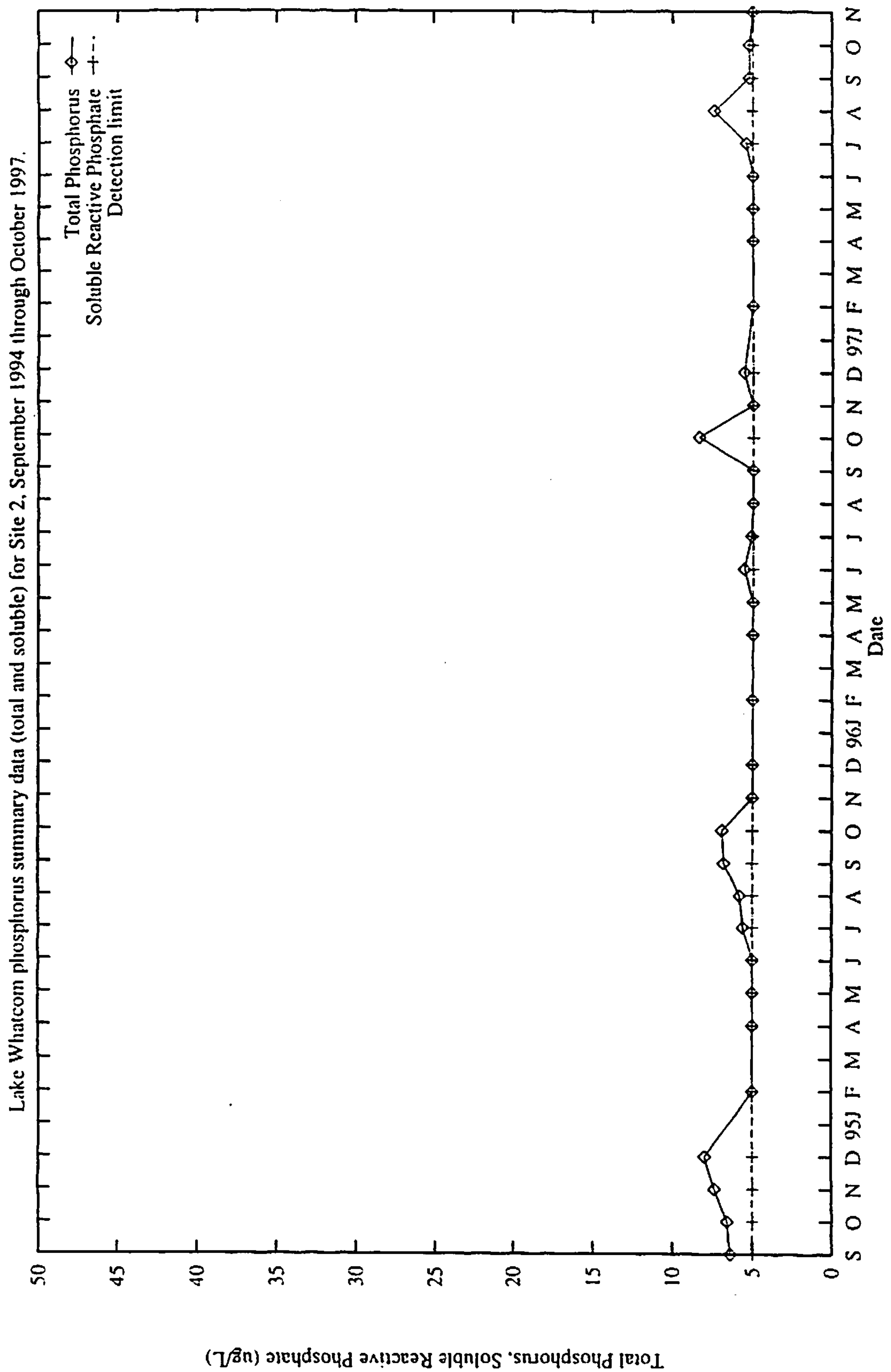


Figure 66: Lake Whatcom phosphorus summary data for Site 2.

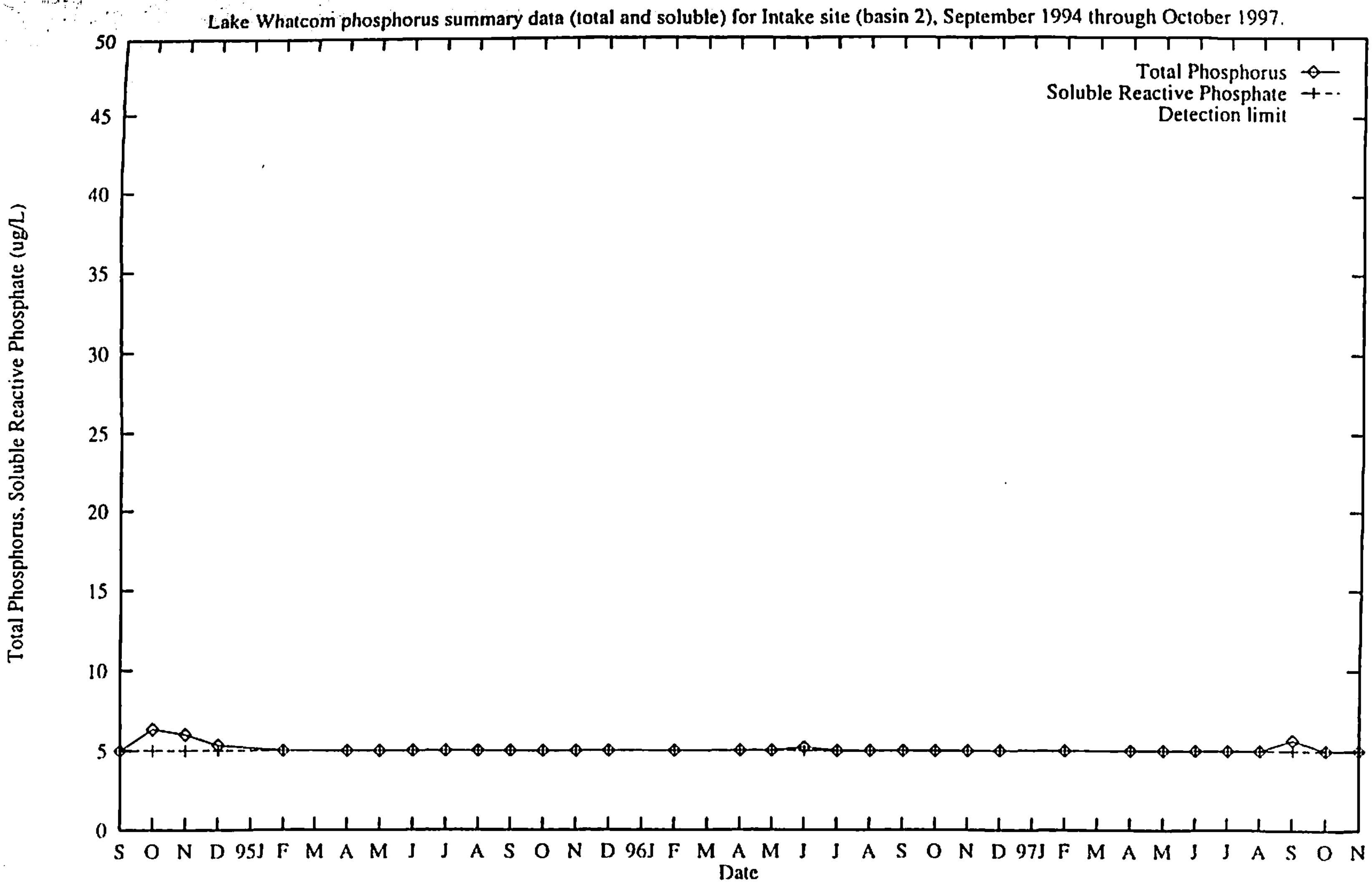


Figure 67: Lake Whatcom phosphorus summary data for the Intake site.

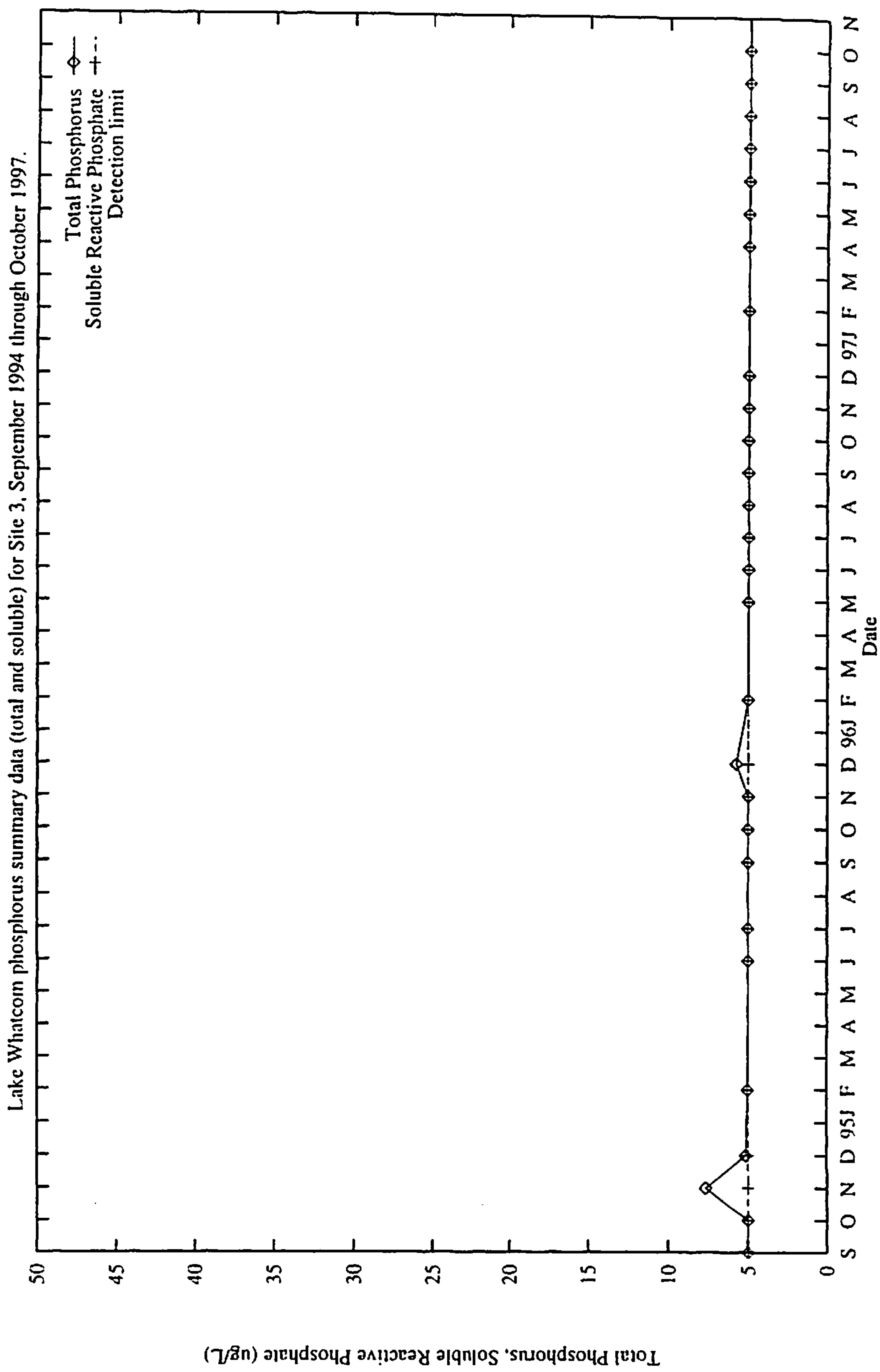


Figure 68: Lake Whatcom phosphorus summary data for Site 3.

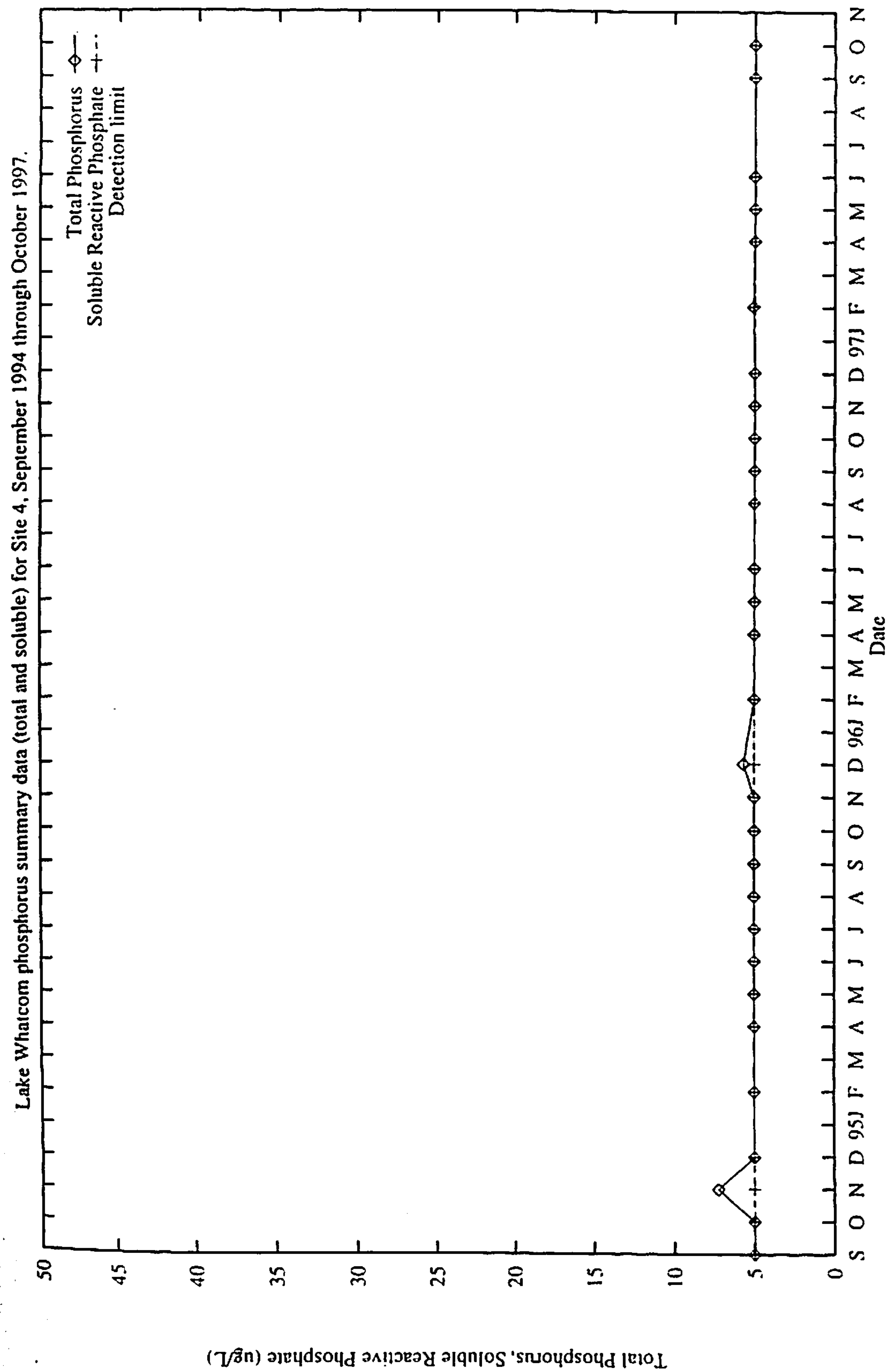


Figure 69: Lake Whatcom phosphorus summary data for Site 4.

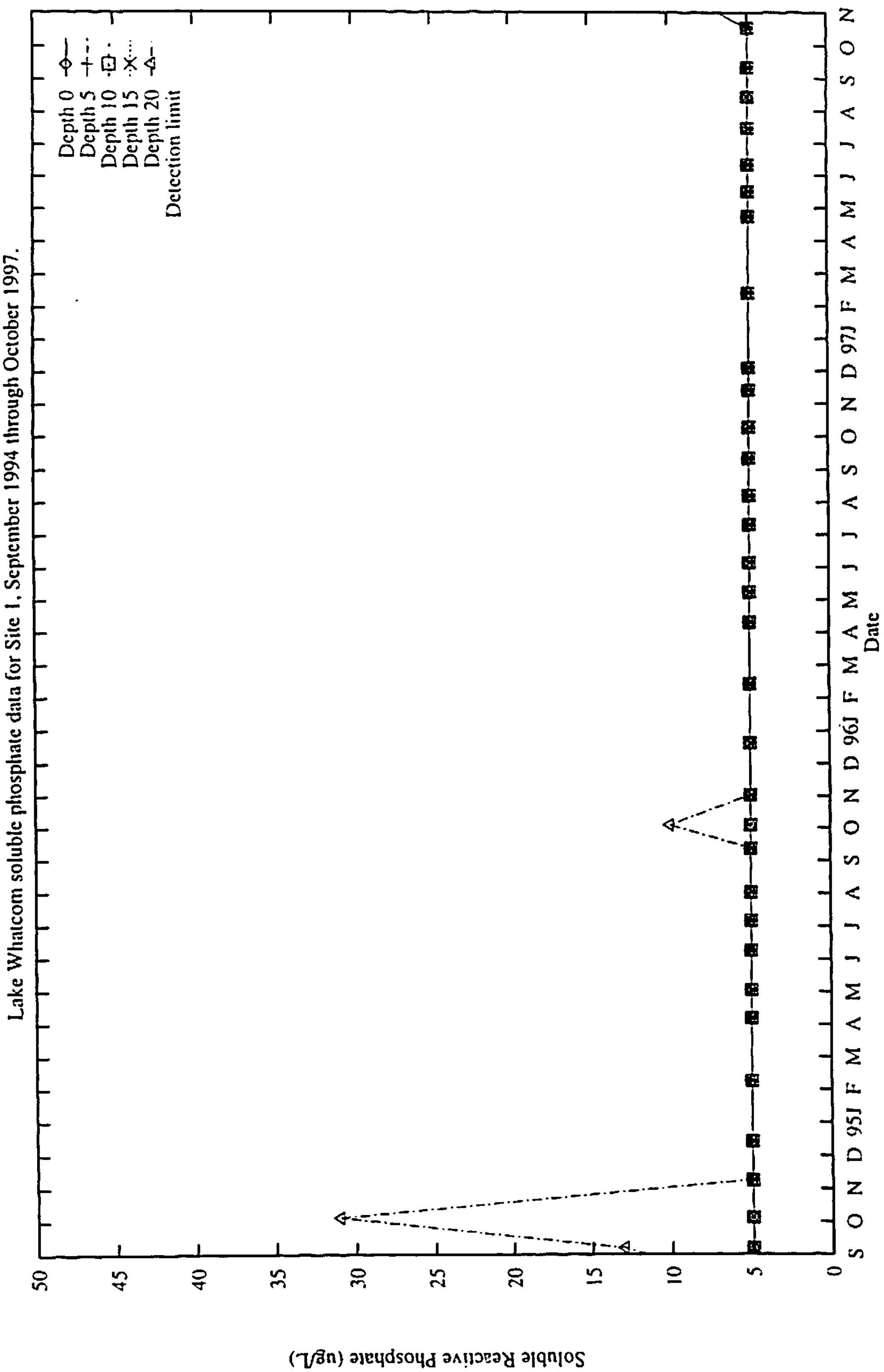


Figure 70: Lake Whatcom soluble phosphate data for Site 1.

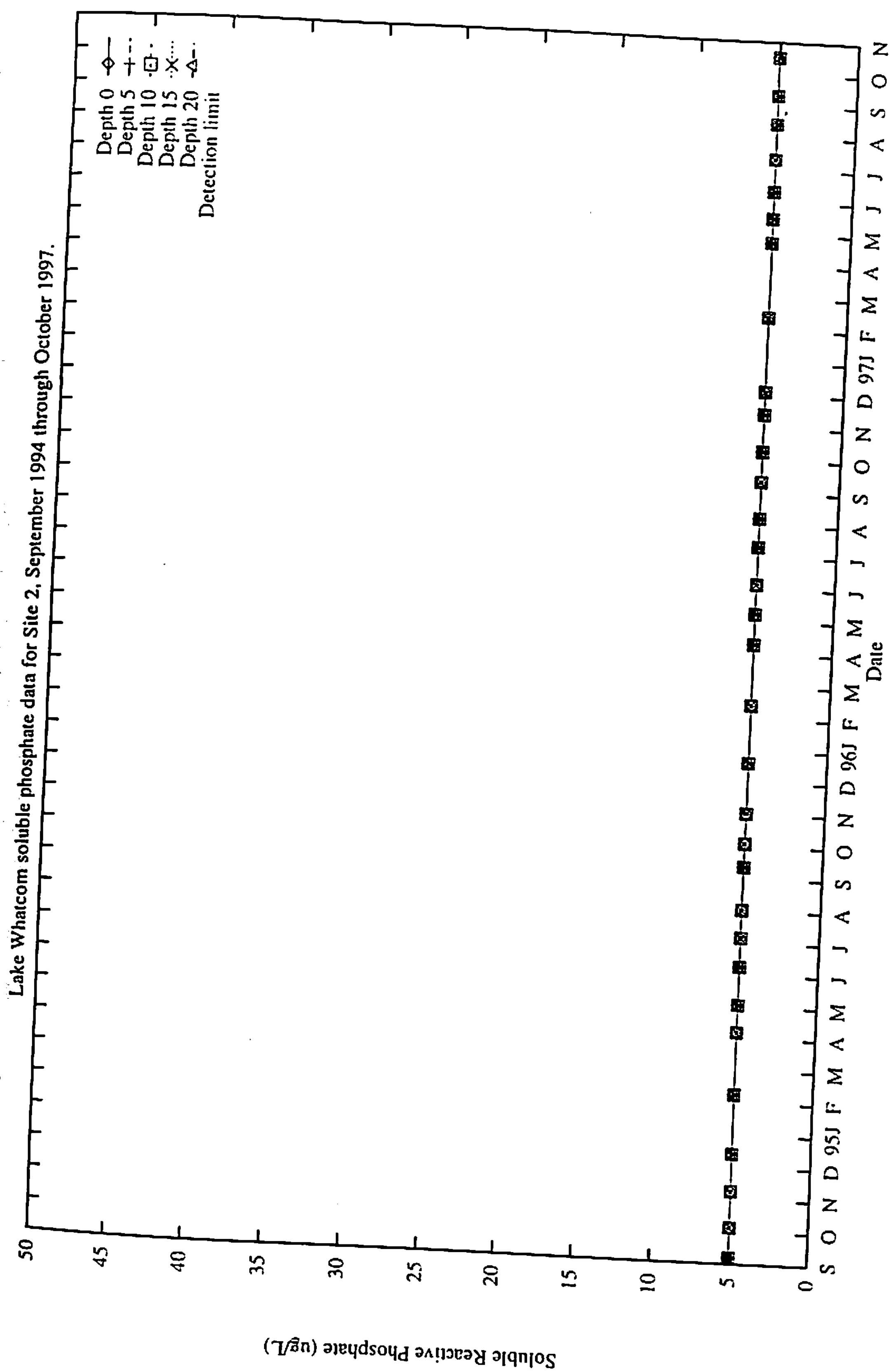


Figure 71: Lake Whatcom soluble phosphate data for Site 2.

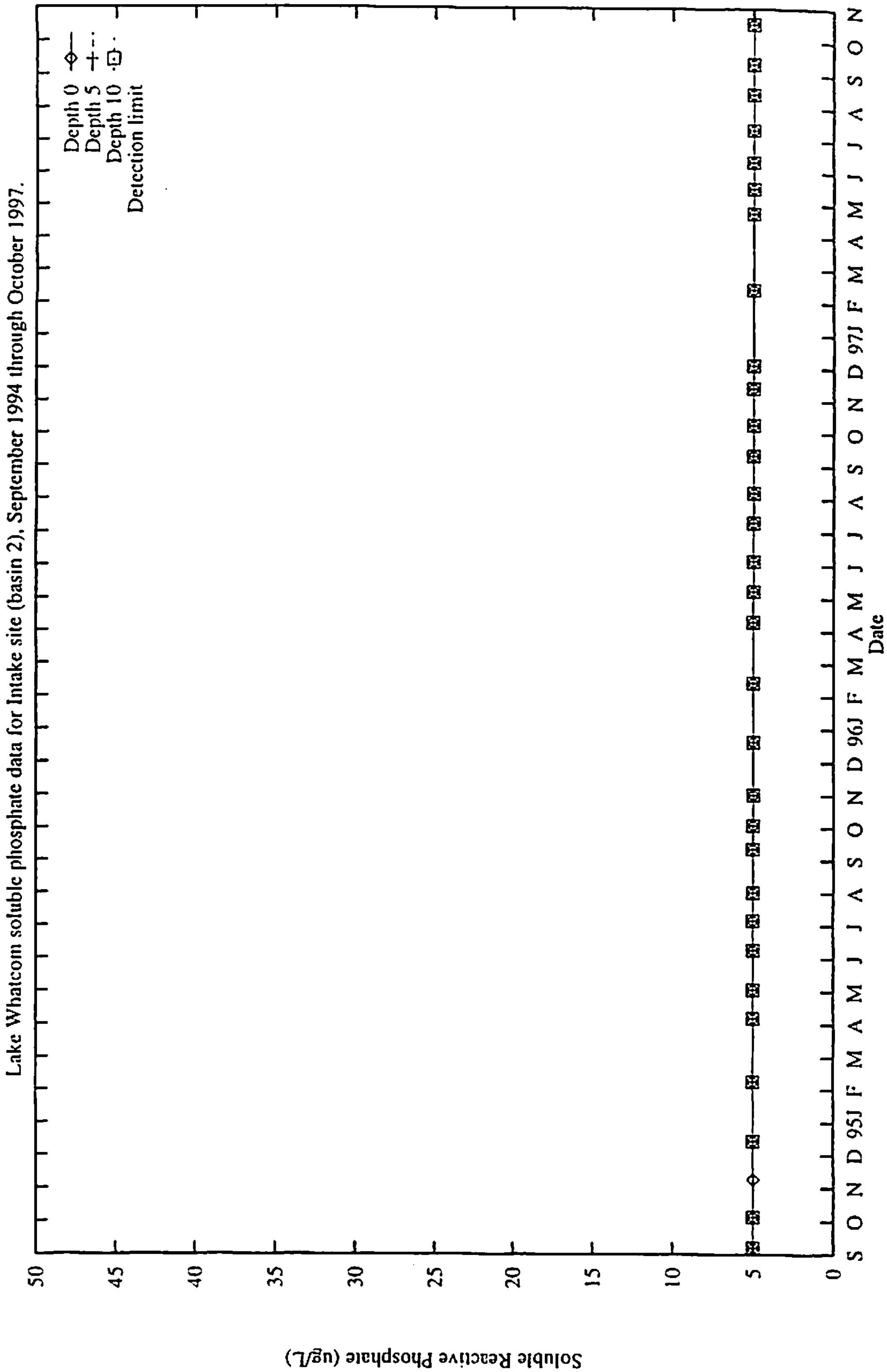


Figure 72: Lake Whatcom soluble phosphate data for the Intake site.

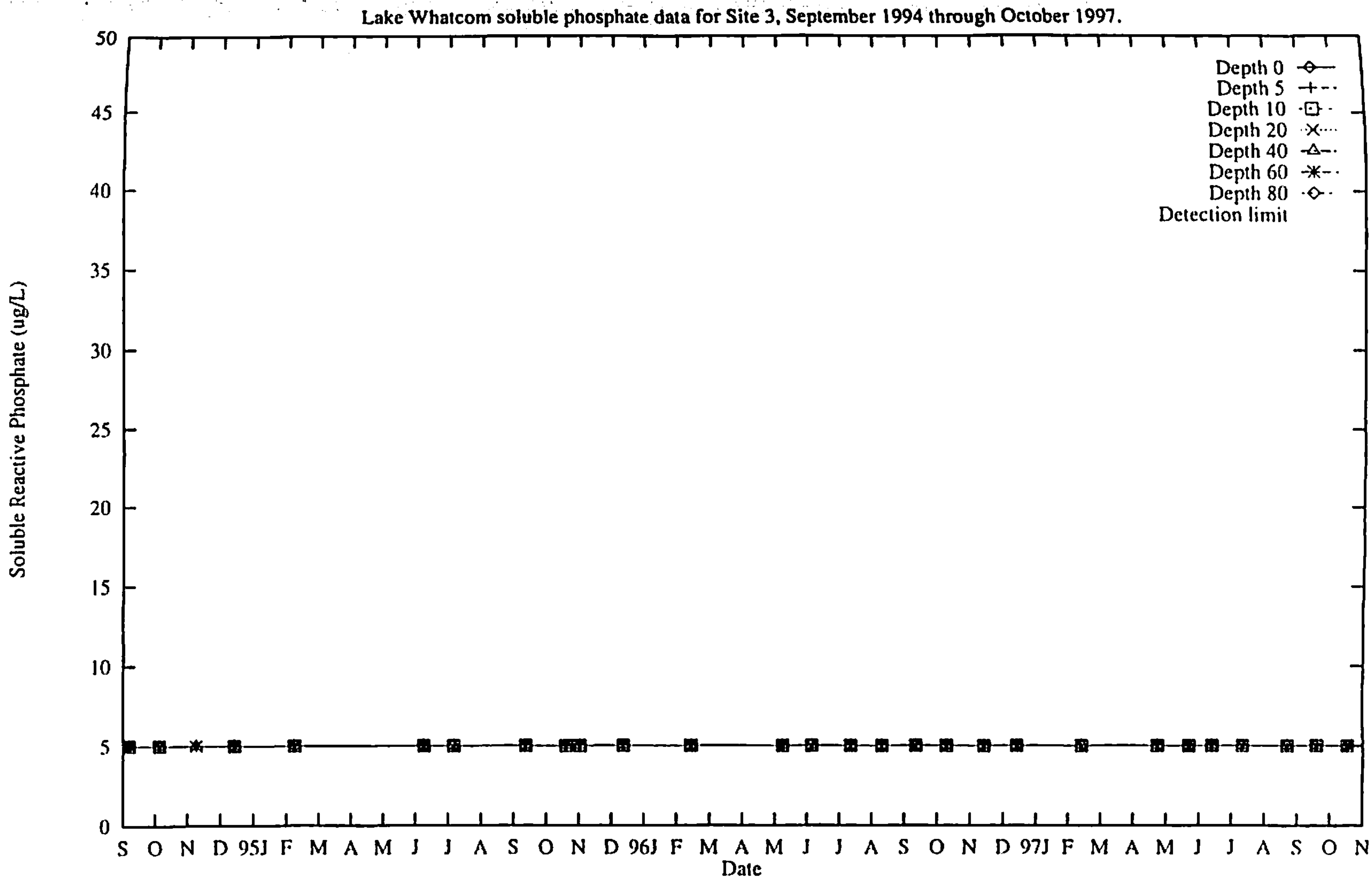


Figure 73: Lake Whatcom soluble phosphate data for Site 3.

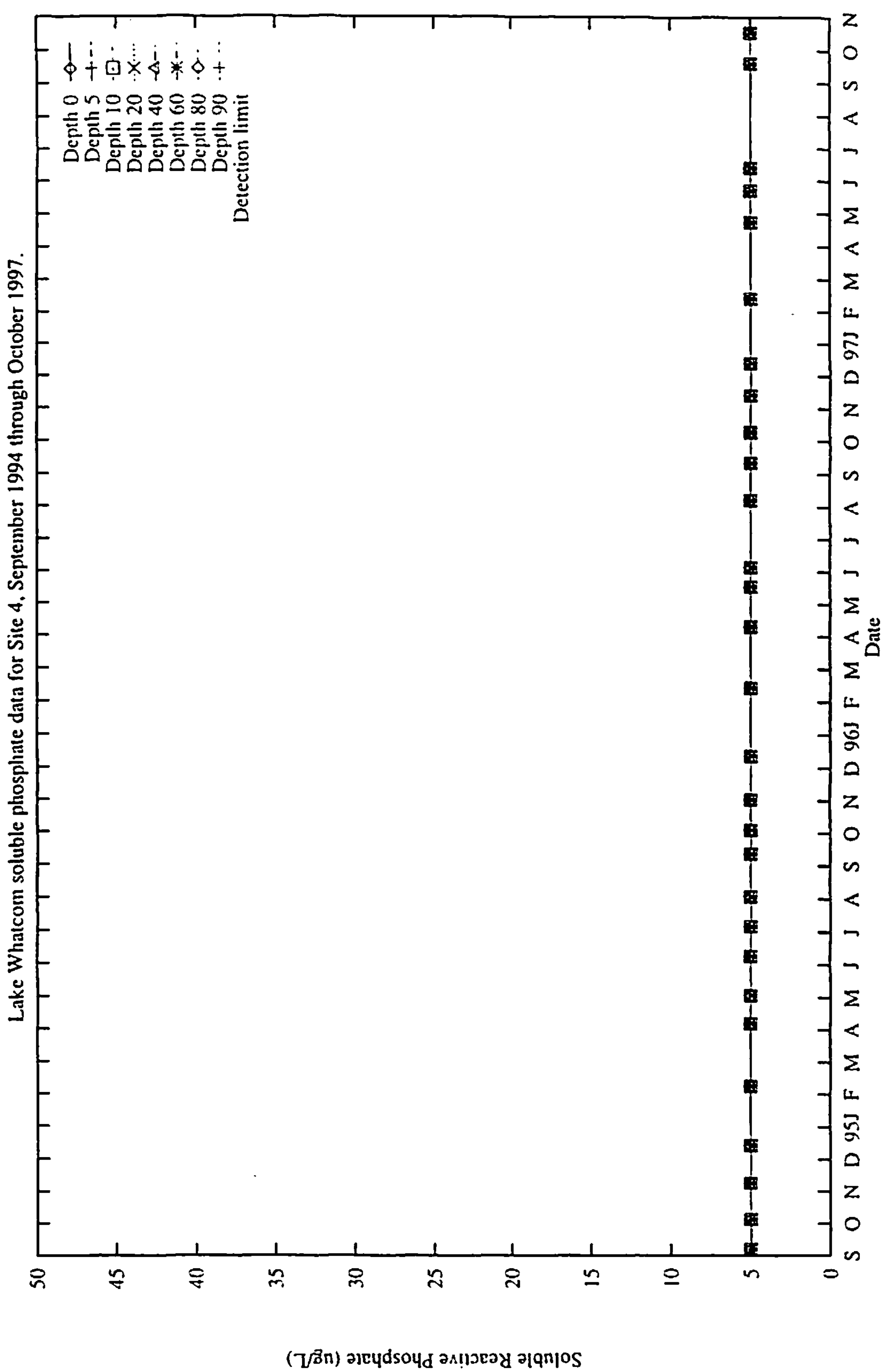


Figure 74: Lake Whatcom soluble phosphate data for Site 4.

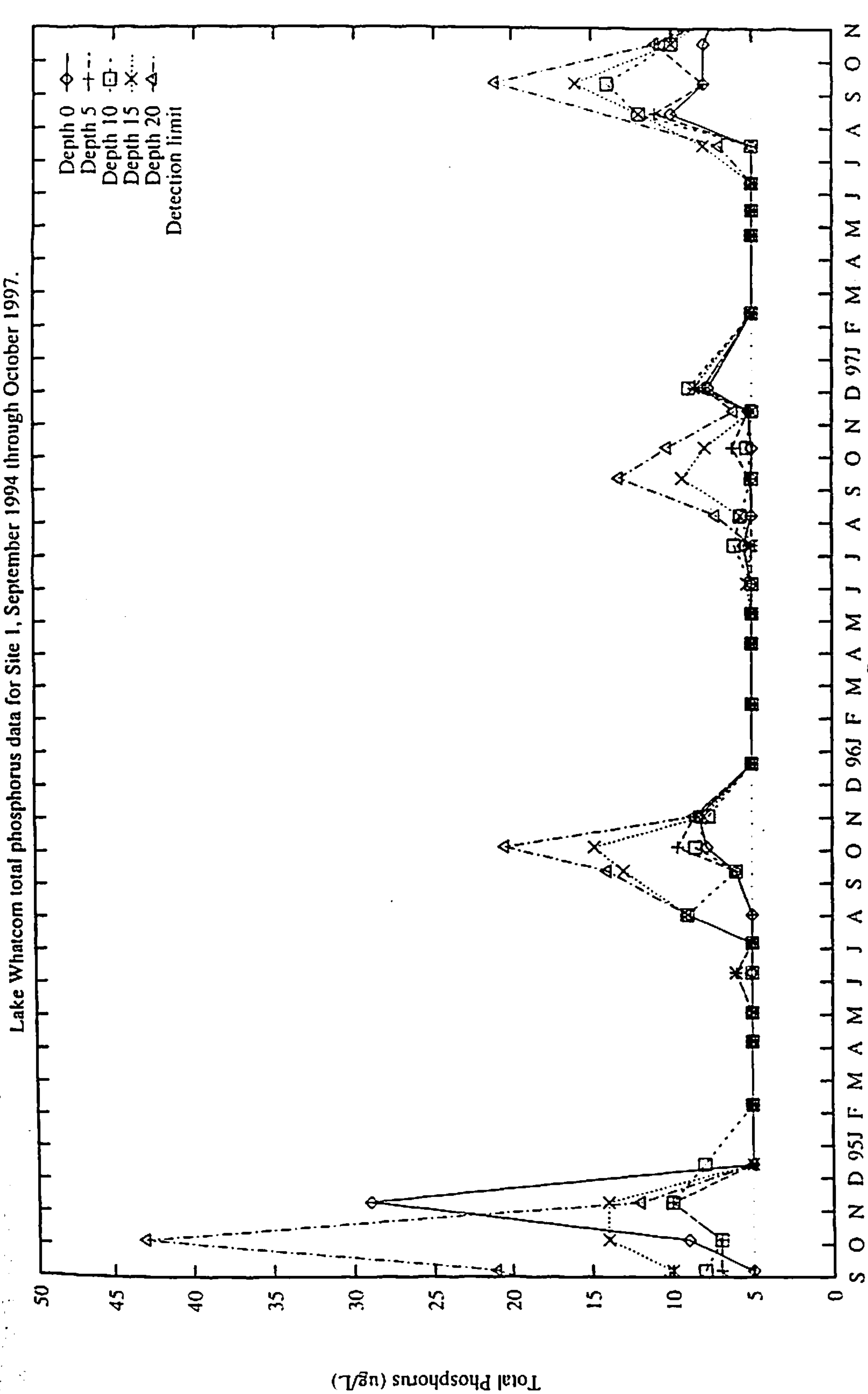


Figure 75: Lake Whatcom total phosphorus data for Site 1.

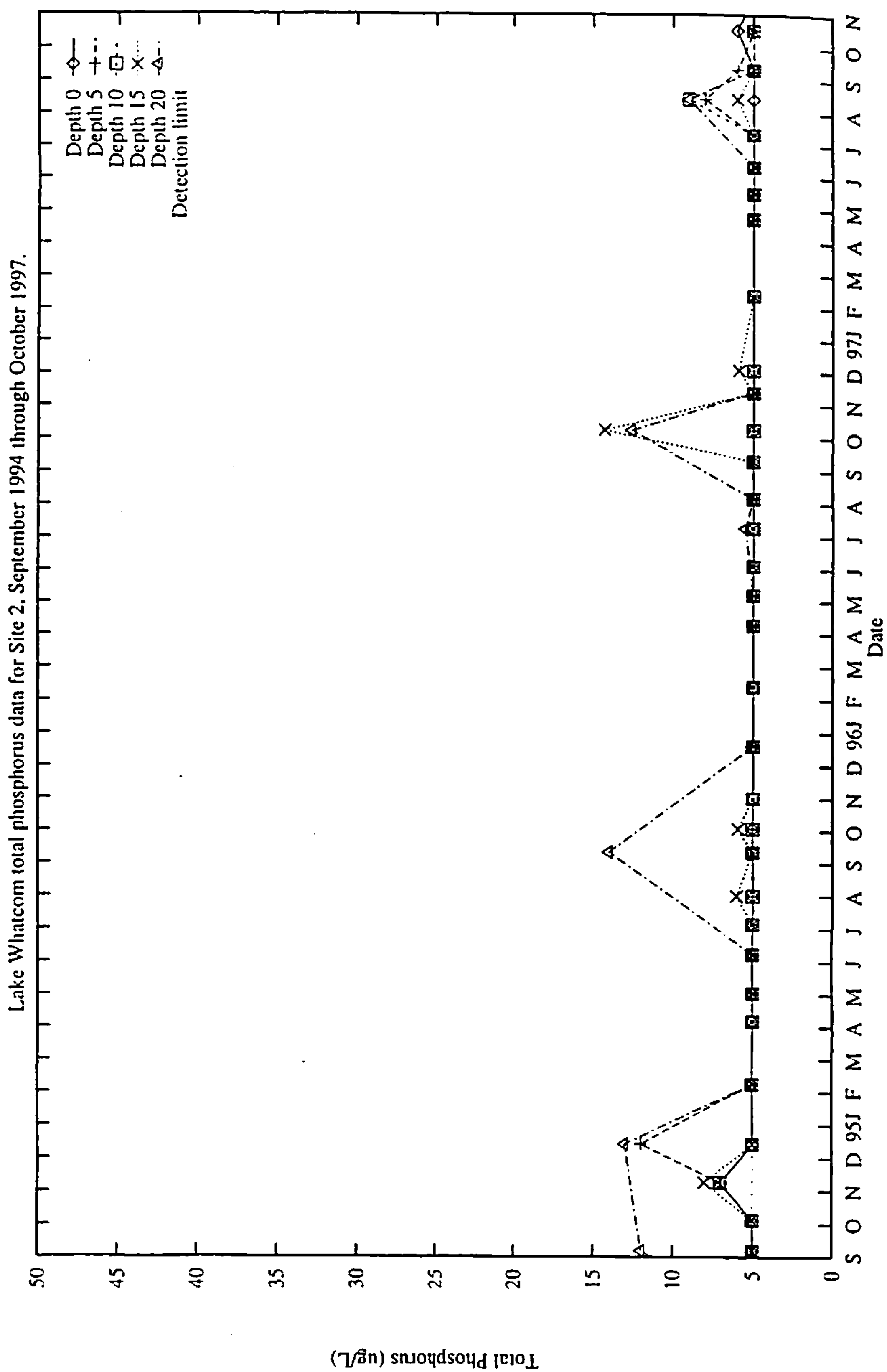


Figure 76: Lake Whatcom total phosphorus data for Site 2.

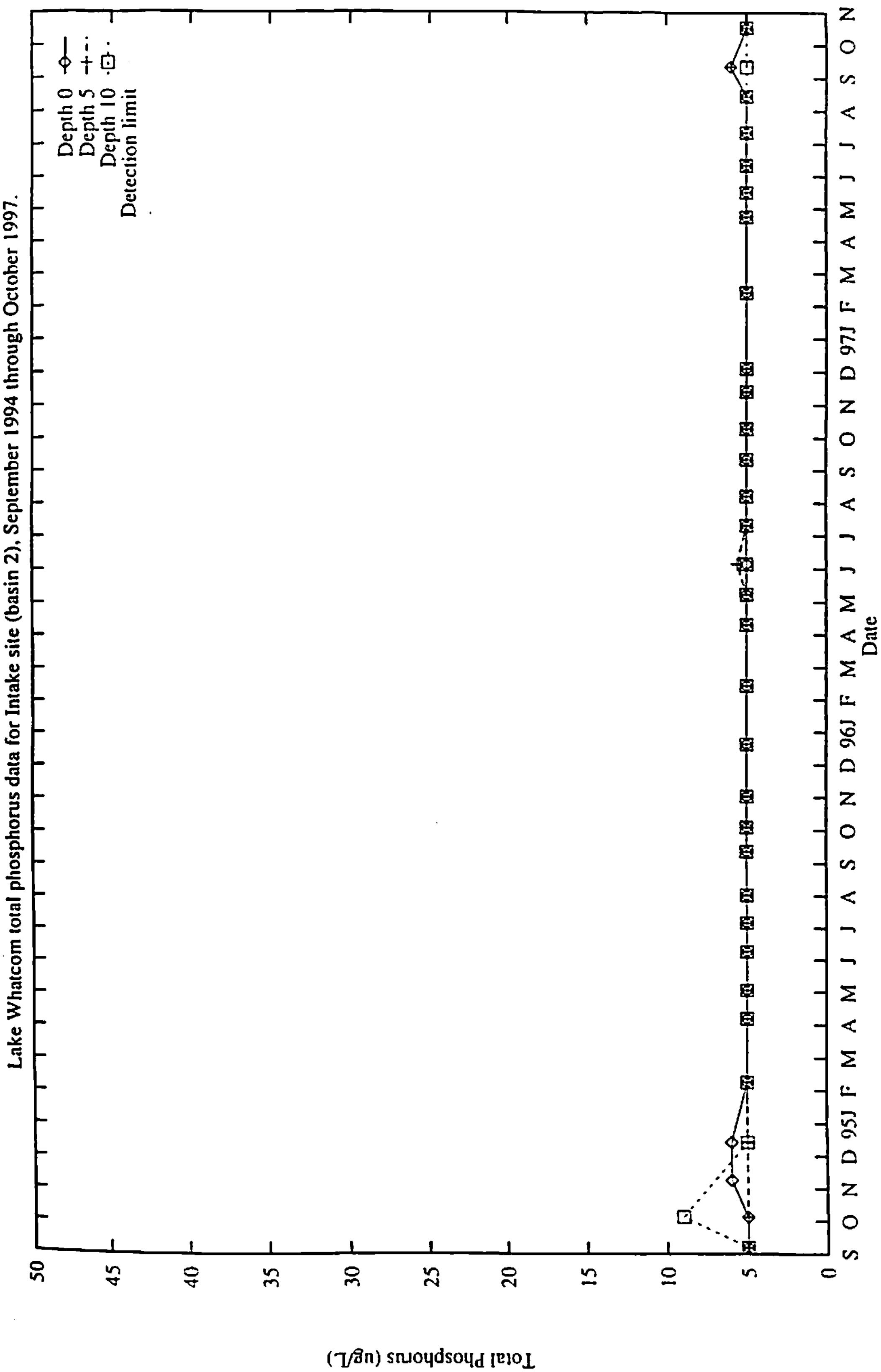


Figure 77: Lake Whatcom total phosphorus data for the Intake site.

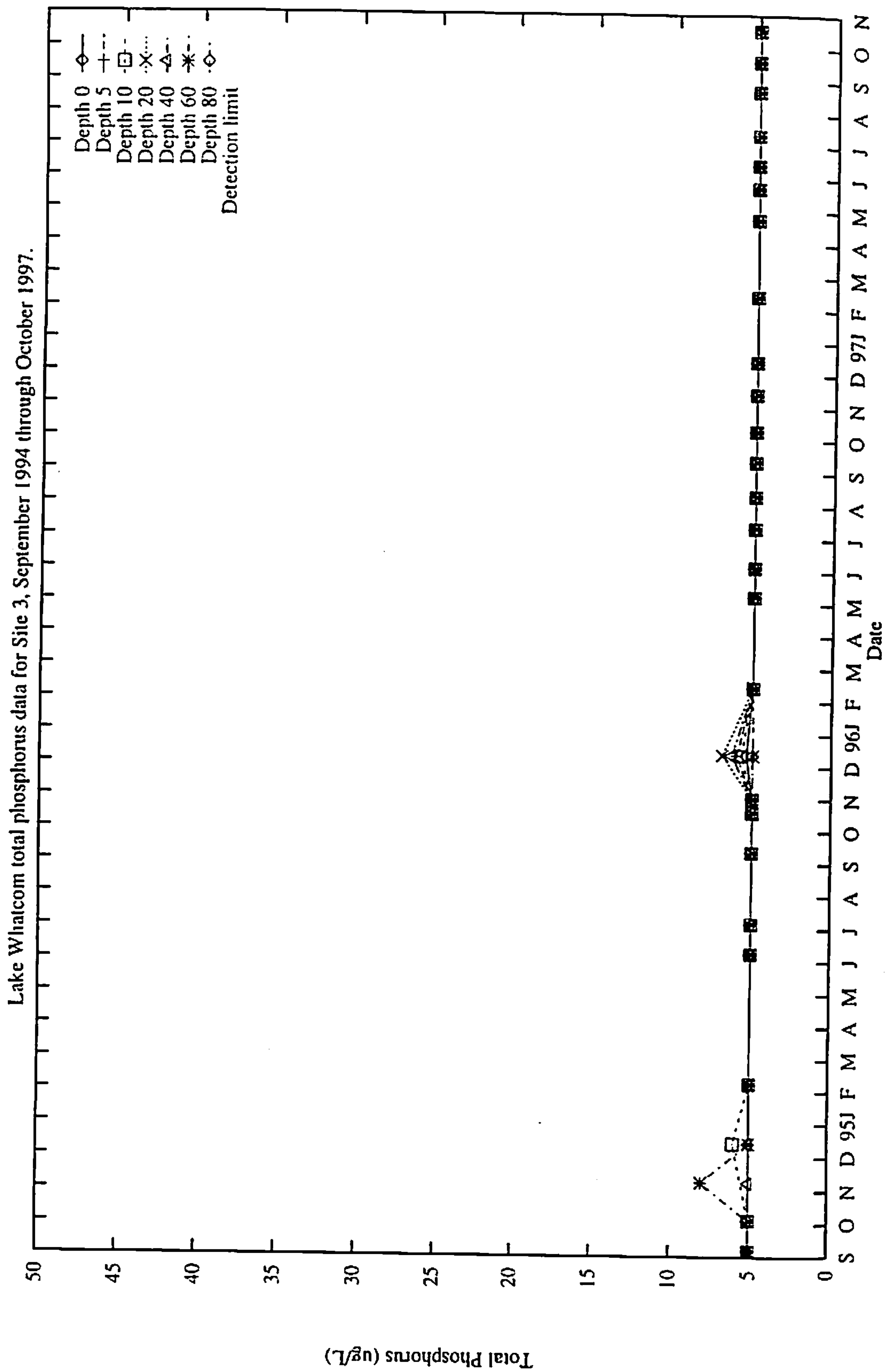


Figure 78: Lake Whatcom total phosphorus data for Site 3.

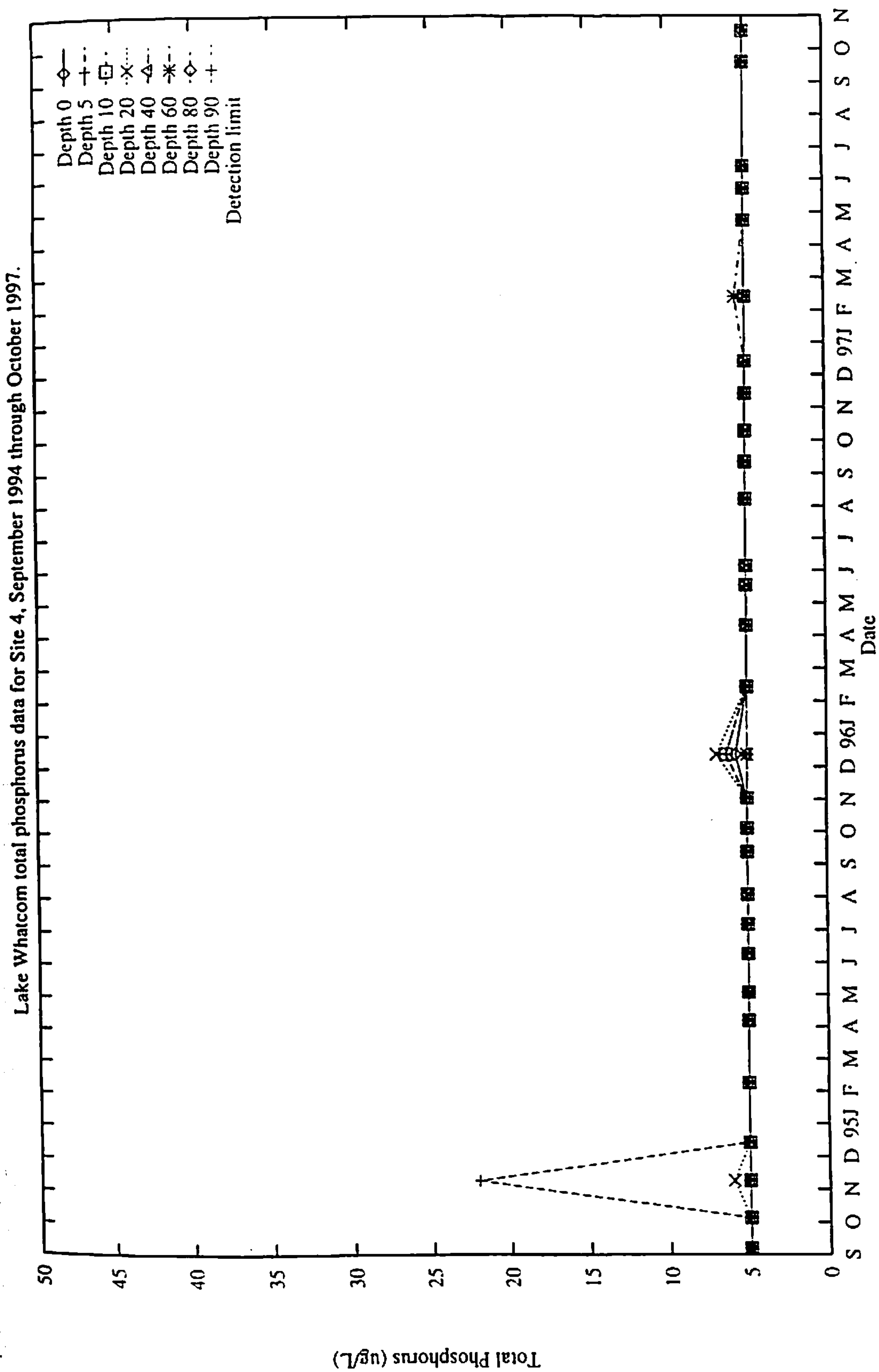


Figure 79: Lake Whatcom total phosphorus data for Site 4.

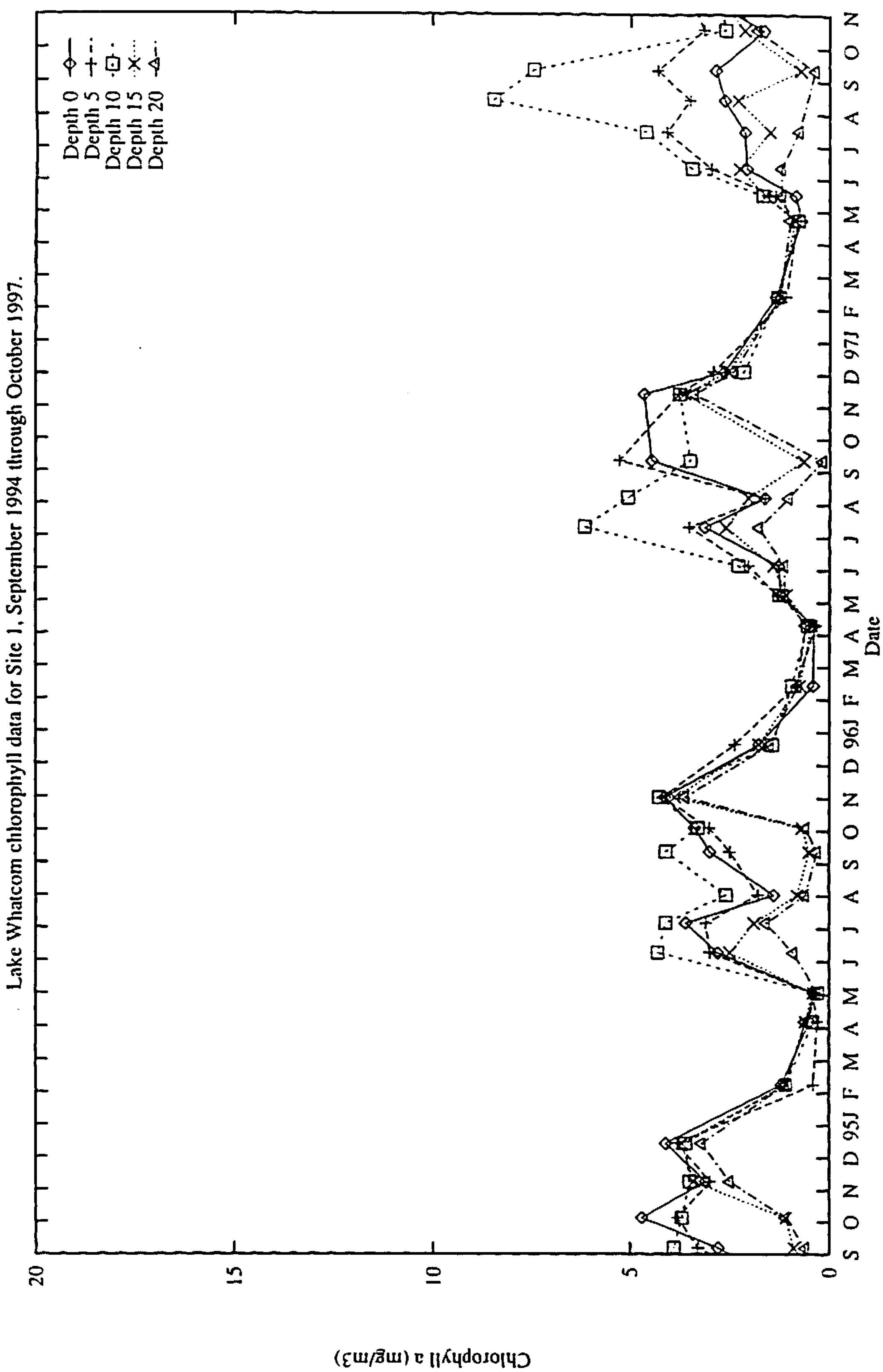


Figure 80: Lake Whatcom chlorophyll data for Site 1.

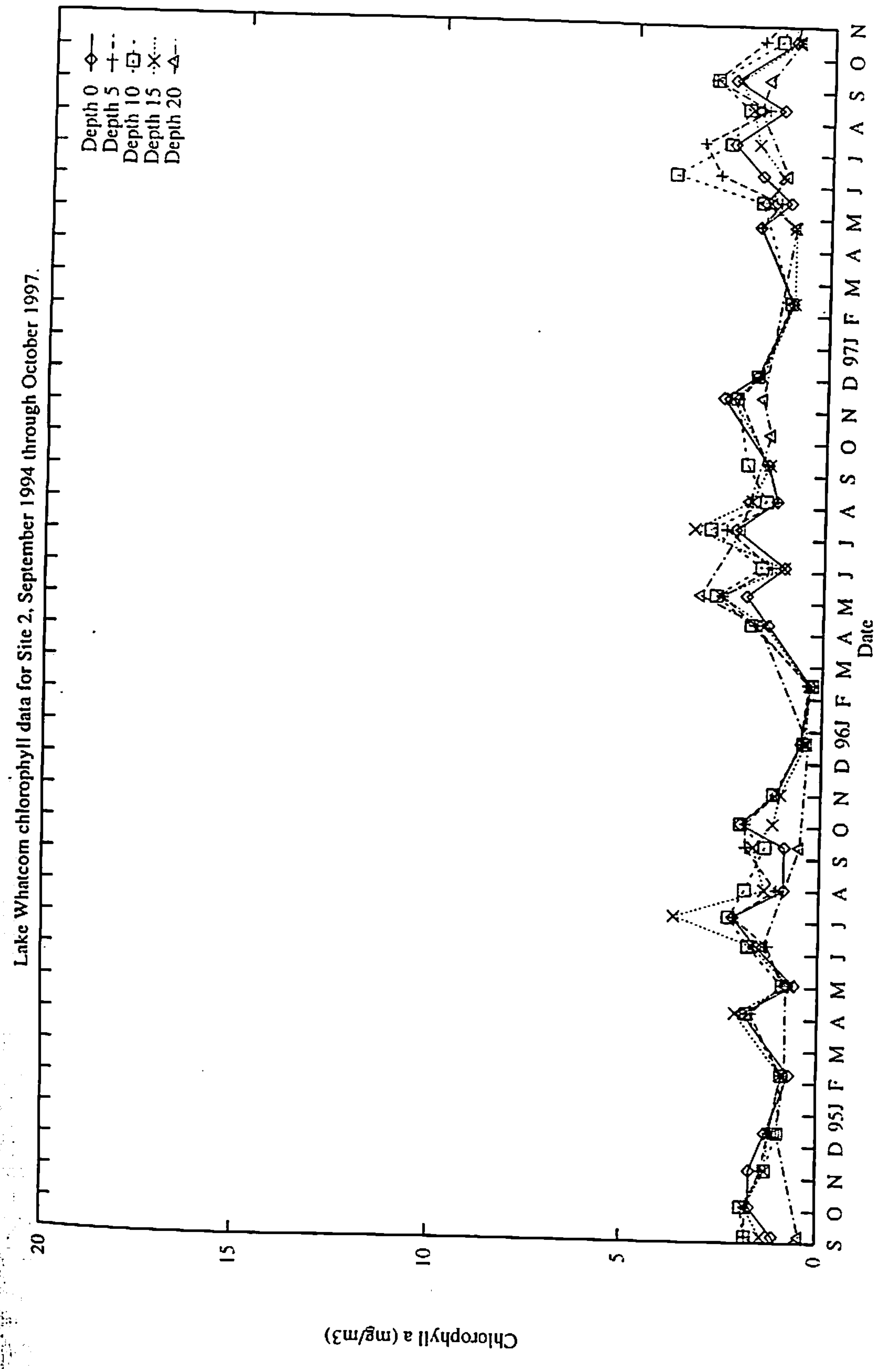


Figure 81: Lake Whatcom chlorophyll data for Site 2.

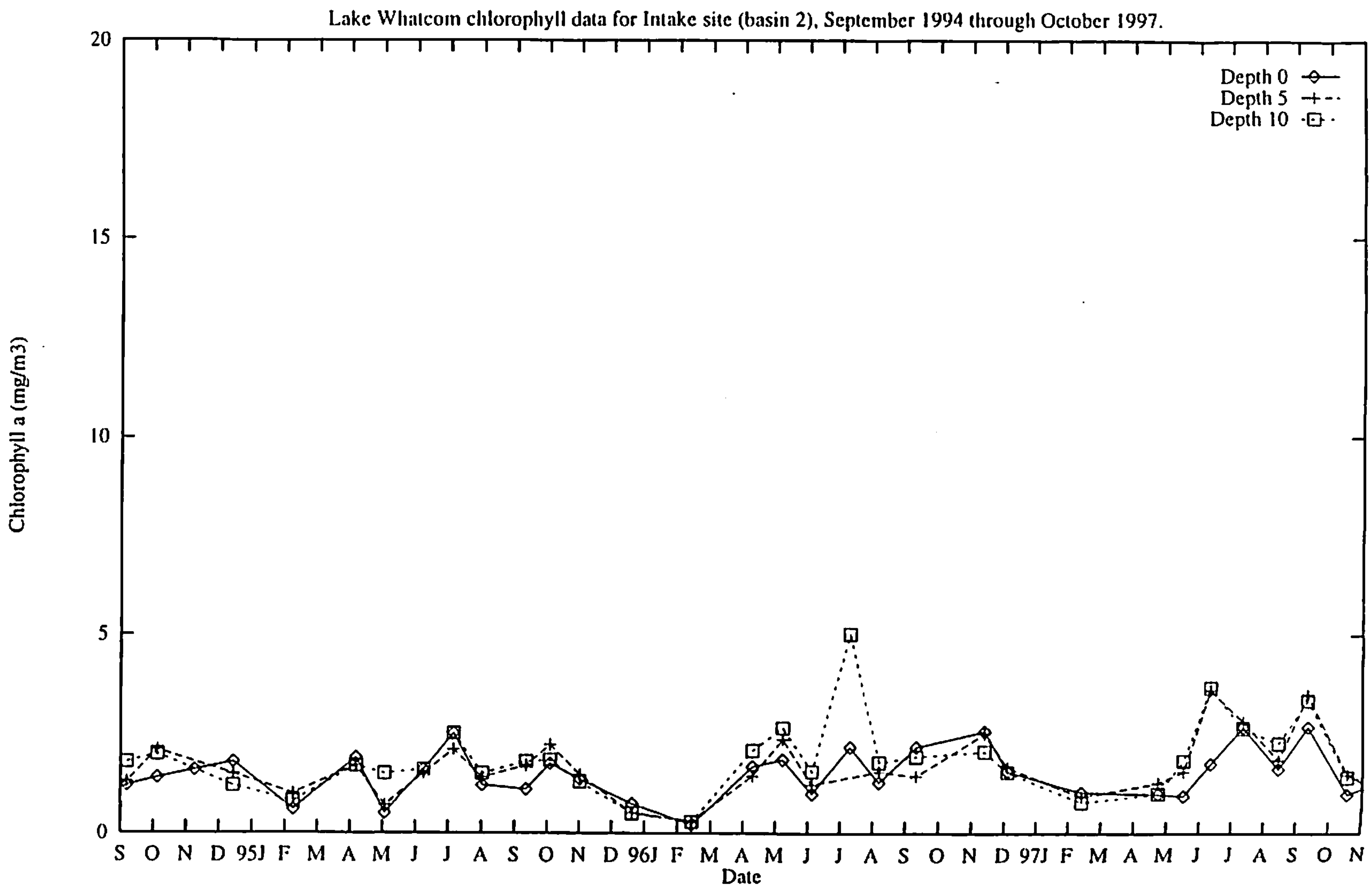


Figure 82: Lake Whatcom chlorophyll data for the Intake site.

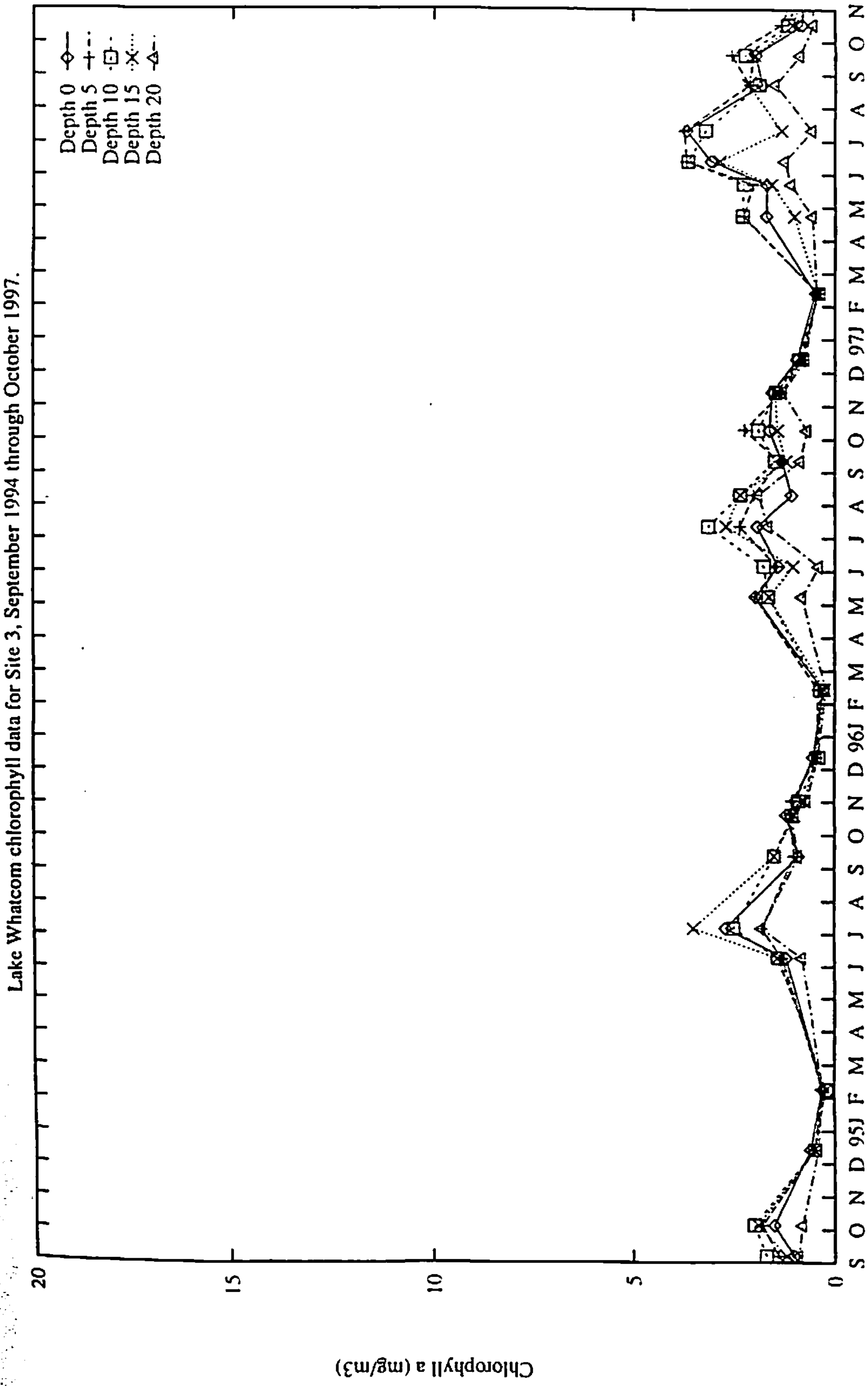


Figure 83: Lake Whatcom chlorophyll data for Site 3.

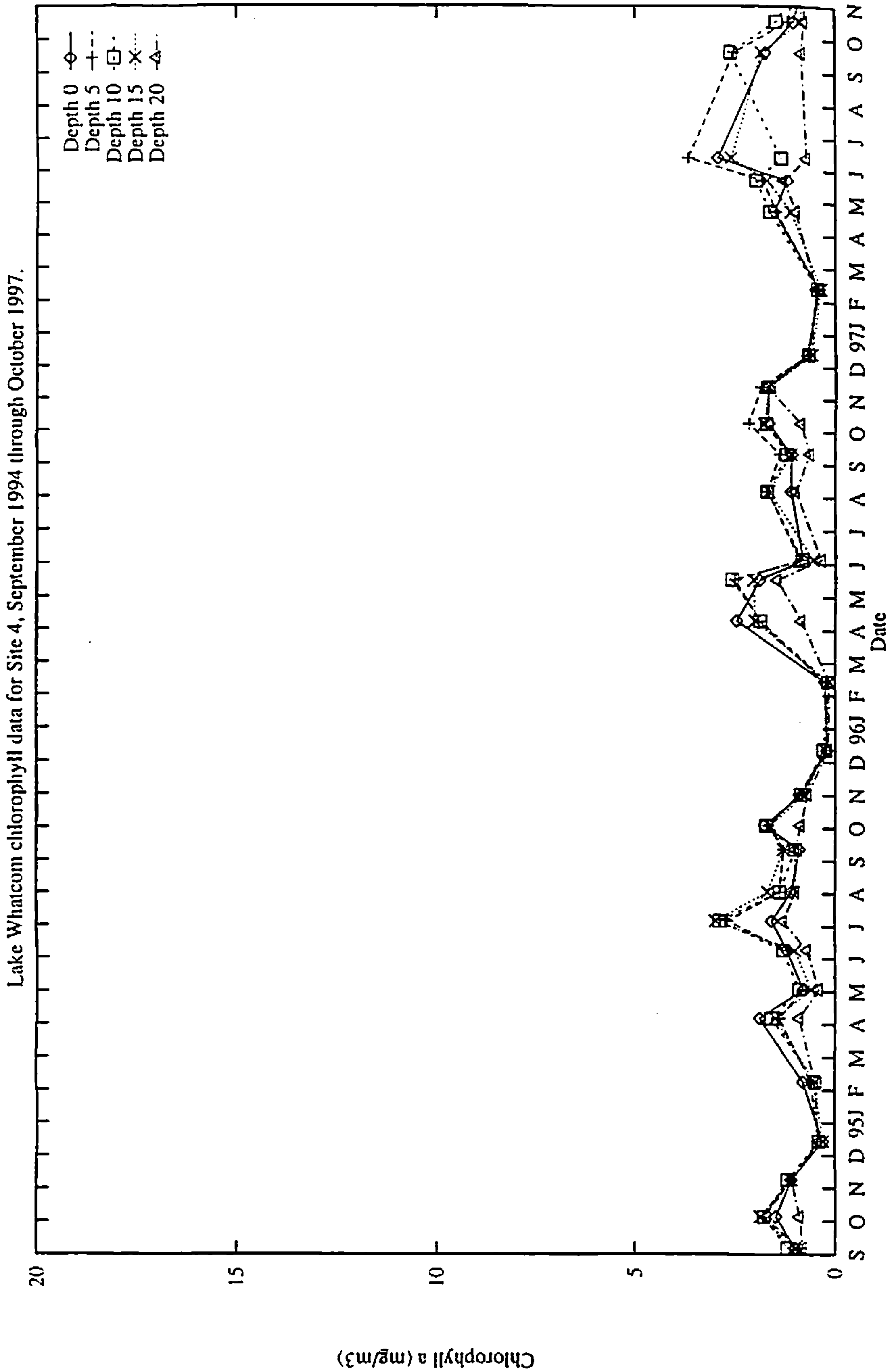


Figure 84: Lake Whatcom chlorophyll data for Site 4.

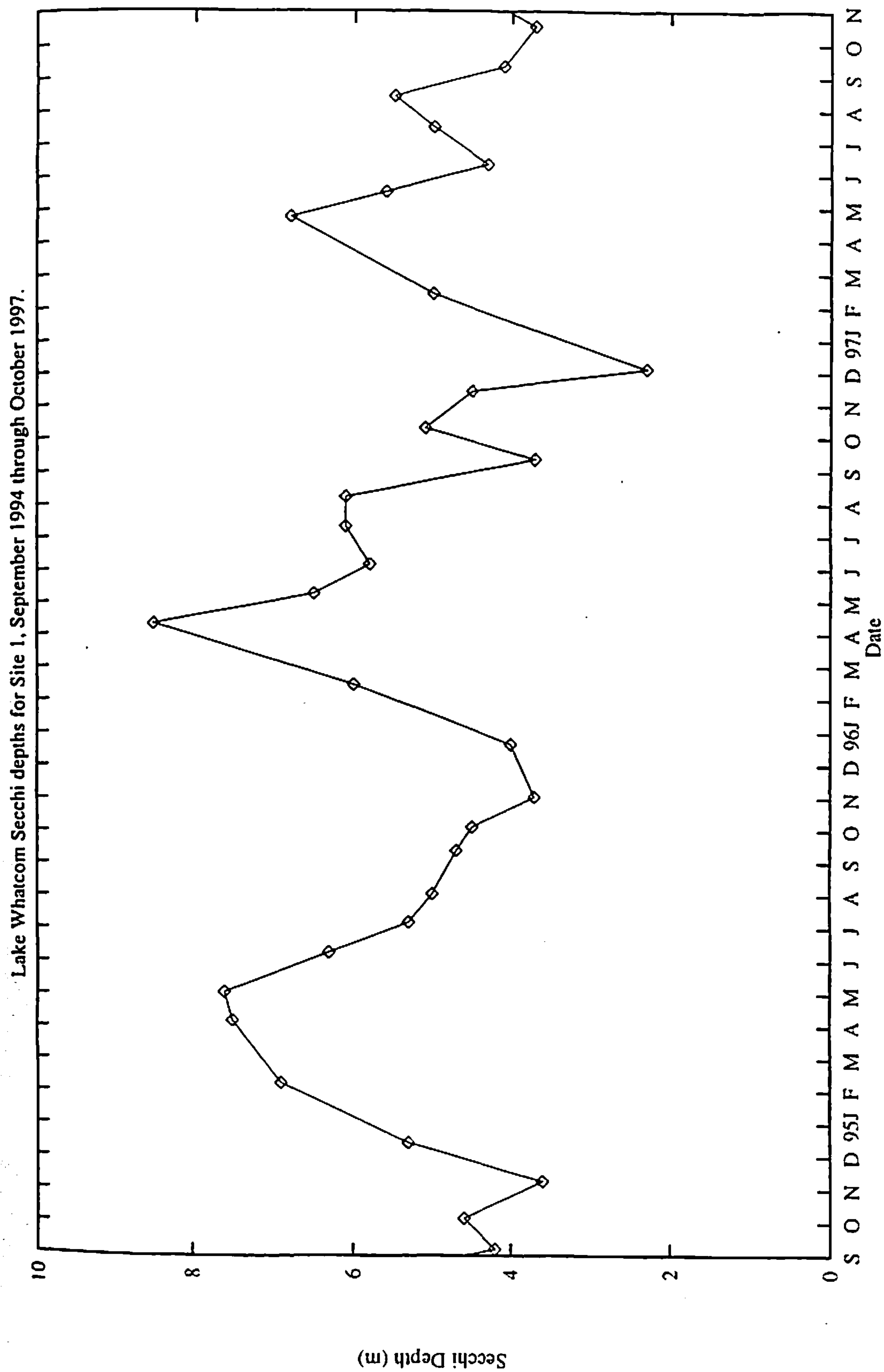


Figure 85: Lake Whatcom Secchi depths for Site 1.

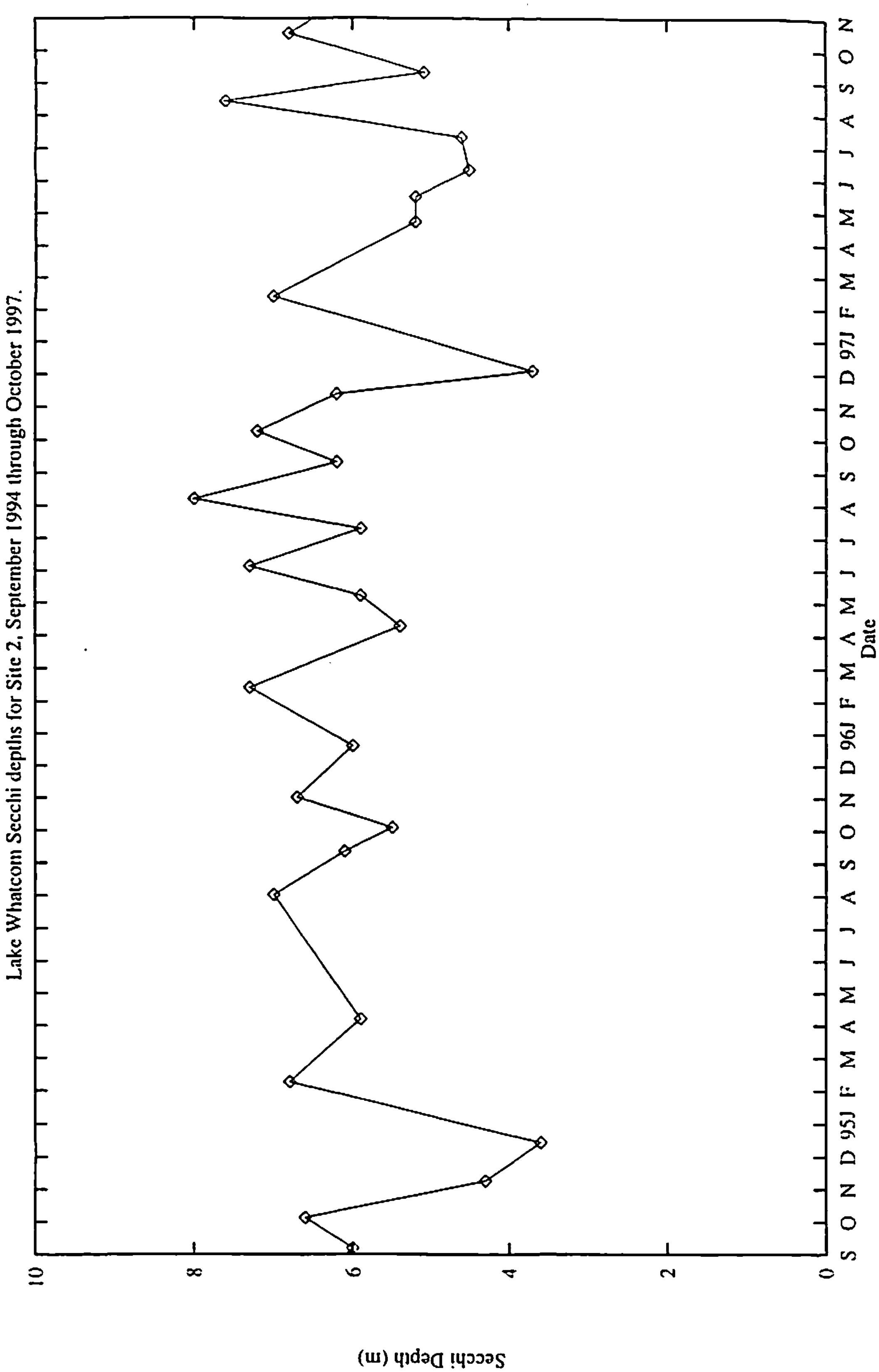


Figure 86: Lake Whatcom Secchi depths for Site 2.

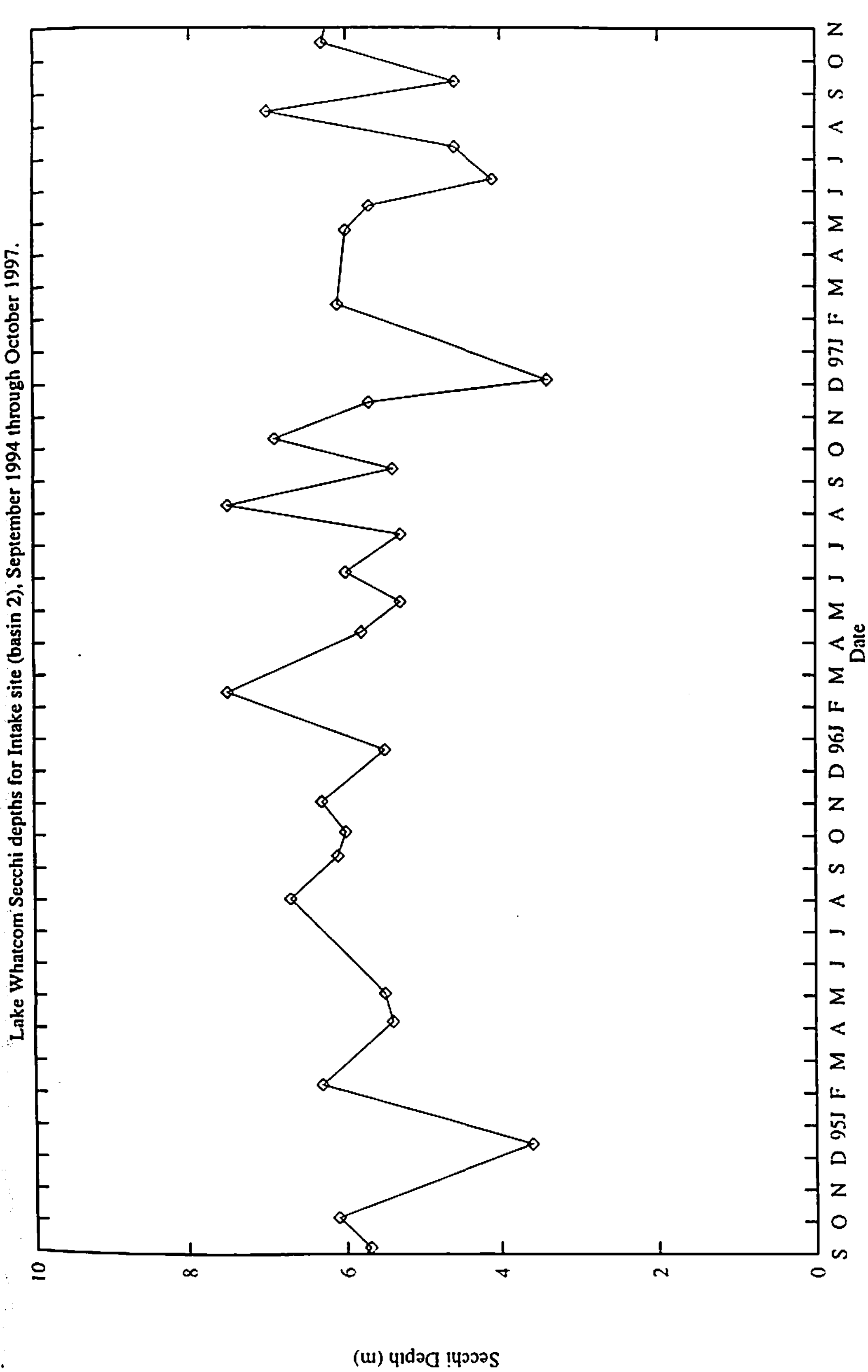


Figure 87: Lake Whatcom Secchi depths for the Intake site.

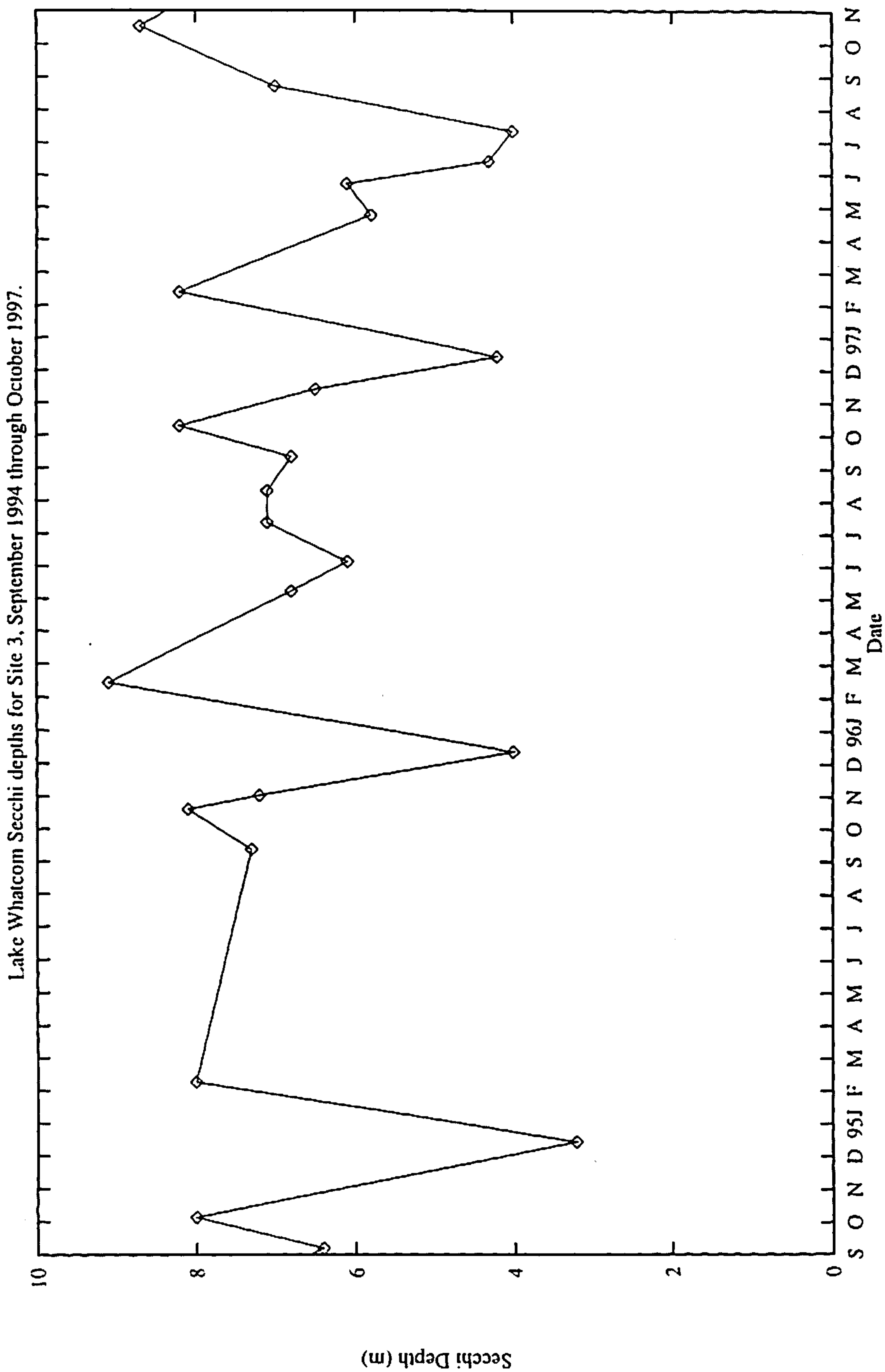


Figure 88: Lake Whatcom Secchi depths for Site 3.

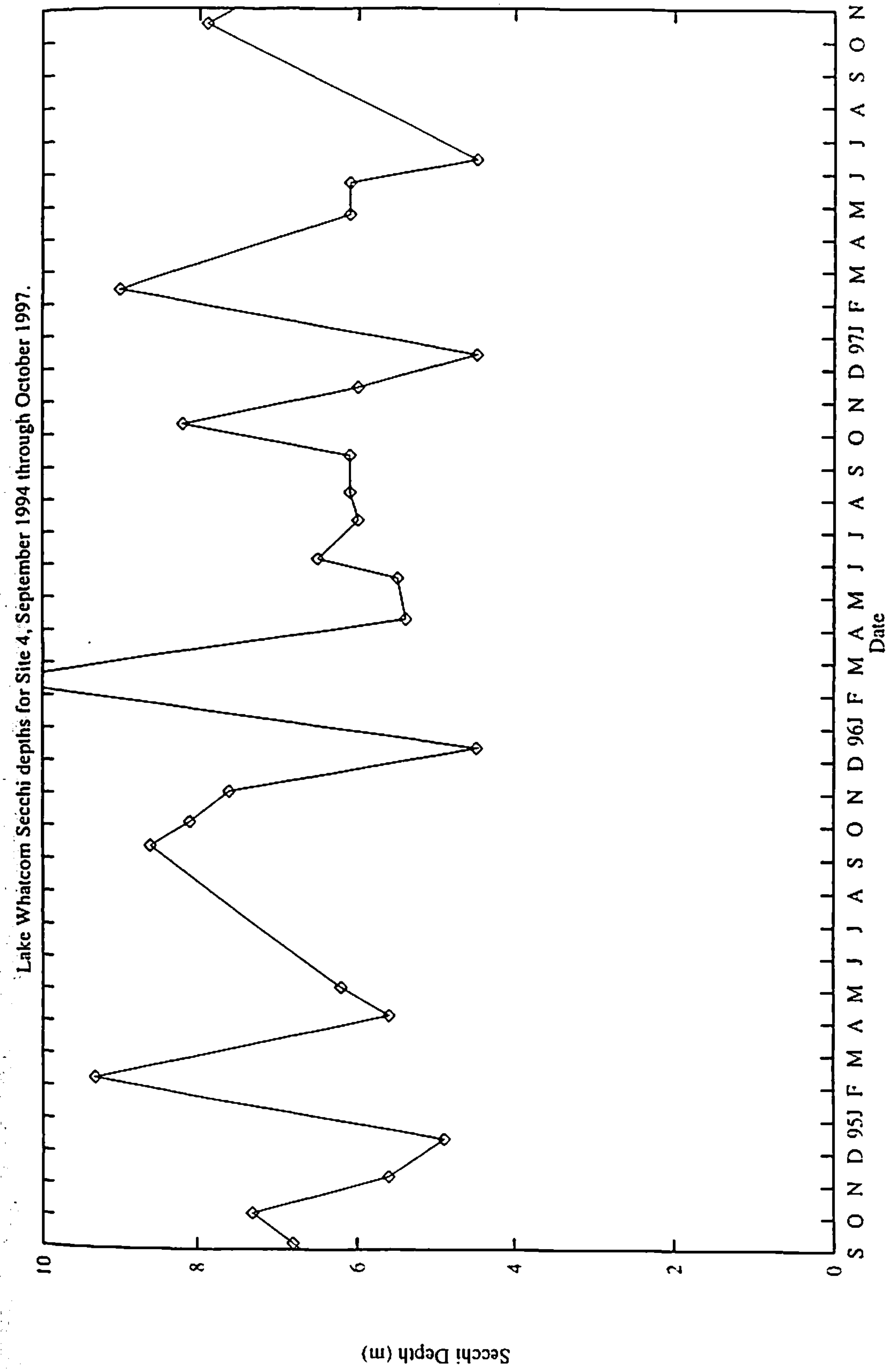


Figure 89: Lake Whatcom Secchi depths for Site 4.

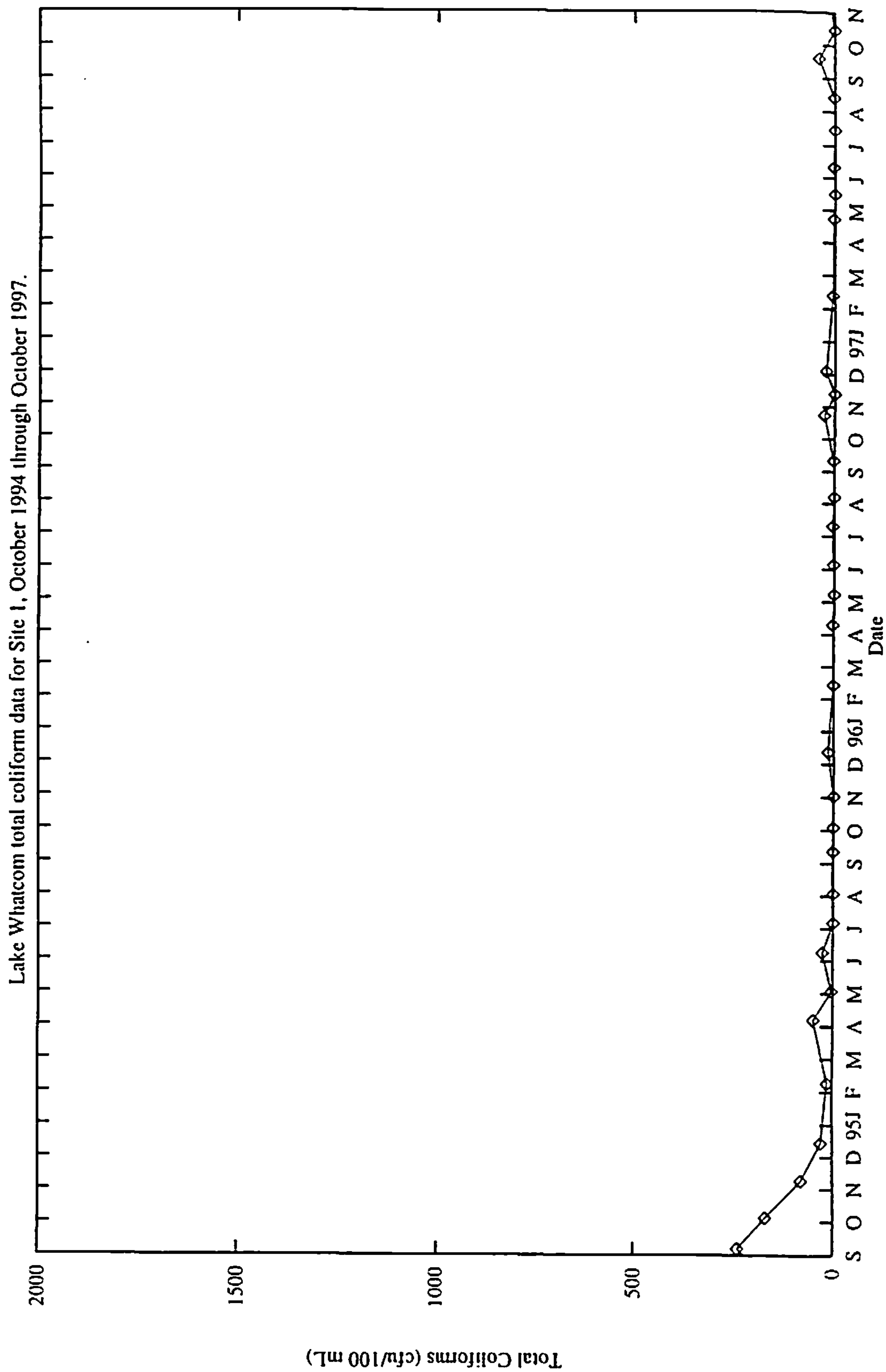


Figure 90: Lake Whatcom total coliform data for Site 1.

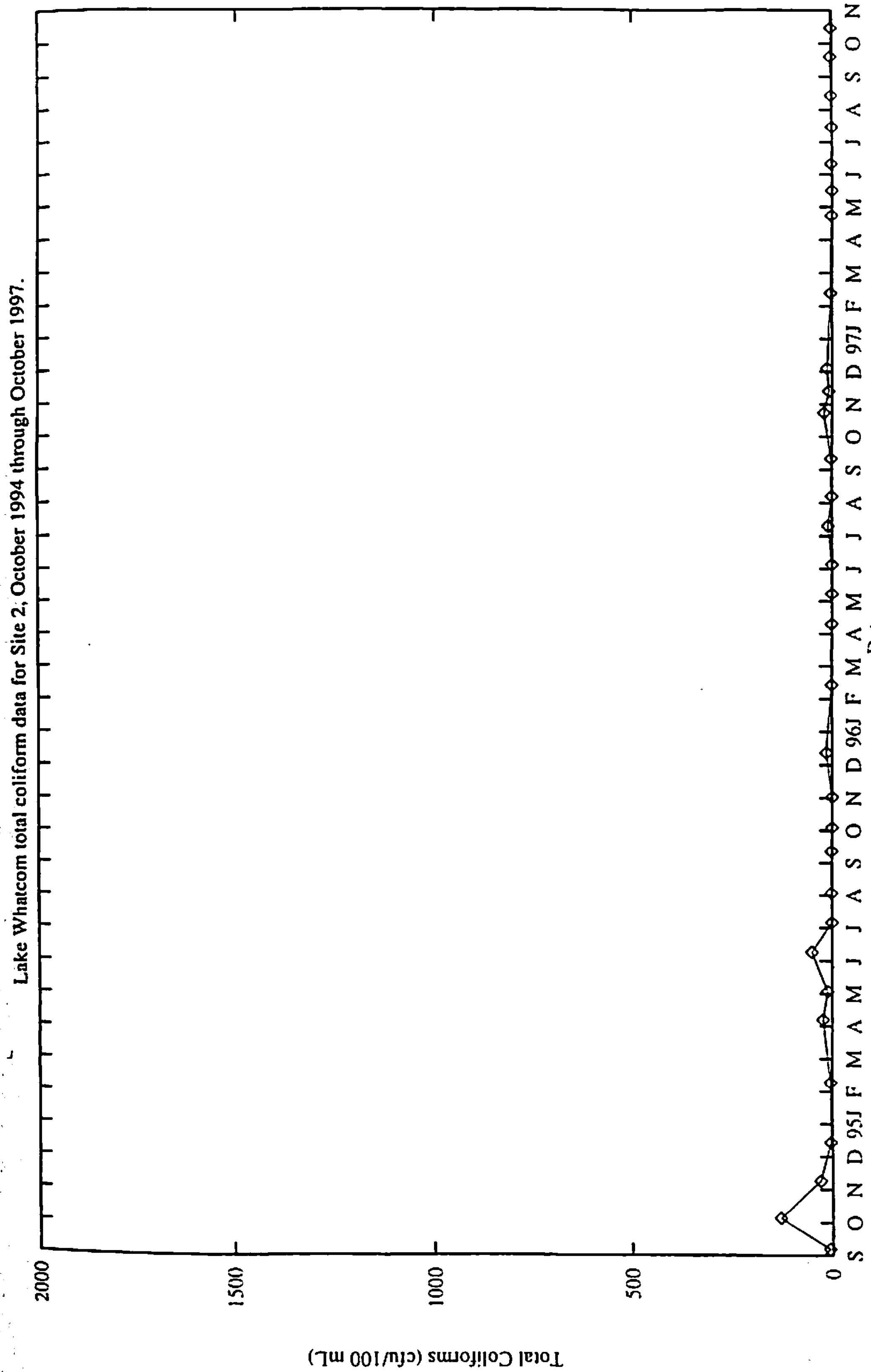


Figure 91: Lake Whatcom total coliform data for Site 2.

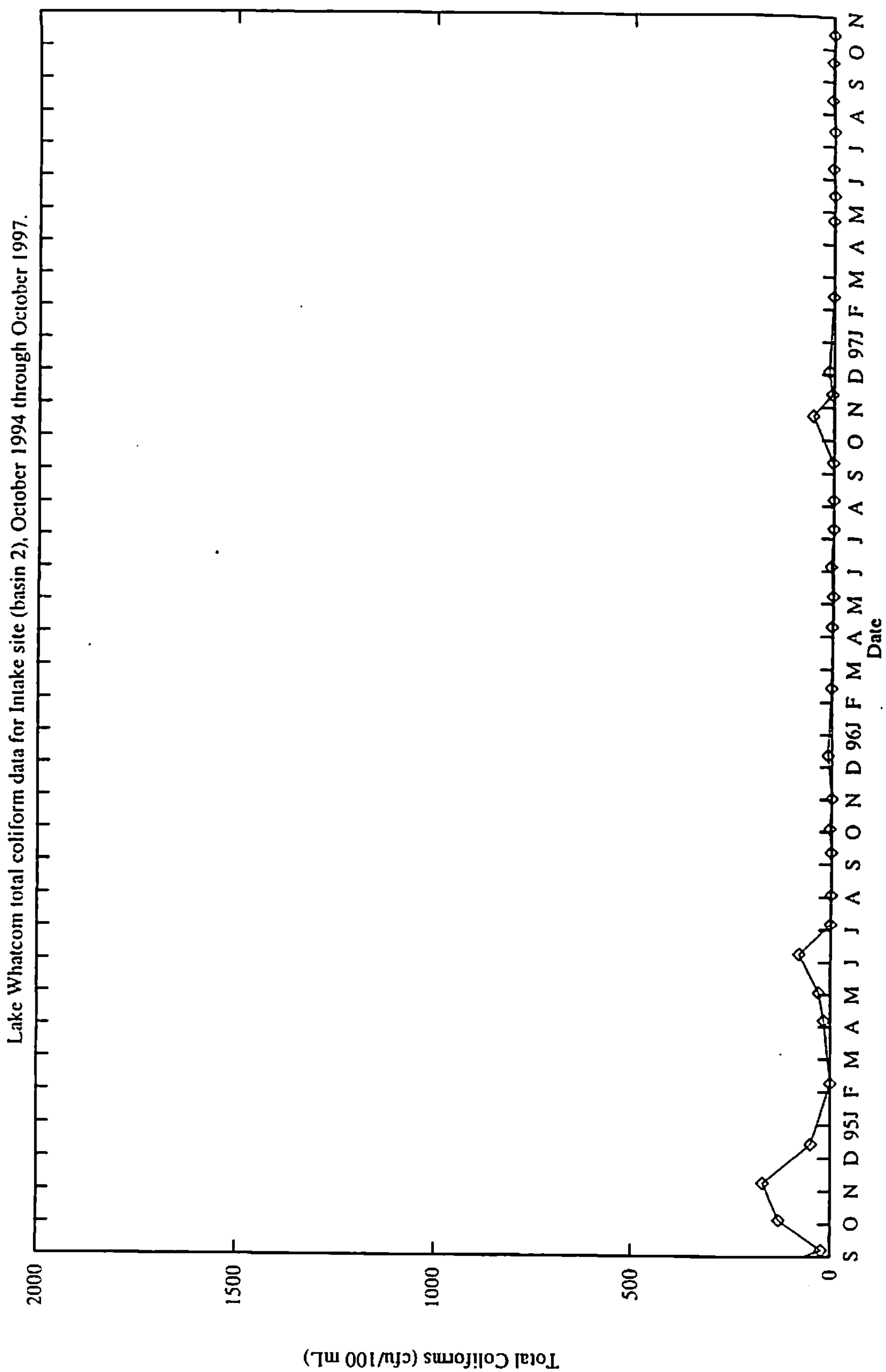


Figure 92: Lake Whatcom total coliform data for the Intake site.

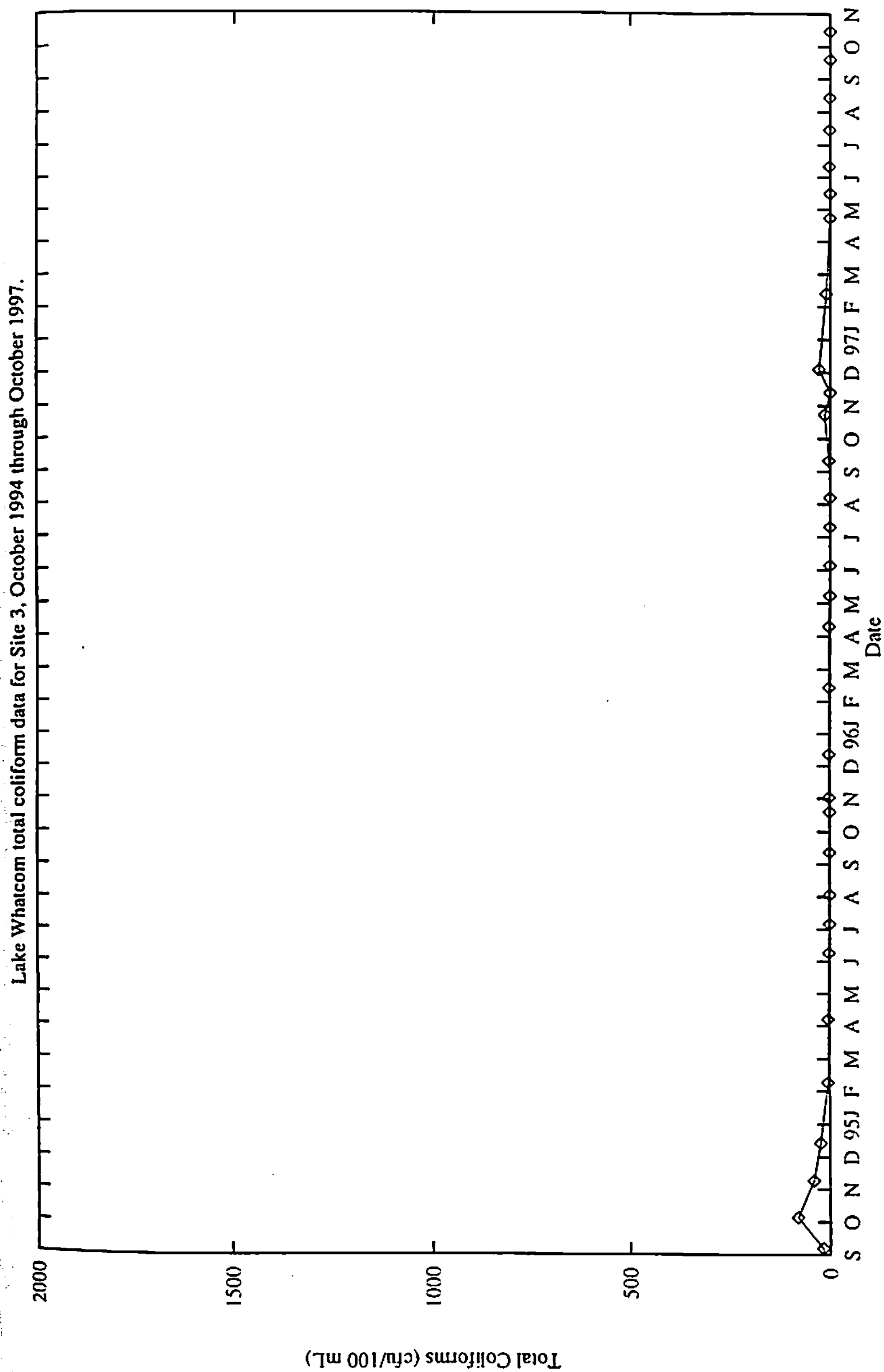


Figure 93: Lake Whatcom total coliform data for Site 3.

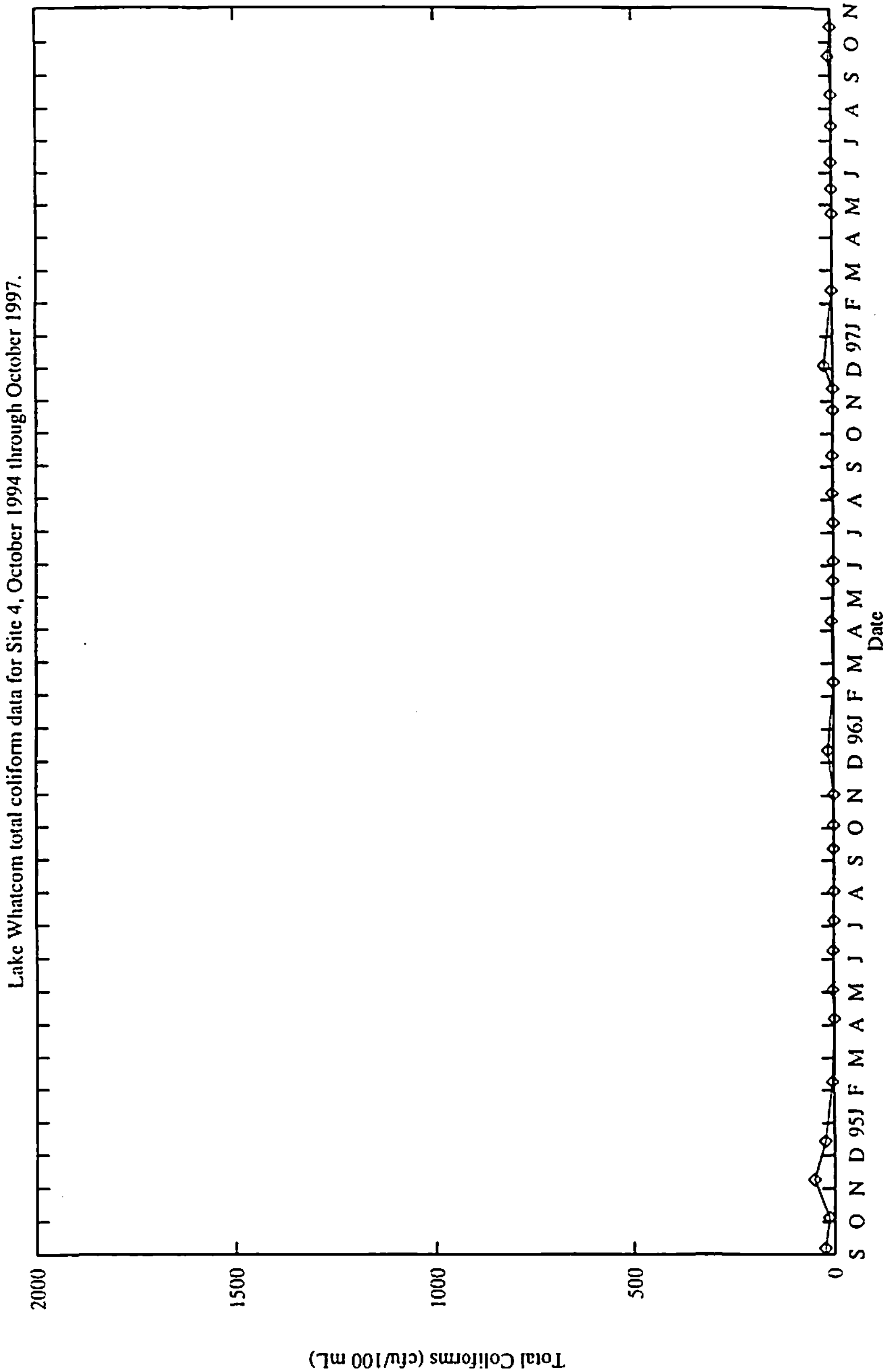


Figure 94: Lake Whatcom total coliform data for Site 4.

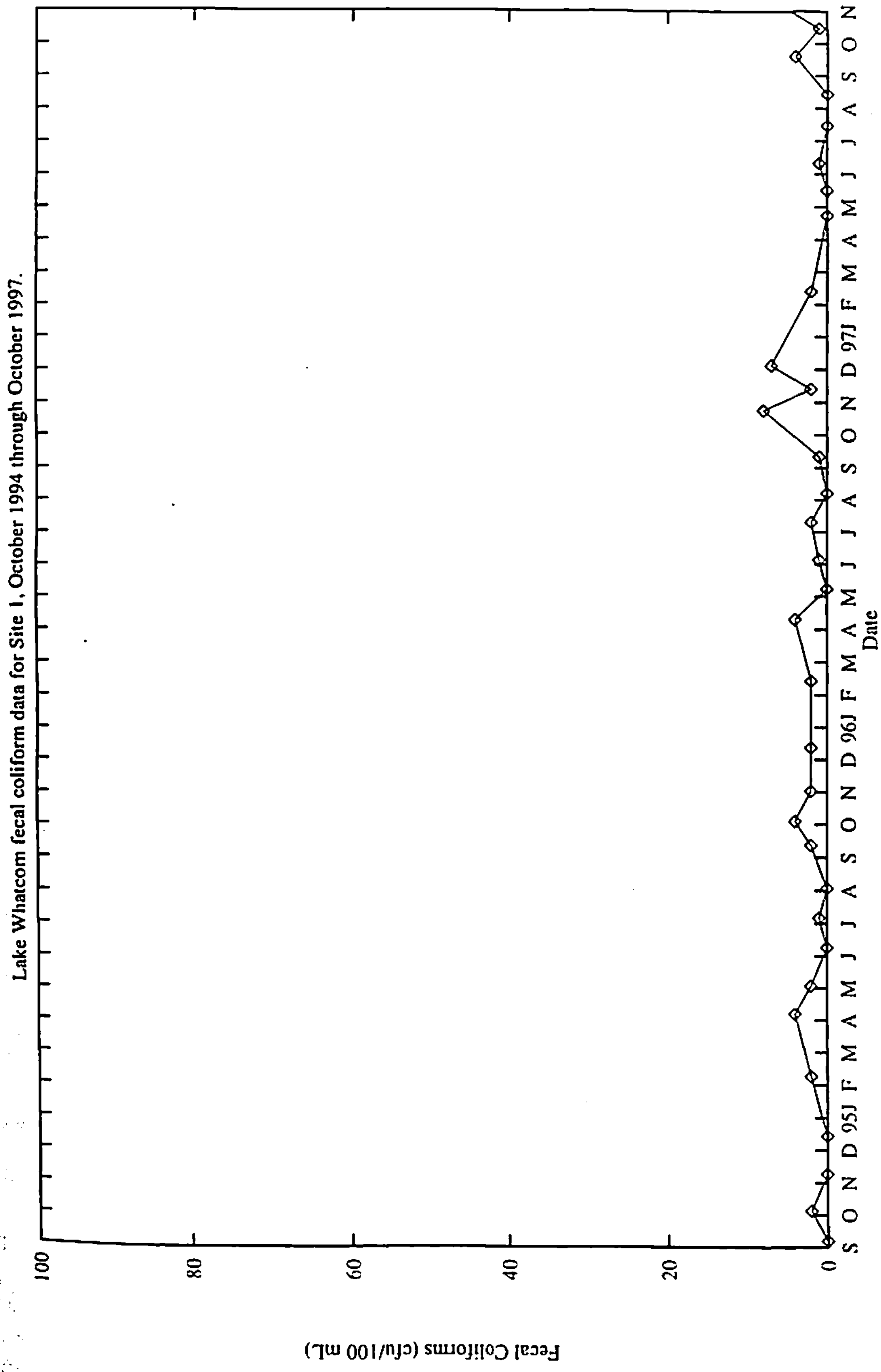


Figure 95: Lake Whatcom fecal coliform data for Site 1.

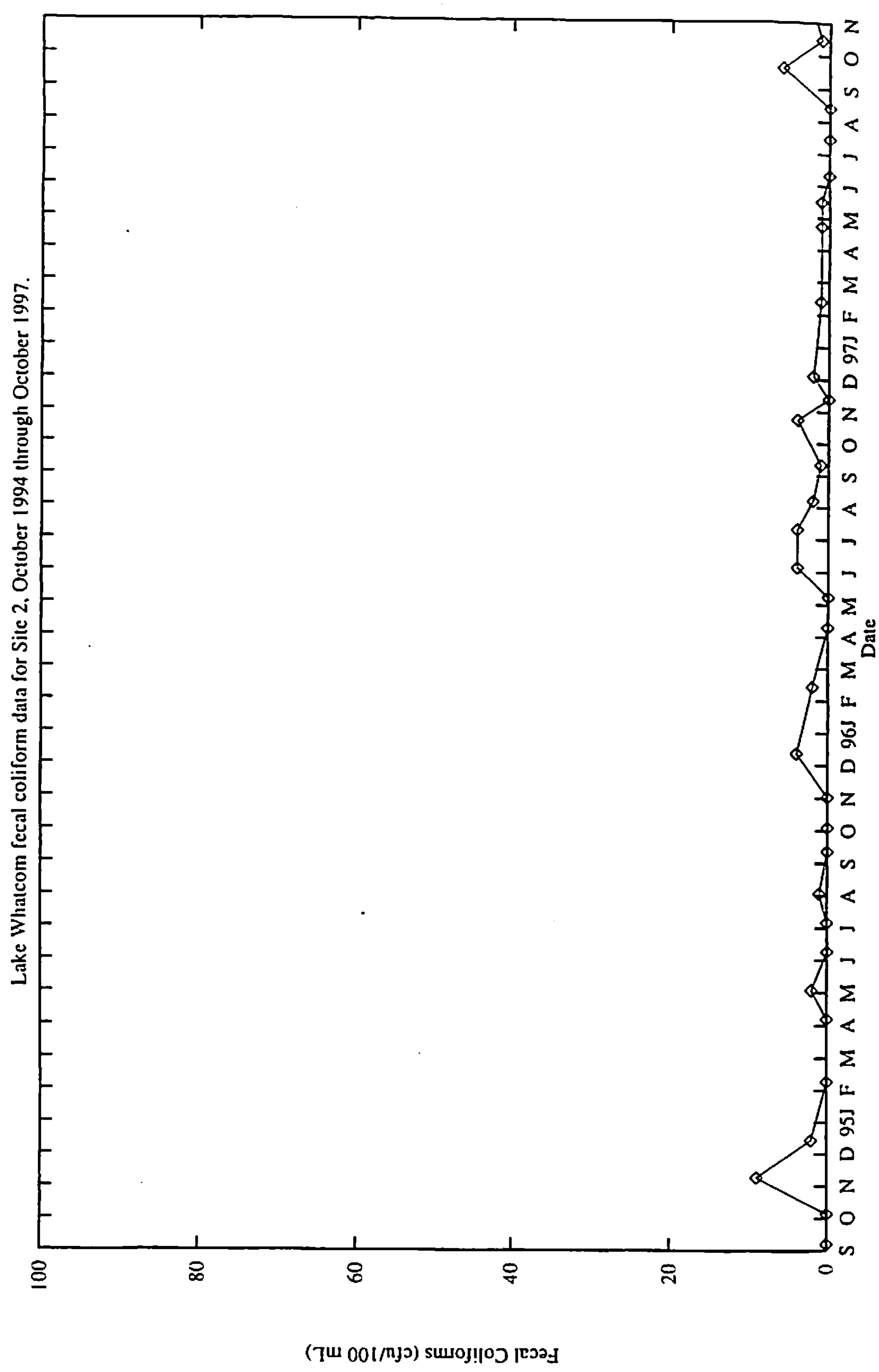


Figure 96: Lake Whatcom fecal coliform data for Site 2.

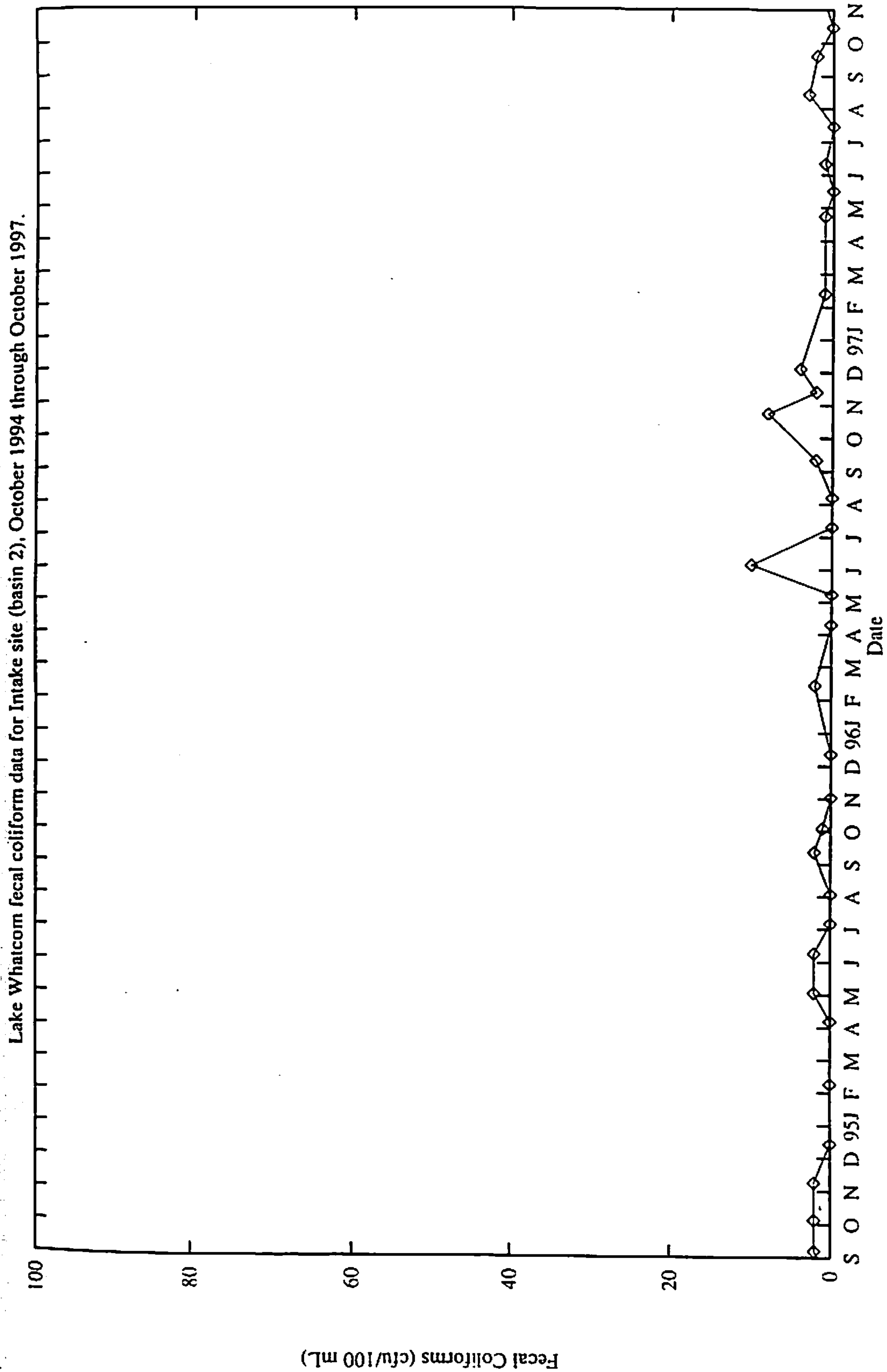


Figure 97: Lake Whatcom fecal coliform data for the Intake site.

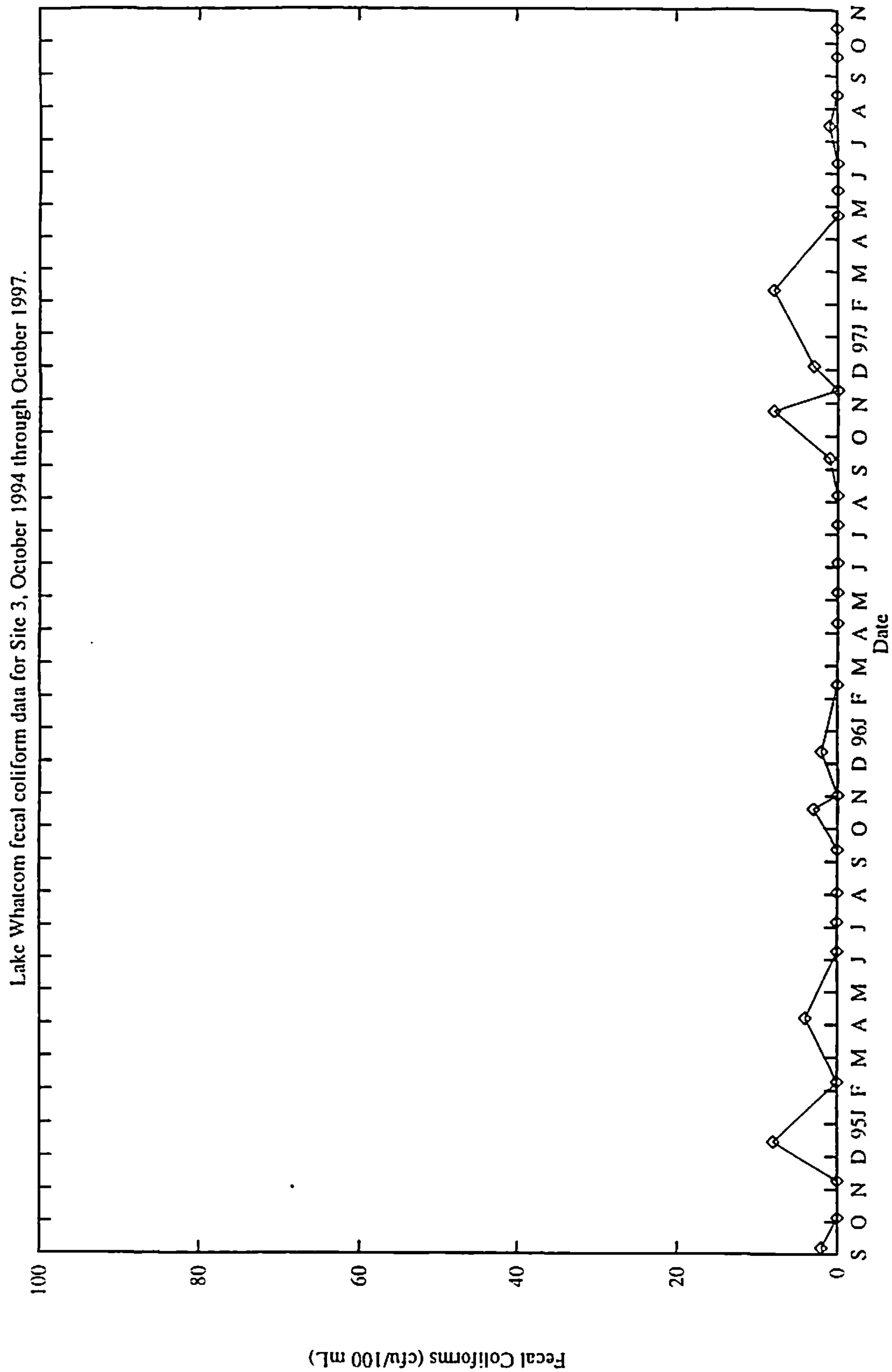


Figure 98: Lake Whatcom fecal coliform data for Site 3.

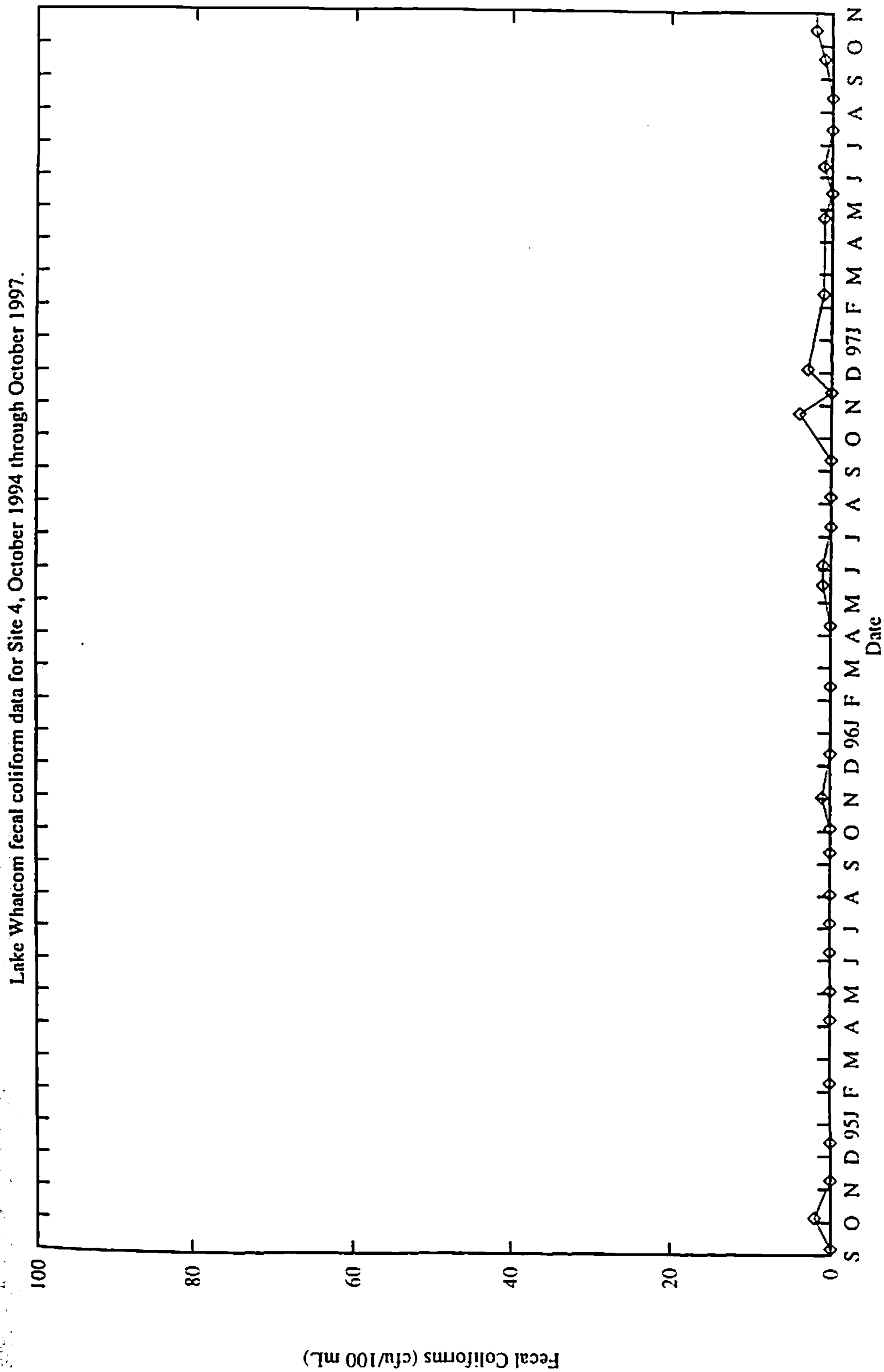


Figure 99: Lake Whatcom fecal coliform data for Site 4.

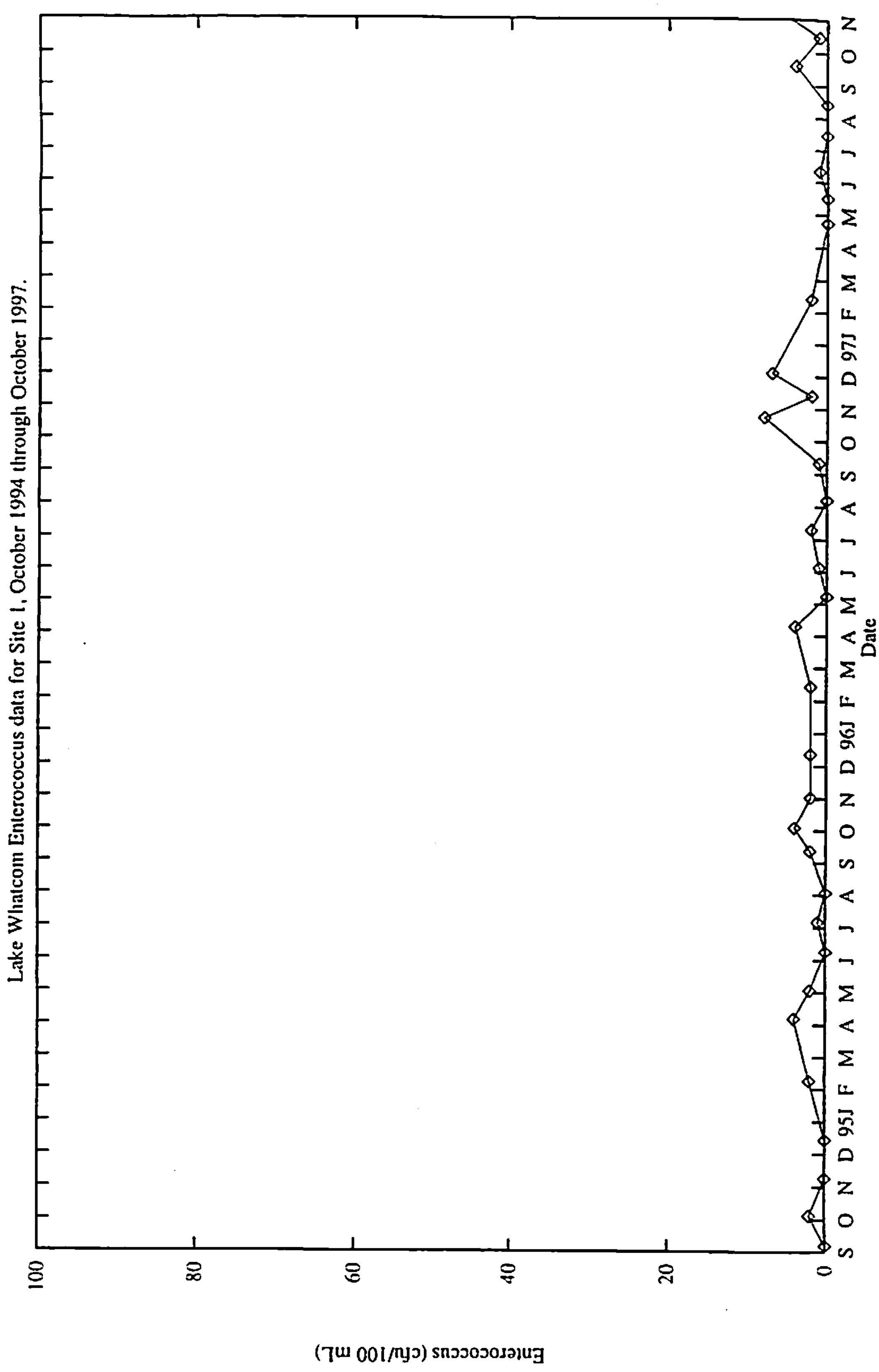


Figure 100: Lake Whatcom *Enterococcus* data for Site 1.

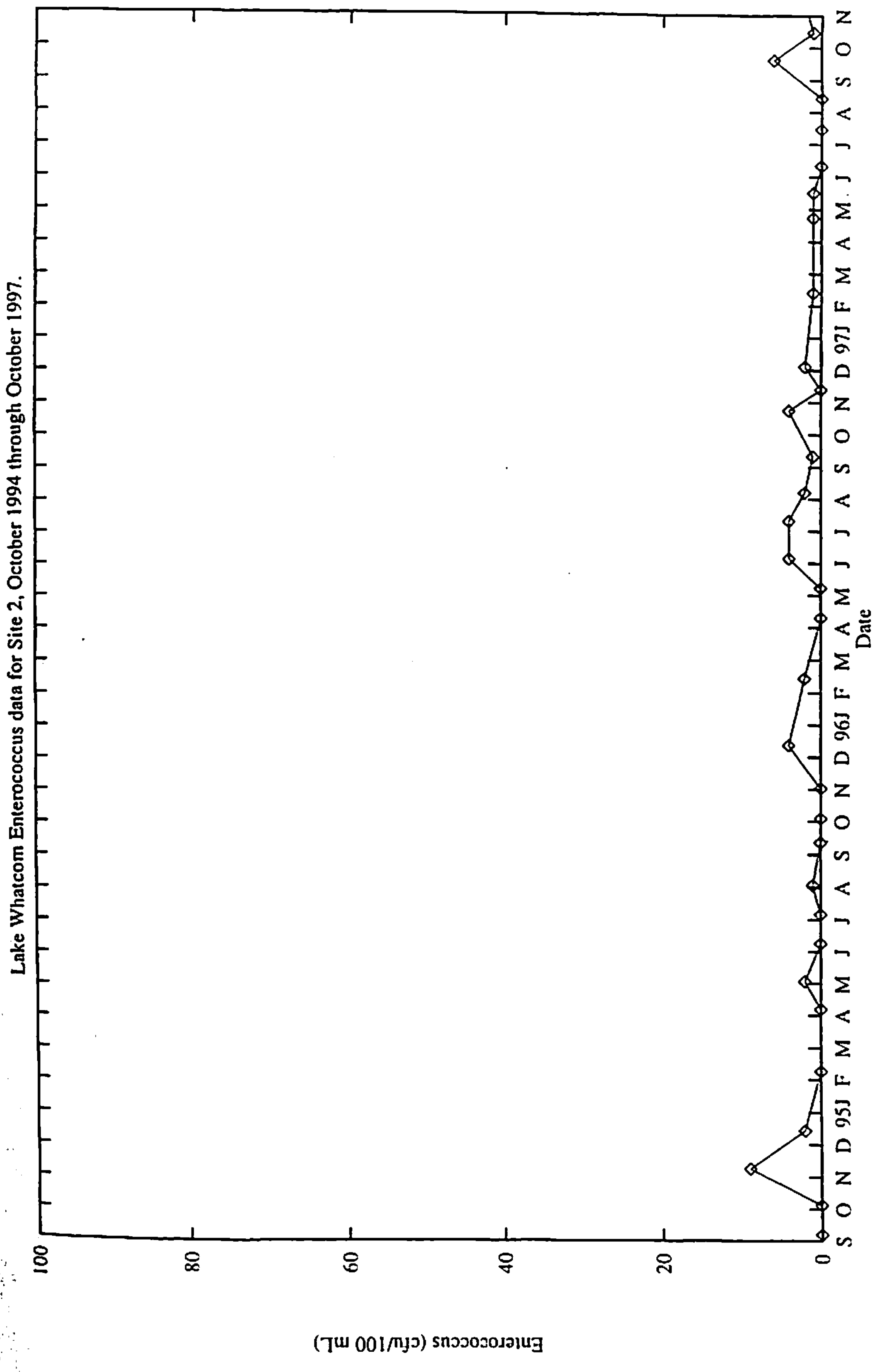


Figure 101: Lake Whatcom *Enterococcus* data for Site 2.

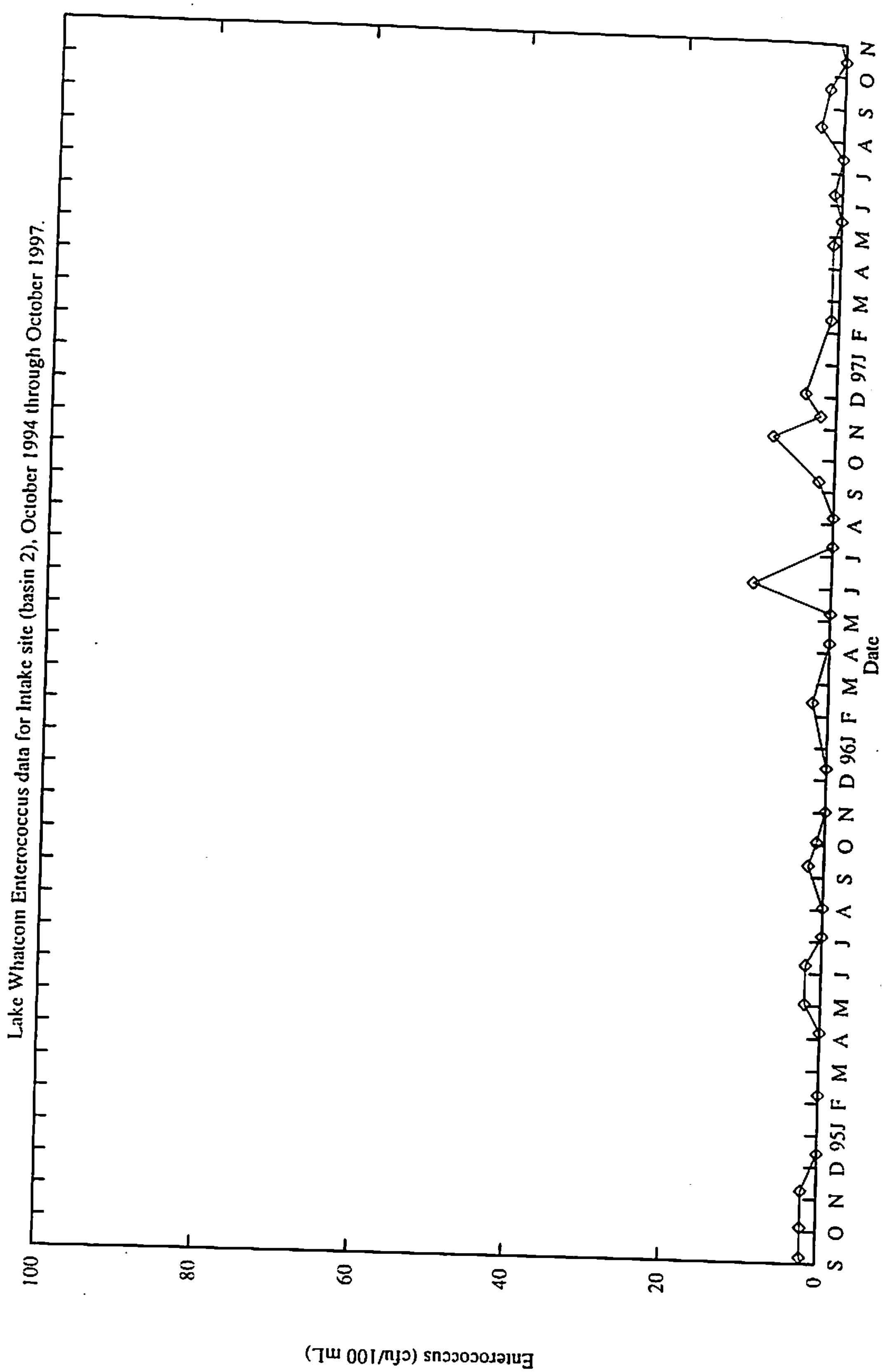


Figure 102: Lake Whatcom *Enterococcus* data for the Intake site.

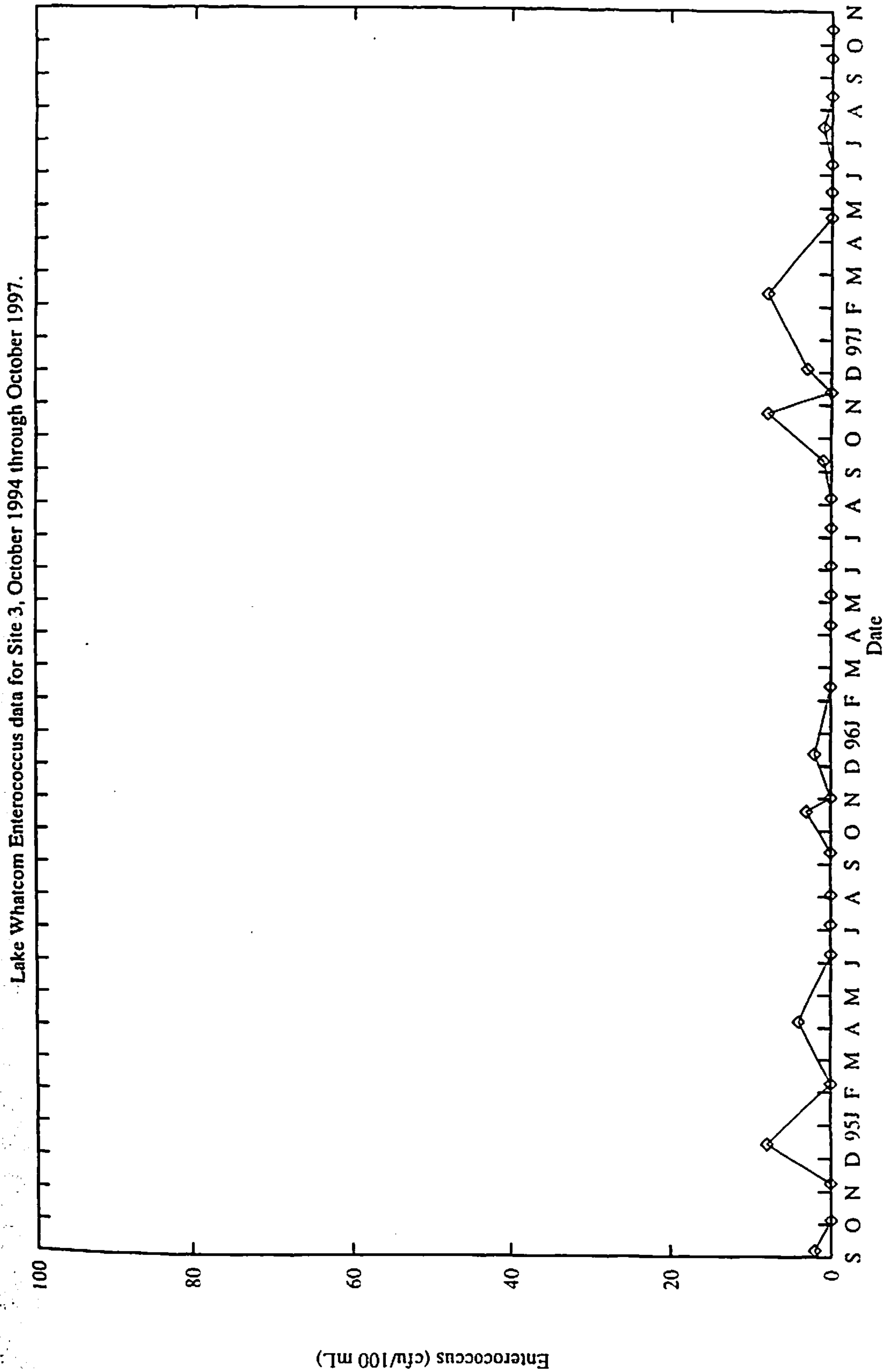


Figure 103: Lake Whatcom *Enterococcus* data for Site 3.

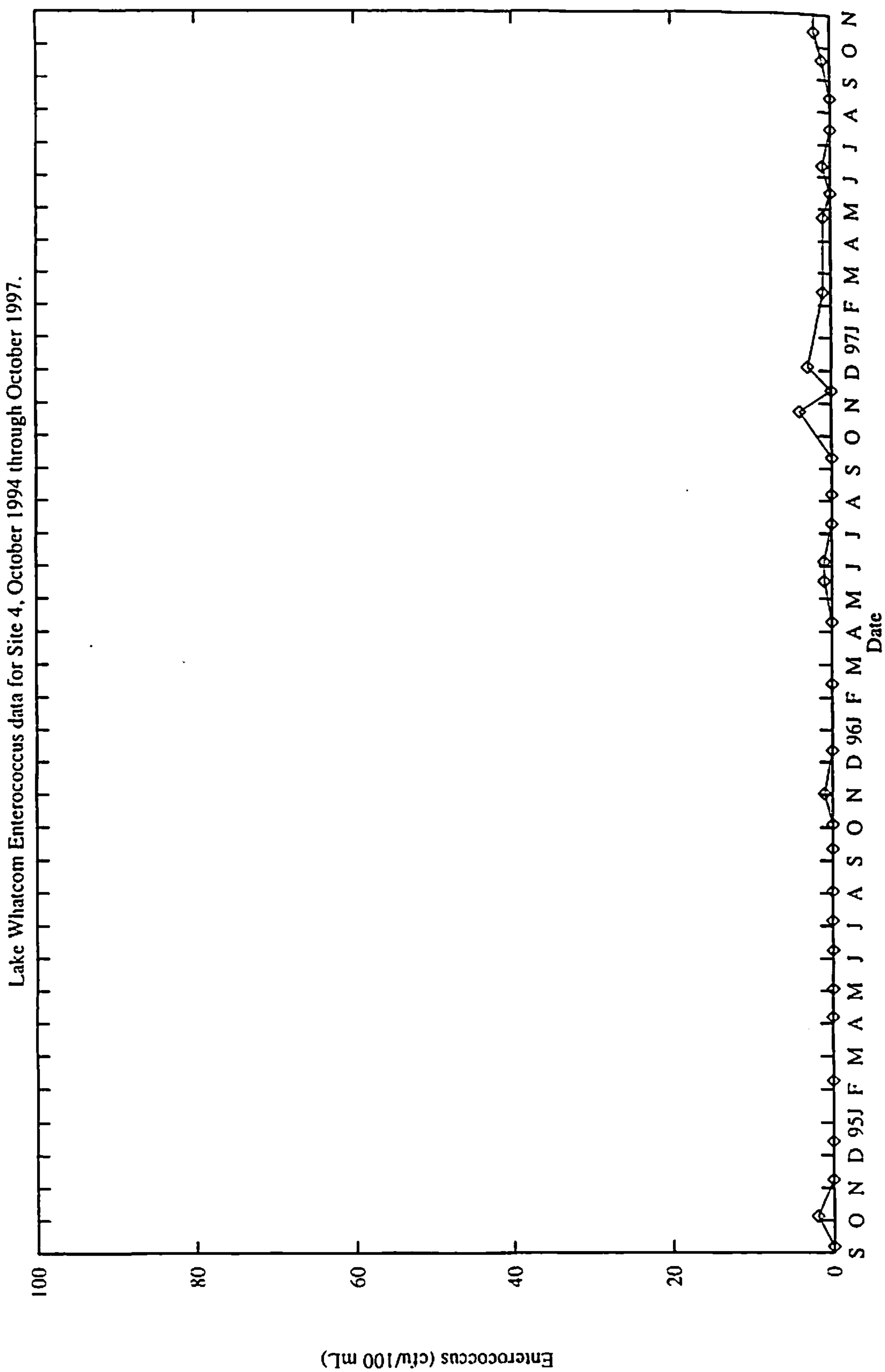


Figure 104: Lake Whatcom fecal *Enterococcus* for Site 4.

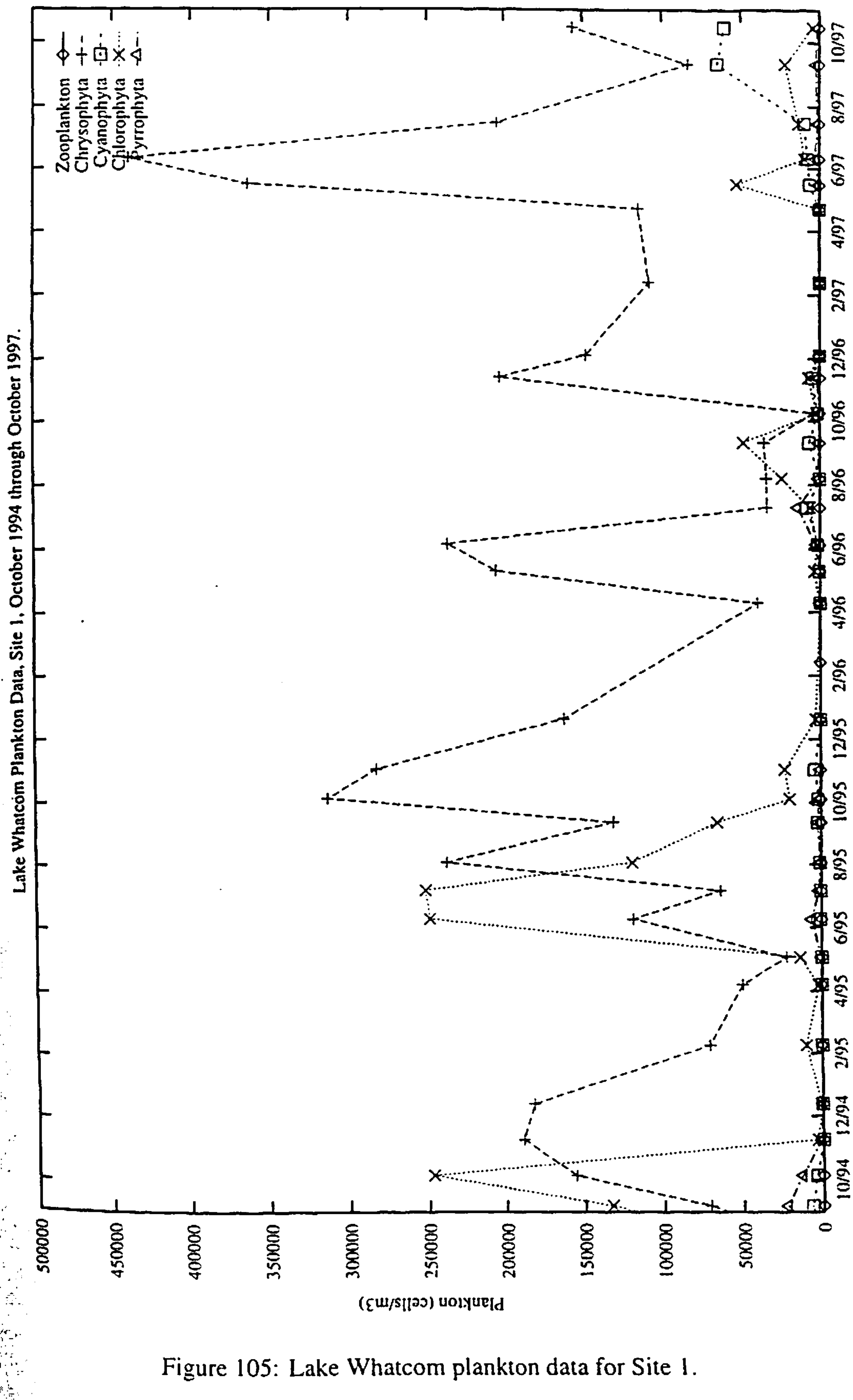


Figure 105: Lake Whatcom plankton data for Site 1.

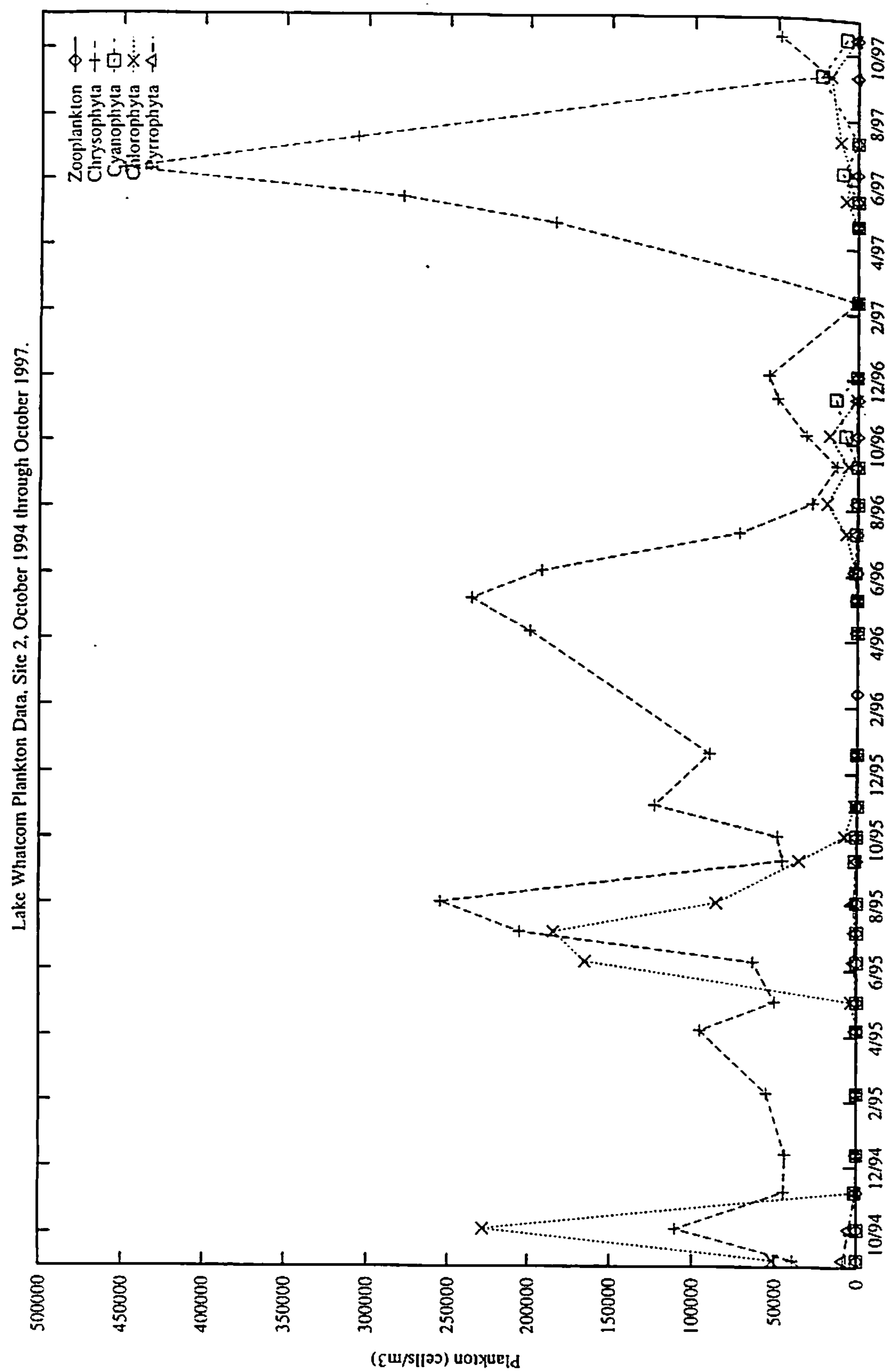


Figure 106: Lake Whatcom plankton data for Site 2.

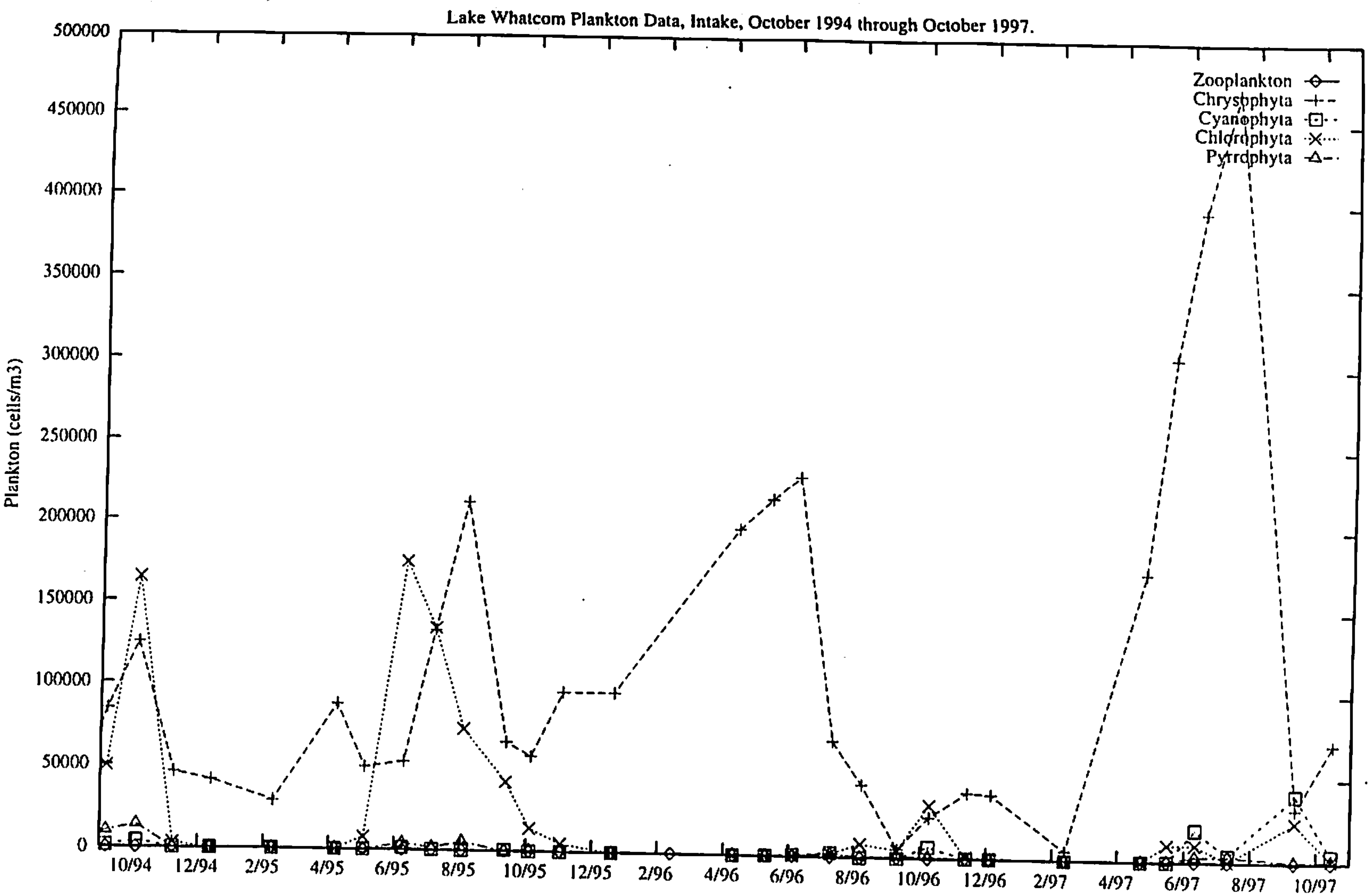


Figure 107: Lake Whatcom plankton data for the Intake Site.

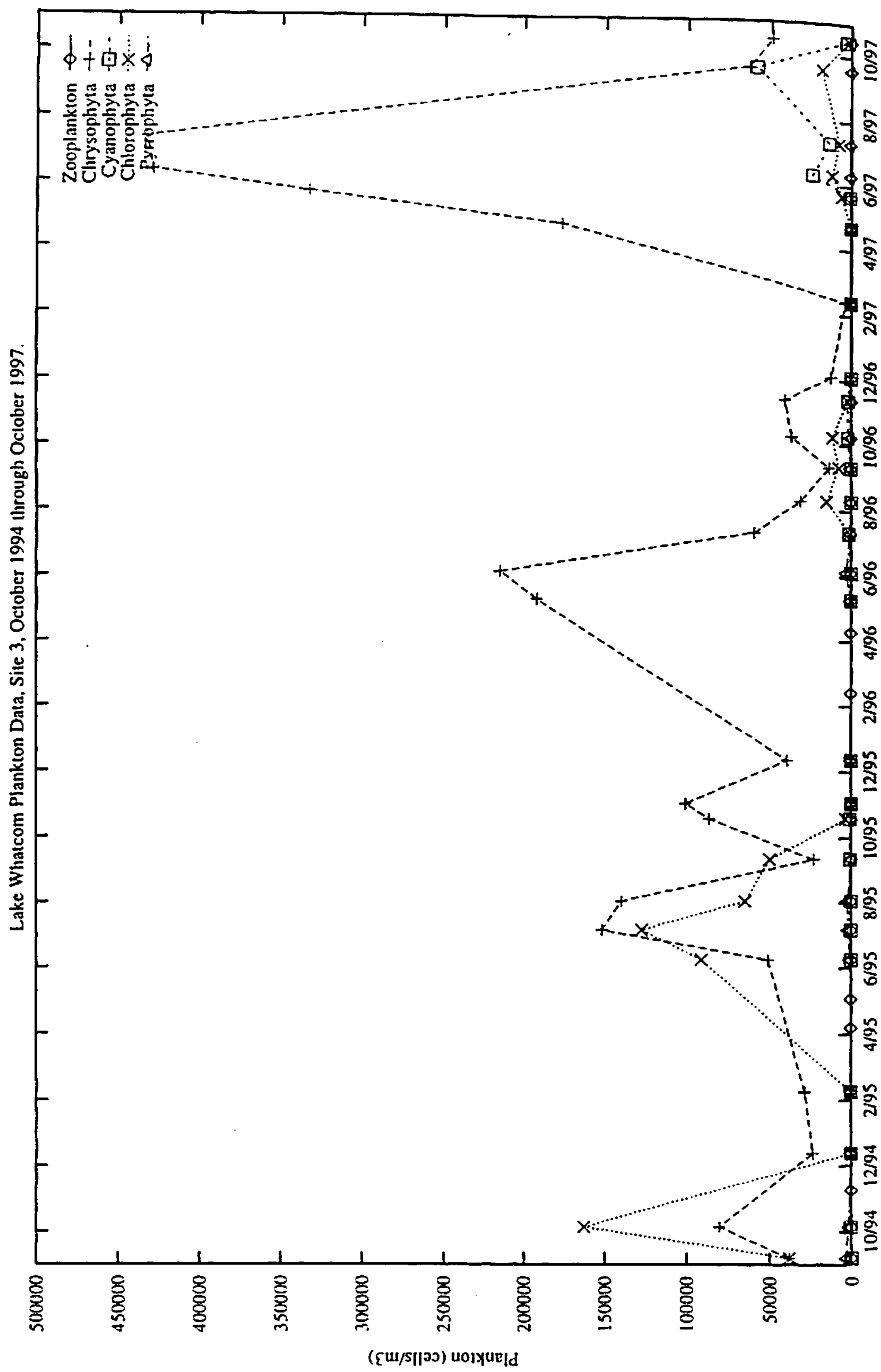


Figure 108: Lake Whatcom plankton data for Site 3.

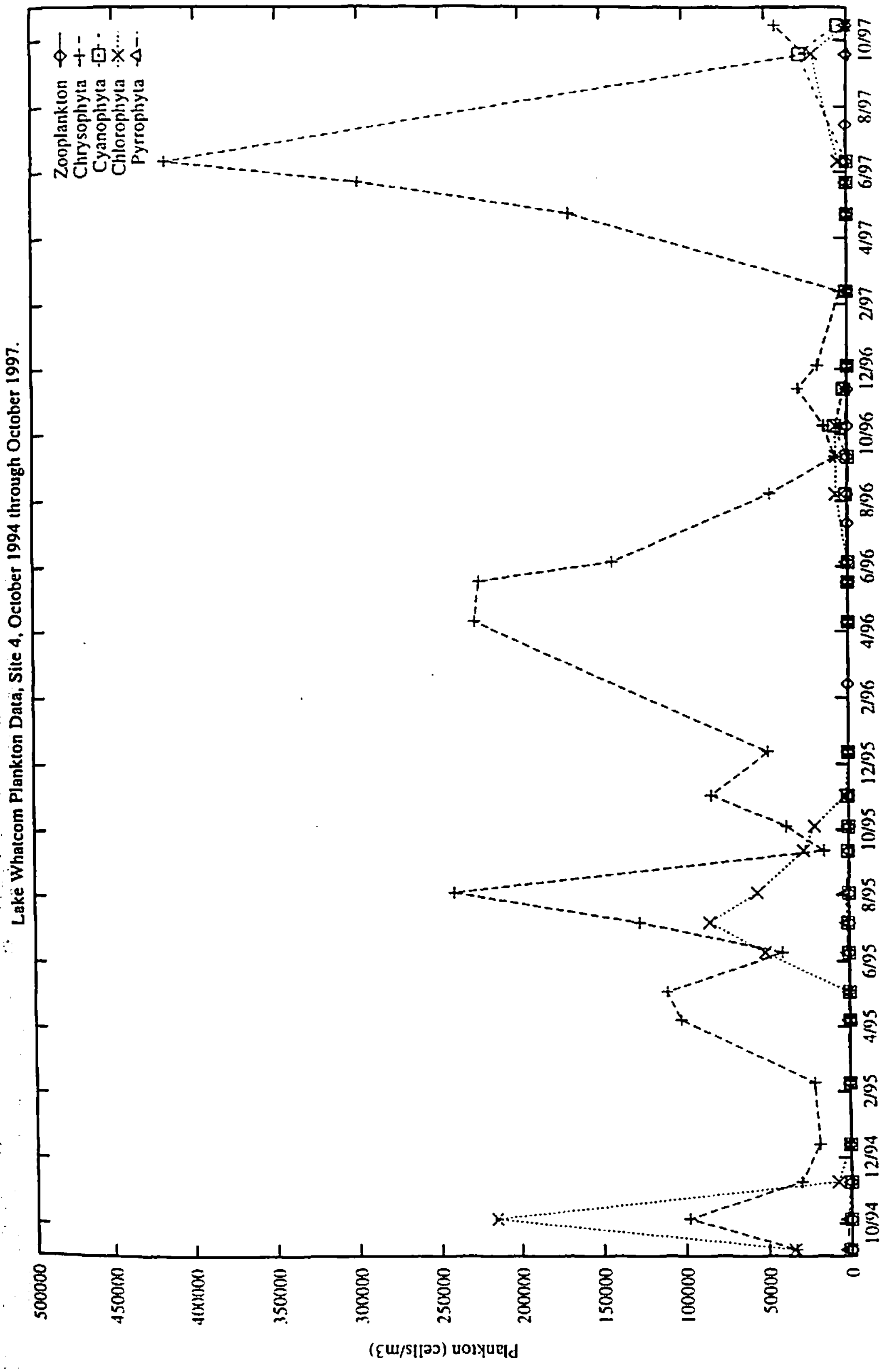


Figure 109: Lake Whatcom plankton data for Site 4.

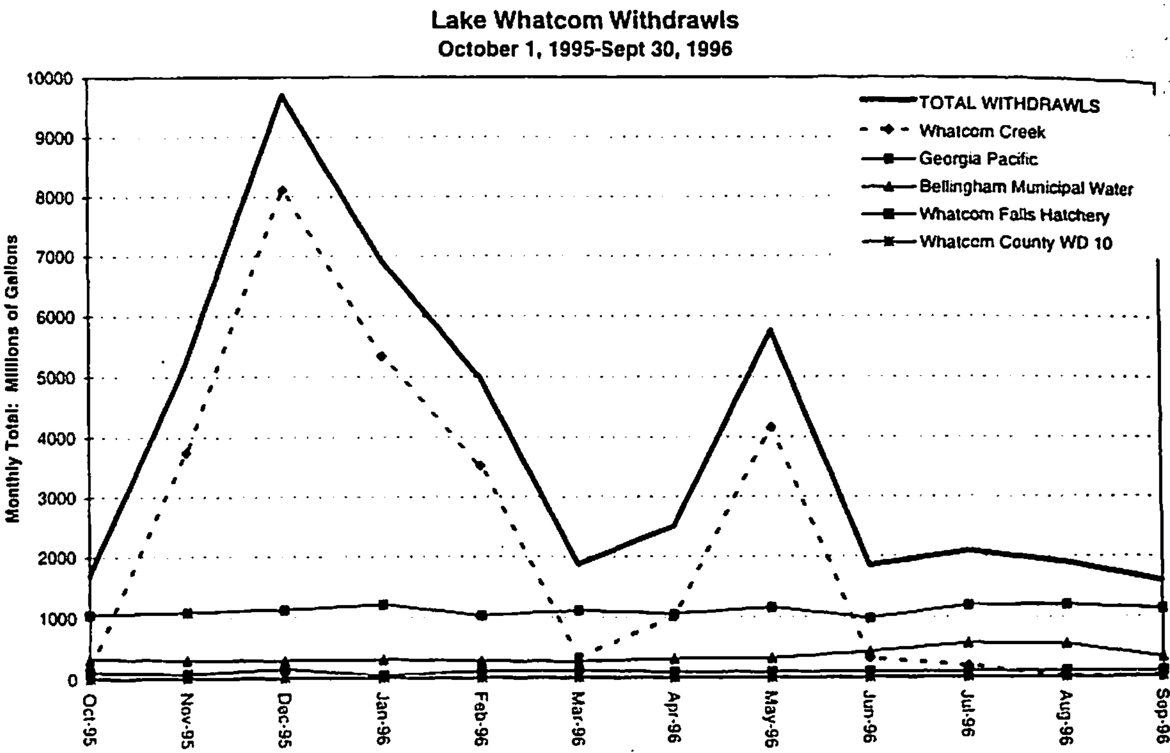


Figure 110: Lake Whatcom withdrawals, October 1, 1995–September 30, 1996.

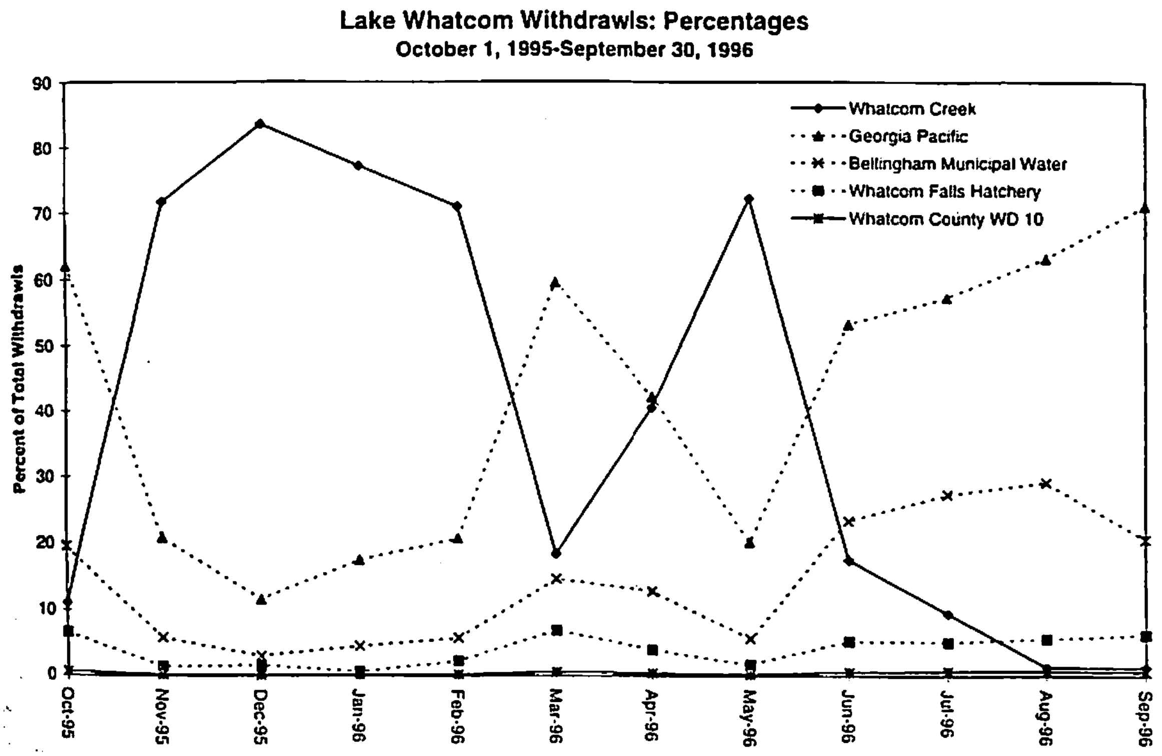


Figure 111: Lake Whatcom withdrawal percentages, October 1, 1995–September 30, 1996.

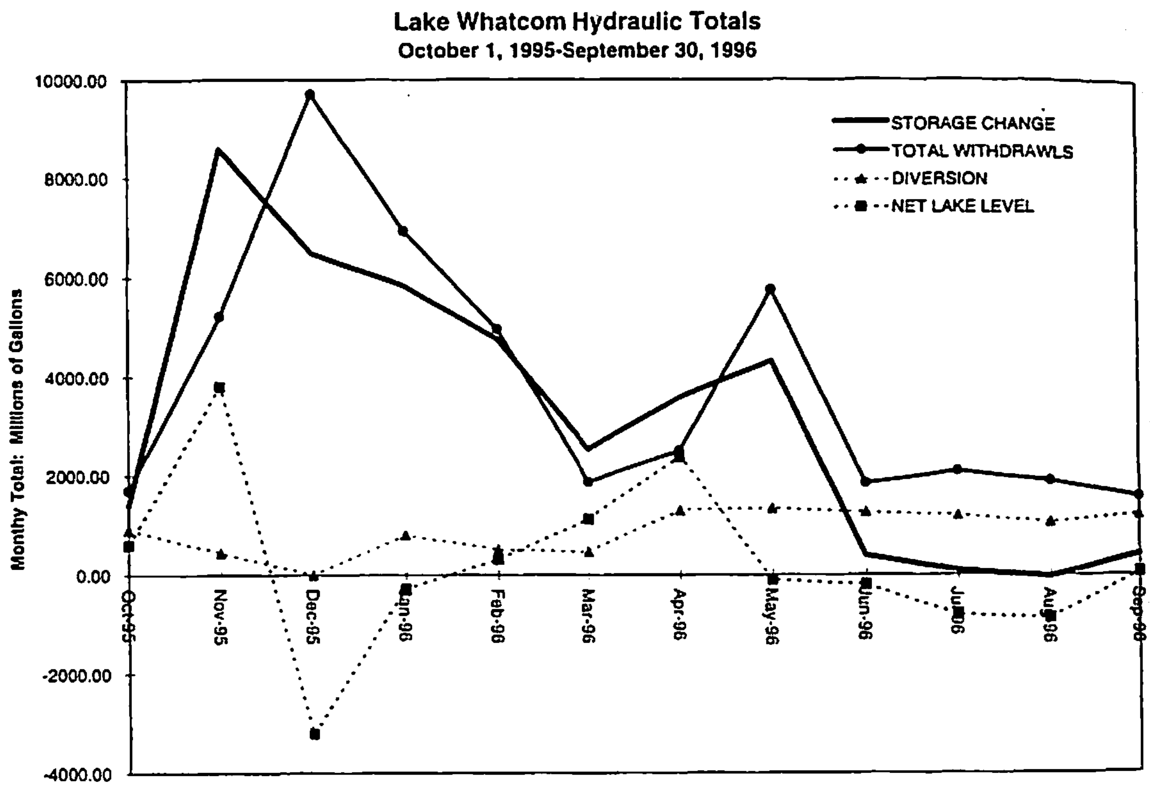


Figure 112: Lake Whatcom hydraulic totals, October 1, 1995–September 30, 1996.

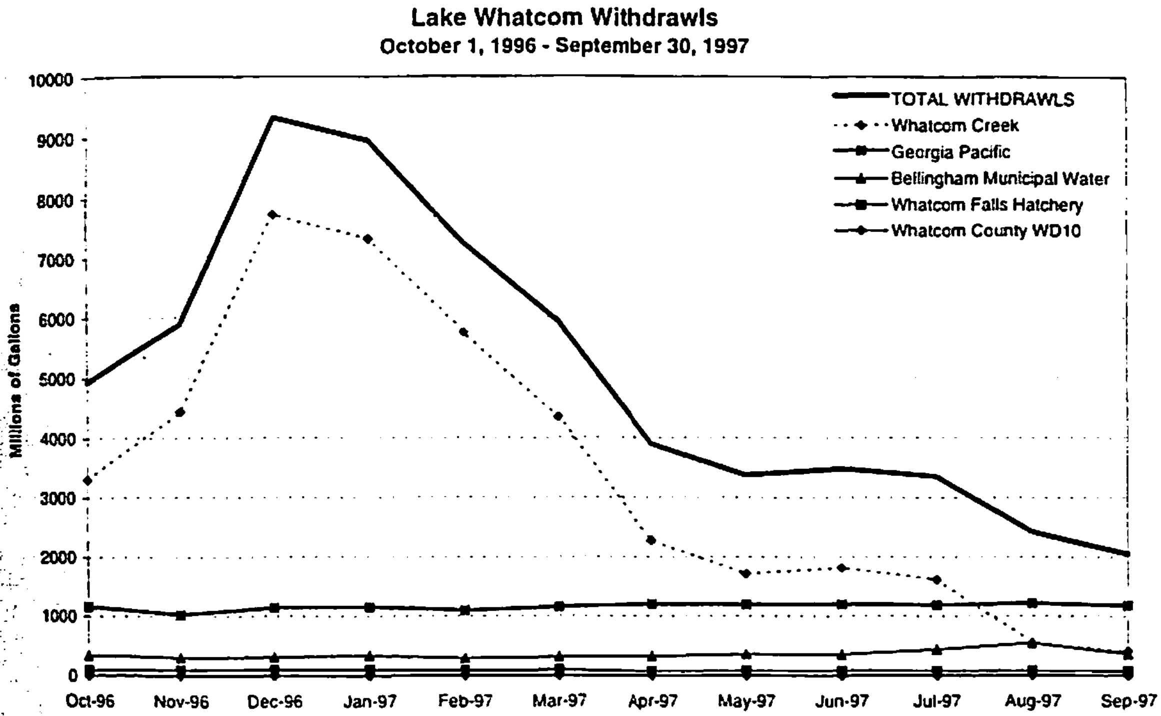


Figure 113: Lake Whatcom withdrawals, October 1, 1996–September 30, 1997.

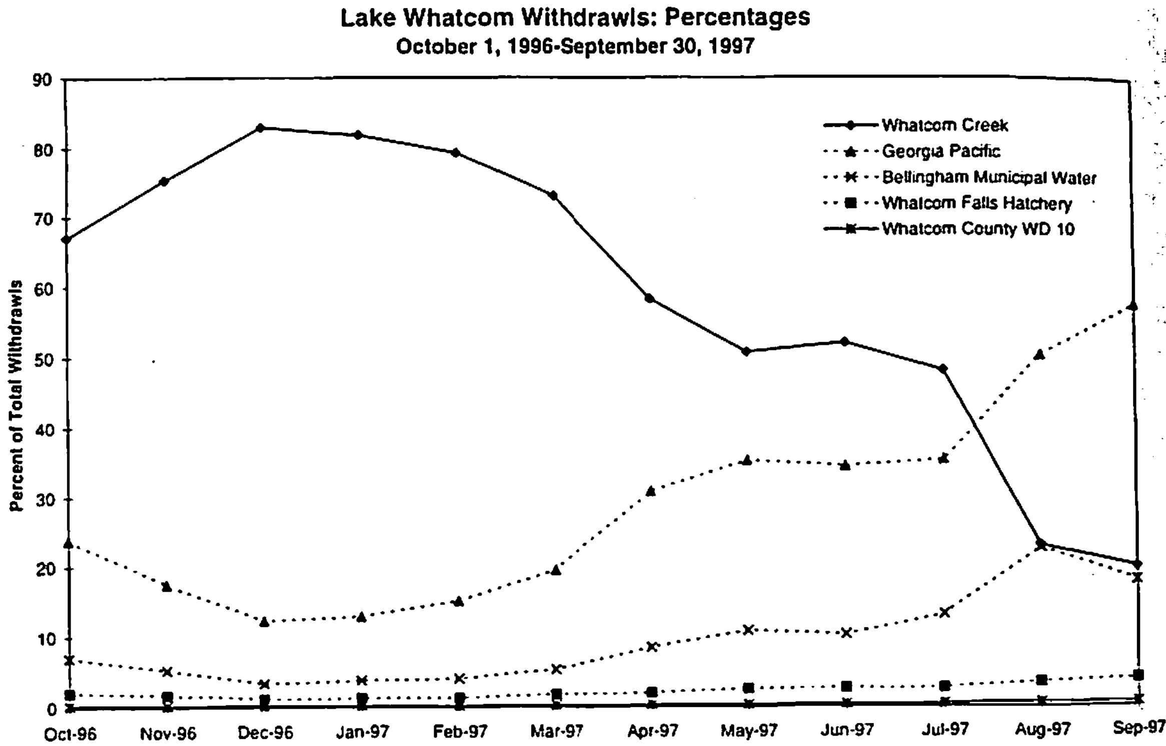


Figure 114: Lake Whatcom withdrawal percentages, October 1, 1996–September 30, 1997.

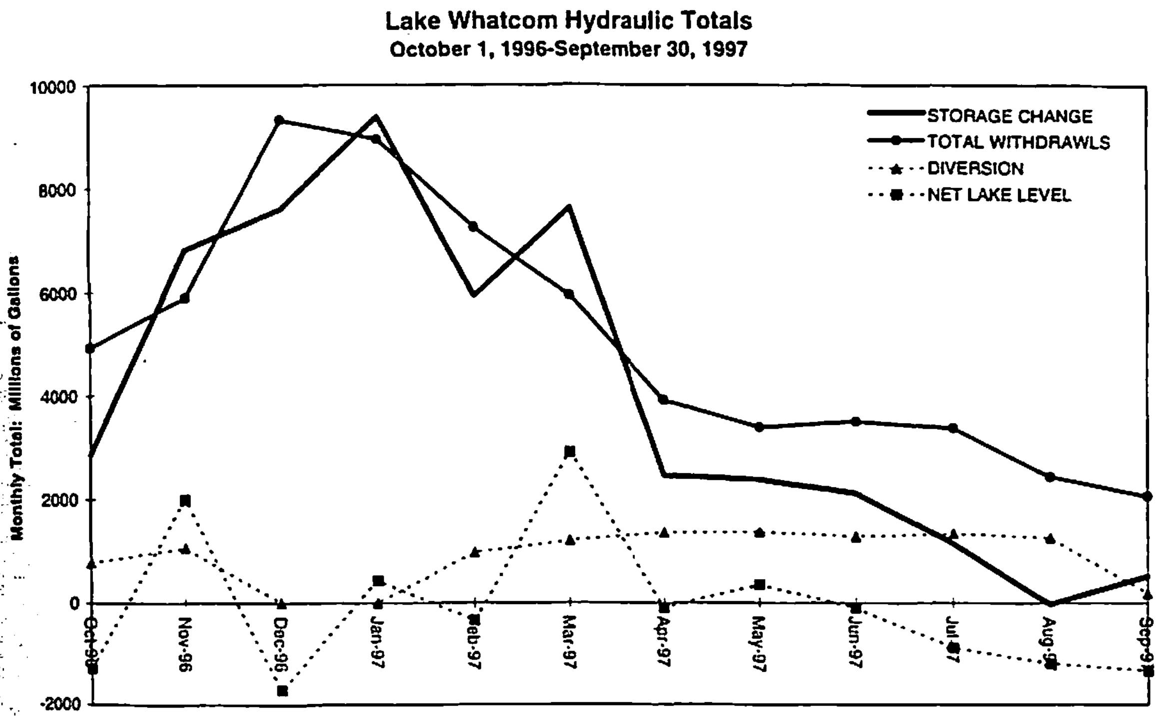
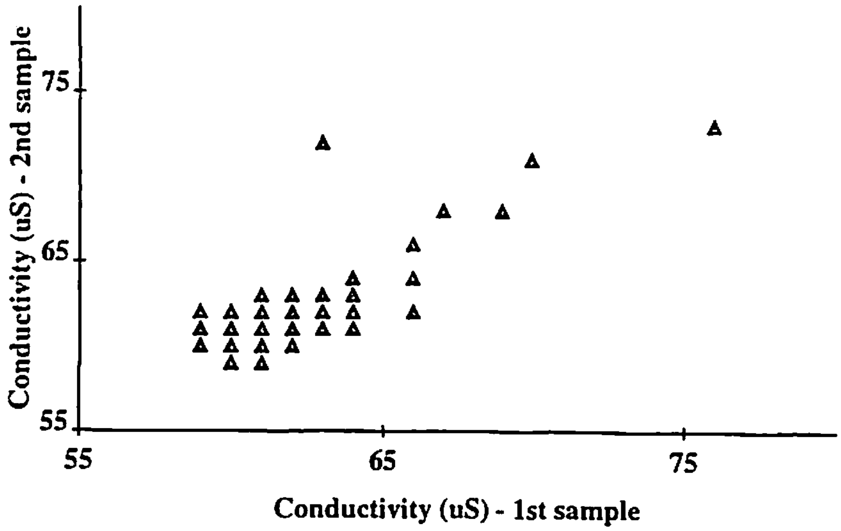


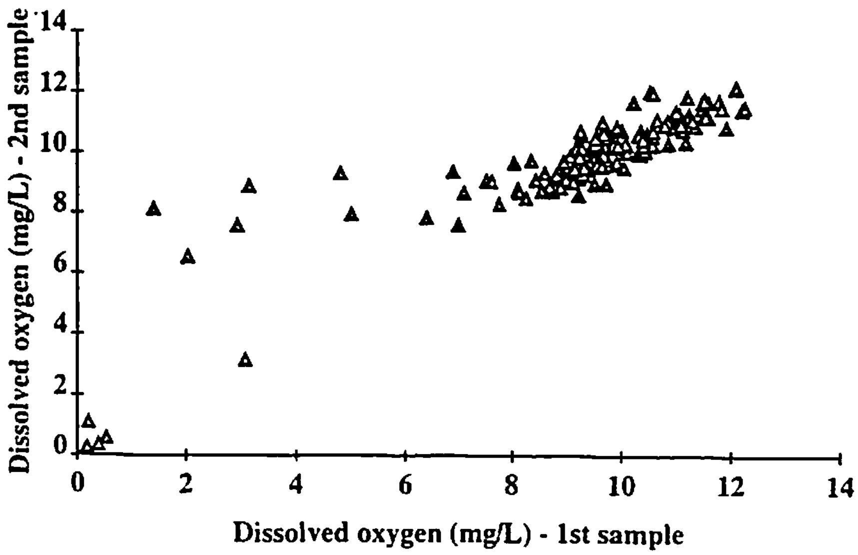
Figure 115: Lake Whatcom hydraulic totals, October 1, 1996–September 30, 1997.

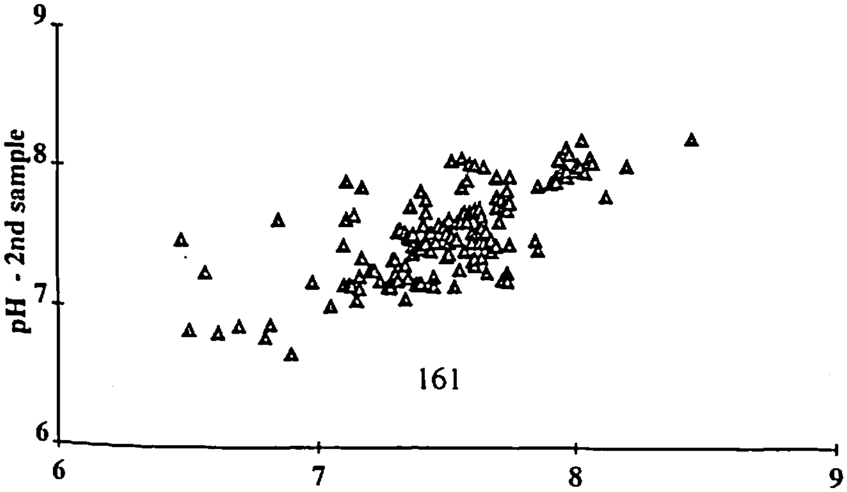
Figure 116: Park Place wet pond, cell 1. Photograph taken on September 16, 1997.

Figure 117: Park Place wet pond, cell 2. Photograph taken on September 16, 1997.

Figure 118: Park Place wet pond, cell 3. Photograph taken on September 16, 1997.


Conductivity (uS) - 2nd sample
75
65
55
55
65
75
Conductivity (uS) - 1st sample


Dissolved oxygen (mg/L) - 2nd sample
14
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
Dissolved oxygen (mg/L) - 1st sample


pH - 2nd sample
9
8
7
6
6
7
8
9

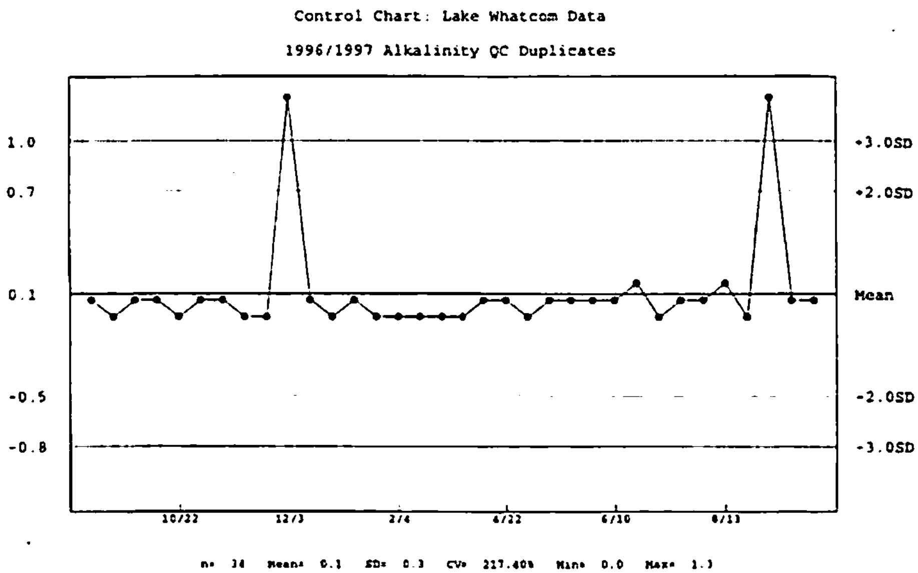


Figure 120: Alkalinity duplicates control chart.

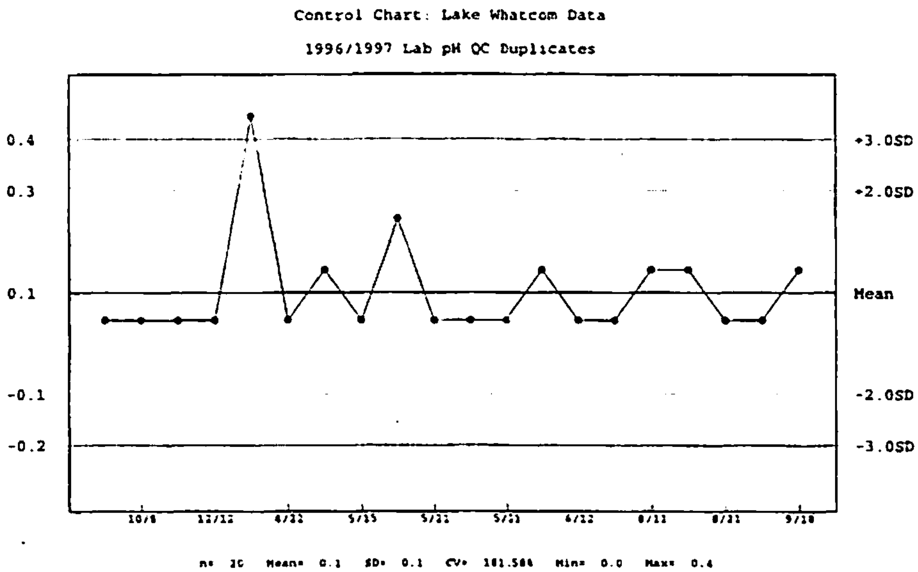


Figure 121: Conductivity duplicates control chart.

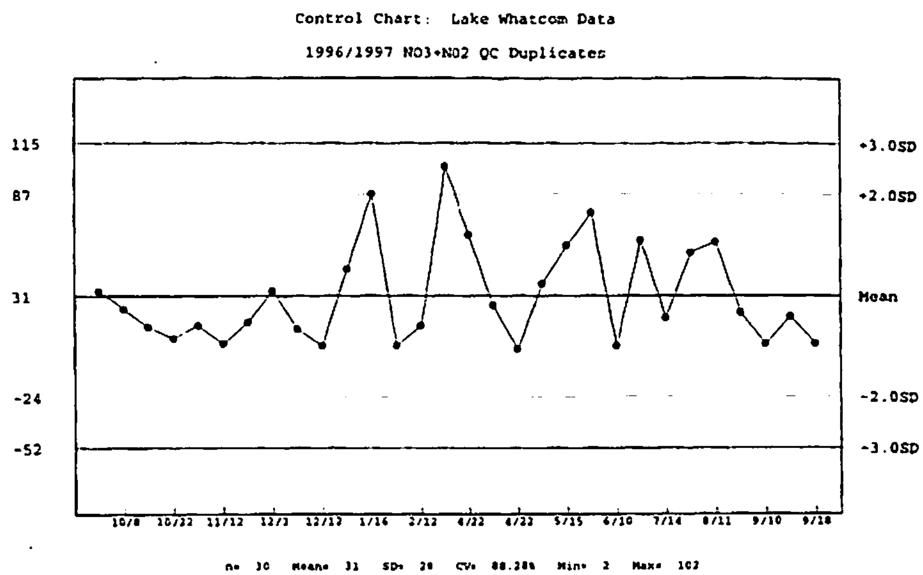


Figure 122: Nitrate/nitrite duplicates control chart.

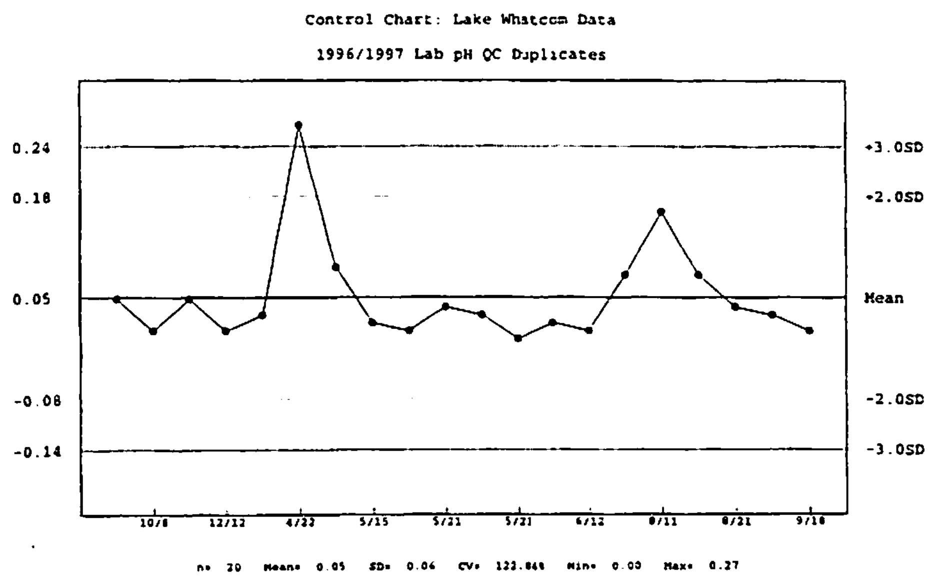


Figure 123: pH duplicates control chart.

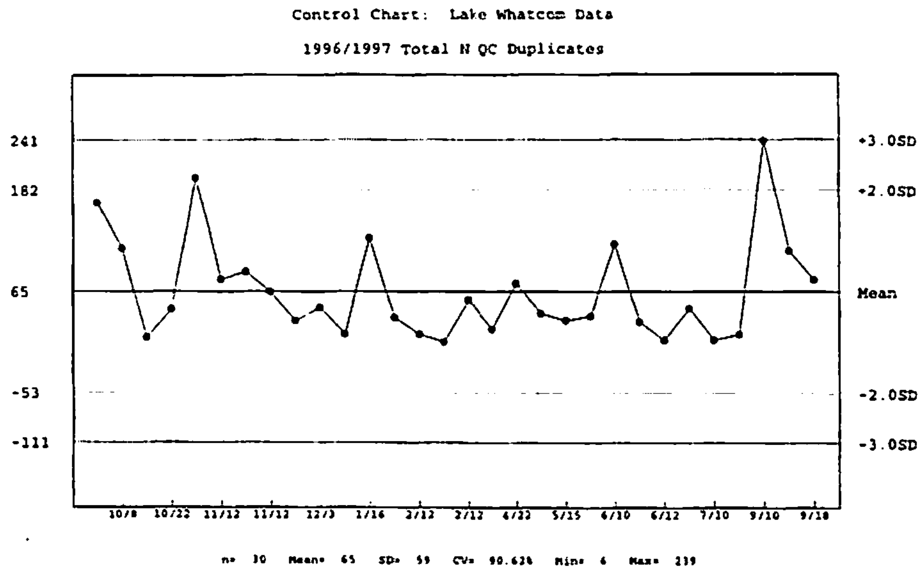


Figure 124: Total nitrogen duplicates control chart.

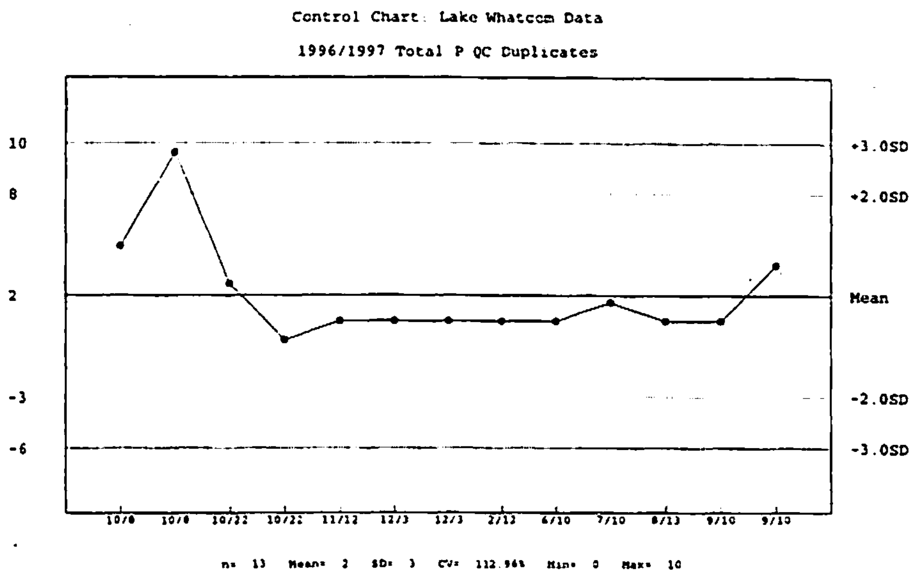


Figure 125: Total phosphorus duplicates control chart.

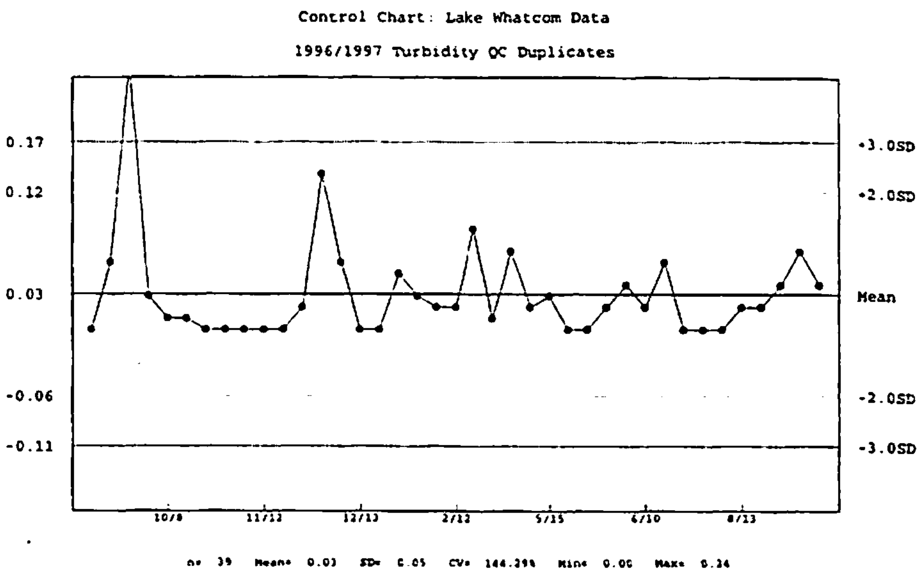


Figure 126: Turbidity duplicates control chart.

A Site Descriptions

A.1 Lake Whatcom Monitoring Sites

Please refer to Figures 127-129 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 four major lake sampling sites have been used since the early 1960's. Table 25 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.

Three sites were added in the fall of 1996 along the 40 meter depth contour in basin 3 near Strawberry sill. These sites are identified as "s1–s3" in Figure 129. There are no permanent buoys at these sites; depth is determined at each site using an electronic depth finder.

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 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.

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

Site s1 is located along the 40 m depth contour in the basin 3 side of Strawberry sill off the north-northwest shore of Lake Whatcom. The site is off a point with a house and dock as the lakeshore curves into Agate Bay; the point of Delstra Park is on a bearing slightly south of west. The GPS coordinates are 48° 44.83 N, 122° 21.8 W, although the GPS response is erratic at this location due to topography.

Site s2 is located approximately mid-channel between Delestra Park and Strawberry sill. The site is midway between a flat-roofed, brown-grey boathouse with red trim on the northeast point of Delestra Park and a white boathouse with two square windows just back from the north side of Strawberry point. The GPS coordinated are 48° 44.65 N, 122° 22.42 W.

Site s3 is located off the southwest shore just before the road cut of Lake Whatcom Blvd., straight off and between two stair towers. The GPS coordinates are 48° 44.50 N, 122° 21.92 W.

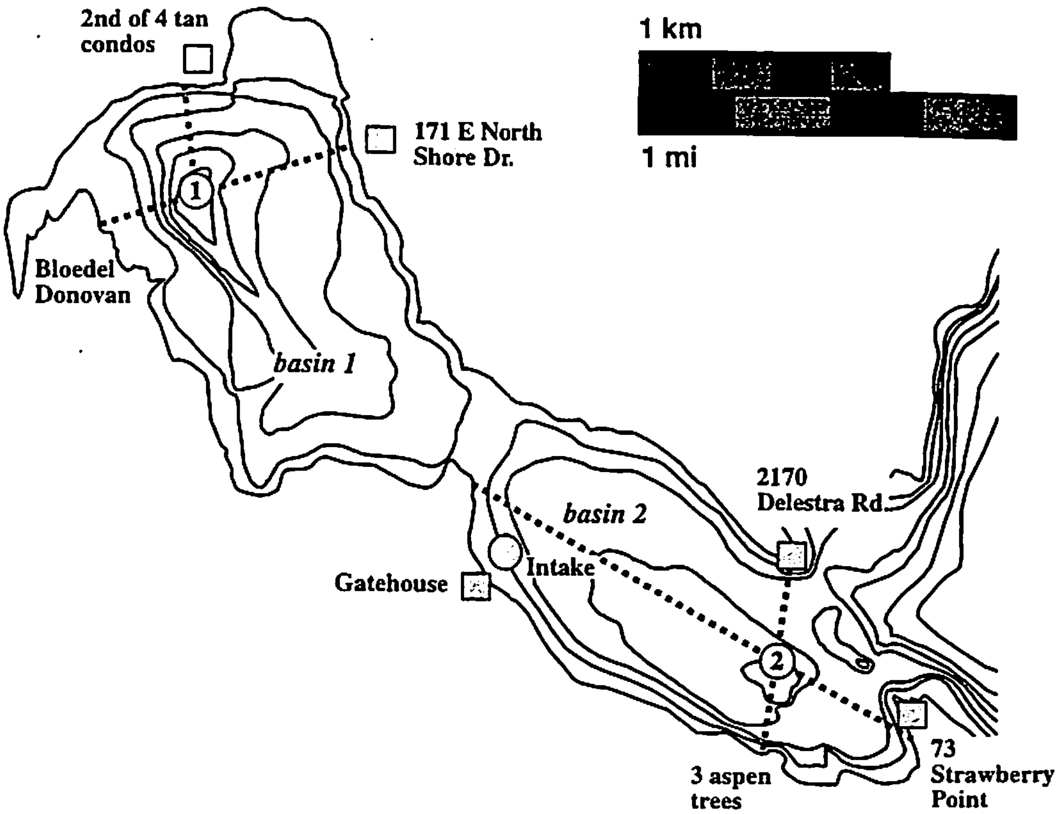


Figure 127: Lake Whatcom sampling sites, basins 1–2.

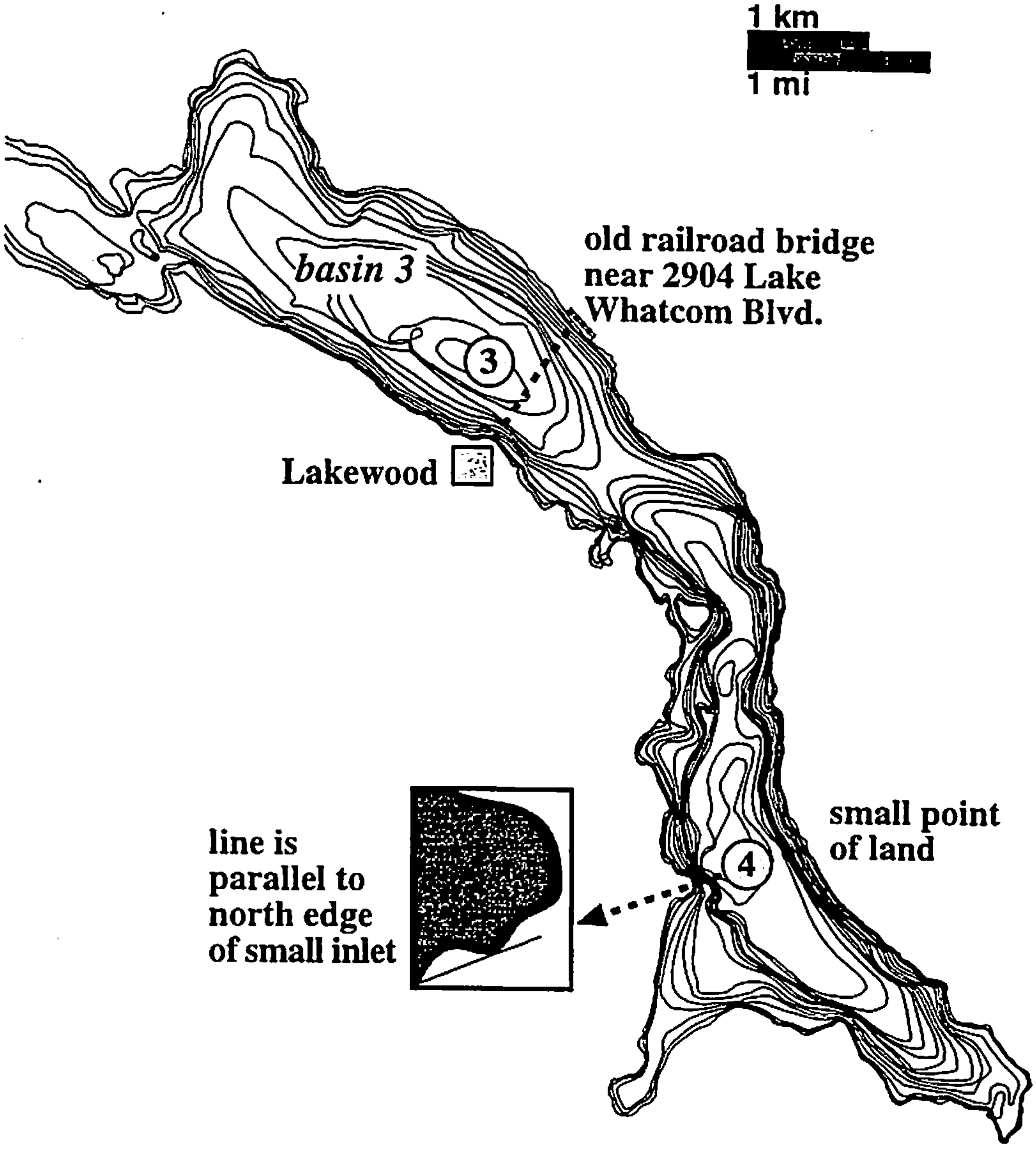


Figure 128: Lake Whatcom sampling sites, basin 3.

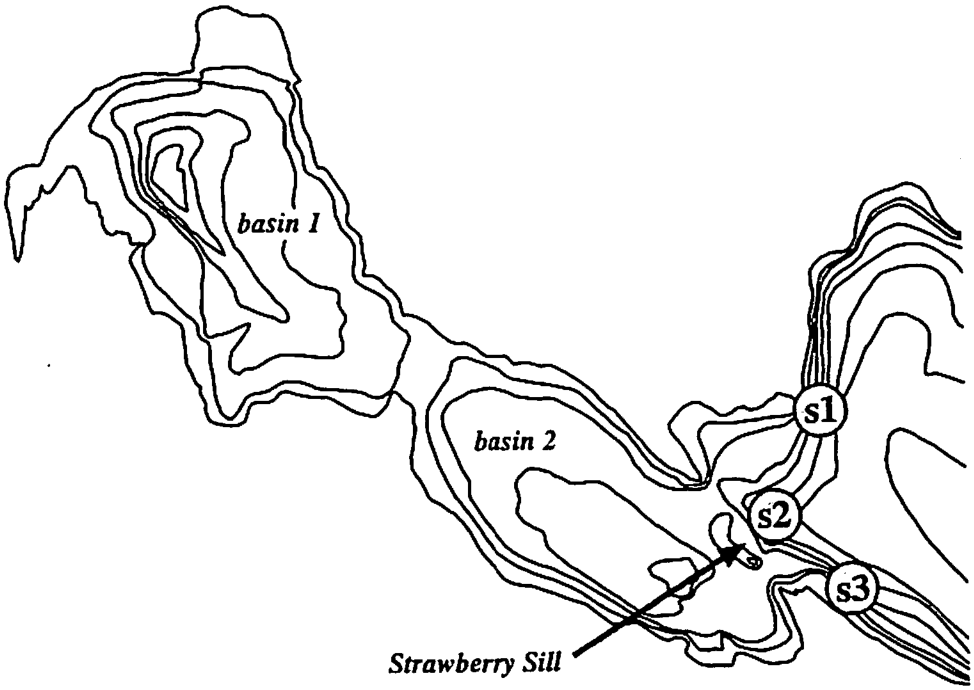


Figure 129: Strawberry sill sampling sites.

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 Whatcom 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 1996/97 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 = 10 μg/L
Carbon, total organic	± 0.1 mg/L	Nitrogen, nitrate/nitrite	dl = 10 μg/L
Chlorophyll *a*	± 0.1 mg/m³	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 μS/cm	pH, Hydrolab	± 0.1 pH unit
Conductivity, lab	± 2 μS/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 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Gatehouse	00	10	08	1996	16.4	7.4	63	9.82	na	na
Gatehouse	00	11	12	1996	11.6	7.6	63	10.43	61.9	na
Gatehouse	00	12	03	1996	8.9	7.3	62	11.00	na	na
Gatehouse	00	02	12	1997	6.3	7.1	61	11.59	60.8	na
Gatehouse	00	04	22	1997	8.3	7.6	60	11.54	60.4	na
Gatehouse	00	05	15	1997	11.2	7.6	60	11.91	na	na
Gatehouse	00	06	10	1997	11.1	7.5	60	10.01	60.2	na
Gatehouse	00	07	10	1997	16.2	7.3	60	9.09	na	na
Gatehouse	00	08	13	1997	16.3	7.3	61	9.11	na	na
Gatehouse	00	09	16	1997	19.0	7.4	61	9.49	na	na
Site 1	00	10	08	1996	16.2	7.5	65	9.92	na	5.1
Site 1	01	10	08	1996	16.2	7.6	65	9.80	na	na
Site 1	02	10	08	1996	16.2	7.7	65	9.75	na	na
Site 1	03	10	08	1996	16.1	7.8	65	9.60	na	na
Site 1	04	10	08	1996	16.1	7.8	65	9.58	na	na
Site 1	05	10	08	1996	16.0	7.8	65	9.44	na	na
Site 1	06	10	08	1996	16.0	7.8	65	9.37	na	na
Site 1	07	10	08	1996	16.0	7.8	65	9.32	na	na
Site 1	08	10	08	1996	15.9	7.8	65	9.25	na	na
Site 1	09	10	08	1996	15.9	7.8	65	9.14	na	na
Site 1	10	10	08	1996	15.9	7.8	65	8.87	na	na
Site 1	11	10	08	1996	15.5	7.6	66	5.87	na	na
Site 1	12	10	08	1996	14.3	7.2	69	1.08	na	na
Site 1	13	10	08	1996	13.2	6.9	74	0.26	na	na
Site 1	14	10	08	1996	12.2	6.8	74	0.23	na	na
Site 1	15	10	08	1996	12.1	6.8	74	0.19	na	na
Site 1	16	10	08	1996	12.0	6.8	74	0.19	na	na
Site 1	17	10	08	1996	11.9	6.8	74	0.20	na	na
Site 1	18	10	08	1996	11.8	6.8	75	0.20	na	na
Site 1	19	10	08	1996	11.8	6.8	75	0.20	na	na
Site 1	20	10	08	1996	11.8	6.8	76	0.20	72.6	na
Site 1	00	11	12	1996	11.2	7.3	65	10.86	na	4.5
Site 1	01	11	12	1996	11.0	7.5	65	10.62	na	na
Site 1	02	11	12	1996	10.9	7.5	65	10.52	na	na
Site 1	03	11	12	1996	10.8	7.6	64	10.45	na	na
Site 1	04	11	12	1996	10.7	7.6	64	10.34	na	na
Site 1	05	11	12	1996	10.7	7.6	64	10.30	na	na
Site 1	06	11	12	1996	10.7	7.7	64	10.25	na	na
Site 1	07	11	12	1996	10.6	7.7	64	10.18	na	na
Site 1	08	11	12	1996	10.6	7.7	65	10.17	na	na
Site 1	09	11	12	1996	10.6	7.7	64	10.09	na	na
Site 1	10	11	12	1996	10.6	7.7	64	10.09	na	na
Site 1	11	11	12	1996	10.6	7.7	64	10.02	na	na
Site 1	12	11	12	1996	10.5	7.7	64	9.97	na	na
Site 1	13	11	12	1996	10.5	7.7	64	9.98	na	na
Site 1	14	11	12	1996	10.5	7.7	65	9.99	na	na
Site 1	15	11	12	1996	10.5	7.7	64	10.00	na	na
Site 1	16	11	12	1996	10.5	7.7	64	10.00	na	na
Site 1	17	11	12	1996	10.5	7.7	65	10.00	na	na
Site 1	18	11	12	1996	10.5	7.7	64	9.93	na	na
Site 1	19	11	12	1996	10.5	7.7	63	9.95	na	na
Site 1	20	11	12	1996	10.4	7.7	64	9.92	63.9	na

Lake Whatcom 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 1	00	12	03	1996	7.6	7.4	64	11.54	na	2.3
Site 1	01	12	03	1996	7.5	7.5	64	11.40	na	na
Site 1	02	12	03	1996	7.5	7.5	64	11.32	na	na
Site 1	03	12	03	1996	7.4	7.6	64	11.25	na	na
Site 1	04	12	03	1996	7.4	7.6	64	11.20	na	na
Site 1	05	12	03	1996	7.4	7.6	64	11.21	na	na
Site 1	06	12	03	1996	7.4	7.6	64	11.16	na	na
Site 1	07	12	03	1996	7.4	7.6	64	11.12	na	na
Site 1	08	12	03	1996	7.3	7.6	64	11.11	na	na
Site 1	09	12	03	1996	7.3	7.6	64	11.06	na	na
Site 1	10	12	03	1996	7.3	7.7	64	11.06	64.1	na
Site 1	11	12	03	1996	7.3	7.6	64	11.02	na	na
Site 1	12	12	03	1996	7.3	7.7	64	11.02	na	na
Site 1	13	12	03	1996	7.3	7.7	64	11.03	na	na
Site 1	14	12	03	1996	7.3	7.7	64	11.03	na	na
Site 1	15	12	03	1996	7.3	7.7	64	11.04	na	na
Site 1	16	12	03	1996	7.3	7.7	64	10.99	na	na
Site 1	17	12	03	1996	7.2	7.7	64	10.98	na	na
Site 1	18	12	03	1996	7.2	7.7	64	10.99	na	na
Site 1	19	12	03	1996	7.2	7.7	63	10.99	na	na
Site 1	20	12	03	1996	7.2	7.7	64	11.00	62.4	na
Site 1	00	02	12	1997	5.5	7.1	63	12.45	na	5.0
Site 1	01	02	12	1997	5.4	7.4	63	12.16	na	na
Site 1	02	02	12	1997	5.3	7.4	63	12.14	na	na
Site 1	03	02	12	1997	5.3	7.5	63	12.16	na	na
Site 1	04	02	12	1997	5.3	7.5	63	12.09	na	na
Site 1	05	02	12	1997	5.3	7.5	63.	12.09	71.6	na
Site 1	06	02	12	1997	5.3	7.5	63	12.12	na	na
Site 1	07	02	12	1997	5.2	7.5	63	12.08	na	na
Site 1	08	02	12	1997	5.2	7.5	63	12.08	na	na
Site 1	09	02	12	1997	5.2	7.6	63	12.08	na	na
Site 1	10	02	12	1997	5.2	7.6	63	12.10	na	na
Site 1	11	02	12	1997	5.2	7.6	63	12.09	na	na
Site 1	12	02	12	1997	5.2	7.6	63	12.10	na	na
Site 1	13	02	12	1997	5.2	7.6	63	12.10	na	na
Site 1	14	02	12	1997	5.2	7.6	63	12.13	na	na
Site 1	15	02	12	1997	5.2	7.6	63	12.06	na	na
Site 1	16	02	12	1997	5.2	7.6	63	12.05	na	na
Site 1	17	02	12	1997	5.2	7.6	63	12.07	na	na
Site 1	18	02	12	1997	5.2	7.6	62	12.08	na	na
Site 1	19	02	12	1997	5.2	7.6	63	12.08	na	na
Site 1	20	02	12	1997	5.1	7.6	62	12.09	62.1	na
Site 1	00	04	22	1997	11.4	7.3	62	11.92	61.6	6.8
Site 1	01	04	22	1997	11.3	7.4	62	11.83	na	na
Site 1	02	04	22	1997	11.0	7.4	61	11.62	na	na
Site 1	03	04	22	1997	10.9	7.5	61	11.45	na	na
Site 1	04	04	22	1997	10.7	7.5	62	11.40	na	na
Site 1	05	04	22	1997	10.6	7.5	62	11.35	61.8	na
Site 1	06	04	22	1997	10.5	7.5	62	11.30	na	na
Site 1	07	04	22	1997	10.3	7.5	61	11.20	na	na
Site 1	08	04	22	1997	10.2	7.5	62	11.15	na	na
Site 1	09	04	22	1997	10.0	7.5	61	11.13	na	na
Site 1	10	04	22	1997	9.9	7.5	61	11.13	61.8	na
Site 1	11	04	22	1997	9.9	7.5	61	11.14	na	na

Lake Whatcom 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 1	12	04	22	1997	9.8	7.5	61	11.08	na	na
Site 1	13	04	22	1997	9.8	7.5	61	11.06	na	na
Site 1	14	04	22	1997	9.8	7.5	61	11.04	na	na
Site 1	15	04	22	1997	9.7	7.5	61	10.97	na	na
Site 1	16	04	22	1997	9.7	7.5	60	10.92	na	na
Site 1	17	04	22	1997	9.6	7.5	60	10.80	na	na
Site 1	18	04	22	1997	9.6	7.5	61	10.78	na	na
Site 1	19	04	22	1997	9.6	7.5	61	10.79	na	na
Site 1	20	04	22	1997	9.5	7.5	60	10.85	na	na
Site 1	00	05	15	1997	17.8	7.8	62	10.68	na	5.6
Site 1	01	05	15	1997	na	na	na	na	na	na
Site 1	02	05	15	1997	na	na	na	na	na	na
Site 1	03	05	15	1997	na	na	na	na	na	na
Site 1	04	05	15	1997	na	na	na	na	na	na
Site 1	05	05	15	1997	13.6	7.9	61	11.98	na	na
Site 1	06	05	15	1997	na	na	na	na	na	na
Site 1	07	05	15	1997	na	na	na	na	na	na
Site 1	08	05	15	1997	na	na	na	na	na	na
Site 1	09	05	15	1997	na	na	na	na	na	na
Site 1	10	05	15	1997	12.6	7.7	61	11.66	na	na
Site 1	11	05	15	1997	na	na	na	na	na	na
Site 1	12	05	15	1997	na	na	na	na	na	na
Site 1	13	05	15	1997	na	na	na	na	na	na
Site 1	14	05	15	1997	na	na	na	na	na	na
Site 1	15	05	15	1997	12.3	7.5	62	10.63	na	na
Site 1	16	05	15	1997	na	na	na	na	na	na
Site 1	17	05	15	1997	na	na	na.	na	na	na
Site 1	18	05	15	1997	na	na	na	na	na	na
Site 1	19	05	15	1997	na	na	na	na	na	na
Site 1	20	05	15	1997	11.9	7.3	62	9.95	na	na
Site 1	00	06	10	1997	19.2	7.7	62	9.46	61.2	4.3
Site 1	01	06	10	1997	19.1	7.9	62	9.54	na	na
Site 1	02	06	10	1997	18.8	8.0	62	9.44	na	na
Site 1	03	06	10	1997	18.8	8.0	62	9.46	na	na
Site 1	04	06	10	1997	17.8	8.3	62	10.04	na	na
Site 1	05	06	10	1997	16.8	8.5	61	10.41	na	na
Site 1	06	06	10	1997	15.7	8.7	61	10.95	na	na
Site 1	07	06	10	1997	14.1	8.9	60	11.20	na	na
Site 1	08	06	10	1997	12.9	8.5	61	9.99	na	na
Site 1	09	06	10	1997	12.2	8.2	61	8.93	na	na
Site 1	10	06	10	1997	11.9	7.9	61	8.62	na	na
Site 1	11	06	10	1997	11.7	7.9	61	7.85	na	na
Site 1	12	06	10	1997	11.4	7.8	62	7.33	na	na
Site 1	13	06	10	1997	11.1	7.7	61	6.78	na	na
Site 1	14	06	10	1997	11.0	7.6	61	6.58	na	na
Site 1	15	06	10	1997	10.9	7.5	61	6.39	61.6	na
Site 1	16	06	10	1997	10.9	7.4	62	6.32	na	na
Site 1	17	06	10	1997	10.8	7.3	61	6.28	na	na
Site 1	18	06	10	1997	10.8	7.3	61	6.23	na	na
Site 1	19	06	10	1997	10.7	7.3	61	6.19	na	na
Site 1	20	06	10	1997	10.7	7.2	61	6.15	na	na
Site 1	00	07	14	1997	20.5	7.6	63	9.92	60.7	5.0
Site 1	01	07	14	1997	19.9	7.8	62	9.98	na	na
Site 1	02	07	14	1997	19.8	7.9	62	9.94	na	na

Lake Whatcom 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 1	03	07	14	1997	19.7	8.0	62	9.90	na	na
Site 1	04	07	14	1997	19.6	8.0	62	9.83	na	na
Site 1	05	07	14	1997	18.9	8.2	62	10.04	na	na
Site 1	06	07	14	1997	18.6	8.2	61	9.88	na	na
Site 1	07	07	14	1997	17.8	8.0	61	9.53	na	na
Site 1	08	07	14	1997	16.0	7.7	62	9.06	na	na
Site 1	09	07	14	1997	14.5	7.5	63	8.13	na	na
Site 1	10	07	14	1997	13.2	7.2	63	7.08	61.8	na
Site 1	11	07	14	1997	12.4	7.1	62	6.26	na	na
Site 1	12	07	14	1997	12.0	7.0	63	5.23	na	na
Site 1	13	07	14	1997	11.7	6.9	63	4.64	na	na
Site 1	14	07	14	1997	11.4	6.9	63	3.89	na	na
Site 1	15	07	14	1997	11.3	6.8	64	3.67	na	na
Site 1	16	07	14	1997	11.2	6.8	64	3.39	na	na
Site 1	17	07	14	1997	11.1	6.8	64	3.31	na	na
Site 1	18	07	14	1997	11.1	6.7	63	3.27	na	na
Site 1	19	07	14	1997	11.0	6.7	64	3.15	na	na
Site 1	20	07	14	1997	11.0	6.7	63	3.07	63.3	na
Site 1	00	08	13	1997	23.2	8.2	63	9.55	na	5.5
Site 1	01	08	13	1997	23.2	8.2	63	9.51	na	na
Site 1	02	08	13	1997	23.0	8.3	62	9.50	na	na
Site 1	03	08	13	1997	22.8	8.4	62	9.45	na	na
Site 1	04	08	13	1997	22.3	8.4	61	9.50	na	na
Site 1	05	08	13	1997	21.8	8.5	61	9.87	na	na
Site 1	06	08	13	1997	21.0	8.4	62	9.77	na	na
Site 1	07	08	13	1997	19.9	8.3	62	10.01	na	na
Site 1	08	08	13	1997	18.8	8.1	62	9.99	na	na
Site 1	09	08	13	1997	15.9	7.9	63	7.10	na	na
Site 1	10	08	13	1997	13.9	7.6	64	4.80	61.3	na
Site 1	11	08	13	1997	13.0	7.5	64	3.20	na	na
Site 1	12	08	13	1997	12.4	7.3	66	1.63	na	na
Site 1	13	08	13	1997	11.9	7.2	66	1.03	na	na
Site 1	14	08	13	1997	11.7	7.0	66	0.61	na	na
Site 1	15	08	13	1997	11.6	7.0	66	0.61	na	na
Site 1	16	08	13	1997	11.4	6.9	66	0.57	na	na
Site 1	17	08	13	1997	11.4	6.9	66	0.53	na	na
Site 1	18	08	13	1997	11.4	6.9	65	0.53	na	na
Site 1	19	08	13	1997	11.3	6.8	66	0.53	65.8	na
Site 1	20	08	13	1997	na	na	na	na	na	na
Site 1	00	09	10	1997	21.3	8.3	62	9.94	na	4.1
Site 1	01	09	10	1997	21.2	8.4	62	9.86	na	na
Site 1	02	09	10	1997	21.1	8.4	62	9.83	na	na
Site 1	03	09	10	1997	21.0	8.5	62	9.81	na	na
Site 1	04	09	10	1997	20.8	8.4	62	9.62	na	na
Site 1	05	09	10	1997	20.6	8.4	62	9.56	na	na
Site 1	06	09	10	1997	20.4	8.3	62	9.10	na	na
Site 1	07	09	10	1997	20.2	8.0	61	8.53	na	na
Site 1	08	09	10	1997	19.0	7.7	63	6.34	na	na
Site 1	09	09	10	1997	16.8	7.4	65	4.21	na	na
Site 1	10	09	10	1997	15.2	7.3	66	2.03	62.2	na
Site 1	11	09	10	1997	12.8	7.2	67	0.57	na	na
Site 1	12	09	10	1997	12.0	7.1	67	0.50	na	na
Site 1	13	09	10	1997	11.9	7.0	66	0.46	na	na
Site 1	14	09	10	1997	11.7	7.0	67	0.46	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 1	15	09	10	1997	11.6	7.0	68	0.42	na	na
Site 1	16	09	10	1997	11.5	6.9	68	0.42	na	na
Site 1	17	09	10	1997	11.5	6.9	66	0.42	na	na
Site 1	18	09	10	1997	11.4	6.9	67	0.42	na	na
Site 1	19	09	10	1997	11.4	6.9	68	0.43	na	na
Site 1	20	09	10	1997	11.4	6.9	67	0.38	67.5	na
Intake	00	10	08	1996	16.7	7.6	63	9.81	na	6.9
Intake	01	10	08	1996	16.6	7.7	63	9.72	na	na
Intake	02	10	08	1996	16.4	7.8	63	9.68	na	na
Intake	03	10	08	1996	16.3	7.8	63	9.69	na	na
Intake	04	10	08	1996	16.2	7.9	62	9.64	na	na
Intake	05	10	08	1996	16.2	7.9	63	9.57	na	na
Intake	06	10	08	1996	16.2	7.9	63	9.50	na	na
Intake	07	10	08	1996	16.1	8.0	63	9.50	na	na
Intake	08	10	08	1996	16.1	8.0	63	9.48	na	na
Intake	09	10	08	1996	16.1	7.9	63	9.42	na	na
Intake	10	10	08	1996	16.1	7.9	63	9.34	61.8	na
Intake	00	11	12	1996	11.4	7.6	63	10.36	na	5.7
Intake	01	11	12	1996	11.4	7.6	63	10.29	na	na
Intake	02	11	12	1996	11.3	7.7	62	10.22	na	na
Intake	03	11	12	1996	11.4	7.7	62	10.15	na	na
Intake	04	11	12	1996	11.3	7.7	62	10.11	na	na
Intake	05	11	12	1996	11.2	7.7	62	10.08	61.7	na
Intake	06	11	12	1996	11.2	7.8	61	10.04	na	na
Intake	07	11	12	1996	11.2	7.7	62	10.01	na	na
Intake	08	11	12	1996	11.2	7.8	62	10.01	na	na
Intake	09	11	12	1996	11.2	7.8	62	9.98	na	na
Intake	10	11	12	1996	11.1	7.8	62	9.93	61.7	na
Intake	00	12	03	1996	8.3	7.4	63	11.19	61.1	3.4
Intake	01	12	03	1996	8.3	7.5	63	11.04	na	na
Intake	02	12	03	1996	8.4	7.5	63	10.98	na	na
Intake	03	12	03	1996	8.3	7.5	62	10.93	na	na
Intake	04	12	03	1996	8.3	7.5	62	10.89	na	na
Intake	05	12	03	1996	8.3	7.6	62	10.84	61.1	na
Intake	06	12	03	1996	8.3	7.6	62	10.85	na	na
Intake	07	12	03	1996	8.3	7.6	62	10.81	na	na
Intake	08	12	03	1996	8.3	7.6	61	10.81	na	na
Intake	09	12	03	1996	8.3	7.6	62	10.81	na	na
Intake	10	12	03	1996	8.3	7.6	62	10.77	na	na
Intake	00	02	12	1997	5.9	7.3	62	11.78	60.8	6.1
Intake	01	02	12	1997	5.9	7.4	62	11.62	na	na
Intake	02	02	12	1997	5.9	7.4	62	11.57	na	na
Intake	03	02	12	1997	5.9	7.4	62	11.57	na	na
Intake	04	02	12	1997	5.9	7.5	62	11.57	na	na
Intake	05	02	12	1997	5.9	7.5	62	11.52	60.8	na
Intake	06	02	12	1997	5.9	7.5	62	11.52	na	na
Intake	07	02	12	1997	5.9	7.5	61	11.52	na	na
Intake	08	02	12	1997	5.9	7.5	60	11.53	na	na
Intake	09	02	12	1997	5.9	7.5	61	11.54	na	na
Intake	10	02	12	1997	5.8	7.5	61	11.51	60.9	na
Intake	00	04	22	1997	10.8	7.3	62	12.60	na	6.0
Intake	01	04	22	1997	10.6	7.4	62	12.39	na	na
Intake	02	04	22	1997	10.0	7.4	62	12.35	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Intake	03	04	22	1997	9.1	7.5	60	12.28	na	na
Intake	04	04	22	1997	8.9	7.6	60	12.10	na	na
Intake	05	04	22	1997	8.7	7.6	60	12.03	na	na
Intake	06	04	22	1997	8.6	7.6	60	11.90	na	na
Intake	07	04	22	1997	8.4	7.6	60	11.79	na	na
Intake	08	04	22	1997	8.2	7.6	61	11.60	na	na
Intake	09	04	22	1997	8.0	7.6	60	11.57	na	na
Intake	10	04	22	1997	7.9	7.5	60	11.50	60.5	na
Intake	00	05	15	1997	17.5	7.8	61	11.12	na	5.7
Intake	01	05	15	1997	na	na	na	na	na	na
Intake	02	05	15	1997	na	na	na	na	na	na
Intake	03	05	15	1997	na	na	na	na	na	na
Intake	04	05	15	1997	na	na	na	na	na	na
Intake	05	05	15	1997	15.6	8.0	60	11.60	na	na
Intake	06	05	15	1997	na	na	na	na	na	na
Intake	07	05	15	1997	na	na	na	na	na	na
Intake	08	05	15	1997	na	na	na	na	na	na
Intake	09	05	15	1997	na	na	na	na	na	na
Intake	10	05	15	1997	13.4	7.9	60	12.28	na	na
Intake	00	06	10	1997	18.6	7.6	61	9.63	na	4.1
Intake	01	06	10	1997	18.4	7.8	62	9.57	na	na
Intake	02	06	10	1997	18.2	7.9	61	9.52	na	na
Intake	03	06	10	1997	17.6	8.1	61	9.52	na	na
Intake	04	06	10	1997	16.7	8.5	60	9.96	na	na
Intake	05	06	10	1997	15.9	8.5	60	9.97	na	na
Intake	06	06	10	1997	15.5	8.4	60	9.94	na	na
Intake	07	06	10	1997	14.8	8.2	60	9.92	na	na
Intake	08	06	10	1997	14.4	8.2	60	9.94	na	na
Intake	09	06	10	1997	12.7	8.2	60	9.93	na	na
Intake	10	06	10	1997	11.8	8.1	60	9.66	59.6	na
Intake	00	07	10	1997	18.0	7.3	61	9.31	na	4.6
Intake	01	07	10	1997	18.0	7.7	61	9.22	na	na
Intake	02	07	10	1997	18.1	7.8	61	9.15	na	na
Intake	03	07	10	1997	18.1	7.9	61	9.04	na	na
Intake	04	07	10	1997	18.0	7.9	61	8.97	na	na
Intake	05	07	10	1997	18.0	8.0	61	8.95	59.4	na
Intake	06	07	10	1997	18.0	8.0	61	8.90	na	na
Intake	07	07	10	1997	17.9	8.0	61	8.92	na	na
Intake	08	07	10	1997	17.8	8.0	61	8.90	na	na
Intake	09	07	10	1997	17.8	8.0	60	8.87	na	na
Intake	10	07	10	1997	17.8	7.9	61	8.87	na	na
Intake	00	08	13	1997	22.6	7.7	62	9.30	na	7.0
Intake	01	08	13	1997	22.5	7.8	62	9.15	na	na
Intake	02	08	13	1997	22.3	7.9	62	9.16	na	na
Intake	03	08	13	1997	21.7	7.9	61	9.25	na	na
Intake	04	08	13	1997	21.3	8.0	61	9.41	na	na
Intake	05	08	13	1997	21.2	8.0	61	9.32	na	na
Intake	06	08	13	1997	20.8	8.0	61	9.42	na	na
Intake	07	08	13	1997	20.6	8.0	62	9.38	na	na
Intake	08	08	13	1997	20.3	8.0	61	9.34	na	na
Intake	09	08	13	1997	19.4	7.8	60	9.06	na	na
Intake	10	08	13	1997	18.8	7.7	61	9.21	59.3	na
Intake	00	09	10	1997	20.8	8.0	62	9.32	60.1	4.6
Intake	01	09	10	1997	20.8	8.2	61	9.28	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Intake	02	09	10	1997	20.4	8.2	61	9.32	na	na
Intake	03	09	10	1997	20.2	8.2	61	9.19	na	na
Intake	04	09	10	1997	20.1	8.1	61	9.16	na	na
Intake	05	09	10	1997	20.0	8.1	61	9.15	59.9	na
Intake	06	09	10	1997	19.9	8.0	61	9.09	na	na
Intake	07	09	10	1997	19.9	7.9	61	9.00	na	na
Intake	08	09	10	1997	19.7	7.8	60	8.88	na	na
Intake	09	09	10	1997	19.4	7.7	61	8.70	na	na
Intake	10	09	10	1997	19.2	7.6	61	8.54	59.8	na
Site 2	00	10	08	1996	16.6	7.6	63	9.94	na	7.2
Site 2	01	10	08	1996	16.5	7.8	64	9.85	na	na
Site 2	02	10	08	1996	16.3	7.8	63	9.81	na	na
Site 2	03	10	08	1996	16.2	7.9	63	9.80	na	na
Site 2	04	10	08	1996	16.2	8.0	63	9.73	na	na
Site 2	05	10	08	1996	16.2	8.0	63	9.68	61.7	na
Site 2	06	10	08	1996	16.2	8.0	63	9.58	na	na
Site 2	07	10	08	1996	16.2	8.0	63	9.53	na	na
Site 2	08	10	08	1996	16.2	8.0	63	9.47	na	na
Site 2	09	10	08	1996	16.1	8.0	63	9.41	na	na
Site 2	10	10	08	1996	16.1	7.9	63	9.22	61.8	na
Site 2	11	10	08	1996	16.1	7.9	63	9.02	na	na
Site 2	12	10	08	1996	16.0	7.8	63	8.74	na	na
Site 2	13	10	08	1996	16.0	7.7	63	8.69	na	na
Site 2	14	10	08	1996	15.9	7.7	63	8.08	na	na
Site 2	15	10	08	1996	14.2	7.1	65	1.16	na	na
Site 2	16	10	08	1996	12.6	6.9	67	0.15	na	na
Site 2	17	10	08	1996	11.7	6.8	68	0.12	na	na
Site 2	17.8	10	08	1996	11.4	6.8	71	0.12	na	na
Site 2	00	11	12	1996	11.4	7.4	62	10.30	61.6	6.2
Site 2	01	11	12	1996	11.4	7.5	62	10.20	na	na
Site 2	02	11	12	1996	11.4	7.5	62	10.12	na	na
Site 2	03	11	12	1996	11.4	7.6	62	10.09	na	na
Site 2	04	11	12	1996	11.4	7.6	62	10.04	na	na
Site 2	05	11	12	1996	11.3	7.6	62	10.03	na	na
Site 2	06	11	12	1996	11.3	7.6	62	10.01	na	na
Site 2	07	11	12	1996	11.3	7.6	63	10.00	na	na
Site 2	08	11	12	1996	11.3	7.7	62	9.99	na	na
Site 2	09	11	12	1996	11.2	7.7	62	10.00	na	na
Site 2	10	11	12	1996	11.2	7.7	62	9.97	na	na
Site 2	11	11	12	1996	11.2	7.7	61	9.97	na	na
Site 2	12	11	12	1996	11.2	7.7	61	9.97	na	na
Site 2	13	11	12	1996	11.2	7.7	62	9.93	na	na
Site 2	14	11	12	1996	11.2	7.7	62	9.89	na	na
Site 2	15	11	12	1996	11.2	7.7	62	9.86	61.7	na
Site 2	16	11	12	1996	11.1	7.7	62	9.69	na	na
Site 2	17	11	12	1996	11.1	7.6	62	9.19	na	na
Site 2	00	12	03	1996	8.2	7.3	63	11.51	na	3.7
Site 2	01	12	03	1996	8.3	7.4	62	11.19	na	na
Site 2	02	12	03	1996	8.3	7.4	62	11.08	na	na
Site 2	03	12	03	1996	8.3	7.5	62	11.03	na	na
Site 2	04	12	03	1996	8.3	7.5	61	10.93	na	na
Site 2	05	12	03	1996	8.3	7.5	62	10.88	na	na
Site 2	06	12	03	1996	8.3	7.6	61	10.88	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 2	07	12	03	1996	8.3	7.6	62	10.83	na	na
Site 2	08	12	03	1996	8.3	7.6	61	10.77	na	na
Site 2	09	12	03	1996	8.3	7.6	61	10.77	na	na
Site 2	10	12	03	1996	8.3	7.6	61	10.77	na	na
Site 2	11	12	03	1996	8.3	7.6	62	10.77	na	na
Site 2	12	12	03	1996	8.3	7.6	61	10.77	na	na
Site 2	13	12	03	1996	8.3	7.6	61	10.72	na	na
Site 2	14	12	03	1996	8.3	7.6	61	10.72	na	na
Site 2	15	12	03	1996	8.3	7.6	61	10.72	na	na
Site 2	16	12	03	1996	8.3	7.6	62	10.71	na	na
Site 2	17	12	03	1996	8.3	7.6	62	10.71	na	na
Site 2	18	12	03	1996	8.3	7.6	61	10.65	61.1	na
Site 2	00	02	12	1997	5.9	7.3	62	11.78	na	7.0
Site 2	01	02	12	1997	5.9	7.4	62	11.72	na	na
Site 2	02	02	12	1997	5.9	7.4	62	11.66	na	na
Site 2	03	02	12	1997	5.9	7.4	62	11.60	na	na
Site 2	04	02	12	1997	5.9	7.4	62	11.62	na	na
Site 2	05	02	12	1997	5.9	7.4	61	11.59	na	na
Site 2	06	02	12	1997	5.9	7.4	61	11.54	na	na
Site 2	07	02	12	1997	5.9	7.5	61	11.54	na	na
Site 2	08	02	12	1997	5.9	7.5	62	11.54	na	na
Site 2	09	02	12	1997	5.8	7.5	62	11.51	na	na
Site 2	10	02	12	1997	5.8	7.5	61	11.52	na	na
Site 2	11	02	12	1997	5.8	7.5	61	11.52	na	na
Site 2	12	02	12	1997	5.8	7.5	61	11.52	na	na
Site 2	13	02	12	1997	5.8	7.5	61	11.47	na	na
Site 2	14	02	12	1997	5.8	7.5	61	11.47	na	na
Site 2	15	02	12	1997	5.8	7.5	61	11.47	60.9	na
Site 2	16	02	12	1997	5.8	7.5	61	11.47	na	na
Site 2	17	02	12	1997	5.8	7.5	61	11.47	na	na
Site 2	18	02	12	1997	5.8	7.5	61	11.47	na	na
Site 2	00	04	22	1997	10.4	7.4	61	12.75	na	5.2
Site 2	01	04	22	1997	10.2	7.5	61	12.36	na	na
Site 2	02	04	22	1997	9.8	7.6	61	12.33	na	na
Site 2	03	04	22	1997	9.5	7.7	60	12.21	na	na
Site 2	04	04	22	1997	9.2	7.6	61	12.25	na	na
Site 2	05	04	22	1997	9.0	7.6	61	12.25	60.4	na
Site 2	06	04	22	1997	8.9	7.7	61	12.20	na	na
Site 2	07	04	22	1997	8.8	7.7	60	12.11	na	na
Site 2	08	04	22	1997	8.6	7.7	60	11.98	na	na
Site 2	09	04	22	1997	8.4	7.7	60	11.90	na	na
Site 2	10	04	22	1997	8.3	7.6	60	11.80	na	na
Site 2	11	04	22	1997	8.1	7.6	60	11.79	na	na
Site 2	12	04	22	1997	8.0	7.6	60	11.74	na	na
Site 2	13	04	22	1997	7.9	7.6	60	11.73	na	na
Site 2	14	04	22	1997	7.8	7.6	60	11.66	na	na
Site 2	15	04	22	1997	7.8	7.6	61	11.57	na	na
Site 2	16	04	22	1997	7.7	7.6	60	11.55	na	na
Site 2	17	04	22	1997	7.6	7.5	60	11.46	na	na
Site 2	18	04	22	1997	7.6	7.5	60	11.43	na	na
Site 2	00	05	15	1997	17.2	7.8	61	11.15	na	5.2
Site 2	01	05	15	1997	na	na	na	na	na	na
Site 2	02	05	15	1997	na	na	na	na	na	na
Site 2	03	05	15	1997	na	na	na	na	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 2	04	05	15	1997	na	na	na	na	na	na
Site 2	05	05	15	1997	15.6	7.9	60	11.56	na	na
Site 2	06	05	15	1997	na	na	na	na	na	na
Site 2	07	05	15	1997	na	na	na	na	na	na
Site 2	08	05	15	1997	na	na	na	na	na	na
Site 2	09	05	15	1997	na	na	na	na	na	na
Site 2	10	05	15	1997	13.4	8.0	60	12.21	na	na
Site 2	11	05	15	1997	na	na	na	na	na	na
Site 2	12	05	15	1997	na	na	na	na	na	na
Site 2	13	05	15	1997	na	na	na	na	na	na
Site 2	14	05	15	1997	na	na	na	na	na	na
Site 2	15	05	15	1997	10.3	7.6	60	11.90	na	na
Site 2	16	05	15	1997	na	na	na	na	na	na
Site 2	17	05	15	1997	na	na	na	na	na	na
Site 2	18	05	15	1997	na	na	na	na	na	na
Site 2	19	05	15	1997	na	na	na	na	na	na
Site 2	20	05	15	1997	9.8	7.3	61	10.89	na	na
Site 2	00	06	10	1997	18.4	8.0	61	9.53	59.9	4.5
Site 2	01	06	10	1997	18.3	8.0	61	9.50	na	na
Site 2	02	06	10	1997	18.1	8.1	61	9.48	na	na
Site 2	03	06	10	1997	17.4	8.2	60	9.62	na	na
Site 2	04	06	10	1997	17.2	8.3	60	9.64	na	na
Site 2	05	06	10	1997	16.9	8.4	60	9.74	na	na
Site 2	06	06	10	1997	15.6	8.4	60	9.92	na	na
Site 2	07	06	10	1997	15.1	8.3	60	9.94	na	na
Site 2	08	06	10	1997	14.6	8.3	60	9.86	na	na
Site 2	09	06	10	1997	13.6	8.2	60	9.82	na	na
Site 2	10	06	10	1997	12.2	8.1	60	9.80	na	na
Site 2	11	06	10	1997	11.4	8.0	59	9.62	na	na
Site 2	12	06	10	1997	10.6	7.9	60	9.53	na	na
Site 2	13	06	10	1997	9.9	7.8	59	9.32	na	na
Site 2	14	06	10	1997	9.7	7.8	59	9.31	na	na
Site 2	15	06	10	1997	9.4	7.7	59	9.26	60.1	na
Site 2	16	06	10	1997	9.3	7.7	59	9.31	na	na
Site 2	17	06	10	1997	9.2	7.6	59	9.13	na	na
Site 2	18	06	10	1997	9.1	7.6	60	9.22	na	na
Site 2	00	07	10	1997	18.0	7.8	61	9.47	na	4.6
Site 2	01	07	10	1997	18.0	8.0	61	9.38	na	na
Site 2	02	07	10	1997	18.0	8.1	61	9.32	na	na
Site 2	03	07	10	1997	18.0	8.1	61	9.27	na	na
Site 2	04	07	10	1997	17.9	8.1	61	9.22	na	na
Site 2	05	07	10	1997	17.9	8.2	61	9.19	na	na
Site 2	06	07	10	1997	17.9	8.2	61	9.14	na	na
Site 2	07	07	10	1997	17.8	8.1	61	9.12	na	na
Site 2	08	07	10	1997	17.8	8.1	60	9.06	na	na
Site 2	09	07	10	1997	17.8	8.1	60	9.05	na	na
Site 2	10	07	10	1997	17.7	8.1	60	8.99	na	na
Site 2	11	07	10	1997	17.4	8.0	60	8.94	na	na
Site 2	12	07	10	1997	15.0	7.9	61	8.56	na	na
Site 2	13	07	10	1997	12.1	7.8	61	8.71	na	na
Site 2	14	07	10	1997	11.0	7.6	61	8.21	na	na
Site 2	15	07	10	1997	10.5	7.6	60	8.20	na	na
Site 2	16	07	10	1997	10.4	7.5	61	8.14	na	na
Site 2	17	07	10	1997	10.2	7.4	60	8.16	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 2	18	07	10	1997	10.0	7.3	60	7.60	60.3	na
Site 2	00	08	13	1997	22.5	7.6	61	9.22	60.0	7.6
Site 2	01	08	13	1997	22.5	7.7	62	9.13	na	na
Site 2	02	08	13	1997	22.4	7.8	61	9.05	na	na
Site 2	03	08	13	1997	22.3	7.9	61	9.02	na	na
Site 2	04	08	13	1997	21.9	7.9	62	9.08	na	na
Site 2	05	08	13	1997	21.5	8.0	62	9.29	59.7	na
Site 2	06	08	13	1997	21.3	8.0	61	9.21	na	na
Site 2	07	08	13	1997	20.7	8.0	61	9.25	na	na
Site 2	08	08	13	1997	20.4	7.9	61	9.28	na	na
Site 2	09	08	13	1997	19.3	7.9	60	9.22	na	na
Site 2	10	08	13	1997	18.4	7.8	60	9.24	na	na
Site 2	11	08	13	1997	17.1	7.8	60	9.17	na	na
Site 2	12	08	13	1997	15.2	7.8	61	9.10	na	na
Site 2	13	08	13	1997	13.6	7.7	61	8.47	na	na
Site 2	14	08	13	1997	12.9	7.7	62	8.16	na	na
Site 2	15	08	13	1997	12.2	7.6	61	8.02	na	na
Site 2	16	08	13	1997	11.6	7.5	61	6.78	na	na
Site 2	17	08	13	1997	11.2	7.3	63	5.15	na	na
Site 2	18	08	13	1997	10.5	7.2	63	3.37	na	na
Site 2	00	09	10	1997	20.7	8.0	61	9.72	60.1	5.1
Site 2	01	09	10	1997	20.6	8.1	61	9.58	na	na
Site 2	02	09	10	1997	20.5	8.2	62	9.55	na	na
Site 2	03	09	10	1997	20.2	8.2	61	9.53	na	na
Site 2	04	09	10	1997	20.2	8.2	61	9.44	na	na
Site 2	05	09	10	1997	20.1	8.2	61	9.41	na	na
Site 2	06	09	10	1997	20.0	8.1	61	9.33	na	na
Site 2	07	09	10	1997	20.0	8.1	61	9.27	na	na
Site 2	08	09	10	1997	19.9	8.0	61	9.18	na	na
Site 2	09	09	10	1997	19.7	7.9	60	9.05	na	na
Site 2	10	09	10	1997	19.5	7.8	60	8.89	59.9	na
Site 2	11	09	10	1997	18.8	7.6	60	8.65	na	na
Site 2	12	09	10	1997	16.9	7.5	60	8.33	na	na
Site 2	13	09	10	1997	14.7	7.5	61	7.71	na	na
Site 2	14	09	10	1997	13.7	7.3	61	6.66	na	na
Site 2	15	09	10	1997	12.5	7.1	62	5.22	na	na
Site 2	16	09	10	1997	11.6	7.0	61	3.80	na	na
Site 2	17	09	10	1997	11.0	6.9	65	1.82	na	na
Site 2	18	09	10	1997	10.7	6.9	65	0.94	na	na
Site 3	00	10	08	1996	16.3	7.6	63	9.92	61.7	8.2
Site 3	01	10	08	1996	16.3	7.8	63	9.76	na	na
Site 3	02	10	08	1996	16.3	7.9	63	9.71	na	na
Site 3	03	10	08	1996	16.3	8.0	63	9.70	na	na
Site 3	04	10	08	1996	16.2	8.0	63	9.68	na	na
Site 3	05	10	08	1996	16.2	8.0	63	9.65	61.6	na
Site 3	06	10	08	1996	16.2	8.0	63	9.62	na	na
Site 3	07	10	08	1996	16.2	8.0	63	9.63	na	na
Site 3	08	10	08	1996	16.2	8.0	63	9.57	na	na
Site 3	09	10	08	1996	16.2	8.0	63	9.40	na	na
Site 3	10	10	08	1996	16.2	8.0	63	9.37	na	na
Site 3	15	10	08	1996	16.0	7.9	62	9.27	na	na
Site 3	20	10	08	1996	10.5	7.7	62	8.25	61.8	na
Site 3	25	10	08	1996	9.1	7.6	61	8.51	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 3	30	10	08	1996	8.4	7.5	60	8.64	na	na
Site 3	35	10	08	1996	8.0	7.5	61	8.78	na	na
Site 3	40	10	08	1996	7.6	7.5	62	8.81	62.4	na
Site 3	45	10	08	1996	7.5	7.4	62	8.71	na	na
Site 3	50	10	08	1996	7.3	7.3	62	8.61	na	na
Site 3	55	10	08	1996	7.3	7.3	61	8.52	na	na
Site 3	60	10	08	1996	7.3	7.3	63	8.44	na	na
Site 3	65	10	08	1996	7.2	7.3	62	8.40	na	na
Site 3	70	10	08	1996	7.2	7.3	62	8.22	na	na
Site 3	75	10	08	1996	7.1	7.3	62	7.87	na	na
Site 3	80	10	08	1996	7.0	7.1	64	5.00	63.1	na
Site 3	00	11	12	1996	11.4	7.4	62	10.10	61.5	6.5
Site 3	01	11	12	1996	11.4	7.4	62	10.01	na	na
Site 3	02	11	12	1996	11.3	7.5	62	9.94	na	na
Site 3	03	11	12	1996	11.3	7.6	63	9.90	na	na
Site 3	04	11	12	1996	11.3	7.6	62	9.87	na	na
Site 3	05	11	12	1996	11.3	7.6	62	9.84	na	na
Site 3	06	11	12	1996	11.3	7.6	61	9.80	na	na
Site 3	07	11	12	1996	11.3	7.6	62	9.80	na	na
Site 3	08	11	12	1996	11.3	7.6	62	9.80	na	na
Site 3	09	11	12	1996	11.3	7.6	61	9.77	na	na
Site 3	10	11	12	1996	11.3	7.6	61	9.74	61.5	na
Site 3	15	11	12	1996	11.2	7.6	61	9.72	na	na
Site 3	20	11	12	1996	11.2	7.6	60	9.69	na	na
Site 3	25	11	12	1996	10.9	7.6	61	9.37	na	na
Site 3	30	11	12	1996	8.3	7.5	62	8.10	na	na
Site 3	35	11	12	1996	7.9	7.4	62	8.10	na	na
Site 3	40	11	12	1996	7.6	7.3	62	8.12	62.4	na
Site 3	45	11	12	1996	7.5	7.2	64	8.09	na	na
Site 3	50	11	12	1996	7.4	7.2	61	8.02	na	na
Site 3	55	11	12	1996	7.4	7.2	62	7.99	na	na
Site 3	60	11	12	1996	7.3	7.1	63	7.92	na	na
Site 3	65	11	12	1996	7.3	7.1	62	7.83	na	na
Site 3	70	11	12	1996	7.2	7.1	62	7.24	na	na
Site 3	75	11	12	1996	7.2	7.1	62	7.03	na	na
Site 3	80	11	12	1996	7.2	7.0	62	6.98	62.8	na
Site 3	00	12	12	1996	7.9	7.2	62	11.07	na	4.2
Site 3	01	12	12	1996	7.9	7.3	62	11.00	na	na
Site 3	02	12	12	1996	7.9	7.3	62	10.88	na	na
Site 3	03	12	12	1996	7.9	7.3	62	10.82	na	na
Site 3	04	12	12	1996	7.9	7.3	62	10.76	na	na
Site 3	05	12	12	1996	7.9	7.3	62	10.71	na	na
Site 3	06	12	12	1996	7.9	7.3	62	10.71	na	na
Site 3	07	12	12	1996	7.9	7.3	62	10.65	na	na
Site 3	08	12	12	1996	7.9	7.3	62	10.59	na	na
Site 3	09	12	12	1996	7.9	7.4	61	10.59	na	na
Site 3	10	12	12	1996	7.9	7.4	62	10.58	61.3	na
Site 3	15	12	12	1996	7.9	7.4	62	10.52	na	na
Site 3	20	12	12	1996	7.9	7.4	62	10.52	61.2	na
Site 3	25	12	12	1996	7.9	7.4	61	10.46	na	na
Site 3	30	12	12	1996	7.9	7.4	60	10.41	na	na
Site 3	35	12	12	1996	7.9	7.4	61	10.35	na	na
Site 3	40	12	12	1996	7.8	7.3	61	9.64	61.9	na
Site 3	45	12	12	1996	7.6	7.3	61	8.85	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 3	50	12	12	1996	7.4	7.2	62	8.55	na	na
Site 3	55	12	12	1996	7.3	7.2	63	8.46	na	na
Site 3	60	12	12	1996	7.3	7.1	62	8.31	na	na
Site 3	65	12	12	1996	7.3	7.1	62	8.26	na	na
Site 3	70	12	12	1996	7.2	7.1	63	8.14	na	na
Site 3	75	12	12	1996	7.2	7.1	62	8.03	na	na
Site 3	80	12	12	1996	7.2	7.1	62	7.91	na	na
Site 3	00	02	12	1997	6.2	7.2	61	11.49	na	8.2
Site 3	01	02	12	1997	6.1	7.3	61	11.38	na	na
Site 3	02	02	12	1997	6.1	7.3	62	11.32	na	na
Site 3	03	02	12	1997	6.1	7.3	62	11.28	na	na
Site 3	04	02	12	1997	6.2	7.3	62	11.26	na	na
Site 3	05	02	12	1997	6.1	7.4	61	11.23	61.1	na
Site 3	06	02	12	1997	6.1	7.3	61	11.21	na	na
Site 3	07	02	12	1997	6.1	7.4	61	11.21	na	na
Site 3	08	02	12	1997	6.1	7.4	61	11.16	na	na
Site 3	09	02	12	1997	6.1	7.4	61	11.15	na	na
Site 3	10	02	12	1997	6.1	7.4	62	11.15	na	na
Site 3	15	02	12	1997	6.1	7.4	61	11.16	na	na
Site 3	20	02	12	1997	6.1	7.4	61	11.16	na	na
Site 3	25	02	12	1997	6.1	7.4	61	11.10	na	na
Site 3	30	02	12	1997	6.1	7.4	61	11.10	na	na
Site 3	35	02	12	1997	6.1	7.4	62	11.10	na	na
Site 3	40	02	12	1997	6.1	7.4	61	11.10	na	na
Site 3	45	02	12	1997	6.1	7.4	61	11.05	na	na
Site 3	50	02	12	1997	6.1	7.4	60	11.05	na	na
Site 3	55	02	12	1997	6.1	7.4	60.	11.05	na	na
Site 3	60	02	12	1997	6.1	7.4	61	11.06	63.4	na
Site 3	65	02	12	1997	6.1	7.4	60	11.05	na	na
Site 3	70	02	12	1997	6.1	7.4	61	11.00	na	na
Site 3	75	02	12	1997	6.1	7.4	60	11.00	na	na
Site 3	80	02	12	1997	6.1	7.4	61	11.01	na	na
Site 3	00	04	22	1997	10.1	7.3	61	12.20	60.5	5.8
Site 3	01	04	22	1997	10.0	7.5	61	12.20	na	na
Site 3	02	04	22	1997	9.5	7.5	60	12.16	na	na
Site 3	03	04	22	1997	9.1	7.5	61	12.19	na	na
Site 3	04	04	22	1997	9.0	7.6	60	12.10	na	na
Site 3	05	04	22	1997	8.9	7.6	60	12.06	na	na
Site 3	06	04	22	1997	8.8	7.6	60	12.02	na	na
Site 3	07	04	22	1997	8.7	7.6	60	11.99	na	na
Site 3	08	04	22	1997	8.6	7.6	60	11.89	na	na
Site 3	09	04	22	1997	8.5	7.6	60	11.83	na	na
Site 3	10	04	22	1997	8.4	7.6	60	11.83	60.0	na
Site 3	15	04	22	1997	7.8	7.6	60	11.61	na	na
Site 3	20	04	22	1997	7.4	7.6	60	11.59	60.4	na
Site 3	25	04	22	1997	7.3	7.6	60	11.48	na	na
Site 3	30	04	22	1997	7.2	7.6	61	11.43	na	na
Site 3	35	04	22	1997	7.1	7.6	59	11.37	na	na
Site 3	40	04	22	1997	6.9	7.6	59	11.34	na	na
Site 3	45	04	22	1997	6.8	7.6	60	11.28	na	na
Site 3	50	04	22	1997	6.8	7.5	58	11.23	na	na
Site 3	55	04	22	1997	6.7	7.5	58	11.18	na	na
Site 3	60	04	22	1997	6.6	7.5	59	11.23	na	na
Site 3	65	04	22	1997	6.5	7.5	59	11.15	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 3	70	04	22	1997	6.5	7.5	58	11.06	na	na
Site 3	75	04	22	1997	6.5	7.5	59	11.00	na	na
Site 3	80	04	22	1997	6.5	7.4	59	10.95	60.5	na
Site 3	00	05	21	1997	15.8	8.0	60	10.40	na	6.1
Site 3	01	05	21	1997	na	na	na	na	na	na
Site 3	02	05	21	1997	na	na	na	na	na	na
Site 3	03	05	21	1997	na	na	na	na	na	na
Site 3	04	05	21	1997	na	na	na	na	na	na
Site 3	05	05	21	1997	15.3	7.9	60	10.51	na	na
Site 3	06	05	21	1997	na	na	na	na	na	na
Site 3	07	05	21	1997	na	na	na	na	na	na
Site 3	08	05	21	1997	na	na	na	na	na	na
Site 3	09	05	21	1997	na	na	na	na	na	na
Site 3	10	05	21	1997	12.3	7.8	60	11.45	na	na
Site 3	15	05	21	1997	na	na	na	na	na	na
Site 3	20	05	21	1997	9.2	7.5	60	11.35	na	na
Site 3	25	05	21	1997	na	na	na	na	na	na
Site 3	30	05	21	1997	na	na	na	na	na	na
Site 3	35	05	21	1997	na	na	na	na	na	na
Site 3	40	05	21	1997	7.6	7.4	60	11.28	na	na
Site 3	45	05	21	1997	na	na	na	na	na	na
Site 3	50	05	21	1997	na	na	na	na	na	na
Site 3	55	05	21	1997	na	na	na	na	na	na
Site 3	60	05	21	1997	7.8	7.4	60	11.02	na	na
Site 3	65	05	21	1997	na	na	na	na	na	na
Site 3	70	05	21	1997	na	na	na	na	na	na
Site 3	75	05	21	1997	na	na	na	na	na	na
Site 3	80	05	21	1997	7.8	7.3	61	10.78	na	na
Site 3	00	06	12	1997	17.1	8.3	61	10.23	na	4.3
Site 3	01	06	12	1997	17.1	8.3	60	10.19	na	na
Site 3	02	06	12	1997	17.1	8.4	61	10.15	na	na
Site 3	03	06	12	1997	17.1	8.4	60	10.13	na	na
Site 3	04	06	12	1997	17.1	8.4	60	10.14	na	na
Site 3	05	06	12	1997	17.1	8.4	61	10.11	na	na
Site 3	06	06	12	1997	17.0	8.4	60	10.11	na	na
Site 3	07	06	12	1997	17.0	8.4	60	10.08	na	na
Site 3	08	06	12	1997	17.0	8.4	60	10.09	na	na
Site 3	09	06	12	1997	16.1	8.3	60	10.28	na	na
Site 3	10	06	12	1997	14.6	8.2	60	10.40	59.3	na
Site 3	15	06	12	1997	10.5	8.0	60	10.34	na	na
Site 3	20	06	12	1997	9.3	7.8	59	10.31	60.1	na
Site 3	25	06	12	1997	8.6	7.8	60	10.32	na	na
Site 3	30	06	12	1997	7.7	7.8	60	10.38	na	na
Site 3	35	06	12	1997	7.4	7.7	60	10.39	na	na
Site 3	40	06	12	1997	7.2	7.7	60	10.35	60.4	na
Site 3	45	06	12	1997	7.0	7.7	59	10.36	na	na
Site 3	50	06	12	1997	6.9	7.6	58	10.36	na	na
Site 3	55	06	12	1997	6.9	7.6	60	10.33	na	na
Site 3	60	06	12	1997	6.8	7.6	59	10.29	na	na
Site 3	65	06	12	1997	6.8	7.6	58	10.35	na	na
Site 3	70	06	12	1997	6.8	7.5	60	10.10	na	na
Site 3	75	06	12	1997	6.7	7.5	59	9.84	na	na
Site 3	80	06	12	1997	6.7	7.5	59	9.52	na	na
Site 3	00	07	10	1997	17.5	7.4	60	9.65	na	4.0

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 3	01	07	10	1997	17.5	7.8	60	9.50	na	na
Site 3	02	07	10	1997	17.5	7.9	60	9.41	na	na
Site 3	03	07	10	1997	17.5	8.0	60	9.35	na	na
Site 3	04	07	10	1997	17.5	8.0	60	9.30	na	na
Site 3	05	07	10	1997	17.5	8.0	60	9.24	59.0	na
Site 3	06	07	10	1997	17.5	8.0	60	9.24	na	na
Site 3	07	07	10	1997	17.5	8.1	60	9.19	na	na
Site 3	08	07	10	1997	17.5	8.1	60	9.17	na	na
Site 3	09	07	10	1997	17.0	8.0	60	9.16	na	na
Site 3	10	07	10	1997	15.6	7.8	60	9.19	na	na
Site 3	15	07	10	1997	10.0	7.9	62	9.56	na	na
Site 3	20	07	10	1997	8.9	7.9	61	9.68	60.2	na
Site 3	25	07	10	1997	7.9	7.8	60	9.76	na	na
Site 3	30	07	10	1997	7.5	7.8	61	9.84	na	na
Site 3	35	07	10	1997	7.3	7.8	60	9.81	na	na
Site 3	40	07	10	1997	7.1	7.7	59	9.88	na	na
Site 3	45	07	10	1997	7.0	7.7	59	9.84	na	na
Site 3	50	07	10	1997	7.0	7.7	60	9.83	na	na
Site 3	55	07	10	1997	6.9	7.6	59	9.81	na	na
Site 3	60	07	10	1997	6.9	7.6	59	9.78	60.6	na
Site 3	65	07	10	1997	6.8	7.6	59	9.72	na	na
Site 3	70	07	10	1997	6.8	7.5	60	9.52	na	na
Site 3	75	07	10	1997	6.7	7.5	60	9.22	na	na
Site 3	80	07	10	1997	6.7	7.4	60	8.08	na	na
Site 3	00	08	21	1997	21.8	7.3	60	9.23	na	7.0
Site 3	01	08	21	1997	21.7	7.5	60	9.04	na	na
Site 3	02	08	21	1997	21.7	7.6	60.	9.02	na	na
Site 3	03	08	21	1997	21.7	7.6	60	8.95	na	na
Site 3	04	08	21	1997	21.7	7.7	60	8.88	na	na
Site 3	05	08	21	1997	21.7	7.7	61	8.86	na	na
Site 3	06	08	21	1997	21.7	7.7	60	8.82	na	na
Site 3	07	08	21	1997	21.6	7.7	60	8.80	na	na
Site 3	08	08	21	1997	21.6	7.7	60	8.81	na	na
Site 3	09	08	21	1997	21.2	7.7	60	8.85	na	na
Site 3	10	08	21	1997	20.0	7.7	60	8.98	59.7	na
Site 3	15	08	21	1997	12.9	7.8	60	9.03	na	na
Site 3	20	08	21	1997	9.1	7.7	60	9.33	60.3	na
Site 3	25	08	21	1997	8.2	7.7	59	9.51	na	na
Site 3	30	08	21	1997	7.7	7.7	58	9.65	na	na
Site 3	35	08	21	1997	7.4	7.6	59	9.73	na	na
Site 3	40	08	21	1997	7.3	7.6	57	9.76	na	na
Site 3	45	08	21	1997	7.1	7.6	59	9.70	na	na
Site 3	50	08	21	1997	7.1	7.6	59	9.75	na	na
Site 3	55	08	21	1997	7.0	7.6	59	9.65	na	na
Site 3	60	08	21	1997	7.0	7.5	59	9.52	61.2	na
Site 3	65	08	21	1997	6.9	7.5	60	9.26	na	na
Site 3	70	08	21	1997	6.8	7.5	60	9.12	na	na
Site 3	75	08	21	1997	6.8	7.5	60	8.79	na	na
Site 3	80	08	21	1997	6.8	7.3	61	6.88	61.5	na
Site 3	00	09	18	1997	18.9	7.6	61	9.43	na	na
Site 3	01	09	18	1997	18.9	7.7	60	9.39	na	na
Site 3	02	09	18	1997	18.3	7.7	62	9.40	na	na
Site 3	03	09	18	1997	18.2	7.8	62	9.41	na	na
Site 3	04	09	18	1997	18.2	7.8	61	9.37	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 3	05	09	18	1997	18.1	7.8	61	9.32	59.8	na
Site 3	06	09	18	1997	18.1	7.8	61	9.29	na	na
Site 3	07	09	18	1997	18.1	7.8	61	9.26	na	na
Site 3	08	09	18	1997	18.1	7.8	60	9.23	na	na
Site 3	09	09	18	1997	18.1	7.8	61	9.19	na	na
Site 3	10	09	18	1997	18.1	7.8	60	9.17	na	na
Site 3	15	09	18	1997	13.3	7.6	61	8.79	na	na
Site 3	20	09	18	1997	9.8	7.5	61	9.09	na	na
Site 3	25	09	18	1997	8.3	7.5	60	9.24	na	na
Site 3	30	09	18	1997	7.8	7.4	60	9.55	na	na
Site 3	35	09	18	1997	7.5	7.4	59	9.70	na	na
Site 3	40	09	18	1997	7.3	7.4	59	9.72	60.8	na
Site 3	45	09	18	1997	7.2	7.4	59	9.73	na	na
Site 3	50	09	18	1997	7.1	7.4	58	9.70	na	na
Site 3	55	09	18	1997	7.0	7.3	58	9.67	na	na
Site 3	60	09	18	1997	7.0	7.3	58	9.60	na	na
Site 3	65	09	18	1997	7.0	7.3	59	9.54	na	na
Site 3	70	09	18	1997	6.9	7.3	60	9.18	na	na
Site 3	75	09	18	1997	6.8	7.2	60	8.54	na	na
Site 3	80	09	18	1997	6.8	7.1	63	5.93	na	na
Site 4	00	10	08	1996	16.3	7.6	63	9.87	na	8.2
Site 4	01	10	08	1996	16.3	7.8	63	9.63	na	na
Site 4	02	10	08	1996	16.3	7.8	63	9.60	na	na
Site 4	03	10	08	1996	16.2	7.9	63	9.58	na	na
Site 4	04	10	08	1996	16.2	7.9	63	9.56	na	na
Site 4	05	10	08	1996	16.2	7.9	63	9.56	61.7	na
Site 4	06	10	08	1996	16.2	7.9	63	9.53	na	na
Site 4	07	10	08	1996	16.2	7.9	63	9.51	na	na
Site 4	08	10	08	1996	16.2	7.9	63	9.50	na	na
Site 4	09	10	08	1996	16.2	7.9	63	9.47	na	na
Site 4	10	10	08	1996	16.2	7.9	63	9.47	na	na
Site 4	15	10	08	1996	16.2	7.9	62	9.38	na	na
Site 4	20	10	08	1996	11.7	7.7	62	8.03	61.6	na
Site 4	25	10	08	1996	9.1	7.6	61	8.58	na	na
Site 4	30	10	08	1996	8.3	7.5	61	8.90	na	na
Site 4	35	10	08	1996	7.9	7.5	60	9.00	na	na
Site 4	40	10	08	1996	7.7	7.5	62	8.90	na	na
Site 4	45	10	08	1996	7.5	7.5	62	9.02	na	na
Site 4	50	10	08	1996	7.4	7.4	60	9.02	na	na
Site 4	55	10	08	1996	7.4	7.4	60	9.05	na	na
Site 4	60	10	08	1996	7.3	7.4	61	9.07	na	na
Site 4	65	10	08	1996	7.3	7.4	60	9.08	na	na
Site 4	70	10	08	1996	7.3	7.4	61	8.95	na	na
Site 4	75	10	08	1996	7.2	7.4	61	8.93	na	na
Site 4	80	10	08	1996	7.2	7.4	59	8.98	na	na
Site 4	85	10	08	1996	7.2	7.3	61	8.84	na	na
Site 4	90	10	08	1996	7.1	7.3	62	8.71	na	na
Site 4	00	11	12	1996	11.2	7.3	62	10.18	na	6.0
Site 4	01	11	12	1996	11.2	7.4	62	10.04	na	na
Site 4	02	11	12	1996	11.2	7.5	62	9.99	na	na
Site 4	03	11	12	1996	11.2	7.5	61	9.91	na	na
Site 4	04	11	12	1996	11.2	7.5	62	9.87	na	na
Site 4	05	11	12	1996	11.2	7.5	62	9.83	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 4	06	11	12	1996	11.2	7.5	62	9.83	na	na
Site 4	07	11	12	1996	11.2	7.5	62	9.79	na	na
Site 4	08	11	12	1996	11.2	7.5	61	9.79	na	na
Site 4	09	11	12	1996	11.2	7.5	62	9.79	na	na
Site 4	10	11	12	1996	11.2	7.6	62	9.75	na	na
Site 4	15	11	12	1996	11.1	7.6	61	9.75	na	na
Site 4	20	11	12	1996	11.2	7.6	61	9.76	na	na
Site 4	25	11	12	1996	10.9	7.5	61	9.54	na	na
Site 4	30	11	12	1996	8.4	7.5	63	8.18	na	na
Site 4	35	11	12	1996	7.7	7.4	61	8.26	na	na
Site 4	40	11	12	1996	7.6	7.3	62	8.25	na	na
Site 4	45	11	12	1996	7.5	7.3	63	8.20	na	na
Site 4	50	11	12	1996	7.4	7.2	64	8.50	na	na
Site 4	55	11	12	1996	7.3	7.2	62	8.47	na	na
Site 4	60	11	12	1996	7.3	7.2	62	8.54	na	na
Site 4	65	11	12	1996	7.3	7.2	60	8.30	na	na
Site 4	70	11	12	1996	7.2	7.2	62	8.15	na	na
Site 4	75	11	12	1996	7.2	7.2	61	8.12	na	na
Site 4	80	11	12	1996	7.2	7.1	62	8.23	na	na
Site 4	85	11	12	1996	7.2	7.1	61	8.25	na	na
Site 4	90	11	12	1996	7.1	7.1	61	8.10	62.4	na
Site 4	00	12	12	1996	7.9	7.6	62	11.20	61.2	4.5
Site 4	01	12	12	1996	7.9	7.5	62	10.83	na	na
Site 4	02	12	12	1996	7.9	7.5	62	10.66	na	na
Site 4	03	12	12	1996	7.8	7.5	62	10.61	na	na
Site 4	04	12	12	1996	7.8	7.5	62	10.55	na	na
Site 4	05	12	12	1996	7.8	7.5	62	10.50	na	na
Site 4	06	12	12	1996	7.8	7.5	62	10.44	na	na
Site 4	07	12	12	1996	7.8	7.4	62	10.38	na	na
Site 4	08	12	12	1996	7.8	7.4	62	10.38	na	na
Site 4	09	12	12	1996	7.8	7.4	62	10.39	na	na
Site 4	10	12	12	1996	7.8	7.4	62	10.33	na	na
Site 4	15	12	12	1996	7.8	7.4	61	10.33	na	na
Site 4	20	12	12	1996	7.8	7.4	61	10.27	na	na
Site 4	25	12	12	1996	7.8	7.4	61	10.28	na	na
Site 4	30	12	12	1996	7.8	7.4	62	10.28	na	na
Site 4	35	12	12	1996	7.8	7.4	61	10.28	na	na
Site 4	40	12	12	1996	7.8	7.4	61	10.22	61.2	na
Site 4	45	12	12	1996	7.7	7.4	61	10.03	na	na
Site 4	50	12	12	1996	7.6	7.4	60	9.71	na	na
Site 4	55	12	12	1996	7.5	7.3	60	8.99	na	na
Site 4	60	12	12	1996	7.3	7.3	63	8.59	na	na
Site 4	65	12	12	1996	7.3	7.2	61	8.54	na	na
Site 4	70	12	12	1996	7.3	7.2	63	8.50	na	na
Site 4	75	12	12	1996	7.3	7.2	62	8.44	na	na
Site 4	80	12	12	1996	7.2	7.2	62	8.45	na	na
Site 4	85	12	12	1996	7.2	7.1	64	8.40	na	na
Site 4	90	12	12	1996	7.2	7.1	63	8.35	63.2	na
Site 4	00	02	12	1997	6.1	7.1	61	11.36	na	9.0
Site 4	01	02	12	1997	6.1	7.2	61	11.25	na	na
Site 4	02	02	12	1997	6.1	7.2	61	11.14	na	na
Site 4	03	02	12	1997	6.1	7.3	61	11.09	na	na
Site 4	04	02	12	1997	6.1	7.3	61	11.04	na	na
Site 4	05	02	12	1997	6.1	7.3	61	11.04	na	na

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Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 4	06	02	12	1997	6.1	7.3	61	11.00	na	na
Site 4	07	02	12	1997	6.1	7.3	61	10.99	na	na
Site 4	08	02	12	1997	6.1	7.3	61	11.00	na	na
Site 4	09	02	12	1997	6.1	7.3	61	10.99	na	na
Site 4	10	02	12	1997	6.1	7.4	61	10.99	na	na
Site 4	15	02	12	1997	6.1	7.4	61	10.99	na	na
Site 4	20	02	12	1997	6.1	7.4	61	10.93	60.8	na
Site 4	25	02	12	1997	6.1	7.4	61	10.94	na	na
Site 4	30	02	12	1997	6.1	7.4	61	10.94	na	na
Site 4	35	02	12	1997	6.1	7.4	61	10.94	na	na
Site 4	40	02	12	1997	6.1	7.4	61	10.94	61.8	na
Site 4	45	02	12	1997	6.1	7.4	61	10.90	na	na
Site 4	50	02	12	1997	6.1	7.4	62	10.89	na	na
Site 4	55	02	12	1997	6.1	7.4	61	10.89	na	na
Site 4	60	02	12	1997	6.1	7.4	61	10.83	na	na
Site 4	65	02	12	1997	6.1	7.4	60	10.84	na	na
Site 4	70	02	12	1997	6.1	7.4	61	10.84	na	na
Site 4	75	02	12	1997	6.1	7.4	61	10.84	na	na
Site 4	80	02	12	1997	6.0	7.4	61	10.79	na	na
Site 4	85	02	12	1997	6.0	7.4	61	10.81	na	na
Site 4	90	02	12	1997	6.0	7.4	60	10.76	na	na
Site 4	00	04	22	1997	10.2	7.3	61	11.47	61.7	6.1
Site 4	01	04	22	1997	9.8	7.4	60	11.54	na	na
Site 4	02	04	22	1997	9.3	7.5	60	11.54	na	na
Site 4	03	04	22	1997	9.2	7.5	61	11.52	na	na
Site 4	04	04	22	1997	8.9	7.6	60	11.51	na	na
Site 4	05	04	22	1997	8.8	7.6	60·	11.50	na	na
Site 4	06	04	22	1997	8.7	7.6	60	11.50	na	na
Site 4	07	04	22	1997	8.6	7.6	60	11.44	na	na
Site 4	08	04	22	1997	8.5	7.7	60	11.42	na	na
Site 4	09	04	22	1997	8.4	7.7	60	11.36	na	na
Site 4	10	04	22	1997	8.2	7.7	60	11.30	na	na
Site 4	15	04	22	1997	8.1	7.7	60	11.30	na	na
Site 4	20	04	22	1997	8.0	7.7	59	11.27	na	na
Site 4	25	04	22	1997	7.9	7.6	60	11.25	na	na
Site 4	30	04	22	1997	7.5	7.7	60	11.12	na	na
Site 4	35	04	22	1997	7.3	7.6	60	11.13	na	na
Site 4	40	04	22	1997	7.0	7.6	59	11.04	na	na
Site 4	45	04	22	1997	6.9	7.6	59	11.05	na	na
Site 4	50	04	22	1997	6.9	7.6	59	11.03	na	na
Site 4	55	04	22	1997	6.8	7.6	59	11.00	na	na
Site 4	60	04	22	1997	6.7	7.6	57	10.96	na	na
Site 4	65	04	22	1997	6.7	7.6	59	10.94	na	na
Site 4	70	04	22	1997	6.6	7.6	58	10.92	na	na
Site 4	75	04	22	1997	6.6	7.6	59	10.88	na	na
Site 4	80	04	22	1997	6.6	7.6	59	10.84	na	na
Site 4	85	04	22	1997	6.5	7.6	59	10.82	na	na
Site 4	90	04	22	1997	6.5	7.5	59	10.79	na	na
Site 4	00	05	21	1997	15.6	7.9	60	10.52	na	6.1
Site 4	01	05	21	1997	na	na	na	na	na	na
Site 4	02	05	21	1997	na	na	na	na	na	na
Site 4	03	05	21	1997	na	na	na	na	na	na
Site 4	04	05	21	1997	na	na	na	na	na	na
Site 4	05	05	21	1997	15.1	7.9	60	10.51	na	na

Lake Whatcom 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 4	06	05	21	1997	na	na	na	na	na	na
Site 4	07	05	21	1997	na	na	na	na	na	na
Site 4	08	05	21	1997	na	na	na	na	na	na
Site 4	09	05	21	1997	na	na	na	na	na	na
Site 4	10	05	21	1997	12.6	7.8	60	11.29	na	na
Site 4	15	05	21	1997	na	na	na	na	na	na
Site 4	20	05	21	1997	9.6	7.6	60	11.42	na	na
Site 4	25	05	21	1997	na	na	na	na	na	na
Site 4	30	05	21	1997	na	na	na	na	na	na
Site 4	35	05	21	1997	na	na	na	na	na	na
Site 4	40	05	21	1997	7.8	7.5	60	11.32	na	na
Site 4	45	05	21	1997	na	na	na	na	na	na
Site 4	50	05	21	1997	na	na	na	na	na	na
Site 4	55	05	21	1997	na	na	na	na	na	na
Site 4	60	05	21	1997	7.6	7.4	61	11.38	na	na
Site 4	65	05	21	1997	na	na	na	na	na	na
Site 4	70	05	21	1997	na	na	na	na	na	na
Site 4	75	05	21	1997	na	na	na	na	na	na
Site 4	80	05	21	1997	7.5	7.4	61	11.38	na	na
Site 4	85	05	21	1997	na	na	na	na	na	na
Site 4	90	05	21	1997	7.5	7.4	61	11.37	na	na
Site 4	00	06	12	1997	18.4	8.3	61	10.41	na	4.5
Site 4	01	06	12	1997	17.7	8.5	61	10.38	na	na
Site 4	02	06	12	1997	17.3	8.5	61	10.36	na	na
Site 4	03	06	12	1997	16.9	8.5	60	10.44	na	na
Site 4	04	06	12	1997	16.9	8.5	60	10.43	na	na
Site 4	05	06	12	1997	16.8	8.5	60	10.39	59.4	na
Site 4	06	06	12	1997	14.2	8.3	60	10.61	na	na
Site 4	07	06	12	1997	13.0	8.2	60	10.71	na	na
Site 4	08	06	12	1997	12.3	8.1	60	10.52	na	na
Site 4	09	06	12	1997	11.6	8.0	60	10.59	na	na
Site 4	10	06	12	1997	11.3	7.9	61	10.60	na	na
Site 4	15	06	12	1997	9.5	7.8	60	10.44	na	na
Site 4	20	06	12	1997	8.4	7.8	60	10.34	60.1	na
Site 4	25	06	12	1997	7.6	7.7	59	10.38	na	na
Site 4	30	06	12	1997	7.3	7.7	60	10.39	na	na
Site 4	35	06	12	1997	7.1	7.6	61	10.51	na	na
Site 4	40	06	12	1997	7.0	7.6	61	10.47	na	na
Site 4	45	06	12	1997	6.9	7.6	58	10.45	na	na
Site 4	50	06	12	1997	6.9	7.5	58	10.43	na	na
Site 4	55	06	12	1997	6.8	7.5	59	10.39	na	na
Site 4	60	06	12	1997	6.8	7.5	58	10.34	na	na
Site 4	65	06	12	1997	6.8	7.5	59	10.35	na	na
Site 4	70	06	12	1997	6.7	7.5	59	10.38	na	na
Site 4	75	06	12	1997	6.7	7.5	59	10.40	na	na
Site 4	80	06	12	1997	6.7	7.4	60	10.30	na	na
Site 4	85	06	12	1997	6.6	7.4	58	10.24	na	na
Site 4	90	06	12	1997	6.6	7.4	59	10.19	na	na
Site 4	00	07	14	1997	na	na	na	na	na	na
Site 4	01	07	14	1997	na	na	na	na	na	na
Site 4	02	07	14	1997	na	na	na	na	na	na
Site 4	03	07	14	1997	na	na	na	na	na	na
Site 4	04	07	14	1997	na	na	na	na	na	na
Site 4	05	07	14	1997	na	na	na	na	na	na

Lake Whatcom 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 4	06	07	14	1997	na	na	na	na	na	na
Site 4	07	07	14	1997	na	na	na	na	na	na
Site 4	08	07	14	1997	na	na	na	na	na	na
Site 4	09	07	14	1997	na	na	na	na	na	na
Site 4	10	07	14	1997	na	na	na	na	na	na
Site 4	15	07	14	1997	na	na	na	na	na	na
Site 4	20	07	14	1997	na	na	na	na	na	na
Site 4	25	07	14	1997	na	na	na	na	na	na
Site 4	30	07	14	1997	na	na	na	na	na	na
Site 4	35	07	14	1997	na	na	na	na	na	na
Site 4	40	07	14	1997	na	na	na	na	na	na
Site 4	45	07	14	1997	na	na	na	na	na	na
Site 4	50	07	14	1997	na	na	na	na	na	na
Site 4	55	07	14	1997	na	na	na	na	na	na
Site 4	60	07	14	1997	na	na	na	na	na	na
Site 4	65	07	14	1997	na	na	na	na	na	na
Site 4	70	07	14	1997	na	na	na	na	na	na
Site 4	75	07	14	1997	na	na	na	na	na	na
Site 4	80	07	14	1997	na	na	na	na	na	na
Site 4	85	07	14	1997	na	na	na	na	na	na
Site 4	90	07	14	1997	na	na	na	na	na	na
Site 4	00	08	21	1997	na	na	na	na	na	na
Site 4	01	08	21	1997	na	na	na	na	na	na
Site 4	02	08	21	1997	na	na	na	na	na	na
Site 4	03	08	21	1997	na	na	na	na	na	na
Site 4	04	08	21	1997	na	na	na	na	na	na
Site 4	05	08	21	1997	na	na	na.	na	na	na
Site 4	06	08	21	1997	na	na	na	na	na	na
Site 4	07	08	21	1997	na	na	na	na	na	na
Site 4	08	08	21	1997	na	na	na	na	na	na
Site 4	09	08	21	1997	na	na	na	na	na	na
Site 4	10	08	21	1997	na	na	na	na	na	na
Site 4	15	08	21	1997	na	na	na	na	na	na
Site 4	20	08	21	1997	na	na	na	na	na	na
Site 4	25	08	21	1997	na	na	na	na	na	na
Site 4	30	08	21	1997	na	na	na	na	na	na
Site 4	35	08	21	1997	na	na	na	na	na	na
Site 4	40	08	21	1997	na	na	na	na	na	na
Site 4	45	08	21	1997	na	na	na	na	na	na
Site 4	50	08	21	1997	na	na	na	na	na	na
Site 4	55	08	21	1997	na	na	na	na	na	na
Site 4	60	08	21	1997	na	na	na	na	na	na
Site 4	65	08	21	1997	na	na	na	na	na	na
Site 4	70	08	21	1997	na	na	na	na	na	na
Site 4	75	08	21	1997	na	na	na	na	na	na
Site 4	80	08	21	1997	na	na	na	na	na	na
Site 4	85	08	21	1997	na	na	na	na	na	na
Site 4	90	08	21	1997	na	na	na	na	na	na
Site 4	00	09	18	1997	18.3	7.4	60	9.49	59.7	na
Site 4	01	09	18	1997	18.1	7.5	60	9.40	na	na
Site 4	02	09	18	1997	17.9	7.5	61	9.38	na	na
Site 4	03	09	18	1997	17.8	7.5	61	9.38	na	na
Site 4	04	09	18	1997	17.8	7.5	60	9.36	na	na
Site 4	05	09	18	1997	17.8	7.5	60	9.34	na	na

B.2

Lake Whatcom 1996/97 Hydrolab and Lab Conductivity Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO	LCond	Secchi
Site 4	06	09	18	1997	17.7	7.6	60	9.31	na	na
Site 4	07	09	18	1997	17.7	7.6	60	9.32	na	na
Site 4	08	09	18	1997	17.7	7.6	60	9.29	na	na
Site 4	09	09	18	1997	17.7	7.6	61	9.26	na	na
Site 4	10	09	18	1997	17.7	7.6	60	9.23	na	na
Site 4	15	09	18	1997	15.7	7.5	61	8.95	na	na
Site 4	20	09	18	1997	10.6	7.4	60	8.95	60.2	na
Site 4	25	09	18	1997	8.5	7.4	61	9.33	na	na
Site 4	30	09	18	1997	7.8	7.4	61	9.63	na	na
Site 4	35	09	18	1997	7.5	7.4	60	9.70	na	na
Site 4	40	09	18	1997	7.4	7.3	60	9.89	60.6	na
Site 4	45	09	18	1997	7.2	7.3	59	9.85	na	na
Site 4	50	09	18	1997	7.2	7.3	58	9.92	na	na
Site 4	55	09	18	1997	7.1	7.3	59	9.88	na	na
Site 4	60	09	18	1997	7.0	7.3	59	9.94	na	na
Site 4	65	09	18	1997	7.0	7.3	59	9.95	na	na
Site 4	70	09	18	1997	7.0	7.3	59	9.93	na	na
Site 4	75	09	18	1997	6.9	7.3	59	9.87	na	na
Site 4	80	09	18	1997	6.9	7.3	59	9.87	na	na
Site 4	85	09	18	1997	6.9	7.3	59	9.82	na	na
Site 4	90	09	18	1997	6.8	7.3	59	9.51	na	na

B.2 Lake Whatcom Laboratory Analysis Data

Lake Whatcom 1996/97 Water Quality Data.

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP	Chl
Gatehouse	00	10	08	96	19.1	0.7	< 10	221	174	< 5	< 5	na
Gatehouse	00	11	12	96	19.0	0.6	< 10	261	219	< 5	< 5	na
Gatehouse	00	12	03	96	18.3	1.6	13	396	378	< 5	6	na
Gatehouse	00	02	12	97	17.8	0.5	< 10	623	411	< 5	5	na
Gatehouse	00	04	22	97	17.6	0.5	< 10	509	349	< 5	< 5	na
Gatehouse	00	05	15	97	17.7	0.5	< 10	336	329	< 5	< 5	na
Gatehouse	00	06	10	97	17.9	0.6	30	559	361	< 5	< 5	na
Gatehouse	00	07	10	97	18.3	0.6	15	469	349	< 5	< 5	na
Gatehouse	00	08	13	97	18.3	0.6	18	307	236	< 5	6	na
Gatehouse	00	09	16	97	19.3	0.8	10	327	150	< 5	< 5	na
Site 1	00	10	08	96	20.3	0.8	27	328	87	< 5	5	na
Site 1	05	10	08	96	20.7	0.8	16	178	72	< 5	6	na
Site 1	10	10	08	96	20.7	0.9	16	135	61	< 5	5	na
Site 1	15	10	08	96	25.3	2.4	194	272	14	< 5	8	na
Site 1	20	10	08	96	25.8	1.4	182	315	17	< 5	10	na
Site 1	00	11	12	96	20.1	0.9	< 10	244	166	< 5	5	4.7
Site 1	05	11	12	96	20.4	1.0	< 10	159	168	< 5	5	3.8
Site 1	10	11	12	96	20.5	0.9	11	228	122	< 5	< 5	3.8
Site 1	15	11	12	96	20.3	1.0	11	168	155	< 5	5	3.6
Site 1	20	11	12	96	20.5	1.0	10	136	155	< 5	6	3.4
Site 1	00	12	03	96	19.5	2.6	12	548	230	< 5	8	2.7
Site 1	05	12	03	96	19.4	2.6	11	478	260	< 5	8	2.9
Site 1	10	12	03	96	19.4	2.9	< 10	466	236	< 5	9	2.2
Site 1	15	12	03	96	19.5	3.2	na	569	262	< 5	9	2.6
Site 1	20	12	03	96	19.4	2.8	17	557	283	< 5	8	2.4
Site 1	00	02	12	97	18.1	0.9	< 10	569	407	< 5	< 5	1.4
Site 1	05	02	12	97	18.2	0.9	< 10	514	418	< 5	< 5	1.1
Site 1	10	02	12	97	18.1	1.0	na	454	383	< 5	< 5	1.3
Site 1	15	02	12	97	18.2	1.0	< 10	508	394	< 5	< 5	1.2
Site 1	20	02	12	97	18.2	1.0	< 10	623	403	< 5	< 5	1.2
Site 1	00	04	22	97	18.4	0.6	10	299	354	< 5	< 5	0.7
Site 1	05	04	22	97	18.3	0.7	< 10	381	351	< 5	< 5	0.8
Site 1	10	04	22	97	18.4	0.7	10	338	325	< 5	< 5	0.8
Site 1	15	04	22	97	18.6	0.7	< 10	366	330	< 5	< 5	0.9
Site 1	20	04	22	97	18.4	0.8	17	398	347	< 5	< 5	1.0
Site 1	00	05	15	97	18.8	0.5	< 10	304	337	< 5	< 5	0.9
Site 1	05	05	15	97	19.3	0.6	11	316	309	< 5	< 5	1.4
Site 1	10	05	15	97	18.3	0.6	15	281	313	< 5	< 5	1.7
Site 1	15	05	15	97	18.3	0.5	16	296	296	< 5	< 5	1.6
Site 1	20	05	15	97	18.4	0.6	21	283	329	< 5	< 5	1.2
Site 1	00	06	10	97	19.0	0.8	< 10	478	246	< 5	< 5	2.1
Site 1	05	06	10	97	18.6	1.0	< 10	475	275	< 5	5	3.0
Site 1	10	06	10	97	20.6	0.9	11	440	273	< 5	5	3.5
Site 1	15	06	10	97	18.5	0.7	47	437	283	< 5	< 5	2.3
Site 1	20	06	10	97	18.5	0.6	53	454	292	< 5	< 5	1.2
Site 1	00	07	14	97	19.3	0.6	< 10	368	171	< 5	< 5	2.1
Site 1	05	07	14	97	19.3	0.7	< 10	325	171	< 5	< 5	4.1
Site 1	10	07	14	97	19.1	0.6	< 10	413	254	< 5	5	4.6
Site 1	15	07	14	97	19.2	0.8	< 10	453	320	< 5	8	1.5
Site 1	20	07	14	97	19.3	1.0	< 10	373	371	< 5	7	0.8
Site 1	00	08	13	97	19.6	0.6	< 10	225	95	< 5	10	2.6
Site 1	05	08	13	97	19.2	0.6	< 10	236	116	< 5	11	3.5
Site 1	10	08	13	97	19.9	1.1	< 10	292	82	< 5	12	8.5
Site 1	15	08	13	97	20.6	1.8	38	386	174	< 5	12	2.3
Site 1	19	08	13	97	21.3	2.4	41	339	na	< 5	14	1.4

Lake Whatcom 1996/97 Water Quality Data.

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP	Chl
Site 1	00	09	10	97	19.9	0.8	< 10	262	53	< 5	8	2.9
Site 1	05	09	10	97	20.0	0.9	< 10	271	51	< 5	8	4.3
Site 1	10	09	10	97	20.6	1.4	14	317	63	< 5	14	7.4
Site 1	15	09	10	97	22.7	5.9	116	265	46	< 5	16	0.7
Site 1	20	09	10	97	23.3	8.7	128	370	48	< 5	21	0.4
Intake	00	10	08	96	19.1	0.5	< 10	333	187	< 5	< 5	na
Intake	05	10	08	96	19.1	0.6	< 10	270	174	< 5	< 5	na
Intake	10	10	08	96	19.1	0.6	< 10	275	178	< 5	< 5	na
Intake	00	11	12	96	18.9	0.5	< 10	198	277	< 5	< 5	2.6
Intake	05	11	12	96	18.8	0.5	< 10	189	230	< 5	< 5	2.5
Intake	10	11	12	96	18.9	0.5	< 10	184	261	< 5	< 5	2.1
Intake	00	12	03	96	18.2	1.4	14	478	296	< 5	< 5	1.6
Intake	05	12	03	96	18.2	1.8	13	481	279	< 5	< 5	1.7
Intake	10	12	03	96	18.2	1.6	10	375	318	< 5	< 5	1.6
Intake	00	02	12	97	17.8	0.6	< 10	629	437	< 5	< 5	1.0
Intake	05	02	12	97	17.7	0.6	< 10	435	373	< 5	< 5	0.9
Intake	10	02	12	97	17.7	0.5	< 10	581	366	< 5	< 5	0.8
Intake	00	04	22	97	18.0	0.7	< 10	325	384	< 5	< 5	1.0
Intake	05	04	22	97	17.7	0.7	< 10	362	334	< 5	< 5	1.3
Intake	10	04	22	97	17.6	0.5	12	286	332	< 5	< 5	1.0
Intake	00	05	15	97	18.1	0.5	< 10	237	359	< 5	< 5	1.0
Intake	05	05	15	97	18.1	0.6	< 10	314	300	< 5	< 5	1.6
Intake	10	05	15	97	18.0	0.7	< 10	271	305	< 5	< 5	1.8
Intake	00	06	10	97	18.7	0.8	< 10	446	288	< 5	< 5	1.8
Intake	05	06	10	97	18.1	1.0	21	486	285	< 5	5	3.6
Intake	10	06	10	97	18.0	1.0	14	472	347	< 5	< 5	3.7
Intake	00	07	10	97	18.4	0.6	< 10	336	256	< 5	< 5	2.7
Intake	05	07	10	97	18.4	0.7	< 10	346	256	< 5	< 5	2.8
Intake	10	07	10	97	18.3	0.5	< 10	410	256	< 5	< 5	2.6
Intake	00	08	13	97	19.2	0.5	< 10	292	135	< 5	< 5	1.6
Intake	05	08	13	97	18.6	0.4	< 10	275	188	< 5	< 5	1.9
Intake	10	08	13	97	18.5	0.5	< 10	309	191	< 5	5	2.3
Intake	00	09	10	97	20.2	0.5	< 10	258	132	< 5	6	2.7
Intake	05	09	10	97	na	0.5	< 10	227	157	< 5	6	3.5
Intake	10	09	10	97	18.9	0.6	< 10	348	165	< 5	< 5	3.4
Site 2	00	10	08	96	19.1	0.5	< 10	272	191	< 5	< 5	na
Site 2	05	10	08	96	19.1	0.5	< 10	303	178	< 5	< 5	na
Site 2	10	10	08	96	19.2	0.5	< 10	229	174	< 5	< 5	na
Site 2	15	10	08	96	19.2	0.5	< 10	283	172	< 5	14	na
Site 2	20	10	08	96	19.5	0.9	17	365	206	< 5	13	1.4
Site 2	00	11	12	96	18.9	0.4	< 10	< 100	270	< 5	< 5	2.6
Site 2	05	11	12	96	18.7	0.4	< 10	194	241	< 5	< 5	2.3
Site 2	10	11	12	96	18.8	0.4	< 10	261	255	< 5	< 5	2.3
Site 2	15	11	12	96	18.8	0.5	< 10	161	250	< 5	< 5	2.4
Site 2	20	11	12	96	18.9	0.5	< 10	175	233	< 5	< 5	1.7
Site 2	00	12	03	96	18.2	1.5	< 10	463	307	< 5	5	1.8
Site 2	05	12	03	96	18.4	1.6	< 10	457	294	< 5	5	1.8
Site 2	10	12	03	96	18.4	1.5	< 10	466	365	< 5	5	1.8
Site 2	15	12	03	96	18.3	1.6	< 10	518	348	< 5	6	1.7
Site 2	18	12	03	96	18.3	1.6	< 10	490	363	< 5	7	1.7
Site 2	00	02	12	97	17.7	0.6	< 10	487	392	< 5	< 5	1.0
Site 2	05	02	12	97	17.8	0.6	< 10	538	420	< 5	< 5	0.9
Site 2	10	02	12	97	18.0	0.6	< 10	448	418	< 5	< 5	1.0
Site 2	15	02	12	97	17.6	0.5	< 10	454	396	< 5	< 5	0.9
Site 2	18	02	12	97	17.6	0.6	< 10	557	440	< 5	< 5	0.9
Site 2	00	04	22	97	17.8	0.6	< 10	309	375	< 5	< 5	1.8

Lake Whatcom 1996/97 Water Quality Data.

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP	Chl
Site 2	05	04	22	97	17.8	0.7	< 10	318	369	< 5	< 5	1.8
Site 2	10	04	22	97	17.7	0.6	< 10	394	397	< 5	< 5	na
Site 2	15	04	22	97	17.6	0.5	< 10	312	349	< 5	< 5	0.9
Site 2	20	04	22	97	17.5	0.6	< 10	463	369	< 5	< 5	0.9
Site 2	00	05	15	97	18.3	0.6	< 10	310	323	< 5	< 5	1.1
Site 2	05	05	15	97	17.9	0.5	< 10	312	353	< 5	< 5	1.3
Site 2	10	05	15	97	18.1	0.7	< 10	320	292	< 5	< 5	1.8
Site 2	15	05	15	97	17.9	0.5	< 10	285	347	< 5	< 5	1.6
Site 2	20	05	15	97	17.7	0.5	< 10	267	325	< 5	< 5	1.7
Site 2	00	06	10	97	18.3	0.8	< 10	464	294	< 5	< 5	1.8
Site 2	05	06	10	97	18.1	0.9	24	510	318	< 5	< 5	2.8
Site 2	10	06	10	97	18.0	1.1	15	510	306	< 5	< 5	4.0
Site 2	15	06	10	97	17.8	0.5	19	529	361	< 5	< 5	1.3
Site 2	20	06	10	97	17.8	0.5	27	427	390	< 5	< 5	1.1
Site 2	00	07	10	97	18.4	0.5	< 10	357	258	< 5	< 5	2.5
Site 2	05	07	10	97	18.3	0.7	< 10	392	256	< 5	< 5	3.3
Site 2	10	07	10	97	18.2	0.6	< 10	354	233	< 5	< 5	2.6
Site 2	15	07	10	97	17.9	0.6	23	456	371	< 5	< 5	1.9
Site 2	18	07	10	97	17.8	0.5	22	472	373	< 5	7	1.4
Site 2	00	08	13	97	19.4	0.4	< 10	234	138	< 5	5	1.3
Site 2	05	08	13	97	18.6	0.7	< 10	317	197	< 5	8	1.7
Site 2	10	08	13	97	18.5	0.4	< 10	324	165	< 5	9	2.2
Site 2	15	08	13	97	18.3	0.5	19	410	247	< 5	6	2.1
Site 2	20	08	13	97	18.7	0.6	48	455	288	< 5	9	1.9
Site 2	00	09	10	97	19.3	0.5	< 10	426	130	< 5	< 5	2.5
Site 2	05	09	10	97	19.2	0.6	< 10	379	160	< 5	6	3.0
Site 2	10	09	10	97	18.9	0.5	< 10	323	185	< 5	< 5	3.0
Site 2	15	09	10	97	18.6	0.5	22	407	272	< 5	< 5	2.4
Site 2	20	09	10	97	18.7	0.5	58	605	316	< 5	< 5	1.6
Site 3	00	10	08	96	18.9	0.4	13	343	191	< 5	< 5	1.6
Site 3	05	10	08	96	18.8	0.4	< 10	311	202	< 5	< 5	2.2
Site 3	10	10	08	96	18.9	0.4	< 10	300	189	< 5	< 5	1.9
Site 3	15	10	08	96	na	na	na	na	na	na	na	1.4
Site 3	20	10	08	96	18.0	0.4	< 10	535	359	< 5	< 5	0.7
Site 3	40	10	08	96	18.1	0.4	< 10	539	365	< 5	< 5	na
Site 3	60	10	08	96	18.3	0.3	< 10	507	406	< 5	< 5	na
Site 3	80	10	08	96	18.5	0.5	< 10	464	391	< 5	< 5	na
Site 3	00	11	12	96	18.7	0.4	< 10	261	261	< 5	< 5	1.6
Site 3	05	11	12	96	18.7	0.4	< 10	178	237	< 5	< 5	1.3
Site 3	10	11	12	96	18.6	0.4	< 10	161	241	< 5	< 5	1.5
Site 3	15	11	12	96	na	na	na	na	na	na	na	1.5
Site 3	20	11	12	96	18.7	0.4	< 10	226	273	< 5	< 5	1.3
Site 3	40	11	12	96	18.2	0.3	< 10	251	370	< 5	< 5	na
Site 3	60	11	12	96	18.3	0.3	< 10	346	366	< 5	< 5	na
Site 3	80	11	12	96	18.3	0.5	< 10	295	344	< 5	< 5	na
Site 3	00	12	12	96	18.1	1.2	< 10	533	335	< 5	< 5	0.9
Site 3	05	12	12	96	18.1	1.2	< 10	530	382	< 5	5	0.8
Site 3	10	12	12	96	18.1	1.2	16	506	447	< 5	< 5	0.9
Site 3	15	12	12	96	na	na	na	na	na	na	na	0.8
Site 3	20	12	12	96	18.1	1.2	< 10	536	393	< 5	< 5	0.7
Site 3	40	12	12	96	18.5	0.9	< 10	612	382	< 5	< 5	na
Site 3	60	12	12	96	18.2	0.4	< 10	603	432	< 5	< 5	na
Site 3	80	12	12	96	18.3	0.6	< 10	557	500	< 5	< 5	na
Site 3	00	02	12	97	17.7	0.5	< 10	635	459	< 5	< 5	0.5
Site 3	05	02	12	97	17.7	0.6	< 10	541	452	< 5	< 5	0.4
Site 3	10	02	12	97	17.7	0.6	< 10	490	373	< 5	< 5	0.4
Site 3	15	02	12	97	na	na	na	na	na	na	na	0.4

Lake Whatcom 1996/97 Water Quality Data.

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP	Chl
Site 3	20	02	12	97	17.6	0.6	< 10	551	416	< 5	< 5	0.4
Site 3	40	02	12	97	17.7	0.5	< 10	487	407	< 5	< 5	na
Site 3	60	02	12	97	17.7	0.5	< 10	611	403	< 5	< 5	na
Site 3	80	02	12	97	17.8	0.5	< 10	508	401	< 5	< 5	na
Site 3	00	04	22	97	17.6	0.5	< 10	463	388	< 5	< 5	1.7
Site 3	05	04	22	97	17.5	0.7	< 10	411	392	< 5	< 5	2.3
Site 3	10	04	22	97	17.6	0.6	< 10	407	341	< 5	< 5	2.3
Site 3	15	04	22	97	na	na	na	na	na	na	na	1.0
Site 3	20	04	22	97	17.5	0.4	< 10	442	382	< 5	< 5	0.6
Site 3	40	04	22	97	17.4	0.5	< 10	394	323	< 5	< 5	na
Site 3	60	04	22	97	17.5	0.5	< 10	472	375	< 5	< 5	na
Site 3	80	04	22	97	17.6	0.5	< 10	450	401	< 5	< 5	na
Site 3	00	05	21	97	18.1	0.5	< 10	432	313	< 5	< 5	1.7
Site 3	05	05	21	97	18.1	0.5	< 10	360	315	< 5	< 5	2.0
Site 3	10	05	21	97	17.7	0.7	< 10	330	321	< 5	< 5	2.3
Site 3	15	05	21	97	na	na	na	na	na	na	na	1.6
Site 3	20	05	21	97	17.6	0.5	< 10	384	331	< 5	< 5	1.1
Site 3	40	05	21	97	na	0.3	< 10	354	372	< 5	< 5	na
Site 3	60	05	21	97	17.6	0.3	< 10	267	376	< 5	< 5	na
Site 3	80	05	21	97	17.7	0.3	< 10	336	404	< 5	< 5	na
Site 3	00	06	12	97	18.2	0.7	< 10	416	314	< 5	< 5	3.1
Site 3	05	06	12	97	18.0	0.8	< 10	384	279	< 5	5	3.7
Site 3	10	06	12	97	18.0	0.9	< 10	410	230	< 5	< 5	3.6
Site 3	15	06	12	97	na	na	na	na	na	na	na	2.8
Site 3	20	06	12	97	17.9	0.4	< 10	540	402	< 5	< 5	1.2
Site 3	40	06	12	97	17.5	0.3	< 10	524	423	< 5	< 5	na
Site 3	60	06	12	97	17.6	0.3	< 10	591	382	< 5	< 5	na
Site 3	80	06	12	97	17.7	0.2	< 10	570	429	< 5	< 5	na
Site 3	00	07	10	97	18.2	0.6	< 10	384	288	< 5	< 5	3.7
Site 3	05	07	10	97	18.1	0.6	< 10	410	326	< 5	< 5	3.7
Site 3	10	07	10	97	18.2	0.6	< 10	373	252	< 5	< 5	3.2
Site 3	15	07	10	97	na	na	na	na	na	na	na	1.3
Site 3	20	07	10	97	17.7	0.2	16	552	419	< 5	< 5	0.6
Site 3	40	07	10	97	17.6	0.3	< 10	576	472	< 5	< 5	na
Site 3	60	07	10	97	17.7	0.3	< 10	517	532	< 5	< 5	na
Site 3	80	07	10	97	17.9	0.3	< 10	491	445	< 5	< 5	na
Site 3	00	08	21	97	18.7	0.3	< 10	281	156	< 5	< 5	1.8
Site 3	05	08	21	97	18.7	0.4	< 10	272	162	< 5	< 5	2.1
Site 3	10	08	21	97	18.7	0.4	< 10	251	163	< 5	< 5	1.9
Site 3	15	08	21	97	na	na	na	na	na	na	na	2.1
Site 3	20	08	21	97	17.7	0.4	14	440	321	< 5	< 5	1.5
Site 3	40	08	21	97	17.7	0.3	< 10	390	430	< 5	< 5	na
Site 3	60	08	21	97	17.8	0.3	< 10	395	391	< 5	< 5	na
Site 3	80	08	21	97	17.9	0.4	< 10	305	369	< 5	< 5	na
Site 3	00	09	18	97	19.9	0.4	< 10	407	180	< 5	< 5	2.0
Site 3	05	09	18	97	18.9	0.8	< 10	234	183	< 5	< 5	2.6
Site 3	10	09	18	97	na	0.4	< 10	373	175	< 5	< 5	2.2
Site 3	15	09	18	97	na	na	na	na	na	na	na	2.0
Site 3	20	09	18	97	17.9	0.2	12	593	361	< 5	< 5	0.9
Site 3	40	09	18	97	17.8	0.4	< 10	503	427	< 5	< 5	na
Site 3	60	09	18	97	na	0.4	< 10	385	428	< 5	< 5	na
Site 3	80	09	18	97	na	0.5	< 10	392	408	< 5	< 5	na
Site 4	00	10	08	96	19.0	0.4	< 10	397	191	< 5	< 5	1.7
Site 4	05	10	08	96	19.0	0.4	< 10	236	223	< 5	< 5	2.2
Site 4	10	10	08	96	19.0	0.4	< 10	300	216	< 5	< 5	1.7
Site 4	15	10	08	96	na	na	na	na	na	na	na	1.8
Site 4	20	10	08	96	18.4	0.3	< 10	255	408	< 5	< 5	0.9

Lake Whatcom 1996/97 Water Quality Data.

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP	Chl
Site 4	40	10	08	96	18.1	0.2	< 10	683	372	< 5	< 5	na
Site 4	60	10	08	96	18.2	0.2	< 10	401	352	< 5	< 5	na
Site 4	80	10	08	96	18.2	0.2	< 10	485	320	< 5	< 5	na
Site 4	90	10	08	96	18.3	0.3	< 10	453	363	< 5	< 5	na
Site 4	00	11	12	96	18.6	0.4	< 10	212	244	< 5	< 5	1.7
Site 4	05	11	12	96	18.5	0.4	< 10	237	250	< 5	< 5	1.9
Site 4	10	11	12	96	18.6	0.4	< 10	189	241	< 5	< 5	1.7
Site 4	15	11	12	96	na	na	na	na	na	na	na	1.7
Site 4	20	11	12	96	18.6	0.4	< 10	244	268	< 5	< 5	1.7
Site 4	40	11	12	96	18.1	0.3	< 10	394	297	< 5	< 5	na
Site 4	60	11	12	96	18.3	0.3	< 10	279	372	< 5	< 5	na
Site 4	80	11	12	96	18.2	0.3	< 10	249	339	< 5	< 5	na
Site 4	90	11	12	96	18.2	0.3	< 10	318	379	< 5	< 5	na
Site 4	00	12	12	96	17.9	1.0	< 10	512	397	< 5	< 5	0.7
Site 4	05	12	12	96	18.0	0.8	< 10	581	389	< 5	< 5	0.7
Site 4	10	12	12	96	18.1	0.8	< 10	551	374	< 5	< 5	0.7
Site 4	15	12	12	96	na	na	na	na	na	na	na	0.6
Site 4	20	12	12	96	18.0	1.0	< 10	560	415	< 5	< 5	0.6
Site 4	40	12	12	96	18.0	0.8	10	584	421	< 5	< 5	na
Site 4	60	12	12	96	18.3	0.4	< 10	657	432	< 5	< 5	na
Site 4	80	12	12	96	18.2	0.4	< 10	530	354	< 5	< 5	na
Site 4	90	12	12	96	18.3	0.3	< 10	566	395	< 5	< 5	na
Site 4	00	02	12	97	17.8	0.4	< 10	563	379	< 5	< 5	0.4
Site 4	05	02	12	97	17.8	0.5	< 10	560	403	< 5	< 5	0.5
Site 4	10	02	12	97	17.7	0.4	< 10	508	416	< 5	< 5	0.5
Site 4	15	02	12	97	na	na	na	na	na	na	na	0.4
Site 4	20	02	12	97	17.8	0.5	< 10	629	422	< 5	< 5	0.5
Site 4	40	02	12	97	17.7	0.4	< 10	632	429	< 5	5	na
Site 4	60	02	12	97	17.8	0.5	< 10	566	390	< 5	6	na
Site 4	80	02	12	97	17.7	0.5	< 10	596	401	< 5	< 5	na
Site 4	90	02	12	97	17.7	0.5	< 10	623	483	< 5	< 5	na
Site 4	00	04	22	97	17.6	0.4	< 10	390	345	< 5	< 5	1.6
Site 4	05	04	22	97	17.5	0.5	< 10	411	354	< 5	< 5	1.5
Site 4	10	04	22	97	17.6	0.5	< 10	455	373	< 5	< 5	1.7
Site 4	15	04	22	97	na	na	na	na	na	na	na	1.1
Site 4	20	04	22	97	17.6	0.5	< 10	342	380	< 5	< 5	1.0
Site 4	40	04	22	97	17.6	0.6	< 10	375	334	< 5	< 5	na
Site 4	60	04	22	97	17.6	0.6	< 10	394	330	< 5	< 5	na
Site 4	80	04	22	97	17.5	0.4	< 10	383	297	< 5	< 5	na
Site 4	90	04	22	97	17.5	0.4	< 10	485	354	< 5	< 5	na
Site 4	00	05	21	97	17.9	0.5	< 10	287	351	< 5	< 5	1.2
Site 4	05	05	21	97	17.7	0.5	< 10	261	432	< 5	< 5	1.8
Site 4	10	05	21	97	17.7	0.6	< 10	388	292	< 5	< 5	2.0
Site 4	15	05	21	97	na	na	na	na	na	na	na	1.7
Site 4	20	05	21	97	17.7	0.4	< 10	312	382	< 5	< 5	1.3
Site 4	40	05	21	97	17.6	0.4	< 10	298	333	5	< 5	na
Site 4	60	05	21	97	17.5	0.3	< 10	370	361	< 5	< 5	na
Site 4	80	05	21	97	17.6	0.3	< 10	332	367	< 5	< 5	na
Site 4	90	05	21	97	17.7	0.3	< 10	302	343	< 5	< 5	na
Site 4	00	06	12	97	18.0	0.8	< 10	419	279	< 5	< 5	3.0
Site 4	05	06	12	97	18.0	0.8	11	532	294	< 5	5	3.7
Site 4	10	06	12	97	17.8	0.7	10	443	343	< 5	< 5	1.4
Site 4	15	06	12	97	na	na	na	na	na	na	na	2.6
Site 4	20	06	12	97	17.6	0.3	11	446	357	< 5	< 5	0.7
Site 4	40	06	12	97	17.6	0.3	< 10	535	421	< 5	< 5	na
Site 4	60	06	12	97	17.6	0.3	< 10	505	394	< 5	< 5	na
Site 4	80	06	12	97	18.6	0.2	< 10	526	370	< 5	< 5	na
Site 4	90	06	12	97	17.7	0.3	< 10	435	357	< 5	< 5	na

Lake Whatcom 1996/97 Water Quality Data.

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP	Chl
Site 4	00	07	14	97	na	na	na	na	na	na	na	na
Site 4	05	07	14	97	na	na	na	na	na	na	na	na
Site 4	10	07	14	97	na	na	na	na	na	na	na	na
Site 4	15	07	14	97	na	na	na	na	na	na	na	na
Site 4	20	07	14	97	na	na	na	na	na	na	na	na
Site 4	40	07	14	97	na	na	na	na	na	na	na	na
Site 4	60	07	14	97	na	na	na	na	na	na	na	na
Site 4	80	07	14	97	na	na	na	na	na	na	na	na
Site 4	90	07	14	97	na	na	na	na	na	na	na	na
Site 4	00	08	21	97	na	na	na	na	na	na	na	na
Site 4	05	08	21	97	na	na	na	na	na	na	na	na
Site 4	10	08	21	97	na	na	na	na	na	na	na	na
Site 4	15	08	21	97	na	na	na	na	na	na	na	na
Site 4	20	08	21	97	na	na	na	na	na	na	na	na
Site 4	40	08	21	97	na	na	na	na	na	na	na	na
Site 4	60	08	21	97	na	na	na	na	na	na	na	na
Site 4	80	08	21	97	na	na	na	na	na	na	na	na
Site 4	90	08	21	97	na	na	na	na	na	na	na	na
Site 4	00	09	18	97	18.8	0.4	10	416	193	< 5	< 5	1.8
Site 4	05	09	18	97	18.8	0.6	< 10	333	201	< 5	< 5	2.6
Site 4	10	09	18	97	18.8	0.4	< 10	289	201	< 5	< 5	2.6
Site 4	15	09	18	97	na	na	na	na	na	na	na	1.9
Site 4	20	09	18	97	18.0	0.6	16	593	387	< 5	< 5	0.9
Site 4	40	09	18	97	17.8	0.2	< 10	556	395	< 5	< 5	na
Site 4	60	09	18	97	18.0	0.2	< 10	520	385	< 5	< 5	na
Site 4	80	09	18	97	17.9	0.2	< 10	457	430	< 5	< 5	na
Site 4	90	09	18	97	18.0	0.2	< 10	615	428	< 5	< 5	na

B.3 Lake Whatcom Plankton and Coliform Data

Lake Whatcom 1996/97 Plankton Data.

Site	Depth	Month	Day	Year	Zooplankton (#/L)	Chrysophyta (#/L)	Cyanophyta (#/L)	Chlorophyta (#/L)	Pyrrophyta (#/L)
Site 1	5	10	8	1996	7	3895	1404	2148	286
Site 1	5	11	12	1996	116	202715	4921	7265	1875
Site 1	5	12	3	1996	80	147715	146	292	292
Site 1	5	2	12	1997	2	107696	0	0	0
Site 1	5	4	22	1997	66	114586	0	0	508
Site 1	5	5	15	1997	59	363309	6216	52532	802
Site 1	5	6	10	1997	150	439667	7624	9530	2541
Site 1	5	7	14	1997	88	204069	9739	13280	1328
Site 1	5	9	10	1997	30	83128	64681	21800	2156
Site 1	5	10	14	1997	148	156142	60557	4354	1385
Intake	5	10	8	1996	42	24644	7109	31989	1185
Intake	5	11	12	1996	47	39830	333	1333	167
Intake	5	12	3	1996	23	38861	406	542	0
Intake	5	2	12	1997	4	5749	0	0	0
Intake	5	4	22	1997	59	173551	0	0	323
Intake	5	5	15	1997	63	306570	0	10301	448
Intake	5	6	10	1997	193	395536	19373	10332	3229
Intake	5	7	10	1997	77	469857	4323	432	3458
Intake	5	9	10	1997	36	32179	40658	24086	771
Intake	5	10	14	1997	47	70814	4432	1542	1349
Site 2	5	10	8	1996	66	32078	7830	17681	1010
Site 2	5	11	12	1996	25	49592	13879	846	677
Site 2	5	12	3	1996	26	54839	542	271	135
Site 2	5	2	12	1997	6	599	0	0	0
Site 2	5	4	22	1997	41	184319	0	0	0
Site 2	5	5	15	1997	79	278724	0	7708	208
Site 2	5	6	10	1997	188	449812	9681	3724	1117
Site 2	5	7	10	1997	83	306534	0	11249	281
Site 2	5	9	10	1997	36	18618	23175	17316	391
Site 2	5	10	14	1997	73	48238	7447	1016	677
Site 3	5	10	8	1996	77	37335	2094	11863	698
Site 3	5	11	12	1996	49	41496	2166	2333	0
Site 3	5	12	3	1996	20	13025	0	635	318
Site 3	5	2	12	1997	4	3953	120	0	0
Site 3	5	4	22	1997	43	176843	0	0	0
Site 3	5	5	21	1997	88	333107	664	6197	443
Site 3	5	6	10	1997	258	429092	24589	12121	346
Site 3	5	7	10	1997	109	433167	13874	7708	385
Site 3	5	9	18	1997	59	63494	58864	18850	331
Site 3	5	10	14	1997	53	49592	3554	1862	0
Site 4	5	10	8	1996	27	14236	7820	7218	1604
Site 4	5	11	12	1996	37	29997	2500	2000	0
Site 4	5	12	3	1996	15	18108	0	0	159
Site 4	5	2	12	1997	2	4583	115	0	0
Site 4	5	4	22	1997	23	169005	0	0	0
Site 4	5	5	21	1997	119	299487	0	453	453
Site 4	5	6	10	1997	200	417664	0	5195	693
Site 4	5	7	14	1997	268	na	na	na	na
Site 4	5	9	18	1997	81	24982	28825	21139	320
Site 4	5	10	14	1997	35	43538	5416	208	208

Lake Whatcom 1996/97 Coliform and Enterococcus Data.

Site	Depth	Month	Day	Year	Total Coliforms (cfu/100 mL)	Fecal Coliforms (cfu/100 mL)	Enterococcus (cfu/100 mL)
Site 1	0.3	10	22	1996	26	8	2
Site 1	0.3	11	12	1996	< 4	2	< 2
Site 1	0.3	12	03	1996	22	7	2
Site 1	0.3	02	12	1997	5	2	< 2
Site 1	0.3	04	22	1997	2	0	< 2
Site 1	0.3	05	15	1997	< 1	< 1	< 2
Site 1	0.3	06	10	1997	3	1	< 2
Site 1	0.3	07	14	1997	< 1	< 1	< 2
Site 1	0.3	08	13	1997	1	< 1	< 2
Site 1	0.3	09	18	1997	40	4	< 2
Intake	0.3	10	22	1996	53	8	< 2
Intake	0.3	11	12	1996	4	2	< 2
Intake	0.3	12	03	1996	12	4	< 2
Intake	0.3	02	12	1997	2	1	< 2
Intake	0.3	04	22	1997	2	1	2
Intake	0.3	05	15	1997	< 1	< 1	< 2
Intake	0.3	06	10	1997	3	1	< 2
Intake	0.3	07	14	1997	< 1	< 1	< 2
Intake	0.3	08	13	1997	5	3	< 2
Intake	0.3	09	18	1997	4	2	< 2
Site 2	0.3	10	22	1996	20	4	2
Site 2	0.3	11	12	1996	8	< 4	< 2
Site 2	0.3	12	03	1996	12	2	2
Site 2	0.3	02	12	1997	3	1	< 2
Site 2	0.3	04	22	1997	1	1	< 2
Site 2	0.3	05	15	1997	< 1	1	< 2
Site 2	0.3	06	10	1997	2	< 1	< 2
Site 2	0.3	07	14	1997	< 1	< 1	< 2
Site 2	0.3	08	13	1997	2	< 1	< 2
Site 2	0.3	09	18	1997	4	6	< 2
Site 3	0.3	10	22	1996	13	8	< 2
Site 3	0.3	11	12	1996	< 4	< 4	< 2
Site 3	0.3	12	03	1996	28	3	< 2
Site 3	0.3	02	12	1997	10	8	< 2
Site 3	0.3	04	22	1997	1	0	< 2
Site 3	0.3	05	15	1997	< 1	< 1	< 2
Site 3	0.3	06	10	1997	2	< 1	< 2
Site 3	0.3	07	14	1997	1	1	4
Site 3	0.3	08	13	1997	1	< 1	< 2
Site 3	0.3	09	18	1997	< 1	< 1	< 2

Lake Whatcom 1996/97 Coliform and Enterococcus Data.

Site	Depth	Month	Day	Year	Total Coliforms (cfu/100 mL)	Fecal Coliforms (cfu/100 mL)	Enterococcus (cfu/100 mL)
Site 4	0.3	10	22	1996	< 10	4	< 2
Site 4	0.3	11	12	1996	< 4	< 2	< 2
Site 4	0.3	12	03	1996	22	3	< 2
Site 4	0.3	02	12	1997	1	1	< 2
Site 4	0.3	04	22	1997	1	1	2
Site 4	0.3	05	15	1997	< 1	< 1	< 2
Site 4	0.3	06	10	1997	1	1	< 2
Site 4	0.3	07	14	1997	< 1	< 1	< 2
Site 4	0.3	08	13	1997	1	< 1	2
Site 4	0.3	09	18	1997	8	1	< 2
B. Donov.	0.3	10	22	1996	20	8	< 2
B. Donov.	0.3	11	12	1996	20	4	< 2
B. Donov.	0.3	12	03	1996	28	3	< 2
B. Donov.	0.3	02	12	1997	8	6	< 2
B. Donov.	0.3	04	22	1997	6	4	2
B. Donov.	0.3	05	15	1997	10	7	< 2
B. Donov.	0.3	06	10	1997	8	2	< 2
B. Donov.	0.3	07	14	1997	6	6	4
B. Donov.	0.3	08	13	1997	45	37	8
B. Donov.	0.3	09	18	1997	50	6	< 2

B.4 Strawberry Sill Hydrolab and Laboratory Analysis Data

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s1	00	10	22	1996	13.5	7.5	63	10.21
Site s1	01	10	22	1996	13.5	7.6	63	9.92
Site s1	02	10	22	1996	13.5	7.7	63	9.74
Site s1	03	10	22	1996	13.4	7.7	63	9.70
Site s1	04	10	22	1996	13.4	7.7	63	9.67
Site s1	05	10	22	1996	13.4	7.7	63	9.60
Site s1	06	10	22	1996	13.4	7.7	63	9.61
Site s1	07	10	22	1996	13.4	7.7	63	9.58
Site s1	08	10	22	1996	13.4	7.7	63	9.54
Site s1	09	10	22	1996	13.4	7.8	63	9.55
Site s1	10	10	22	1996	13.4	7.7	63	9.51
Site s1	15	10	22	1996	13.4	7.7	62	9.47
Site s1	20	10	22	1996	12.8	7.7	62	9.23
Site s1	25	10	22	1996	8.3	7.5	61	8.33
Site s1	30	10	22	1996	7.8	7.4	62	8.57
Site s1	35	10	22	1996	7.6	7.3	62	8.50
Site s1	00	01	16	1997	6.7	7.3	62	10.97
Site s1	01	01	16	1997	6.5	7.4	62	10.84
Site s1	02	01	16	1997	6.5	7.4	62	10.85
Site s1	03	01	16	1997	6.5	7.5	62	10.80
Site s1	04	01	16	1997	6.5	7.5	62	10.76
Site s1	05	01	16	1997	6.4	7.5	62	10.71
Site s1	06	01	16	1997	6.4	7.5	61	10.66
Site s1	07	01	16	1997	6.4	7.5	61	10.66
Site s1	08	01	16	1997	6.4	7.5	62	10.61
Site s1	09	01	16	1997	6.4	7.5	62	10.55
Site s1	10	01	16	1997	6.4	7.5	61	10.56
Site s1	15	01	16	1997	6.4	7.6	61	10.50
Site s1	20	01	16	1997	6.4	7.5	61	10.51
Site s1	25	01	16	1997	6.4	7.5	60	10.46
Site s1	30	01	16	1997	6.4	7.5	60	10.46
Site s1	35	01	16	1997	6.3	7.5	61	10.47
Site s1	00	02	10	1997	6.5	7.4	63	11.30
Site s1	01	02	10	1997	6.4	7.4	63	11.27
Site s1	02	02	10	1997	6.3	7.5	62	11.28
Site s1	03	02	10	1997	6.3	7.5	62	11.24
Site s1	04	02	10	1997	6.3	7.5	62	11.22
Site s1	05	02	10	1997	6.3	7.5	61	11.21
Site s1	06	02	10	1997	6.2	7.5	61	11.17
Site s1	07	02	10	1997	6.2	7.5	62	11.18
Site s1	08	02	10	1997	6.2	7.5	61	11.13

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s1	09	02	10	1997	6.2	7.5	62	11.14
Site s1	10	02	10	1997	6.2	7.5	62	11.09
Site s1	15	02	10	1997	6.2	7.6	61	11.06
Site s1	20	02	10	1997	6.2	7.6	62	11.07
Site s1	25	02	10	1997	6.1	7.6	61	11.03
Site s1	30	02	10	1997	6.1	7.6	61	11.00
Site s1	35	02	10	1997	6.1	7.6	61	10.99
Site s1	00	04	29	1997	10.7	7.8	60	12.07
Site s1	01	04	29	1997	10.7	7.9	60	12.03
Site s1	02	04	29	1997	10.6	7.9	60	11.99
Site s1	03	04	29	1997	10.5	7.9	60	11.99
Site s1	04	04	29	1997	10.3	8.0	61	11.99
Site s1	05	04	29	1997	10.3	8.0	61	11.96
Site s1	06	04	29	1997	10.3	8.0	60	11.93
Site s1	07	04	29	1997	10.2	8.0	60	11.87
Site s1	08	04	29	1997	10.2	8.0	60	11.84
Site s1	09	04	29	1997	10.2	8.0	60	11.82
Site s1	10	04	29	1997	10.1	8.0	60	11.77
Site s1	15	04	29	1997	10.0	8.0	60	11.69
Site s1	20	04	29	1997	8.1	7.9	60	11.36
Site s1	25	04	29	1997	7.7	7.8	60	11.30
Site s1	30	04	29	1997	7.3	7.8	60	11.24
Site s1	35	04	29	1997	7.0	7.8	60	11.13
Site s1	00	05	21	1997	15.9	8.0	60	10.46
Site s1	05	05	21	1997	15.8	8.0	60	10.39
Site s1	10	05	21	1997	15.3	7.9	60	10.62
Site s1	15	05	21	1997	10.4	7.6	60	11.38
Site s1	20	05	21	1997	9.4	7.5	60	11.29
Site s1	25	05	21	1997	9.3	7.5	60	11.29
Site s1	30	05	21	1997	8.7	7.5	60	11.26
Site s1	35	05	21	1997	8.5	7.4	60	11.20
Site s1	00	06	12	1997	17.5	8.2	61	10.49
Site s1	01	06	12	1997	17.4	8.3	61	10.43
Site s1	02	06	12	1997	17.4	8.3	61	10.40
Site s1	03	06	12	1997	17.4	8.3	61	10.37
Site s1	04	06	12	1997	17.4	8.4	61	10.34
Site s1	05	06	12	1997	17.4	8.4	61	10.31
Site s1	06	06	12	1997	17.4	8.4	61	10.29
Site s1	07	06	12	1997	17.3	8.4	61	10.26
Site s1	08	06	12	1997	17.3	8.4	61	10.23
Site s1	09	06	12	1997	17.3	8.4	61	10.18

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s1	10	06	12	1997	16.2	8.3	61	10.45
Site s1	15	06	12	1997	10.7	8.0	60	10.60
Site s1	20	06	12	1997	9.2	7.9	60	10.49
Site s1	25	06	12	1997	8.2	7.9	59	10.58
Site s1	30	06	12	1997	7.4	7.8	60	10.43
Site s1	35	06	12	1997	7.2	7.8	59	10.41
Site s1	00	07	14	1997	18.4	8.1	60	9.80
Site s1	01	07	14	1997	18.4	8.1	60	9.83
Site s1	02	07	14	1997	18.4	8.1	60	9.76
Site s1	03	07	14	1997	18.3	8.1	60	9.79
Site s1	04	07	14	1997	18.3	8.2	60	9.78
Site s1	05	07	14	1997	18.2	8.2	60	9.80
Site s1	06	07	14	1997	18.1	8.2	60	9.76
Site s1	07	07	14	1997	18.1	8.2	61	9.75
Site s1	08	07	14	1997	18.1	8.2	61	9.75
Site s1	09	07	14	1997	18.0	8.2	60	9.69
Site s1	10	07	14	1997	18.0	8.2	60	9.68
Site s1	15	07	14	1997	13.4	7.9	61	9.40
Site s1	20	07	14	1997	9.5	7.7	61	9.92
Site s1	25	07	14	1997	8.2	7.6	60	10.05
Site s1	30	07	14	1997	7.6	7.5	60	10.07
Site s1	35	07	14	1997	7.4	7.5	60	10.15
Site s1	00	09	18	1997	19.2	7.6	61	9.25
Site s1	01	09	18	1997	18.4	7.7	61	9.32
Site s1	02	09	18	1997	18.3	7.8	62	9.30
Site s1	03	09	18	1997	18.2	7.8	61	9.26
Site s1	04	09	18	1997	18.2	7.8	60	9.24
Site s1	05	09	18	1997	18.2	7.8	60	9.22
Site s1	06	09	18	1997	18.2	7.8	61	9.20
Site s1	07	09	18	1997	18.2	7.8	61	9.17
Site s1	08	09	18	1997	18.1	7.8	60	9.14
Site s1	09	09	18	1997	18.1	7.8	60	9.11
Site s1	10	09	18	1997	18.1	7.8	60	9.09
Site s1	15	09	18	1997	17.9	7.6	60	9.08
Site s1	20	09	18	1997	9.1	7.5	59	9.17
Site s1	25	09	18	1997	8.1	7.5	59	9.14
Site s1	30	09	18	1997	7.7	7.4	60	9.43
Site s1	35	09	18	1997	7.4	7.4	59	9.32
Site s2	00	10	22	1996	13.6	7.6	63	9.91
Site s2	01	10	22	1996	13.6	7.6	63	9.81

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s2	02	10	22	1996	13.6	7.6	63	9.78
Site s2	03	10	22	1996	13.6	7.7	63	9.75
Site s2	04	10	22	1996	13.5	7.7	63	9.70
Site s2	05	10	22	1996	13.5	7.7	63	9.65
Site s2	06	10	22	1996	13.5	7.7	63	9.66
Site s2	07	10	22	1996	13.5	7.7	63	9.63
Site s2	08	10	22	1996	13.5	7.7	63	9.60
Site s2	09	10	22	1996	13.5	7.7	62	9.60
Site s2	10	10	22	1996	13.5	7.7	63	9.54
Site s2	15	10	22	1996	13.4	7.7	63	9.39
Site s2	20	10	22	1996	10.2	7.5	60	8.22
Site s2	25	10	22	1996	7.9	7.3	62	8.39
Site s2	30	10	22	1996	7.6	7.2	62	8.33
Site s2	35	10	22	1996	7.5	7.2	62	8.39
Site s2	00	01	16	1997	6.3	7.4	62	11.03
Site s2	01	01	16	1997	6.3	7.4	62	10.92
Site s2	02	01	16	1997	6.3	7.5	62	10.80
Site s2	03	01	16	1997	6.3	7.5	62	10.74
Site s2	04	01	16	1997	6.3	7.5	62	10.68
Site s2	05	01	16	1997	6.3	7.5	62	10.57
Site s2	06	01	16	1997	6.3	7.5	62	10.57
Site s2	07	01	16	1997	6.3	7.5	61	10.52
Site s2	08	01	16	1997	6.3	7.5	61	10.52
Site s2	09	01	16	1997	6.3	7.5	61	10.45
Site s2	10	01	16	1997	6.3	7.5	61	10.45
Site s2	15	01	16	1997	6.3	7.5	61	10.47
Site s2	20	01	16	1997	6.3	7.5	61	10.42
Site s2	25	01	16	1997	6.3	7.5	61	10.42
Site s2	30	01	16	1997	6.0	7.5	62	10.56
Site s2	35	01	16	1997	5.9	7.6	60	10.62
Site s2	00	02	10	1997	6.3	7.4	63	11.33
Site s2	01	02	10	1997	6.2	7.4	63	11.24
Site s2	02	02	10	1997	6.2	7.5	62	11.08
Site s2	03	02	10	1997	6.2	7.5	62	11.06
Site s2	04	02	10	1997	6.1	7.5	62	11.03
Site s2	05	02	10	1997	6.1	7.5	61	11.04
Site s2	06	02	10	1997	6.1	7.5	61	10.99
Site s2	07	02	10	1997	6.1	7.6	61	10.99
Site s2	08	02	10	1997	6.1	7.5	61	11.00
Site s2	09	02	10	1997	6.1	7.6	61	11.00
Site s2	10	02	10	1997	6.1	7.6	61	11.00

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s2	15	02	10	1997	6.1	7.6	61	10.96
Site s2	20	02	10	1997	6.1	7.6	61	10.96
Site s2	25	02	10	1997	6.1	7.6	61	10.95
Site s2	30	02	10	1997	6.1	7.6	61	10.91
Site s2	35	02	10	1997	6.0	7.6	61	10.99
Site s2	00	04	29	1997	10.7	7.8	60	11.79
Site s2	01	04	29	1997	10.7	7.9	60	11.70
Site s2	02	04	29	1997	10.6	7.9	60	11.66
Site s2	03	04	29	1997	10.6	7.9	60	11.63
Site s2	04	04	29	1997	10.4	7.9	60	11.63
Site s2	05	04	29	1997	10.2	7.9	61	11.61
Site s2	06	04	29	1997	10.2	8.0	60	11.58
Site s2	07	04	29	1997	10.1	7.9	61	11.59
Site s2	08	04	29	1997	10.1	7.9	60	11.55
Site s2	09	04	29	1997	10.0	7.9	59	11.57
Site s2	10	04	29	1997	10.0	7.9	60	11.54
Site s2	15	04	29	1997	9.9	7.9	60	11.49
Site s2	20	04	29	1997	8.3	7.8	59	11.13
Site s2	25	04	29	1997	7.5	7.7	60	11.14
Site s2	30	04	29	1997	7.3	7.7	60	11.08
Site s2	35	04	29	1997	7.0	7.6	58	11.00
Site s2	00	05	21	1997	16.1	7.9	60	10.41
Site s2	05	05	21	1997	15.7	8.0	60	10.37
Site s2	10	05	21	1997	14.8	8.0	61	10.77
Site s2	15	05	21	1997	10.5	7.6	60	11.38
Site s2	20	05	21	1997	9.7	7.5	60	11.21
Site s2	25	05	21	1997	9.6	7.4	60	11.20
Site s2	30	05	21	1997	8.6	7.4	61	11.20
Site s2	35	05	21	1997	8.5	7.4	60	11.16
Site s2	00	06	12	1997	17.4	8.2	61	10.31
Site s2	01	06	12	1997	17.5	8.4	61	10.21
Site s2	02	06	12	1997	17.5	8.4	61	10.19
Site s2	03	06	12	1997	17.4	8.5	61	10.16
Site s2	04	06	12	1997	17.4	8.5	61	10.13
Site s2	05	06	12	1997	17.3	8.5	61	10.11
Site s2	06	06	12	1997	17.3	8.5	61	10.12
Site s2	07	06	12	1997	17.1	8.4	61	10.20
Site s2	08	06	12	1997	16.8	8.4	60	10.24
Site s2	09	06	12	1997	16.7	8.4	61	10.29
Site s2	10	06	12	1997	16.3	8.5	61	10.42
Site s2	15	06	12	1997	12.0	8.2	61	10.46

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s2	20	06	12	1997	9.5	8.1	60	10.37
Site s2	25	06	12	1997	8.0	8.0	60	10.34
Site s2	30	06	12	1997	7.4	7.9	60	10.27
Site s2	35	06	12	1997	7.3	7.8	60	10.34
Site s2	00	07	14	1997	19.3	7.8	60	9.87
Site s2	01	07	14	1997	19.0	7.9	61	9.84
Site s2	02	07	14	1997	18.6	8.0	61	9.87
Site s2	03	07	14	1997	18.4	8.1	60	9.86
Site s2	04	07	14	1997	18.3	8.1	60	9.81
Site s2	05	07	14	1997	18.2	8.1	60	9.80
Site s2	06	07	14	1997	18.1	8.1	60	9.80
Site s2	07	07	14	1997	18.1	8.1	61	9.76
Site s2	08	07	14	1997	18.1	8.1	60	9.77
Site s2	09	07	14	1997	18.0	8.1	60	9.75
Site s2	10	07	14	1997	18.0	8.1	60	9.74
Site s2	15	07	14	1997	13.2	7.8	61	9.68
Site s2	20	07	14	1997	9.8	7.7	61	9.99
Site s2	25	07	14	1997	8.3	7.6	60	10.14
Site s2	30	07	14	1997	7.7	7.6	60	10.15
Site s2	35	07	14	1997	7.3	7.6	60	10.38
Site s2	00	09	18	1997	18.8	7.5	61	9.31
Site s2	01	09	18	1997	18.8	7.6	61	9.24
Site s2	02	09	18	1997	18.4	7.6	61	9.24
Site s2	03	09	18	1997	18.3	7.7	61	9.18
Site s2	04	09	18	1997	18.2	7.7	61	9.20
Site s2	05	09	18	1997	18.2	7.7	61	9.22
Site s2	06	09	18	1997	18.2	7.8	61	9.20
Site s2	07	09	18	1997	18.2	7.8	60	9.16
Site s2	08	09	18	1997	18.2	7.8	60	9.13
Site s2	09	09	18	1997	18.1	7.8	60	9.07
Site s2	10	09	18	1997	18.1	7.8	60	9.09
Site s2	15	09	18	1997	15.3	7.6	61	8.66
Site s2	20	09	18	1997	9.2	7.5	59	8.94
Site s2	25	09	18	1997	8.3	7.5	61	8.92
Site s2	30	09	18	1997	7.6	7.4	60	9.23
Site s2	35	09	18	1997	7.4	7.4	59	9.32
Site s3	00	10	22	1996	13.6	7.4	63	9.95
Site s3	01	10	22	1996	13.6	7.5	63	9.79
Site s3	02	10	22	1996	13.5	7.6	63	9.71
Site s3	03	10	22	1996	13.5	7.6	63	9.69

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s3	04	10	22	1996	13.4	7.7	63	9.64
Site s3	05	10	22	1996	13.4	7.7	63	9.60
Site s3	06	10	22	1996	13.4	7.7	63	9.58
Site s3	07	10	22	1996	13.4	7.7	63	9.54
Site s3	08	10	22	1996	13.4	7.7	62	9.50
Site s3	09	10	22	1996	13.4	7.7	63	9.46
Site s3	10	10	22	1996	13.4	7.7	63	9.47
Site s3	15	10	22	1996	13.4	7.7	62	9.43
Site s3	20	10	22	1996	13.2	7.7	61	9.27
Site s3	25	10	22	1996	8.0	7.4	61	8.27
Site s3	30	10	22	1996	7.7	7.3	61	8.35
Site s3	35	10	22	1996	7.5	7.3	63	8.37
Site s3	00	01	16	1997	6.3	7.4	61	11.02
Site s3	01	01	16	1997	6.3	7.4	61	10.82
Site s3	02	01	16	1997	6.3	7.4	61	10.70
Site s3	03	01	16	1997	6.3	7.4	61	10.64
Site s3	04	01	16	1997	6.3	7.5	61	10.57
Site s3	05	01	16	1997	6.3	7.5	61	10.51
Site s3	06	01	16	1997	6.3	7.5	61	10.51
Site s3	07	01	16	1997	6.3	7.5	61	10.45
Site s3	08	01	16	1997	6.3	7.5	61	10.46
Site s3	09	01	16	1997	6.3	7.5	61	10.46
Site s3	10	01	16	1997	6.3	7.5	61	10.47
Site s3	15	01	16	1997	6.3	7.5	61	10.41
Site s3	20	01	16	1997	6.3	7.5	60	10.42
Site s3	25	01	16	1997	6.3	7.5	60	10.36
Site s3	30	01	16	1997	6.3	7.5	60	10.36
Site s3	35	01	16	1997	6.2	7.5	61	10.36
Site s3	00	02	10	1997	6.3	7.4	63	11.53
Site s3	01	02	10	1997	6.3	7.4	63	11.28
Site s3	02	02	10	1997	6.3	7.5	63	11.17
Site s3	03	02	10	1997	6.2	7.5	62	11.08
Site s3	04	02	10	1997	6.1	7.5	61	11.02
Site s3	05	02	10	1997	6.1	7.5	61	10.99
Site s3	06	02	10	1997	6.1	7.5	61	10.94
Site s3	07	02	10	1997	6.1	7.5	61	10.95
Site s3	08	02	10	1997	6.1	7.5	62	10.95
Site s3	09	02	10	1997	6.1	7.5	61	10.95
Site s3	10	02	10	1997	6.1	7.5	61	10.95
Site s3	15	02	10	1997	6.1	7.5	62	10.96
Site s3	20	02	10	1997	6.1	7.6	62	10.98

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s3	25	02	10	1997	6.0	7.6	62	11.00
Site s3	30	02	10	1997	6.0	7.6	60	11.01
Site s3	35	02	10	1997	6.0	7.6	60	11.01
Site s3	00	04	29	1997	10.7	7.6	60	11.86
Site s3	01	04	29	1997	10.6	7.7	60	11.74
Site s3	02	04	29	1997	10.4	7.7	60	11.77
Site s3	03	04	29	1997	10.3	7.8	60	11.71
Site s3	04	04	29	1997	10.1	7.8	61	11.65
Site s3	05	04	29	1997	10.1	7.8	60	11.60
Site s3	06	04	29	1997	10.0	7.8	60	11.59
Site s3	07	04	29	1997	10.0	7.8	60	11.55
Site s3	08	04	29	1997	10.0	7.8	60	11.54
Site s3	09	04	29	1997	10.0	7.8	60	11.52
Site s3	10	04	29	1997	9.9	7.8	60	11.51
Site s3	15	04	29	1997	9.8	7.8	60	11.44
Site s3	20	04	29	1997	8.9	7.8	59	11.27
Site s3	25	04	29	1997	7.3	7.7	60	11.09
Site s3	30	04	29	1997	7.0	7.7	60	11.01
Site s3	35	04	29	1997	6.9	7.7	59	10.91
Site s3	00	05	21	1997	15.8	7.9	60	10.38
Site s3	05	05	21	1997	15.5	7.9	60	10.35
Site s3	10	05	21	1997	13.1	7.8	60	11.04
Site s3	15	05	21	1997	10.5	7.5	60	11.36
Site s3	20	05	21	1997	9.6	7.5	60	11.33
Site s3	25	05	21	1997	9.3	7.4	60	11.28
Site s3	30	05	21	1997	8.6	7.4	60	11.26
Site s3	35	05	21	1997	8.2	7.4	60	11.22
Site s3	00	06	12	1997	17.6	8.4	61	10.05
Site s3	01	06	12	1997	17.6	8.5	61	10.08
Site s3	02	06	12	1997	17.6	8.5	61	10.06
Site s3	03	06	12	1997	17.5	8.5	61	10.06
Site s3	04	06	12	1997	17.3	8.5	61	10.05
Site s3	05	06	12	1997	17.1	8.5	61	10.16
Site s3	06	06	12	1997	17.0	8.5	60	10.20
Site s3	07	06	12	1997	16.9	8.5	60	10.21
Site s3	08	06	12	1997	16.8	8.5	61	10.21
Site s3	09	06	12	1997	16.7	8.4	61	10.21
Site s3	10	06	12	1997	16.6	8.4	61	10.20
Site s3	15	06	12	1997	11.2	8.1	60	10.30
Site s3	20	06	12	1997	9.1	8.0	60	10.27
Site s3	25	06	12	1997	8.2	7.9	59	10.25

Strawberry Sill 1996/97 Hydrolab Data

Site	Depth	Month	Day	Year	Temp	pH	Cond	DO
Site s3	30	06	12	1997	7.5	7.9	60	10.26
Site s3	35	06	12	1997	7.3	7.8	59	10.16
Site s3	00	07	14	1997	18.9	8.0	61	9.74
Site s3	01	07	14	1997	18.9	8.1	61	9.71
Site s3	02	07	14	1997	18.6	8.1	60	9.74
Site s3	03	07	14	1997	18.2	8.2	61	9.75
Site s3	04	07	14	1997	18.1	8.2	60	9.76
Site s3	05	07	14	1997	18.0	8.2	61	9.73
Site s3	06	07	14	1997	17.9	8.2	60	9.72
Site s3	07	07	14	1997	17.9	8.1	60	9.71
Site s3	08	07	14	1997	17.8	8.1	60	9.68
Site s3	09	07	14	1997	17.8	8.1	61	9.65
Site s3	10	07	14	1997	17.8	8.1	60	9.66
Site s3	15	07	14	1997	12.9	7.8	59	9.63
Site s3	20	07	14	1997	9.0	7.7	60	10.07
Site s3	25	07	14	1997	8.1	7.6	60	10.10
Site s3	30	07	14	1997	7.7	7.5	61	10.06
Site s3	35	07	14	1997	7.3	7.5	60	10.08
Site s3	00	09	18	1997	18.5	7.5	62	9.30
Site s3	01	09	18	1997	18.5	7.6	61	9.27
Site s3	02	09	18	1997	18.4	7.6	61	9.26
Site s3	03	09	18	1997	18.3	7.7	61	9.26
Site s3	04	09	18	1997	18.2	7.7	61	9.25
Site s3	05	09	18	1997	18.2	7.8	61	9.22
Site s3	06	09	18	1997	18.2	7.8	61	9.20
Site s3	07	09	18	1997	18.2	7.8	61	9.16
Site s3	08	09	18	1997	18.2	7.8	60	9.14
Site s3	09	09	18	1997	18.1	7.8	60	9.12
Site s3	10	09	18	1997	18.1	7.8	61	9.09
Site s3	15	09	18	1997	14.2	7.6	60	8.67
Site s3	20	09	18	1997	9.4	7.4	60	8.84
Site s3	25	09	18	1997	8.2	7.4	60	9.01
Site s3	30	09	18	1997	7.5	7.3	60	9.13
Site s3	35	09	18	1997	7.3	7.3	59	9.46

Strawberry Sill 1996/97 Water Quality Data

Site	Depth	Month	Day	Year	Alk	Turb	NH3	TN	NO3	SRP	TP
Site s1	00	10	22	1996	18.8	0.4	5	617	224	< 5	< 5
Site s1	05	10	22	1996	18.8	0.4	5	595	216	< 5	< 5
Site s1	10	10	22	1996	18.9	0.4	5	552	243	< 5	< 5
Site s1	15	10	22	1996	18.9	0.4	5	755	278	< 5	< 5
Site s1	20	10	22	1996	18.8	0.4	5	577	278	5	< 5
Site s1	25	10	22	1996	18.0	0.2	< 5	715	371	< 5	< 5
Site s1	30	10	22	1996	18.0	0.2	< 5	925	303	< 5	< 5
Site s1	35	10	22	1996	18.1	0.2	< 5	853	387	< 5	< 5
Site s1	00	01	16	1997	17.8	0.8	6	412	331	< 5	< 5
Site s1	05	01	16	1997	17.9	0.9	5	401	310	< 5	< 5
Site s1	10	01	16	1997	18.0	0.9	5	348	312	< 5	< 5
Site s1	15	01	16	1997	17.9	0.9	5	558	304	< 5	< 5
Site s1	20	01	16	1997	17.9	0.9	< 5	501	390	< 5	< 5
Site s1	25	01	16	1997	17.9	0.9	< 5	433	409	< 5	< 5
Site s1	30	01	16	1997	17.8	0.8	5	414	356	< 5	< 5
Site s1	35	01	16	1997	18.0	0.8	5	371	310	< 5	< 5
Site s2	00	10	22	1996	18.9	0.4	< 5	802	230	< 5	< 5
Site s2	05	10	22	1996	18.8	0.4	5	624	224	< 5	< 5
Site s2	10	10	22	1996	18.9	0.4	5	646	235	< 5	< 5
Site s2	15	10	22	1996	19.0	0.5	7	635	251	< 5	< 5
Site s2	20	10	22	1996	19.4	0.6	14	519	273	< 5	< 5
Site s2	25	10	22	1996	18.1	0.2	< 5	773	457	< 5	< 5
Site s2	30	10	22	1996	18.3	0.2	< 5	936	425	< 5	< 5
Site s2	35	10	22	1996	18.2	0.3	< 5	907	365	< 5	< 5
Site s2	00	01	16	1997	17.8	0.8	< 5	499	312	< 5	< 5
Site s2	05	01	16	1997	17.9	0.7	< 5	430	371	< 5	< 5
Site s2	10	01	16	1997	17.9	0.8	< 5	462	314	< 5	< 5
Site s2	15	01	16	1997	17.9	0.8	< 5	487	337	< 5	< 5
Site s2	20	01	16	1997	18.0	0.8	< 5	469	411	< 5	< 5
Site s2	25	01	16	1997	17.9	0.8	< 5	442	375	< 5	< 5
Site s2	30	01	16	1997	17.8	0.8	< 5	526	346	< 5	< 5
Site s2	35	01	16	1997	17.8	0.8	< 5	535	281	< 5	< 5
Site s3	00	10	22	1996	19.1	0.4	6	599	230	< 5	< 5
Site s3	05	10	22	1996	18.8	0.4	5	588	249	< 5	< 5
Site s3	10	10	22	1996	18.8	0.4	5	526	259	< 5	< 5
Site s3	15	10	22	1996	18.8	0.4	5	642	240	< 5	< 5
Site s3	20	10	22	1996	18.8	0.3	6	624	251	< 5	< 5
Site s3	25	10	22	1996	18.0	0.2	< 5	907	379	< 5	< 5
Site s3	30	10	22	1996	18.2	0.2	< 5	769	471	< 5	< 5
Site s3	35	10	22	1996	18.1	0.2	< 5	900	476	< 5	< 5
Site s3	00	01	16	1997	17.8	0.8	< 5	387	323	< 5	< 5
Site s3	05	01	16	1997	17.8	0.8	< 5	440	388	< 5	< 5
Site s3	10	01	16	1997	17.9	0.8	< 5	481	373	< 5	< 5
Site s3	15	01	16	1997	17.9	0.8	< 5	442	383	< 5	< 5
Site s3	20	01	16	1997	17.8	0.8	< 5	453	358	< 5	< 5
Site s3	25	01	16	1997	17.9	0.8	< 5	328	321	< 5	< 5
Site s3	30	01	16	1997	17.9	0.8	5	456	377	< 5	< 5
Site s3	35	01	16	1997	17.8	0.8	5	483	417	< 5	< 5

C AmTest Reports

The following AmTest data reports are filed by sampling date:

Sample location	Date	Analyses
1. Strawberry sill, surface and 35 m	Oct 22, 1997	metals, total organic carbon
2. Watershed creeks	Feb 10, 1997	metals, total organic carbon
3. Lake Whatcom, surface and bottom	Feb 12, 1997	total organic carbon only
4. Park Place wet pond	Feb 19, 1997	metals, total organic carbon
5. Watershed creeks	Aug 14, 1996	total organic carbon only
6. Lake Whatcom, surface and bottom and Park Place wet pond	Sep 18, 1997	metals, total organic carbon

LW - STRAWBERRY SILL -
TOC & METALS

AMTEST

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

Nov 1 1996

Western Washington University
Huxley College
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

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

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

CLIENT ID		MATRIX	AM TEST ID	TEST
109633-O	Site s1 0m	Water	96-A014837	CONV, MET,
109633-B	35m	Water	96-A014838	CONV, MET,
109634-O	Site s2 0m	Water	96-A014839	CONV, MET,
109634-B	35m	Water	96-A014840	CONV, MET,
109635-O	Site s3 0m	Water	96-A014841	CONV, MET,
109635-B	35m	Water	96-A014842	CONV, MET,
1096FD	Site s2 0m	Water	96-A014843	CONV, MET,

Your seven (7) samples were received on Wednesday, October 23 1996. This was within 24 hours of the time that the samples were collected (10/22/96). 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 #: 55815
PO Number: T21979

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
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 10/23/96
Date Reported: 11/ 1/96

Project Name: Lake Whatcom Aux.
Project #: 55815
PO Number: T21979

WATER SAMPLES

AM TEST Identification Number 96-A014837
Client Identification 109633-O site s1 0m
Sampling Date 10/22/96

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	[redacted]		0.10
Cadmium (mg/l)	[redacted]		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)	< 0.01		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)	< 0.002		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	3.2		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)	0.3		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)	0.005		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 10/23/96
Date Reported: 11/ 1/96

WATER SAMPLES

AM TEST Identification Number 96-A014838
Client Identification 109633-B Sik 51 35m
Sampling Date 10/22/96

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	0.01		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)	[redacted]		0.10
Cadmium (mg/l)	[redacted]		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	< 0.002		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)	1.8		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.4		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)	0.002		0.002

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 10/23/96
Date Reported: 11/ 1/96

WATER SAMPLES

AM TEST Identification Number 96-A014839
Client Identification 109634-0 Site 32 Om
Sampling Date 10/22/96

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.7		1.0
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)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	[redacted]		0.10
Cadmium (mg/l)	[redacted]		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	< 0.002		0.002
Molybdenum (mg/l)	0.03		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)	1.9		0.1
Selenium (mg/l)	0.04		0.03
Silicon (mg/l)	0.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.054		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: 10/23/96
Date Reported: 11/ 1/96

WATER SAMPLES

AM TEST Identification Number 96-A014840
Client Identification 109634-B Silk s2 35m
Sampling Date 10/22/96

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	0.01		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)	[redacted]		0.10
Cadmium (mg/l)	[redacted]		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	0.002		0.002
Molybdenum (mg/l)	0.01		0.01
Sodium (mg/l)	3.1		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)	1.8		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.4		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)	0.003		0.002

ANALYSIS REPORT AMTEST

tern Washington University
hael Hilles

Date Received: 10/23/96
Date Reported: 11/ 1/96

WATER SAMPLES

TEST Identification Number 96-A014841
ent Identification 109635-O Site S3 0m
pling Date 10/22/96

AMETER	RESULT	Q	D.L.
ventionals			
al Organic Carbon (mg/l)	1.8		1.0
al Metals			
minum (mg/l)	0.01		0.01
imony (mg/l)	< 0.02		0.02
enic (mg/l)	< 0.03		0.03
on (mg/l)	< 0.1		0.10
ium (mg/l)	0.008		0.003
yllium (mg/l)	< 0.005		0.005
cium (mg/l)	[redacted]		0.10
mium (mg/l)	[redacted]		0.002
alt (mg/l)	< 0.003		0.003
omium (mg/l)	< 0.006		0.006
per (mg/l)	< 0.002		0.002
n (mg/l)	< 0.01		0.01
cury (mg/l)	< 0.01		0.01
assium (mg/l)	< 1		1.0
hium (mg/l)	< 0.02		0.02
nesium (mg/l)	2.0		0.10
ganese (mg/l)	< 0.002		0.002
ybdenum (mg/l)	< 0.01		0.01
ium (mg/l)	3.3		0.1
kel (mg/l)	< 0.01		0.01
sphorus (mg/l)	< 0.05		0.05
d (mg/l)	< 0.001		0.001
fur (mg/l)	1.8		0.1
enium (mg/l)	< 0.03		0.03
icon (mg/l)	0.3		0.10
ver (mg/l)	< 0.01		0.01
(mg/l)	< 0.02		0.02
ontium (mg/l)	0.061		0.003
anium (mg/l)	< 0.01		0.01
llium (mg/l)	< 0.03		0.03
adium (mg/l)	< 0.002		0.002
rium (mg/l)	< 0.001		0.001
c (mg/l)	0.005		0.002

METHODOLOGY REPORT

AM TEST ID 96-A014837   MATRIX : Water
CLIENT ID 109633-O   SAMPLED: 10/22/96

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	10/31/96
Silver	mg/l	200.7	EPA	0.01	10/30/96
Aluminum	mg/l	200.7	EPA	0.01	10/30/96
Arsenic	mg/l	200.7	EPA	0.03	10/30/96
Boron	mg/l	200.7	EPA	0.10	10/30/96
Barium	mg/l	200.7	EPA	0.003	10/30/96
eryllium	mg/l	200.7	EPA	0.005	10/30/96
alcium	mg/l	200.7	EPA	0.10	10/30/96
admium	mg/l	200.7	EPA	0.002	10/30/96
obalt	mg/l	200.7	EPA	0.003	10/30/96
hromium	mg/l	200.7	EPA	0.006	10/30/96
opper	mg/l	200.7	EPA	0.002	10/30/96
Iron	mg/l	200.7	EPA	0.01	10/30/96
ercury	mg/l	200.7	EPA	0.010	10/30/96
otassium	mg/l	200.7	EPA	1.0	10/30/96
ithium	mg/l	200.7	EPA	0.02	10/30/96
agnesium	mg/l	200.7	EPA	0.10	10/30/96
anganese	mg/l	200.7	EPA	0.002	10/30/96
olybdenum	mg/l	200.7	EPA	0.01	10/30/96
odium	mg/l	200.7	EPA	0.5	10/30/96
ickel	mg/l	200.7	EPA	0.01	10/30/96
hosphorus	mg/l	200.7	EPA	0.05	10/30/96
ead	mg/l	239.2	EPA	0.001	10/30/96
ulfur	mg/l	200.7	EPA	0.1	10/30/96
ntimony	mg/l	200.7	EPA	0.02	10/30/96
elenium	mg/l	200.7	EPA	0.03	10/30/96
ilicon	mg/l	200.7	EPA	0.1	10/30/96
in	mg/l	200.7	EPA	0.02	10/30/96
trontium	mg/l	200.7	EPA	0.003	10/30/96
itanium	mg/l	200.7	EPA	0.01	10/30/96
hallium	mg/l	200.7	EPA	0.03	10/30/96
anadium	mg/l	200.7	EPA	0.002	10/30/96
ttrium	mg/l	200.7	EPA	0.001	10/30/96
inc	mg/l	200.7	EPA	0.002	10/30/96
cid Dig.(Tot Metals)		3010	EPA		10/28/96

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

AMTEST

Quality Control Summary

for 9605921
014837
014838
014839
014840
014841
014842
014843

ICATES		sample value	duplicate value	RPD %
014737 DUP: Total Organic Carbon	mg/l	530	510	3.8
014838 DUP: Total Organic Carbon	mg/l	< 1	< 1	
014837 DUP: Silver	mg/l	< 0.01	< 0.01	
014837 DUP: Aluminum	mg/l	< 0.01	0.01	
014837 DUP: Arsenic	mg/l	< 0.03	< 0.03	
014837 DUP: Boron	mg/l	< 0.1	< 0.1	
014837 DUP: Barium	mg/l	0.007	0.007	0.00
014837 DUP: Beryllium	mg/l	< 0.005	< 0.005	
014837 DUP: Calcium	mg/l	6.13	6.10	0.49
014837 DUP: Cadmium	mg/l	< 0.002	< 0.002	
014837 DUP: Cobalt	mg/l	< 0.003	< 0.003	
014837 DUP: Chromium	mg/l	< 0.006	< 0.006	
014837 DUP: Copper	mg/l	< 0.002	< 0.002	
014837 DUP: Iron	mg/l	< 0.01	< 0.01	
014837 DUP: Mercury	mg/l	< 0.01	< 0.01	
014837 DUP: Potassium	mg/l	< 1	< 1	
014837 DUP: Lithium	mg/l	< 0.02	< 0.02	
014837 DUP: Magnesium	mg/l	2.03	2.01	0.99
014837 DUP: Manganese	mg/l	< 0.002	< 0.002	
014837 DUP: Molybdenum	mg/l	< 0.01	< 0.01	
014837 DUP: Sodium	mg/l	3.2	3.2	0.00
014837 DUP: Nickel	mg/l	< 0.01	< 0.01	
014837 DUP: Phosphorus	mg/l	< 0.05	< 0.05	
014955 DUP: Lead	mg/l	0.005	0.004	22.
014995 DUP: Lead	mg/l	0.009	0.009	0.00
014837 DUP: Sulfur	mg/l	1.8	1.7	5.7
014837 DUP: Antimony	mg/l	< 0.02	< 0.02	
014837 DUP: Selenium	mg/l	< 0.03	< 0.03	
014837 DUP: Silicon	mg/l	0.3	0.3	0.00
014837 DUP: Tin	mg/l	< 0.02	< 0.02	
014837 DUP: Strontium	mg/l	0.060	0.060	0.00
14837 DUP: Titanium	mg/l	< 0.01	< 0.01	
14837 DUP: Thallium	mg/l	< 0.03	< 0.03	
14837 DUP: Vanadium	mg/l	< 0.002	< 0.002	
14837 DUP: Yttrium	mg/l	< 0.001	< 0.001	
14837 DUP: Zinc	mg/l	0.005	0.006	18.

X SPIKES		sample value	sample+spk value	spike value	Recovery %
14839 SPIKE: Total Organic Carbon	mg/l	1.7	21.	20.	96.5
14838 SPIKE: Aluminum	mg/l	0.01	11.0	10.0	110.
14838 SPIKE: Arsenic	mg/l	< 0.03	1.13	1.00	113.

Quality Control Summary
(continued)

QC for 9605921

BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Silver	mg/l	< 0.01
BLANK: Aluminum	mg/l	< 0.01
BLANK: Arsenic	mg/l	< 0.03
BLANK: Boron	mg/l	< 0.1
BLANK: Barium	mg/l	< 0.003
BLANK: Beryllium	mg/l	< 0.005
BLANK: Calcium	mg/l	< 0.1
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cobalt	mg/l	< 0.003
BLANK: Chromium	mg/l	< 0.006
BLANK: Copper	mg/l	< 0.002
BLANK: Iron	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Potassium	mg/l	< 1
BLANK: Lithium	mg/l	< 0.02
BLANK: Magnesium	mg/l	< 0.1
BLANK: Manganese	mg/l	< 0.002
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Sodium	mg/l	< 0.5
BLANK: Nickel	mg/l	< 0.01
BLANK: Phosphorus	mg/l	< 0.05
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Sulfur	mg/l	< 0.1
BLANK: Antimony	mg/l	< 0.02
BLANK: Selenium	mg/l	< 0.03
BLANK: Silicon	mg/l	< 0.1
BLANK: Tin	mg/l	< 0.02
BLANK: Strontium	mg/l	< 0.003
BLANK: Titanium	mg/l	< 0.01
BLANK: Thallium	mg/l	< 0.03
BLANK: Vanadium	mg/l	< 0.002
BLANK: Yttrium	mg/l	< 0.001
BLANK: Zinc	mg/l	< 0.002

AMTEST

Quality Control Summary
(continued)

for 9605921

A014838	SPIKE: Barium	mg/l	0.007	1.08	1.00	107.
A014838	SPIKE: Beryllium	mg/l	< 0.005	1.18	1.00	118.
A014838	SPIKE: Calcium	mg/l	5.69	16.5	10.0	108.
A014838	SPIKE: Cadmium	mg/l	< 0.002	1.18	1.00	118.
A014838	SPIKE: Chromium	mg/l	< 0.006	1.07	1.00	107.
A014838	SPIKE: Copper	mg/l	< 0.002	1.07	1.00	107.
A014838	SPIKE: Iron	mg/l	< 0.01	5.55	5.00	111.
A014838	SPIKE: Potassium	mg/l	< 1	10.6	10.0	106.
A014838	SPIKE: Magnesium	mg/l	1.84	12.5	10.0	107.
A014838	SPIKE: Manganese	mg/l	< 0.002	1.11	1.00	111.
A014838	SPIKE: Molybdenum	mg/l	< 0.01	1.08	1.00	108.
A014838	SPIKE: Sodium	mg/l	3.0	14.5	10.0	115.
A014838	SPIKE: Nickel	mg/l	< 0.01	1.16	1.00	116.
A014956	SPIKE: Lead	mg/l	0.002	0.028	0.025	104.
A014996	SPIKE: Lead	mg/l	0.001	0.026	0.025	100.
A014838	SPIKE: Selenium	mg/l	< 0.03	1.16	1.00	116.
A014838	SPIKE: Thallium	mg/l	< 0.03	1.14	1.00	114.
A014838	SPIKE: Zinc	mg/l	0.002	1.12	1.00	112.

NDARD REFERENCE MATERIALS			measured value	true value	Recovery %
own	SRM: Total Organic Carbon	mg/l	49.	49.	99.6
own	SRM: Total Organic Carbon	mg/l	49.	49.	99.6
own	SRM: Silver	mg/l	0.23	0.20	115.
own	SRM: Aluminum	mg/l	10.4	10.0	104.
own	SRM: Arsenic	mg/l	2.17	2.00	108.
own	SRM: Barium	mg/l	2.03	2.00	102.
own	SRM: Calcium	mg/l	10.7	10.0	107.
own	SRM: Cadmium	mg/l	2.13	2.00	106.
own	SRM: Chromium	mg/l	1.97	2.00	98.5
own	SRM: Copper	mg/l	1.98	2.00	99.0
own	SRM: Iron	mg/l	2.11	2.00	106.
own	SRM: Potassium	mg/l	94.4	100.	94.4
own	SRM: Magnesium	mg/l	10.3	10.0	103.
own	SRM: Manganese	mg/l	2.06	2.00	103.
own	SRM: Molybdenum	mg/l	2.06	2.00	103.
own	SRM: Sodium	mg/l	21.3	20.0	106.
own	SRM: Nickel	mg/l	2.13	2.00	106.
own	SRM: Phosphorus	mg/l	11.9	10.0	119.
own	SRM: Lead	mg/l	0.013	0.013	100.
own	SRM: Lead	mg/l	0.013	0.013	100.
own	SRM: Sulfur	mg/l	2.0	2.0	100.
own	SRM: Antimony	mg/l	1.95	2.00	97.5
own	SRM: Selenium	mg/l	2.00	2.00	100.
own	SRM: Tin	mg/l	1.8	2.0	90.0
own	SRM: Strontium	mg/l	2.2	2.0	110.
own	SRM: Titanium	mg/l	2.17	2.00	108.
own	SRM: Thallium	mg/l	2.30	2.00	115.
own	SRM: Zinc	mg/l	2.04	2.00	102.

ANKS Result

LW CREEKS - FEB 10, 1997
METALS & TOC

AMTEST

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

Feb 21 1997

Michael Hilles
WWU Huxley College
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

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

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

CLIENT ID	MATRIX	AM TEST ID	TEST
55815FEBC1 - Smith Cr	Water	97-A001911	CONV, MET,
55815FebC2 - Silver Beach	Water	97-A001912	CONV, MET,
55815FebC3 - Park Place	Water	97-A001913	CONV, MET,
55815FebC4 - Blue Canyon	Water	97-A001914	CONV, MET,
55815FebC5 - Anderson	Water	97-A001915	CONV, MET,
55815FebC6 - Wildwood	Water	97-A001916	CONV, MET,
55815FebC7 - Austin	Water	97-A001917	CONV, MET,
55815FebCFD - Wildwood	Water	97-A001918	CONV, ← TOC only

Your eight (8) samples were received on Tuesday, February 11 1997. This was within 24 hours of the time that the samples were collected (2/10/97). 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
Director of Inorganic Laboratory

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

ANALYSIS REPORT AMTEST

Michael Hilles
Michael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

AM TEST Identification Number 97-A001912
Client Identification 55815FebC2 Silver Beach Creek
Sampling Date 2/10/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	0.20		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)	0.021		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	9.9		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)	0.27		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)	4.4		0.10
Manganese (mg/l)	0.042		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)	0.18		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	2.2		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)	0.080		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

ANALYSIS REPORT AMTEST

chael Hilles
chael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

TEST Identification Number 97-A001913
ient Identification 55815FebC3 Park Place drain
mpling Date 2/10/97

RAMETER	RESULT	Q	D.L.
nventionals			
tal Organic Carbon (mg/l)	< 1		1.0
tal Metals			
uminum (mg/l)	0.18		0.01
timony (mg/l)	< 0.02		0.02
senic (mg/l)	< 0.03		0.03
ron (mg/l)	< 0.1		0.10
rium (mg/l)	0.026		0.003
ryllium (mg/l)	< 0.005		0.005
lcium (mg/l)	15.		0.10
dmium (mg/l)	< 0.002		0.002
balt (mg/l)	< 0.003		0.003
romium (mg/l)	< 0.006		0.006
pper (mg/l)	< 0.002		0.002
on (mg/l)	0.34		0.01
rcury (mg/l)	< 0.01		0.01
tassium (mg/l)	< 1		1.0
thium (mg/l)	< 0.02		0.02
gnesium (mg/l)	7.3		0.10
nganese (mg/l)	0.091		0.002
lybdenum (mg/l)	< 0.01		0.01
dium (mg/l)	7.0		0.1
ckel (mg/l)	< 0.01		0.01
osphorus (mg/l)	0.26		0.05
ad (mg/l)	< 0.001		0.001
lfur (mg/l)	4.9		0.1
lenium (mg/l)	< 0.03		0.03
licon (mg/l)	0.8		0.10
lver (mg/l)	< 0.01		0.01
n (mg/l)	< 0.02		0.02
rontium (mg/l)	0.12		0.003
tanium (mg/l)	< 0.01		0.01
allium (mg/l)	< 0.03		0.03
nadium (mg/l)	< 0.002		0.002
trium (mg/l)	< 0.001		0.001
nc (mg/l)	0.019		0.002

ANALYSIS REPORT AMTEST

Michael Hilles
Michael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

AM TEST Identification Number 97-A001914 *Blue Canyon*
Client Identification 55815FebC4
Sampling Date 2/10/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
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)	0.059		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	21.		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)	0.09		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)	6.0		0.10
Manganese (mg/l)	0.006		0.002
Molybdenum (mg/l)	0.02		0.01
Sodium (mg/l)	13.		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.14		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	6.2		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.4		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.67		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)	0.010		0.002

ANALYSIS REPORT AMTEST

Michael Hilles
Michael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

AM TEST Identification Number 97-A001915
Client Identification 55815FebC5 Anderson Creek
Sampling Date 2/10/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
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)	0.012		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)	0.07		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)	0.83		0.10
Manganese (mg/l)	0.010		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	1.9		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.14		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)	0.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.067		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)	0.014		0.002

ANALYSIS REPORT AMTEST

Michael Hilles
Michael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

AM TEST Identification Number	97-A001916	
Client Identification	55815FebC6	Wildwood Cr.
Sampling Date	2/10/97	

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	0.01		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)	< 0.003		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	3.0		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)	0.01		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)	1.0		0.10
Manganese (mg/l)	< 0.002		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	2.4		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	0.09		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	0.9		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.4		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.038		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

ANALYSIS REPORT AMTEST

Michael Hilles
Michael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

AM TEST Identification Number 97-A001917
Client Identification 55815FebC7 Austin Creek
Sampling Date 2/10/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
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)	0.008		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	4.0		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)	0.13		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)	1.2		0.10
Manganese (mg/l)	0.014		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	4.4		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)	1.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.5		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.045		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)	0.036		0.002

ANALYSIS REPORT AMTEST

Michael Hilles
Michael Hilles

Date Received: 2/11/97
Date Reported: 2/21/97

WATER SAMPLES

AM TEST Identification Number	97-A001918	
Client Identification	55815FebCFD	Wildwood Cr.
Sampling Date	2/10/97	

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.1		1.0

AMTEST

METHODOLOGY REPORT

AM TEST ID 97-A001911
CLIENT ID 55815FEBC1

MATRIX : Water
SAMPLED: 2/10/97

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	2/19/97
Silver	mg/l	200.7	EPA	0.01	2/14/97
Aluminum	mg/l	200.7	EPA	0.01	2/14/97
Arsenic	mg/l	200.7	EPA	0.03	2/14/97
Boron	mg/l	200.7	EPA	0.10	2/14/97
Barium	mg/l	200.7	EPA	0.003	2/14/97
Beryllium	mg/l	200.7	EPA	0.005	2/14/97
Calcium	mg/l	200.7	EPA	0.10	2/14/97
Cadmium	mg/l	200.7	EPA	0.002	2/14/97
Cobalt	mg/l	200.7	EPA	0.003	2/14/97
Chromium	mg/l	200.7	EPA	0.006	2/14/97
Copper	mg/l	200.7	EPA	0.002	2/14/97
Iron	mg/l	200.7	EPA	0.01	2/14/97
Mercury	mg/l	200.7	EPA	0.010	2/14/97
Potassium	mg/l	200.7	EPA	1.0	2/14/97
Lithium	mg/l	200.7	EPA	0.02	2/14/97
Magnesium	mg/l	200.7	EPA	0.10	2/14/97
Manganese	mg/l	200.7	EPA	0.002	2/14/97
Molybdenum	mg/l	200.7	EPA	0.01	2/14/97
Sodium	mg/l	200.7	EPA	0.5	2/14/97
Nickel	mg/l	200.7	EPA	0.01	2/14/97
Phosphorus	mg/l	200.7	EPA	0.05	2/14/97
Lead	mg/l	239.2	EPA	0.001	2/18/97
Sulfur	mg/l	200.7	EPA	0.1	2/14/97
Antimony	mg/l	200.7	EPA	0.02	2/14/97
Selenium	mg/l	200.7	EPA	0.03	2/14/97
Silicon	mg/l	200.7	EPA	0.1	2/14/97
Tin	mg/l	200.7	EPA	0.02	2/14/97
Strontium	mg/l	200.7	EPA	0.003	2/14/97
Titanium	mg/l	200.7	EPA	0.01	2/14/97
Thallium	mg/l	200.7	EPA	0.03	2/14/97
Vanadium	mg/l	200.7	EPA	0.002	2/14/97
Yttrium	mg/l	200.7	EPA	0.001	2/14/97
Zinc	mg/l	200.7	EPA	0.002	2/14/97
Acid Dig.(Tot Metals)		3010	EPA		2/12/97

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 9707311
97-A001911
97-A001912
97-A001913
97-A001914
97-A001915
97-A001916
97-A001917
97-A001918

DUPLICATES		sample value	duplicate value	RPD %
97-A001911 DUP: Total Organic Carbon	mg/l	< 1	< 1	
97-A001911 DUP: Silver	mg/l	< 0.01	< 0.01	
97-A001911 DUP: Aluminum	mg/l	0.08	0.07	13.
97-A001911 DUP: Arsenic	mg/l	< 0.03	< 0.03	
97-A001911 DUP: Boron	mg/l	< 0.1	< 0.1	
97-A001911 DUP: Barium	mg/l	0.004	0.004	0.00
97-A001911 DUP: Beryllium	mg/l	< 0.005	< 0.005	
97-A001911 DUP: Calcium	mg/l	3.96	3.95	0.25
97-A001911 DUP: Cadmium	mg/l	< 0.002	< 0.002	
97-A001911 DUP: Cobalt	mg/l	< 0.003	< 0.003	
97-A001911 DUP: Chromium	mg/l	< 0.006	< 0.006	
97-A001911 DUP: Copper	mg/l	< 0.002	< 0.002	
97-A001911 DUP: Iron	mg/l	0.04	0.04	0.00
97-A001911 DUP: Mercury	mg/l	< 0.01	< 0.01	
97-A001911 DUP: Potassium	mg/l	< 1	< 1	
97-A001911 DUP: Lithium	mg/l	< 0.02	< 0.02	
97-A001911 DUP: Magnesium	mg/l	1.31	1.30	0.77
97-A001911 DUP: Manganese	mg/l	< 0.002	< 0.002	
97-A001911 DUP: Molybdenum	mg/l	< 0.01	< 0.01	
97-A001911 DUP: Sodium	mg/l	2.7	2.7	0.00
97-A001911 DUP: Nickel	mg/l	< 0.01	< 0.01	
97-A001911 DUP: Phosphorus	mg/l	0.20	0.19	5.1
97-A001723 DUP: Lead	mg/l	0.063	0.062	1.6
97-A001943 DUP: Lead	mg/l	0.011	0.010	9.5
97-A001911 DUP: Sulfur	mg/l	1.0	1.0	0.00
97-A001911 DUP: Antimony	mg/l	< 0.02	< 0.02	
97-A001911 DUP: Selenium	mg/l	< 0.03	< 0.03	
97-A001911 DUP: Silicon	mg/l	0.5	0.5	0.00
97-A001911 DUP: Tin	mg/l	< 0.02	< 0.02	
97-A001911 DUP: Strontium	mg/l	0.046	0.047	2.2
97-A001911 DUP: Titanium	mg/l	< 0.01	< 0.01	
97-A001911 DUP: Thallium	mg/l	< 0.03	< 0.03	
97-A001911 DUP: Vanadium	mg/l	< 0.002	< 0.002	
97-A001911 DUP: Yttrium	mg/l	< 0.001	< 0.001	
97-A001911 DUP: Zinc	mg/l	0.012	0.011	8.7

MATRIX SPIKES		sample value	sample+spk value	spike value	Recovery %
97-A001912 SPIKE: Total Organic Carbon	mg/l	< 1	20.	20.	100.
97-A001912 SPIKE: Aluminum	mg/l	0.20	9.80	10.0	96.0
97-A001912 SPIKE: Arsenic	mg/l	< 0.03	1.12	1.00	112.

AMTEST

Quality Control Summary
(continued)

QC for 9707311

97-A001912 SPIKE: Barium	mg/l	0.021	1.09	1.00	107.
97-A001912 SPIKE: Beryllium	mg/l	< 0.005	1.03	1.00	103.
97-A001912 SPIKE: Calcium	mg/l	9.92	19.0	10.0	90.8
97-A001912 SPIKE: Cadmium	mg/l	< 0.002	1.13	1.00	113.
97-A001912 SPIKE: Chromium	mg/l	< 0.006	1.00	1.00	100.
97-A001912 SPIKE: Copper	mg/l	< 0.002	1.03	1.00	103.
97-A001912 SPIKE: Iron	mg/l	0.27	5.36	5.00	102.
97-A001912 SPIKE: Potassium	mg/l	< 1	10.7	10.0	107.
97-A001912 SPIKE: Magnesium	mg/l	4.40	14.2	10.0	98.0
97-A001912 SPIKE: Manganese	mg/l	0.042	1.07	1.00	103.
97-A001912 SPIKE: Molybdenum	mg/l	< 0.01	0.95	1.00	95.0
97-A001912 SPIKE: Sodium	mg/l	5.1	15.1	10.0	98.0
97-A001912 SPIKE: Nickel	mg/l	< 0.01	1.05	1.00	105.
97-A001724 SPIKE: Lead	mg/l	0.004	0.033	0.025	116.
97-A001944 SPIKE: Lead	mg/l	< 0.001	0.027	0.025	108.
97-A001912 SPIKE: Selenium	mg/l	< 0.03	1.10	1.00	110.
97-A001912 SPIKE: Thallium	mg/l	< 0.03	1.00	1.00	100.
97-A001912 SPIKE: Zinc	mg/l	0.021	1.10	1.00	108.

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	49.	49.	99.6
Known	SRM: Silver	mg/l	0.20	0.20	100.
Known	SRM: Aluminum	mg/l	8.60	10.0	86.0
Known	SRM: Arsenic	mg/l	2.14	2.00	107.
Known	SRM: Barium	mg/l	1.98	2.00	99.0
Known	SRM: Calcium	mg/l	9.40	10.0	94.0
Known	SRM: Cadmium	mg/l	2.04	2.00	102.
Known	SRM: Chromium	mg/l	1.87	2.00	93.5
Known	SRM: Copper	mg/l	1.93	2.00	96.5
Known	SRM: Iron	mg/l	1.92	2.00	96.0
Known	SRM: Potassium	mg/l	95.0	100.	95.0
Known	SRM: Magnesium	mg/l	9.60	10.0	98.0
Known	SRM: Manganese	mg/l	1.92	2.00	96.0
Known	SRM: Molybdenum	mg/l	1.80	2.00	90.0
Known	SRM: Nickel	mg/l	1.85	2.00	92.5
Known	SRM: Phosphorus	mg/l	11.6	10.0	116.
Known	SRM: Lead	mg/l	0.016	0.015	107.
Known	SRM: Lead	mg/l	0.015	0.015	100.
Known	SRM: Sulfur	mg/l	1.8	2.0	90.0
Known	SRM: Antimony	mg/l	2.09	2.00	104.
Known	SRM: Selenium	mg/l	1.94	2.00	97.0
Known	SRM: Tin	mg/l	1.9	2.0	95.0
Known	SRM: Strontium	mg/l	2.08	2.00	104.
Known	SRM: Titanium	mg/l	1.91	2.00	95.5
Known	SRM: Thallium	mg/l	1.95	2.00	97.5
Known	SRM: Zinc	mg/l	2.03	2.00	102.

BLANKS		Result
BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Silver	mg/l	< 0.01

AMTEST

Quality Control Summary
(continued)

QC for 9707311

BLANK: Aluminum	mg/l	< 0.01
BLANK: Arsenic	mg/l	< 0.03
BLANK: Boron	mg/l	< 0.1
BLANK: Barium	mg/l	< 0.003
BLANK: Beryllium	mg/l	< 0.005
BLANK: Calcium	mg/l	< 0.1
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cobalt	mg/l	< 0.003
BLANK: Chromium	mg/l	< 0.006
BLANK: Copper	mg/l	< 0.002
BLANK: Iron	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Potassium	mg/l	< 1
BLANK: Lithium	mg/l	< 0.02
BLANK: Magnesium	mg/l	< 0.1
BLANK: Manganese	mg/l	< 0.002
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Sodium	mg/l	< 0.5
BLANK: Nickel	mg/l	< 0.01
BLANK: Phosphorus	mg/l	< 0.05
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Sulfur	mg/l	< 0.1
BLANK: Antimony	mg/l	< 0.02
BLANK: Selenium	mg/l	< 0.03
BLANK: Silicon	mg/l	< 0.1
BLANK: Tin	mg/l	< 0.02
BLANK: Strontium	mg/l	< 0.003
BLANK: Titanium	mg/l	< 0.01
BLANK: Thallium	mg/l	< 0.03
BLANK: Vanadium	mg/l	< 0.002
BLANK: Yttrium	mg/l	< 0.001
BLANK: Zinc	mg/l	< 0.002

AMTEST

Quality Control Summary
(continued)

QC for 9707311

97-A001912	SPIKE: Barium	mg/l	0.021	1.09	1.00	107.
97-A001912	SPIKE: Beryllium	mg/l	< 0.005	1.03	1.00	103.
97-A001912	SPIKE: Calcium	mg/l	9.92	19.0	10.0	90.8
97-A001912	SPIKE: Cadmium	mg/l	< 0.002	1.13	1.00	113.
97-A001912	SPIKE: Chromium	mg/l	< 0.006	1.00	1.00	100.
97-A001912	SPIKE: Copper	mg/l	< 0.002	1.03	1.00	103.
97-A001912	SPIKE: Iron	mg/l	0.27	5.36	5.00	102.
97-A001912	SPIKE: Potassium	mg/l	< 1	10.7	10.0	107.
97-A001912	SPIKE: Magnesium	mg/l	4.40	14.2	10.0	98.0
97-A001912	SPIKE: Manganese	mg/l	0.042	1.07	1.00	103.
97-A001912	SPIKE: Molybdenum	mg/l	< 0.01	0.95	1.00	95.0
97-A001912	SPIKE: Sodium	mg/l	5.3	15.1	10.0	98.0
97-A001912	SPIKE: Nickel	mg/l	< 0.01	1.05	1.00	105.
97-A001724	SPIKE: Lead	mg/l	0.004	0.033	0.025	116.
97-A001944	SPIKE: Lead	mg/l	< 0.001	0.027	0.025	108.
97-A001912	SPIKE: Selenium	mg/l	< 0.03	1.10	1.00	110.
97-A001912	SPIKE: Thallium	mg/l	< 0.03	1.00	1.00	100.
97-A001912	SPIKE: Zinc	mg/l	0.021	1.10	1.00	108.

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	49.	49.	99.6
Known	SRM: Silver	mg/l	0.20	0.20	100.
Known	SRM: Aluminum	mg/l	8.60	10.0	86.0
Known	SRM: Arsenic	mg/l	2.14	2.00	107.
Known	SRM: Barium	mg/l	1.98	2.00	99.0
Known	SRM: Calcium	mg/l	9.40	10.0	94.0
Known	SRM: Cadmium	mg/l	2.04	2.00	102.
Known	SRM: Chromium	mg/l	1.87	2.00	93.5
Known	SRM: Copper	mg/l	1.93	2.00	96.5
Known	SRM: Iron	mg/l	1.92	2.00	96.0
Known	SRM: Potassium	mg/l	95.0	100.	95.0
Known	SRM: Magnesium	mg/l	9.80	10.0	98.0
Known	SRM: Manganese	mg/l	1.92	2.00	96.0
Known	SRM: Molybdenum	mg/l	1.80	2.00	90.0
Known	SRM: Nickel	mg/l	1.85	2.00	92.5
Known	SRM: Phosphorus	mg/l	11.6	10.0	116.
Known	SRM: Lead	mg/l	0.016	0.015	107.
Known	SRM: Lead	mg/l	0.015	0.015	100.
Known	SRM: Sulfur	mg/l	1.8	2.0	90.0
Known	SRM: Antimony	mg/l	2.09	2.00	104.
Known	SRM: Selenium	mg/l	1.94	2.00	97.0
Known	SRM: Tin	mg/l	1.9	2.0	95.0
Known	SRM: Strontium	mg/l	2.08	2.00	104.
Known	SRM: Titanium	mg/l	1.91	2.00	95.5
Known	SRM: Thallium	mg/l	1.95	2.00	97.5
Known	SRM: Zinc	mg/l	2.03	2.00	102.

BLANKS		Result
BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Silver	mg/l	< 0.01

LAKE WHATCOM - FEB 12 19
TOC only

AMTEST

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

Feb 21 1997

WWU Huxley College
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

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

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

CLIENT ID			MATRIX	AM TEST ID	TEST
02129711-0	Site 1	0m	Water	97-A002127	CONV,
02129711-B	"	20m	Water	97-A002128	CONV,
02129721-0	Intake	0m	Water	97-A002129	CONV,
02129721-B	"	10m	Water	97-A002130	CONV,
02129722-0	Site 2	0m	Water	97-A002131	CONV,
02129722-B	"	18m	Water	97-A002132	CONV,
02129731-0	Site 3	0m	Water	97-A002133	CONV,
02129731-B	"	80m	Water	97-A002134	CONV,
02129732-0	Site 4	0m	Water	97-A002135	CONV,
02129732-B	"	90m	Water	97-A002136	CONV,

Your ten (10) samples were received on Friday, February 14 1997. This was a total of 48 hours (2 days) after sample collection (2/12/97). 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
Director of Inorganic Laboratory
Project #: 55815
PO Number: T25389

2 199

AMTEST

AmTest Inc.

Professional
Analytical
Services

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

Fax: 206 883 3495

Tel: 206 885 1664

ANALYSIS REPORT

WWU Huxley College
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 2/14/97
Date Reported: 2/21/97

Project Name: Lake Whatcom Monitor
Project #: 55815
PO Number: T25389
Date Sampled: 2/12/97

Water Samples

PARAMETER	UNITS	RESULT
97-A002127		
Client ID: 02129711-0 Site 1 - 0m		
Total Organic Carbon	mg/l	< 1
97-A002128		
Client ID: 02129711-B Site 1 - 20m		
Total Organic Carbon	mg/l	< 1
97-A002129		
Client ID: 02129721-0 Intake 0m		
Total Organic Carbon	mg/l	< 1
97-A002130		
Client ID: 02129721-B Intake 10m		
Total Organic Carbon	mg/l	< 1
97-A002131		
Client ID: 02129722-0 Site 2 0m		
Total Organic Carbon	mg/l	< 1
97-A002132		
Client ID: 02129722-B Site 2 18m		
Total Organic Carbon	mg/l	< 1
97-A002133		
Client ID: 02129731-0 Site 3 0m		
Total Organic Carbon	mg/l	< 1
97-A002134		
Client ID: 02129731-B Site 3 80m		
Total Organic Carbon	mg/l	< 1
97-A002135		
Client ID: 02129732-0 Site 4 0m		
Total Organic Carbon	mg/l	< 1

AMTEST

ANALYSIS REPORT

WWU Huxley College

Date Received: 2/14/97
Date Reported: 2/21/97

Attention: Michael Hilles

Water Samples

PARAMETER	UNITS	RESULT
97-A002136		
Client ID: 02129732-B Site 4 90m		
Total Organic Carbon	mg/l	< 1

AMTEST

METHODOLOGY REPORT

AM TEST ID 97-A002127
CLIENT ID 02129711-0

MATRIX : Water
SAMPLED: 2/12/97

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSI[S]
Total Organic Carbon	mg/l	415.1	EPA	1.0	2/20/97

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 9707109
97-A002127
97-A002128
97-A002129
97-A002130
97-A002131
97-A002132
97-A002133
97-A002134
97-A002135
97-A002136

DUPLICATES		sample value	duplicate value	RPD %
97-A002127 DUP: Total Organic Carbon	mg/l	< 1	< 1	

MATRIX SPIKES		sample value	sample+spk value	spike value	Recovery %
97-A002128 SPIKE: Total Organic Carbon	mg/l	< 1	8.6	10.	86.0

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	4.8	4.9	97.6

BLANKS			Result
	BLANK: Total Organic Carbon	mg/l	< 1

PARK PLACE PONDS - FEB 19, 1997
TOC & METALS

AMTEST

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

Mar 4 1997

Western Washington University
Huxley College of Env. Science
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

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

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

CLIENT ID	MATRIX	AM TEST ID	TEST
55815APP4 Park Place Inlet	Water	97-A002502	CONV, MET,
55815APP5 Outlet	Water	97-A002503	CONV, MET,

Your two (2) samples were received on Friday, February 21 1997. This was a total of 48 hours (2 days) after sample collection (2/19/97). 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
Director of Inorganic Laboratory

Project #: 55815
PO Number: T25389

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 of Env. Science
IWS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 2/21/97
Date Reported: 3/ 4/97

Project Name: Lake Whatcom Park Pl
Project #: 55815
PO Number: T25389

WATER SAMPLES

AM TEST Identification Number 97-A002502
Client Identification 55815APP4 *Park Place Inlet*
Sampling Date 2/19/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	0.16		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)	0.027		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)	0.25		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)	5.5		0.10
Manganese (mg/l)	0.053		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	6.4		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)	3.8		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)	0.10		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)	0.025		[illegible]

ANALYSIS REPORT AMTEST

Western Washington University
Michael Hilles

Date Received: 2/21/97
Date Reported: 3/ 4/97

WATER SAMPLES

AM TEST Identification Number 97-A002503
Client Identification 55815APP5 Park Place Outlet
Sampling Date 2/19/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	0.20		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)	0.025		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)	0.29		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)	5.4		0.10
Manganese (mg/l)	0.044		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	6.3		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)	3.8		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)	0.097		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

AMTEST

METHODOLOGY REPORT

AM TEST ID 97-A002502
CLIENT ID 55815APP4

MATRIX : Water
SAMPLED: 2/19/97

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	2/27/97
Silver	mg/l	200.7	EPA	0.01	2/27/97
Aluminum	mg/l	200.7	EPA	0.01	2/27/97
Arsenic	mg/l	200.7	EPA	0.03	2/27/97
Boron	mg/l	200.7	EPA	0.10	2/27/97
Barium	mg/l	200.7	EPA	0.003	2/27/97
Beryllium	mg/l	200.7	EPA	0.005	2/27/97
Calcium	mg/l	200.7	EPA	0.10	2/27/97
Cadmium	mg/l	200.7	EPA	0.002	2/27/97
Cobalt	mg/l	200.7	EPA	0.003	2/27/97
Chromium	mg/l	200.7	EPA	0.006	2/27/97
Copper	mg/l	200.7	EPA	0.002	2/27/97
Iron	mg/l	200.7	EPA	0.01	2/27/97
Mercury	mg/l	200.7	EPA	0.010	2/27/97
Potassium	mg/l	200.7	EPA	1.0	2/27/97
Lithium	mg/l	200.7	EPA	0.02	2/27/97
Magnesium	mg/l	200.7	EPA	0.10	2/27/97
Manganese	mg/l	200.7	EPA	0.002	2/27/97
Molybdenum	mg/l	200.7	EPA	0.01	2/27/97
Sodium	mg/l	200.7	EPA	0.5	2/27/97
Nickel	mg/l	200.7	EPA	0.01	2/27/97
Phosphorus	mg/l	200.7	EPA	0.05	2/27/97
Lead	mg/l	239.2	EPA	0.001	2/25/97
Sulfur	mg/l	200.7	EPA	0.1	2/27/97
Antimony	mg/l	200.7	EPA	0.02	2/27/97
Selenium	mg/l	200.7	EPA	0.03	2/27/97
Silicon	mg/l	200.7	EPA	0.1	2/27/97
Tin	mg/l	200.7	EPA	0.02	2/27/97
Strontium	mg/l	200.7	EPA	0.003	2/27/97
Titanium	mg/l	200.7	EPA	0.01	2/27/97
Thallium	mg/l	200.7	EPA	0.03	2/27/97
Vanadium	mg/l	200.7	EPA	0.002	2/27/97
Yttrium	mg/l	200.7	EPA	0.001	2/27/97
Zinc	mg/l	200.7	EPA	0.002	2/27/97
Acid Dig.(Tot Metals)		3010	EPA		2/24/97

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 9707491
97-A002502
97-A002503

DUPLICATES		sample value	duplicate value	RPD %
97-A002345 DUP: Total Organic Carbon	mg/l	310	350	12.
97-A002453 DUP: Silver	mg/l	< 0.01	< 0.01	
97-A002453 DUP: Boron	mg/l	0.23	0.23	0.00
97-A002453 DUP: Cadmium	mg/l	< 0.002	< 0.002	
97-A002508 DUP: Cadmium	mg/l	< 0.002	< 0.002	
97-A002453 DUP: Chromium	mg/l	< 0.006	< 0.006	
97-A002508 DUP: Chromium	mg/l	< 0.006	< 0.006	
97-A002453 DUP: Copper	mg/l	0.077	0.075	2.6
97-A002508 DUP: Iron	mg/l	2.38	2.32	2.6
97-A002508 DUP: Manganese	mg/l	0.020	0.019	5.1
97-A002453 DUP: Molybdenum	mg/l	< 0.01	< 0.01	
97-A002453 DUP: Nickel	mg/l	< 0.01	< 0.01	
97-A002508 DUP: Nickel	mg/l	< 0.01	< 0.01	
97-A002018 DUP: Lead	mg/l	< 0.001	< 0.001	
97-A002452 DUP: Lead	mg/l	0.003	0.002	40.
97-A002508 DUP: Lead	mg/l	0.002	0.001	67.
97-A002644 DUP: Lead	mg/l	0.002	0.002	0.00
97-A002453 DUP: Zinc	mg/l	0.116	0.118	1.7

MATRIX SPIKES		sample value	sample+spk value	spike value	Recovery %
97-A002346 SPIKE: Total Organic Carbon	mg/l	2.1	12.	10.	99.0
97-A002454 SPIKE: Cadmium	mg/l	< 0.002	1.04	1.00	104.
97-A002509 SPIKE: Cadmium	mg/l	< 0.002	1.05	1.00	105.
97-A002454 SPIKE: Chromium	mg/l	< 0.006	0.951	1.00	95.1
97-A002509 SPIKE: Chromium	mg/l	< 0.006	0.950	1.00	95.0
97-A002454 SPIKE: Copper	mg/l	0.066	1.06	1.00	99.4
97-A002509 SPIKE: Iron	mg/l	0.63	5.53	5.00	98.0
97-A002509 SPIKE: Manganese	mg/l	0.007	0.982	1.00	97.5
97-A002454 SPIKE: Molybdenum	mg/l	< 0.01	0.96	1.00	96.0
97-A002454 SPIKE: Nickel	mg/l	< 0.01	1.01	1.00	101.
97-A002509 SPIKE: Nickel	mg/l	< 0.01	1.00	1.00	100.
97-A002273 SPIKE: Lead	mg/l	< 0.001	0.022	0.025	88.0
97-A002453 SPIKE: Lead	mg/l	0.004	0.029	0.025	100.
97-A002509 SPIKE: Lead	mg/l	< 0.001	0.028	0.025	112.
97-A002675 SPIKE: Lead	mg/l	< 0.001	0.026	0.025	104.
97-A002454 SPIKE: Zinc	mg/l	0.186	1.09	1.00	90.4

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	4.7	4.9	95.5
Known	SRM: Silver	mg/l	0.20	0.20	100.
Known	SRM: Aluminum	mg/l	9.00	10.0	90.0
Known	SRM: Barium	mg/l	2.00	2.00	100.
Known	SRM: Calcium	mg/l	9.22	10.0	92.2
Known	SRM: Cadmium	mg/l	2.09	2.00	104.
Known	SRM: Chromium	mg/l	1.90	2.00	95.0

AMTEST

Quality Control Summary
(continued)

QC for 9707491

Known	SRM: Copper	mg/l	1.95	2.00	97.5
Known	SRM: Iron	mg/l	1.97	2.00	98.5
Known	SRM: Potassium	mg/l	98.3	100.	98.3
Known	SRM: Magnesium	mg/l	9.84	10.0	98.4
Known	SRM: Manganese	mg/l	1.94	2.00	97.0
Known	SRM: Molybdenum	mg/l	1.84	2.00	92.0
Known	SRM: Sodium	mg/l	21.0	20.0	105.
Known	SRM: Nickel	mg/l	1.90	2.00	95.0
Known	SRM: Lead	mg/l	0.014	0.015	93.3
Known	SRM: Lead	mg/l	0.014	0.015	93.3
Known	SRM: Lead	mg/l	0.017	0.015	113.
Known	SRM: Lead	mg/l	0.016	0.015	107.
Known	SRM: Lead	mg/l	0.017	0.015	113.
Known	SRM: Sulfur	mg/l	1.9	2.0	95.0
Known	SRM: Antimony	mg/l	2.11	2.00	106.
Known	SRM: Selenium	mg/l	2.00	2.00	100.
Known	SRM: Zinc	mg/l	2.06	2.00	103.

BLANKS

		Result
BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Silver	mg/l	< 0.01
BLANK: Aluminum	mg/l	< 0.01
BLANK: Arsenic	mg/l	< 0.03
BLANK: Boron	mg/l	< 0.1
BLANK: Barium	mg/l	< 0.003
BLANK: Beryllium	mg/l	< 0.005
BLANK: Calcium	mg/l	< 0.1
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cobalt	mg/l	< 0.003
BLANK: Chromium	mg/l	< 0.006
BLANK: Copper	mg/l	< 0.002
BLANK: Iron	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Potassium	mg/l	< 1
BLANK: Lithium	mg/l	< 0.02
BLANK: Magnesium	mg/l	< 0.1
BLANK: Manganese	mg/l	< 0.002
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Sodium	mg/l	< 0.5
BLANK: Nickel	mg/l	< 0.01
BLANK: Phosphorus	mg/l	< 0.05
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Lead	mg/l	< 0.001
BLANK: Sulfur	mg/l	< 0.1
BLANK: Antimony	mg/l	< 0.02
BLANK: Selenium	mg/l	< 0.03
BLANK: Silicon	mg/l	< 0.1
BLANK: Tin	mg/l	< 0.02

AMTEST

Quality Control Summary
(continued)

QC for 9707491

BLANK: Strontium	mg/l	< 0.003
BLANK: Titanium	mg/l	< 0.01
BLANK: Thallium	mg/l	< 0.03
BLANK: Vanadium	mg/l	< 0.002
BLANK: Yttrium	mg/l	< 0.001
BLANK: Zinc	mg/l	0.007

LW CREEKS - AUG 11, 1997
TOC only

AMTEST

AmTest Inc.

Professional
Analytical
Services

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

Fax: 206 883 3495

Tel: 206 885 1664

ANALYSIS REPORT

WWU Huxley College
C/O Michael Hilles
1WS MS 9069
Bellingham, WA 98225
Attention: Michael Hilles

Date Received: 8/14/97
Date Reported: 8/15/97

Project Name: Lake Whatcom Mnt.Cks
Project #: 55815
PO Number: T25389
Date Sampled: 8/11/97

Water Samples

PARAMETER	UNITS	RESULT
97-A010967		
Client ID: CLW1b Smith Creek		
Total Organic Carbon	mg/l	2.3
97-A010968		
Client ID: CLW2b Silver Beach Cr.		
Total Organic Carbon	mg/l	7.5
97-A010969		
Client ID: CLW3b Park Place		
Total Organic Carbon	mg/l	7.1
97-A010970		
Client ID: CLW4b Blue Canyon		
Total Organic Carbon	mg/l	2.1
97-A010971		
Client ID: CLW5b Anderson		
Total Organic Carbon	mg/l	1.1
97-A010972		
Client ID: CLW7b Austin		
Total Organic Carbon	mg/l	2.4
97-A010973		
Client ID: CLWFDb Smith Creek		
Total Organic Carbon	mg/l	2.0

Reported by: [illegible signature]

7

AMTEST

METHODOLOGY REPORT

AM TEST ID 97-A010967
CLIENT ID CLW1b

MATRIX : Water
SAMPLED: 8/11/97

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	8/14/97

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 9709913
97-A010967
97-A010968
97-A010969
97-A010970
97-A010971
97-A010972
97-A010973

DUPLICATES		sample value	duplicate value	RPD %
97-A010967 DUP: Total Organic Carbon	mg/l	2.3	2.8	20.
97-A010969 DUP: Total Organic Carbon	mg/l	7.1	6.0	17.

MATRIX SPIKES		sample value	sample+spk value	spike value	Recovery %
97-A010968 SPIKE: Total Organic Carbon	mg/l	7.5	52.	50.	89.0

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	5.1	4.9	104.

BLANKS		Result
BLANK: Total Organic Carbon	mg/l	< 1 .

LAKE WHATCOM - SEPT 18, 1997 - TOC & ME
PARK PLACE POND - SEPT 18, 1997 - TOC & ME

AMTEST LABORATORIES

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

Tel: 425 885 1664

Fax: 425 883 3495

Oct 9 1997

WWU Huxley College
IWS MS 9069
Bellinghanm, WA 98225
Attention: Michael Hilles

Dear Michael Hilles:

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

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

CLIENT ID	MATRIX	AM TEST ID	TEST
09189711-0 Site 1 0m	Water	97-A013579	CONV, MET,
09189711-B 20m	Water	97-A013580	CONV, MET,
09189721-0 Intake 0m	Water	97-A013581	CONV, MET,
09189721-B 10m	Water	97-A013582	CONV, MET,
09189722-0 Site 2 0m	Water	97-A013583	CONV, MET,
09189722-B 20m	Water	97-A013584	CONV, MET,
09189731-0 Site 3 0m	Water	97-A013585	CONV, MET,
09189731-B 80m	Water	97-A013586	CONV, MET,
09189732-0 Site 4 0m	Water	97-A013587	CONV, MET,
09189732-B 90m	Water	97-A013588	CONV, MET,
091897FD Site 1 20m	Water	97-A013589	CONV, MET,
55815BPP4 Park Place Inlet	Water	97-A013590	CONV, MET,
55815B995 Park Place Outlet	Water	97-A013591	CONV, MET,

Your thirteen (13) samples were received on Wednesday, September 24 1997. This was a total of 144 hours (6 days) after sample collection (9/18/97). 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

ANALYSIS REPORT AMTEST LABORATORIES

AmTest Inc.
14603 N.E. 87th St.
Redmond, WA 98052
Tel: 425 885 1664
Fax: 425 883 3495

WWU Huxley College
IWS MS 9069
Bellinghanm, WA 98225
Attention: Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

Project Name: Lake Whatcom Monitor
Project #: 55815
PO Number: T25389

WATER SAMPLES

AM TEST Identification Number 97-A013579
Client Identification 09189711-0 Site 1 Om
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.2		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	6.1		0.10
Cadmium (mg/l)	< 0.002		0.002
Cobalt (mg/l)	0.004		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.01		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)	0.012		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	3.1		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)	0.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.062		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)	[illegible]		[illegible]

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013580
Client Identification 09189711-B Site 1 20m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	0.011		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	6.7		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)	0.91		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)	0.25		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	3.2		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)	1.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.069		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)	0.013		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013581
Client Identification 09189721-0 Intake 0 m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.8		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	0.006		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	< 0.002		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)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.056		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

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013582
Client Identification 09189721-B Intake 10m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.2		1.0
Total Metals			
Aluminum (mg/l)	0.01		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)	0.006		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.6		0.10
Cadmium (mg/l)	0.003		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)	1.4		1.0
Lithium (mg/l)	< 0.02		0.02
Magnesium (mg/l)	1.8		0.10
Manganese (mg/l)	0.003		0.002
Molybdenum (mg/l)	2.8		0.01
Sodium (mg/l)	< 0.5		0.1
Nickel (mg/l)	< 0.01		0.01
Phosphorus (mg/l)	1.5		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	< 0.1		0.1
Selenium (mg/l)	0.14		0.03
Silicon (mg/l)	< 0.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	0.06		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)	0.007		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013583
Client Identification 09189722-0 Site 2 Om
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.6		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	5.6		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	0.003		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)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.055		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)	0.013		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013584
Client Identification 09189722-B Site 2 20m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.4		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	0.003		0.002
Cobalt (mg/l)	0.005		0.003
Chromium (mg/l)	< 0.006		0.006
Copper (mg/l)	< 0.002		0.002
Iron (mg/l)	0.12		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)	0.074		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)	1.4		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.2		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)	0.011		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013585
Client Identification 09189731-0 Site 3 0m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	2.9		1.0
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)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.5		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)	0.01		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)	1.8		0.10
Manganese (mg/l)	< 0.002		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)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.055		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

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013586
Client Identification 09189731-B Site 3 80m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
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)	0.006		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.7		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)	1.8		0.10
Manganese (mg/l)	0.016		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)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.2		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)	0.008		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013587
Client Identification 09189732-0 Site 4 Om
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
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)	0.006		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	< 0.002		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)	1.5		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.1		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.056		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)	0.012		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013588
Client Identification 09189732-B Site 4 90m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	< 1		1.0
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)	0.007		0.003
Beryllium (mg/l)	< 0.005		0.005
Calcium (mg/l)	5.7		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)	< 0.01		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)	1.8		0.10
Manganese (mg/l)	0.004		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)	1.6		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.2		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)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.010		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013589
Client Identification 091897FD Site 1 20 m
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	1.2		1.0
Total Metals			
Aluminum (mg/l)	< 0.01		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)	6.6		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)	0.89		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)	0.24		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)	1.4		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.3		0.10
Silver (mg/l)	< 0.01		0.01
Tin (mg/l)	< 0.02		0.02
Strontium (mg/l)	0.067		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

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number 97-A013590
Client Identification 55815BPP4 Park Place Inlet
Sampling Date 9/18/97

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	4.0		1.0
Total Metals			
Aluminum (mg/l)	0.19		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)	0.024		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)	0.47		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)	7.5		0.10
Manganese (mg/l)	0.10		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	9.1		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)	2.3		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.4		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)	< 0.002		0.002
Yttrium (mg/l)	< 0.001		0.001
Zinc (mg/l)	0.014		0.002

ANALYSIS REPORT AMTEST

WWU Huxley College
Michael Hilles

Date Received: 9/24/97
Date Reported: 10/ 9/97

WATER SAMPLES

AM TEST Identification Number	97-A013591	Park Place Outlet
Client Identification	55815B995	
Sampling Date	9/18/97	

PARAMETER	RESULT	Q	D.L.
Conventionals			
Total Organic Carbon (mg/l)	4.2		1.0
Total Metals			
Aluminum (mg/l)	0.05		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)	21.		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)	0.36		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)	8.2		0.10
Manganese (mg/l)	0.14		0.002
Molybdenum (mg/l)	< 0.01		0.01
Sodium (mg/l)	11.		0.1
Nickel (mg/l)	0.02		0.01
Phosphorus (mg/l)	0.09		0.05
Lead (mg/l)	< 0.001		0.001
Sulfur (mg/l)	2.0		0.1
Selenium (mg/l)	< 0.03		0.03
Silicon (mg/l)	0.2		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)	< 0.01		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)	0.012		0.002

AMTEST

METHODOLOGY REPORT

AM TEST ID 97-A013579
CLIENT ID 09189711-0

MATRIX : Water
SAMPLED: 9/18/97

ANALYTE	UNITS	METHOD NUMBER	METHOD REFERENCE	DETECTION LIMIT *	DATE OF ANALYSIS
Total Organic Carbon	mg/l	415.1	EPA	1.0	10/ 8/97
Silver	mg/l	200.7	EPA	0.01	10/ 2/97
Aluminum	mg/l	200.7	EPA	0.01	10/ 2/97
Arsenic	mg/l	200.7	EPA	0.03	10/ 2/97
Boron	mg/l	200.7	EPA	0.10	10/ 2/97
Barium	mg/l	200.7	EPA	0.003	10/ 2/97
Beryllium	mg/l	200.7	EPA	0.005	10/ 2/97
Calcium	mg/l	200.7	EPA	0.10	10/ 2/97
Cadmium	mg/l	200.7	EPA	0.002	10/ 2/97
Cobalt	mg/l	200.7	EPA	0.003	10/ 2/97
Chromium	mg/l	200.7	EPA	0.006	10/ 2/97
Copper	mg/l	200.7	EPA	0.002	10/ 2/97
Iron	mg/l	200.7	EPA	0.01	10/ 2/97
Mercury	mg/l	200.7	EPA	0.010	10/ 2/97
Potassium	mg/l	200.7	EPA	1.0	10/ 2/97
Lithium	mg/l	200.7	EPA	0.02	10/ 2/97
Magnesium	mg/l	200.7	EPA	0.10	10/ 2/97
Manganese	mg/l	200.7	EPA	0.002	10/ 2/97
Molybdenum	mg/l	200.7	EPA	0.01	10/ 2/97
Sodium	mg/l	200.7	EPA	0.5	10/ 2/97
Nickel	mg/l	200.7	EPA	0.01	10/ 2/97
Phosphorus	mg/l	200.7	EPA	0.05	10/ 2/97
Lead	mg/l	239.2	EPA	0.001	10/ 2/97
Sulfur	mg/l	200.7	EPA	0.1	10/ 2/97
Antimony	mg/l	200.7	EPA	0.02	10/ 2/97
Selenium	mg/l	200.7	EPA	0.03	10/ 2/97
Silicon	mg/l	200.7	EPA	0.1	10/ 2/97
Tin	mg/l	200.7	EPA	0.02	10/ 2/97
Strontium	mg/l	200.7	EPA	0.003	10/ 2/97
Titanium	mg/l	200.7	EPA	0.01	10/ 2/97
Thallium	mg/l	200.7	EPA	0.03	10/ 2/97
Vanadium	mg/l	200.7	EPA	0.002	10/ 2/97
Yttrium	mg/l	200.7	EPA	0.001	10/ 2/97
Zinc	mg/l	200.7	EPA	0.002	10/ 2/97
Acid Dig.(Tot Metals)		3010	EPA		10/ 1/97

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 9710531

97-A013579
97-A013580
97-A013581
97-A013582
97-A013583
97-A013584
97-A013585
97-A013586
97-A013587
97-A013588
97-A013589
97-A013590
97-A013591

DUPLICATES		sample value	duplicate value	RPD %
97-A013579 DUP: Total Organic Carbon	mg/l	1.2	1.2	0.00
97-A013590 DUP: Total Organic Carbon	mg/l	4.C	4.6	14.
97-A013579 DUP: Silver	mg/l	< 0.01	< 0.01	
97-A013589 DUP: Silver	mg/l	< 0.01	< 0.01	
97-A013579 DUP: Aluminum	mg/l	< 0.01	< 0.01	
97-A013589 DUP: Aluminum	mg/l	< 0.01	< 0.01	
97-A013579 DUP: Arsenic	mg/l	< 0.03	< 0.03	
97-A013589 DUP: Arsenic	mg/l	< 0.03	< 0.03	
97-A013579 DUP: Boron	mg/l	< 0.1	< 0.1	
97-A013589 DUP: Boron	mg/l	< 0.1	< 0.1	
97-A013579 DUP: Barium	mg/l	0.007	0.008	13.
97-A013589 DUP: Barium	mg/l	0.012	0.011	8.7
97-A013579 DUP: Beryllium	mg/l	< 0.005	< 0.005	
97-A013589 DUP: Beryllium	mg/l	< 0.005	< 0.005	
97-A013579 DUP: Calcium	mg/l	6.13	6.19	0.97
97-A013589 DUP: Calcium	mg/l	6.59	6.52	1.1
97-A013579 DUP: Cadmium	mg/l	< 0.002	< 0.002	
97-A013589 DUP: Cadmium	mg/l	< 0.002	< 0.002	
97-A013579 DUP: Cobalt	mg/l	0.004	< 0.003	
97-A013589 DUP: Cobalt	mg/l	< 0.003	< 0.003	
97-A013579 DUP: Chromium	mg/l	< 0.006	< 0.006	
97-A013589 DUP: Chromium	mg/l	< 0.006	< 0.006	
97-A013579 DUP: Copper	mg/l	< 0.002	< 0.002	
97-A013589 DUP: Copper	mg/l	< 0.002	< 0.002	
97-A013579 DUP: Iron	mg/l	0.01	0.02	67.
97-A013589 DUP: Iron	mg/l	0.89	0.96	7.6
97-A013579 DUP: Mercury	mg/l	< 0.01	< 0.01	
97-A013589 DUP: Mercury	mg/l	< 0.01	< 0.01	
97-A013579 DUP: Potassium	mg/l	< 1	< 1	
97-A013589 DUP: Potassium	mg/l	< 1	< 1	
97-A013579 DUP: Lithium	mg/l	< 0.02	< 0.02	
97-A013589 DUP: Lithium	mg/l	< 0.02	< 0.02	
97-A013579 DUP: Magnesium	mg/l	1.98	2.01	1.5
97-A013589 DUP: Magnesium	mg/l	2.02	2.00	1.0

AMTEST

Quality Control Summary
(continued)

QC for 9710531

97-A013579 DUP: Manganese	mg/l	0.012	0.011	8.7
97-A013589 DUP: Manganese	mg/l	0.243	0.243	0.00
97-A013579 DUP: Molybdenum	mg/l	< 0.01	< 0.01	
97-A013589 DUP: Molybdenum	mg/l	< 0.01	< 0.01	
97-A013579 DUP: Sodium	mg/l	3.1	3.2	3.2
97-A013589 DUP: Sodium	mg/l	3.0	3.0	0.00
97-A013579 DUP: Nickel	mg/l	< 0.01	< 0.01	
97-A013589 DUP: Nickel	mg/l	< 0.01	< 0.01	
97-A013579 DUP: Phosphorus	mg/l	< 0.05	< 0.05	
97-A013589 DUP: Phosphorus	mg/l	< 0.05	< 0.05	
97-A013401 DUP: Lead	mg/l	0.001	< 0.001	
97-A013411 DUP: Lead	mg/l	< 0.001	< 0.001	
97-A013421 DUP: Lead	mg/l	0.002	0.002	0.00
97-A013436 DUP: Lead	mg/l	< 0.001	< 0.001	
97-A013581 DUP: Lead	mg/l	< 0.001	< 0.001	
97-A013660 DUP: Lead	mg/l	< 0.001	< 0.001	
97-A013579 DUP: Sulfur	mg/l	1.6	1.6	0.00
97-A013589 DUP: Sulfur	mg/l	1.4	1.4	0.00
97-A013579 DUP: Antimony	mg/l	< 0.02	< 0.02	
97-A013589 DUP: Antimony	mg/l	< 0.02	< 0.02	
97-A013579 DUP: Selenium	mg/l	< 0.03	< 0.03	
97-A013589 DUP: Selenium	mg/l	< 0.03	< 0.03	
97-A013579 DUP: Silicon	mg/l	0.1	0.1	0.00
97-A013589 DUP: Silicon	mg/l	0.3	0.3	0.00
97-A013579 DUP: Tin	mg/l	< 0.02	< 0.02	
97-A013589 DUP: Tin	mg/l	< 0.02	< 0.02	
97-A013579 DUP: Strontium	mg/l	0.062	0.062	0.00
97-A013589 DUP: Strontium	mg/l	0.067	0.067	0.00
97-A013579 DUP: Titanium	mg/l	< 0.01	< 0.01	
97-A013589 DUP: Titanium	mg/l	< 0.01	< 0.01	
97-A013579 DUP: Thallium	mg/l	< 0.03	< 0.03	
97-A013589 DUP: Thallium	mg/l	< 0.03	< 0.03	
97-A013579 DUP: Vanadium	mg/l	< 0.002	< 0.002	
97-A013589 DUP: Vanadium	mg/l	< 0.002	< 0.002	
97-A013579 DUP: Yttrium	mg/l	< 0.001	< 0.001	
97-A013589 DUP: Yttrium	mg/l	< 0.001	< 0.001	
97-A013579 DUP: Zinc	mg/l	0.013	0.011	17.
97-A013589 DUP: Zinc	mg/l	0.009	0.010	11.

MATRIX SPIKES		sample value	sample+spk value	spike value	Recovery %
97-A013580 SPIKE: Total Organic Carbon	mg/l	< 1	46.	50.	92.0
97-A013580 SPIKE: Aluminum	mg/l	< 0.01	11.4	10.0	114.
97-A013590 SPIKE: Aluminum	mg/l	0.19	11.9	10.0	117.
97-A013580 SPIKE: Arsenic	mg/l	< 0.03	1.03	1.00	103.
97-A013590 SPIKE: Arsenic	mg/l	< 0.03	1.06	1.00	106.
97-A013580 SPIKE: Barium	mg/l	0.011	1.00	1.00	98.9
97-A013590 SPIKE: Barium	mg/l	0.024	1.05	1.00	103.
97-A013580 SPIKE: Beryllium	mg/l	< 0.005	0.997	1.00	99.7
97-A013590 SPIKE: Beryllium	mg/l	< 0.005	1.03	1.00	103.

AMTEST

Quality Control Summary
(continued)

QC for 9710531

97-A013580 SPIKE: Calcium	mg/l	6.66	15.6	10.0	89.4
97-A013590 SPIKE: Calcium	mg/l	17.7	26.0	10.0	83.0
97-A013580 SPIKE: Cadmium	mg/l	< 0.002	1.00	1.00	100.
97-A013590 SPIKE: Cadmium	mg/l	< 0.002	1.03	1.00	103.
97-A013580 SPIKE: Chromium	mg/l	< 0.005	0.964	1.00	96.4
97-A013590 SPIKE: Chromium	mg/l	< 0.005	1.01	1.00	101.
97-A013580 SPIKE: Copper	mg/l	< 0.002	0.966	1.00	96.6
97-A013590 SPIKE: Copper	mg/l	< 0.002	1.01	1.00	101.
97-A013580 SPIKE: Iron	mg/l	0.91	5.91	5.00	100.
97-A013590 SPIKE: Iron	mg/l	0.47	5.67	5.00	104.
97-A013580 SPIKE: Potassium	mg/l	< 1	9.4	10.0	94.0
97-A013590 SPIKE: Potassium	mg/l	< 1	11.2	10.0	112.
97-A013580 SPIKE: Magnesium	mg/l	2.06	11.7	10.0	96.4
97-A013590 SPIKE: Magnesium	mg/l	7.46	16.7	10.0	92.4
97-A013580 SPIKE: Manganese	mg/l	0.248	1.24	1.00	99.2
97-A013590 SPIKE: Manganese	mg/l	0.101	1.16	1.00	106.
97-A013580 SPIKE: Molybdenum	mg/l	< 0.01	0.94	1.00	94.0
97-A013590 SPIKE: Molybdenum	mg/l	< 0.01	1.02	1.00	102.
97-A013580 SPIKE: Sodium	mg/l	3.2	13.2	10.0	100.
97-A013590 SPIKE: Sodium	mg/l	9.1	19.0	10.0	99.0
97-A013580 SPIKE: Nickel	mg/l	< 0.01	0.93	1.00	93.0
97-A013590 SPIKE: Nickel	mg/l	< 0.01	0.98	1.00	98.0
97-A013402 SPIKE: Lead	mg/l	0.005	0.030	0.025	100.
97-A013412 SPIKE: Lead	mg/l	0.002	0.027	0.025	100.
97-A013422 SPIKE: Lead	mg/l	0.001	0.026	0.025	100.
97-A013437 SPIKE: Lead	mg/l	< 0.001	0.023	0.025	92.0
97-A013582 SPIKE: Lead	mg/l	< 0.001	0.022	0.025	88.0
97-A013661 SPIKE: Lead	mg/l	< 0.001	0.022	0.025	88.0
97-A013590 SPIKE: Antimony	mg/l	< 0.02	0.92	1.00	92.0
97-A013580 SPIKE: Selenium	mg/l	< 0.03	0.97	1.00	97.0
97-A013590 SPIKE: Selenium	mg/l	< 0.03	1.01	1.00	101.
97-A013580 SPIKE: Thallium	mg/l	< 0.03	1.01	1.00	101.
97-A013590 SPIKE: Thallium	mg/l	< 0.03	1.10	1.00	110.
97-A013580 SPIKE: Zinc	mg/l	0.013	1.07	1.00	106.
97-A013590 SPIKE: Zinc	mg/l	0.014	1.13	1.00	112.

STANDARD REFERENCE MATERIALS			measured value	true value	Recovery %
Known	SRM: Total Organic Carbon	mg/l	45.	49.	91.5
Known	SRM: Total Organic Carbon	mg/l	44.	49.	89.4
Known	SRM: Silver	mg/l	0.22	0.20	110.
Known	SRM: Aluminum	mg/l	11.1	10.0	111.
Known	SRM: Arsenic	mg/l	2.01	2.00	100.
Known	SRM: Boron	mg/l	0.20	0.20	100.
Known	SRM: Barium	mg/l	1.96	2.00	98.0
Known	SRM: Beryllium	mg/l	1.94	2.00	97.0
Known	SRM: Calcium	mg/l	9.58	10.0	95.8
Known	SRM: Cadmium	mg/l	1.99	2.00	99.5
Known	SRM: Cobalt	mg/l	0.210	0.200	105.
Known	SRM: Chromium	mg/l	1.90	2.00	95.0
Known	SRM: Copper	mg/l	1.97	2.00	98.5

AMTEST

Quality Control Summary
(continued)

QC for 9710531

Known	SRM: Iron	mg/l	2.06	2.00	103.
Known	SRM: Mercury	mg/l	0.980	1.00	98.0
Known	SRM: Potassium	mg/l	95.0	100.	95.0
Known	SRM: Lithium	mg/l	0.21	0.20	105.
Known	SRM: Magnesium	mg/l	9.86	10.0	98.6
Known	SRM: Manganese	mg/l	2.03	2.00	102.
Known	SRM: Molybdenum	mg/l	1.85	2.00	92.5
Known	SRM: Sodium	mg/l	19.0	20.0	95.0
Known	SRM: Nickel	mg/l	1.89	2.00	94.5
Known	SRM: Phosphorus	mg/l	11.6	10.0	116.
Known	SRM: Lead	mg/l	0.016	0.015	107.
Known	SRM: Lead	mg/l	0.017	0.015	113.
Known	SRM: Lead	mg/l	0.017	0.015	113.
Known	SRM: Lead	mg/l	0.017	0.015	113.
Known	SRM: Lead	mg/l	0.016	0.015	107.
Known	SRM: Lead	mg/l	0.017	0.015	113.
Known	SRM: Sulfur	mg/l	1.9	2.0	95.0
Known	SRM: Selenium	mg/l	1.83	2.00	91.5
Known	SRM: Silicon	mg/l	8.0	10.	80.0
Known	SRM: Tin	mg/l	1.8	2.0	90.0
Known	SRM: Strontium	mg/l	2.11	2.00	106.
Known	SRM: Titanium	mg/l	1.96	2.00	98.0
Known	SRM: Thallium	mg/l	1.96	2.00	98.0
Known	SRM: Vanadium	mg/l	0.210	0.200	105.
Known	SRM: Yttrium	mg/l	0.210	0.200	105.
Known	SRM: Zinc	mg/l	2.05	2.00	102.

BLANKS

		Result
BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Total Organic Carbon	mg/l	< 1
BLANK: Silver	mg/l	< 0.01
BLANK: Aluminum	mg/l	< 0.01
BLANK: Arsenic	mg/l	< 0.03
BLANK: Boron	mg/l	< 0.1
BLANK: Barium	mg/l	< 0.003
BLANK: Beryllium	mg/l	< 0.005
BLANK: Calcium	mg/l	< 0.1
BLANK: Cadmium	mg/l	< 0.002
BLANK: Cobalt	mg/l	< 0.003
BLANK: Chromium	mg/l	< 0.006
BLANK: Copper	mg/l	< 0.002
BLANK: Iron	mg/l	< 0.01
BLANK: Mercury	mg/l	< 0.01
BLANK: Potassium	mg/l	< 1
BLANK: Lithium	mg/l	< 0.02
BLANK: Magnesium	mg/l	< 0.1
BLANK: Manganese	mg/l	< 0.002
BLANK: Molybdenum	mg/l	< 0.01
BLANK: Sodium	mg/l	< 0.5
BLANK: Nickel	mg/l	< 0.01
BLANK: Phosphorus	mg/l	< 0.05

AMTEST

Quality Control Summary
(continued)

QC for 9710531

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