FARMING PRACTICES AND WATER QUALITY IN THE UPPER KLAMATH BASIN

Final Report to the California State Water Resources Control Board

205j program

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Summary

The Upper Klamath Basin (UKB) is a high desert region straddling the California-Oregon border east of the Cascade Range. Irrigation and other agricultural practices in the U. S. Bureau of Reclamation's Klamath Project may result in impaired surface water quality, reducing its use for wildlife and fish in important national wildlife refuges that receive drainage water from farms, and in the Klamath River. By 2004, a system of total maximum daily loads (TMDL) for nutrients must be established for the Klamath River. To investigate the relationships among agricultural practices and surface water quality in the Upper Klamath Basin, a two year reconnaissance survey of surface water and agricultural tile drain locations, focusing on nitrogen and phosphorus concentrations and mass transfers was conducted. Data was collected at 18 surface locations and 10 tile drain locations. Triplicate samples were taken every ten days during the growing season (April through October) and one or two times a month during the remainder of the months, depending on opportunity. No samples were taken from tile drains during the winter months because there was no irrigation and drainage during that period. Water samples were analyzed for phosphorus (total P, soluble reactive P, total filterable P, and particulate P) and nitrogen (total N, soluble N, Soluble organic N, total filterable N, particulate N, and ammonia N), temperature, pH and electrical conductivity, a measure of salinity or total dissolved solids. Analyses of data, including data quality, estimates of the transfer of nutrients in surface waters in the region, and hypotheses about the relationship between agriculture and water quality are reported.

1. The salt and nutrient content of surface waters increases nearly threefold as water moves through the watershed from the Lost River and J canal diversion to the Klamath Straits Drain. Mean EC_w levels in input waters at the J canal diversion were approximately 250 $\mu S\ cm^{-1}$, while water sampled at the D pump increased to 600 $\mu S\ cm^{-1}$ on average over the sample period. By the time water reenters the Klamath River, salt concentrations have increased to approximately 700 $\mu S\ cm^{-1}$.

2. The EC_w values observed in subsurface tile drains were higher on average than in input waters and surface waters elsewhere in the region, especially in the Lease Lands area of the Tulelake Irrigation District (TID). EC_w values averaged approximately 2,500 $\mu S\ cm^{-1}$. Recycling irrigation water through soils in the TID increases the salinity of the water, especially by the time it reaches and is reused in the Lease Lands area of the Tulelake National Wildlife Refuge (TLNWR). Soils in this part of the Klamath Project area are naturally high in salt.

3. Water temperatures in agricultural subsurface tile drains were significantly lower than surface water temperatures during the growing season when tile drains were active. pH values in tile drains were lower than surface water values. The temperature and pH of tile drains does not influence surface water values.

4. For total phosphorus (TP) input waters at the J canal irrigation diversion for the TID averaged approximately 0.27 mg L^{-1} for the two years reported. Water leaving the Tulelake Sumps at the D pump increases to 0.33 mg L^{-1}. Water leaving the Lower Klamath National Wildlife Refuge (LKNWR) sampled at the start of the Klamath Straits Drain, averaged 0.33 mg L^{-1}, similar to those at the D pump. TP increased further to 0.40 mg L^{-1} a the end of the Klamath Straits Drain. The overall increase in P concentration in surface waters was much less than for salt, suggesting that processes other than simple enrichment are occurring, particularly those associated with the exchange of sedimentary P and aquatic plant species. TN increases from 2.3 mg L^{-1} to 4.0 mg L^{-1} over the same pathway. Atomic ratios (TN:TP) of surface water samples remain constant at approximately 10:1 throughout the system, suggesting that the amount of sediment and other small particulate matter in surface waters affects the values observed. The amount of sediment is influenced in part by the agitation of surface water as it passes through pumps and over weirs.

5. The average seasonal TP value in tile drains beneath farm fields is approximately 0.34 mg L^{-1} . While average total P values in subsurface tile drains were not different from those found at the D pump and the LKNWR outlet, the range in values was great (0.1 to 0.8 mg L^{-1}). Similarly, high NO_3 -N values were observed at times in tile drains. Very high values in tile drains lead to the inference that some fertilizer N and P is lost in drainage water, combined with nutrients derived from decaying soil organic matter. The amount estimated as lost is much less than the amount of surplus fertilizer P applied and the amount of P surmised to be mineralized from decaying soil organic matter. P from fertilizer and decaying organic matter appears to be accumulating in soils and lake sediments in the region.

6. Ammonia N concentrations are at or below the limit of detection in subsurface agricultural tile lines and one to two orders of magnitude below the values observed in surface soils. Un-ionized ammonia increases with temperature. Values above 0.25 mg L^{-1} were observed in late summer at several locations.

7. Some leaching of soluble salts and nutrients is unavoidable when crops are irrigated. P fertilizer is applied at rates higher than crop removal, while fertilizer n is applied at rates less than crop removal. Reduced fertilizer use can help bring P inputs and outputs into balance and may reduce further any avoidable losses of P. This objective should be the subject of an agronomic research program in the region.

8. Surface waters entering the TID, the TLNWR, and the LKNWR are already enriched with N and P. It seems unlikely that reducing N and P losses from farming in the TID, if possible, would influence surface water quality sufficiently to make them significantly less eutrophic. For P, the hypothesized threshold concentration limiting algae growth in fresh waters is 5 to 25 times smaller than the values observed in waters entering the TID for irrigation use. The addition of nutrients from agriculture probably does not influence significantly surface water quality in the

region. Wetland sediments, large amounts of organic matter in soils, and water introduced for irrigation contain essentially unlimited amounts of nutrients for aquatic plant growth. It is not clear how this circumstance could be changed under any reasonable time frame, if ever.

9. Using a TMDL approach may not result in reduced amounts of nutrients returned to the Klamath River because wetlands and farming practices in the southern portion of the Klamath Project result in the net removal of nutrients from the waters diverted for irrigation on a yearly basis, compared to allowing the same amount of water simply to flow down the river unused. Because of large errors of estimation for the amounts of water transferred, combined with smaller errors associated with estimating nutrient concentrations in water samples, and with year to year climate variation, TMDLs may not be an effective or efficient means of reducing nutrients in return flows to the Klamath River. Rational confidence limits for TMDLs may have to be too broad to be effective. Recycling of some drainage water for irrigation would reduce the amount of nutrients returned to the river more effectively than implementing a TMDL program.

TASK 1. Project Management and Administration

1.1 Quality Assurance Project Plan.

1.1.1 Problem Definition/Background

The Upper Klamath Basin is a 3.65 million acre watershed on the border of California and Oregon east of the Cascade Mountains (Fig. 1). It is the site of two large and several small irrigation districts , including the Klamath Irrigation District (KID) in Oregon and the Tulelake Irrigation District (TID) in California. These districts receive water from the U. S. Bureau of Reclamation (USBR) as part of the Klamath Project (Fig. 2). Farming and ranching are the economic foundation of the region. The climate is semi-arid with average precipitation equal to approximately 25 % of potential evapotranspiration making irrigation necessary for crop production. Water for the Klamath Project is derived from the Lost River and Upper Klamath Lake. Farm fields border on or are located within the Tule Lake National Wildlife Refuge (TLNWR) and the Lower Klamath Lake National Wildlife Refuge (LKNWR). Water flows directly into the refuges' marshes from irrigation drainage channels. The TLNWR is bordered on its north and east by TID, and in the west by Sheepy Ridge and the south by Lava Beds National Monument. About 22,000 acres of Tule Lake and Lower Klamath National Wildlife Refuges are leased annually to approximately 80 farmers. The wildlife refuge receives water from undiverted Lost River flows and subsurface and surface drainage from the TID and Klamath Irrigation District (KID) to the north in Oregon. Subsequently, water from the Tule Lake Sumps is diverted to LKNWR and from there to the Klamath River below Klamath Falls. This diversion is a human artifact because the Lost River and Klamath River watersheds are otherwise hydrologically separate. On its way to the river, diverted water is supplemented with additional drainage from the Klamath Drainage District (KDD) added to the Klamath Straits Drain (Fig. 2).

Based on the U.S. Endangered Species Act, agricultural water use was cut off in 2001 to meet the needs of fish species in Upper Klamath Lake and the Klamath River. This decision was controversial and resulted in economic harm to the agricultural community. The apparent requirement to simultaneously increase in-stream flows in the Lower Klamath River while maintaining higher water levels in upstream lakes (including Upper Klamath Lake) to preserve critical aquatic habitats constitute a set of conflicting demands that make it difficult for USBR to deliver adequate water supplies for both irrigation and aquatic conservation.

In addition to water quantity limitations, there are concerns that agricultural practices may result in impaired surface water quality, possibly reducing its value for wildlife conservation in the TLNWR and LKNWR and particularly by raising nutrient levels in water returned to the Klamath River. The surface water within the basin is judged highly eutrophic because of high pH, high levels of un-ionized NH_3, and low dissolved oxygen (DO) during warm months. Farming may enrich surface water with nitrogen and phosphorus from fertilizer applications or from mineralization of the region's organic matter rich soils, contributing to the growth of algae

and other aquatic plants, which further impair naturally eutrophic surface waters. Low levels of dissolved oxygen occur in surface waters throughout the Upper Klamath Basin in the summer, and are related directly to the growth and subsequent death and decomposition of aquatic plants and other organisms (Sorenson and Schwarzbach, 1991). If DO in surface waters is influenced by drainage discharge, it occurs through the mechanism of leaching of nutrients that subsequently stimulate the growth of aquatic plants where they would otherwise not grow. Apart from work carried out by Kaffka et al. (1995, 2002), tile drainage data from farm fields have not been collected in a systematic way in the region.

Restriction of agricultural water supplies and regulation of agricultural drainage may seriously damage the economy of the region, but regulatory decisions based on the Clean Water and Endangered Species Acts are required. Unless adequate assessment can be carried out, regulatory decisions about water quality will be made in the absence of adequate scientific evaluation of the impact of the agricultural practices on water quality. TMDLs must be established in 2004 for the Klamath River. The relationship between agricultural drainage and surface water in the region needs to be better understood to provide objective information for regulators and clear goals for farmers and researchers to improve agricultural management practices.

1.1.2 Project Description

This project measured N and P concentrations, ammonia, temperature, pH, and electrical conductivity (EC_w) of water samples collected throughout the southern portion of the Klamath Project. The goal was to evaluate the contribution of agricultural non-point source discharges to surface water quality, with particular emphasis on the Tulelake Irrigation District (TID), and to suggest solutions where problems could be identified. Samples were collected throughout the year from selected locations on the Lost River, irrigation and water delivery systems, agricultural subsurface tile drains, and both refuges (Fig. 2, Fig. 3). Findings are used to suggest improved farm management practices where necessary. Specifically, we:

1. Collected and analyzed subsurface tile drain and surface water quality samples throughout the TID and surrounding locations in California and Oregon within the Klamath Project area from January 1999 to October 2001,
2. Quantified farm fertilizer use,
3. Created hypotheses linking crop management and irrigation with water quality in subsurface tile drains on farms,
4. Assessed the contribution of irrigation drainage to the mass transfer of nutrients to and from surface waters in the Klamath Project area of interest.

1.1.3 Quality Objectives and Criteria for Measurement Data

Project scope: Water and soil samples were collected entirely within the Klamath Project of the US Bureau of Reclamation (USBR), with particular emphasis on the waters entering and leaving the TID and TLNWR and waters entering and leaving the LKNWR. Samples also were collected at the Klamath Straits Drain outlet near highway 97 in Oregon to help assess appropriate TMDL criteria for the Klamath River (Table 1).

Sample times: Samples were collected throughout the year, but particular emphasis was given to sample collection during the growing season from late March until November. During the growing season, samples were collected from all surface and agricultural tile drain sites at approximately ten day intervals. During late fall, winter and early spring, samples were collected from surface waters as weather conditions permitted, up to twice a month. There are no tile drainage waters available when irrigation is suspended in the late autumn, and ice covers surface collection locations commonly during the winter.

Intended uses of the data: Data should be useful for establishing TMDLs for the Klamath River. These may include quantitative limits on the discharge of nutrients from the Klamath Project. Within the area of concern, data collected at input and output locations are useful to quantify the amount of nutrients entering the TID and the amount leaving. Similar uses for the data apply to LKNWR and the Klamath Straits Drain. These analyses, combined with data from the USBR quantifying the volume of water moving from one point to another in the project area provides an estimate of the quantity of nutrients transferred within the project area in an average year. In earlier studies by the USBR and others (Sorenson and Schwarzbach, 1991; MacCoy, 1994), data were collected less frequently, sometimes quarterly or even less often, and do not allow for the accurate assessment of mass transfers of nutrients (Kaffka et al., 1995). Data from tile drains provides an assessment of the range of nurtrient concentrations present in agricultural discharges, and seasonal trends, if any. Data from the fertilizer use survey allows for an estimation of net nutrient addition and uptake and removal by crops. Taken together, these data will facilitate the formulation of hypotheses about the effects of agricultural practices on surface water quality. These hypotheses are presented in detail in Task 3 below.

Data requirements: The most important water quality parameters that may link agricultural practices and surface water quality involve the ecologically important nutrients, N and P. Temperature and pH influence the chemical speciation of N and P in the environment, particulalry the form of ammonia N present. More un-ionized ammonia is present when temperature and pH are higher. Salts are derived from the leaching of soils through irrigation and through evaporative concentration in soils occurring naturally over long periods of time. Salinity measurements aid in the quantifying leaching processes. Water samples were analyzed for total P, soluble P, total N, nitrate N, ammonia N, salinity as electrical conductivity (EC_w), pH, and

temperature at the point of collection. Collection and analytical methods are discussed below. Samples were collected at sites representative of farming conditions in the TID, including on lands farmed within the TLNWR, from tile drains. Additional data were collected at a few locations for surface drains, which are the most common drainage system in the TID and elsewhere in the Klamath Project.

Parameters of interest: Descriptive statistics were computed for individual sample events and locations and for the two year period. These are reported and discussed in Task 3 below. The complete data set, arranged by sample date and location are included in Appendix Table 1A. Of particular interest is the variance among different samples collected at the same place and time. The variance among surface water samples is expected to be greater than that among agricultural tile drain samples due to the variable occurrence of coarse organic materials and sediment. Water volume data are derived from USBR and TID records. These data also are reported in Task 3, below.

Analytical methods: At collection, water temperature, pH, and electrical conductivity (EC_w : a measure of salinity) were determined. Samples were stabilized with toluene and refrigerated until analysis. Sample aliquots were filtered through 5 micron filters and analyzed for filterable, reactive P by direct colorimetric analysis (AOCS 973.55; Watanabe and Olsen, 1965) and for soluble N (NO_3-N) using HPLC methods (Thayer and Huffaker, 1980). Typically, 0.45 micron filters are used for this procedure (Haygarth and Sharpley, 2000). In the UKB, most of the surface water samples are so laden with algae, aquatic plants and other materials that filtration with smaller diameter filters has proved impractical. A second aliquot was digested using a procedure modified from Johnes and Heathwaite, (1992), using persulfate digestion. Digested samples were then analyzed for N and P using HPLC and colorimetric methods as above. Filtered samples were also digested and analyzed for N and P as above. A schematic diagram of the analysis protocol is presented in Fig. 4. Ammonia was collected separately in acidified sample bottles and refrigerated until analysis. HPLC and spectrophotometry methods are used for determination (Goyal et al., 1988).

Analytical sensitivity and related objectives: Soluble P levels lower than 0.07 mg L^{-1} are thought to be the P concentration that restricts the growth of algae in P limited freshwater systems. Typical soluble P levels observed in surface waters in the Klamath Project area of interest commonly are usually two or more times that level. Techniques used for the analysis of soluble P must be sensitive to the level of 0.075 mg L^{-1}. Total P (TP) analyses must also be sensitive to similar levels in solution. Public health limits for NO_3-N in water are 10 mg L^{-1}. Common analytical techniques are sensitive to the 0.3 mg L^{-1} level. The techniques used in this project for both NO_3-N and total N (TN) are sensitive to 0.05 mg L^{-1}, exceeding the requirements for environmental monitoring. The majority of N found in surface waters is present as organic N, which is analyzed as TN. For mass transfer or mass balance calculations, the amounts of TN and

TP are of concern. Very small amounts of NO_3-N are present in surface waters, but NO_3-N is the dominant form of N found in tile drains. It is most important to analyze surface waters for TP and TN and NH_3 and subsurface tile drain samples for NO_3-N and PO_4-P. Ammonia is found in surface waters in lesser amounts than total N, but is ecologically significant in its NH_3 form at low amounts (> 0.25 mg L^{-1}). Ammonium ion (NH_4^+) is the common form of the NH_4 -NH_3 pair in water near neutral pH. At pH 8.0 and greater, increasingly larger amounts of NH_3 are present. Ammonia concentrations of 0.25 mg L^{-1} or greater are thought to be harmful to fish and other aquatic organisms (US EPA). Analytical techniques must be able to determine the concentration of ammonia to one order of magnitude less. The level of sensitivity for the technique used here is 0.03 mg L^{-1}. Ammonium is converted to un-ionized ammonia using the equation: $[NH_4^+]/ [NH_3] = 10^{9.22} / 10^{pH}$ at 25 ^oC. Conversion to NH_3 lowers the effective sensitivity of the test by approximately two orders of magnitude to 0.0003 mg L^{-1}.

The sensitivity, accuracy, and reproducibility of these analyses were monitored throughout the project. Careful experimentation was done at the beginning of the project to develop reproducible protocols. Factors such as the influence of sub-sample agitation prior to analysis were compared and found to be insignificant. Once the analytical procedures were developed, they were used throughout the study period. To compare reproducibility, a set of samples was analyzed four times. Results are presented in Table 2. For N, the values of repeated analyses were invariably within 5 % of the mean of all the analyses. Half the values were within 1% and another 25 % of the samples were within 2 % of the mean. For P, 3 of the 24 analyses varied by more than 5 %, more than half the values were within 2 % of the mean, and the remaining values were in the 2 % to 5 % range of the mean. Recovery of internal standards was checked with every subset of samples analyzed. Each analysis for P included standards containing 0.25. 0.5, 0.75, and 1.0 mg L^{-1} P. The average recovery throughout the project was between 97.6 % and 104.7 % (Table 3).

The specificity of reactions (freedom from interference) is important for accurate detection of such low levels of the ions of interest. HPLC separation of nitrate was standardized to obtain clear, well-separated peaks. OPA-derivatization of ammonia coupled with flourescence monitoring removes any background interference by substances that might otherwise show absorbance in colorimetric determinations. The ammonium molybdate assay used here is a standard accepted procedure for P determination.

1.1.4 Project Narrative

Work performed: Water samples were collected consistent with the sampling plan discussed above. Samples were analyzed and results used together with data on water movement collected by the USBR to estimate mass transfers of nutrients (N and P) and salts through the area of interest within the Klamath Project. Water samples from agricultural subsurface tile drains, were collected and used to estimate the range in concentrations of N, P and salts. An agricultural mass balance was calculated. These are discussed in Task 3 below.

Criteria for success: Samples from the majority of the proposed times and locations were collected and analyzed within the desired limits for accuracy and reproducibility. A reasonably accurate estimate of fertilizer use was developed. A mass balance for nutrients for the TID and for known amounts of water entering and leaving the LKNWR was calculated. This mass balance reflects nutrient additions in water and fertilizers, and outputs in water and harvested crops. Nutrient additions from surface runoff from surrounding land areas, inflows from ephemeral or perennial streams other than the Lost River, and artisian ground water inputs could not be accounted.

1.1.5 Special Training Requirements

Personnel assisting with sample collection and field analyses of water samples (temperature, EC_w, and pH) were trained in sample collection technique and handling, and the proper use of instrumentation. Training in appropriate analytical techniques was provided to all laboratory personnel handling the samples.

1.2 Data Management

Data are submitted with this report the State Water Resources Control Board for input into the SWQIS/STORET system. Appropriate electronic media and reporting protocols have been followed.

TASK 2. Public Participation

2.1 Formation of a Technical Advisory Committee:

A technical advisory committee (TAC) was formed to oversee progress and technical aspects of the project. They assisted TID with the guidance of the project. The TAC include representatives from some of the interested agencies and groups including the North Coast Regional Water Quality Control Board (NCRWQCB), the Oregon Department of Environmental Quality (ODEQ), the USFWS, the USBR, University of California Cooperative Extension, and the Department of Agronomy and Range Science at UC Davis, or others agreed to by the TID, and the project manager (Table 2). A meeting was held on April 28, 1999. Technical advisory committee meetings were held on April 28, 1999, November 11, 1999, and May 9, 2000.

2.2 Public Meetings

TID provided notice and conducted public meetings on April 28, 1999. The project's goals, objectives, and progress of the study were described and public comments noted. In addition, results were presented at public forums for review and comment on several occasions, including a crop management meeting for growers in the Klamath Project region on March 3, 2000, and field day for growers and the general public on August 2, 2000. This last meeting served the purpose of a public meeting including questions and comments from the public on the nature of the project and results to date. Some of the project results were presented to a scientific audience on August 18, 1999 at the meeting of the International Institute of Ecosystem Health, held in Sacramento, California.

2.3 Public Participation

A number of public agencies are affected by the project. These include the NCRWQCB, USFWS, California Department of Fish and Game, USBR, Klamath Basin Water Users, Tulelake Growers Association, the City of Klamath Falls, the Natural Resources Conservation Service of Siskyou and Modoc counties in California and Klamath County, Oregon, the Klamath Resource Conservation District, and others. A public notice of meetings was sent to these organizations and was noticed in the local press.

Task 3. Data Summary and Interpretation

3.1 Introduction

The Upper Klamath Basin is a high desert region straddling the California-Oregon border east of the Cascade Range. Precipitation averages approximately 25 % of potential evapotranspiration, so irrigation is necessary for crop production. Irrigated agriculture is the basis of the local economy. The UKB also is the location of wildlife refuges that are critical for migrating waterfowl using the Pacific Flyway and is one of the sources of the Klamath River, important for its scenery, trout and anadramous fisheries. Two native fish species in Upper Klamath Lake (the Lost River sucker and short nosed sucker) are listed as endangered, and steel head trout and Coho salmon also are listed or likely to be listed as threatened or endangered in the Klamath River in the near future.

Irrigation and other agricultural practices in the U. S. Bureau of Reclamation's (USBR) Klamath Project may result in impaired surface water quality, reducing its use for wildlife and fish in the TLNWR, LKNWR and the Klamath River. Surface water within the basin can have high pH levels (> 9.0 in summer), high levels of un-ionized ammonia (NH_3) (> 1.0 mg L^{-1}), and low dissolved oxygen (DO) during warm months. These quality characteristics are related to the growth, death, and decomposition of large amounts of algae and other aquatic organisms.

The relationship between agricultural drainage and surface water quality in the region is not well understood. Shallow waters in the UKB have always been eutrophic, but likely have been further enriched by human activities such as urbanization, logging, grazing, and farming. Farming may enrich surface water with nitrogen and phosphorus from fertilizer applications or from the mineralization of the region's organic matter rich soils resulting from cultivation. Nutrients in surface waters derived from agricultural drainage, especially phosphorus, may stimulate additional aquatic plant growth at higher than background levels (Hecky and Kilham, 1988).

Non-point source (NPS) pollution of surface waters has been recognized as a significant problem nationwide for many years (Correll, 1998; Novotny and Chesters, 1981). The loss of nutrients from agricultural landscapes can lead to impairment of surface waters for other uses, including wildlife conservation. In the UKB, important conservation objectives for waterfowl and fish are linked directly to the use of land and water for irrigated agriculture because much of the water for the wildlife refuges is derived directly from agricultural drainage, and return flows from the Klamath Project enter the Klamath River. To protect surface waters from NPS pollution, the current federal Clean Water Act provides for the establishment of standards or limits, called Total Maximum Daily Loads (TMDL) (Parry, 1998). By court order, TMDL standards must be set for the Klamath River in 2004.

In addition to water quality concerns, local farmers are faced with the loss of a part or all of their irrigation supplies due to restrictions related to the Endangered Species Act. In 2001 this threat became a fact and irrigation with Klamath Project water was eliminated for the first time in

the 96 year history of the project. The permanent loss of irrigation water or narrow restrictions on the quality of drainage water will undermine the economic viability of the local farming community, already struggling with low commodity prices. The resolution of regulatory issues in the Upper Klamath Basin provides a test of whether more ambitious conservation objectives related to species preservation or recovery can be adopted while maintaining the economic use of natural resources in rural, irrigation-dependent areas of the western United States.

3.1.1. Previous Work

The USBR has measured surface water transfers since the project began in 1907 and water quality over a sixty year period, but sampling and analysis have not been consistent throughout this period. The U. S. Fish and Wildlife Service and U. S. Geological Service (USFWS/USGS) carried out a multi-year sampling and analysis program for surface waters in the region (Sorenson and Schwarzbach, 1991; MacCoy, 1994). Snyder and Morace (1997) analyzed and modeled the rates of mineralization of organic soils surrounding Upper Klamath Lake in Oregon. Their model predicted large losses of N and P from mineralizing organic soils, but the concentrations they measured in agricultural drainage water were less than they predicted. Kaffka et al. (1995) reviewed all available historical data, and collected limited surface and subsurface tile drain data with the objective of formulating initial hypotheses about the relationship between agricultural nutrient losses and surface water quality. Their analyses included estimations of water and nutrient application rates by farmers and an assessment of long term trends in surface water quality in the region. Based on USBR data, they reported a decline in the salinity of surface waters (measured as electrical conductivity) draining the Tulelake Sumps and the Tulelake Irrigation District (TID) over the 1945 to 1990 period. A salt balance calculated for the irrigated areas of the TID by USBR supports the hypothesis that by the1980's, salt inputs and outputs were in approximate balance (Kaffka et al., 1995). Less data were available for determining trends for total P concentrations in surface waters. Sample collections and analyses made by the USBR and reported by Kaffka et al. (1995) revealed no apparent trend over the ten year period from 1980 to 1990. Salinity and P concentrations in water samples were not correlated during the period, suggesting that P concentrations in surface waters might not be related simply to the leaching and drainage processes that result in the loss of salts and nutrients from soils. They also collected a limited number of agricultural tile drain samples to estimate possible salt and nutrient losses but the number collected was insufficient to evaluate season-long nutrient concentrations and possible transfers from soils to surface waters. Kaffka et al. (2002), carried out a reconnaissance survey of surface and tile drain sample sites from 1995 to 1998 in the southern region of the Klamath Project, centered on the TID. Using yearly average rates of flux, they estimated that the direct contribution of P from agricultural tile drains was small relative to other surface water nutrient transfers.

3.1.2. Objectives

To further investigate the relationships among agricultural practices and surface water quality in the UKB, the reconnaissance survey initiated by Kaffka et al., (2002) was expanded and carried out from January 1999 to October 2000 based on funding from the State Water Resources Control Board's 205j program. The survey was intended to provide a spatial and temporal summary of average water quality conditions and to provide baseline data for the setting of water quality standards in the region. It might also provide some guidance in structuring natural resource use in the region, particularly farming. This report presents results from that completed survey and some hypotheses about the relative amounts and importance to surface water quality of nutrients derived from arable farming in the TID.

Since the reliability of water delivered by the Klamath Project to TID, KDD, and the national wildlife refuges has become uncertain, the calculations and hypotheses presented here may be only of historical interest.

3.2 Methods

Starting in 1999, based on funding from the SWRCB 205(j) program, a reconnaissance sampling program for surface water and agricultural subsurface tile drains was carried out in the southern portion of USBR's Klamath Project, focusing particularly on the TID (Fig. 1). Triplicate samples were collected approximately at ten day intervals throughout the growing season (April through October) from surface water sampling locations (Table 1, Fig. 2) and agricultural tile drains (Fig. 3), while in winter surface water samples were collected twice a month or as possible. The thirteen tile drain sample points are located throughout TID, with eight in the Lease Lands area, part of the TLNWR. Samples were collected directly from tile drain outlets, or if tile outlets were submerged, directly from tile lines near the drain outlets fitted with back flow check valves, using a small portable pump. Some samples were collected from drainage sumps fitted with lift pumps, integrating drainage water from several tile lines and interceptor ditches at the edge of the fields. Surface water samples were collected from inflow locations (J canal diversion at the Anderson-Rose Dam [Table 1, #14][1], the Lost River as it enters California from Oregon [19], pump 7 [16], D canal [17], and selected distribution canals) and outflows (D pump [18] and the Klamath Straits Drain at its origin leaving the LKNWR [21], where it crosses County Line Road [33] partway between the LKNWR outlet and the endpoint by the lift pump intake near highway 97 [20]). These surface water locations trace water quality as it enters the TID, as it leaves, and as it returns to the Klamath River [20]. They allow for an estimation of the amounts of nutrients transferred within and out of the southern Klamath Project

[1]Numbers in Table 1 and in the text are the site location numbers used when collecting the samples. They refer to the original daily sequence in which samples were collected, and also as new sample sites were added over time from 1995 to 2000. Over 100 miles of driving were needed each day that samples were collected to reach all the sample locations.

when combined with flow data from USBR. The analysis of water samples is discussed in Task 1 above.

Data for the amount of water transferred from place to place within the Klamath Project is available from the USBR and is used here. Long term averages (1965-2000) and data aggregated over shorter time steps are used to calculate nutrient transfers. Data were aggregated based on the sampling dates. Water quality sampling occurred at approximately 10 day intervals during the growing season and less frequently in late fall to early spring. For a particular sampling period, the sample date was taken as the midpoint of the period, and daily flows from before and after the sample date were summed (Table 5). These sums were combined with nutrient concentrations for the sample date to calculate nutrient transfers during the period. Yearly transfers have also been calculated, and average nutrient concentrations for the year used. Combined with 95 % confidence intervals, yearly average values provide a second estimate of the range of amounts transferred. Tile drainage volumes are not measured in the UKB, so they must be estimated. This estimate is discussed below (see Eq. 4).

A simplified equation accounting for the water balance in the portion of the Klamath Project described in this report is:

$$I_i + P_i + C_i = O_i + ET_i \qquad \text{(Eq. 1)}$$

where I_i are the sum of all measured or computed inflows into the southern portion of the Klamath Project determined at location *i*, P_i is precipitation occurring, and C_i is a closure term that includes unaccounted inflows or outflows and measurement errors. O_i includes measured outflows and ET_i is the sum of all estimated evapo-transpiration occurring in the region of interest[2].

To aid accounting and to help estimate associated nutrient transfers that might ultimately originate from farming practices in the TID, water and nutrient balances were calculated for each half of the watershed analyzed (Fig. 5). Watershed 1 (W1) includes TID and associated areas of the TLNWR (primarily the Tule Lake Sumps A and B). Watershed 2 (W2) includes the lands lying to the west of Sheepy Ridge, including the LKNWR and Klamath Drainage District (KDD). The D pump and tunnel from the Tule Lake Sumps to the LKNWR connect the two watersheds. W2 drains into the Klamath River at the end of the Klamath Straits Drain [20].

Water mass balances for W1 are accounted as:

$$I_{LR} + I_J + I_{KID} + P_{W1} + C_{W1} = ET_{c\text{-}TID} + ET_S + ET_{d\text{-}TID} + O_D \qquad \text{(Eq. 2)}$$

Within W1, water and nutrient mass balances are further developed for the Tule Lake Sumps and the TID crop land. Water is transferred back and forth between the Sumps and irrigation canals

[2]Symbols are defined and average and maximum and minimum flows for the period 1961-2000 are reported in Table 6

during the growing season. Net transfers can be calculated from TID pump records (Kaffka et al., 1995, and J. Pyle, TID, personal communication, 2002). For the Sumps, the water balance is accounted as:

$$I_{LR} + I_S + P_S + C_S = ET_S + O_S + O_D \quad \text{(Eq. 3)}$$

For crop land in the TID, the balance is accounted as:

$$I_J + I_{KID} + O_S + P_{TID} = ET_{c\text{-}TID} + ET_{d\text{-}TID} + I_S + C_{TID} \quad \text{(Eq. 4)}$$

Crop water use was estimated by Kaffka et al. (1995) based on data from California's statewide CIMIS weather data collection system combined with crop water use estimates developed over several years for a variety of crops in the region. A modified Penman-Montieth equation was used to predict ET_c (Snyder et al., 1987). This estimate is still representative and is used in this report. It is similar to one reported by Mateos et al. (2000).

Overall water use efficiency can be estimated for the TID from equation 4 by:

$$WUE = (ET_{c\text{-}TID} / (I_J + I_{KID} + O_S + P_{TID}))*100 \quad \text{(Eq. 5)}$$

Deep percolation below tile line depth is considered to be a small loss, and is discounted because arable soils are underlain by deep, largely lucustrine clay deposits with extremely low rates of infiltration and hydraulic conductivity that are saturated most of the year (NRCS, 1994). Artificial drainage is required for farming. Because of the constant reuse of water for irrigation and the various, unpredictable pathways that water follows as it moves through the crop land-Sump system, it is difficult to directly measure net drainage water flows to the Sumps. The WUE calculation can be used to estimate the net amount of water ending up in the Sumps that is derived directly or indirectly from agricultural drainage. To estimate the WUE for irrigation water only the precipitation term can be left out.

The water balance for watershed 2 is estimated as:

$$O_D + I_{ADY} + I_N + P_{W2} + C_{W2} = ET_{W2} + O_{KSD} \quad \text{(Eq. 6)}$$

ET for W2 includes estimated crop ET_c for the KDD and ET for the LKNWR. In general, water volumes for W2 are less well accounted or measured than for W1. Davids Engineering (1998) suggested that I_{ADY} is underestimated and O_{KSD} is overestimated in USBR data. The KDD is in Oregon, outside the area of regulatory concern for the California State Water Resources Control Board, so less attention has been given to farming practices and detailed water balances in that area.

Combining Equations 2 and 6 provides a water balance for the entire area of concern, and links inputs from the upper portion of the Klamath Project and farming activities in TID to return

flows to the Klamath River. Combining and simplifying the two equations gives:

$$I_{LR} + I_J + I_{KID} + I_{ADY} + I_N + P_{W1} + P_{W2} + C_{W1} + C_{W2} = ET_{c\text{-}TID} + ET_S + ET_{d\text{-}TID} + ET_{W2} + O_{KSD} \quad \text{(Eq. 7)}$$

Equation 7 is the explicit form of equation 1. In accounting for overall mass balances for the southern half of the Klamath Project, the transfer of water and nutrients via the D pump (O_D) from W1 to W2 disappears from the equation and does not have to be taken into account.

Salt (TDS) and nutrient balances (total N and total P) are determined by multiplying the concentrations of total N and total P measured at each sampling location by the water volume transferred at that location during a given period. There are several pumps that transfer water into the Tule Lake Sumps from TID canals and drains or back from the Sumps into TID canals and drains. We sampled water pumped into the Sumps from the end of the N canal (Loc # 34) and those concentration values are taken as representative in this report. D pump values are used for transfers from the Sumps to the irrigation canals.

To determine average fertilizer application rates, farmers in the Tulelake Irrigation District (TID) were surveyed with a questionnaire about their fertilizer use and fertilizer suppliers were interviewed and asked about typical fertilizer application rates in the TID. Crop acreage and crop yields reported by TID were combined with estimates of crop nutrient concentrations derived from the agronomic literature and from agricultural extension personnel in the region were used to estimate crop nutrient removal. Alfalfa fixes N but was considered neutral in calculating fertilizer balances, neither contributing nor removing N. In reality, alfalfa likely removes N from the system (Mathers et al., 1975). The amount of removal compared to the amount of N fixed from atmospheric N cannot be accurately determined without specialized study, so nitrogen removal is likely underestimated for the TID as a whole.

3. 3 Results

3.3.1. Surface Water Samples.

Averages and standard deviations for each sample date and location are reported in Table 7. Some of those same data are displayed graphically in Appendix Fig 1. Averages, median values, confidence limits, and other statistics for surface water quality samples collected in 1999 and 2000 are reported in Table 8. Temperature and pH averaged for each year by sample type are presented in Figs. 6 and 7. In tile drains, pH is near neutral, relatively uniform, and constant throughout the sample period, while in surface waters it is higher, and falls from high levels in autumn when a large amount of water is removed from the sumps. Box plots of the same data for total N and total P only are arranged sequentially according to the direction of flow (from north to south in the TID and then towards the Klamath River outlet) and are presented in Fig. 8 and 9.

3.3.2. Agricultural Tile Drain Samples.

Averages, median values, confidence limits, and other statistics for subsurface tile drain water quality samples collected in 1999 and 2000 also are reported in Table 8. Box plots of the same data for TN and TP only are arranged by tile drain type in Fig. 10 and 11. Lower numbered sites are in the northern portion of the TID [1 to 6, and 37] , and data from simple tile drains in the Lease Lands area with higher numbers [21 to 28]. Approximate locations of these sample sites are illustrated in Fig. 3.

3.3.3. Fertilizer Use and Crop Uptake.

Responses to a questionnaire about fertilizer application rates from farmers ranged from less than 15 % of all planted acres for sugar beets to greater than 25 % of all planted acres for small grains. Average farmer responses agreed closely with estimates provided independently by the primary fertilizer supplier in the region for all farmers and for all the important crops. On average, crops take up and remove more N than is applied as fertilizer but less P. In particular, potato crops were the most heavily fertilized crops and most of the P surplus resulted from applications to potatoes (Table 9).

3.3.4. Water Balances.

Water transfers within the southern portion of the Klamath Project are presented in Table 10 as solutions for equations 2 through 7. The data used are average amounts calculated from the 1965 to 2000 period for the surface water sample locations surveyed, and median, maximum, minimum and 95 % confidence limit estimates from the same data. A water balance for the Tulelake Irrigation District including the Sumps, the primary agricultural area in the southern Klamath Project is presented in Table 10 (Eq. 2) as is a water balance for irrigated crop land in the TID (Eq. 4). A quantity of water approximately equal to estimated ET_c in the TID is diverted into the J canal for irrigation. Other inputs include flows in the Lost River, and drainage from the Klamath Irrigation District (KID) to the north of TID or into the Lost River below the Anderson-Rose Dam but above the Tule Lake Sump.

3.3.5. Agricultural Drainage.

Assuming 2.2 acre feet per year evapotranspiration on average for the 60,000 acres of crop land farmed in the TID (Kaffka et al., 1995; Mateos et al., 2000), approximately 132,000 acre feet per year are used by crops. From equation 4, WUE and data in Table 7 can be estimated as approximately 58 % for average conditions. Conversely, 42 % of the water entering the TID from all sources including precipitation is diverted to the Lower Klamath National Wildlife Refuge.

This water is supplemented and mixed with water from the Klamath River via the ADY and North canals, and unaccounted inflows from ephemeral streams in the W2 watershed and then returned to the Klamath River, acquiring additional agricultural drainage along the way as it passes through the Klamath Drainage District (fig. 5). Leaving out the precipitation term, efficiency increases by 10 % to 68 %. Discounting precipitation, both Mateos et al.(2001), and David's Engineering (1998) estimated approximately 70 %.

3.3.6. Salt Transfers (TDS).

Average EC_w values for 1999 and 2000 are reported in Table 8. They can be converted to total dissolved solids (TDS) by multiplying by 0.74 (Hanson et al., 1993). The complete data from which these values are computed are found in Appendix Table 1. Calculated amounts of TDS transferred in water at surface water locations are reported in Table 11. Calculated TDS values for 1999 are compared to estimates based on yearly mean, median, and 95 % CLM values, calculated using mean, maximum, and minimum water volumes for those same locations over the 1965 to 2000 period from the USBR. Using this method, the most likely range for the amounts of nutrients transferred can be estimated, as well as the amounts that may be transferred in exceptionally wet and dry years, based on the historic record.

The most common salts in surface waters in the Upper Klamath Basin are calcium and sodium sulfates (MacCoy, 1994; Kaffka et al., 1995). Salt content increases as water is reused, passing from the northeast to the southwest of the TID. Values for tile drains in the northeastern region of TID average approximately 600 μS cm^{-1} (locations 1, 2, 4, 6, 37) while in the southwest portion of the district (locations 22-25, 27, 28) they range from 600 to 2500 μS cm^{-1} (Table 8). This increase is a function of the reuse of water and higher, naturally occurring levels of salinity in soils in some of the southwest areas of the district (MacCoy, 1994; Wilson et al., 1961). Water entering the district averages somewhat less than 300 μS cm^{-1}, water leaving the Tulelake Sumps at the D pump increases to 600 μS cm^{-1} and water re-entering the Klamath River increases further to approximately 700 μS cm^{-1}.

3.3.7. Phosphorus Transfers.

Phosphorus values behave differently from TDS. As water moves through the study area, P concentrations do no increase as much as do salts. And the quantity of total P returned to the Klamath River is estimated to be lower than the amount of P entering the TID, and lower still when the amount of P entering the southern portion of the Klamath Project as a whole (including the P amounts associated with the ADY and North Canal diversions) are accounted. Outflows include the effects of any total P losses from farming to surface waters in the region. Adding the estimated values of P imported with water into the study area given in Table 11 (mean values), results in an estimate of approximately 100 t yr^{-1} of elemental P per year imported, while approximately 62 t yr^{-1} are exported to the Klamath River at location 20 (KSD). The diversion of

water through the southern portion of the Klamath Project results in an apparent storage or removal of P from the surface water supply. Conservatively, it can be determined with reasonable certainty that the operation of the southern portion of the Klamath Project does not result in net P transfers to the Klamath River, if the data evaluated here are representative.

Within the TID, mean yearly TP concentrations in representative subsurface tile drains and drainage sumps are higher than the values for water imported into the district (Table 8). 9 of the 14 locations do not reflect a large increase over the average total P concentration of waters diverted for irrigation at the J canal, the Lost River and Pump 7 (KID drainage) (Fig. 9 and 11). 5 of the 14 locations are higher, however (locations 2, 4, 6, 22, and 27, Fig. 11). A larger portion of the TP found in drains is included in the SRP fraction than in the surface water samples (Kaffka et al., 2002). This reflects the smaller proportion of particulate P and the absence of aquatic plant sediments in subsurface drains compared to surface water samples.

At the agricultural system scale, the amount of P introduced as fertilizer in the TID is much greater than the amount of P entering the TID in surface waters (Tables 9 and 11). If all inputs of P are added and all outputs including crop removal and water transferred at the D pump are subtracted, then there appears to be a net P accumulation of approximately 6 lbs ac^{-1} yr^{-1} (Table 9). This P, derived both from imported water and from surplus fertilization, appears to be accumulating in soils and lake sediments in the region, but primarily in soils. Accumulation would not be expected to be uniform in all fields. Since the largest amount of fertilizer P is added to potato and onion crops, accumulation will be greatest in fields which are used for these crops most frequently.

3.3.8. N Transfers.

TN values are lower at inflow locations than in outflow locations, but are fairly consistent otherwise (fig. 8, Table 8). There is a small, but insignificant increase in TN concentrations at the KSD outlet (location 20) compared to other outflow locations, whereas all the inflow locations plotted are approximately similar, reflecting the common origin of inflow waters in Upper Klamath Lake and the Klamath River. Values for the D Pump (outflow from the Tulelake Sumps) and from Lower Klamath Lake Outlet also are approximately similar.

Tile drain TN and NO_3-N values are larger than surface water values (fig. 8 and 10 and Table 8). The majority of this N shows up in the TFN fraction and is probably nitrate and soluble organic N derived from the organic matter rich soils. NO_3-N derived from fertilizer would be included in this fraction.

At the agricultural system scale, more TN is imported with water into the study area than is exported at location 20 (Table 11). The amount of N introduced as fertilizer in the TID, like P, is much greater than the amount of N entering the TID in surface waters. If all direct fertilizer inputs and outputs in crop products are accounted, the amount of N added as fertilizer is less than the amount of N removed by crops (Table 9). This under-accounted N is derived from irrigation water and from mineralizing soil organic matter.

3.3.9. The Occurrence of Un-ionized Ammonia N.

Un-ionized ammonia N was present in minute quantities in agricultural subsurface tile drains (Table 8). Amounts in surface waters were 10 to 100 times greater, with occasional samples exceeding the damage threshold (0.25 mg L^{-1}) by up to two orders of magnitude at locations 18 and 20 and occasionally elsewhere (Table 8). Because levels in tile drains were so low, ammonia present in surface water samples formed there from decay processes associated with the death and decomposition of aquatic plants and other organisms. Comparisons at locations 24.1 and 24.2, and 25.1 and 25.2 also show large increases in surface drains compared to drain tiles emptying into these drains.

3.3.10. Transfers Associated with Agricultural Drainage.

If WUE calculations are used to estimate the amount of water entering the Tulelake Sumps from the TID's drainage canals, the amount equals I_S, derived from TID pump records, approximately 100,000 acre feet per year. The amount of nutrients and salt in this water that may be attributed to TID operations, including farming, is the difference between the amounts in the water used for irrigation and the water returned to the sumps. Location 31 (Table 8) is near the end of the N canal, the major agricultural drain that bisects the TID. It might be considered representative of the transfer locations between the canals and the Sumps. Another representative location is pump 6 (location 34, Table 8). These two locations have very similar average and median values for TN, TP, and EC_w (Table 8). The difference between the N canal and Pump 6 discharge TP concentration and the J canal average value is approximately 0.065 mg L^{-1}. Average TN values are almost identical between the two locations. TDS values are higher in the N canal (Table 8). Only small amounts of TN and TP can be attributed to TID operations using this method (4.2 to 6.9 t TN per year, 5.9 to 14.2 t TP per year, and 5,100 to 12,900 t TDS per year). P and salt are more enriched at this canal site than nitrogen.

N canal concentrations may reflect the behavior of nutrient cycling in surface waters more than the influence of discharges from tile drains. An alternative way to calculate transfer from tile drains is to use average values for tile drain nutrient and TDS concentrations. Average TN concentrations in tile drains are much higher than those for the N canal (10.6 mg L^{-1}) and the variance is large. TP is more similar (0.36 mg L^{-1}) and TDS (EC_w) is also much greater (1250 µS cm^{-1}). For perspective, this value for TN is low for agricultural drains generally, and the TP value represents an increase of approximately 0.1 mg L^{-1}. Nonetheless, both TN and TDS values increase substantially using this method of estimation. TN values range from 780 to 1200 t yr^{-1}, an increase of two orders of magnitude over the N canal-based estimate. TDS ranges from 63,000 to 95,000 t yr^{-1}, an increase of one order of magnitude. There are no direct discharges into the Sumps from agricultural subsurface tiles, however, so the N and pump 6 canal estimates may be the most representative.

Neither tile drainage sumps nor tile lines are very common in the TID. The most common drainage system involves subsurface flow into a surface ditch at the ends of fields and then transfer of that water into a larger agricultural drain like the N canal or the drain served by Pump 6. Because these systems operate unpredictably, they could not be systematically sampled in this survey.

3.4 Discussion

3.4.1. Sources of Uncertainty in the Estimates.

Sampling Error, Analytical Error. In repeated analyses of the same samples, and in recovery of standards during the analysis of N and P, errors associated with analyses were determined to be small, within the range of 2 to 5% at most, and commonly lower. Samples were collected in triplicate. When averaged, the standard deviations are mostly small relative to means, suggesting that successive samples taken at the same location at the same time will be largely similar. There were some exceptions. Sometimes, some of the surface water samples would differ by a larger amount. This was likely due to the collection of a large amount of detrital material with the sample. At most sample locations, mean values were larger than median values. This means that a few high value samples raised the average for samples at a given location. These effects are evident in the box plot diagrams presented (Fig. 8-11). This was especially true for surface water samples (Fig. 8 and 10). Many environmental data sets are right skewed, with a number of high observations. In this case, the median may better estimate the true population mean than the arithmetic mean (Gilbert, 1987).

In evaluating the amount of nutrients or salts transferred around the study area, a probable range rather than an absolute value must be used. This range will include observed variation and accumulated errors associated with sampling, analysis, and measurement of water flows, as well as any unaccounted or unknown sources of variation. In environmental assessment, the cumulative effects of all these sources of error on the estimates for mass transfers must be kept in mind. When setting limits like TMDLs, margins for error as well as margins for natural variability must be included. Ranges for estimates, including 95 % confidence limits, are reported in Table 11. These are first attempts at encompassing the kind of variation encountered. Additional statistical analysis incorporating tests for non-parametric range estimation and using the larger data set assembled and discussed by Kaffka et al. (2002), combined with the current one, is needed and currently is in preparation (Kaffka and Dhawan, in preparation).

Water Transfers. There are several sources of uncertainty associated with the estimates for TDS, TP, and TN reported. The measurement of water volumes transferred within the basin is based on the field-rated capacity of pumps and measurements at weirs and gauging stations maintained and reported by USBR. All of these measurements are subject to error. USBR personnel estimate that records of transfers have an estimation error of approximately 10%

with a range of 5 % to 25 % (J. Bryant, USBR, personal communication). The same range of uncertainty is likely to apply to pump data provided by the TID (J. Pyle, TID, personal communication). Davids Engineering (1998) estimated that water balances for the southern and western portion of the project, comprising LKNWR and the farming areas of the Klamath Drainage District, were poorly accounted. They suggested that pump ratings for the Klamath Straits Drain outlet (Fig. 2, #20) may under-report the amount of water transferred at that location, while an apparently larger volume of water enters that part of the watershed than can be accounted for by the measured flows at the facilities maintained by USBR, particularly the ADY canal. If more water is being imported into this portion of the watershed than is accounted, then the amount of nutrients imported also is underestimated. Alternatively, if export amounts are under reported, then the amount of nutrients leaving the Klamath Project and entering the Klamath River at this location also are under reported.

Closure terms are used to adjust water balance equations and incorporate errors in estimating water balances for different portions of the combined watershed (Table 10). In some cases these are small, while in others they are larger. For equation 2 (W1), the closure term for mean values is 7.2 % of the total water balance volume and is positive. For equation 3 (Tulelake Sumps) the closure term increases to 13.7% and again is positive, meaning that more water is needed as an input to balance the equation. For TID crop land, the water calculations seem well balanced because the closure term is less than 1%. But the estimate for inflows from KID is based only on informed judgment and is itself a type of closure term. The closure term for W2 in equation 6 is approximately similar to that for W1 (5.4 %) and is negative, indicating that more water must be added to adjust the equation. Davids Engineering (1998) suggested that diversions to W2 were underestimated and the sign of the closure term supports their view. For W1 and W2 combined, the closure terms cancel to less than 1 %, while in absolute magnitude they equal 7.5 %. As discussed, values of approximately 10% seem reasonable to most water managers.

Agricultural Tile Drains. Agricultural fields are drained using three different types of systems. One is a combined series of collector tiles feeding a common sump that also intercepts water passing along one side of the field in an irrigation supply canal. Six of our 13 sample locations are of this type. These are all located on privately owned land and were installed to reduce back flows from irrigation canals and other drainage problems. Typically, they are 6 to 9 feet deep (Wilson et al., 1961). The nutrient contents of samples from these tile drain sumps are more similar to drainage canal values (locations 31, 34) than to the other tile drains in the area. The concentrations in the sump-type drains probably reflect some influence from water seeping into the tiles from nearby drainage ditches. Another type of tile system consists of individual lines draining directly into surface drains at the ends of fields. These drains are shallower (4 feet). Eight of our sample locations are of this type. These are all located in the Lease Lands area, part of the TLNWR. Overall, there are not many subsurface tile drainage systems in the TID. The most common drainage system in the TID is a deep ditch along one end of a field, emptied periodically into a master drain with a pump. These drains border nearly every field. Identifying the source of nutrients in the water derived from this last source is difficult

because nutrients may originate from diverse sources, including sediments in the ditches, erosional deposition from ditch banks, waterfowl, N fixation by algae, neighboring fields, and other unaccounted sources.

Direct comparisons between tile lines and the ditches into which they empty can be made (Table 8: Locations 24.1 (tile) vs 24.2 (ditch) and 25.1 (tile) vs 25.2 (ditch)). In both cases, larger amounts of TP were found in the samples from the ditches than in the tile drains, and a larger proportion of the P found was particulate P. This was not true for salts, which were higher in the tile drain samples than in the ditches. TN was greater in the tile drains, primarily in the form of NO_3-N or soluble organic N. The amounts of nutrients in the ditches are in the approximate N:P ratios found in most surface water samples in the basin (10:1), while in the tile drain samples they are higher. These ratios are discussed further below. Large amounts of NO_3-N in tile drain samples likely originate from mineralizing organic matter and from fertilizer, present in the soil-water. The differences in water quality between tiles and drainage ditches suggest that the ditches and water management infrastructure itself has a role in regulating nutrient transfers and can contribute nutrients (especially TP) to the system from internal hydrologic cycles present in the ditches and canals, from agitation of sediments, from the death and decay of aquatic plants, from N fixation by blue green algae, and from agitation of sediments due to pumping and transfer of water. These ditches may also serve to buffer nutrient transfers, and result in losses of nutrients, especially TN. The cycling of nutrients in surface drainage structures built in the organic soils of the UKB region has not been studied.

The reuse of drainage water for irrigation throughout the Klamath Project further complicates the estimation of nutrient contributions from farm fields to tile drains and then to surface waters. Each time water passes through the soil profile, it dissolves soluble salts and nutrients. Salt concentrations increase in the TID from north to south reflecting increasing water reuse in that direction, and higher levels of natural soil salinity. Salts are not taken up by plants, so reuse will cause them to increase. In contrast, N and P applied with irrigation water act as inputs to the cropping system, contributing ultimately to the nutrient supply used by crops, and less of an increase may be expected for these nutrients. Testing this simple hypothesis with the data collected in this reconnaissance survey is complicated by a lack of comparable drainage systems in both parts of the TID. So only inferences can be made.

The tile lines located in the southwestern portion of the district (Fig. 11, locations: 22, 23, 24, 25, 27) have an average median value of 0.27 mg total P L^{-1} while those in the northeastern area (locations: 1, 2, 5, 6, 37) have an average median value of 0.37 mg total P L^{-1}. These last are taken from tile drainage sumps. There are several possible reasons for this difference. One is that more row crops tend to be grown in the northern portion of the district on private lands than in the southwestern portion on refuge lands, where grains are more common. Greater P concentrations in these locations may reflect higher rates of fertilization, especially over time. A more likely reason is a difference in the behavior of the drainage systems sampled. In the north portion of the district, tile drainage sumps integrate several field tiles with water intercepted at field edges entering the field from adjacent agricultural drains. These values mostly are higher in TP than the

simple tile line values from the Lease Land area. In contrast, water samples are lower in TN and all the other N fractions. Differences between the two systems probably are due to different hydrologic behavior of each drainage system. The tile drain lines sampled at collector sumps probably work as designed to intercept water and nutrients from adjoining agricultural drainage canals as well as water from the fields themselves, while simple tiles in the Lease Lands area reflect the nutrients present in the soil-water system. Differences in tile line depth may also influence nutrient contents.

The behavior of soluble constituents in the soil water system of these unique organic soils is poorly understood. In particular, salt leaching is more complex in bicarbonate-dominated soil-water systems like those of the Upper Klamath Basin than otherwise (Oster and Rhoades, 1975). Simple leaching ratios may not predict salt loading rates because bicarbonate can increase salt solubility. Salt solubility may also be increased by oxidizing organic matter in the organic matter rich soils of the region. The behavior of N and P is more complex still because of their role in plant growth and microbiological life cycles and the complex P solubility chemistry of these soils. The lake bottom soils farmed in the TID are unusual and the chemistry of these soils has not been studied to date. If there is a future need for such information, such studies will have to be undertaken.

The sampling of tile drainage sites was not linked directly to irrigation cycles. Upon initial soil saturation, drainage volumes increase, and concentrations of salts and some nutrients will be greater than later in the irrigation cycle. Over the period of sampling, tile drainage samples were collected at various times during the irrigation-drainage cycle and reflect the range in concentrations possible. Averaging them will not accurately estimate the loading rates from waters derived from tile drains. The only way to accurately monitor discharges from tile drains is to monitor them continuously for drainage volumes and nutrient concentrations (De Vos, 2001). So the data reported here describe only the range of nutrient concentrations present in subsurface agricultural drainage in the TID. They are not adequate to determine with confidence the amounts of nutrients lost from farm fields to surface waters. A more intensive sampling effort for this purpose is needed, but was beyond the scope of this reconnaissance survey. But because subsurface tile drains are not common in the area, the best way to determine transfers is to rely on values from the agricultural drains that directly transfer nutrients from the agricultural surface drains into the Sumps.

We have not attempted to relate the differences in the relative contribution of agricultural drainage to differences in readily (biologically) available P (mostly SRP) or other types of P transferred from location to location in the UKB. Not accounting for bio-available P may underestimate the importance of agriculturally derived P in nutrient cycles in the UKB. Sharpley et al. (1995), note that the form of P entering surface waters can be important for its effects on productivity. However, in the UKB area studied, surface waters are all shallow (typically less than 2 m), and subject to constant agitation from wind and from turbulent flow of water due to diversions and transfers by pumps. Under these conditions, sedimentary P is constantly re-suspended in the shallow surface waters and cycling between sediments and aquatic plants has the

largest potential to influence levels of aquatic primary productivity. Correll (1998), Correll et al., (1999) and Heathwaite et al. (1999) discount the importance of soluble P. Suspended P and sedimentary P form a continuum from potentially available to available P in aquatic systems. Similar considerations apply to N. There is little nitrate present in surface waters. Any nitrate lost directly from farm soils to surface water is quickly converted to aquatic plant biomass and analyzed as TN.

3.4.2. Implications for Natural Resource Management

Redfield Ratios and Limiting Factors. Algae, under reasonably good growth conditions, will have an elemental composition with predictable atomic ratios. N:P ratios of 15 or 16 to 1 correspond to the Redfield ratio (Redfield, 1958). When surface waters are limited by P, biomass N:P ratios are well above the Redfield ratio, while when they are over-enriched with P, they are well below these levels (Correll, 1998). In surface water samples in the study area described by this report, N:P ratios are usually 10:1 or less. For example, using TN and TP data from Table 8, the N:P ratios in the J canal water supply, D pump, Lost River, Lower Klamath outlet and Klamath Straits Drain Outlet are 8.4:1, 11.6:1, 7.8:1, 10.3:1, and 10.0:1 respectively. TP and TN are primarily derived from organic matter in the samples. In contrast, the N:P ratios at tile drain locations 24.1 and 25.1 are much larger: 274.6:1 and 42.0:1 respectively, while the N:P ratios in the surface water drainage ditches into which they drain are similar to the other surface water locations mentioned (9.8:1 and 11.7:1). Redfield ratios must be used with caution in interpreting nutrient limitations in surface water systems because algae in nature do not always reflect the same behavior as in the laboratory (Correll, 1998). Nevertheless, these ratios provide additional reasons to think that P is non-limiting in surface waters in the Upper Klamath Basin.

In addition, it is apparent that while tile drains contribute soluble N in the form of nitrate and soluble organic N to ditches and surface waters, the amounts lost from soils via this pathway do not affect the TN:TP ratios found in surface waters. This suggests that the high TN values in soil-water beneath fields, sampled in simple tile line systems in the Lease Lands area, do not reach the agricultural drains in sufficient amounts to influence atomic ratios there or in other surface water bodies. And further, that surface water nutrient contents are influenced primarily by the supply of nutrients found in sediments and the surface waters themselves. The amount of water entering the Sumps from TID pumps (I_S) is equivalent to approximately two times the water volume held at any one time in the Sumps each year. Sump and D pump TN:TP ratios should reflect the higher amounts of N in tile drains if these soil-water concentrations were transferred. The much larger increase in TDS (salts) as water moves through the UKB than in N and P also supports the hypothesis that biological processes in the shallow surface waters of the region control the amounts of nutrients available. Salts are not affected by these processes.

Particulate N (PN) and particulate P (PP) fractions are larger proportions of TN and TP in surface water samples than in tile drain samples. In tile drain samples, a larger proportion of total nutrients are found in the soluble fraction (Table 8). The proportion of particulate matter to total

nutrient content in samples in surface water locations remains fairly constant. The average of PP:TP for all surface water locations is 0.35, PN:TN is 0.27 at all sample locations. This constancy may help explain the stability of atomic ratios in surface waters throughout the surface water transfer system. Particulate matter is much lower at tile drain sample locations (PP:TP: 0.2; PN:TN: 0.13). This suggests that agitation of the surface water by pumps as it moves through the system and increased rates of flow over weirs is responsible for some of the nutrient transport through the system.

Agriculture and ecosystem health in the southern, Upper Klamath Basin. All older reports about water quality in the Upper Klamath Basin, including simple observations by early explorers, report eutrophic and saline conditions (Kaffka, et al., 1995). With the construction of the Klamath Project starting in 1905, the natural landscape was altered substantially, particularly by the draining of wetlands and the removal of now surplus water as drainage. These alterations doubtless affected a number of native species of fish and waterfowl in the UKB and may have caused some local species extinctions in recent history that are not recognized. The hydrology of the UKB also was altered, particularly by linking the Klamath and Lost River watersheds, which were previously separate, by conserving more water in the upper basin late in the season than would have been conserved naturally, and by the creation of a carefully regulated surface water distribution system, replacing natural flooding and wetlands. Organic soils developed over geologic time beneath the region's shallow wetlands under anaerobic conditions released large amounts of organically bound nutrients when first exposed to air and cultivation (Snyder and Morace, 1997), enriching sediments in the region's lakes and streams. These sediments currently support abundant populations of algae and other aquatic plant species. The threshold for algae growth in fresh waters is variously reported as between 0.05 and 0.01 mg L^{-1} (Grobbelaar and House, 1995; Correl, 1998), 5 to 25 times smaller than the values of waters entering the TID for irrigation use. Current nutrient additions do not appear to affect significantly the biogeochemistry of these eutrophic, shallow water systems.

The effects of farming practices. More N than P is lost from tile lines directly affected by agriculture, but on a mass balance basis, N is under supplied to soils while P is oversupplied (Table 9). Fertilizer likely is a source of accumulating P in the soils and sediments of the TID. Agricultural system level nutrient balance calculations have only recently begun to be made and there are few references to provide perspective. A recent summary reported seven different calculated rates of P accumulation in arable farming systems from largely temperate areas. These varied from 2 kg^{-1} ha^{-1} yr^{-1} to 94 kg^{-1} ha^{-1} yr^{-1} (Haygarth and Jarvis, 1999). Five of the estimates were greater than 11 kg^{-1} ha^{-1} yr^{-1}, placing the TID loading rate in the lower end of the range reported. Nevertheless, accumulating P in soils above crop needs has the potential to result in P release to the environment over time. Heckrath et al. (1995) found in an analysis of the long running Broadbalk experiment at Rothamsted, England, that P losses in drain tiles increased to undesirable levels only after soil P analyses rose to greater than 60 mg kg^{-1} Olsen P ($NaHCO_3$ extraction, see Olsen et al., 1954). There has been no systematic survey of soil P levels in the TID to our knowledge. Kaffka et al. (1998) reported Olsen P levels from a sugarbeet irrigation

cutoff experiment that ranged between 10 and 20 mg kg^{-1} on average over the soil profile to tile drain depth (1.1m). It is not known if these values are typical for the region, nor can it be surmised that
lower values in the soils in the Upper Klamath Basin result in low values of P loss (Hooda et al, 2000). Additional, more systematic surveys are required. In any event, reduction of P fertilization rates to potato crops would reduce overall loading rates, should be achievable agronomically over time, and would lessen further the potential for agricultural contributions of P to surface waters in the region. This strategy would be a positive step for agricultural producers in further reducing any possible contribution of P by farming to the surface waters (Sharpley et al, 1995), but would not likely affect nutrient levels in surface waters in the region.

3.4.3. Management Options for Reducing Nutrients in Return Flows to the Klamath River

Total Maximum Daily Loads. TMDL is a concept used to regulate point source pollution, that now is being applied to non-point source pollution (Parry, 1998). Some of its limitations in regulating non-point source pollution are the difficulties in identifying all relevant sources of nutrient flows to the receiving water body, errors in measuring return flows when these sources can be identified, identification of plausible benefits from regulatory actions, and definition of rational regulatroy standards to achieve that benefit. None of these limitations is easily overcome. The fact that a law exists that mandates the use of TMDLs for non-point source regulation does not change the physical limits met in applying the concept to diffuse landscapes and large watersheds.

To be rational, any standard set at the Klamath Straits Drain outlet (location 20) or anywhere else in the surface water transfer system would have to account for the variation that occurs among years, and among days in the year. Also, there are errors associated with the collection and measurement of the samples themselves, and there are errors associated with estimating the water volumes transferred. If, for example, the amount of water transferred were underestimated, then meeting some numeric standard would not help achieve the putative regulatory goal. If the amount of water were overestimated, then the standard may be excessive and unnecessarily punitive to resource users. Year to year variation in weather can be very great. The standard deviation in yearly rainfall in the UKB is slightly more than 25 % and rainfall has varied from 6.7 to 23.9 inches per year over the last 115 years. This natural amount of variation will influence the amounts of water and nutrients moving through the project area. All these uncertainties make a numeric standard for discharge of nutrients on a daily basis of limited value.

Any standard set must be made with reasonable confidence intervals, and be adjustable based on variations in weather. Confidence intervals must account for uncertainties in estimates of discharge volumes. The day is not the best time interval for measuring a discharge amount. In contrast to point source regulation, any given day of the year can be remarkably different from the

same day the previous year, and such variation is entirely "natural." The same may also be true for intervals as long as month in a climatically variable location like the Upper Klamath Basin. Flood events or droughts mean that some consideration needs to be given to the maximum flow estimates provided for this purpose in Tables 10 and 11. The minimum flows are less important because they should always be below a rational TMDL limit. If the regulatory goal is to limit or reduce the addition of nutrients to the Klamath River, there may be more easily quantified and effective ways to achieve that goal.

Reuse of Drainage Water. TP, TN, and TDS values observed in 1999 and 2000 are similar to others observed previously (MacCoy, 1994; Kaffka et al., 1995; Kaffka et al., 2002; Kaffka and Dhawan, in preparation). TP levels are very high for freshwater systems, creating eutrophic conditions in all the surface waters sampled. These levels are nearly an order of magnitude larger than those reported to be limiting in other studies (Correll, 1998). Algal and other aquatic plant growth is limited in all likelihood by simple physical conditions such as available light levels in the water column, and temperature. Input surface waters, sediments, and soils are the most important sources of P in the area studied, and amounts of P and N are not likely to change, even if farming activities are modified or curtailed.

Nutrients are added to the Klamath River from the southern portion of the Klamath Project at the Klamath Straits Drain (location 20). The amounts added are less than the amounts that would have been carried down the river if the cumulative water diversions made to serve the project area studied had not been made. Nevertheless, there may be a more direct and certain way to reduce further the amount of nutrients added to the river at the straits drain if this is thought necessary. Some of the water returned to the river at the straits drain can be re-diverted to farming, rather than to the river. In that case, the nutrients in the water can serve a useful role as inputs to crop production. If necessary, water not returned to the river can be substituted by additional releases from Upper Klamath Lake, equivalent to the amounts recycled at the KSD. It is not clear whether recycling from the KSD is technically feasible from an engineering perspective, nor how it would affect the interests or wishes of the region's water users, or those with responsibility for wildlife conservation. Strictly from a nutrient loading perspective, recycling would be the most effective way to reduce the amount of nutrients flowing in the Klamath River at that location. Rather than using a TMDL approach, recycling drainage water would provide a rational measure for reducing further overall nutrient transport. Fig. 12 shows average monthly water flows at all the important transfer locations in the southern Klamath Project. There are clearly periods in spring and summer when water is diverted for agriculture while at the same time water is returned to the Klamath River. Some of the water returned might be recycled, instead of diverting it from the system. Drainage water need not be recycled only from the KSD outlet, however, but conceivably could be reused at any point in the system. Within TID, water is recycled from the Sumps to the fields and back again throughout the season, so the reuse of drainage water is already common practice.

References

Correll, D.L.,. (1998). The role of phosphorus in the eutrophication of receiving waters. J. Environ. Qual. 27:261-266.

Correll. D.L., Jordan, T. E., and Weller, D.E.. (1999). Transfer of phosphorus from the farm to the bay. P131-142. In: Sharpley, A.N. (Ed.) Agriculture and Phosphorus Management. The Chesapeake Bay. Lewis/CRC press. Boca Raton, Florida. 229 p.

DeVos, J.A.. (2001). Monitoring nitrate leaching from submerged drains. J. Environ. Qual. 30:1092-1096.

Davids Engineering. (1998). Klamath Project Historical Water Use Analysis. Preliminary Report to the USBR, Klamath Falls, Oregon. Cited by permission of USBR (2002).

Gilbert, R.O. (1987). Statistical Methods for Environmental Monitoring. Van Nostrand Rheinhold, New York. 320 p

Goyal, S. S., Rains, D.W., and Huffaker R.C. (1988). Determination of ammonium ions by flourometry or spectrophotometry after on-line derivatization of 0-phthalaldehyde. Analytical Chem. 60:175-179.

Grobbelaar, J. H. and House, **W.A.** (1995). Phosphorus as a limiting resource in inland waters: interactions with nitrogen. Pp 255-273. In: Tiessen, H. (Ed.). Phosphorus in the Global Environment. J. Wiley and Sons, Inc. New York. 462 p.

Hanson, B., Grattan, S.R. and Fulton, **A**. (1993). Agricultural Salinity and Drainage. University of California Irrigation Program, Dept. of Land, Air, and Water Resources, Univ. Calif., Davis.

Haygarth P.M., and Sharpley, A.N. (2000). Terminology for phosphorus transfer. J. Env. Qual. 29:10-15.

Haygarth, P.M., and Jarvis, S.C., (1999). Transfer of phosphorus from agricultural soils. Adv. In Agronomy. Vol 66:195-249.

Heathwaite, L., Heygarth, P., and Dils, R. (1999). Pathways of phosphorus transport. P 107-130. In: Sharpley, A.N. (Ed.) Agriculture and Phosphorus Management. The Chesapeake Bay. Lewis/CRC press. Boca Raton, Florida. 229 p.

Heckrath, G., Brookes, P.C., Poulton, P.R., and Goulding, K.W.T. (1995). Phosphrous leaching from soils containing different phosphorus concentrations in the Broadbalk experiment. J. Environ. Qual. 24: 904-910.

Hecky, R.E., and Kilham, P. (1988). Nutrient limitation of phytoplankton in freshwater and amrine ecosystems: a review of recent evidence on the effects of enrichment. Limnol. Oceanogr. 33:796-822.

Helrich, K, ed., (1990). Official Methods of Analysis of the Association of Official Analytical

Chemists. 15th Ed., Vol. 1, Agricultural Chemicals; Contaminants; Drugs. Arlington, Virginia.

Hooda, P.S., Rendell, A.R., Edwards, A.C., Withers, P.J.A., Aitken, M.N., and Truesdale, V.W. (2000). Relating soil phosphorus indices to potential phosphorus release to water. J. Environ. Qual. 29:1166-1171.

Johnes, PJ. and Heathwaite, **A.L**. (1992). A procedure for the simultaneous determination of total nitrogen and total phosphorus in freshwater samples using persulphate microwave digestion. Wat. Res. 26(10):1281-1287.

Kaffka, S.R. and Dhawan, A. (in preparation). Water quality and agriculture in the southern Klamath Project.

Kaffka, S.R., Dhawan, A., and Kirby, **D**. (2002). Irrigation, agricultural drainage, and nutrient loading in the Upper Klamath Basin. In: Rapport, D.J., Lasley, W.L., Rolston, D.E., Nielden, N.O., Qualset, C.O., and Damiania, A.B. (Eds). Managing for Healthy Ecosystems. Lewis/CRC Press.

Kaffka, SR, Peterson, G.P., and Kirby, D. (1998). Earlier irrigation cutoff for sugarbeets conserves water. Calif. Agriculture 52: 21-24.

Kaffka, SR, Lu, T., and Carlson, H.L. (1995). An assessment of the effects of agriculture on water quality in the Tulelake region of California. Res. Prog. Rep 108. University of California Intermountain Research and Extension Center. Tulelake, California. 85p.

MacCoy, DE (1994). Physical, Chemical, and Biological Data for Detailed Study of Irrigation Drainage in the Klamath Basin, California and Oregon, 1990-92. Open file report 93-497. U.S. Geological Survey. Sacramento, California.

Mateos, L., Young, C.A., Wallender, W.W., and Carlson, H.L.. (2000). Simulating spatially distributed water and salt balances. J. Irrigation and Drainage Engineering 126(5):288-295.

Mathers, A.C., Stewart, B.A., and Blair, R.. (1975). Nitrate-nitrogen removal from soil profiles by alfalfa. J. Environ. Qual. 4:402-405.

Novotny, V and Chesters, G. (1981). Handbook of Nonpoint Pollution, Sources and

NRCS (1994). Soil Survey of Butte Valley-Tule Lake Area, Parts of Siskyou and Modoc Counties. USDA.

Olsen, SR, Cole, C.V., Watanabe, F.S., and Dean, L.A. (1954). Estimation of available phosphorus in soils by extraction with sodium bicarbonate. USDA Circ. 939, USDA, Washington, DC.

Oster, J . and Rhoades , **J.R.,** (1975). Calculated drainage water compositions and salt burdens

resulting from irrigation with river waters in the western United States. J. Environ. Qual., 4:33-40.

Parry, R. (1998). Agricultural phosphorus and water quality: a U.S. Environmental Protection Agency Perspective. J. Environ. Qual. 27:258-261.

Redfield, A.C. (1958). The biological control of chemical factors in the environment. Am. Sci. 46:1-221.

Sorenson, SK and Schwarzbach, S.E.. (1991). Reconnaisance Investigation of Water Quality, Bottom Sediment, and Biota Associated with Irrigation Drainage in the Klamth Basin, California and Oregon, 1988-89.U.S. Geological Survey Water-Resources Investigations Report 90-42304. Sacramento, California.

Sharpley, A.N., Hedley, M.J., Sibbesen, E., Hilbriecht-Ilkowska, A., House, W.A., and Ryzkowski, **L.** (1995). Phosphorus tranfers from terrestrial to aquatic systems. P 171-199. In: Tiessen, H. (Ed.). Phosporus in the Global Environment. J. Wiley and Sons, Inc. New York. 462 p.

Snyder, D.T., and Morace, **J.L**. (1997). Nitrogen and phosphorus loading from drained wetlands adjacent to Upper Klamath and Agency Lakes, Oregon. Water Resources Investigation Rep 97-4059. USGS/USBR. 67p

Snyder, RL, Lanini, D.A., Shaw, D.A., and Pruitt, **W.O.** (1987). Using reference evapotranspiration (ET_o) and crop coefficients to estimate crop evapotranspiration for agronomic crops, grasses, and vegetable crops. Leaflet 21427, Cooperative Extension of the University of California, DANR.

Thayer, J.R. and Huffaker, **R.C**. (1980). Determination of nitrate and nitrite by high pressure liquid chromatography. Comparison with other methods for nitrate determination. Analytical Biochem. 102:110-119.

USBR (1942-1974). Annual Project History: Klamath Project, Oregon-California. U.S. Department of the Interior, Bureau of Reclamation, Region 2, Klamath Falls, Oregon.

USDA-CSRS (1994). Soil Survey of Butte Valley-Tule Lake Area, California.

Watanabe, F.S. and Olsen, S.R. (1965). Test of an ascorbic acid method for determining phosphorus in water and $NaHCO_3$ extracts from soil. Soil Sci. Soc. of Am., Proc. 677-678.

Wilson, L.G., Luthien, J.N., and Biggar, J.W. (1961). Drainage-salinity investigation of the Tulelake lease lands. Bulletin 779. Calif. Agric. Exp. Station.

Table 1. Water sampling locations

Number / Location		Description
1	1	92-1 (subsurface tile line-sump type)
2	2	4189 (subsurface tile line-sump type)
3	4	4322 (subsurface tile line-sump type)
4	5	4362 (subsurface tile line-sump type)
5	6	4465 (subsurface tile line-sump type)
6	10	Drain near 4322
7	14	Headworks for J canal (Anderson Rose Dam)
8	15	Canal near 4465
9	16	Pump 7 (drain from KID)
10	17	D canal (at end)
11	18	D pump (at pump intake)
12	19	Lost River (just north of state line)
13	20	Klamath Straits Drain at highway 97 (at pump intake)
14	21	Lower Klamath Refuge outlet (at highway)
15	22	8334 (subsurface tile line)
16	23	8304 (subsurface tile line)
17	24(1)	8365S (subsurface tile line)
18	24-2	8365S (Surface drain at outlet of subsurface tile line)
19	25(1)	8208S (subsurface tile line)
20	25-2	8208S (surface drain at outlet of subsurface tile line)
21	27	8208M (subsurface tile line)
22	28	8366 (subsurface tile drain)
23	30	Tulelake Sewage Plant discharge
24	31	N canal
25	32	ADY canal, near highway 97
26	33	Straights drain at County Line Road
27	34	Pump 6
28	37	92-2 (subsurface tile line-sump type)

Table 2. Repeated analyses for total P and total N. Samples from 1/13/99.

Analysis	Location	Sample	TP *(mg/l)*	mean of samples	sample value as % of overall mean	s.e.%	SRP *(mg/l)*	mean of samples	sample value as % of overall mean	s.e.%
		A	1.057				0.607			
Ist	14	B	1.016	1.034	99.2		0.616	0.608	101.9	
		C	1.030				0.603			
		A	1.023				0.615			
2nd	14	B	0.942	0.996	95.5		0.597	0.594	99.4	
		C	1.023				0.570			
		A	0.988			2.83	0.597			0.60
3rd	14	B	1.042	1.000	95.8		0.603	0.594	99.5	
		C	0.969				0.582			
		A	1.144				0.593			
4th	14	B	1.111	1.142	109.5		0.583	0.592	99.2	
		C	1.171				0.601			
	overall mean		1.043				0.597			
		A	0.833				0.389			
Ist	15	B	0.811	0.849	97.6		0.402	0.401	101.9	
		C	0.904				0.411			
		A	0.861				0.403			
2nd	15	B	0.887	0.871	100.0		0.382	0.391	99.4	
		C	0.864				0.389			
		A	0.879			1.65	0.399			0.54
3rd	15	B	0.858	0.844	97.0		0.385	0.390	99.2	
		C	0.796				0.387			
		A	0.944				0.407			
4th	15	B	0.917	0.917	105.4		0.387	0.392	99.5	
		C	0.890				0.381			
	overall mean		0.870				0.393			
		A	0.679				0.229			
Ist	21	B	0.663	0.671	97.7		0.223	0.225	102.1	
		C	0.672				0.225			
		A	0.635				0.219			
2nd	21	B	0.672	0.623	90.7		0.210	0.217	98.5	
		C	0.563				0.223			
		A	0.729			3.17	0.214			0.69
3rd	21	B	0.726	0.719	104.7		0.219	0.219	99.1	
		C	0.702				0.223			
		A	0.768				0.222			
4th	21	B	0.707	0.735	106.9		0.219	0.221	100.2	
		C	0.729				0.223			
	overall mean		0.687				0.221			

Table 2 (cont.)

Analysis	Location	Replicate	TN *(mg/l)*	mean of samples	sample value as % of overall mean	s.e.%	SN *(mg/l)*	mean of samples	sample value as % of overall mean	s.e.%
		A	5.071				3.010			
Ist	14	B	4.628	4.861	104.4		2.881	2.887	101.7	
		C	4.884				2.769			
		A	5.143				2.760			
2nd	14	B	3.581	4.479	96.2		2.728	2.742	96.6	
		C	4.714				2.739			
		A	4.753			1.49	2.960			0.99
3rd	14	B	4.774	4.687	100.6		2.874	2.864	100.9	
		C	4.533				2.759			
		A	4.598				2.901			
4th	14	B	4.461	4.605	98.9		2.744	2.858	100.7	
		C	4.755				2.930			
	overall mean		4.658				2.838			
		A	14.931				11.363			
Ist	15	B	14.846	14.897	103.4		11.748	11.590	99.7	
		C	14.915				11.658			
		A	14.719				11.399			
2nd	15	B	14.253	14.456	100.3		11.667	11.555	99.4	
		C	14.396				11.601			
		A	14.092			1.08	11.483			0.26
3rd	15	B	14.401	14.233	98.7		11.671	11.625	100.0	
		C	14.206				11.722			
		A	13.755				11.607			
4th	15	B	14.249	14.070	97.6		11.776	11.715	100.8	
		C	14.206				11.762			
	overall mean		14.414				11.621			
		A	6.098				2.954			
Ist	21	B	5.974	6.003	103.7		3.114	3.058	100.6	
		C	5.936				3.105			
		A	5.841				3.140			
2nd	21	B	5.781	5.775	99.8		3.046	3.036	99.9	
		C	5.704				2.922			
		A	5.234			1.41	2.996			0.55
3rd	21	B	5.853	5.545	95.8		2.897	2.989	98.3	
		C	5.548				3.075			
		A	5.956				3.076			
4th	21	B	5.686	5.831	100.7		3.063	3.080	101.3	
		C	5.849				3.100			
	overall mean		5.788				3.041			

Table 3. Recovery of internal standards for total P analyses, 1999 and 200

TP recovered (mg/l) 2000													
dates	*2/7*	*3/3*	*4/19*	*5/1*	*5/16*	*6/12*	*7/24*	*8/14*	*9/20*	*10/16*	**Mean**	**S.E**	**Per cent**
P Standard (mg/l)													
0.25	0.250	0.257	0.246	0.261	0.259	0.264	0.257	0.246	0.258	0.261	0.256	0.004	102.3
0.50	0.533	0.520	0.515	0.545	0.529	0.526	0.525	0.529	0.540	0.518	0.528	0.005	105.6
0.75	0.771	0.743	0.728	0.722	0.722	0.748	0.722	0.734	0.764	0.704	0.736	0.012	98.1
1.00	0.994	0.998	0.979	1.018	0.981	0.996	0.996	0.969	0.946	1.015	0.989	0.012	98.9

1999													
dates	*8/3*	*8/19*	*8/19*	*8/30*	*8/30*	*9/22*	*10/12*	*11/17*	*11/29*	*12/6*	**Mean**	**S.E**	**Per cent**
P Standard (mg/l)													
0.25	0.255	0.285	0.266	0.277	0.258	0.274	0.260	0.262	0.267	0.277	0.268	0.006	107.2
0.50	0.474	0.500	0.493	0.516	0.487	0.496	0.550	0.512	0.530	0.531	0.509	0.013	101.8
0.75	0.737	0.771	0.732	0.712	0.729	0.677	0.755	0.715	0.693	0.754	0.727	0.017	97.0
1.00	1.008	1.021	0.989	0.982	1.026	0.986	0.988	0.960	0.952	1.005	0.992	0.014	99.2

TP recovered (mg/l)		
Standard P	Average 1999-2000	
(mg/l)	**Mean**	**% TP**
0.25	0.262	104.7
0.50	0.519	103.7
0.75	0.732	97.6
1.00	0.990	99.0

Table 4. Technical Advisory Committee

Name	Institutional affiliation	Address	Phone/fax	E-mail
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Table 5. Water Volume transfers at Selected Upper Klamath Basin Locations Around Sampling Dates (Jan. to Dec. 1999)

Year	*Month*	*Day*	*Day of Year*	*Sampling Period*	*J Canal 14*	*Lost River 19*	*D Pump 18*	*LK Outlet 21*	*KSD F+ FF 20*	*ADY 32*	*N Canal 31*
				1999				*(ac-ft)*			
1999	1	13	13	01/01 - 01/15	0	1275	2866	2787	3783	9638	
1999	1	18	18	01/16 - 01/31	0	2108	0	46	5494		
1999	2	18	49	02/01 - 03/15	0	11421	19280	22949	33366		
1999	4	6	96	03/16 - 04/12	3814	530	2643	7638	10513	9596	4897
1999	4	19	109	04/13 - 04/30	4969	1141	4009	6149	7779	3656	522
1999	5	7	127	05/01 - 05/18	10124	1071	5819	5425	5871	2717	1870
1999	5	27	147	05/19 - 06/01	12813	1043	5582	4334	5256	2918	2099
1999	6	7	158	06/02 - 06/13	9328	200	3610	2983	4251	4247	2265
1999	6	18	169	06/13 - 06/23	11112	327	3010	2448	3638	3749	2156
1999	6	28	179	06/24 - 07/03	11808	22	1486	301	1626	3902	2202
1999	7	8	189	07/04 - 07/14	11877	83	1562	387	2093	3921	2545
1999	7	19	199	07/15 - 07/25	10265	284	1562	1006	2323	3808	2559
1999	7	30	211	07/26 - 08/04	9007	85	1530	1422	2906	3362	1797
1999	8	9	221	08/05 - 08/15	6811	787	2892	2628	3761	3552	1505
1999	8	19	231	08/15 - 08/25	7379	56	4960	4229	5129	3388	2112
1999	8	30	245	08/26 - 09/04	6432	141	4504	2410	2797	3180	1615
1999	9	9	252	09/05 - 09/14	5242	36	4514	224	1591	2971	1547
1999	9	20	263	09/15 - 09/25	5300	222	4413	236	1480	2636	1519
1999	9	30	273	09/26 - 10/06	3838	1083	3401	95	901	3834	1135
1999	10	12	285	10/07 - 10/18	2083	1492	3240	117	883	3959	1781
1999	10	25	298	10/19 - 11/05	2971	0	6544	93	1190	5070	714
1999	11	17	321	11/06 - 11/23	1609	460	7796	18	859	4996	147
1999	11	29	333	11/24 - 12/07	0	762	3057	69	867	2997	653
1999	12	14	348	12/08 - 12/31	0	1353	1204	1563	2606	2281	569
				Yearly total	136782	25982	99484	69557	110961	90378	36209

Water Volume transfers at Selected Upper Klamath Basin Locations Around Sampling Dates* (Jan.to Oct, 2000)

Year	*Month*	*Day*	*Day of Year*	*Sampling Period*	*J Canal 14*	*Lost River 19*	*D Pump 18*	*LK Outlet KSD F+ FF 21*	*20*	*ADY 32*	*N Canal 31*
				2000				*(ac-ft)*			
2000	1	6	6	01/01 - 01/20	0	2297	3001	292	1819	7361	5050
2000	2	7	38	01/21 - 02/23	0	4590	4627	680	12208	9322	3017
2000	3	10	69	02/24 - 03/22	692	1529	1936	3673	10189	6457	301
2000	4	4	94	03/23 - 04/11	5748	0	0	1377	4249	3777	1295
2000	4	19	109	04/12 - 04/25	3047	1127	3375	901	3874	2006	990
2000	5	1	121	04/26 - 05/08	5137	918	4866	2182	3128	2015	1222
2000	5	16	136	05/09 - 05/19	6419	690	4432	5703	5764	1077	1232
2000	5	22	142	05/19 - 05/28	8305	820	4060	4798	4957	1682	1539
2000	6	2	153	05/29 - 06/07	8801	331	3228	3808	4161	3365	1351
2000	6	12	163	06/08 - 06/17	9295	353	1649	1162	2920	3466	2047
2000	6	22	173	06/18 - 06/28	13724	131	1760	409	2271	4316	2311
2000	7	3	184	06/29 - 07/08	10548	317	1421	210	1787	3484	2473
2000	7	14	195	07/09 - 07/19	9866	186	2933	1942	2884	3098	1916
2000	7	24	205	07/20 - 07/29	8823	83	3010	1732	2944	3347	2097
2000	8	3	215	07/30 - 08/08	8604	81	2762	702	1944	3235	1359
2000	8	14	226	08/09 - 08/19	8975	107	1551	393	1928	2994	1644
2000	8	24	236	08/20 - 08/30	8640	165	1559	186	1353	3150	1503
2000	9	5	248	08/31 - 09/13	5651	639	4255	2803	3299	2616	1745
2000	9	20	263	09/14 - 10/02	4600	2150	5710	1420	2023	2949	2541
2000	10	16	289	10/03 - 10/31	3719	7515	10421	131	936	7490	1371
				Yearly total	130594	24031	66556	34503	74637	77207	37004

Table 6. Water balance symbols, data sources, and error estimates. Symbols are listed by equation and the order in which they occur.*

Location	Symbol	Description	Source	Data quality	Amount (acre feet per year/ 10^{-3})
Equation 2: Water balance for W1					
14	I_J	J canal. Main irrigation diversion for TID. Measured at the Anderson-Rose Dam.	USBR records	USBR records. Accuracy range: 5% to 25 %.	123.5
19	I_{LR}	Lost River (LR). Measured at the Anderson-Rose Dam.	USBR records	USBR records. Accuracy range: 5% to 25 %.	26.8
--	I_{KID}	Drainage from KID into TID Quality measured at Pump7 (16) and D canal (17).	Estimated by TID personnel, also Mateos et al. (2000), Kaffka et al. (1995), Davids Eng. (1998).	Estimate only. Changes in this estimate influence the closure term in Equation 2 (C_{W1}).	39.0
---	P_{W1}	Precipitation occurring in W1	CIMIS data for Tulelake. Presumed accurate at the sample location, in the town of Tulelake at the UC Intermountain Ressearch and Extension Center.	Rainfall in the region can at times vary locally over short distances. Calculated by extrapolating precipitation measurements for the entire land area, including the TL Sumps. Adjusted for effective rainfall = 0.8 x precipitation.	52.4
---	C_{W1}	Closure term for W1	By calculation in Eq. 2	Incorporates all other errors of measurement, estimation and extrapolation.	-15.0

---	$ET_{c\text{-}TID}$	Crop evaoptranspiration for the TID	Estimated based on crop acreage records from TID, CIMIS weather data, and the use of a modifed Penman-Montieth equation (see text)	Estimates of crop water use in the TID have been made for several years. Crop coefficients and water use are reasonably accurate.	135.0
---	ET_S	Tulelake Sump evapotranspiration	Estimated based on CIMIS data for ETo adjusted for the effects of open water bodies on evaporation, equal to 0.7 x ETo. See also Mateos et al. (2000).	Estimated, subject to extrapolation error and use of constant to convert from ETo to open water body loss.	33.5
---	$ET_{d\text{-}TID}$	TID drain evaporation	Losses from irrigation canals and drains are assumed to be equal to 80% of the year long pan evaporation amount derived from the CIMIS weather data system (34.7 ac in) and a surface area of 4.86 km^2.	Estimated, subject to extrapolation error and use of a constant to convert from ETo to open water body loss.	3.0
18	O_D	D pump	USBR records	USBR records. Accuracy range: 5% to 25 %.	88.8
Equation 3: Water balance for the Tulelake Sumps					
	I_S	Water pumped from the TID's canals and drains into the Tulelake Sumps during and after the growing season.	TID records. Estimated by Kaffka et al., 1995. For the period 1988 to 1994.	Reliable within the limits of pump record accuracy: 5 to 25 %.	99.0

	P_S	Precipitation falling on the Tulelake Sumps	CIMIS data for Tulelake. Presumed accurate at the sample location, in the town of Tulelake at the UC IREC.	Rainfall in the region can at times vary locally over short distances. Calculated by extrapolating precipitation measurements at the CIMIS weather station for the area of the Sumps.	10.8
---	C_S	Closure term	By difference from Eq. 3	Unaccounted gains probably due to increases in Lost River volume between A/R Dam and entry to the TL Sumps, errors in pump records, subsurface flows to Sumps and unaccounted drainage from TID and other sources.	21.7
---	O_S	Water pumped from the Tulelake Sumps for irrigation	TID records. Kaffka et al., 1995.	Reliable within the limits of pump record accuracy.	36.0
Equation 4: Water balance for crop land in the TID.					
	P_{TID}	Precipitation falling on crop land in the TID.	CIMIS data for Tulelake. Extrapolated for area of cropland.	Presumed accurate at the sample location, in the town of Tulelake at the UC IREC. Rainfall in the region can at times vary locally over short distances.	40.0
---	C_{TID}	Crop land drainage	Closure term for Eq. 4. Equal to net drainage from crop land to Sumps.	Estimated. Depends on actual $ET_{c\text{-}TID}$. If $ET_{c\text{-}TID}$ equals 2 ac ft /ac/yr, a closure term is needed. If $ET_{c\text{-}TID}$ equals 2.2 ac ft/ac/yr, no closure term is needed.	14.0 to 0.0

Equation 6: Water balance for W2

32	I_{ADY}	Inflows from the Klamath River to the TLNWR and KDD.	USBR records	USBR records. Accuracy range: 5% to 25 %. May be underestimated. See Davids Engineering (1998).	71.2
33	I_N	Inflows from the Klamath River to KDD.	USBR records	USBR records. Accuracy range: 5% to 25 %.	31.0
---	P_{W2}	Precipitation falling on LKNWR and KDD	By calculation	Based on weather data collected at the CIMIS station in Tulelake.	93.3
---	C_{W2}	Closure term for W2	By difference		43.7
21	O_{LK}	Outflows from LKNWR to the Klamath Straits Drain	USBR records	USBR records. Accuracy range: 5% to 25 %.	58.2
---	ET_{W2}	Evapotranspiration for W2	By calculation	Based on weathr data collected at the CIMIS station in Tulelake.	158.0
20	O_{KSD}	Outflows from the end of the KSD to the Klamath River	USBR records	USBR records. Accuracy range: 5% to 25 %. May be overestimated. See Davids Engineering (1998).	111.0

* Symbols are defined for the first equation in which they appear.

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Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	1	13	10	A,B,C	2.0005	1.7824	1.7696	ND	0.2308	15.492	11.3518	13.7094	2.3576	1.7826	.	.	894.3	7.78	1.7
					0.0552	0.0209	0.0256		0.0801	0.3166	0.0612	0.1941	0.2089	0.4869			0.5	0.01	
1999	1	13	14	A,B,C	0.5571	0.6085	0.5662	ND	ND	4.8609	2.8868	4.0833	1.1965	0.7776	.	.	882.3	8.43	0.6
					0.01	0.0032	0.0073			0.1048	0.0568	0.1084	0.1448	0.1004			0.5	0.01	
1999	1	13	15	A,B,C	0.3926	0.4008	0.3731	ND	0.0195	14.8971	11.5898	13.3521	1.7623	1.545	.	.	813.7	8.42	1.7
					0.0717	0.0053	0.0048	0.0014	0.0757	0.0214	0.0949	0.2368	0.1423	0.2534			0.7	0.01	
1999	1	13	16	A,B,C	0.7767	0.7954	0.7856	ND	ND	11.4975	8.7054	10.3629	1.6575	1.1346	.	.	1114.3	8.55	0.6
					0.0152	0.0111	0.0153			0.2867	0.0645	0.2871	0.3112	0.3409			2.3	0.02	
1999	1	13	18	A,B,C	0.2086	0.2008	0.1979	ND	0.0107	4.6287	1.7445	3.5601	1.8156	1.0686	.	.	783.3	8.23	2.2
					0.0226	0.003	0.0007		0.0228	0.05	0.031	0.081	0.026	0.0859			0.7	0.01	
1999	1	13	19	A,B,C	0.474	0.601	0.5645	ND	ND	4.7895	2.8765	3.852	0.9755	0.9375	.	.	884.3	8.43	0.6
					0.0321	0.0032	0.0171	0.0145		0.031	0.0082	0.136	0.1428	0.164			0.5	0.01	
1999	1	13	20	A,B,C	0.2157	0.242	0.2517	0.0097	ND	6.138	3.0626	5.1384	2.0758	0.9996	.	.	875.3	8.07	0.6
					0.0122	0.0073	0.0063	0.0079		0.0695	0.05	0.2719	0.2878	0.2032			1.2	0.01	
1999	1	13	21	A,B,C	0.2238	0.2255	0.239	0.0136	ND	6.0027	3.0577	4.9029	1.8452	1.0998	.	.	893.7	8.07	0.6
					0.0121	0.0015	0.0183	0.0179		0.0397	0.0424	0.1218	0.1082	0.1521			0.5	0	
1999	1	13	30	A,B,C	2.0458	1.928	2.0306	0.1027	0.0152	16.614	12.6162	15.3105	2.6943	1.3035	.	.	887.3	7.98	2.8
					0.0599	0.0044	0.0443	0.0424	0.0695	0.0642	0.062	0.0687	0.0756	0.0791			0.3	0	
1999	1	13	32	A,B,C	0.2654	0.2257	0.217	ND	0.0484	4.6371	1.8421	3.3822	1.5401	1.2549	.	.	576.3	8.43	2.2
					0.0471	0.0061	0.0062		0.041	0.0615	0.0295	0.0568	0.0405	0.0768			0.7	0	
1999	2	18	10	A,B,C	1.7817	1.688	1.6786	ND	0.1031	12.8838	1.4681	12.4878	11.0197	0.396	.	.	1012.7	7.94	2.2
					0.0295	0.0017	0.0614		0.0408	0.3332	0.0277	0.1498	0.1394	0.3758			0.7	0.01	
1999	2	18	14	A,B,C	0.7843	0.6023	0.6232	0.021	0.1611	4.7241	2.5348	3.7665	1.2317	0.9576	.	.	966	8.94	2.2
					0.0614	0.0024	0.0577	0.0568	0.0163	0.3161	0.0225	0.1257	0.1041	0.4305			0	0	
1999	2	18	15	A,B,C	0.5168	0.4628	0.4716	0.0088	0.0451	12.0753	8.7558	10.6146	1.8588	1.4607	.	.	845.7	8.6	1.7
					0.0237	0.0036	0.0102	0.0078	0.0162	0.3238	0.0187	0.1154	0.1107	0.2149			0.7	0.02	
1999	2	18	16	A,B,C	0.6747	0.6458	0.6174	ND	0.0573	9.8148	7.8383	9.6903	1.852	0.1245	.	.	1055.3	8.63	0.6
					0.017	0	0.0062		0.0229	0.217	0.0579	0.4074	0.4648	0.5074			0.5	0.01	
1999	2	18	18	A,B,C	0.5407	0.2669	0.4185	0.1516	0.1222	10.1121	2.3495	4.8336	2.4841	5.2785	.	.	716.3	8.84	2.8
					0.0964	0.0136	0.0181	0.0066	0.0851	1.2223	0.0432	0.0058	0.0472	1.2211			0.7	0.01	
1999	2	18	19	A,B,C	0.5562	0.6017	0.5923	ND	-0.0361	4.1049	2.619	3.7782	1.1592	0.3267	.	.	998.3	8.98	2.8
					0.0367	0.0105	0.0411		0.0593	0.0297	0.0392	0.0971	0.0926	0.0999			0.3	0	
1999	2	18	20	A,B,C	0.417	0.2454	0.3219	0.0765	0.0951	4.4532	1.2177	3.5652	2.3475	0.888	.	.	674.3	9.06	1.1
					0.0334	0.0021	0.0084	0.0104	0.0261	0.1805	0.0571	0.0997	0.1437	0.2448			0.5	0	
1999	2	18	21	A,B,C	0.3879	0.2274	0.2705	0.0432	0.1173	4.5768	1.5853	3.6879	2.1026	0.8889	.	.	681.7	9.03	0.6
					0.0071	0.0037	0.0036	0.0063	0.0108	0.1049	0.0269	0.0388	0.0444	0.0788			0.5	0	
1999	2	18	30	A,B,C	1.936	1.5561	1.8708	0.3147	0.0652	14.367	0.0854	13.9416	13.8562	0.4254	.	.	909.3	8.01	5.6
					0.0187	0.06	0.0442	0.084	0.0256	0.3724	0.0447	0.4113	0.4042	0.047			0.7	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	3	15	10	A,B,C	0.9163	0.7903	0.9233	0.133	ND	10.9488	0.9465	8.0685	7.122	2.8803	.	.	1565.7	8.4	1.7
					0.0389	0.045	0.0802	0.0428		2.0861	0.7348	0.7191	0.2657	1.3853			3.8	0.03	
1999	3	15	14	A,B,C	0.2224	0.1458	0.1589	0.013	0.0635	2.9265	ND	1.3188	1.3188	1.6077	.	.	997.3	8.72	3.9
					0.0267	0.0165	0.0355	0.0501	0.0611	0.2102		0.0622	0.0622	0.1548			1.5	0.01	
1999	3	15	15	A,B,C	0.1551	0.0566	0.2022	0.1456	ND	9.4797	2.1721	2.0715	-0.1006	7.4082	.	.	877	8.44	0.6
					0.0123	0.015	0.018	0.0217		0.1697	0.5002	0.0661	0.467	0.1941			11	0.02	
1999	3	15	16	A,B,C	0.0425	0.0264	0.0343	0.0079	0.0082	1.788	ND	1.3977	1.3977	0.3903	.	.	1222.7	8.58	1.7
					0.0043	0.0031	0.0032	0.0036	0.0074	0.0995		0.1628	0.1628	0.2564			0.5	0.01	
1999	3	15	18	A,B,C	0.2376	0.0489	0.0718	0.0229	0.1658	4.1751	0.008	2.0154	2.0074	2.1597	.	.	789.3	8.9	1.7
					0.0097	0.0077	0.0128	0.0121	0.0209	0.1486	0.0065	0.1772	0.1836	0.0286			2.4	0	
1999	4	6	10	A,B,C	1.6757	1.2927	1.4592	0.1665	0.2165	12.5583	0.0934	9.5352	9.4418	3.0231	5.3865	0.233	1331.7	7.88	5.6
					0.1085	0.0755	0.035	0.0555	0.135	0.453	0.0273	0.302	0.3079	0.6758	0.1049	0.0057	24	0.02	
1999	4	6	14	A,B,C	0.2121	0.0408	0.0934	0.0526	0.1187	3.4953	0.9898	0.9858	-0.004	2.5095	0.2996	0.0276	577.3	8.23	6.7
					0.0069	0.0103	0.0025	0.0125	0.0081	0.0242	0.031	0.1753	0.1515	0.1547	0.004	0.001	5.1	0.02	
1999	4	6	15	A,B,C	0.3333	0.09	0.2135	0.1235	0.1198	11.0118	7.2776	8.3283	1.0507	2.6835	0.2921	0.0283	984.7	8.25	1.1
					0.0186	0.0201	0.0142	0.0059	0.0328	0.5529	0.043	0.2277	0.2706	0.3766	0.0045	0.0012	1.2	0.02	
1999	4	6	16	A,B,C	0.4479	0.117	0.4319	0.3149	0.016	7.4391	4.2681	4.5033	0.2352	2.9358	0.1612	0.0264	1050	8.51	3.3
					0.0262	0.0157	0.0192	0.0188	0.0071	0.0549	0.0704	0.3768	0.4106	0.3334	0.0051	0.0017	16.1	0.03	
1999	4	6	18	A,B,C	0.3729	0.0289	0.0836	0.0547	0.2893	6.531	0.2454	2.3778	2.1324	4.1532	ND	ND	934.7	8.84	5.6
					0.0063	0.0012	0.0133	0.0143	0.0196	0.602	0.0134	0.1136	0.1002	0.7141			8.9	0.01	
1999	4	6	19	A,B,C	0.3133	0.1004	0.2191	0.1187	0.0943	5.8887	1.6095	1.8045	0.195	4.0842	0.2974	0.0308	709.7	8.28	5.6
					0.0297	0.0101	0.0147	0.0053	0.0168	0.2737	0.1146	0.0719	0.0977	0.3201	0.005	0.0015	5.4	0.02	
1999	4	6	20	A,B,C	0.3861	0.0458	0.1186	0.0728	0.2675	5.2251	ND	3.1047	3.1047	2.1204	0.2013	0.0433	1107.7	8.67	5
					0.0167	0.0084	0.0097	0.0026	0.0107	0.1004		0.1973	0.1973	0.1712	0.0543	0.0107	5.6	0.01	
1999	4	6	21	A,B,C	0.2663	0.0242	0.0691	0.0449	0.1972	4.9203	0.1986	2.8929	2.6943	2.0274	0.306	0.0441	1012	8.45	5
					0.0326	0.0007	0.007	0.0062	0.0366	0.0372	0.0212	0.1669	0.1589	0.203	0.0043	0.001	5.7	0.02	
1999	4	6	30	A,B,C	1.8387	1.3357	1.7252	0.3895	0.1135	15.8685	0.6306	12.351	11.7204	3.5175	6.257	0.1667	1087.3	7.66	6.7
					0.1111	0.0332	0.0268	0.0192	0.0953	0.1766	0.0061	0.5247	0.5308	0.353	0.037	0.0054	69.3	0.01	
1999	4	6	31	A,B,C	0.4639	0.1513	0.2862	0.1348	0.1778	4.0896	0.0064	1.3752	1.3688	2.7144	0.207	0.0547	932.3	8.78	4.4
					0.0252	0.0087	0.0335	0.0302	0.0163	0.1417	0.0052	0.0196	0.0206	0.1225	0.0098	0.002	2.8	0.01	
1999	4	6	32	A,B,C	0.1041	0.0286	0.0353	0.0067	0.0688	2.5695	ND	1.662	1.662	0.9075	0.0195	0.0069	638	8.99	5.6
					0.0048	0.0051	0.0009	0.0043	0.0044	0.0555		0.0906	0.0906	0.0942	0.0159	0.0057	7.7	0.01	
1999	4	19	10	A,B,C	1.9263	1.816	1.898	0.082	0.0282	11.7816	0.1694	9.1401	8.9707	2.6415	.	.	1130	7.87	8.9
					0.1915	0.007	0.0106	0.0116	0.2016	0.4981	0.0071	0.2368	0.2301	0.2805			4.5	0.02	
1999	4	19	14	A,B,C	0.3792	0.2955	0.052	ND	0.3273	2.6604	0.662	1.0683	0.4063	1.5921	.	.	434.7	8.06	8.9
					0.0181	0.0028	0.0076		0.0257	0.0277	0.0034	0.0299	0.0265	0.0576			6.6	0.01	
1999	4	19	15	A,B,C	0.3109	0.2283	0.0264	ND	0.2846	4.8543	2.7948	0.9738	ND	3.8805	.	.	432	8.01	5
					0.0007	0.0031	0.0017		0.0024	0.0261	0.0035	0.0323		0.0576			2.4	0.02	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	4	19	16	A,B,C	0.4792	0.3812	0.0686	ND	0.4105	4.4415	2.443	1.4286	ND	3.0129	.	.	611	8.3	5.6
					0.0278	0.0103	0.0014		0.029	0.0512	0.0629	0.1653		0.2038			2.4	0.03	
1999	4	19	18	A,B,C	0.4833	0.046	0.1122	0.0662	0.371	4.6773	0	2.1219	2.1219	2.5554	.	.	878.3	8.79	8.3
					0.0254	0.0067	0.0391	0.0425	0.0347	0.1244	0	0.1588	0.1588	0.2276			0.7	0.03	
1999	4	19	19	A,B,C	0.4297	0.2506	0.0691	ND	0.3606	2.8602	0.7592	1.044	0.2848	1.8162	.	.	479.7	8	8.9
					0.0182	0.0087	0.0063		0.0212	0.0342	0.0064	0.0409	0.0348	0.075			2.6	0.02	
1999	4	19	20	A,B,C	0.3395	0.0374	0.0644	0.027	0.2751	3.8334	0.0121	2.1687	2.1566	1.6647	.	.	847.3	8.73	8.3
					0.0306	0.0035	0.006	0.0081	0.0364	0.0437	0.0051	0.2492	0.2456	0.2438			7.1	0.02	
1999	4	19	21	A,B,C	0.4017	0.0961	0.0656	ND	0.336	4.1928	0.1546	1.9773	1.8227	2.2155	.	.	755.7	8.35	10.6
					0.0193	0.0068	0.0094		0.01	0.0348	0.0037	0.0133	0.0139	0.0431			2.4	0.05	
1999	4	19	30	A,B,C	2.0334	1.5185	1.5348	0.0163	0.4986	13.7193	0.2127	10.485	10.2723	3.2343	.	.	894.3	8.75	10
					0.0513	0.0134	0.017	0.0211	0.058	0.1824	0.0037	0.3423	0.341	0.1732			2.7	0.01	
1999	4	19	31	A,B,C	0.5307	0.3728	0.2003	ND	0.3304	3.2346	0.8287	1.1907	0.362	2.0439	.	.	553	8.43	8.3
					0.011	0.0063	0.0116		0.0153	0.0483	0.0435	0.0914	0.1293	0.0904			5.3	0.03	
1999	4	19	32	A,B,C	0.1753	0.0536	0.0358	ND	0.1395	2.3478	0.0739	1.4049	1.331	0.9429	.	.	421	8.06	10
					0.0351	0.0036	0.0007		0.0346	0.1309	0.0107	0.0824	0.0772	0.0569			1.7	0	
1999	5	7	2	A,B,C	0.447	0.3435	0.3601	0.0166	0.0869	4.8444	3.3221	4.2804	0.9583	0.564	ND	ND	583.7	7.93	9.4
					0.046	0.0044	0.0091	0.0068	0.0459	0.1464	0.116	0.1099	0.0107	0.2552			0.7	0.01	
1999	5	7	10	A,B,C	2.0456	1.9363	1.6599	ND	0.3857	8.3781	0.009	5.7408	5.7318	2.6373	1.3211	0.1879	1191.7	8.44	6.7
					0.1203	0.0068	0.1443		0.1556	0.0803	0.0074	0.1581	0.1642	0.1981	0.0266	0.0013	1	0.01	
1999	5	7	14	A,B,C	0.1098	0.037	0.0645	0.0276	0.0453	1.3254	ND	1.1337	1.1337	0.1917	0.1035	0.0123	334.3	8.35	8.3
					0.0075	0.0128	0.0068	0.0126	0.01	0.0413		0.0305	0.0305	0.0197	0.0034	0.0004	1	0.02	
1999	5	7	15	A,B,C	0.1185	0.0135	0.0645	0.051	0.054	1.9281	0.015	1.1991	1.1841	0.729	0.16	0.0106	450.7	8.07	4.4
					0.0087	0.0002	0.008	0.0078	0.0123	0.4121	0.0122	0.233	0.2208	0.1793	0.0064	0.0004	1.2	0.03	
1999	5	7	16	A,B,C	0.1231	0.0228	0.1487	0.126	ND	1.4046	ND	1.0533	1.0533	0.3513	0.0641	0.0057	284	8.21	5.6
					0.0101	0.0078	0.0301	0.0251		0.0367		0.0795	0.0795	0.0473	0.003	0.0004	2.9	0.01	
1999	5	7	17	A,B,C	0.0782	0.0198	0.0398	0.0201	0.0384	1.2969	ND	0.8841	0.8841	0.4128	ND	ND	109.2	8.07	8.3
					0.0054	0.0047	0.0026	0.0061	0.007	0.1349		0.0262	0.0262	0.1599			1.3	0.01	
1999	5	7	18	A,B,C	0.3885	0.0298	0.1006	0.0708	0.2878	4.4052	0.0172	2.2215	2.2043	2.1837	0.5316	0.2073	889.7	9.03	10
					0.0046	0.0006	0.0037	0.0031	0.0029	0.4814	0.0073	0.2023	0.1962	0.2827	0.0137	0.0039	1	0.02	
1999	5	7	19	A,B,C	0.1414	0.015	0.0586	0.0436	0.0828	1.4073	ND	1.017	1.017	0.3903	0.0632	0.0059	282	8.23	8.3
					0.0084	0.0007	0.0051	0.0043	0.0097	0.0662		0.0395	0.0395	0.1053	0.0011	0.0004	4.1	0.04	
1999	5	7	20	A,B,C	0.3066	0.0444	0.1446	0.1002	0.162	3.5025	ND	2.211	2.211	1.2915	0.315	0.1143	891.7	8.97	9.4
					0.0019	0.0105	0.0317	0.0326	0.0298	0.0615		0.0792	0.0792	0.0789	0.0041	0.0071	1.7	0.03	
1999	5	7	21	A,B,C	0.2288	0.029	0.0878	0.0589	0.1409	3.0849	ND	2.1483	2.1483	0.9366	0.4037	0.1175	916.3	8.83	11.1
					0.0078	0.0056	0.003	0.0048	0.0054	0.0626		0.046	0.046	0.0537	0.0072	0.0016	1	0.01	
1999	5	7	30	A,B,C	1.837	1.8512	1.7135	ND	0.1235	12.4794	0.0284	10.5492	10.5208	1.9302	7.216	2.5204	854	8.95	8.3
					0.0437	0.0201	0.1414		0.1582	0.8032	0.0232	0.4856	0.5026	1.0314	0.1523	0.0644	1.4	0.02	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	5	7	31	A,B,C	0.2819	0.104	0.2448	0.1408	0.0371	1.731	ND	1.7778	1.7778	ND	0.1515	0.0504	462.7	8.92	8.3
					0.0259	0.0066	0.0178	0.0244	0.0265	0.2408		0.3689	0.3689		0.0055	0.0032	2.8	0.03	
1999	5	7	32	A,B,C	0.1121	0.0168	0.0961	0.0794	0.016	1.7793	0.0147	1.4745	1.4598	0.3048	0.2604	0.0285	384.7	8.31	9.4
					0.0224	0.0007	0.0164	0.0159	0.0311	0.1116	0.012	0.0182	0.0174	0.0987	0.0016	0.0001	0.3	0	
1999	5	27	2	A,B,C	0.5087	0.4745	0.4968	0.0223	0.012	5.0025	3.5902	4.7988	1.2086	0.2037	ND	ND	523.7	8.09	11.1
					0.0114	0.0013	0.0004	0.0016	0.0116	0.0829	0.0121	0.1526	0.1442	0.078			0.5	0	
1999	5	27	5	A,B,C	0.3712	0.0332	0.2031	0.1699	0.1681	2.7888	0.0294	1.5228	1.4934	1.266	ND	ND	422	7.85	
					0.0209	0.0037	0.0261	0.0225	0.0129	0.4788	0.0115	0.2962	0.3023	0.1832			0.9	0.01	
1999	5	27	6	A,B,C	0.4881	0.4269	0.4781	0.0512	0.0101	3.1029	2.0847	2.85	0.7653	0.2529	ND	ND	888.3	7.95	8.9
					0.0043	0.0031	0.0163	0.0194	0.0173	0.06	0.0049	0.0306	0.035	0.0318			0.7	0.01	
1999	5	27	10	A,B,C	2.6326	1.807	2.4027	0.5956	0.2299	10.7256	0.7968	8.3253	7.5285	2.4003	2.9334	1.1838	893.3	9.05	16.7
					0.1435	0.0172	0.2073	0.1939	0.2737	0.298	0.042	0.0659	0.0989	0.2415	0.0613	0.0344	0.7	0.01	
1999	5	27	14	A,B,C	0.2764	0.1898	0.2539	0.0641	0.0225	1.9152	0.2205	1.548	1.3275	0.3672	0.1704	0.0231	155.5	8.42	17.8
					0.0106	0.0024	0.0055	0.0033	0.0057	0.0525	0.0026	0.019	0.0164	0.049	0.0023	0.0003	1.5	0.01	
1999	5	27	15	A,B,C	0.4038	0.3371	0.4053	0.0682	-0.0015	2.8965	1.0088	2.682	1.6732	0.2145	0.1069	0.0055	357	7.96	12.8
					0.0077	0.003	0.0078	0.0051	0.0154	0.0032	0.039	0.032	0.0662	0.0291	0.0047	0.0003	0.5	0.01	
1999	5	27	16	A,B,C	0.2664	0.1395	0.1777	0.0383	0.0886	2.4837	0.5848	1.7295	1.1447	0.7542	0.0687	0.0069	251.3	8.27	12.8
					0.0595	0.0017	0.0052	0.0036	0.0554	0.3716	0.0143	0.1357	0.1239	0.4131	0.0048	0.0003	0.7	0.01	
1999	5	27	17	A,B,C	0.0949	0.0666	0.1059	0.0393	ND	1.4187	0.0052	0.9855	0.9803	0.4332	ND	ND	124.2	7.95	16.1
					0.0021	0.0009	0.002	0.0027		0.1563	0.0042	0.0443	0.0439	0.1121			0.1	0.02	
1999	5	27	18	A,B,C	0.2252	0.1112	0.1945	0.0833	0.0307	2.3478	0.0182	1.9521	1.9339	0.3957	0.0989	0.0608	865	9.42	16.1
					0.0064	0.0083	0.0065	0.0064	0.0102	0.0526	0.0074	0.04	0.0377	0.0145	0.0047	0.0029	16.4	0.01	
1999	5	27	19	A,B,C	0.3027	0.2347	0.2946	0.06	0.0081	1.5654	0.234	1.2657	1.0317	0.2997	ND	ND	325	8.91	18.3
					0.0069	0.0028	0.0046	0.0056	0.0064	0.0318	0.0018	0.0147	0.0153	0.0382			0.9	0.01	
1999	5	27	20	A,B,C	0.4919	0.3808	0.5087	0.1279	ND	4.0407	0.0246	3.6945	3.6699	0.3462	0.2698	0.0263	164.5	8.25	22.2
					0.0092	0.0039	0.0185	0.0165		0.0892	0.0153	0.129	0.1138	0.0834	0.0029	0.0006	0.2	0.01	
1999	5	27	21	A,B,C	0.4201	0.3085	0.3933	0.0848	0.0268	3.327	0.1106	2.9799	2.8693	0.3471	0.337	0.0322	166.7	8.24	19.4
					0.0035	0.0029	0.0051	0.0054	0.0041	0.0699	0.0017	0.0238	0.0255	0.0929	0.0085	0.0011	0.1	0.01	
1999	5	27	24	A,B,C	0.0896	0.0214	0.0824	0.061	0.0072	22.2885	16.6624	21.6516	4.9892	0.6369	ND	ND	3223.3	7.48	13
					0.0187	0.0013	0.0076	0.0063	0.0116	0.334	0.1549	0.224	0.0755	0.2708			7.2	0.01	
1999	5	27	25	A,B,C	0.1423	0.0301	0.0987	0.0685	0.0436	22.3119	16.3091	21.7113	5.4022	0.6006	ND	ND	3346.7	7.53	10
					0.0358	0.0012	0.0156	0.0163	0.0409	0.0046	0.1726	0.3162	0.3481	0.3116			11.9	0.01	
1999	5	27	28	A,B,C	0.0819	0.0226	0.0723	0.0497	0.0096	17.0949	12.3618	16.7199	4.3581	0.375	0.0391	0.0011	3086.7	7.67	11
					0.0147	0.0032	0.0108	0.0102	0.0096	0.262	0.0428	0.2358	0.278	0.2971	0.016	0.0004	10.9	0.03	
1999	5	27	30	A,B,C	2.2925	1.798	2.0453	0.2473	0.2472	10.8336	0.3071	9.4305	9.1234	1.4031	5.0274	1.3237	423.3	8.77	17.8
					0.0821	0.0087	0.0427	0.0494	0.05	0.301	0.0453	0.3218	0.2863	0.2252	0.1099	0.0322	1.2	0.01	
1999	5	27	31	A,B,C	0.3823	0.2334	0.3392	0.1058	0.0431	1.7796	0.0111	1.4709	1.4598	0.3087	0.2451	0.0503	399.3	8.63	17.2
					0.0115	0.0069	0.0082	0.0052	0.0124	0.1411	0.009	0.1553	0.1466	0.0477	0.0044	0.001	0.7	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	5	27	32	A,B,C	0.1955	0.0268	0.1609	0.1341	0.0345	2.2815	0.0843	1.9395	1.8552	0.342	0.1787	0.0348	354	8.52	21.7
					0.0055	0.0011	0.016	0.015	0.0124	0.0824	0.0278	0.2153	0.2428	0.2052	0.0028	0.0013	0.9	0.01	
1999	6	7	1	A,B,C	0.1572	0.041	0.1079	0.0669	0.0493	16.5306	9.4279	16.1178	6.6899	0.4128	ND	ND	2486.7	7.98	8
					0.0084	0.0053	0.0284	0.0281	0.0333	0.2127	0.937	0.1059	0.8407	0.1352			11.9	0.02	
1999	6	7	2	A,B,C	0.4762	0.3714	0.4787	0.1073	ND	3.4455	1.9291	3.2037	1.2746	0.2418	ND	ND	464	8.04	13
					0.0101	0.0202	0.0076	0.0177		0.3376	0.2157	0.3493	0.1556	0.0255			17.2	0.01	
1999	6	7	5	A,B,C	0.4166	0.0868	0.3405	0.2537	0.0761	2.91	0.1388	2.2554	2.1166	0.6546	ND	ND	508.7	7.7	11
					0.0031	0.0142	0.0321	0.0254	0.0352	0.0211	0.0582	0.1481	0.1472	0.1536			0.3	0.02	
1999	6	7	6	A,B,C	0.1486	0.038	0.0731	0.0351	0.0755	2.8266	0.1268	2.0559	1.9291	0.7707	ND	ND	299	8.68	10
					0.0081	0.0024	0.0109	0.0084	0.0053	0.1662	0.0436	0.017	0.0546	0.1784			0.9	0.02	
1999	6	7	10	A,B,C	2.0257	1.0363	1.7865	0.7502	0.2392	8.3976	ND	6.819	6.819	1.5786	2.9245	0.2261	1016.3	8.14	12
					0.038	0.0702	0.1494	0.1357	0.1269	0.1876		0.1811	0.1811	0.1277	0.0318	0.0025	1.5	0.01	
1999	6	7	14	A,B,C	0.2144	0.0392	0.1224	0.0832	0.092	1.5204	0.1432	1.2783	1.1351	0.2421	ND	ND	308.7	8.54	14
					0.0047	0.0057	0.0069	0.0077	0.0113	0.039	0.0246	0.0947	0.076	0.0559			0.3	0.02	
1999	6	7	15	A,B,C	0.4567	0.3795	0.4265	0.047	0.0302	3.0432	1.6366	2.589	0.9524	0.4542	ND	ND	835.7	8	9
					0.0039	0.0138	0.0359	0.024	0.0374	0.191	0.0271	0.1797	0.1961	0.0389			4.8	0	
1999	6	7	16	A,B,C	0.1458	0.0263	0.0557	0.0294	0.0901	1.7841	0.3678	1.2264	0.8586	0.5577	ND	ND	279.3	7.95	11
					0.0047	0.0015	0.0028	0.0042	0.0019	0.0288	0.0171	0.1072	0.1048	0.1039			1.8	0.03	
1999	6	7	17	A,B,C	0.1243	0.0216	0.0359	0.0142	0.0884	1.5699	0.0332	0.9486	0.9154	0.6213	ND	ND	115	8.49	11
					0.0183	0	0.0031	0.0031	0.0164	0.1739	0.0072	0.1183	0.1111	0.1549			0.2	0.02	
1999	6	7	18	A,B,C	0.2745	0.1154	0.238	0.1226	0.0365	2.6607	0.0146	2.403	2.3884	0.2577	0.406	0.1026	883	8.79	11
					0.0271	0.0061	0.0115	0.017	0.025	0.0438	0.0061	0.0596	0.0542	0.0575	0.0795	0.0173	3.9	0.21	
1999	6	7	19	A,B,C	0.161	0.0266	0.0688	0.0421	0.0922	1.5594	0.1476	1.1682	1.0206	0.3912	ND	ND	237	9.09	14
					0.0156	0.0017	0.0039	0.0056	0.0182	0.1078	0.0606	0.156	0.2144	0.0667			1.2	0.02	
1999	6	7	20	A,B,C	0.3709	0.1442	0.3066	0.1624	0.0643	5.6619	0.0408	5.2353	5.1945	0.4266	0.3664	0.1548	1346	9.08	16
					0.0272	0.0049	0.0093	0.0067	0.034	0.0225	0.0276	0.0806	0.1076	0.1023	0.0326	0.0149	4.5	0.01	
1999	6	7	21	A,B,C	0.316	0.0793	0.1993	0.12	0.1167	3.7815	0.153	3.252	3.099	0.5295	0.268	0.0693	841.3	8.79	16
					0.0095	0.001	0.0079	0.007	0.0116	0.0819	0.0149	0.034	0.0214	0.0493	0.0373	0.005	1.4	0.12	
1999	6	7	22	A,B,C	0.3947	0.238	0.3463	0.1083	0.0484	3.0351	0.0316	2.8416	2.81	0.1935	ND	ND	684.3	8.37	13
					0.0243	0.0038	0.0158	0.012	0.0333	0.215	0.0039	0.2376	0.238	0.0501			1.1	0.02	
1999	6	7	23	A,B,C	0.2559	0.1813	0.3963	0.2151	ND	33.0116	24.3639	32.5562	8.1923	0.4554	0.0574	0.0045	1281	8.16	11
					0.0961	0.0913	0.1307	0.0394		0.3567	0.1877	0.5279	0.3402	0.8846	0.0406	0.0031	2.9	0.01	
1999	6	7	24	A,B,C	0.0599	0.0276	0.0639	0.0364	ND	19.1676	13.4312	19.2912	5.86	ND	ND	ND	3156.7	7.81	8
					0.026	0.0085	0.0144	0.0084		0.109	0.1114	0.1713	0.267				33.4	0	
1999	6	7	25	A,B,C	0.1491	0.029	0.0446	0.0156	0.1045	27.846	20.7218	26.7075	5.9857	1.1385	ND	ND	3590	7.82	9
					0.0542	0.0032	0.0068	0.0065	0.0536	0.2991	0.3077	0.2532	0.5607	0.4826			4.7	0.01	
1999	6	7	28	A,B,C	0.0666	0.0278	0.0779	0.0501	ND	18.2664	12.6039	17.7291	5.1252	0.5373	ND	ND	3116.7	7.83	9
					0.0122	0.0026	0.0067	0.0073		0.2669	0.0769	0.1109	0.0744	0.2539			14.4	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	6	7	30	A,B,C	1.931	1.1613	1.6376	0.4763	0.2935	8.0946	0.0584	6.6285	6.5701	1.4661	3.7542	1.1397	823.7	8.86	14
					0.0234	0.0107	0.0134	0.0179	0.0104	0.211	0.0412	0.1635	0.1235	0.301	0.0886	0.0339	2.4	0.02	
1999	6	7	31	A,B,C	0.4109	0.218	0.3032	0.0852	0.1077	2.088	0.0759	1.4187	1.3428	0.6693	0.1829	0.0705	442	9.02	14
					0.0141	0.0074	0.012	0.0069	0.0212	0.0897	0.014	0.0309	0.0415	0.1099	0.0292	0.0106	1.2	0.01	
1999	6	7	32	A,B,C	0.1152	0.0335	0.0823	0.0488	0.0329	1.2858	0.0398	1.1919	1.1521	0.0939	ND	ND	131.2	8.6	16
					0.0078	0.0044	0.0109	0.0071	0.0035	0.1612	0.0178	0.0963	0.082	0.1285			0.3	0.02	
1999	6	18	1	A,B,C	0.2268	0.038	0.1113	0.0733	0.1155	13.6203	6.0111	13.3995	7.3884	0.2208	0.3965	0.0181	2623.3	7.9	9
					0.0177	0.0112	0.008	0.0126	0.0194	0.7289	1.1891	0.6657	0.524	0.0907	0.0401	0.0021	5.4	0.03	
1999	6	18	2	A,B,C	0.4291	0.2238	0.3562	0.1324	0.073	2.2026	0.1265	1.623	1.4965	0.5796	ND	ND	441.3	7.96	14
					0.009	0.0087	0.0131	0.0045	0.0173	0.1398	0.0662	0.0853	0.0367	0.0546			10.2	0.02	
1999	6	18	5	A,B,C	0.2607	0.1271	0.1921	0.065	0.0686	1.4628	0.0568	0.9069	0.8501	0.5559	0.0608	0.0019	478.3	7.8	13
					0.0233	0.0075	0.0201	0.0144	0.0039	0.0205	0.0269	0.0564	0.0465	0.0391	0.0496	0.0016	2.1	0.03	
1999	6	18	6	A,B,C	0.4005	0.2389	0.3019	0.063	0.0986	2.502	0.7857	2.223	1.4373	0.279	ND	ND	800.3	7.9	11
					0.0123	0.0785	0.0634	0.015	0.0532	0.1846	0.2602	0.164	0.3072	0.2031			1	0.01	
1999	6	18	10	A,B,C	1.0446	0.6335	0.892	0.2585	0.1526	5.8464	0.0502	4.5375	4.4873	1.3089	2.984	0.3663	888.7	8.37	19
					0.0998	0.0738	0.0395	0.0347	0.0691	0.0699	0.0095	0.1054	0.103	0.1748	0.0314	0.0031	1.8	0.01	
1999	6	18	14	A,B,C	0.2029	0.0746	0.1391	0.0644	0.0638	1.5666	0.0221	1.1271	1.105	0.4395	ND	ND	265	7.91	19
					0.006	0.0118	0.0092	0.0028	0.0151	0.0928	0.0091	0.0439	0.0482	0.0838			0	0.04	
1999	6	18	15	A,B,C	0.1851	0.0275	0.0952	0.0677	0.0899	2.6106	0.0325	1.7094	1.6769	0.9012	0.1951	0.0269	339.7	8.5	22
					0.0247	0.0014	0.0049	0.0038	0.0253	0.3608	0.0266	0.231	0.2045	0.356	0.0868	0.0074	0.7	0.18	
1999	6	18	16	A,B,C	0.1195	0.0319	0.0726	0.0408	0.0469	1.4523	ND	1.1469	1.1469	0.3054	ND	ND	310	8.63	18
					0.0031	0.0021	0.0077	0.0061	0.0049	0.0471		0.0174	0.0174	0.0415			0.9	0.25	
1999	6	18	17	A,B,C	0.1347	0.0461	0.0778	0.0317	0.0569	1.4343	ND	1.0347	1.0347	0.3996	ND	ND	130.8	7.82	21
					0.0093	0.0045	0.0076	0.004	0.0124	0.0751		0.0122	0.0122	0.0861			0.1	0.03	
1999	6	18	18	A,B,C	0.3114	0.1355	0.2159	0.0804	0.0955	2.8311	0.0156	2.1312	2.1156	0.6999	0.0735	0.0443	807.3	9.4	19
					0.0205	0.0031	0.0064	0.0069	0.0142	0.0774	0.0007	0.0257	0.0251	0.0754	0.0305	0.0185	1	0	
1999	6	18	19	A,B,C	0.2138	0.1076	0.1512	0.0437	0.0625	1.8669	0.0323	1.3959	1.3636	0.471	ND	ND	282.3	8	19
					0.0071	0.0073	0.005	0.0023	0.0022	0.2022	0.0264	0.1594	0.134	0.1107			0.5	0.02	
1999	6	18	20	A,B,C	0.298	0.2205	0.2637	0.0432	0.0343	2.8767	0.0315	2.4819	2.4504	0.3948	ND	ND	891.7	9.61	20
					0.0167	0.0032	0	0.0032	0.0167	0.0556	0.0027	0.0161	0.0168	0.0523			1.8	0.03	
1999	6	18	21	A,B,C	0.3137	0.1603	0.2238	0.0635	0.0899	2.9298	0.016	2.2461	2.2301	0.6837	0.3336	0.1705	743	9.24	21
					0.0231	0.0041	0.0113	0.0074	0.0224	0.0939	0.0014	0.0721	0.0719	0.053	0.0246	0.0139	2.2	0.01	
1999	6	18	23	A,B,C	0.1078	0.0351	0.0609	0.0259	0.0469	33.9156	24.4968	32.9688	8.472	0.9468	ND	ND	1794.3	8.04	14
					0.0057	0.0012	0.005	0.0044	0.0048	0.2395	0.0778	0.4471	0.438	0.2434			6.4	0.06	
1999	6	18	24	A,B,C	0.156	0.038	0.0692	0.0312	0.0868	55.0083	38.6221	53.1894	14.5673	1.8189	0.0937	0.003	3056.7	7.77	14
					0.0212	0.0036	0.0148	0.0117	0.0349	0.1211	0.3265	0.711	0.7331	0.5899	0.0765	0.0024	9.8	0.01	
1999	6	18	25	A,B,C	0.1708	0.0479	0.1056	0.0578	0.0651	48.4212	34.7461	48.3963	13.6502	0.0249	ND	ND	4166.7	7.83	18
					0.006	0.0013	0.0046	0.0059	0.0055	0.3456	0.3794	0.7304	0.4403	0.5223			17.8	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	6	18	30	A,B,C	1.8312	1.6078	1.7645	0.1567	0.0667	10.3965	0.3202	9.5469	9.2267	0.8496	5.6551	0.224	873.3	7.84	21
					0.0437	0.0779	0.1483	0.1197	0.1055	0.2399	0.1966	0.3096	0.3456	0.1165	0.0413	0.0026	1.7	0.01	
1999	6	18	31	A,B,C	0.3336	0.1414	0.1834	0.042	0.1502	2.5944	ND	1.2441	1.2441	1.3503	0.1872	0.0101	230.3	7.99	19
					0.0582	0.0097	0.0094	0.0012	0.0493	0.5826		0.0673	0.0673	0.5937	0.0331	0.0013	0.5	0.04	
1999	6	18	32	A,B,C	0.1247	0.0391	0.0791	0.04	0.0456	1.5192	0.2115	1.0719	0.8604	0.4473	ND	ND	172.5	8.87	20
					0.0071	0.0036	0.0018	0.0026	0.0053	0.0301	0.0733	0.0187	0.0917	0.0482			0.2	0.01	
1999	6	28	1	A,B,C	0.1206	0.0313	0.0932	0.062	0.0273	13.1442	5.9788	13.2183	7.2395	ND	0.1369	0.0031	2300	7.59	11
					0.0306	0.0023	0.0023	0.0029	0.0286	0.271	0.3228	0.237	0.111		0.0588	0.0013	0	0.03	
1999	6	28	2	A,B,C	0.6778	0.429	0.6057	0.1767	0.072	4.4781	2.0505	4.2993	2.2488	0.1788	ND	ND	608.7	8.3	13
					0.0792	0.0844	0.0832	0.0256	0.0079	0.8321	0.6937	0.8028	0.3451	0.2303			64.2	0.06	
1999	6	28	5	A,B,C	0.3938	0.2092	0.3045	0.0954	0.0893	2.0028	0.0653	1.1151	1.0498	0.8877	ND	ND	466.3	7.63	14
					0.0069	0.0077	0.0186	0.0131	0.0242	0.231	0.0371	0.1052	0.0681	0.3202			0.7	0	
1999	6	28	6	A,B,C	0.4432	0.416	0.4304	0.0144	0.0128	2.1297	1.1005	2.1303	1.0298	ND	ND	ND	723.7	7.85	11
					0.0004	0.0108	0.02	0.0141	0.0197	0.2058	0.0656	0.2146	0.1738				1.4	0.01	
1999	6	28	10	A,B,C	1.9138	1.1927	1.722	0.5293	0.1918	9.6531	0.0234	8.0925	8.0691	1.5606	4.9397	0.1129	851.3	7.59	18
					0.085	0.1139	0.1944	0.0955	0.1555	0.6194	0.0034	0.6035	0.6056	0.552	0.4662	0.0065	2.3	0.02	
1999	6	28	14	A,B,C	0.1494	0.0255	0.0878	0.0623	0.0615	1.7442	0.0041	1.2936	1.2895	0.4506	0.0663	0.0043	230	8.08	18
					0.0086	0	0.0072	0.0072	0.0058	0.0633	0.0034	0.0316	0.0329	0.0455	0.0541	0.0035	0.5	0.01	
1999	6	28	15	A,B,C	0.148	0.0211	0.0622	0.0411	0.0858	2.6646	0.0191	2.3184	2.2993	0.3462	ND	ND	277	8.69	19
					0.0004	0.0018	0.0029	0.0015	0.0032	0.1828	0.0156	0.2518	0.2364	0.0711			0.9	0.01	
1999	6	28	16	A,B,C	0.1107	0.0188	0.0681	0.0493	0.0426	1.6944	ND	1.3044	1.3044	0.39	ND	ND	239.7	7.43	16
					0.0276	0.001	0.0068	0.0058	0.0272	0.149		0.0266	0.0266	0.1402			1.8	0.01	
1999	6	28	17	A,B,C	0.1137	0.0188	0.0483	0.0295	0.0654	2.247	0.0209	1.8375	1.8166	0.4095	ND	ND	118.2	8.93	17
					0.0047	0.001	0.0026	0.0022	0.0023	0.0644	0.0035	0.0809	0.081	0.0919			0.2	0.02	
1999	6	28	18	A,B,C	0.2614	0.1088	0.1755	0.0668	0.0859	2.9442	0.0223	2.6982	2.6759	0.246	0.1471	0.0901	838.7	9.41	14
					0.0088	0.0189	0.0209	0.0048	0.0264	0.1151	0.0043	0.2332	0.2308	0.2075	0.0143	0.0088	2.6	0.01	
1999	6	28	19	A,B,C	0.1884	0.026	0.0784	0.0523	0.1101	1.9377	0.0217	1.5387	1.517	0.399	ND	ND	262.3	8.19	19
					0.0047	0.0037	0.0057	0.0022	0.003	0.2088	0.0177	0.179	0.1614	0.0347			1.5	0	
1999	6	28	20	A,B,C	0.2726	0.2523	0.3059	0.0535	ND	3.102	0.0388	3.0666	3.0278	0.0354	ND	ND	1026.7	9.36	19
					0.0169	0.0577	0.0089	0.0663		0.0635	0.0007	0.1182	0.1178	0.1812			8	0	
1999	6	28	21	A,B,C	0.2615	0.0506	0.1427	0.0921	0.1188	2.9082	0.0146	2.2866	2.272	0.6216	0.5352	0.0449	535	8.18	21
					0.0198	0.0087	0.0029	0.0111	0.0169	0.1248	0.0119	0.0982	0.0877	0.0403	0.0849	0.007	0.5	0	
1999	6	28	23	A,B,C	0.1205	0.0214	0.0955	0.0741	0.0251	32.2311	22.8	31.3467	8.5467	0.8844	ND	ND	1852.3	7.49	11
					0.0116	0.0002	0.0016	0.0018	0.0101	0.4321	0.3127	1.3867	1.0798	1.3078			3.5	0.01	
1999	6	28	24	A,B,C	0.0604	0.0171	0.0522	0.035	0.0082	48.8298	36.9366	47.676	10.7394	1.1538	ND	ND	3383.3	7.55	14
					0.0123	0.0016	0.0095	0.0084	0.0176	0.5102	0.0719	2.1286	2.2002	1.7384			7.2	0	
1999	6	28	25	A,B,C	0.139	0.0266	0.082	0.0553	0.057	5.2401	1.4586	5.0559	3.5973	0.1842	ND	ND	1094.7	9.11	17
					0.0035	0.0029	0.0072	0.0043	0.004	0.2229	0.0916	0.0923	0.1049	0.2407			2.6	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	6	28	28	A,B,C	0.1068	0.0255	0.0824	0.057	0.0243	36.0726	26.4895	36.6591	10.1696	ND	0.3211	0.0119	2886.7	7.82	14
					0.0017	0.002	0.0191	0.0202	0.0176	0.4771	0.2161	1.3396	1.4707	ND	0.1321	0.0049	9.8	0.01	
1999	6	28	30	A,B,C	2.0556	1.3008	1.6658	0.365	0.3897	10.4748	0.1816	9.7458	9.5642	0.729	4.9469	0.1635	863.7	7.75	19
					0.0438	0.1107	0.0916	0.0624	0.0755	0.1065	0.0891	0.3245	0.4085	0.3253	0.0436	0.0049	3	0.01	
1999	6	28	31	A,B,C	0.1459	0.0249	0.1004	0.0755	0.0455	1.8477	0.0081	1.7337	1.7256	0.114	0.2454	0.0138	469.3	8	17
					0.0099	0.0021	0.0037	0.0018	0.0091	0.0998	0.0066	0.0053	0.0086	0.0997	0.0133	0.0006	1	0.01	
1999	6	28	32	A,B,C	0.255	0.0225	0.1274	0.1049	0.1276	4.1262	0.0192	3.2733	3.2541	0.8529	ND	ND	149	9.53	19
					0.0156	0.0031	0.0097	0.0098	0.0133	0.0881	0.0084	0.1444	0.1511	0.0831			0.2	0	
1999	7	8	1	A,B,C	0.2568	0.027	0.0252	-0.0018	0.2316	7.4763	0.1406	7.59	7.4494	ND	0.1862	0.0064	2070	7.77	10
					0.0297	0.0043	0.004	0.0082	0.0258	1.1071	0.047	0.9363	0.9476		0.1025	0.0036	4.7	0	
1999	7	8	2	A,B,C	0.2524	0.1146	0.1741	0.0595	0.0783	1.7487	0.0181	1.1997	1.1816	0.549	ND	ND	378	8.09	18
					0.0261	0.0086	0.0106	0.016	0.0164	0.1156	0.01	0.0704	0.0787	0.1847			0.5	0.03	
1999	7	8	5	A,B,C	0.4151	0.293	0.3757	0.0828	0.0393	2.0952	0.0546	1.2921	1.2375	0.8031	ND	ND	431.7	7.85	15
					0.0209	0.0144	0.0351	0.0218	0.0226	0.1682	0.011	0.1923	0.1829	0.0623			1.2	0.03	
1999	7	8	10	A,B,C	1.9438	1.5055	1.6926	0.1871	0.2511	8.5326	0.0265	7.0341	7.0076	1.4985	2.9572	0.1031	816	7.78	17
					0.0541	0.0433	0.0748	0.032	0.0213	0.2856	0.0029	0.2843	0.2828	0.039	0.2744	0.0109	0.9	0.01	
1999	7	8	14	A,B,C	0.2881	0.2316	0.2837	0.0521	0.0044	3.1503	1.2754	2.6769	1.4015	0.4734	0.1417	0.0208	251.7	8.46	18
					0.0028	0.0103	0.0062	0.015	0.0042	0.1109	0.0681	0.0079	0.0745	0.1185	0.0286	0.0042	3.5	0.01	
1999	7	8	15	A,B,C	0.1731	0.04	0.0698	0.0298	0.1033	2.8596	0.051	1.9071	1.8561	0.9525	0.2095	0.0521	288.7	8.75	19
					0.0166	0.0083	0.0105	0.0041	0.0204	0.0564	0.0218	0.173	0.153	0.1504	0.0015	0.0004	1.1	0.01	
1999	7	8	16	A,B,C	0.1506	0.0328	0.0527	0.0199	0.0979	3.489	0.1504	2.0106	1.8602	1.4784	0.1718	0.0072	291.3	7.85	16
					0.0116	0.0094	0.0105	0.0042	0.0161	0.7581	0.0575	0.5434	0.4882	0.2147	0.0055	0.0011	1.9	0.05	
1999	7	8	17	A,B,C	0.2094	0.0175	0.0247	0.0073	0.1847	5.0202	0.031	3.0228	2.9918	1.9974	0.3216	0.1864	123	9.36	17
					0.0195	0.0005	0.0069	0.0069	0.0235	0.1374	0.01	0.1439	0.1522	0.1708	0.0442	0.0292	0.1	0.03	
1999	7	8	18	A,B,C	0.1574	0.0342	0.0438	0.0096	0.1136	3.1836	0.0256	2.0886	2.063	1.095	0.226	0.1599	764.7	9.61	17
					0.0211	0.0054	0.0037	0.0017	0.0236	0.1416	0.0072	0.0755	0.0684	0.2102	0.0597	0.043	0.7	0.01	
1999	7	8	19	A,B,C	0.2514	0.0688	0.1188	0.0501	0.1326	2.4267	0.0147	1.4436	1.4289	0.9831	0.1157	0.0466	265.3	9.06	18
					0.0218	0.0287	0.0329	0.0097	0.0253	0.3139	0.0036	0.114	0.1146	0.3402	0.0021	0.0005	0.7	0.01	
1999	7	8	20	A,B,C	0.5314	0.2502	0.3994	0.1493	0.1319	3.9084	0.0158	2.8443	2.8285	1.0641	0.3721	0.0076	754.7	9.42	20
					0.009	0.0147	0.0154	0.0007	0.0139	0.2174	0.0042	0.2367	0.2331	0.1602	0.0314	0.0004	3	0.02	
1999	7	8	21	A,B,C	0.4171	0.0433	0.1037	0.0603	0.3134	3.3438	0.0178	2.1636	2.1458	1.1802	0.2774	0.0881	408	8.9	20
					0.0248	0.0133	0.0155	0.0062	0.0243	0.1247	0.0034	0.0876	0.0868	0.0912	0.0639	0.0199	0.5	0.01	
1999	7	8	22	A,B,C	0.2197	0.013	0.0395	0.0265	0.1802	4.7763	0.0192	3.5448	3.5256	1.2315	0.1976	0.0054	1737.7	7.67	16
					0.0185	0.0009	0.0018	0.0014	0.0201	0.1813	0.0066	0.0204	0.0259	0.196	0.0088	0.0002	4.7	0.01	
1999	7	8	23	A,B,C	0.1658	0.0437	0.1334	0.0897	0.0324	23.8191	5.1395	22.6758	17.5363	1.1433	ND	ND	1895.3	7.5	11
					0.0076	0.0031	0.0232	0.0204	0.0182	0.7417	0.4846	0.6666	1.0465	0.5148			2	0	
1999	7	8	24	A,B,C	0.0594	0.0061	0.0431	0.037	0.0164	42.3657	31.138	41.0493	9.9113	1.3164	ND	ND	3873.3	7.5	16
					0.0122	0.001	0.0044	0.0036	0.0142	0.5999	1.7538	0.9567	1.0122	0.6166			7.2	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	7	8	25	A,B,C	0.1908	0.0367	0.0749	0.0382	0.1158	25.9365	14.4244	24.4131	9.9887	1.5234	ND	ND	2087.7	7.8	16
					0.0068	0.0092	0.0066	0.0154	0.0066	0.3657	2.1695	0.508	1.783	0.4532			851	0.01	
1999	7	8	27	A,B,C	0.1571	0.0104	0.0467	0.0363	0.1104	5.2758	0.2323	3.6933	3.461	1.5825	0.1949	0.0638	1188.7	8.91	18
					0.0176	0.0009	0.0029	0.0039	0.0183	0.7685	0.0932	0.5005	0.4746	0.2699	0.0289	0.0094	12.7	0.01	
1999	7	8	28	A,B,C	0.1643	0.0864	0.1468	0.0604	0.0175	35.7372	31.6985	34.4394	2.7409	1.2978	ND	ND	2863.3	7.57	11
					0.0136	0.0118	0.0047	0.0142	0.0183	0.5949	1.2547	0.9583	0.6488	0.48			26	0.01	
1999	7	8	30	A,B,C	2.3112	1.5445	1.7335	0.189	0.5777	8.7411	0.1024	6.984	6.8816	1.7571	3.7702	0.1783	835	7.92	19
					0.049	0.0212	0.0396	0.054	0.0202	0.6208	0.0367	0.0825	0.0487	0.5383	0.1124	0.0069	0.5	0	
1999	7	8	31	A,B,C	0.2007	0.0506	0.1093	0.0588	0.0914	2.3544	0.0151	1.7358	1.7207	0.6186	0.3425	0.0619	434.7	8.57	19
					0.0282	0.0083	0.0146	0.0071	0.0157	0.0927	0.0006	0.0534	0.0539	0.0679	0.0136	0.0015	1.8	0.01	
1999	7	8	32	A,B,C	0.2146	0.0197	0.0821	0.0624	0.1325	2.9103	0.1181	2.6589	2.5408	0.2514	0.3019	0.0434	203.7	8.45	21
					0.0115	0.0017	0.01	0.0086	0.0151	0.1164	0.0596	0.4671	0.4116	0.4112	0.0072	0.001	0.7	0.01	
1999	7	19	1	A,B,C	0.1699	0.0009	0.0655	0.0646	0.1044	4.2357	0.046	3.4764	3.4304	0.7593	0.13	0.0089	1662	8.09	12
					0.0098	0.0006	0.0068	0.0062	0.0036	0.0777	0.0143	0.2166	0.2195	0.2289	0.0074	0.0004	0.5	0.01	
1999	7	19	2	A,B,C	0.3558	0.2641	0.3247	0.0606	0.031	2.1765	0.0783	1.6608	1.5825	0.5157	ND	ND	353.7	7.98	18
					0.0082	0.0238	0.0067	0.0201	0.0126	0.1967	0.0344	0.3921	0.4089	0.1974			2.4	0.02	
1999	7	19	5	A,B,C	0.4801	0.3954	0.4564	0.0611	0.0237	1.5189	0.024	1.1268	1.1028	0.3921	0.0332	0.0013	421	7.87	15
					0.0149	0.0062	0.009	0.003	0.0077	0.0932	0.0056	0.0378	0.0433	0.1144	0.0271	0.0011	0.5	0.01	
1999	7	19	10	A,B,C	1.3823	1.1376	1.4014	0.2637	ND	6.7395	0.044	8.7447	8.7007	-2.0052	2.6388	0.1252	927.3	7.92	20
					0.0268	0.0075	0.0323	0.0322		0.3457	0.0095	2.6047	2.5972	2.3012	0.2617	0.011	0.7	0.01	
1999	7	19	14	A,B,C	0.1448	0.0253	0.0865	0.0612	0.0583	2.8068	0.0583	2.1522	2.0939	0.6546	0.4703	0.0247	246.3	7.95	20
					0.0019	0.0047	0.0033	0.0015	0.0042	0.3735	0.0281	0.4515	0.4237	0.0852	0.0443	0.0045	0.3	0.04	
1999	7	19	15	A,B,C	0.1771	0.0164	0.0969	0.0806	0.0802	2.658	0.0213	2.0163	1.995	0.6417	0.4222	0.0255	235.7	8.04	21
					0.0084	0.0066	0.0098	0.0061	0.0055	0.0368	0.0106	0.153	0.1621	0.1165	0.161	0.0096	1.2	0.01	
1999	7	19	16	A,B,C	0.1876	0.0621	0.2628	0.2007	ND	2.523	0.3137	0.0582	-0.2555	2.4648	0.3154	0.02	184.1	8.06	18
					0.0148	0.0443	0.0893	0.1004		0.1408	0.2122	0.0321	0.1832	0.1236	0.0074	0.0006	0.4	0	
1999	7	19	17	A,B,C	0.2149	0.025	0.0796	0.0546	0.1353	2.9628	0.0238	1.6485	1.6247	1.3143	0.2753	0.031	141.6	8.33	20
					0.0065	0.0146	0.0221	0.0077	0.0171	0.1069	0.0083	0.2898	0.2981	0.3544	0.0108	0.002	0.7	0.01	
1999	7	19	18	A,B,C	0.3012	0.2161	0.2555	0.0394	0.0457	5.0181	0.0397	3.7506	3.7109	1.2675	0.5673	0.4532	570.7	9.84	17
					0.0377	0.0267	0.0216	0.0163	0.0398	0.5864	0.0294	0.6242	0.5995	0.1927	0.0698	0.0547	0.5	0.01	
1999	7	19	19	A,B,C	0.1289	0.0232	0.0783	0.0551	0.0506	1.7571	0.0099	1.6254	1.6155	0.1317	0.3589	0.0389	272.7	8.31	19
					0.004	0.0031	0.0047	0.0021	0.0055	0.0949	0.0055	0.1407	0.1357	0.1006	0.0166	0.0019	0.5	0	
1999	7	19	20	A,B,C	0.6308	0.4072	0.5123	0.1051	0.1185	3.7002	0.0192	3.3609	3.3417	0.3393	0.2783	0.0778	1057.7	8.82	22
					0.0111	0.01	0.0308	0.0208	0.0202	0.055	0.0118	0.1013	0.1109	0.09	0.0798	0.0221	1	0	
1999	7	19	21	A,B,C	0.3586	0.1084	0.1951	0.0867	0.1635	2.3979	0.0149	2.3214	2.3065	0.0765	0.5015	0.0348	475.3	8.52	20
					0.0102	0.0057	0.0142	0.0114	0.0204	0.0392	0.0038	0.1638	0.1666	0.1819	0.0304	0.0022	2	0.34	
1999	7	19	22	A,B,C	0.2237	0.1078	0.1682	0.0604	0.0555	1.7481	0.0439	1.6332	1.5893	0.1149	0.0726	0.0028	404.7	7.83	15
					0.0395	0.0273	0.0209	0.0068	0.019	0.1012	0.0237	0.1512	0.1278	0.0507	0.0209	0.0008	0.5	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm-1		deg C
1999	7	19	23	A,B,C	0.2736	0.0117	0.0448	0.0332	0.2288	5.0901	0.0081	3.5868	3.5787	1.5033	0.1464	0.0036	182.5	7.63	12
					0.0357	0.0012	0.0077	0.0076	0.0331	0.3018	0.0009	0.099	0.0999	0.2033	0.0241	0.0006	0.4	0.01	
1999	7	19	24	A,B,C	0.0643	0.0045	0.0292	0.0247	0.035	38.6181	12.7198	37.9566	25.2368	0.6615	ND	ND	4040	7.46	14
					0.015	0	0.0042	0.0042	0.0172	0.5039	2.7449	0.8246	3.2794	0.4455			9.4	0.01	
1999	7	19	25	A,B,C	0.2664	0.0757	0.1348	0.0591	0.1316	4.1832	0.16	3.4491	3.2891	0.7341	0.0942	0.0406	1081.3	9.11	18
					0.0073	0.014	0.0084	0.0056	0.0069	0.3326	0.0627	0.2954	0.2568	0.145	0.0121	0.0053	1.1	0.01	
1999	7	19	27	A,B,C	0.2069	0.0605	0.1299	0.0695	0.077	3.3225	0.0184	2.8572	2.8388	0.4653	0.0397	0.0163	1063.3	9.08	14
					0.0255	0.0093	0.0168	0.0076	0.0122	0.1263	0.0041	0.0969	0.1006	0.1909	0.0324	0.0133	2	0.01	
1999	7	19	28	A,B,C	0.0604	0.0111	0.0395	0.0284	0.021	5.6667	0.0136	5.1465	5.1329	0.5202	ND	ND	2946.7	7.66	13
					0.0077	0.0006	0.0075	0.007	0.0048	0.0677	0.0016	0.2245	0.224	0.2882			9.8	0.02	
1999	7	19	30	A,B,C	2.6542	1.9148	2.2976	0.3829	0.3565	13.0782	0.0256	13.053	13.0274	0.0252	6.6653	0.2529	881.3	7.82	21
					0.0982	0.011	0.058	0.0482	0.0547	0.313	0.0131	0.2449	0.2351	0.4335	0.0336	0.0065	0.5	0.01	
1999	7	19	31	A,B,C	0.1563	0.0487	0.0788	0.0301	0.0775	2.3139	0.1013	2.1657	2.0644	0.1482	0.3068	0.019	213.3	8.04	19
					0.0015	0.006	0.0102	0.0061	0.0088	0.4282	0.0664	0.0499	0.1127	0.4681	0.0145	0.0008	0.7	0.01	
1999	7	19	32	A,B,C	0.2323	0.007	0.0567	0.0497	0.1756	2.6319	0.0374	1.7919	1.7545	0.84	0.9397	0.1756	125.3	8.59	22
					0.0101	0.0011	0.0019	0.0029	0.0101	0.1537	0.0113	0.0742	0.0644	0.2152	0.0047	0.0031	0.2	0.01	
1999	7	30	1	A,B,C	1.3339	1.098	1.13	0.0321	0.2038	2.958	1.1183	2.4891	1.3708	0.4689	ND	ND	380.3	7.53	18
					0.0174	0.0024	0.0108	0.0087	0.013	0.0972	0.0309	0.0759	0.0532	0.0364			0.7	0.01	
1999	7	30	2	A,B,C	0.2354	0.0855	0.1809	0.0954	0.0545	1.4889	0.0305	1.1832	1.1527	0.3057	ND	ND	376.7	8.03	19
					0.0132	0.0147	0.016	0.0195	0.0188	0.2059	0.0045	0.1703	0.1671	0.0388			1.4	0.01	
1999	7	30	5	A,B,C	0.5256	0.4886	0.5127	0.0241	0.0129	1.4376	0.2284	1.0983	0.8699	0.3393	ND	ND	370.3	7.47	20
					0.0008	0.0062	0.0151	0.011	0.0153	0.0947	0.0062	0.0558	0.0498	0.1174			0.7	0	
1999	7	30	10	A,B,C	2.1022	1.707	1.7923	0.0853	0.3099	8.7159	0.0573	6.99	6.9327	1.7259	5.1655	0.1054	817.3	7.54	16
					0.0522	0.04	0.0281	0.065	0.0788	0.2783	0.0237	0.4188	0.4039	0.2363	0.3069	0.006	1.4	0.01	
1999	7	30	14	A,B,C	0.1388	0.0263	0.0776	0.0514	0.0612	1.9992	0.0165	1.3464	1.3299	0.6528	0.2005	0.0055	234.7	7.68	20
					0.0058	0.0042	0.0068	0.0062	0.0126	0.105	0.0057	0.0804	0.0802	0.0867	0.0119	0.0003	1.5	0	
1999	7	30	15	A,B,C	0.1211	0.0103	0.0589	0.0487	0.0622	2.1183	0.0161	1.4391	1.423	0.6792	0.2327	0.007	263	7.72	20
					0.0137	0	0.0045	0.0045	0.0103	0.0884	0.003	0.0288	0.0259	0.0755	0.0406	0.001	0.5	0.01	
1999	7	30	16	A,B,C	0.1139	0.0307	0.0718	0.0412	0.0421	2.1879	0.0166	1.7457	1.7291	0.4422	0.0426	0.0015	191.5	7.8	19
					0.0052	0.0097	0.0086	0.0023	0.0041	0.2803	0.0136	0.2656	0.2522	0.0369	0.0188	0.0006	2.3	0.03	
1999	7	30	17	A,B,C	0.0656	0.009	0.0446	0.0356	0.021	2.1018	0.0397	1.2615	1.2218	0.8403	0.0134	0.0004	131.6	7.69	21
					0.0049	0.001	0.002	0.0026	0.003	0.1158	0.0064	0.0249	0.0309	0.1404	0.011	0.0003	0.3	0	
1999	7	30	18	A,B,C	0.2511	0.1507	0.2258	0.0751	0.0253	2.4555	0.0141	2.3829	2.3688	0.0726	0.1843	0.125	489.3	9.56	19
					0.0131	0.003	0.0057	0.003	0.0074	0.1257	0.002	0.3132	0.3137	0.4009	0.0384	0.026	1	0.01	
1999	7	30	19	A,B,C	0.2421	0.103	0.1703	0.0673	0.0718	1.9764	0.0175	1.6494	1.6319	0.327	0.1955	0.01	311.7	7.98	21
					0.0073	0.004	0.014	0.0169	0.012	0.129	0.0016	0.0749	0.0764	0.1278	0.0399	0.0011	0.3	0.04	
1999	7	30	20	A,B,C	1.281	0.7174	0.7996	0.0822	0.4813	7.9752	0.1129	8.8299	8.717	ND	6.39	2.0852	659.3	8.88	22
					0.3888	0.2923	0.284	0.015	0.1052	1.4511	0.0658	3.2699	3.2047		1.8107	0.6945	7.2	0.04	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm-1		deg C
1999	7	30	21	A,B,C	0.2363	0.1024	0.1878	0.0854	0.0485	2.3871	0.0111	2.3574	2.3463	0.0297	0.3	0.0173	539	8.01	23
					0.0087	0.0135	0.0151	0.0018	0.0072	0.04	0.0038	0.0242	0.0242	0.0393	0.0824	0.0047	0.5	0	
1999	7	30	22	A,B,C	0.4602	0.4464	0.4153	ND	0.0449	1.95	0.079	1.785	1.706	0.165	ND	ND	434.3	7.58	20
					0.0172	0.0012	0.0046		0.0216	0.0869	0.0064	0.0504	0.0477	0.132			4.8	0.02	
1999	7	30	23	A,B,C	1.2221	1.0915	1.0439	-0.0476	0.1782	2.2851	0.8744	2.3118	1.4374	ND	ND	ND	619.7	7.59	18
					0.0106	0.0028	0.0041	0.0025	0.0106	0.0581	0.0258	0.1396	0.1283				7.2	0.03	
1999	7	30	24	A,B,C	0.1129	0.0534	0.0979	0.0445	0.015	33.8118	29.5497	33.1794	3.6297	0.6324	ND	ND	399.7	7.22	16
					0.0031	0.0012	0.0095	0.0084	0.0116	0.2425	0.542	0.1537	0.5739	0.2357			2.2	0.01	
1999	7	30	25	A,B,C	1.1382	1.0799	1.0659	ND	0.0723	2.5617	1.1525	2.883	1.7305	ND	ND	ND	382.7	7.53	16
					0.0544	0.006	0.0362		0.0883	0.2535	0.1489	0.224	0.1022				1.4	0.02	
1999	7	30	27	A,B,C	1.181	1.0868	1.0611	ND	0.1199	2.5962	0.9368	2.3772	1.4404	0.219	ND	ND	349.3	7.54	22
					0.0318	0.0087	0.0283		0.0063	0.2277	0.1044	0.1867	0.1132	0.1041			12.1	0.01	
1999	7	30	28	A,B,C	0.1459	0.0566	0.093	0.0364	0.0529	34.9752	28.9695	33.7095	4.74	1.2657	ND	ND	401	7.16	18
					0.014	0.0021	0.0052	0.007	0.0162	0.6547	0.2915	0.9049	1.0346	0.6842			0.8	0	
1999	7	30	30	A,B,C	2.3527	1.8717	2.0371	0.1654	0.3156	11.1639	0.0804	8.0634	7.983	3.1005	6.0545	0.1513	827.7	7.63	22
					0.0364	0.0282	0.0196	0.0204	0.0555	0.2682	0.0486	0.1625	0.1473	0.3841	0.1729	0.0036	0.7	0.01	
1999	7	30	31	A,B,C	0.283	0.1696	0.2244	0.0548	0.0586	2.1612	0.015	1.857	1.842	0.3042	0.2516	0.0086	317	7.77	22
					0.01	0.0047	0.0116	0.0095	0.0139	0.1059	0.0016	0.3121	0.3114	0.411	0.0377	0.0014	0.9	0.02	
1999	7	30	32	A,B,C	0.1358	0.0068	0.0621	0.0553	0.0736	1.6803	0.0251	1.3101	1.285	0.3702	0.5268	0.0284	141.4	7.98	24
					0.0151	0.0005	0.0047	0.0045	0.0169	0.0573	0.0004	0.0299	0.0295	0.0287	0.0044	0.0007	0.7	0.01	
1999	7	30	33	A,B,C	0.2455	0.1083	0.1997	0.0915	0.0458	2.7432	0.0524	2.5257	2.4733	0.2175	0.5276	0.0599	564	8.33	22
					0.0136	0.0097	0.0173	0.0079	0.0287	0.1563	0.0095	0.1117	0.1199	0.2294	0.0283	0.0602	0.5	0.03	
1999	8	3	1	A,B,C	0.7376	0.545	0.6307	0.0856	0.1069	1.8432	0.1745	1.7082	1.5337	0.135	ND	ND	.	.	.
					0.3602	0.2979	0.3057	0.0179	0.0594	0.0985	0.1315	0.0752	0.0769	0.0481					
1999	8	3	5	A,B,C	0.4014	0.2973	0.3686	0.0714	0.0328	1.1808	0.0438	0.9252	0.8814	0.2556	ND	ND	.	.	.
					0.0453	0.054	0.0373	0.0185	0.0113	0.1	0.0335	0.2886	0.3219	0.1932					
1999	8	3	22	A,B,C	0.4452	0.3655	0.3756	0.0101	0.0696	2.0361	0.0063	0.4107	0.4044	1.6254	ND	ND	.	.	.
					0.0234	0.0218	0.0256	0.015	0.0116	0.1019	0.0014	0.0963	0.0961	0.1266					
1999	8	3	23	A,B,C	0.9126	0.7082	0.7694	0.0613	0.1432	2.1354	0.0395	1.9605	1.921	0.1749	ND	ND	.	.	.
					0.3105	0.2805	0.2774	0.0075	0.0415	0.1911	0.0279	0.1995	0.1734	0.1634					
1999	8	3	24	A,B,C	0.1319	0.0514	0.0996	0.0482	0.0323	31.6611	27.0236	29.9514	2.9278	1.7097	ND	ND	.	.	.
					0.0033	0.0053	0.0098	0.0045	0.0084	0.3756	0.1221	3.9771	3.9178	3.8265					
1999	8	3	25	A,B,C	0.7441	0.569	0.5769	0.0079	0.1671	2.6073	0.8951	2.5725	1.6774	0.0348	ND	ND	.	.	.
					0.3604	0.3216	0.3071	0.0146	0.0542	0.1266	0.1018	0.2137	0.2117	0.1089					
1999	8	3	27	A,B,C	1.1926	1.0356	1.0822	0.0466	0.1104	3.2679	1.1549	2.8374	1.6825	0.4305	ND	ND	.	.	.
					0.3612	0.3232	0.3198	0.0132	0.0414	0.3112	0.2749	0.085	0.19	0.2614					
1999	8	3	28	A,B,C	0.1254	0.0403	0.0966	0.0563	0.0288	31.5117	26.2837	34.5441	8.2604	ND	ND	ND	.	.	.
					0.002	0.007	0.0164	0.0107	0.0148	0.3162	0.7578	0.1571	0.6099						

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	8	9	2	A,B,C	0.31	0.0875	0.1143	0.0268	0.1957	1.9872	0.0232	1.3569	1.3337	0.6303	ND	ND	414	7.89	19
					0.0298	0.0416	0.0506	0.0093	0.052	0.1853	0.0143	0.0806	0.0681	0.1444			0.9	0.02	
1999	8	9	5	A,B,C	0.4517	0.4803	0.4006	ND	0.0511	1.1706	0	1.0881	1.0881	0.0825	ND	ND	359.3	7.72	18
					0.0164	0.0031	0.0228		0.0197	0.1282	0	0.118	0.118	0.0403			1	0.03	
1999	8	9	10	A,B,C	1.8528	1.4499	1.4215	ND	0.4314	9.4989	0.0216	7.9137	7.8921	1.5852	ND	ND	739	7.48	18
					0.0322	0.0421	0.0125		0.0396	0.2166	0.0075	0.1143	0.1076	0.2366			1.2	0.01	
1999	8	9	14	A,B,C	0.3261	0.1875	0.2326	0.0452	0.0935	1.8924	0.0074	1.4217	1.4143	0.4707	ND	ND	264	7.72	19
					0.0035	0.0059	0.0069	0.0122	0.0045	0.0579	0.0037	0.0683	0.0646	0.0709			1.4	0.01	
1999	8	9	15	A,B,C	0.1421	0.0069	0.0384	0.0315	0.1037	2.4312	0.0119	1.398	1.3861	1.0332	0.0557	0.0025	242.7	7.92	19
					0.0165	0.0007	0.002	0.0017	0.0157	0.1095	0.0049	0.0451	0.0443	0.0656	0.0231	0.001	0.7	0.03	
1999	8	9	16	A,B,C	0.1406	0.0101	0.0467	0.0366	0.0939	1.7547	0.0161	1.5843	1.5682	0.1704	0.0243	0.0011	200.7	7.91	17
					0.0055	0.0023	0.0054	0.0038	0.0077	0.0685	0.0102	0.0588	0.0487	0.118	0.0198	0.0009	1	0.03	
1999	8	9	17	A,B,C	0.1358	0.008	0.0286	0.0206	0.1071	2.4141	0.0388	1.7607	1.7219	0.6534	0.0521	0.0027	117.5	7.92	19
					0.0113	0.0017	0.0053	0.0037	0.013	0.2574	0.0269	0.2329	0.2063	0.081	0.0217	0.0012	0.1	0.04	
1999	8	9	18	A,B,C	0.3378	0.2146	0.2409	0.0263	0.0969	2.9898	ND	1.9155	1.9155	1.0743	ND	ND	445.7	9.58	16
					0.0133	0.004	0.0036	0.0038	0.0155	0.4766		0.0967	0.0967	0.5709			0.3	0.01	
1999	8	9	19	A,B,C	0.2064	0.061	0.0948	0.0338	0.1115	2.0208	0.0022	1.7127	1.7105	0.3081	ND	ND	271.3	7.83	19
					0.0155	0.0107	0.0101	0.0134	0.0056	0.105	0.0018	0.14	0.1382	0.2089			2.8	0.03	
1999	8	9	20	A,B,C	0.2263	0.1219	0.1718	0.0499	0.0545	2.8185	0.0065	2.7405	2.734	0.078	ND	ND	789.7	9.23	17
					0.0174	0.0205	0.0213	0.0037	0.0071	0.0336	0.0053	0.0804	0.0807	0.0469			1.2	0.01	
1999	8	9	21	A,B,C	0.2303	0.0122	0.0739	0.0617	0.1564	2.5758	0.0184	2.217	2.1986	0.3588	ND	ND	596.3	8.59	18
					0.0119	0.0023	0.0095	0.0082	0.0213	0.1059	0.0059	0.098	0.1021	0.0127			0.7	0	
1999	8	9	22	A,B,C	0.5249	0.3295	0.3806	0.0511	0.1443	2.3382	0.0114	2.0949	2.0835	0.2433	ND	ND	655.3	7.67	16
					0.0286	0.0386	0.0377	0.0092	0.0663	0.1033	0.0042	0.0555	0.055	0.1244			0.7	0.03	
1999	8	9	23	A,B,C	0.209	0.0143	0.0921	0.0779	0.1169	19.7655	8.1731	19.584	11.4109	0.1815	ND	ND	176.1	7.53	16
					0.0151	0.002	0.0082	0.007	0.0227	0.4743	2.7834	0.3353	2.8765	0.1919			0.1	0.02	
1999	8	9	24	A,B,C	0.3984	0.2023	0.2924	0.0901	0.106	3.4914	0.0097	2.9868	2.9771	0.5046	ND	ND	2843.3	7.63	13
					0.0405	0.0154	0.0119	0.0131	0.0289	0.0476	0.0055	0.1241	0.1206	0.1456			2.7	0	
1999	8	9	25	A,B,C	0.152	0.0102	0.0782	0.068	0.0738	31.2597	22.8547	31.2159	8.3612	0.0438	ND	ND	1047	8.51	17
					0.0209	0.0005	0.001	0.0015	0.0211	1.3859	1.6322	0.8014	0.8887	0.6081			11.7	0.13	
1999	8	9	30	A,B,C	1.3752	0.769	1.1001	0.3311	0.2751	10.2948	0.0396	8.4402	8.4006	1.8546	5.9221	0.2099	802	7.79	20
					0.0594	0.0884	0.1266	0.0424	0.0818	0.2806	0.0176	0.3108	0.3251	0.3309	0.2314	0.0063	1.2	0.01	
1999	8	9	31	A,B,C	0.3217	0.2063	0.3092	0.1029	0.0125	2.1984	0.0169	1.5939	1.577	0.6045	ND	ND	281.7	7.83	18
					0.0116	0.0094	0.0112	0.016	0.0187	0.0967	0.0138	0.1617	0.1688	0.2487			0.7	0.01	
1999	8	9	32	A,B,C	0.1065	0.0099	0.0667	0.0568	0.0399	1.7508	0.0078	1.2933	1.2855	0.4575	ND	ND	136.2	7.27	20
					0.0027	0.0006	0.0051	0.005	0.0074	0.0219	0.0064	0.0186	0.0123	0.0402			1.3	0.01	
1999	8	9	33	A,B,C	0.2297	0.0716	0.1813	0.1097	0.0484	2.7846	ND	2.511	2.511	0.2736	ND	ND	654.7	9.15	19
					0.0069	0.0156	0.0186	0.0036	0.0123	0.0887		0.0743	0.0743	0.0146			0.7	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	8	19	2	A,B,C	0.4425	0.3508	0.405	0.0542	0.0375	2.5428	0.9713	2.0502	1.0789	0.4926	0.2166	0.0037	432.7	7.47	18
					0.0107	0.0387	0.0362	0.0139	0.0269	0.1797	0.2855	0.1822	0.1034	0.0686	0.039	0.0006	16.8	0.02	
1999	8	19	5	A,B,C	0.5366	0.4863	0.4977	0.0113	0.0389	0.7818	ND	0.8496	0.8496	ND	0.022	0.0002	334.3	7.15	18
					0.0208	0.0022	0.0138	0.0147	0.0074	0.054		0.0181	0.0181		0.0067	0.0001	1.4	0.01	
1999	8	19	10	A,B,C	1.927	1.6343	1.8427	0.2084	0.0843	7.8009	ND	6.9645	6.9645	0.8364	3.8271	0.0343	669.7	7.18	15
					0.0246	0.015	0.0244	0.0112	0.0186	0.1214		0.0994	0.0994	0.1926	0.2298	0.0023	1.4	0	
1999	8	19	14	A,B,C	0.2382	0.1105	0.1688	0.0583	0.0694	1.6227	ND	1.62	1.62	0.0027	0.3071	0.009	311.3	7.7	20
					0.01	0.0082	0.0038	0.0118	0.0113	0.0817		0.0882	0.0882	0.0068	0.034	0.001	0.3	0	
1999	8	19	15	A,B,C	0.1761	0.0226	0.1043	0.0817	0.0718	2.0151	ND	1.7055	1.7055	0.3096	0.6171	0.0074	289.7	7.31	19
					0.0104	0.0049	0.0066	0.0018	0.0142	0.1614		0.0858	0.0858	0.2207	0.1061	0.0014	0.7	0.03	
1999	8	19	16	A,B,C	0.2012	0.0151	0.1071	0.092	0.0941	2.1672	ND	1.8702	1.8702	0.297	0.432	0.003	204.3	7.07	17
					0.0066	0.001	0.0073	0.0066	0.0082	0.0298		0.1095	0.1095	0.1093	0.0167	0.0002	1.9	0.01	
1999	8	19	17	A,B,C	0.2215	0.0185	0.1261	0.1076	0.0954	2.8038	0.009	2.2089	2.1999	0.5949	0.3273	0.0028	135.2	7.16	16
					0.0117	0.0026	0.0094	0.0092	0.0145	0.2531	0.0046	0.1115	0.1112	0.1584	0.1111	0.0009	0.3	0.02	
1999	8	19	18	A,B,C	0.3489	0.1955	0.2628	0.0673	0.0862	2.2353	ND	2.0664	2.0664	0.1689	0.2363	0.1841	575	9.79	18
					0.0066	0.0047	0.0069	0.0063	0.0131	0.0444		0.0121	0.0121	0.0548	0.0064	0.005	0.5	0	
1999	8	19	19	A,B,C	0.3559	0.1975	0.2873	0.0898	0.0686	1.9443	ND	1.3893	1.3893	0.555	0.4775	0.0213	293.7	7.9	21
					0.006	0.007	0.0074	0.0083	0.0075	0.0947		0.0242	0.0242	0.1099	0.0666	0.0019	0.7	0.03	
1999	8	19	20	A,B,C	0.3267	0.2133	0.2605	0.0472	0.0662	2.3859	0.0015	1.9776	1.9761	0.4083	0.186	0.0841	523.3	9.14	20
					0.003	0.0256	0.0071	0.0188	0.0066	0.0608	0.0013	0.0197	0.0187	0.06	0.0165	0.0103	2.7	0.03	
1999	8	19	21	A,B,C	0.2933	0.1271	0.228	0.1009	0.0653	2.1186	0.0069	2.214	2.2071	ND	0.2571	0.0354	447	8.43	20
					0.0066	0.0072	0.0034	0.0053	0.008	0.0243	0.0056	0.2903	0.2847		0.0167	0.0015	0.5	0.02	
1999	8	19	22	A,B,C	0.547	0.4356	0.5132	0.0777	0.0338	1.7859	0.0047	1.3932	1.3885	0.3927	0.1058	0.0036	433.3	7.79	15
					0.039	0.0079	0.0178	0.0129	0.0369	0.0981	0.0038	0.0387	0.0367	0.093	0.0234	0.0006	0.7	0.03	
1999	8	19	23	A,B,C	0.2775	0.0364	0.2351	0.1987	0.0425	21.0924	7.8333	20.4381	12.6048	0.6543	ND	ND	1527.7	7.28	15
					0.0052	0.008	0.0203	0.0186	0.0168	0.9779	3.0476	1.0918	2.004	0.191			2.1	0	
1999	8	19	24	A,B,C	0.102	0.0042	0.0818	0.0776	0.0202	29.529	17.1122	28.9125	11.8003	0.6165	0.0016	ND	3500	7.11	12
					0.0063	0.001	0.0055	0.0054	0.0023	0.7423	5.0934	1.0427	4.0529	0.3095	0.0013		0	0.01	
1999	8	19	25	A,B,C	0.3484	0.1903	0.2992	0.1089	0.0492	3.2244	0.026	2.8974	2.8714	0.327	0.1084	0.021	950	8.61	18
					0.0122	0.0023	0.0107	0.0117	0.0181	0.0436	0.0175	0.1125	0.1166	0.0764	0.0099	0.0016	2.9	0.01	
1999	8	19	27	A,B,C	0.3387	0.199	0.3108	0.1118	0.0279	2.9454	0.0024	2.7039	2.7015	0.2415	0.1184	0.0217	995.3	8.58	18
					0.0069	0.0067	0.0057	0.0124	0.0125	0.0547	0.002	0.0639	0.0631	0.1113	0.0019	0.0006	0.7	0.02	
1999	8	19	28	A,B,C	0.1102	0.0091	0.104	0.0949	0.0062	30.8139	20.9206	29.7381	8.8175	1.0758	0.0029	ND	2463.3	7.41	12
					0.0077	0.0012	0.011	0.0103	0.0034	0.2628	1.5607	0.3779	1.6631	0.3371	0.0024		2.7	0.03	
1999	8	19	30	A,B,C	2.8119	2.15	2.6051	0.4551	0.2068	10.5951	0.025	8.6616	8.6366	1.9335	3.9132	0.1549	686.3	7.84	20
					0.0297	0.0175	0.0898	0.0929	0.1189	0.1484	0.0144	0.0643	0.0538	0.0916	0.0702	0.0006	2.3	0.01	
1999	8	19	31	A,B,C	0.332	0.2515	0.3288	0.0774	0.0031	1.5561	ND	1.3698	1.3698	0.1863	0.1901	0.0034	288	7.47	19
					0.0028	0.0034	0.01	0.0112	0.0097	0.0331		0.1392	0.1392	0.1345	0.0297	0.0006	0.5	0.03	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
					mg / L												uS.cm^{-1}		deg C
1999	8	19	32	A,B,C	0.1792	0.019	0.117	0.098	0.0622	1.512	0.0015	1.3461	1.3446	0.1659	0.2426	0.0083	197.6	7.77	21
					0.0055	0.0023	0.0062	0.0054	0.0117	0.0816	0.0013	0.0577	0.0574	0.1318	0.0049	0.0009	0.5	0.04	
1999	8	19	33	A,B,C	0.2915	0.158	0.2621	0.1041	0.0294	2.3511	ND	2.0727	2.0727	0.2784	0.229	0.1041	511.3	9.12	21
					0.0106	0.0099	0.0117	0.0203	0.0176	0.0396		0.0247	0.0247	0.0227	0.0097	0.004	1.5	0.01	
1999	8	19	34	A,B,C	0.3397	0.2164	0.2924	0.0761	0.0473	1.5345	ND	1.2678	1.2678	0.2667	0.3979	0.0076	284	7.52	18
					0.014	0.0032	0.0178	0.0147	0.0077	0.1052		0.0321	0.0321	0.0777	0.1008	0.0019	1.2	0	
1999	8	30	2	A,B,C	0.359	0.1651	0.2753	0.1102	0.0837	1.6344	0.0015	1.6785	1.677	ND	ND	ND	326.7	7.63	16
					0.0206	0.0098	0.0189	0.0121	0.0077	0.0837	0.0013	0.113	0.1138				0.7	0.01	
1999	8	30	5	A,B,C	0.5487	0.5065	0.5066	0.0001	0.0421	0.9318	ND	1.0734	1.0734	ND	ND	ND	382	7.3	19
					0.0154	0.0043	0.0052	0.0051	0.0102	0.1484		0.0093	0.0093				0.8	0	
1999	8	30	10	A,B,C	2.0133	1.448	1.6625	0.2145	0.3508	10.2627	0.002	8.7039	8.7019	1.5588	4.5931	0.0449	1024.3	7.21	15
					0.0128	0.0665	0.04	0.096	0.0527	0.1732	0.0017	0.156	0.1543	0.114	1.1955	0.0125	1.9	0.03	
1999	8	30	14	A,B,C	0.2226	0.0463	0.1069	0.0607	0.1157	2.6487	0.0021	1.8903	1.8882	0.7584	0.3257	0.012	223	7.82	19
					0.0137	0.017	0.0233	0.0064	0.0252	0.2523	0.0017	0.0657	0.0654	0.1922	0.1473	0.0054	0.5	0.01	
1999	8	30	15	A,B,C	0.284	0.0604	0.1248	0.0644	0.1592	2.8098	0.0106	2.0175	2.0069	0.7923	0.3856	0.008	283.7	7.56	19
					0.0188	0.0072	0.0065	0.0079	0.0127	0.1907	0.0044	0.0836	0.0879	0.1073	0.1582	0.0033	1.9	0.01	
1999	8	30	16	A,B,C	0.2347	0.0193	0.0958	0.0766	0.1389	2.3553	ND	1.6833	1.6833	0.672	0.4207	0.0089	234	7.57	16
					0.0174	0.0037	0.0215	0.0179	0.0165	0.1312		0.0765	0.0765	0.0727	0.1989	0.0047	6.9	0.05	
1999	8	30	17	A,B,C	0.3338	0.0213	0.0996	0.0783	0.2342	5.8317	0.0297	4.1007	4.071	1.731	1.4173	0.0933	112.1	8.07	19
					0.0111	0.0011	0.0132	0.0132	0.0199	0.5153	0.0242	0.361	0.3653	0.4984	0.2674	0.0182	0.9	0	
1999	8	30	18	A,B,C	0.3599	0.1885	0.2318	0.0433	0.1282	2.9802	0.011	1.9773	1.9663	1.0029	0.0146	0.0012	328	8.14	14
					0.0145	0.0107	0.0114	0.0167	0.0046	0.146	0.0023	0.0425	0.0405	0.1875	0.012	0.001	0.5	0.01	
1999	8	30	19	A,B,C	0.2206	0.0217	0.0798	0.0581	0.1408	2.3901	ND	1.8132	1.8132	0.5769	1.3052	0.0224	174.4	7.47	16
					0.0113	0.0071	0.0127	0.0064	0.0147	0.1264		0.1144	0.1144	0.0595	0.0531	0.0011	0.4	0.01	
1999	8	30	20	A,B,C	0.3169	0.2071	0.2603	0.0532	0.0566	2.6973	ND	2.3454	2.3454	0.3519	0.0434	0.0008	289.3	7.53	19
					0.0133	0.013	0.0127	0.0198	0.0074	0.0279		0.0469	0.0469	0.0725	0.0238	0.0004	0.5	0.01	
1999	8	30	21	A,B,C	0.3476	0.1687	0.2404	0.0717	0.1071	2.9955	ND	2.5929	2.5929	0.4026	ND	ND	535.7	8.65	20
					0.0134	0.0067	0.0149	0.0086	0.0282	0.0829		0.3212	0.3212	0.2474			0.3	0.01	
1999	8	30	30	A,B,C	2.3452	0.4797	0.8964	0.4168	1.4488	15.468	0.0025	6.9876	6.9851	8.4804	4.5779	0.0708	1041.7	7.42	20
					0.0601	0.1381	0.0689	0.0823	0.1279	0.1681	0.0021	2.2876	2.2866	2.4251	0.0294	0.0026	1.4	0.02	
1999	8	30	31	A,B,C	0.3912	0.1057	0.1933	0.0876	0.1979	2.6988	ND	1.3878	1.3878	1.311	0.081	0.0018	370.3	7.58	18
					0.0186	0.0111	0.0007	0.0115	0.019	0.0553		0.0861	0.0861	0.075	0.0335	0.0007	5.9	0.01	
1999	8	30	32	A,B,C	0.3878	0.0508	0.1166	0.0658	0.2711	2.6208	ND	1.3833	1.3833	1.2375	0.3752	0.0056	284.3	7.41	18
					0.0143	0.0135	0.0125	0.0078	0.0109	0.0843		0.0349	0.0349	0.0513	0.0013	0.0001	0.3	0.01	
1999	8	30	33	A,B,C	0.3324	0.1608	0.2458	0.085	0.0866	2.8251	0.0031	2.5509	2.5478	0.2742	0.0872	0.0013	562.7	7.43	19
					0.0027	0.0096	0.0085	0.0178	0.0106	0.0512	0.0026	0.0965	0.0946	0.0471	0.0712	0.0011	1.4	0.01	
1999	8	30	34	A,B,C	0.3522	0.1473	0.2284	0.0812	0.1237	2.1012	ND	1.3029	1.3029	0.7983	0.1195	0.002	358.3	7.45	18
					0.0147	0.026	0.0284	0.0025	0.0174	0.1305		0.0734	0.0734	0.1934	0.0328	0.0005	6	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	9	9	2	A,B,C	0.6733	0.4586	0.6187	0.1602	0.0546	2.0652	0.0029	1.443	1.4401	0.6222	ND	ND	688.3	8.15	17
					0.0635	0.0768	0.0866	0.0098	0.0231	0.0762	0.0023	0.0342	0.0349	0.056			14.8	0.02	
1999	9	9	5	A,B,C	0.5544	0.5201	0.5825	0.0624	ND	0.894	ND	0.7923	0.7923	0.1017	ND	ND	418.7	7.35	17
					0.0082	0.0019	0.0111	0.0122		0.034		0.0294	0.0294	0.0612			0.5	0.03	
1999	9	9	10	A,B,C	1.0546	0.6479	0.8213	0.1734	0.2333	8.5101	0.0017	6.7986	6.7969	1.7115	2.7928	0.0256	699.3	7.2	14
					0.0177	0.014	0.0152	0.027	0.0328	0.173	0.0014	0.129	0.1278	0.048	1.016	0.0088	0.7	0.02	
1999	9	9	14	A,B,C	0.1361	0.021	0.0622	0.0412	0.0739	2.0637	0.0169	1.5957	1.5788	0.468	0.0762	0.0012	287.7	7.44	17
					0.0143	0.0036	0.0064	0.0042	0.0135	0.0635	0.0138	0.037	0.0467	0.0982	0.0425	0.0007	0.3	0	
1999	9	9	15	A,B,C	0.1228	0.0106	0.0401	0.0296	0.0826	2.1789	ND	1.3137	1.3137	0.8652	0.2196	0.0068	262.7	7.73	16
					0.0036	0.0021	0.0036	0.0028	0.0036	0.0901		0.025	0.025	0.0893	0.0148	0.0006	0.7	0.01	
1999	9	9	16	A,B,C	0.1549	0.0205	0.0654	0.0449	0.0896	2.1219	ND	1.4454	1.4454	0.6765	0.455	0.0074	229.3	7.43	15
					0.0088	0.0057	0.0099	0.0057	0.003	0.0439		0.0606	0.0606	0.0264	0.0575	0.0013	1	0.03	
1999	9	9	17	A,B,C	0.1136	0.0161	0.0406	0.0245	0.073	2.4633	0.0095	1.5294	1.5199	0.9339	0.1592	0.0029	122.4	7.49	16
					0.0114	0.0026	0.0084	0.0067	0.0079	0.3197	0.0078	0.0641	0.0569	0.256	0.0107	0.0001	0	0.02	
1999	9	9	18	A,B,C	0.2237	0.1483	0.1971	0.0488	0.0265	2.6385	0.0041	2.3394	2.3353	0.2991	0.1163	0.0732	616.3	9.48	17
					0.005	0.0072	0.0075	0.0146	0.0123	0.0311	0.0017	0.0129	0.0134	0.0302	0.0562	0.035	1	0.01	
1999	9	9	19	A,B,C	0.1917	0.028	0.0727	0.0448	0.1189	2.292	0.003	1.5102	1.5072	0.7818	0.5567	0.0063	252.7	7.27	17
					0.0097	0.0042	0.0131	0.0093	0.0037	0.1309	0.0025	0.0535	0.0536	0.1039	0.0795	0.0012	0.3	0.03	
1999	9	9	20	A,B,C	0.4787	0.1132	0.1898	0.0766	0.2889	5.4672	ND	3.3162	3.3162	2.151	ND	ND	1066.3	8.7	17
					0.0284	0.0355	0.0327	0.0028	0.0338	0.2724		0.0543	0.0543	0.2785			1	0.01	
1999	9	9	21	A,B,C	0.2325	0.0384	0.0934	0.055	0.1391	3.2757	ND	2.3322	2.3322	0.9435	0.2169	0.0056	430.7	7.64	18
					0.014	0.0027	0.0038	0.0023	0.0103	0.0936		0.0739	0.0739	0.1541	0.097	0.0026	0.7	0.01	
1999	9	9	30	A,B,C	2.3155	1.4585	1.5539	0.0954	0.7616	15.657	0.0055	11.8278	11.8223	3.8292	5.7155	0.082	727.3	7.39	18
					0.0278	0.0423	0.0779	0.0388	0.06	0.3312	0.0023	0.1277	0.1265	0.2732	0.2762	0.0051	0.7	0.01	
1999	9	9	31	A,B,C	0.2777	0.2045	0.2303	0.0258	0.0474	1.7928	0.0071	1.407	1.3999	0.3858	0.1787	0.0063	312.7	7.78	17
					0.0057	0.0092	0.0024	0.0078	0.008	0.0837	0.0058	0.0533	0.0479	0.0463	0.004	0.0002	0.3	0.01	
1999	9	9	32	A,B,C	0.2136	0.0134	0.0294	0.016	0.1842	2.9853	0.0076	1.9776	1.97	1.0077	0.3036	0.0099	213.7	7.75	17
					0.0132	0.0017	0.0038	0.0033	0.0134	0.0341	0.0033	0.1085	0.1093	0.1355	0.0469	0.0016	11.1	0	
1999	9	9	33	A,B,C	0.5306	0.09	0.1449	0.055	0.3856	4.8873	0.0122	2.2374	2.2252	2.6499	0.1945	0.0043	465.3	7.59	19
					0.0493	0.0107	0.0158	0.006	0.0352	0.321	0.0004	0.0338	0.0334	0.3402	0.1588	0.0035	1.4	0	
1999	9	9	34	A,B,C	0.3018	0.1964	0.2414	0.045	0.0604	1.8012	0.0109	1.3323	1.3214	0.4689	0.0214	0.0004	320.7	7.56	16
					0.0045	0.0091	0.0011	0.0099	0.0038	0.0055	0.0069	0.031	0.0364	0.0339	0.0175	0.0004	1.4	0.01	
1999	9	20	2	A,B,C	0.3347	0.204	0.2543	0.0504	0.0804	2.0667	0.0259	1.5663	1.5404	0.5004	0.0355	0.0009	421.3	7.66	17
					0.0143	0.0104	0.0087	0.0029	0.006	0.2004	0.016	0.1146	0.1031	0.0938	0.0272	0.0007	3.3	0.02	
1999	9	20	10	A,B,C	2.2076	1.76	1.9481	0.1881	0.2595	17.5008	1.9297	15.6117	13.682	1.8891	11.6705	0.0867	802.7	7.1	12
					0.1676	0.0432	0.059	0.0196	0.11	0.427	1.0626	0.5556	0.7387	0.1841	0.5526	0.0064	2.2	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	9	20	14	A,B,C	0.118	0.023	0.0425	0.0195	0.0755	2.2263	0.1002	1.6497	1.5495	0.5766	0.4594	0.0066	294.7	7.37	15
					0.0094	0.004	0.0094	0.0089	0.0176	0.0872	0.0682	0.0645	0.0879	0.1488	0.0133	0.0002	2.2	0	
1999	9	20	15	A,B,C	0.1677	0.0375	0.0756	0.0381	0.0921	2.3331	0.0661	1.6899	1.6238	0.6432	0.2218	0.0036	337.7	7.44	14
					0.0221	0.0182	0.0273	0.0091	0.0075	0.0395	0.0338	0.1397	0.1116	0.1028	0.018	0.0004	0.7	0.01	
1999	9	20	16	A,B,C	0.2641	0.0298	0.0917	0.0619	0.1724	3.1041	0.0149	1.8351	1.8202	1.269	0.709	0.0021	251.3	6.68	14
					0.0163	0.0068	0.0247	0.0181	0.0215	0.05	0.0037	0.1389	0.142	0.1593	0.0898	0.0003	2.1	0.04	
1999	9	20	17	A,B,C	0.1326	0.0167	0.0323	0.0156	0.1003	2.5446	0.0021	1.6962	1.6941	0.8484	0.298	0.0025	136.5	7.16	14
					0.0139	0.0012	0.0004	0.0007	0.0139	0.0845	0.0017	0.0418	0.0435	0.0741	0.0085	0.0001	1.2	0	
1999	9	20	18	A,B,C	0.2086	0.0728	0.1019	0.0291	0.1067	2.973	0.1027	2.3517	2.249	0.6213	0.3944	0.2134	559.3	9.3	17
					0.0266	0.0024	0.0044	0.0044	0.0299	0.0786	0.061	0.0608	0.0323	0.0779	0.0129	0.0096	0.3	0.01	
1999	9	20	19	A,B,C	0.1667	0.0406	0.0742	0.0335	0.0925	2.0835	0.0039	1.491	1.4871	0.5925	0.5168	0.007	294.7	7.37	15
					0.0409	0.0081	0.0072	0.0019	0.0341	0.1663	0.0032	0.0189	0.0193	0.1821	0.0533	0.0004	1	0.03	
1999	9	20	20	A,B,C	0.3508	0.0295	0.0625	0.033	0.2883	4.1376	0.0191	2.4978	2.4787	1.6398	0.0473	0.0091	746.7	8.6	16
					0.0267	0.0079	0.008	0.0005	0.0187	0.1611	0.0046	0.0088	0.0126	0.169	0.0206	0.0042	2.6	0.02	
1999	9	20	21	A,B,C	0.2159	0.0523	0.1019	0.0496	0.114	2.7561	0.0137	2.1975	2.1838	0.5586	0.2684	0.0051	448.7	7.53	18
					0.007	0.007	0.0151	0.0131	0.0221	0.0868	0.0033	0.0233	0.0266	0.1088	0.1462	0.0027	19.1	0.01	
1999	9	20	30	A,B,C	2.5821	1.7888	2.1595	0.3707	0.4227	17.7699	0.0809	14.9169	14.836	2.853	11.0572	0.1096	801.7	7.22	17
					0.0191	0.0196	0.1232	0.137	0.1356	0.2141	0.0494	1.305	1.2768	1.4491	0.1386	0.0056	1.1	0.02	
1999	9	20	31	A,B,C	0.2217	0.1539	0.1959	0.0421	0.0258	1.8819	0.0017	1.5261	1.5244	0.3558	0.3594	0.0069	319	7.51	16
					0.0292	0.0173	0.0163	0.0076	0.0165	0.0418	0.0014	0.054	0.0527	0.013	0.051	0.001	2.2	0.01	
1999	9	20	32	A,B,C	0.0844	0.0145	0.0235	0.0091	0.0608	2.2827	0.0041	1.4745	1.4704	0.8082	0.2885	0.0045	173.2	7.42	18
					0.0197	0.0005	0.0016	0.0014	0.0201	0.0734	0.0017	0.0211	0.0194	0.061	0.0045	0.0002	0.9	0.02	
1999	9	20	33	A,B,C	0.2987	0.0864	0.1453	0.0589	0.1534	3.4944	0.0239	2.4213	2.3974	1.0731	0.2118	0.0109	576	8	17
					0.0182	0.0021	0.0075	0.0056	0.0152	0.1218	0.0075	0.0996	0.0947	0.1226	0.1163	0.0057	1.2	0.03	
1999	9	20	34	A,B,C	0.3113	0.1855	0.231	0.0455	0.0804	2.0616	0.0016	1.4001	1.3985	0.6615	0.2406	0.0038	334.3	7.43	15
					0.0235	0.0223	0.0205	0.0024	0.003	0.0653	0.0013	0.075	0.0762	0.1343	0.0613	0.0009	4.9	0.01	
1999	9	30	2	A,B,C	0.402	0.1153	0.2391	0.1238	0.1629	2.1693	0.1263	1.5834	1.4571	0.5859	ND	ND	487.3	7.46	15
					0.0143	0.0367	0.0088	0.0291	0.0171	0.1676	0.0903	0.1173	0.027	0.0511			4.4	0.02	
1999	9	30	10	A,B,C	2.1276	1.4152	2.0507	0.6355	0.0769	16.101	0.0209	15.4662	15.4453	0.6348	11.0453	0.0758	834	7.06	8
					0.0203	0.1241	0.0851	0.207	0.091	0.1215	0.0015	0.2825	0.2813	0.1611	0.2961	0.0033	1.2	0.01	
1999	9	30	14	A,B,C	0.0834	0.0148	0.064	0.0492	0.0194	1.7322	0.0139	1.6737	1.6598	0.0585	0.0666	0.001	215	7.39	12
					0.0098	0.0034	0.0108	0.0079	0.0171	0.0464	0.0024	0.056	0.0558	0.056	0.0544	0.0008	0	0	
1999	9	30	15	A,B,C	0.1495	0.0094	0.0589	0.0495	0.0906	2.2128	0.0159	1.6215	1.6056	0.5913	0.1198	0.0038	285	7.76	12
					0.0155	0.0011	0.024	0.0236	0.0136	0.1159	0.0043	0.1647	0.1612	0.0799	0.0978	0.0031	0.5	0.01	
1999	9	30	16	A,B,C	0.1959	0.0135	0.0447	0.0312	0.1512	2.1921	0.0051	1.4355	1.4304	0.7566	0.2914	0.0025	215.3	7.16	11
					0.0181	0.0024	0.0042	0.0062	0.0221	0.0736	0.0021	0.0289	0.0279	0.0452	0.0474	0.0005	1.8	0.01	
1999	9	30	17	A,B,C	0.2137	0.0175	0.0396	0.0221	0.1741	2.9814	0.003	1.752	1.749	1.2294	0.2078	0.0018	128.8	7.15	10
					0.0083	0.0015	0.0013	0.0025	0.0085	0.1472	0.0024	0.0451	0.0473	0.1532	0.0848	0.0007	0.2	0.02	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	9	30	18	A,B,C	0.1979	0.0617	0.1516	0.0899	0.0463	2.6115	0.0266	2.3064	2.2798	0.3051	ND	ND	572	9.26	14
					0.0193	0.0075	0.0266	0.0208	0.0453	0.0315	0.0022	0.104	0.1022	0.0903			0.5	0.01	
1999	9	30	19	A,B,C	0.0778	0.0092	0.0488	0.0396	0.029	1.7559	0.0097	1.4667	1.457	0.2892	0.2688	0.0028	271.3	7.26	11
					0.0125	0.0002	0.0036	0.0038	0.0151	0.0719	0.0015	0.0509	0.0505	0.0312	0.1194	0.0013	1.4	0.02	
1999	9	30	20	A,B,C	0.4102	0.0948	0.2289	0.1341	0.1812	4.1265	0.0241	2.8632	2.8391	1.2633	ND	ND	543.3	7.65	13
					0.0263	0.0031	0.0054	0.0078	0.021	0.3574	0.0036	0.2132	0.2102	0.2066			44.5	0.04	
1999	9	30	21	A,B,C	0.2336	0.052	0.1205	0.0686	0.113	2.7897	0.0221	2.2167	2.1946	0.573	ND	ND	357	7.3	15
					0.0318	0.0043	0.0062	0.0034	0.0269	0.182	0.0042	0.0334	0.0309	0.1568			0.8	0	
1999	9	30	30	A,B,C	2.0215	1.535	1.8766	0.3416	0.1449	16.839	0.0338	12.7515	12.7177	4.0875	11.0022	0.1376	771.3	7.33	14
					0.0275	0.0766	0.0374	0.0566	0.0478	0.1974	0.007	0.307	0.3001	0.1371	0.139	0.0025	3.1	0	
1999	9	30	31	A,B,C	0.2005	0.0681	0.1187	0.0507	0.0817	2.1513	0.0057	0.0303	0.0246	2.121	ND	ND	307.7	7.67	12
					0.0046	0.0109	0.0113	0.0004	0.0115	0.1508	0.0047	0.0247	0.0274	0.1346			1.7	0.02	
1999	9	30	32	A,B,C	0.0941	0.0106	0.03	0.0193	0.0642	2.2809	ND	ND	ND	2.2809	0.4066	0.0023	134.9	6.98	14
					0.0131	0.0052	0.0037	0.0042	0.0107	0.1417				0.1417	0.02	0.0002	0.5	0.01	
1999	9	30	33	A,B,C	0.1443	0.0183	0.0575	0.0392	0.0868	2.8293	0.0822	0.0345	ND	2.7948	0.0804	0.0008	282	7.21	13
					0.0147	0.0021	0.0106	0.0094	0.0101	0.2417	0.0287	0.0282		0.2199	0.0656	0.0006	3.7	0.01	
1999	9	30	34	A,B,C	0.2045	0.0405	0.0961	0.0556	0.1084	2.1714	0.0085	0.4386	0.4301	1.7328	ND	ND	314.3	7.36	11
					0.0121	0.0034	0.0117	0.0097	0.0176	0.1138	0.0069	0.3581	0.3512	0.3427			2.6	0.01	
1999	10	12	10	A,B,C	2.1264	1.2678	1.1679	ND	0.9585	10.5108	0.0673	8.5365	8.4692	1.9743	4.3616	0.0275	673	7.03	9
					0.0265	0.0436	0.0135		0.0132	0.1214	0.0243	0.7715	0.7711	0.6965	0.7857	0.0041	2.6	0.01	
1999	10	12	14	A,B,C	0.1308	0.0011	0.2497	0.2485	ND	2.247	0.0293	1.2144	1.1851	1.0326	0.3211	0.0041	202	7.33	13
					0.0068	0	0.012	0.012		0.108	0.0201	0.4998	0.4899	0.4754	0.0064	0.0004	0.5	0.04	
1999	10	12	15	A,B,C	0.1353	0.0017	0.2496	0.2479	ND	2.2461	0.0696	1.4679	1.3983	0.7782	ND	ND	334.3	7.43	12
					0.0152	0.0005	0.014	0.0137		0.1261	0.0235	0.0583	0.0709	0.0818			2.6	0	
1999	10	12	16	A,B,C	0.1363	0.0071	0.2203	0.2132	ND	1.9824	0.0095	1.3353	1.3258	0.6471	0.2495	0.003	262.3	7.31	9
					0.016	0.0032	0.0077	0.0091		0.0695	0.0039	0.0236	0.0274	0.085	0.0255	0.0003	2.2	0.01	
1999	10	12	17	A,B,C	0.0821	0.0023	0.2193	0.2171	ND	1.974	0.0088	1.392	1.3832	0.582	ND	ND	140.4	7.12	11
					0.0094	0.0014	0.0048	0.0036		0.0431	0.0041	0.0837	0.0805	0.0429			0.2	0	
1999	10	12	18	A,B,C	0.3604	0.0858	0.246	0.1601	0.1144	3.6876	0.0394	2.4075	2.3681	1.2801	0.9334	0.269	611.7	8.83	15
					0.0092	0.0019	0.0717	0.0735	0.0706	0.1071	0.0111	0.1311	0.1211	0.1386	0.0081	0.0059	1.1	0.02	
1999	10	12	19	A,B,C	0.1561	0.0272	0.0968	0.0696	0.0592	2.1312	0.0042	1.6896	1.6854	0.4416	0.2899	0.0029	200.3	7.24	12
					0.0076	0.0117	0.0098	0.005	0.0052	0.0255	0.0034	0.0205	0.0174	0.0201	0.1229	0.0013	0.3	0.02	
1999	10	12	20	A,B,C	0.2142	0.0479	0.1154	0.0675	0.0988	2.3007	ND	1.5591	1.5591	0.7416	0.5147	0.0084	247.3	7.45	14
					0.0206	0.0153	0.022	0.007	0.0025	0.0319		0.0435	0.0435	0.0577	0.0997	0.0014	0.7	0.02	
1999	10	12	21	A,B,C	0.1082	0.0033	0.05	0.0468	0.0582	2.3709	0.0232	1.9353	1.9121	0.4356	0.1828	0.0051	376	7.7	14
					0.0159	0.0004	0.011	0.0109	0.0088	0.1996	0.0121	0.1906	0.1794	0.0155	0.0934	0.0027	0.5	0.01	
1999	10	12	30	A,B,C	2.7728	2.0021	2.5824	0.5803	0.1905	14.1477	4.7794	12.8928	8.1134	1.2549	6.0552	0.0973	708	7.42	14
					0.0507	0.0096	0.0232	0.0267	0.0376	0.052	0.7493	0.0931	0.7401	0.0945	0.9192	0.0217	2.5	0.03	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	10	12	31	A,B,C	0.1936	0.0364	0.1154	0.079	0.0783	2.0235	0.0425	1.3929	1.3504	0.6306	0.4179	0.0218	315	7.4	12
					0.0207	0.0064	0.0065	0.0025	0.0222	0.1442	0.0174	0.0611	0.053	0.1563	0.0407	0.0123	2.2	0.01	
1999	10	12	32	A,B,C	0.0845	0.007	0.0469	0.0399	0.0376	2.0034	0.0313	1.6191	1.5878	0.3843	0.3465	0.0016	134.3	6.91	13
					0.003	0.0005	0.0037	0.0032	0.0066	0.2162	0.0098	0.1906	0.1865	0.0559	0.035	0.0002	0.1	0.01	
1999	10	12	33	A,B,C	0.1895	0.0106	0.0747	0.0641	0.1148	2.6685	0.0106	1.7427	1.7321	0.9258	0.4646	0.0121	333	7.65	14
					0.0049	0.0024	0.0029	0.0005	0.0037	0.0584	0.0025	0.0767	0.0774	0.0923	0.0425	0.0012	0.5	0	
1999	10	12	34	A,B,C	0.2461	0.0882	0.155	0.0668	0.0911	1.7937	0.0047	1.4289	1.4242	0.3648	0.2835	0.0105	323	7.16	11
					0.0011	0.0032	0.0191	0.0189	0.019	0.0841	0.002	0.0251	0.024	0.0791	0.0708	0.0068	0.9	0	
1999	10	25	10	A,B,C	2.3618	1.169	2.0829	0.9139	0.2788	12.2034	0.0216	12.1779	12.1563	0.0255	9.3171	0.0744	743.5	7.13	5
					0.0078	0.1186	0.0609	0.15	0.0684	0.1115	0.014	0.1301	0.1357	0.0495	0.1758	0.0007	0.3	0	
1999	10	25	14	A,B,C	0.167	0.0782	0.1302	0.052	0.0368	1.317	ND	1.1616	1.1616	0.1554	0.1743	0.0112	463.3	8.06	9
					0.0102	0.0128	0.0153	0.003	0.0095	0.0526		0.0438	0.0438	0.0913	0.0143	0.0007	1.7	0.02	
1999	10	25	15	A,B,C	0.2115	0.0145	0.0761	0.0616	0.1354	2.997	1.3373	2.9013	1.564	0.0957	0.0565	0.0063	474.3	8.35	8
					0.0339	0.0021	0.0047	0.0051	0.0371	0.5914	0.2489	0.5178	0.3599	0.1418	0.0461	0.0051	1.1	0.02	
1999	10	25	16	A,B,C	0.6907	0.2703	0.6022	0.332	0.0885	3.1338	0.9008	3.2526	2.3518	ND	0.3685	0.0199	715.7	7.98	6
					0.0138	0.0153	0.0172	0.0318	0.0307	0.1822	0.1033	0.0635	0.1413		0.0122	0.0007	0.3	0.01	
1999	10	25	18	A,B,C	0.3057	0.038	0.1125	0.0745	0.1932	3.2157	0.0049	2.4372	2.4323	0.7785	0.6602	0.2399	595	8.98	9
					0.0065	0.0032	0.0068	0.0036	0.0092	0.0468	0.004	0.041	0.044	0.0462	0.0062	0.0015	1.2	0	
1999	10	25	19	A,B,C	0.2229	0.0263	0.0907	0.0645	0.1322	1.3752	ND	1.4913	1.4913	ND	0.9925	0.0201	567.7	7.54	8
					0.0534	0.0089	0.0349	0.0297	0.0255	0.0704		0.1913	0.1913		0.0412	0.0002	1.8	0.02	
1999	10	25	20	A,B,C	0.1852	0.0238	0.0581	0.0343	0.1271	2.5506	0.0163	1.9113	1.895	0.6393	0.4024	0.0069	375.3	7.47	8
					0.0268	0.0069	0.0201	0.0189	0.0228	0.1714	0.0133	0.0455	0.0354	0.1264	0.0247	0.0004	1.1	0	
1999	10	25	21	A,B,C	0.2656	0.0193	0.0919	0.0726	0.1736	3.0501	0.0019	2.3745	2.3726	0.6756	0.6598	0.0542	786.3	8.18	12
					0.0098	0.002	0.0059	0.0039	0.0044	0.0374	0.0015	0.0493	0.0481	0.0364	0.0361	0.0029	1.4	0	
1999	10	25	30	A,B,C	2.6229	1.0842	2.411	1.3268	0.2119	14.7642	ND	15.0072	15.0072	ND	11.9583	0.1227	744	7.24	10
					0.0272	0.1484	0.0051	0.1458	0.025	0.1725		0.2077	0.2077		0.0714	0.0018	1.2	0	
1999	10	25	31	A,B,C	0.3569	0.1781	0.2565	0.0783	0.1004	2.0262	ND	1.6611	1.6611	0.3651	0.3205	0.0164	517.3	7.86	9
					0.0034	0.0089	0.0071	0.0064	0.0065	0.0425		0.0683	0.0683	0.1107	0.0412	0.0036	0.3	0.04	
1999	10	25	32	A,B,C	0.0848	0.0151	0.0398	0.0247	0.045	1.8105	0.0181	1.6668	1.6487	0.1437	0.3308	0.0021	170.4	7.04	11
					0.0117	0.0005	0.0016	0.0014	0.011	0.1846	0.0103	0.169	0.1589	0.0272	0.038	0.0003	0.1	0.01	
1999	10	25	33	A,B,C	0.1446	0.0181	0.0508	0.0327	0.0938	2.1788	0.0112	1.8537	1.8425	0.3251	0.5328	0.0263	504.7	7.94	8
					0.0052	0.0022	0.0061	0.0041	0.0063	0.0552	0.0091	0.0593	0.0683	0.0973	0.0062	0.0007	0.7	0.01	
1999	10	25	34	A,B,C	0.4411	0.2288	0.3358	0.107	0.1052	2.2407	1.0415	2.1414	1.0999	0.0993	0.569	0.0278	526	7.93	7
					0.0288	0.0306	0.039	0.0101	0.0167	0.0884	0.0177	0.2583	0.2459	0.1699	0.0045	0.0009	0.9	0.02	
1999	11	17	10	A,B,C	2.3264	2.0169	2.2071	0.1902	0.1193	18.5097	0.0584	17.0613	17.0029	1.4484	13.9438	0.0879	763	7.03	6
					0.0345	0.0016	0.0415	0.0405	0.0524	0.1985	0.0145	0.1818	0.1675	0.0605	0.2246	0.0022	0.5	0.01	
1999	11	17	14	A,B,C	0.4345	0.4128	0.3537	ND	0.0808	3.1467	1.3138	2.7966	1.4828	0.3501	0.2283	0.0084	507.3	7.8	7
					0.0107	0.0012	0.0027		0.0083	0.0798	0.0383	0.0661	0.0635	0.0152	0.0274	0.0011	0.3	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	11	17	15	A,B,C	0.3842	0.3618	0.3945	0.0328	ND	5.6871	3.8111	5.5416	1.7305	0.1455	0.1735	0.0053	613.3	7.72	4
					0.0024	0.0043	0.0127	0.0169		0.0486	0.0087	0.0353	0.0439	0.0839	0.0378	0.0012	0.7	0	
1999	11	17	16	A,B,C	0.6927	0.7398	0.6246	ND	0.0681	4.5522	2.7636	4.5228	1.7592	0.0294	0.2323	0.0063	636.7	7.67	5
					0.0139	0.0037	0.0017		0.0154	0.1483	0.0328	0.2004	0.1684	0.0539	0.0418	0.001	0.5	0.01	
1999	11	17	18	A,B,C	0.6025	0.3543	0.3884	0.0342	0.2141	6.8334	0.1954	5.3577	5.1623	1.4757	2.4207	0.1153	491.3	7.92	6
					0.0081	0.0031	0.0133	0.0158	0.015	0.0346	0.0314	0.071	0.0626	0.0947	0.2226	0.0108	0.5	0.01	
1999	11	17	19	A,B,C	0.4584	0.4218	0.3833	ND	0.0751	2.9742	1.3282	2.7105	1.3823	0.2637	0.2187	0.0081	519.3	7.81	6
					0.007	0.0044	0.0084		0.0154	0.0816	0.0249	0.0229	0.0057	0.0654	0.0378	0.0014	0.3	0	
1999	11	17	20	A,B,C	0.2001	0.1194	0.1677	0.0483	0.0324	3.1338	0.4432	2.6706	2.2274	0.4632	0.4474	0.0067	363.3	7.41	7
					0.0203	0.0093	0.0077	0.0034	0.0274	0.1162	0.0226	0.2287	0.2067	0.2195	0.032	0.0005	0.5	0.01	
1999	11	17	21	A,B,C	0.0872	0.043	0.0869	0.044	0.0002	2.3652	0.4884	2.1246	1.6362	0.2406	0.2373	0.0005	608	6.61	7
					0.0045	0.0017	0.0024	0.0007	0.0049	0.0932	0.0024	0.0112	0.0128	0.1025	0.009	0	0.5	0	
1999	11	17	30	A,B,C	2.4668	2.1509	2.4522	0.3014	0.0146	22.3962	0.1671	19.2258	19.0587	3.1704	18.311	0.1386	703.3	7.11	7
					0.0626	0.0165	0.0803	0.0638	0.0367	0.1195	0.035	0.1555	0.1641	0.1104	0.1033	0.0022	0.5	0.01	
1999	11	17	31	A,B,C	0.395	0.4203	0.4217	0.0015	ND	3.3219	0.6618	2.598	1.9362	0.7239	0.5829	0.0222	550.7	7.82	6
					0.0313	0.0129	0.014	0.0117		0.0845	0.0191	0.1203	0.1046	0.0896	0.0521	0.0022	0.5	0	
1999	11	17	32	A,B,C	0.086	0.0459	0.0719	0.0261	0.0141	2.5239	0.5022	2.2854	1.7832	0.2385	0.2599	0.0026	531.3	7.23	6
					0.0103	0.0021	0.016	0.0153	0.0061	0.1604	0.0103	0.0971	0.0875	0.0647	0.0225	0.0002	0.5	0.02	
1999	11	17	33	A,B,C	0.0921	0.0469	0.0818	0.0349	0.0103	2.4459	0.4944	2.1267	1.6323	0.3192	0.2665	0.0018	543.3	7.05	6
					0.0019	0	0.004	0.004	0.0027	0.0285	0.0022	0.0365	0.0387	0.0426	0.0151	0.0001	0.5	0	
1999	11	17	34	A,B,C	0.5274	0.5204	0.5251	0.0046	0.0024	3.0804	0.9366	2.7594	1.8228	0.321	0.3956	0.0107	543.3	7.66	7
					0.0108	0.0203	0.0128	0.0157	0.0141	0.0286	0.0071	0.0081	0.0139	0.0312	0.0931	0.0025	0.5	0.01	
1999	11	29	10	A,B,C	2.5324	0.7556	2.133	1.3774	0.3993	17.9682	0.0219	14.727	14.7051	3.2412	16.1231	0.1694	736.3	7.25	5
					0.0373	0.2173	0.0411	0.2257	0.0562	0.0455	0.0078	0.2152	0.2225	0.1704	0.0397	0.004	0.7	0.01	
1999	11	29	14	A,B,C	0.3034	0.1114	0.1812	0.0698	0.1222	2.2203	ND	1.3569	1.3569	0.8634	0.4909	0.029	604	8.02	5
					0.0353	0.0056	0.0111	0.0153	0.0388	0.3314		0.0938	0.0938	0.3757	0.0556	0.0032	0.9	0.01	
1999	11	29	15	A,B,C	0.2444	0.0661	0.1378	0.0718	0.1066	6.9987	4.3862	6.1473	1.7611	0.8514	0.0251	0.0002	732.7	7.14	4
					0.0104	0.0043	0.0033	0.006	0.0103	0.3695	0.4169	0.3747	0.0427	0.0309	0.0205	0.0002	0.7	0.01	
1999	11	29	16	A,B,C	0.7239	0.4293	0.5985	0.1692	0.1254	3.5172	ND	2.6997	2.6997	0.8175	0.2219	0.0162	872.3	8.12	5
					0.0325	0.02	0.0206	0.012	0.0156	0.2394		0.2265	0.2265	0.0681	0.0152	0.0013	1	0.01	
1999	11	29	18	A,B,C	0.5141	0.0352	0.1452	0.11	0.3689	6.1425	0.0113	3.2052	3.1939	2.9373	2.4327	0.1603	564.3	8.07	5
					0.0071	0.0032	0.0083	0.0058	0.0129	0.1042	0.0043	0.1646	0.1635	0.0954	0.0491	0.0021	0.7	0.01	
1999	11	29	19	A,B,C	0.255	0.119	0.2038	0.0847	0.0512	1.6626	ND	1.2996	1.2996	0.363	0.3302	0.0193	599.3	8.02	6
					0.0109	0.0064	0.007	0.0015	0.0041	0.0623		0.0534	0.0534	0.0355	0.0042	0.0009	7.4	0.03	
1999	11	29	20	A,B,C	0.1512	0.0081	0.0479	0.0398	0.1033	2.5419	0.0106	1.6863	1.6757	0.8556	0.3809	0.0298	427.3	8.15	5
					0.0055	0.0024	0.0033	0.0041	0.003	0.0859	0.0087	0.0784	0.0699	0.0161	0.0562	0.0045	1	0.01	
1999	11	29	21	A,B,C	0.0779	0.0308	0.0447	0.014	0.0332	1.8921	0.0109	1.5987	1.5878	0.2934	0.1214	0.0008	158.3	7.06	5
					0.0068	0.0048	0.0016	0.0033	0.0052	0.0044	0.0089	0.0633	0.065	0.0616	0.0498	0.0003	0.3	0.04	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999-2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECe	pH	TEMP
										mg / L							uS.cm^{-1}		deg C
1999	11	29	30	A,B,C	2.3756	1.3434	2.3304	0.987	0.0452	19.0974	0.0137	17.1399	17.1262	1.9575	18.8361	0.2933	682.3	7.42	6
					0.0102	0.0287	0.0033	0.0277	0.01	0.0939	0.0088	0.1669	0.164	0.1536	0.191	0.0062	0.7	0.01	
1999	11	29	31	A,B,C	0.681	0.2734	0.4007	0.1273	0.2803	2.8926	ND	1.9161	1.9161	0.9765	1.4797	0.0548	749.7	7.81	5
					0.0281	0.0481	0.0293	0.0191	0.0133	0.0588		0.0923	0.0923	0.1041	0.0387	0.0006	1	0.01	
1999	11	29	32	A,B,C	0.2789	0.0181	0.0525	0.0344	0.2264	5.6022	1.6325	4.2768	2.6443	1.3254	0.5902	0.0944	791.7	8.51	4
					0.0073	0.0007	0.0038	0.0035	0.0097	0.1643	0.1081	0.1316	0.0387	0.0393	0.0502	0.0065	0.7	0.02	
1999	11	29	34	A,B,C	0.6865	0.2837	0.4906	0.2069	0.196	2.7168	0.0038	1.8252	1.8214	0.8916	1.2542	0.032	744.7	7.64	5
					0.0082	0.0146	0.0142	0.0111	0.0068	0.055	0.0031	0.0825	0.0812	0.0859	0.0765	0.0029	1.4	0.01	
1999	12	14	10	A,B,C	2.2869	1.7923	2.229	0.4366	0.058	19.551	0.013	16.6116	16.5986	2.9394	16.7397	0.3627	746.3	7.57	1
					0.0319	0.0696	0.0644	0.0869	0.0374	0.1211	0.0028	0.0657	0.065	0.0603	0.7911	0.0156	1.4	0.02	
1999	12	14	14	A,B,C	0.4369	0.3062	0.3891	0.0829	0.0478	3.342	1.4182	3.0378	1.6196	0.3042	0.4334	0.0635	596.7	8.46	1
					0.0147	0.0136	0.002	0.0128	0.0156	0.0835	0.0121	0.1324	0.1439	0.1125	0.0166	0.0022	4.4	0.01	
1999	12	14	15	A,B,C	0.2233	0.084	0.1272	0.0432	0.0961	8.9142	5.4886	8.1813	2.6927	0.7329	ND	ND	814	8.34	1
					0.0146	0.007	0.0112	0.009	0.0253	0.1924	0.9503	0.1692	0.7811	0.1283			3.7	0.07	
1999	12	14	16	A,B,C	0.7738	0.5235	0.7165	0.193	0.0573	8.6037	5.2391	7.9866	2.7475	0.6171	ND	ND	982	8.35	1
					0.0351	0.0635	0.039	0.0693	0.0301	0.5177	0.8198	0.4182	0.4596	0.0995			2.4	0.06	
1999	12	14	18	A,B,C	0.4938	0.0594	0.1908	0.1314	0.303	5.8833	0.0088	3.9801	3.9713	1.9032	1.0649	0.2171	608	8.62	1
					0.0297	0.0331	0.0396	0.0082	0.0169	0.1476	0.0072	0.0958	0.0997	0.0858	0.3746	0.0811	9.2	0.02	
1999	12	14	19	A,B,C	0.4489	0.2302	0.2577	0.0275	0.1912	3.4038	1.2341	2.4477	1.2136	0.9561	0.1034	0.0129	613	8.41	1
					0.0507	0.0669	0.051	0.0182	0.0078	0.4046	0.523	0.5085	0.0786	0.1653	0.0844	0.0106	8.5	0.01	
1999	12	14	20	A,B,C	0.1946	0.0189	0.0641	0.0452	0.1305	7.0335	3.4676	6.393	2.9254	0.6405	0.6606	0.0433	644	8.06	1
					0.0012	0.0075	0.009	0.007	0.0086	0.1932	0.141	0.1962	0.0558	0.0406	0.1445	0.0102	0.9	0.03	
1999	12	14	30	A,B,C	2.5521	1.7909	2.3653	0.5744	0.1868	23.4504	0.0963	20.6853	20.589	2.7651	24.305	0.836	747	7.77	2
					0.0183	0.0091	0.0741	0.0655	0.0613	0.3785	0.015	0.3302	0.3177	0.0684	0.8578	0.0644	9	0.03	
1999	12	14	31	A,B,C	0.3538	0.0809	0.1817	0.1008	0.1721	2.9151	0.0887	1.5492	1.4605	1.3659	0.1698	0.0455	579.7	8.72	0
					0.0223	0.0118	0.0149	0.0033	0.0074	0.2258	0.0724	0.0907	0.0756	0.1356	0.1386	0.0372	3.5	0.03	
1999	12	14	32	A,B,C	0.2266	0.0955	0.143	0.0475	0.0837	3.1689	0.2876	2.6319	2.3443	0.537	0.2544	0.0243	138.4	8.08	1
					0.0325	0.0259	0.0431	0.0201	0.017	0.4122	0.1412	0.546	0.412	0.1574	0.104	0.0127	2.4	0.15	
1999	12	14	33	A,B,C	0.2194	0.0648	0.1043	0.0395	0.1151	5.9445	2.2465	4.8306	2.5841	1.1139	0.2901	0.0099	469.7	7.79	1
					0.0273	0.025	0.0262	0.0081	0.003	0.2672	0.2671	0.2294	0.0377	0.1262	0.1215	0.0041	2.2	0.02	
1999	12	14	34	A,B,C	0.7805	0.5498	0.6663	0.1165	0.1142	3.9447	0.8292	3.2055	2.3763	0.7392	0.4456	0.0256	850	7.99	1
					0.0977	0.1377	0.1021	0.0723	0.0513	0.7579	0.3243	0.8126	0.5	0.3515	0.3638	0.0209	4.1	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	1	6	14	A,B,C	0.273	0.0952	0.1511	0.0559	0.122	2.0184	0.0063	1.3086	1.3023	0.7098	0.3091	0.0086	420.7	7.77	3
					0.0319	0.0245	0.0176	0.0106	0.0152	0.1113	0.0052	0.0405	0.0371	0.1445	0.1531	0.0036	0.5	0.07	
2000	1	6	15	A,B,C	0.211	0.0283	0.1173	0.089	0.0938	6.0792	3.353	4.2633	0.9103	1.8159	0.3802	0.0095	532.3	7.63	1
					0.0402	0.0044	0.0296	0.0254	0.0145	1.8962	1.5504	1.2812	0.3731	0.685	0.0476	0.0011	0.5	0	
2000	1	6	19	A,B,C	0.4739	0.4518	0.4103	ND	0.0636	3.8175	2.3576	3.7086	1.351	0.1089	0.5066	0.0212	409.7	7.86	3
					0.0124	0.0024	0.0138		0.0261	0.0647	0.0081	0.0149	0.0173	0.0528	0.0286	0.0014	0.3	0.01	
2000	1	6	30	A,B,C	2.6728	1.7777	2.1979	0.4202	0.4749	19.6932	0.0102	17.4609	17.4507	2.2323	20.8074	0.2982	444	7.39	4
					0.053	0.0088	0.0217	0.0148	0.034	0.153	0.0044	0.2734	0.27	0.2815	0.0607	0.0054	0.9	0.01	
2000	1	6	31	A,B,C	0.314	0.0325	0.0922	0.0597	0.2218	2.6877	ND	1.3155	1.3155	1.3722	0.6593	0.1239	436.7	8.59	2
					0.0062	0.0069	0.0134	0.0071	0.0073	0.0881		0.0588	0.0588	0.1252	0.0206	0.0033	0.5	0	
2000	1	6	32	A,B,C	0.0779	0.0175	0.0635	0.046	0.0144	1.8675	0.1829	1.596	1.4131	0.2715	ND	ND	836	7.47	3
					0.0054	0.0013	0.0036	0.0026	0.0065	0.0937	0.0928	0.1208	0.0594	0.0285			0.5	0.01	
2000	1	6	33	A,B,C	0.3017	0.0119	0.0419	0.0301	0.2598	3.6339	0.0066	1.4325	1.4259	2.2014	1.3206	0.0285	152.7	7.57	2
					0.0125	0.0011	0.0013	0.0018	0.012	0.2392	0.0031	0.0068	0.0077	0.2338	0.3017	0.0066	0.5	0.01	
2000	2	7	10	A,B,C	1.5768	1.1864	1.6113	0.4249	ND	13.3095	0.4509	14.0532	13.6023	ND	11.2101	0.9278	826.7	8.18	7
					0.0684	0.0631	0.037	0.0811		0.4361	0.0128	0.2497	0.2369		0.1493	0.0162	0.7	0.01	
2000	2	7	14	A,B,C	0.6405	0.2024	0.5007	0.2983	0.1398	3.864	0.9785	3.0849	2.1064	0.7791	ND	ND	785.3	9.05	7
					0.0126	0.0145	0.0104	0.0248	0.0055	0.0108	0.0031	0.063	0.0646	0.0738			0.3	0.01	
2000	2	7	15	A,B,C	0.4051	0.1294	0.3838	0.2544	0.0213	9.7332	7.2812	10.0125	2.7313	ND	0.3568	0.0684	865.7	8.6	6
					0.0113	0.0063	0.0036	0.0099	0.0123	0.0101	0.0075	0.0702	0.0638		0.0009	0.0014	0.7	0.01	
2000	2	7	16	A,B,C	0.7853	0.5532	0.7167	0.1635	0.0686	11.019	8.4595	11.3823	2.9228	ND	0.4004	0.0697	1069	8.55	5
					0.0177	0.007	0.011	0.0139	0.013	0.2009	0.0496	0.195	0.2155		0.0169	0.0049	0.5	0.02	
2000	2	7	18	A,B,C	0.6257	0.0143	0.1856	0.1713	0.4402	6.2376	0.2154	3.3468	3.1314	2.8908	1.937	1.0943	635.3	9.34	8
					0.0087	0.0019	0.0036	0.0049	0.0112	0.0393	0.0127	0.067	0.0727	0.0312	0.0666	0.0399	0.7	0.01	
2000	2	7	19	A,B,C	0.6436	0.2039	0.488	0.2842	0.1555	3.8517	0.9892	2.7951	1.8059	1.0566	ND	ND	817.3	8.92	6
					0.0064	0.0043	0.022	0.0185	0.0237	0.1249	0.0046	0.0186	0.0188	0.1435			0.7	0	
2000	2	7	20	A,B,C	0.4117	0.1446	0.3213	0.1766	0.0905	4.0461	0.0139	3.2817	3.2678	0.7644	1.0553	0.4523	880.7	9.1	7
					0.0083	0.005	0.0109	0.011	0.0129	0.1628	0.0052	0.1462	0.1413	0.04	0.1024	0.0428	0.5	0	
2000	2	7	21	A,B,C	0.4041	0.1534	0.2923	0.139	0.1118	3.648	0.0045	2.8344	2.8299	0.8136	0.6297	0.1821	850.7	8.84	8
					0.0021	0.003	0.0285	0.0256	0.0265	0.0357	0.0019	0.049	0.0495	0.0827	0.2606	0.0755	0.5	0	
2000	2	7	30	A,B,C	1.9747	1.5439	1.931	0.3871	0.0437	14.694	0.1645	15.0252	14.8607	ND	12.2549	0.5838	815	7.92	8
					0.1445	0.0165	0.1263	0.1109	0.0224	0.0465	0.0016	0.2975	0.2959		0.0428	0.0134	0.9	0.01	
2000	2	7	31	A,B,C	0.4195	0.0591	0.2479	0.1889	0.1716	3.3174	ND	2.1099	2.1099	1.2075	0.4679	0.1197	894	8.76	8
					0.0084	0.016	0.0302	0.0173	0.0305	0.1439		0.1766	0.1766	0.1816	0.0373	0.0113	0.8	0.01	
2000	2	7	32	A,B,C	0.4377	0.1186	0.3533	0.2347	0.0844	3.7668	0.0049	3.1962	3.1913	0.5706	0.908	0.3967	893.3	9.12	8
					0.0058	0.0046	0.0108	0.0138	0.0123	0.0411	0.0021	0.0493	0.0502	0.0127	0.2419	0.1035	0.5	0.01	
2000	2	7	33	A,B,C	0.457	0.0868	0.3314	0.2446	0.1255	3.8631	0.0088	2.9883	2.9795	0.8748	ND	ND	923.3	8.96	9
					0.013	0.034	0.0022	0.0323	0.0152	0.0815	0.0072	0.0586	0.0646	0.1398			0.5	0	
2000	2	7	34	A,B,C	0.7981	0.512	0.7508	0.2387	0.0473	8.0067	5.777	7.6884	1.9114	0.3183	0.3078	0.065	976.3	8.65	7
					0.0198	0.0147	0.0072	0.0137	0.0127	0.0716	0.1006	0.1149	0.0363	0.0695	0.0085	0.0022	0.7	0.02	
2000	3	10	14	A,B,C	0.6027	0.2103	0.4671	0.2569	0.1356	2.9865	0.0148	2.3817	2.3669	0.6048	0.2709	0.0043	796	7.43	10
					0.0018	0.0134	0.0082	0.0192	0.0098	0.0654	0.0121	0.0722	0.0617	0.0903	0.0045	0	0.5	0	
2000	3	10	15	A,B,C	0.4393	0.0813	0.3416	0.2603	0.0977	11.3091	8.3146	10.2063	1.8917	1.1028	0.1432	0.0164	933	8.34	2
					0.0095	0.0207	0.0186	0.0119	0.0175	0.1297	0.4006	0.1356	0.2694	0.2558	0.0026	0.0005	1.2	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	3	10	16	A,B,C	0.7343	0.5498	0.667	0.1172	0.0673	11.0577	8.8296	10.0854	1.2558	0.9723	0.1931	0.0196	1118.7	8.28	2
					0.0128	0.0102	0.0143	0.0238	0.0187	0.1556	0.0959	0.1309	0.2183	0.2708	0.0082	0.0008	1	0.01	
2000	3	10	18	A,B,C	0.6189	0.0218	0.0728	0.0511	0.5461	5.4342	0.0304	2.085	2.0546	3.3492	0.0233	0.0078	666.7	8.94	5
					0.021	0.007	0.0008	0.0075	0.0218	0.1034	0.0097	0.1643	0.1626	0.0888	0.019	0.0064	0.5	0.01	
2000	3	10	19	A,B,C	0.5379	0.2298	0.4636	0.2338	0.0744	2.8569	0.0041	1.923	1.9189	0.9339	0.2707	0.0357	784.7	8.4	5
					0.0169	0.0059	0.0259	0.0309	0.0099	0.1056	0.0033	0.295	0.2917	0.2063	0.0061	0.0012	0.7	0.01	
2000	3	10	20	A,B,C	0.3547	0.029	0.084	0.055	0.2708	4.2426	0.1985	2.3166	2.1181	1.926	0.101	0.0069	604.7	8.09	4
					0.0143	0.0077	0.0151	0.0077	0.0273	0.098	0.0388	0.1179	0.0906	0.1224	0.0159	0.0011	0.7	0.01	
2000	3	10	21	A,B,C	0.3477	0.028	0.133	0.105	0.2146	4.179	0.268	2.649	2.381	1.53	0.2449	0.0264	1351.3	8.31	5
					0.0095	0.0052	0.0244	0.0223	0.033	0.1032	0.031	0.1386	0.1375	0.0722	0.0338	0.0033	0.3	0.01	
2000	3	10	31	A,B,C	0.6088	0.1336	0.418	0.2844	0.1908	5.76	2.2507	4.1943	1.9436	1.5657	0.2343	0.0532	897	8.69	3
					0.0083	0.0327	0.0532	0.027	0.0597	0.1862	0.5986	0.3192	0.2812	0.1481	0.0101	0.0026	3.3	0	
2000	3	10	32	A,B,C	0.048	0.0147	0.0313	0.0166	0.0167	1.4451	ND	0.9717	0.9717	0.4734	ND	ND	514	8.82	5
					0.0077	0.0027	0.007	0.0076	0.0013	0.0455		0.0582	0.0582	0.0541			0.5	0.01	
2000	3	10	33	A,B,C	0.4595	0.1128	0.2257	0.1128	0.2338	4.008	0.0448	2.5143	2.4695	1.4937	0.1816	0.0429	1580	8.72	5
					0.0054	0.0035	0.0058	0.0029	0.0103	0.0189	0.0093	0.0679	0.0601	0.0491	0.0054	0.0009	0.9	0.01	
2000	3	10	34	A,B,C	0.5126	0.173	0.421	0.248	0.0916	6.1062	4.0218	5.2107	1.1889	0.8955	0.2531	0.0436	895	8.58	3
					0.0226	0.0159	0.0114	0.0263	0.0123	0.0341	0.0145	0.0386	0.0326	0.0208	0.0029	0.0011	1.7	0.04	
2000	4	4	10	A,B,C	2.5383	1.8905	2.1981	0.3076	0.3402	13.9158	0.0247	12.0447	12.02	1.8711	5.0281	0.6416	906	8.39	11
					0.0457	0.0281	0.1246	0.1027	0.1369	0.4893	0.0071	0.4564	0.4593	0.1582	0.0958	0.0163	2.5	0	
2000	4	4	14	A,B,C	0.3007	0.1537	0.2062	0.0525	0.0945	1.515	0.0018	1.1712	1.1694	0.3438	0.023	0.0021	468.3	8.26	14
					0.0055	0.006	0.0173	0.0129	0.0226	0.0639	0.0015	0.0305	0.0302	0.0421	0.0188	0.0017	0.3	0.02	
2000	4	4	15	A,B,C	0.4893	0.239	0.3725	0.1334	0.1169	2.505	0.0568	2.0964	2.0396	0.4086	0.2541	0.0133	647	7.97	10
					0.0135	0.0153	0.0243	0.0143	0.0184	0.3538	0.0361	0.4016	0.3662	0.1614	0.008	0.0003	1.2	0	
2000	4	4	16	A,B,C	0.6471	0.4933	0.5853	0.0921	0.0617	2.6961	0.0204	2.2392	2.2188	0.4569	0.1653	0.0125	800.3	8.14	7
					0.0058	0.0231	0.0185	0.0189	0.0127	0.4205	0.009	0.4633	0.4562	0.1096	0.0076	0.0007	1.5	0.01	
2000	4	4	18	A,B,C	0.419	0.0131	0.1373	0.1241	0.2818	4.428	0.0258	2.3583	2.3325	2.0697	0.1236	0.0333	666.3	8.79	14
					0.0387	0.0024	0.0074	0.0063	0.0348	0.1094	0.0106	0.0062	0.0158	0.1142	0.003	0.0021	0.7	0.02	
2000	4	4	19	A,B,C	0.6932	0.3412	0.5416	0.2004	0.1516	2.7099	ND	2.4012	2.4012	0.3087	ND	ND	629.3	8.55	13
					0.0453	0.0078	0.0258	0.0205	0.0591	0.0929		0.2867	0.2867	0.2774			2.4	0	
2000	4	4	20	A,B,C	0.9013	0.6026	0.6676	0.0649	0.2337	5.5371	0.0352	4.0269	3.9917	1.5102	0.3999	0.0531	1048.7	8.42	16
					0.025	0.0031	0.005	0.0067	0.0298	0.1545	0.0201	0.1693	0.1815	0.0446	0.139	0.0176	7.3	0.01	
2000	4	4	21	A,B,C	0.381	0.0765	0.2266	0.15	0.1544	4.5267	0.002	3.3573	3.3553	1.1694	0.4289	0.017	976	7.84	17
					0.007	0.0111	0.0089	0.0186	0.0077	0.0244	0.0016	0.1297	0.1304	0.113	0.0062	0.0005	0.5	0.01	
2000	4	4	30	A,B,C	2.2717	1.6823	1.9543	0.272	0.3174	16.5147	0.004	14.3241	14.3201	2.1906	7.552	0.268	862	7.79	14
					0.0162	0.01	0.0239	0.0141	0.0385	0.0919	0.0033	0.1291	0.126	0.038	0.0147	0.0058	0.5	0.01	
2000	4	4	31	A,B,C	0.468	0.279	0.3453	0.0663	0.1226	1.9581	0.007	1.4421	1.4351	0.516	ND	ND	583.3	8.64	11
					0.0179	0.0121	0.0118	0.0152	0.0073	0.0913	0.0034	0.0229	0.0213	0.0762			1.2	0	
2000	4	4	32	A,B,C	0.1078	0.0062	0.0441	0.0379	0.0637	1.6185	0.0111	1.254	1.2429	0.3645	ND	ND	152.2	7.56	12
					0.0019	0.0007	0.0047	0.0054	0.0051	0.0864	0.0067	0.0463	0.0399	0.0427			0.1	0.01	
2000	4	4	33	A,B,C	0.1948	0.0116	0.0565	0.0448	0.1383	2.9733	0.0152	2.1342	2.119	0.8391	0.1833	0.0049	557.7	7.66	17
					0.0066	0.0021	0.0132	0.0133	0.0114	0.0164	0.0073	0.0555	0.0484	0.0669	0.0029	0.0002	0.3	0.01	
2000	4	4	34	A,B,C	0.3876	0.2525	0.258	0.0054	0.1297	1.7364	0.0062	1.2822	1.276	0.4542	ND	ND	573.3	8.4	11
					0.0166	0.0102	0.0192	0.0109	0.0078	0.0579	0.0027	0.0391	0.0379	0.03			2.8	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	4	19	10	A,B,C	2.7167	2.0365	2.5805	0.544	0.1362	14.7999	0.0126	11.2059	11.1933	3.594	5.7639	0.0619	845	7.26	7
					0.0261	0.0097	0.0223	0.0144	0.0338	0.1577	0.006	0.0765	0.0742	0.0852	0.0042	0.0006	5.7	0	
2000	4	19	14	A,B,C	0.0918	0.0043	0.0343	0.0301	0.0575	1.4877	0.0054	1.2087	1.2033	0.279	0.0948	0.0015	236	7.41	8
					0.0086	0.0012	0.0019	0.0017	0.0068	0.0614	0.0044	0.032	0.0344	0.0635	0.0086	0.0001	2.5	0.01	
2000	4	19	15	A,B,C	0.1037	0.0058	0.0421	0.0363	0.0616	1.7283	0.0033	1.2312	1.2279	0.4971	ND	ND	400.7	7.46	7
					0.0097	0.0025	0.0153	0.013	0.0057	0.0982	0.0027	0.0523	0.0548	0.0658			1.2	0.01	
2000	4	19	16	A,B,C	0.1447	0.0088	0.0545	0.0457	0.0902	1.8603	0.007	1.2954	1.2884	0.5649	ND	ND	313.7	7.19	8
					0.005	0.0013	0.0085	0.0092	0.0133	0.0154	0.0057	0.1006	0.0953	0.0874			2.4	0.04	
2000	4	19	18	A,B,C	0.2468	0.0149	0.0734	0.0585	0.1734	3.9123	ND	2.0772	2.0772	1.8351	ND	ND	716.7	8.33	6
					0.0397	0.0012	0.0075	0.007	0.0472	0.0382		0.1077	0.1077	0.075			1	0.01	
2000	4	19	19	A,B,C	0.1245	0.0205	0.0867	0.0662	0.0377	1.6077	0.0062	1.1187	1.1125	0.489	ND	ND	228	7.61	8
					0.0036	0.0058	0.009	0.0075	0.0092	0.0329	0.0051	0.0329	0.0379	0.045			0.5	0.01	
2000	4	19	20	A,B,C	0.2344	0.0811	0.1511	0.07	0.0833	2.5869	0.0084	1.9818	1.9734	0.6051	0.236	0.0119	422.7	7.95	6
					0.0099	0.0044	0.0017	0.0049	0.0094	0.0692	0.0069	0.0975	0.0908	0.0412	0.0075	0.0005	2.3	0	
2000	4	19	21	A,B,C	0.308	0.0962	0.1649	0.0687	0.1431	3.6261	ND	2.9469	2.9469	0.6792	0.4475	0.0065	853.3	7.39	8
					0.0295	0.013	0.0134	0.0042	0.0187	0.1431		0.0799	0.0799	0.1318	0.0031	0.0001	2.9	0	
2000	4	19	30	A,B,C	2.3339	1.2816	1.9815	0.6999	0.3524	14.3232	ND	9.7656	9.7656	4.5576	4.8074	0.0755	768.7	7.43	9
					0.034	0.1501	0.0256	0.1296	0.0483	0.1073		0.2162	0.2162	0.2281	0.0167	0.0023	4.7	0.01	
2000	4	19	31	A,B,C	0.3715	0.1441	0.2201	0.076	0.1513	2.289	ND	1.3422	1.3422	0.9468	0.159	0.0089	500.3	8	6
					0.0067	0.0047	0.016	0.0135	0.0161	0.1739		0.0486	0.0486	0.1388	0.0059	0.0004	1	0.02	
2000	4	19	32	A,B,C	0.1304	0.0251	0.0706	0.0456	0.0598	1.5204	0.0087	1.191	1.1823	0.3294	ND	ND	131.6	7.14	9
					0.0069	0.0021	0.0029	0.0046	0.0043	0.0568	0.0071	0.0715	0.0645	0.0168			1.4	0.01	
2000	4	19	33	A,B,C	0.3595	0.1303	0.2436	0.1134	0.1159	3.5415	ND	2.6505	2.6505	0.891	0.3584	0.0064	679.3	7.48	7
					0.0079	0.0115	0.0224	0.0128	0.0158	0.0577		0.0552	0.0552	0.0057	0.0061	0.0001	2.4	0	
2000	4	19	34	A,B,C	0.3425	0.1098	0.1613	0.0515	0.1812	2.2794	ND	1.0398	1.0398	1.2396	ND	ND	363.3	8.27	7
					0.0038	0.0044	0.0065	0.0028	0.0099	0.1034		0.019	0.019	0.0847			1.4	0.01	
2000	5	1	10	A,B,C	2.5595	1.829	2.419	0.59	0.1405	13.6305	0.0121	12.1254	12.1133	1.5051	6.8079	0.0715	892.7	7.25	10
					0.0483	0.0171	0.0101	0.007	0.0582	0.0799	0.0068	0.324	0.3288	0.2935	0.0103	0.0009	1.4	0	
2000	5	1	14	A,B,C	0.2135	0.0725	0.1494	0.0769	0.0641	1.5801	0.0609	1.1493	1.0884	0.4308	ND	ND	325	8.34	14
					0.0045	0.013	0.0159	0.0069	0.0194	0.0676	0.0252	0.0869	0.0992	0.1479			0.5	0.01	
2000	5	1	15	A,B,C	0.189	0.0177	0.1014	0.0838	0.0876	2.766	0.4563	2.205	1.7487	0.561	ND	ND	358.3	7.56	10
					0.0078	0.004	0.0106	0.01	0.0035	0.0576	0.2097	0.1292	0.2356	0.0727			1.7	0.01	
2000	5	1	16	A,B,C	0.1988	0.0177	0.0682	0.0505	0.1306	2.0184	0.0079	1.3026	1.2947	0.7158	ND	ND	270.3	7.29	11
					0.0025	0.004	0.0104	0.0081	0.0123	0.1468	0.0037	0.1043	0.101	0.0433			0.7	0.14	
2000	5	1	17	A,B,C	0.1142	0.0132	0.0574	0.0442	0.0568	1.2627	ND	1.0224	1.0224	0.2403	ND	ND	111.4	7.73	14
					0.0316	0.0017	0.0047	0.0031	0.0362	0.0713		0.0008	0.0008	0.072			0	0.03	
2000	5	1	18	A,B,C	0.3906	0.0472	0.1186	0.0714	0.2721	3.9	0.0113	2.2785	2.2672	1.6215	0.0449	0.0094	698.7	8.65	11
					0.009	0.0066	0.0077	0.0064	0.0166	0.0688	0.0053	0.0191	0.0211	0.0727	0.0366	0.0077	0.5	0	
2000	5	1	19	A,B,C	0.259	0.0963	0.1636	0.0674	0.0954	1.9554	0.0563	1.4103	1.354	0.5451	ND	ND	339.3	8.29	15
					0.0275	0.0038	0	0.0038	0.0275	0.2344	0.0094	0.1674	0.1763	0.0971			2.8	0.02	
2000	5	1	20	A,B,C	0.4611	0.1134	0.2943	0.1809	0.1669	5.0091	0.0335	2.6031	2.5696	2.406	0.3072	0.0499	469.3	8.51	15
					0.0712	0.0161	0.0114	0.0232	0.0655	1.4574	0.0037	0.0575	0.061	1.4053	0.0578	0.0092	2.8	0	
2000	5	1	21	A,B,C	0.4058	0.1938	0.3544	0.1607	0.0514	3.627	0.3848	3.2664	2.8816	0.3606	0.3447	0.0124	585.3	7.8	17
					0.0035	0.0053	0.006	0.0109	0.0069	0.0158	0.0023	0.0705	0.072	0.0808	0.0166	0.0005	1.5	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	5	1	30	A,B,C	2.2932 0.0348	1.5979 0.0969	2.1347 0.0832	0.5368 0.018	0.1585 0.0486	12.9084 0.2191	0.0957 0.0318	12.4326 0.5448	12.3369 0.5132	0.4758 0.3284	6.5305 0.0406	0.0665 0.0006	846.7 1.5	7.24 0.01	13
2000	5	1	31	A,B,C	0.3593 0.0058	0.2199 0.0049	0.3192 0.0042	0.0993 0.0091	0.0401 0.01	1.8024 0.099	0.0666 0.0228	1.7172 0.0991	1.6506 0.0853	0.0852 0.0284	0.0479 0.0222	0.0129 0.0059	460 0.8	8.83 0.03	14
2000	5	1	32	A,B,C	0.1166 0.0021	0.0258 0.0013	0.0833 0.0114	0.0575 0.0106	0.0333 0.011	1.4115 0.0158	0.0143 0.0079	1.1262 0.0071	1.1119 0.0145	0.2853 0.0204	ND	ND	136.2 0.2	8.29 0.02	15
2000	5	1	33	A,B,C	0.5037 0.0131	0.2064 0.0365	0.3618 0.057	0.1554 0.0279	0.1419 0.0628	3.7605 0.2317	0.0893 0.0032	2.7168 0.3539	2.6275 0.3507	1.0437 0.3404	0.3307 0.0025	0.0356 0.0002	653.3 2	8.31 0.01	17
2000	5	1	34	A,B,C	0.375 0.0128	0.1637 0.024	0.237 0.0302	0.0733 0.0094	0.138 0.0426	1.677 0.0981	0.0818 0.0061	1.2453 0.1155	1.1635 0.11	0.4317 0.2123	0.0881 0.0719	0.0202 0.0165	395 0.9	8.69 0.01	13
2000	5	16	1	A,B,C	0.2106 0.0135	0.0174 0.0036	0.1675 0.0355	0.5149 0.0384	0.3332 0.2333	0.4865 0.0412	0.3332 0.2333	4.3782 0.371	4.045 0.1704	0.2562 0.0857	0.0861 0.0703	0.0011 0.0009	1654.3 4.9	7.35 0.01	
2000	5	16	2	A,B,C	0.4794 0.004	0.459 0.0043	0.4673 0.0072	0.0083 0.0114	0.0122 0.0111	3.5643 0.3167	1.8818 0.0118	2.8482 0.1101	0.9664 0.1096	0.7161 0.3337	ND	ND	446.7 1.1	7.28 0.01	10
2000	5	16	10	A,B,C	2.1114 0.0311	1.5035 0.0438	1.9696 0.0299	0.4661 0.0439	0.1418 0.0348	12.6516 0.2549	0.4077 0.1349	10.833 0.2002	10.4253 0.0704	1.8186 0.3361	6.3926 0.0728	0.0818 0.002	871.3 3	7.34 0.01	12
2000	5	16	14	A,B,C	0.21 0.002	0.0871 0.0032	0.1682 0.0143	0.0811 0.0157	0.0418 0.0153	1.5414 0.0513	ND	1.3287 0.1311	1.3287 0.1311	0.2127 0.1125	ND	ND	270 0.8	7.55 0.01	11
2000	5	16	15	A,B,C	0.2085 0.0048	0.0771 0.0184	0.1736 0.013	0.0964 0.0055	0.035 0.0172	2.7795 0.1838	0.7939 0.2831	2.5722 0.2849	1.7783 0.1753	0.2073 0.1124	ND	ND	352.7 1.5	7.44 0.01	11
2000	5	16	16	A,B,C	0.161 0.0095	0.028 0.0047	0.1202 0.0069	0.0922 0.0112	0.0407 0.0158	1.809 0.0019	0.0086 0.007	1.635 0.0545	1.6264 0.0488	0.174 0.0525	ND	ND	220.7 1.8	6.99 0.01	10
2000	5	16	17	A,B,C	0.1235 0.0117	0.0106 0.0002	0.0655 0.0054	0.0549 0.0055	0.058 0.0163	1.4844 0.0999	0.002 0.0017	1.2255 0.1006	1.2235 0.099	0.2589 0.0351	ND	ND	112.8 0.6	7.17 0.01	11
2000	5	16	18	A,B,C	0.3095 0	0.0735 0.001	0.2173 0.0079	0.1438 0.0069	0.0922 0.0079	2.8311 0.038	ND	2.349 0.0298	2.349 0.0298	0.4821 0.0494	0.1828 0.0105	0.0203 0.0013	557.7 3.2	8.32 0	10
2000	5	16	19	A,B,C	0.2149 0.0034	0.0707 0.0285	0.1867 0.0126	0.116 0.0344	0.0282 0.0153	1.7325 0.1261	0.141 0.0442	1.3596 0.0447	1.2186 0.005	0.3729 0.1703	ND	ND	268.7 1.2	7.5 0.02	11
2000	5	16	20	A,B,C	0.4551 0.0209	0.2194 0.0101	0.3697 0.0055	0.1503 0.0057	0.0854 0.0157	4.2984 0.4127	0.0966 0.0214	3.2418 0.0325	3.1452 0.0513	1.0566 0.4143	0.2876 0.0233	0.0237 0.002	787 0.9	8.18 0	12
2000	5	16	21	A,B,C	0.4382 0.0139	0.1724 0.0093	0.327 0.0072	0.1546 0.0164	0.1112 0.0153	3.7287 0.1302	0.0867 0.0312	2.7936 0.0353	2.7069 0.0053	0.9351 0.1636	0.2447 0.0101	0.0209 0.0008	651.7 1.9	8.2 0	10
2000	5	16	30	A,B,C	2.623 0.0276	1.9288 0.0167	2.3007 0.0151	0.3719 0.002	0.3223 0.0237	16.2402 0.0659	0.152 0.0129	13.9491 0.1482	13.7971 0.1367	2.2911 0.1687	9.2304 0.1484	0.0624 0.002	838.7 1.7	7.06 0.01	12
2000	5	16	31	A,B,C	0.2202 0.0042	0.145 0.0022	0.2216 0.0065	0.0766 0.0057	ND	1.4721 0.1967	0.1503 0.0766	1.3962 0.1733	1.2459 0.0974	0.0759 0.0641	ND	ND	327 1.2	8.35 0.01	10
2000	5	16	32	A,B,C	0.1125 0.0034	0.0438 0.0024	0.0906 0.0072	0.0469 0.0058	0.0218 0.0038	1.5912 0.0146	0.0184 0.0002	1.4268 0.0123	1.4084 0.0124	0.1644 0.0268	ND	ND	140.7 0.5	8.01 0.01	11
2000	5	16	33	A,B,C	0.3833 0.0094	0.2288 0.0041	0.3338 0.008	0.105 0.0117	0.0495 0.0102	3.4302 0.0211	0.0771 0.0028	3.3519 0.0423	3.2748 0.0406	0.0783 0.0213	0.2521 0.0053	0.0225 0.0008	742 2.1	8.22 0.01	11
2000	5	16	34	A,B,C	0.2513 0.0091	0.138 0.004	0.2202 0.007	0.0822 0.004	0.0311 0.0044	1.5963 0.0821	ND	1.1844 0.0912	1.1844 0.0912	0.4119 0.0712	ND	ND	296.7 1.2	8.17 0.01	10
2000	5	22	1	A,B,C	0.2716 0.0096	0.0287 0.0045	0.131 0.0068	0.1023 0.0052	0.1406 0.0071	4.5939 0.0059	0.0292 0.0207	4.0659 0.1945	4.0367 0.1788	0.528 0.1894	ND	ND	1689 17.7	7.33 0.03	9

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	5	22	2	A,B,C	0.4887	0.2878	0.4287	0.1408	0.06	2.724	1.0272	2.4912	1.464	0.2328	ND	ND	442.7	7.42	12
					0.0041	0.0164	0.0178	0.0156	0.0142	0.121	0.2263	0.1617	0.085	0.051			6.1	0.01	
2000	5	22	10	A,B,C	1.7383	1.4628	2.2355	0.7727	ND	12.2988	0.0036	11.3814	11.3778	0.9174	6.7579	0.0827	801	7.32	17
					0.5051	0.0194	0.0283	0.0093		0.248	0.0029	0.1567	0.154	0.0913	0.1739	0.0035	2.1	0.01	
2000	5	22	14	A,B,C	0.2111	0.1025	0.18	0.0775	0.0311	1.8054	0.0335	1.647	1.6135	0.1584	ND	ND	278.7	8	19
					0.0089	0.0042	0.009	0.0056	0.0064	0.196	0.0119	0.22	0.2131	0.0421			0.3	0.01	
2000	5	22	15	A,B,C	0.2816	0.055	0.1535	0.0985	0.1281	2.1339	ND	1.5312	1.5312	0.6027	0.0984	0.0039	331	7.95	20
					0.0078	0.0147	0.0041	0.0187	0.009	0.1298		0.1103	0.1103	0.056	0.0803	0.0032	1.2	0.04	
2000	5	22	16	A,B,C	0.166	0.0321	0.0845	0.0524	0.0815	1.5135	0.0041	1.1427	1.1386	0.3708	ND	ND	228.3	7.33	16
					0.0033	0.0013	0.0045	0.0033	0.0078	0.0172	0.0034	0.0373	0.0341	0.0377			1.4	0.01	
2000	5	22	17	A,B,C	0.1	0.0563	0.09	0.0338	0.01	1.3542	0.0236	1.4433	1.4197	ND	ND	ND	239	8.39	14
					0.0065	0.0021	0.0012	0.0024	0.0078	0.1956	0.016	0.2535	0.238				1.4	0.01	
2000	5	22	18	A,B,C	0.3266	0.0623	0.1715	0.1093	0.1551	3.7851	ND	2.3868	2.3868	1.3983	ND	ND	709.3	8.61	17
					0.0151	0.0024	0.0029	0.0033	0.0122	0.2902		0.0047	0.0047	0.2906			4.1	0	
2000	5	22	19	A,B,C	0.2401	0.1391	0.2046	0.0654	0.0355	1.5096	0.0078	1.2759	1.2681	0.2337	ND	ND	231.7	8.58	22
					0.0037	0.0033	0.0033	0.0066	0.0035	0.0579	0.0041	0.0509	0.052	0.0239			0.7	0.01	
2000	5	22	20	A,B,C	0.5292	0.3018	0.4352	0.1334	0.094	3.3276	0.06	2.9352	2.8752	0.3924	0.1897	0.0306	801	8.51	23
					0.0146	0.005	0.0179	0.0132	0.0129	0.0495	0.0243	0.0175	0.0111	0.06	0.0078	0.0013	1.4	0	
2000	5	22	21	A,B,C	0.5138	0.1973	0.3616	0.1644	0.1522	4.4313	0.0185	3.1011	3.0826	1.3302	0.2304	0.0309	754.3	8.42	20
					0.0176	0.0135	0.0308	0.0187	0.0132	0.4595	0.0151	0.2302	0.2152	0.5271	0.0949	0.0128	2.3	0	
2000	5	22	24-1	A,B,C	0.1248	0.0048	0.0582	0.0534	0.0666	33.8025	17.9603	33.0783	15.118	0.7242	ND	ND	3073.3	7.21	10
					0.0077	0.001	0.0076	0.0073	0.0152	0.5412	4.2612	0.4057	3.8836	0.294			5.4	0	
2000	5	22	24-2	A,B,C	0.196	0.0073	0.0812	0.074	0.1148	3.2532	0.0737	2.376	2.3023	0.8772	0.3647	0.0082	1106	7.6	16
					0.0134	0.0024	0.0179	0.0159	0.0174	0.3622	0.0602	0.1831	0.1387	0.1935	0.0945	0.0018	24.5	0.02	
2000	5	22	25-2	A,B,C	0.1909	0.0024	0.0658	0.0634	0.1251	3.6087	0.017	3.2079	3.1909	0.4008	0.2121	0.0462	1109	8.26	18
					0.0074	0.0004	0.007	0.0073	0.0073	0.2014	0.0139	0.1912	0.1886	0.2244	0.0068	0.0208	13	0.01	
2000	5	22	30	A,B,C	2.7624	1.9155	2.5739	0.6584	0.1886	14.1006	ND	13.0404	13.0404	1.0602	9.8645	0.065	823.3	7.22	19
					0.0327	0.0191	0.0534	0.0369	0.0489	0.1418		0.3238	0.3238	0.2137	0.0227	0.0266	1.7	0	
2000	5	22	31	A,B,C	0.3088	0.1637	0.2473	0.0836	0.0615	1.4745	ND	1.3053	1.3053	0.1692	ND	ND	348.3	8.65	19
					0.0029	0.0076	0.0033	0.0081	0.0032	0.0507		0.1382	0.1382	0.1057			0.7	0	
2000	5	22	32	A,B,C	0.1156	0.0072	0.0479	0.0407	0.0677	2.0121	0.0176	1.6488	1.6312	0.3633	ND	0.0085	147.8	8.44	23
					0.0074	0.0023	0.0063	0.004	0.0105	0.2104	0.0144	0.369	0.3547	0.2432		0.007	0.2	0.01	
2000	5	22	33	A,B,C	0.5205	0.2536	0.3873	0.1336	0.1332	3.1497	ND	2.7603	2.7603	0.3894	0.2162	0.02	795.7	8.41	20
					0.0156	0.0039	0.0154	0.0118	0.0048	0.0138		0.061	0.061	0.0485	0.008	0.0082	1.5	0	
2000	5	22	34	A,B,C	0.277	0.1393	0.2283	0.089	0.0487	1.6323	ND	1.2951	1.2951	0.3372	ND	ND	390	8.41	20
					0.0112	0.0019	0.0029	0.0023	0.0092	0.0218		0.0209	0.0209	0.0395			0.5	0.01	
2000	5	22	37	A,B,C	0.4923	0.1255	0.3652	0.2397	0.1271	18.8262	8.9731	15.6375	6.6644	3.1887	0.4784	0.0061	1627.3	7.28	10
					0.0609	0.022	0.0279	0.0379	0.0383	0.2947	0.8021	1.0086	0.7926	1.1571	0.036	0.0001	1.8	0.02	
2000	6	2	1	A,B,C	0.1704	0.0122	0.1254	0.1132	0.045	6.8154	0.862	6.2529	5.3909	0.5625	0.0643	0.0016	1237	7.62	11
					0.0207	0.0013	0.0263	0.0253	0.0062	0.4248	0.293	0.3893	0.2059	0.0753	0.0009	0	6.2	0.01	
2000	6	2	2	A,B,C	0.2523	0.1698	0.2318	0.062	0.0206	1.2084	0.0175	1.0365	1.019	0.1719	ND	ND	388	7.48	14
					0.2567	0.0029	0.0214	0.0188	0.0383	0.111	0.0116	0.0581	0.0516	0.0535			0.9	0	
2000	6	2	5	A,B,C	0.4373	0.2521	0.3659	0.1138	0.0714	1.6743	0.0419	1.1505	1.1086	0.5238	ND	ND	425.7	7.38	12
					0.4373	0.0038	0.0068	0.0099	0.0445	0.1347	0.0253	0.0497	0.0248	0.1159			1.8	0.02	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	6	2	10	A,B,C	1.7048	1.4992	2.1273	0.6281	ND	13.7577	0.0145	12.6198	12.6053	1.1379	7.9552	0.1944	913.7	7.62	15
					0.5682	0.0247	0.0575	0.0655		0.626	0.0082	0.579	0.583	0.0639	0.0052	0.0012	1.9	0	
2000	6	2	14	A,B,C	0.4147	0.1227	0.2006	0.0779	0.2141	1.7856	ND	1.9536	1.9536	ND	0.0111	ND	243.3	7.86	19
					0.1117	0.0088	0.0154	0.0131	0.1241	0.1327		0.4259	0.4259		0.0091		0.5	0.01	
2000	6	2	15	A,B,C	0.1589	0.0094	0.0818	0.0724	0.0771	1.7991	ND	1.2921	1.2921	0.507	ND	ND	254	8.5	18
					0.002	0.001	0.0058	0.005	0.0041	0.1803		0.0244	0.0244	0.185			0.9	0.01	
2000	6	2	16	A,B,C	0.1661	0.01	0.1106	0.1005	0.0555	2.3892	0.201	1.9146	1.7136	0.4746	ND	ND	212	7.33	16
					0.0052	0.0017	0.0089	0.0072	0.0137	0.4143	0.0647	0.4092	0.3457	0.0567			1.4	0.03	
2000	6	2	18	A,B,C	0.271	0.0501	0.1393	0.0892	0.1317	3.1701	0.013	2.3736	2.3606	0.7965	ND	ND	772.7	9.02	14
					0.003	0.0011	0.0035	0.0033	0.0045	0.043	0.0074	0.0156	0.0177	0.0298			2.8	0.01	
2000	6	2	19	A,B,C	0.3529	0.186	0.2447	0.0587	0.1083	1.8504	ND	1.2309	1.2309	0.6195	ND	ND	243	8.47	20
					0.0098	0.0058	0.0097	0.006	0.016	0.1105		0.0168	0.0168	0.1038			1.2	0.02	
2000	6	2	20	A,B,C	0.3548	0.1373	0.2518	0.1145	0.103	3.6393	0.011	2.9475	2.9365	0.6918	0.1095	0.052	819.7	8.96	20
					0.0023	0.0031	0.0068	0.0063	0.0051	0.0239	0.009	0.0551	0.0469	0.041	0.0104	0.0078	1.9	0.01	
2000	6	2	21	A,B,C	0.4363	0.198	0.3333	0.1354	0.103	3.9678	0.0289	3.2526	3.2237	0.7152	0.2688	0.0548	754.7	8.63	19
					0.0064	0.0053	0.0055	0.0099	0.0048	0.4502	0.0131	0.4281	0.4401	0.0979	0.0037	0.001	1.7	0.01	
2000	6	2	22	A,B,C	0.1297	0.014	0.0588	0.0448	0.0709	4.6287	0.0246	4.2774	4.2528	0.3513	0.1232	0.0053	1773.3	7.87	15
					0.0035	0.0062	0.0102	0.0052	0.0136	0.0167	0.0152	0.0399	0.0254	0.0461	0.0046	0.0002	6.9	0	
2000	6	2	24-1	A,B,C	0.0506	0.0011	0.0238	0.0227	0.0268	35.5749	12.8482	34.6269	21.7787	0.948	0.0279	0.0002	3113.3	7.17	9
					0.0061	0.0003	0.0021	0.0024	0.0051	0.4356	2.8853	0.5623	3.0533	0.1268	0.0228	0.0002	7.2	0	
2000	6	2	24-2	A,B,C	0.2514	0.0119	0.0813	0.0695	0.1701	2.7321	0.0323	1.8351	1.8028	0.897	0.2435	0.0052	879.3	7.56	13
					0.033	0.007	0.0202	0.0134	0.0415	0.2611	0.0264	0.0529	0.0358	0.2407	0.017	0.0004	3.3	0.02	
2000	6	2	25-1	A,B,C	0.186	0.01	0.0596	0.0496	0.1264	4.4568	0.1296	2.8263	2.6967	1.6305	0.3301	0.0327	859.3	8.47	16
					0.0106	0	0.0033	0.0033	0.0136	0.2813	0.0087	0.0205	0.0158	0.3018	0.016	0.0106	3.3	0.01	
2000	6	2	25-2	A,B,C	0.1907	0.0112	0.0717	0.0605	0.119	5.5305	0.1136	2.9292	2.8156	2.6013	0.3656	0.081	856	8.47	15
					0.0182	0.001	0.0034	0.0033	0.0148	0.2016	0.0035	0.08	0.0765	0.1331	0.0054	0.0223	0.8	0.01	
2000	6	2	28	A,B,C	0.0763	0.0082	0.0526	0.0444	0.0237	35.7651	24.8148	32.5404	7.7256	3.2247	0.0352	0.0028	2666.7	7.49	8
					0.0106	0.0011	0.0099	0.0088	0.0013	0.8177	1.0918	0.3584	0.7337	0.4601	0.0146	0.0018	16.6	0.04	
2000	6	2	30	A,B,C	2.5461	1.8057	2.3616	0.5559	0.1846	16.7001	0.1341	14.3598	14.2257	2.3403	9.2027	0.0837	812.3	7.38	18
					0.0306	0.0117	0.0382	0.0494	0.0687	0.2939	0.0123	0.2662	0.2615	0.1342	0.0084	0.0342	0.5	0.01	
2000	6	2	31	A,B,C	0.2859	0.1674	0.2228	0.0554	0.0632	1.8288	0.0797	1.7367	1.657	0.0921	ND	ND	292.7	8.82	18
					0.0066	0.0108	0.0165	0.0062	0.0204	0.1181	0.0031	0.053	0.0549	0.0662			0.3	0.01	
2000	6	2	32	A,B,C	0.1386	0.0153	0.0596	0.0442	0.0791	2.2167	0.0731	1.8081	1.735	0.4086	ND	ND	170.6	8.64	19
					0.0021	0.0044	0.0066	0.0036	0.0083	0.0176	0.0025	0.0484	0.0493	0.0566			0.6	0.01	
2000	6	2	33	A,B,C	0.3236	0.1519	0.2413	0.0894	0.0823	4.0356	0.1052	3.6297	3.5245	0.4059	0.142	0.0447	794.3	8.88	19
					0.0167	0.0033	0.0042	0.0009	0.0126	0.1236	0.0283	0.1249	0.1012	0.0917	0.0068	0.0028	1.5	0.01	
2000	6	2	34	A,B,C	0.2688	0.1311	0.1846	0.0535	0.0842	2.5173	0.0905	2.2899	2.1994	0.2274	0.0114	0.0015	317.7	8.65	17
					0.003	0.0032	0.0076	0.0066	0.0076	0.2089	0.0234	0.3579	0.3384	0.149	0.0093	0.0013	1.8	0.01	
2000	6	2	37	A,B,C	0.3166	0.0243	0.2158	0.1915	0.1008	20.6415	13.7915	19.4142	5.6227	1.2273	0.336	0.0065	1531.7	7.47	10
					0.0381	0.0026	0.0422	0.0396	0.0245	0.3379	1.1864	0.4379	0.8342	0.2138	0.0185	0.0003	1.9	0.02	
					0.4677	0.0779	0.4344	0.3565	0.0333	2.6492	1.2847	2.7063	1.4217	ND	ND	ND	440.5	6.95	13
2000	6	12	5	A,B,C	0.0008	0.0108	0.0061	0.0047	0.0053	0.0273	0.0444	0.0629	0.1072				0.9	0.01	
2000	6	12	10	A,B,C	2.5123	1.5037	2.2819	0.7782	0.2305	10.4724	0.0118	9.2016	9.1898	1.2708	5.8518	0.0287	750	6.92	16
					0.0292	0.0317	0.0652	0.0364	0.0483	0.099	0.0014	0.2785	0.2779	0.2345	0.0215	0.0006	1.2	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	6	12	14	A,B,C	0.1139	0.0066	0.0417	0.035	0.0722	1.9308	ND	1.437	1.437	0.4938	ND	ND	228	7.74	16
					0.0067	0.0024	0.001	0.0015	0.0057	0.0371		0.0212	0.0212	0.0159			0.5	0.16	
2000	6	12	15	A,B,C	0.138	0.0099	0.0577	0.0478	0.0803	1.9614	ND	1.5552	1.5552	0.4062	ND	ND	240	7.1	16
					0.0064	0.0029	0.0016	0.0044	0.0077	0.0566		0.0469	0.0469	0.0738			0.5	0.02	
2000	6	12	16	A,B,C	0.1862	0.0081	0.0454	0.0373	0.1407	2.9187	0.0638	1.9782	1.9144	0.9405	ND	ND	170.7	6.72	16
					0.031	0.0021	0.0055	0.0064	0.0321	0.3159	0.0521	0.2555	0.2537	0.1673			0.8	0.01	
2000	6	12	17	A,B,C	0.096	0.0045	0.0431	0.0385	0.0529	2.9676	ND	2.5536	2.5536	0.414	ND	ND	114	7.54	17
					0.0028	0.0007	0.0053	0.0047	0.0027	0.0479		0.07	0.07	0.0295			0.2	0.02	
2000	6	12	18	A,B,C	0.1918	0.0108	0.0922	0.0814	0.0996	2.9811	0.0065	2.5074	2.5009	0.4737	ND	ND	667	8.7	15
					0.005	0.0029	0.0101	0.0075	0.0058	0.0507	0.0053	0.1363	0.1313	0.0889			1.7	0.01	
2000	6	12	19	A,B,C	0.1508	0.0051	0.0634	0.0582	0.0874	1.9644	ND	1.5297	1.5297	0.4347	ND	ND	212	7.28	16
					0.0097	0.0012	0.0027	0.0037	0.012	0.0318		0.0278	0.0278	0.0356			0.5	0.05	
2000	6	12	20	A,B,C	0.2792	0.097	0.2145	0.1175	0.0647	3.5979	0.0053	3.7773	3.772	ND	0.0148	0.0026	860	8.57	16
					0.0069	0.0072	0.0058	0.0077	0.0119	0.1277	0.0044	0.0812	0.077		0.0121	0.0022	3.8	0.01	
2000	6	12	21	A,B,C	0.3222	0.0799	0.1824	0.1025	0.1398	3.0459	ND	2.7579	2.7579	0.288	0.0119	0.0014	560.7	8.38	16
					0.0118	0.0122	0.0111	0.0012	0.0183	0.1076		0.0468	0.0468	0.0717	0.0097	0.0011	3.2	0	
2000	6	12	22	A,B,C	0.351	0.0406	0.24	0.1995	0.111	.	0.1803	2.3388	2.1585	.	ND	ND	493	6.89	13
					0.0145	0.0217	0.0317	0.0424	0.0193	.	0.1472	0.255	0.113	.			2.4	0.03	
2000	6	12	24-1	A,B,C	0.1314	0.0138	0.0799	0.0662	0.0515	41.4432	30.2785	40.3923	10.1138	1.0509	0.0936	0.0005	2803.3	6.96	11
					0.0037	0.0023	0.0049	0.0026	0.0034	0.3875	0.9855	0.2563	0.7614	0.2688	0.0154	0.0001	52.6	0.01	
2000	6	12	24-2	A,B,C	0.2554	0.0798	0.1915	0.1117	0.0639	2.5713	0.0087	2.2056	2.1969	0.3657	0.2811	0.0016	735.7	6.97	14
					0.0747	0.0434	0.0651	0.0238	0.011	0.404	0.0071	0.2602	0.2625	0.1504	0.0293	0.0002	48.6	0.03	
2000	6	12	25-1	A,B,C	0.1699	0.0163	0.133	0.1168	0.0369	11.2629	0.6327	10.8888	10.2561	0.3741	0.0915	0.0007	3280	7.2	13
					0.0129	0.0021	0.0092	0.0079	0.0056	1.5349	0.5108	1.5042	1.2761	0.0418	0.0115	0	81.8	0.01	
2000	6	12	25-2	A,B,C	0.1222	0.0028	0.0691	0.0664	0.0531	3.1506	ND	2.5884	2.5884	0.5622	0.3494	0.0384	966.7	8.1	16
					0.0182	0	0.0007	0.0007	0.0178	0.0783		0.0349	0.0349	0.1125	0.0029	0.0109	11	0.01	
2000	6	12	28	A,B,C	0.1366	0.01	0.1078	0.0978	0.0288	29.1423	18.5994	29.2092	10.6098	ND	0.0959	0.001	2603.3	7.11	11
					0.0064	0.0015	0.0125	0.0118	0.0137	0.4935	2.0201	0.4272	1.6077		0.0066	0.0002	14.4	0.01	
2000	6	12	30	A,B,C	2.2934	1.9355	2.0602	0.1247	0.2332	13.4583	0.0618	13.083	13.0212	0.3753	9.8381	0.0487	832	7.08	17
					0.031	0.0057	0.0092	0.0132	0.0283	0.084	0.0475	0.1267	0.0963	0.1401	0.0171	0.0196	1.2	0.03	
2000	6	12	31	A,B,C	0.1879	0.0615	0.1523	0.0908	0.0356	1.4391	ND	1.2132	1.2132	0.2259	0.0334	0	273	7.51	15
					0.0157	0.0093	0.013	0.0045	0.0031	0.03		0.0686	0.0686	0.075	0.0273	0	0.8	0.01	
2000	6	12	32	A,B,C	0.2122	0.0336	0.1042	0.0705	0.1081	2.6478	0.0094	2.0259	2.0165	0.6219	0.0151	0.0038	159.3	8.05	16
					0.0035	0.0043	0.0086	0.007	0.0051	0.1787	0.0077	0.1651	0.1581	0.0315	0.0123	0.0023	1.1	0.06	
2000	6	12	33	A,B,C	0.2757	0.1226	0.223	0.1004	0.0527	2.694	ND	2.472	2.472	0.222	0.1049	0.0087	710.7	8.31	16
					0.0078	0.0044	0.0043	0.0045	0.0121	0.0627		0.037	0.037	0.0938	0.0069	0.0034	1.9	0.05	
2000	6	12	34	A,B,C	0.1776	0.013	0.1227	0.1097	0.0549	1.9008	ND	1.6785	1.6785	0.2223	0.1409	0.001	351.7	7.1	16
					0.0161	0.001	0.0074	0.0069	0.0089	0.0303		0.0308	0.0308	0.0049	0.0067	0	1.2	0	
2000	6	22	1	A,B,C	0.1395	0.0174	0.0649	0.0475	0.0746	2.8416	0.0091	2.4933	2.4842	0.3483	0.178	0.0007	1048.7	6.85	16
					0.0126	0.0015	0.0051	0.0043	0.008	0.0616	0.0054	0.1331	0.1277	0.1138	0.0241	0.0001	11.4	0.05	
2000	6	22	2	A,B,C	0.4248	0.2277	0.3954	0.1677	0.0294	1.9836	ND	1.5486	1.5486	0.435	ND	ND	451.3	6.65	14
					0.0137	0.0065	0.0367	0.0302	0.0481	0.038		0.104	0.104	0.1329			21.9	0	
2000	6	22	5	A,B,C	ND	0.2738	0.3287	0.0549	ND	1.2048	ND	1.0047	1.0047	0.2001	0.061	0.0003	487.7	7	14
					ND	0.0281	0.0306	0.0082	ND	0.049		0.065	0.065	0.104	0.0498	0.0003	1.2	0.03	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	6	22	6	A,B,C	ND	0.3003	0.3805	0.0802	ND	1.6674	0.1127	1.1271	1.0144	0.5403	ND	ND	647.3	6.67	12
					ND	0.0067	0.0099	0.0136	ND	0.1435	0.092	0.2197	0.1309	0.087			1.4	0.01	
2000	6	22	10	A,B,C	1.5872	1.865	2.0454	0.1804	ND	9.4965	ND	8.7897	8.7897	0.7068	6.3473	0.0216	787	6.76	18
					0.4325	0.0177	0.0369	0.0231		0.1548		0.0703	0.0703	0.1769	0.0154	0.001	1.4	0.02	
2000	6	22	14	A,B,C	0.1563	0.024	0.0715	0.0474	0.0848	2.1534	ND	1.5366	1.5366	0.6168	0.1715	0.0002	201.3	6.3	22
					0.013	0.001	0.005	0.0041	0.0177	0.0744		0.1311	0.1311	0.0669	0.0285	0	0.3	0.01	
2000	6	22	15	A,B,C	0.1251	0.0138	0.0659	0.0521	0.0592	2.1261	0.0074	1.8237	1.8163	0.3024	0.3996	0.0007	337	6.5	20
					0.0068	0.0005	0.0044	0.0048	0.008	0.0969	0.006	0.1479	0.1469	0.1227	0.0115	0	0.5	0.02	
2000	6	22	16	A,B,C	0.1824	0.0192	0.0831	0.0639	0.0993	2.4834	0.0021	1.7748	1.7727	0.7086	0.2267	0.0003	197.6	6.33	20
					0.0126	0.002	0.0083	0.0101	0.0043	0.1025	0.0017	0.0201	0.0213	0.1223	0.0368	0	1.2	0.03	
2000	6	22	17	A,B,C	0.2337	0.0177	0.0911	0.0734	0.1426	3.6636	0.0019	2.505	2.5031	1.1586	0.3897	0.0008	123.4	6.49	20
					0.0172	0.0055	0.0145	0.0112	0.0046	0.1464	0.0015	0.1249	0.1239	0.0373	0.0425	0.0001	0.1	0.04	
2000	6	22	18	A,B,C	0.1675	0.0135	0.1046	0.0911	0.0629	2.7141	ND	2.3097	2.3097	0.4044	0.1626	0.0018	630.7	7.28	18
					0.0172	0.0007	0.0034	0.0027	0.0138	0.0539		0.066	0.066	0.0661	0.0028	0.0002	2.2	0.03	
2000	6	22	19	A,B,C	0.4616	0.1248	0.3796	0.2548	0.082	3.6339	0.0022	3.0399	3.0377	0.594	1.4936	0.0051	259	6.76	21
					0.0055	0.0155	0.0133	0.0042	0.0089	0.0211	0.0018	0.233	0.2316	0.2119	0.0106	0.0003	1.7	0.03	
2000	6	22	20	A,B,C	0.8079	0.6726	0.7641	0.0915	0.0438	5.142	ND	4.6524	4.6524	0.4896	0.282	0.0043	1484.3	7.4	24
					0.0132	0.0066	0.0156	0.0193	0.0078	0.1164		0.0647	0.0647	0.0533	0.0076	0.0006	51.2	0.06	
2000	6	22	21	A,B,C	0.4663	0.0944	0.2738	0.1794	0.1926	4.0992	0.0093	2.8713	2.862	1.2279	0.7279	0.0006	392.7	6.12	26
					0.0101	0.0195	0.0241	0.0168	0.0187	0.2589	0.0003	0.241	0.2412	0.018	0.0227	0.0001	1	0.02	
2000	6	22	22	A,B,C	0.119	0.0204	0.0579	0.0375	0.0611	6.5802	ND	5.8503	5.8503	0.7299	0.34	0.0013	2416.7	6.8	14
					0.0119	0.0014	0.0083	0.0086	0.0133	0.1374		0.0677	0.0677	0.1039	0.0096	0.0001	9.8	0.01	
2000	6	22	24-1	A,B,C	0.0817	0.0262	0.0462	0.02	0.0355	37.6893	20.8436	35.7759	14.9323	1.9134	0.1314	0.0004	3033.3	6.73	12
					0.0031	0.0037	0	0.0037	0.0031	0.7892	4.0862	1.161	3.2284	0.3796	0.0129	0	14.4	0.02	
2000	6	22	24-2	A,B,C	0.306	0.0548	0.1241	0.0694	0.1819	4.9101	0.0129	3.2802	3.2673	1.6299	1.0954	0.0041	1618	6.81	16
					0.058	0.0152	0.0257	0.0108	0.0334	0.5078	0.0067	0.2216	0.2165	0.3423	0.1232	0.0004	29.4	0.02	
2000	6	22	25-1	A,B,C	0.2593	0.0795	0.1707	0.0912	0.0886	2.9973	0.0225	2.5194	2.4969	0.4779	0.1551	0.0008	890.3	7.07	23
					0.0201	0.018	0.0067	0.012	0.025	0.057	0.0019	0.0416	0.0421	0.0175	0.0137	0.0002	2.9	0.05	
2000	6	22	25-2	A,B,C	0.1353	0.0192	0.0835	0.0643	0.0518	3.0885	0.0289	2.6298	2.6009	0.4587	0.2364	0.019	892	6.98	23
					0.0038	0.0012	0.0076	0.0064	0.0114	0.0361	0.0028	0.0219	0.0238	0.0165	0.0376	0.0143	0.5	0.01	
2000	6	22	28	A,B,C	0.0821	0.0134	0.0486	0.0352	0.0336	30.2787	12.6412	29.1606	16.5194	1.1181	0.0982	0.0006	2590	6.89	12
					0.0141	0	0.0082	0.0082	0.0188	1.0459	2.9377	1.1726	1.7653	0.1268	0.0099	0.0001	9.4	0.01	
2000	6	22	30	A,B,C	2.5752	2.0257	2.4449	0.4192	0.1303	15.5349	0.0105	13.7958	13.7853	1.7391	11.5552	0.0386	840.7	6.91	21
					0.0239	0.0218	0.0836	0.0689	0.0681	0.0138	0.0014	0.2136	0.215	0.2069	0.0337	0.0154	1	0.01	
2000	6	22	31	A,B,C	0.1162	0.0218	0.0537	0.0318	0.0625	2.2887	0.0074	1.8108	1.8034	0.4779	0.2891	0.0006	410.3	6.61	20
					0.0066	0.0019	0.0085	0.0083	0.0053	0.021	0.0031	0.024	0.0227	0.0254	0.0146	0	0.7	0.02	
2000	6	22	32	A,B,C	0.1553	0.0183	0.0346	0.0162	0.1208	2.571	0.0133	1.5567	1.5434	1.0143	0.425	0.0008	133.7	6.38	23
					0.0076	0.0005	0.0068	0.0065	0.0136	0.0687	0.0109	0.0571	0.0629	0.0437	0.0074	0.0002	0.2	0.01	
2000	6	22	33	A,B,C	0.4202	0.1311	0.2118	0.0807	0.2084	4.1493	0.0843	2.9112	2.8269	1.2381	0.44	0.0009	635	6.61	23
					0.0099	0.0074	0.0083	0.0056	0.0175	0.0932	0.0466	0.023	0.0263	0.0716	0.0419	0	2.1	0.01	
2000	6	22	34	A,B,C	0.2523	0.0909	0.1535	0.0626	0.0988	2.3844	0.0045	1.5483	1.5438	0.8361	0.4108	0.0011	304.3	6.44	20
					0.0102	0.0122	0.0063	0.0059	0.0051	0.2676	0.0037	0.0108	0.0096	0.263	0.0102	0.0004	1.8	0.02	
2000	6	22	37	A,B,C	0.2654	0.062	0.14	0.0779	0.1254	11.5614	3.9531	10.5396	6.5865	1.0218	0.3878	0.002	1464	6.94	11
					0.0166	0.0231	0.0141	0.011	0.0066	2.7785	1.6972	2.7515	1.4675	0.0348	0.0041	0.0001	17.6	0.02	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	7	3	1	A,B,C	0.172	0.0323	0.1049	0.0725	0.0671	6.6951	1.7415	6,1242	4.3827	0.5709	0.1057	0.0009	1247.7	7.13	14
					0.0078	0.001	0.0187	0.0178	0.0196	0.9014	0.8758	0.8038	0.3843	0.1294	0.0184	0.0002	2.2	0.05	
2000	7	3	2	A,B,C	0.452	0.3114	0.3702	0.0589	0.0818	1.3464	0.0409	1.116	1.0751	0.2304	ND	ND	399.7	6.93	17
					0.007	0.0156	0.0135	0.0073	0.0161	0.0207	0.0334	0.0509	0.0829	0.0389			1.5	0.03	
2000	7	3	5	A,B,C	0.452	0.4032	0.4582	0.055	ND	1.5144	0.7715	1.5432	0.7717	ND	ND	ND	475.7	7.33	15
					0.007	0.0149	0.007	0.0079		0.0979	0.0939	0.0686	0.0401				0.3	0.07	
2000	7	3	6	A,B,C	0.4856	0.3221	0.3957	0.0736	0.0899	1.1724	0.2627	1.3794	1.1167	ND	ND	ND	699	7.2	12
					0.0734	0.0278	0.0445	0.0169	0.0393	0.1598	0.1309	0.2139	0.0949				1.9	0.05	
2000	7	3	10	A,B,C	1.047	0.6101	0.733	0.1228	0.314	10.3338	0.0654	8.8617	8.7963	1.4721	5.5422	0.0247	1081.3	6.87	16
					0.0505	0.0289	0.0469	0.0185	0.0151	0.4891	0.037	0.5798	0.5461	0.1051	0.0408	0.0015	3.3	0.03	
2000	7	3	14	A,B,C	0.1957	0.0243	0.0533	0.0291	0.1424	1.425	ND	1.2792	1.2792	0.1458	0.3133	0.0006	236	6.5	18
					0.0031	0.005	0.0121	0.0071	0.0101	0.032		0.0482	0.0482	0.0599	0.0066	0	0.8	0	
2000	7	3	15	A,B,C	0.1517	0.0155	0.0684	0.0529	0.0833	1.7421	0.0045	1.5909	1.5864	0.1512	0.3157	0.0007	322.7	6.57	20
					0.0054	0.0005	0.0037	0.0033	0.0089	0.1789	0.0037	0.1257	0.122	0.0614	0.0162	0	0.5	0.03	
2000	7	3	16	A,B,C	0.12	0.017	0.0628	0.0458	0.0573	1.7367	ND	1.3809	1.3809	0.3558	0.3305	0.0004	243	6.27	18
					0.0159	0.0004	0.0019	0.0016	0.0147	0.1531		0.0365	0.0365	0.1591	0.0054	0.0001	1.4	0.05	
2000	7	3	17	A,B,C	0.1181	0.0248	0.0722	0.0474	0.0459	2.1237	0.0087	1.6728	1.6641	0.4509	0.131	0.0001	149.7	6	20
					0.0103	0.0055	0.0145	0.009	0.0054	0.1254	0.0051	0.1416	0.1365	0.0653	0.016	0	0.4	0.05	
2000	7	3	18	A,B,C	0.1626	0.0349	0.0817	0.0468	0.0809	3.1635	0.0052	2.6253	2.6201	0.5382	0.1214	0.0108	672.7	8.1	16
					0.0031	0.0139	0.013	0.0026	0.0145	0.0164	0.0042	0.0844	0.0886	0.0707	0.0099	0.004	3	0.24	
2000	7	3	19	A,B,C	0.1682	0.0153	0.0306	0.0153	0.1376	2.1027	0.005	1.2213	1.2163	0.8814	0.4247	0.0004	266.7	6.23	20
					0.0545	0.0025	0.0041	0.0016	0.0504	0.4602	0.0041	0.0101	0.008	0.454	0.0085	0	0.3	0.03	
2000	7	3	20	A,B,C	0.5802	0.3804	0.5121	0.1318	0.0681	3.7779	0.0314	3.3138	3.2824	0.4641	0.1931	0.0034	833	7.47	20
					0.0054	0.0131	0.0084	0.0055	0.0046	0.0191	0.0028	0.0579	0.0606	0.0565	0.0359	0.0008	19.8	0.07	
2000	7	3	21	A,B,C	0.4574	0.0937	0.2797	0.1861	0.1777	3.9054	0.0207	2.7858	2.7651	1.1196	0.6042	0.0014	521.3	6.6	20
					0.0418	0.0105	0.0304	0.0291	0.0135	0.2623	0.0063	0.1586	0.1552	0.1095	0.0084	0.0001	0.7	0.05	
2000	7	3	22	A,B,C	0.3964	0.269	0.3413	0.0723	0.0552	2.5377	0.0105	2.0334	2.0229	0.5043	0.0785	0.0006	724	7.13	16
					0.0137	0.0069	0.0106	0.0056	0.0068	0.0467	0.0005	0.0278	0.0281	0.0454	0.0017	0.0001	6.9	0.05	
2000	7	3	24-1	A,B,C	0.1252	0.0072	0.0553	0.0481	0.0699	33.7755	15.6749	29.4447	13.7698	4.3308	0.1055	0.0007	.	7.03	12
					0.0039	0.0022	0.0004	0.0022	0.0038	0.3087	4.0219	0.0758	3.967	0.2444	0.0097	0.0001		0.03	
2000	7	3	24-2	A,B,C	0.457	0.0848	0.2551	0.1703	0.2018	5.4687	0.0246	4.0164	3.9918	1.4523	4.1865	0.017	914	6.83	15
					0.1038	0.0296	0.0923	0.0659	0.0131	0.9535	0.0134	0.775	0.7628	0.2165	0.092	0.0008	108.5	0.03	
2000	7	3	25-1	A,B,C	0.2374	0.1268	0.23	0.1032	0.0074	2.9814	0.0162	2.595	2.5788	0.3864	0.0604	0.0013	906.3	7.53	17
					0.007	0.0041	0.0046	0.0059	0.0115	0.0395	0.0045	0.0415	0.0457	0.0147	0.0251	0.0005	3.8	0.03	
2000	7	3	25-2	A,B,C	0.2507	0.0842	0.1961	0.1119	0.0546	3.1959	0.0216	2.8833	2.8617	0.3126	0.1119	0.0548	911.7	7.43	16
					0.036	0.0146	0.0368	0.0223	0.0247	0.0587	0.0023	0.0913	0.0893	0.0721	0.0142	0.0437	1.9	0.2	
2000	7	3	30	A,B,C	2.1411	1.9849	2.145	0.1601	ND	14.8311	0.0756	12.2487	12.1731	2.5824	8.804	0.0442	885	7.23	20
					0.052	0.0552	0.0175	0.0472		0.1619	0.037	0.2798	0.2536	0.1798	0.028	0.0177	2.2	0.11	
2000	7	3	31	A,B,C	0.1193	0.0082	0.0558	0.0476	0.0635	2.0628	0.0227	1.6242	1.6015	0.4386	0.4233	0.0008	420	6.5	18
					0.007	0.0007	0	0.0007	0.007	0.0383	0.0103	0.0878	0.0783	0.1214	0.0209	0.0001	1.7	0.05	
2000	7	3	32	A,B,C	0.2689	0.0154	0.0951	0.0797	0.1738	3.1422	ND	1.8756	1.8756	1.2666	0.7691	0.0009	181.5	6.17	20
					0.0287	0.0026	0.0145	0.0128	0.0384	0.2148		0.2036	0.2036	0.3682	0.038	0.0002	0.8	0.03	
2000	7	3	33	A,B,C	0.4363	0.1722	0.2886	0.1164	0.1477	3.8451	0.0191	2.3703	2.3512	1.4748	0.4937	0.0013	643.7	6.73	20
					0.0575	0.0417	0.062	0.0203	0.0056	0.25	0.0019	0.0005	0.0019	0.25	0.0081	0.0003	1.5	0.03	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	7	3	34	A,B,C	0.2472	0.0757	0.1385	0.0628	0.1088	1.9212	0.0085	1.2759	1.2674	0.6453	0.3818	0.0014	340	6.57	18
					0.0338	0.0227	0.0239	0.0021	0.0351	0.0865	0.0009	0.0205	0.0203	0.1033	0.0035	0.0006	1.4	0.05	
2000	7	3	37	A,B,C	0.355	0.038	0.2463	0.2083	0.1088	20.2839	3.7683	15.3816	11.6133	4.9023	0.4004	0.0035	1297.7	6.9	12
					0.0376	0.0035	0.0303	0.029	0.0273	0.4872	1.4975	0.0172	1.5041	0.4854	0.008	0.0002	3.1	0.21	
2000	7	14	1	A,B,C	0.1362	0.0103	0.069	0.0587	0.0671	2.8917	0.0089	2.5515	2.5426	0.3402	0.2588	0.0043	1092	7.45	15
					0.014	0.0027	0.0113	0.0087	0.0028	0.0876	0.0039	0.0703	0.0696	0.0662	0.016	0.0004	4.6	0.02	
2000	7	14	2	A,B,C	0.3177	0.1261	0.2748	0.1488	0.0428	1.4766	ND	1.131	1.131	0.3456	ND	ND	468	6.71	17
					0.0255	0.0101	0.0274	0.0209	0.0093	0.0388		0.0256	0.0256	0.0581			4.6	0.03	
2000	7	14	5	A,B,C	0.3478	0.1775	0.2719	0.0944	0.0759	1.1562	ND	0.8487	0.8487	0.3075	ND	ND	482.7	6.62	17
					0.0044	0.0076	0.0233	0.0173	0.0189	0.0805		0.031	0.031	0.0615			1.2	0.01	
2000	7	14	6	A,B,C	0.4695	0.3161	0.4101	0.094	0.0594	1.3362	0.0048	1.0464	1.0416	0.2898	ND	ND	725	7.03	13
					0.0099	0.0027	0.0036	0.001	0.0093	0.1149	0.0039	0.1143	0.1108	0.0596			1.4	0	
2000	7	14	10	A,B,C	2.2838	1.8415	2.2516	0.4101	0.0322	9.9849	0.0242	9.4413	9.4171	0.5436	6.3013	0.0293	1067.3	6.89	18
					0.0206	0.0082	0.0209	0.0215	0.0104	0.0751	0.0008	0.1363	0.1368	0.1148	0.0146	0.0023	3.9	0.04	
2000	7	14	14	A,B,C	0.1814	0.0395	0.1104	0.0709	0.0711	1.8558	0.0044	1.4022	1.3978	0.4536	0.3393	0.0007	245.3	6.52	18
					0.0207	0.0055	0.0149	0.01	0.014	0.0546	0.0018	0.007	0.0088	0.0604	0.0067	0.0001	0.7	0.04	
2000	7	14	15	A,B,C	0.1342	0.0118	0.0627	0.0509	0.0715	1.7721	0.0076	1.4508	1.4432	0.3213	0.3076	0.0007	357.7	6.54	15
					0.0084	0.0015	0.0063	0.0056	0.0129	0.0716	0.0039	0.1082	0.1044	0.0449	0.0067	0.0001	1.4	0.04	
2000	7	14	16	A,B,C	0.2404	0.0052	0.0724	0.0672	0.168	2.2518	0.0064	1.7271	1.7207	0.5247	0.4176	0.0006	274.3	6.38	20
					0.0171	0.0005	0.0081	0.0076	0.0247	0.1343	0.0027	0.203	0.2005	0.0723	0.0038	0	2.1	0.03	
2000	7	14	17	A,B,C	0.216	0.0073	0.0894	0.0821	0.1265	3.2493	0.0047	2.3214	2.3167	0.9279	0.0213	ND	147.3	6.23	20
					0.0159	0.0015	0.0104	0.0099	0.0155	0.1213	0.002	0.0356	0.0338	0.1565	0.0174		0.7	0.02	
2000	7	14	18	A,B,C	0.2549	0.0873	0.2047	0.1175	0.0501	2.3379	0.0177	2.2893	2.2716	0.0486	0.0728	0.0083	524	8.24	19
					0.0157	0.0012	0.0173	0.0163	0.0104	0.0657	0.0008	0.0557	0.055	0.076	0.0309	0.0041	1.4	0.14	
2000	7	14	19	A,B,C	0.1444	0.0127	0.0773	0.0646	0.0672	1.6494	ND	1.3557	1.3557	0.2937	0.7364	0.0024	286	6.73	19
					0.0172	0.0049	0.0125	0.008	0.0114	0.0729		0.0289	0.0289	0.0888	0.0258	0.0003	1.7	0.07	
2000	7	14	20	A,B,C	0.2495	0.1243	0.2193	0.095	0.0302	2.5782	0.022	2.4282	2.4062	0.15	0.2047	0.0021	698.7	7.24	23
					0.0125	0.004	0.0069	0.0092	0.0094	0.0638	0.0014	0.0602	0.0616	0.0675	0.0031	0.0003	2.6	0.05	
2000	7	14	21	A,B,C	0.3311	0.0774	0.1995	0.1221	0.1316	2.3385	0.0126	1.8462	1.8336	0.4923	0.3903	0.0021	477.3	6.95	23
					0.0016	0.0076	0.0069	0.0045	0.0081	0.0772	0.0066	0.1782	0.1738	0.1564	0.0094	0.0001	1.2	0.03	
2000	7	14	22	A,B,C	0.1522	0.0261	0.077	0.0509	0.0751	5.2206	0.0421	4.6023	4.5602	0.6183	0.2196	0.0012	1096	6.97	13
					0.0012	0.0044	0.0039	0.0082	0.0046	0.1726	0.0022	0.0461	0.0444	0.2005	0.0111	0	8.2	0.01	
2000	7	14	24-1	A,B,C	0.0881	0.0122	0.0503	0.0381	0.0378	36.6855	21.264	34.5315	13.2675	2.154	0.0986	0.0005	465	6.95	13
					0.0068	0.0012	0.0059	0.0047	0.0027	0.2998	0.7532	0.6097	0.166	0.3132	0.0173	0.0001	0.5	0.01	
2000	7	14	24-2	A,B,C	0.575	0.159	0.4372	0.2783	0.1377	6.2322	0.0285	5.0454	5.0169	1.1868	ND	ND	1143.7	6.97	15
					0.1388	0.0594	0.1389	0.0913	0.0136	0.8786	0.001	0.7082	0.709	0.2183			1.4	0.03	
2000	7	14	25-1	A,B,C	0.2072	0.0685	0.1335	0.065	0.0736	2.8332	0.0208	2.1237	2.1029	0.7095	0.1311	0.0009	1031.7	7.04	20
					0.0081	0.0055	0.0044	0.0081	0.0037	0.0794	0.0021	0.0671	0.068	0.0746	0.0076	0.0001	5.5	0.01	
2000	7	14	25-2	A,B,C	0.2378	0.0923	0.1766	0.0843	0.0612	2.6073	0.0244	2.2881	2.2637	0.3192	2.1485	0.0117	1027.3	7.05	20
					0.0055	0.0094	0.012	0.0027	0.0076	0.0785	0.0009	0.0939	0.0946	0.0204	1.6549	0.0089	3.8	0.02	
2000	7	14	30	A,B,C	1.921	0.8164	1.8028	0.9865	0.1181	11.8611	0.0228	10.6026	10.5798	1.2585	8.5612	0.0222	858.7	6.81	21
					0.034	0.0629	0.0413	0.0469	0.0308	0.0274	0.0081	0.269	0.2611	0.294	0.0166	0.0089	1.4	0.01	
2000	7	14	31	A,B,C	0.2172	0.0851	0.1526	0.0676	0.0646	1.2411	0.0021	1.0455	1.0434	0.1956	0.1737	0.0008	394.7	6.77	20
					0.0171	0.0126	0.0209	0.0098	0.006	0.0765	0.0017	0.0422	0.0421	0.0501	0.0143	0.0001	2.1	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	7	14	32	A,B,C	0.1824	0.0093	0.0316	0.0224	0.1508	2.217	ND	0.9579	0.9579	1.2591	0.4593	0.001	166.3	6.53	23
					0.0063	0.0012	0.0034	0.0036	0.0095	0.0709		0.0508	0.0508	0.1157	0.0067	0.0001	0.4	0.03	
2000	7	14	33	A,B,C	0.2354	0.0842	0.166	0.0818	0.0693	2.3403	0.0151	1.9764	1.9613	0.3639	0.2637	0.0011	602	6.86	25
					0.0411	0.0123	0.0196	0.0162	0.0217	0.1752	0.0013	0.1036	0.1025	0.1115	0.0044	0.0001	1.4	0.02	
2000	7	14	34	A,B,C	0.1766	0.0128	0.0703	0.0575	0.1062	1.4868	ND	0.9948	0.9948	0.492	0.505	0.0018	364.3	6.72	20
					0.0086	0.0029	0.0106	0.0078	0.0036	0.0172		0.0795	0.0795	0.0937	0.0313	0.0003	1.5	0.06	
2000	7	14	37	A,B,C	0.3368	0.0391	0.2205	0.1814	0.1163	3.9663	0.0462	3.4386	3.3924	0.5277	0.4581	0.002	1099.3	6.88	12
					0.0203	0.007	0.0199	0.0134	0.0306	0.3028	0.0242	0.3711	0.3552	0.0806	0.0025	0.0008	2	0.1	
2000	7	24	1	A,B,C	0.2212	0.0299	0.1499	0.12	0.0713	3.6567	0.2143	3.2862	3.0719	0.3705	0.0612	0.0009	.	7.43	20
					0.0111	0.0023	0.0268	0.025	0.0318	0.2756	0.1494	0.2591	0.1106	0.0356	0.025	0.0004		0.01	
2000	7	24	5	A,B,C	0.4166	0.3259	0.377	0.0511	0.0395	0.8784	0.0065	0.6978	0.6913	0.1806	ND	ND	.	7.23	17
					0.0403	0.0279	0.0405	0.031	0.0035	0.1281	0.0002	0.0622	0.0624	0.1469				0.02	
2000	7	24	6	A,B,C	0.4703	0.4068	0.4385	0.0317	0.0318	0.6522	0.0052	0.588	0.5828	0.0642	ND	ND	.	7.45	13
					0.014	0.0042	0.0072	0.0088	0.0072	0.1068	0.0022	0.0703	0.0691	0.04			.	0.02	
2000	7	24	10	A,B,C	1.1707	0.6031	0.8967	0.2936	0.274	5.7582	0.0325	4.8351	4.8026	0.9231	2.763	0.0289	.	7.43	17
					0.0677	0.1862	0.1319	0.121	0.0759	0.0924	0.0148	0.3949	0.3871	0.3177	0.0042	0.0109		0.02	
2000	7	24	14	A,B,C	0.2612	0.0213	0.1284	0.1071	0.1329	1.371	0.0036	1.1559	1.1523	0.2151	0.321	0.0082	.	7.05	21
					0.018	0.0032	0.0249	0.0227	0.0318	0.0703	0.0029	0.0331	0.0328	0.0884	0.0022	0.0049	.	0	
2000	7	24	15	A,B,C	0.2837	0.0988	0.1416	0.0428	0.1421	1.0965	ND	0.8529	0.8529	0.2436	0.3284	0.0027	.	7.53	20
					0.0767	0.0219	0.0282	0.0064	0.0491	0.0687		0.0857	0.0857	0.1105	0.1324	0.0004		0.09	
2000	7	24	16	A,B,C	0.2134	0.0523	0.103	0.0508	0.1104	1.6647	0.0037	1.245	1.2413	0.4197	0.3705	0.0024	.	7.04	20
					0.0128	0.0148	0.0082	0.016	0.0203	0.206	0.003	0.2249	0.2223	0.0756	0.0048	0	.	0	
2000	7	24	17	A,B,C	0.1963	0.0418	0.0966	0.0548	0.0997	1.896	0.0137	1.53	1.5163	0.366	0.1848	0.002	.	7.25	21
					0.0147	0.0076	0.019	0.0115	0.0259	0.1582	0.0086	0.14	0.1331	0.131	0.0032	0.0002		0.03	
2000	7	24	18	A,B,C	0.2793	0.1663	0.2598	0.0935	0.0196	2.4441	0.016	2.3088	2.2928	0.1353	ND	ND	.	9.14	20
					0.0086	0.001	0.0031	0.004	0.0106	0.0969	0.0001	0.0527	0.0526	0.0443			.	0.01	
2000	7	24	19	A,B,C	0.4972	0.2018	0.2588	0.057	0.2384	2.4138	0.0132	1.3275	1.3143	1.0863	0.3309	0.0065	.	7.52	24
					0.0708	0.018	0.0114	0.0167	0.0618	0.3232	0.0108	0.0758	0.0696	0.2585	0.0445	0.0011		0.04	
2000	7	24	20	A,B,C	0.3111	0.1865	0.2759	0.0894	0.0352	2.1951	0.0245	2.1558	2.1313	0.0393	0.1064	0.0302	.	8.82	23
					0.0181	0.0002	0.0053	0.0053	0.0133	0.0331	0.0047	0.0399	0.0445	0.0487	0.0065	0.0023		0.01	
2000	7	24	21	A,B,C	0.3423	0.1248	0.1909	0.0661	0.1514	1.8504	0.0095	1.815	1.8055	0.0354	0.2964	0.011	.	7.81	23
					0.0169	0.0034	0.009	0.0081	0.0174	0.0083	0.0012	0.0059	0.0053	0.0141	0.0022	0.0004		0.01	
2000	7	24	22	A,B,C	0.3702	0.2773	0.337	0.0597	0.0332	1.3827	ND	1.3761	1.3761	0.0066	0.0253	0.0002	.	7.14	20
					0.0116	0.0145	0.013	0.0016	0.0149	0.0944		0.0231	0.0231	0.0847	0.0207	0.0002		0.01	
2000	7	24	24-1	A,B,C	0.1328	0.0244	0.1033	0.0789	0.0295	33.645	22.3802	31.7253	9.3451	1.9197	0.0585	0.0009	.	7.4	13
					0.0055	0.0003	0.0074	0.0072	0.0126	0.5387	2.7579	0.5678	2.4046	0.226	0.0243	0.0004		0.01	
2000	7	24	24-2	A,B,C	0.5	0.2522	0.4213	0.1691	0.0787	3.7977	0.055	3.1344	3.0794	0.6633	0.2867	0.0031	.	7.26	15
					0.1115	0.1677	0.1547	0.031	0.0438	0.3484	0.0354	0.2778	0.264	0.1395	0.0457	0.0004		0.04	
2000	7	24	25-1	A,B,C	0.3145	0.2268	0.3145	0.0878	0	2.9676	0.0124	2.7276	2.7152	0.24	0.0148	0.001	.	8.16	22
					0.0074	0.0021	0.0066	0.0059	0.0127	0.1295	0.0051	0.1641	0.1682	0.0977	0.0121	0.0008		0.03	
2000	7	24	25-2	A,B,C	0.4068	0.1728	0.277	0.1042	0.1298	3.285	0.021	2.6082	2.5872	0.6768	0.0435	0.0306	.	8.28	21
					0.0197	0.0208	0.0302	0.0128	0.0366	0.1465	0.0023	0.0447	0.047	0.1115	0.0355	0.025		0.01	
2000	7	24	30	A,B,C	1.7708	1.0946	1.6631	0.5685	0.1077	10.9245	0.0022	9.7779	9.7757	1.1466	6.562	0.0568	.	7.35	23
					0.0173	0.0632	0.0309	0.0703	0.0245	0.1142	0.0018	0.2176	0.2172	0.134	0.0203	0.0229		0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	7	24	31	A,B,C	0.3136	0.2282	0.2943	0.0662	0.0192	1.3134	ND	1.1238	1.1238	0.1896	0.0448	0.001		7.18	20
					0.0067	0.0116	0.0093	0.0029	0.0073	0.1923		0.1219	0.1219	0.0731	0.0188	0.0006		0.03	
2000	7	24	32	A,B,C	0.2222	0.0248	0.1225	0.0977	0.0997	2.073	ND	1.4337	1.4337	0.6393	0.4659	0.0019		7.01	23
					0.0142	0	0.0268	0.0268	0.0209	0.1087		0.1024	0.1024	0.1111	0.0031	0.0008		0.02	
2000	7	24	33	A,B,C	0.5023	0.2767	0.4232	0.1465	0.0792	3.1518	ND	2.205	2.205	0.9468	ND	0.0004		7.56	22
					0.0342	0.0055	0.0131	0.0183	0.023	0.2735		0.0564	0.0564	0.2228		0.0003		0.03	
2000	7	24	34	A,B,C	0.3182	0.1612	0.2311	0.0699	0.0871	1.506	ND	0.9084	0.9084	0.5976	0.1384	0.0012		7.32	20
					0.0205	0.0147	0.0329	0.0182	0.0132	0.0218		0.1035	0.1035	0.0918	0.0051	0		0.13	
2000	8	3	1	A,B,C	0.2326	0.0441	0.1972	0.1531	0.0354	7.626	0.045	7.2516	7.2066	0.3744	0.1803	0.0395	204.7	8.74	14
					0.0255	0.0036	0.0202	0.0174	0.0057	0.1524	0.0045	0.0801	0.0814	0.1107	0.0742	0.0162	1.7	0.05	
2000	8	3	2	A,B,C	0.429	0.2005	0.3076	0.1072	0.1214	1.8099	0.0818	1.3902	1.3084	0.4197	ND	ND	341.3	8.98	18
					0.0441	0.0626	0.0371	0.0471	0.036	0.0478	0.0668	0.0275	0.0683	0.0586			0.7	0.03	
2000	8	3	5	A,B,C	0.485	0.4088	0.4305	0.0217	0.0545	1.0479	0.0917	0.6369	0.5452	0.411	ND	ND	376	8.89	17
					0.0247	0.0256	0.0141	0.0243	0.0155	0.0843	0.0749	0.0962	0.0303	0.0812			1.2	0.04	
2000	8	3	6	A,B,C	0.5205	0.449	0.485	0.036	0.0355	1.2477	0.0175	0.9375	0.92	0.3102	ND	0.2805	526.3	9.14	15
					0.012	0.0177	0.0281	0.0104	0.0167	0.1836	0.0073	0.1471	0.1478	0.0387		0.2291	1	0.04	
2000	8	3	10	A,B,C	2.3528	1.7441	1.9681	0.224	0.3848	8.9487	0.0201	6.5406	6.5205	2.4081	3.0726	1.0479	1097	8.94	17
					0.0338	0.0171	0.0491	0.0379	0.0173	0.184	0.0051	0.2131	0.217	0.175	0.1655	0.0902	1.6	0.03	
2000	8	3	14	A,B,C	0.2971	0.0639	0.1927	0.1288	0.1044	2.2014	0.0357	1.5651	1.5294	0.6363	0.4848	0.1075	228.7	8.68	22
					0.0246	0.0032	0.0122	0.0132	0.0126	0.0935	0.0291	0.0975	0.0749	0.1349	0.0021	0.0021	0.7	0.01	
2000	8	3	15	A,B,C	0.517	0.1879	0.4091	0.2212	0.1079	2.8737	ND	2.5983	2.5983	0.2754	0.1356	0.0373	278.3	8.79	22
					0.0298	0.0052	0.0413	0.0381	0.0151	0.1909		0.2791	0.2791	0.1302	0.0282	0.0091	2.2	0.02	
2000	8	3	16	A,B,C	0.3231	0.0465	0.2316	0.1851	0.0915	2.3493	0.0026	1.8615	1.8589	0.4878	0.3301	0.0505	175.3	8.48	20
					0.0111	0.0065	0.0447	0.0492	0.0343	0.0693	0.0021	0.235	0.2371	0.166	0.0069	0.003	1.2	0.03	
2000	8	3	17	A,B,C	0.3026	0.0397	0.1957	0.156	0.1069	2.7426	ND	2.3661	2.3661	0.3765	0.7209	0.1255	133.6	8.55	22
					0.0143	0.0042	0.015	0.0169	0.0122	0.1058		0.0861	0.0861	0.1897	0.0092	0.0077	0.5	0.03	
2000	8	3	18	A,B,C	0.3081	0.1717	0.2796	0.1079	0.0285	2.9529	ND	2.8416	2.8416	0.1113	ND	ND	460.3	10.81	20
					0.0075	0.0031	0	0.0031	0.0075	0.0259		0.0255	0.0255	0.0092			1	0.01	
2000	8	3	19	A,B,C	0.4105	0.173	0.2796	0.1066	0.1309	2.1009	ND	1.5018	1.5018	0.5991	0.1222	0.0372	234.7	8.87	22
					0.0063	0.0285	0.0147	0.0355	0.0084	0.1216		0.1325	0.1325	0.1141	0.0014	0.0014	0.3	0.03	
2000	8	3	20	A,B,C	0.3476	0.1661	0.2536	0.0876	0.094	2.9442	0.0057	2.3832	2.3775	0.561	0.0343	0.0286	499.7	10.03	22
					0.0074	0.0042	0.0126	0.0101	0.0124	0.0428	0.0047	0.0688	0.0725	0.0954	0.028	0.0233	2.7	0.04	
2000	8	3	21	A,B,C	0.4175	0.0698	0.2177	0.1478	0.1999	3.4926	0.0025	2.4642	2.4617	1.0284	0.9945	0.5371	405.7	9.3	24
					0.0245	0.0088	0.0294	0.0233	0.0432	0.0234	0.0021	0.1221	0.1218	0.1237	0.0053	0.0168	1	0.03	
2000	8	3	24-1	A,B,C	0.1292	0.0273	0.1002	0.0729	0.029	31.7913	23.6857	29.2884	5.6027	2.5029	0.0486	0.0178	376.7	9	14
					0.0053	0.0009	0.0113	0.0115	0.0157	0.3294	0.4572	0.5852	0.2406	0.4264	0.0203	0.0073	1.5	0.04	
2000	8	3	24-2	A,B,C	2.2207	1.5735	1.8331	0.2597	0.3876	8.6988	0.0221	4.518	4.4959	4.1808	1.2838	0.2426	524.3	8.6	16
					0.1548	0.1443	0.2212	0.0799	0.1192	0.6449	0.0117	0.5343	0.5227	0.7822	0.2769	0.0448	4.4	0.02	
2000	8	3	25-2	A,B,C	1.7803	1.1512	1.4882	0.337	0.2921	10.3758	0.0347	7.629	7.5943	2.7468	3.1544	2.2298	815	10.15	22
					0.273	0.2631	0.2763	0.0446	0.0333	0.2064	0.007	0.1467	0.1461	0.0606	0.1244	0.3163	0.5	0.06	
2000	8	3	30	A,B,C	1.576	1.0126	1.4637	0.4511	0.1123	9.7641	0.0139	8.1852	8.1713	1.5789	5.7413	1.1032	769.7	8.8	23
					0.1345	0.0293	0.086	0.0755	0.0488	0.1574	0.009	0.2669	0.2579	0.1363	0.0511	0.4355	4.7	0.01	
2000	8	3	31	A,B,C	0.3507	0.1183	0.237	0.1187	0.1137	2.3061	0.0254	1.7343	1.7089	0.5718	0.222	0.1435	266.3	8.52	22
					0.0071	0.0289	0.0266	0.023	0.0223	0.2023	0.0207	0.1376	0.1463	0.0777	0.0131	0.0878	0.5	0.05	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	8	3	32	A,B,C	0.2677	0.0246	0.2015	0.177	0.0661	3.1626	0.0669	1.9326	1.8657	1.23	0.9986	0.3755	168.8	9.04	24
					0.0083	0.0013	0.0129	0.0119	0.0107	0.0434	0.0546	0.0451	0.0099	0.0199	0.0036	0.027	0.5	0.02	
2000	8	3	33	A,B,C	0.2922	0.092	0.2451	0.1531	0.047	3.207	ND	2.3529	2.3529	0.8541	0.3774	0.2447	520	10.17	24
					0.0275	0.0053	0.0119	0.0093	0.0226	0.0635		0.0218	0.0218	0.0466	0.0153	0.0849	1.6	0.04	
2000	8	3	34	A,B,C	0.3195	0.0243	0.2149	0.1906	0.1046	2.3196	0.0055	1.6698	1.6643	0.6498	0.1569	0.0242	242.7	9.17	22
					0.009	0.0011	0.0143	0.0133	0.0059	0.095	0.0045	0.1371	0.1327	0.0509	0.0242	0.0011	0.3	0.41	
2000	8	14	1	A,B,C	0.3401	0.0437	0.2351	0.1914	0.1051	6.9375	0.0128	6.0978	6.085	0.8397	0.7333	0.0069	1968.3	7.2	12
					0.0385	0.0064	0.0145	0.02	0.024	0.7499	0.002	0.78	0.778	0.1781	0.1217	0.0013	34	0.01	
2000	8	14	2	A,B,C	0.3463	0.1025	0.3157	0.2132	0.0307	1.4601	0.1412	1.0734	0.9322	0.3867	ND	ND	320.7	7.41	20
					0.0046	0.0201	0.0044	0.0195	0.0079	0.1516	0.1153	0.1582	0.2716	0.0632			1.5	0	
2000	8	14	6	A,B,C	0.534	0.5117	0.5157	0.004	0.0182	1.0452	0.0199	0.633	0.6131	0.4122	0.1697	0.0149	460.7	7.53	15
					0.0065	0.0088	0.0125	0.0184	0.0059	0.099	0.0094	0.0286	0.038	0.1003	0.0955	0.0113	0.5	0.01	
2000	8	14	10	A,B,C	1.7847	1.198	1.588	0.39	0.1967	7.3077	0.044	6.2595	6.2155	1.0482	4.8787	0.0434	925.7	7.18	14
					0.0547	0.0509	0.0653	0.1023	0.0494	0.098	0.0096	0.1699	0.1755	0.1222	0.0135	0.0004	2.1	0	
2000	8	14	14	A,B,C	0.2816	0.0683	0.2126	0.1442	0.0691	1.9404	ND	1.4202	1.4202	0.5202	0.2938	0.0025	227.3	7.15	19
					0.0375	0.012	0.0168	0.0249	0.0208	0.0893		0.0729	0.0729	0.0574	0.0092	0.0001	0.7	0.01	
2000	8	14	15	A,B,C	0.272	0.0264	0.1895	0.1632	0.0825	2.0904	ND	1.4394	1.4394	0.651	0.133	0.0016	213.7	7.32	21
					0.0056	0.0011	0.0063	0.0052	0.0008	0.0222		0.0567	0.0567	0.0413	0.0032	0.0001	1.5	0.02	
2000	8	14	16	A,B,C	0.2701	0.0308	0.2173	0.1865	0.0527	2.2698	0.0093	1.5339	1.5246	0.7359	0.121	0.0008	177.2	7.06	18
					0.0063	0.0011	0.0126	0.0118	0.007	0.0711	0.0076	0.0898	0.0961	0.0398	0.0038	0	2.6	0.01	
2000	8	14	17	A,B,C	0.1905	0.0122	0.0665	0.0543	0.1239	1.644	ND	0.8403	0.8403	0.8037	0.4362	0.0028	123.3	7.04	20
					0.013	0.0007	0.0099	0.0091	0.0055	0.169		0.1717	0.1717	0.021	0.0028	0.0001	0.1	0.01	
2000	8	14	18	A,B,C	0.3036	0.1443	0.2569	0.1127	0.0467	1.896	0.0097	1.5366	1.5269	0.3594	0.1151	0.0871	377	9.73	17
					0.0027	0.0032	0.0118	0.009	0.0092	0.0447	0.0003	0.0494	0.0494	0.0174	0.0027	0.0018	0.8	0	
2000	8	14	19	A,B,C	0.2843	0.0408	0.1434	0.1026	0.1409	1.4958	0.0032	0.699	0.6958	0.7968	0.1202	0.0008	204.3	7.08	17
					0.0185	0.0163	0.0212	0.0144	0.0039	0.0415	0.0026	0.0316	0.0291	0.073	0.0007	0	0.7	0.02	
2000	8	14	20	A,B,C	0.3691	0.2784	0.3469	0.0686	0.0221	2.2452	0.0126	1.713	1.7004	0.5322	0.0807	0.0367	531	9.15	19
					0.0234	0.0158	0.023	0.016	0.0034	0.2688	0.0013	0.1619	0.1618	0.1083	0.0085	0.0039	0.5	0.02	
2000	8	14	21	A,B,C	0.6151	0.2161	0.3837	0.1676	0.2314	3.5088	0.0091	2.0967	2.0876	1.4121	0.6841	0.0109	432.3	7.43	21
					0.017	0.0194	0.0122	0.0214	0.0147	0.0512	0.0014	0.0597	0.0599	0.0176	0.013	0.0001	1.2	0	
2000	8	14	24-1	A,B,C	0.1316	0.0388	0.1141	0.0754	0.0175	29.955	20.4566	26.6091	6.1525	3.3459	0.0863	0.0007	428.7	7.14	13
					0.0035	0.0053	0.0054	0.003	0.005	0.4962	0.996	0.4707	0.6898	0.5433	0.0087	0.0001	2.3	0.01	
2000	8	14	24-2	A,B,C	0.8946	0.4728	0.6542	0.1814	0.2404	4.5573	0.0086	2.4315	2.4229	2.1258	4.8311	0.0279	1010	6.99	11
					0.4373	0.305	0.4152	0.1137	0.0422	1.1699	0.0007	0.6579	0.6577	0.5356	0.981	0.0056	64.5	0.01	
2000	8	14	25-2	A,B,C	0.542	0.0295	0.3026	0.2731	0.2394	6.1608	0.0152	3.7902	3.775	2.3706	0.8689	0.2061	865	8.74	18
					0.0495	0.0024	0.0417	0.0397	0.0527	0.4519	0.0007	0.2615	0.2622	0.3179	0.3189	0.058	0.9	0	
2000	8	14	30	A,B,C	2.2004	0.948	1.9224	0.9744	0.2781	7.0923	0.0022	5.5263	5.5241	1.566	4.9967	0.0553	732.7	7.44	20
					0.0393	0.0381	0.0641	0.0305	0.0325	0.1738	0.0018	0.2454	0.2457	0.1687	0.0803	0.0221	1.4	0	
2000	8	14	31	A,B,C	0.3578	0.0235	0.2442	0.2207	0.1136	1.1394	ND	0.7272	0.7272	0.4122	0.1208	0.0051	249.3	7.22	21
					0.0046	0.0024	0.0309	0.0307	0.0307	0.0637		0.069	0.069	0.0617	0.0054	0.0033	1	0.02	
2000	8	14	32	A,B,C	0.247	0.0295	0.1127	0.0832	0.1343	2.595	ND	1.5756	1.5756	1.0194	1.4759	0.0182	135.8	7.18	23
					0.0078	0.0024	0.0034	0.0037	0.0101	0.1323		0.2595	0.2595	0.1293	0.0107	0.0041	0.5	0.01	
2000	8	14	33	A,B,C	0.6891	0.3217	0.4808	0.1591	0.2083	4.158	0.0161	2.5047	2.4886	1.6533	0.1559	0.021	593.3	8.6	20
					0.0194	0.0152	0.0265	0.0114	0.0424	0.0629	0.0004	0.0567	0.0568	0.0088	0.0036	0.0082	1.2	0	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	8	14	34	A,B,C	0.3093	0.1398	0.2315	0.0918	0.0778	0.834	ND	0.5634	0.5634	0.2706	0.0922	0.0011	264.3	7.71	18
					0.017	0.0246	0.0195	0.0121	0.0153	0.041		0.0363	0.0363	0.0568	0.0028	0	0.3	0.37	
2000	8	24	1	A,B,C	0.2052	0.0226	0.1739	0.1513	0.0313	4.434	0.011	3.8916	3.8806	0.5424	0.0764	0.0008	1678.3	7.29	13
					0.0209	0.0037	0.029	0.0274	0.0081	0.885	0.0066	0.8664	0.8635	0.0237	0.0118	0.0001	108.6	0.04	
2000	8	24	2	A,B,C	0.4917	0.2908	0.4392	0.1484	0.0525	1.4082	ND	1.2549	1.2549	0.1533	0	0	318	7.48	19
					0.0142	0.0049	0.0125	0.0078	0.023	0.0187		0.0499	0.0499	0.0436	0	0	8.6	0.02	
2000	8	24	6	A,B,C	0.5306	0.4452	0.4765	0.0313	0.0541	0.4923	0.003	0.543	0.54	ND	ND	ND	465.7	7.54	16
					0.0069	0.0052	0.0169	0.0221	0.0166	0.1854	0.0024	0.0418	0.0437				1.7	0.01	
2000	8	24	10	A,B,C	1.8488	0.7878	1.4225	0.6346	0.4264	7.1676	0.0079	5.0784	5.0705	2.0892	3.9265	0.0328	626.3	7.15	13
					0.0645	0.0148	0.099	0.0844	0.1026	0.1218	0.0035	0.3234	0.3248	0.3994	0.0124	0.0003	1.4	0	
2000	8	24	14	A,B,C	0.1583	0.0281	0.0974	0.0693	0.0609	1.527	0.0069	1.1724	1.1655	0.3546	0.0762	0.0006	194.1	7.14	17
					0.0073	0.0041	0.0109	0.0077	0.0138	0.1543	0.0031	0.0706	0.0712	0.1063	0.0209	0.0001	0.8	0.01	
2000	8	24	15	A,B,C	0.1916	0.0092	0.0831	0.0739	0.1085	1.4781	ND	1.1094	1.1094	0.3687	ND	ND	211	7.52	17
					0.0256	0.0044	0.0302	0.026	0.0056	0.096		0.1385	0.1385	0.0845			0.5	0.01	
2000	8	24	16	A,B,C	0.2075	0.013	0.173	0.16	0.0346	2.1324	ND	1.842	1.842	0.2904	ND	ND	182.6	7.04	17
					0.0106	0.0019	0.0335	0.0333	0.0229	0.2784		0.2859	0.2859	0.0278			2.7	0.01	
2000	8	24	17	A,B,C	0.1255	0.0011	0.0544	0.0533	0.0711	1.8048	0.0235	0.9027	0.8792	0.9021	ND	ND	118.5	7.2	19
					0.0192	0	0.0113	0.0113	0.01	0.2382	0.0192	0.3135	0.2996	0.0754			0.2	0.02	
2000	8	24	18	A,B,C	0.2816	0.1051	0.2714	0.1663	0.0102	2.7117	0.0102	2.4	2.3898	0.3117	ND	ND	408.3	9.88	17
					0.0173	0.0093	0	0.0093	0.0173	0.0349	0.0043	0.057	0.0531	0.0485			0.7	0.01	
2000	8	24	19	A,B,C	0.2624	0.0857	0.182	0.0964	0.0804	1.7205	0.0062	1.3629	1.3567	0.3576	ND	ND	209	7.35	16
					0.0145	0.0252	0.0207	0.0109	0.0133	0.0613	0.0025	0.1548	0.1573	0.1411			0.5	0	
2000	8	24	20	A,B,C	0.2685	0.1415	0.2542	0.1127	0.0143	3.2469	0.0119	2.6694	2.6575	0.5775	0.204	0.0914	538.7	9.14	19
					0.0132	0.0054	0.0067	0.0094	0.0065	0.2393	0.0049	0.2622	0.2671	0.0337	0.0069	0.0034	1.5	0	
2000	8	24	21	A,B,C	0.5287	0.1211	0.3268	0.2058	0.2019	4.08	0.0022	3.1311	3.1289	0.9489	0.8949	0.0149	316.7	7.45	18
					0.0096	0.0048	0.0176	0.0131	0.0186	0.0429	0.0018	0.3445	0.3453	0.3703	0.005	0.0002	0.3	0.01	
2000	8	24	24-1	A,B,C	0.1096	0.0089	0.0883	0.0794	0.0213	30.3744	19.6345	27.7149	8.0804	2.6595	0.0749	0.0007	455.7	7.18	13
					0.0167	0.0033	0.0166	0.0134	0.009	0.7437	1.07	0.3615	0.7949	0.3826	0.0152	0.0001	3.1	0.01	
2000	8	24	24-2	A,B,C	0.7293	0.2443	0.3771	0.1327	0.3523	4.296	0.0699	1.5777	1.5078	2.7183	0.6539	0.0039	460.3	7	13
					0.1032	0.0081	0.039	0.0312	0.1189	0.717	0.0517	0.1682	0.1379	0.5548	0.3051	0.0018	45	0.01	
2000	8	24	25-2	A,B,C	0.4151	0.0289	0.3035	0.2746	0.1116	5.5737	0.0204	4.5258	4.5054	1.0479	0.8981	0.2039	597.7	8.82	16
					0.0159	0.0014	0.0221	0.023	0.0173	0.1542	0.0102	0.0517	0.0448	0.1056	0.0069	0.0392	2	0.01	
2000	8	24	30	A,B,C	2.6865	1.9628	2.6317	0.6689	0.0548	13.1763	0.0033	11.7528	11.7495	1.4235	9.0317	0.0715	663	7.3	19
					0.021	0.0507	0.0155	0.0541	0.0064	0.1009	0.0027	0.22	0.2223	0.1495	0.0197	0.0286	1.7	0	
2000	8	24	31	A,B,C	0.289	0.1183	0.221	0.1028	0.068	1.6512	0.009	1.3803	1.3713	0.2709	0.0889	0.0739	215.3	7.35	18
					0.021	0.0362	0.0429	0.0075	0.026	0.0958	0.0015	0.0062	0.0073	0.0942	0.0089	0.0595	0.3	0.01	
2000	8	24	32	A,B,C	0.0754	0.0115	0.0342	0.0227	0.0412	2.7057	0.0133	2.3454	2.3321	0.3603	1.4084	0.1518	422.3	8.5	20
					0.0124	0.004	0.0086	0.0116	0.0079	0.1649	0.0109	0.2293	0.2199	0.0645	0.0036	0.0615	0.7	0.01	
2000	8	24	33	A,B,C	0.3103	0.1006	0.2065	0.1059	0.1039	2.9574	0.0078	2.0787	2.0709	0.8787	0.205	0.0018	131.7	7.02	18
					0.0112	0.0069	0.0069	0.0032	0.0124	0.0547	0.0015	0.0104	0.0115	0.065	0.007	0.0004	0.4	0.01	
2000	8	24	34	A,B,C	0.204	0.0425	0.1167	0.0742	0.0874	1.5663	0.0022	1.1658	1.1636	0.4005	0.1617	0.0029	226.7	7.32	17
					0.033	0.0119	0.0309	0.0219	0.0034	0.0367	0.0018	0.0427	0.0433	0.0294	0.0013	0	1	0.13	
2000	9	5	1	A,B,C	0.1754	0.028	0.1443	0.1163	0.0311	4.5009	0.0199	3.9219	3.902	0.579	ND	ND	2160	7.33	13
					0.0112	0.0021	0.0044	0.0023	0.0071	0.2733	0.0085	0.283	0.2815	0.0232			4.7	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	9	5	2	A,B,C	0.3695	0.168	0.2909	0.1229	0.0786	1.599	0.0031	1.1208	1.1177	0.4782	ND	ND	371	7.5	17
					0.009	0.0114	0.0374	0.0373	0.0387	0.0304	0.0025	0.0461	0.0455	0.0194			4.5	0.01	
2000	9	5	6	A,B,C	0.5748	0.4832	0.4928	0.0096	0.082	0.6882	0.0019	0.4197	0.4178	0.2685	ND	ND	441.3	7.6	15
					0.0077	0.0113	0.0398	0.0285	0.0321	0.0034	0.0015	0.1761	0.1756	0.1751			1.4	0	
2000	9	5	10	A,B,C	1.3732	0.4875	1.1194	0.6318	0.2538	7.6833	0.0056	6.1515	6.1459	1.5318	4.2051	0.0415	578	7.22	10
					0.1018	0.0736	0.0468	0.0329	0.0921	0.236	0.0024	0.1801	0.1778	0.1977	0.0219	0.0004	1.4	0	
2000	9	5	14	A,B,C	0.2598	0.0408	0.173	0.1322	0.0869	2.415	0.0164	2.0766	2.0602	0.3384	0.1473	0.0032	258.3	7.58	15
					0.0189	0.0097	0.0281	0.0232	0.0398	0.2321	0.0112	0.2351	0.2239	0.0045	0.0127	0.0001	1	0.03	
2000	9	5	15	A,B,C	0.1511	0.0086	0.0764	0.0678	0.0747	2.0046	0.0041	1.3158	1.3117	0.6888	ND	ND	235.3	8	15
					0.0193	0.0002	0.0062	0.006	0.023	0.0515	0.0017	0.0104	0.0087	0.0584			1	0.01	
2000	9	5	16	A,B,C	0.1953	0.0132	0.1191	0.1059	0.0762	1.9572	ND	1.5132	1.5132	0.444	0.1345	0.0016	250.3	7.31	13
					0.0017	0.0035	0.0238	0.0202	0.024	0.0198		0.0723	0.0723	0.0527	0.0116	0.0002	1	0.01	
2000	9	5	17	A,B,C	0.1919	0.0182	0.1507	0.1325	0.0412	2.7156	0.0055	2.001	1.9955	0.7146	ND	ND	125.6	8.49	15
					0.0119	0.0015	0.0234	0.0218	0.0121	0.1203	0.0023	0.1581	0.1605	0.0883			0.3	0.02	
2000	9	5	18	A,B,C	0.3384	0.1343	0.2506	0.1163	0.0878	3.561	0.019	3.1803	3.1613	0.3807	0.0456	0.0316	482.7	9.58	14
					0.0097	0.0144	0.0118	0.003	0.0157	0.0938	0.01	0.1011	0.0921	0.1324	0.0233	0.0163	1.4	0.01	
2000	9	5	19	A,B,C	0.2215	0.0275	0.1222	0.0947	0.0993	2.3565	0.0552	1.806	1.7508	0.5505	ND	ND	221.3	7.4	14
					0.0152	0.0051	0.0327	0.0277	0.0254	0.0535	0.0451	0.0809	0.0943	0.1008			0.5	0.01	
2000	9	5	20	A,B,C	0.3694	0.0307	0.2114	0.1808	0.158	4.6692	ND	3.8457	3.8457	0.8235	0.0161	0.0107	485	9.56	16
					0.0179	0.0012	0.0113	0.0119	0.0071	0.1205		0.1016	0.1016	0.0189	0.0132	0.0088	1.7	0.01	
2000	9	5	21	A,B,C	0.2702	0.028	0.158	0.13	0.1122	4.3281	0.021	3.7725	3.7515	0.5556	ND	ND	447.3	9.38	17
					0.009	0.0018	0.007	0.006	0.0154	0.2333	0.0087	0.3879	0.3794	0.1553			1.5	0.01	
2000	9	5	24-1	A,B,C	0.0883	0.0139	0.0783	0.0645	0.01	29.0139	17.1592	28.5516	11.3924	0.4623	0.1217	0.0012	4450	7.21	13
					0.0079	0.0016	0.0103	0.0101	0.0182	0.5148	0.9772	0.656	0.5108	0.143	0.0009	0	8.2	0.01	
2000	9	5	24-2	A,B,C	0.5221	0.1827	0.2654	0.0827	0.2567	3.3522	0.0779	2.0265	1.9486	1.3257	0.1906	0.0012	512.7	7.05	10
					0.0217	0.0635	0.0827	0.0241	0.0648	0.4861	0.0636	0.5112	0.4476	0.054	0.0273	0.0001	43.4	0.02	
2000	9	5	25-2	A,B,C	0.4076	0.0445	0.2688	0.2242	0.1388	6.6018	0.0176	5.4297	5.4121	1.1721	1.6059	0.137	910.3	8.28	12
					0.0103	0.0028	0.0205	0.0182	0.0274	0.2533	0.0144	0.1901	0.1796	0.1589	0.008	0.0212	1.9	0.01	
2000	9	5	30	A,B,C	1.1907	0.1514	1.0065	0.8551	0.1842	9.9486	ND	9.0522	9.0522	0.8964	6.4953	0.0618	665	7.36	16
					0.0418	0.0324	0.0632	0.0309	0.0263	0.0417		0.0709	0.0709	0.0712	0.0138	0.0228	2.1	0.01	
2000	9	5	31	A,B,C	0.2764	0.0868	0.2258	0.1389	0.0506	1.5177	ND	0.1836	0.1836	1.3341	0.1097	0.0063	294.3	7.95	16
					0.0128	0.0208	0.0141	0.0277	0.0056	0.0375		0.0551	0.0551	0.0513	0.0118	0.0009	1	0.01	
2000	9	5	32	A,B,C	0.1952	0.0549	0.159	0.1041	0.0362	2.5527	ND	0.1137	0.1137	2.439	0.7743	0.0045	134	7.2	17
					0.0108	0.0073	0.0076	0.0128	0.0151	0.1659		0.0466	0.0466	0.1497	0.0088	0.0019	0.5	0.03	
2000	9	5	33	A,B,C	0.3341	0.046	0.2253	0.1793	0.1088	4.7487	ND	0.2961	0.2961	4.4526	0.0251	0.0147	450.3	9.38	16
					0.0139	0.0098	0.027	0.0177	0.0228	0.1742		0.0282	0.0282	0.1501	0.0205	0.012	2.8	0.01	
2000	9	5	34	A,B,C	0.2592	0.1638	0.2444	0.0806	0.0148	1.5513	ND	1.3317	1.3317	0.2196	ND	ND	294	8.5	15
					0.0099	0.0054	0.0107	0.0086	0.0068	0.1204		0.167	0.167	0.0539			0.8	0.37	
2000	9	20	1	A,B,C	0.2689	0.2111	0.2411	0.0301	0.0277	4.8738	1.4305	4.6737	3.2432	0.2001	ND	ND	2060	7.35	14
					0.0079	0.0021	0.0052	0.0031	0.0027	0.3102	0.0287	0.2884	0.2618	0.0751			21.6	0	
2000	9	20	2	A,B,C	0.4525	0.4104	0.4138	0.0034	0.0387	1.7607	0.8757	1.686	0.8103	0.0747	ND	ND	353.3	7.55	
					0.0114	0.013	0.011	0.0195	0.002	0.0225	0.0068	0.0517	0.0571	0.0362			2	0.01	
2000	9	20	6	A,B,C	0.5232	0.4905	0.4883	-0.0022	0.0349	0.9567	0.2184	0.8397	0.6213	0.117	ND	ND	520	7.63	15
					0.0132	0.0051	0.0123	0.0071	0.0084	0.0248	0.0084	0.0361	0.0303	0.0583			3.7	0.01	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
										mg/L							uS.cm^{-1}		deg C
2000	9	20	10	A,B,C	2.9573	1.8091	2.6967	0.8877	0.2605	14.6928	0.002	12.2775	12.2755	2.4153	9.1898	0.0696	802.7	7.11	17
					0.0247	0.0315	0.0476	0.0738	0.0596	0.3721	0.0016	0.2558	0.256	0.2268	0.0187	0.0023	3.4	0.01	
2000	9	20	14	A,B,C	0.42	0.1785	0.2751	0.0965	0.1449	2.2182	0.005	1.5081	1.5031	0.7101	0.1196	0.0017	266	7.37	18
					0.0082	0.0067	0.0097	0.0057	0.0111	0.1161	0.0041	0.1275	0.1235	0.0444	0.0033	0.0001	0.9	0.01	
2000	9	20	15	A,B,C	0.3181	0.1203	0.2904	0.1701	0.0277	2.3037	0.5717	1.9464	1.3747	0.3573	ND	ND	313	7.86	17
					0.0036	0.0202	0.0139	0.0092	0.0121	0.0772	0.0505	0.0933	0.0521	0.0167			0.5	0	
2000	9	20	16	A,B,C	0.3433	0.0423	0.2232	0.1808	0.1202	1.8753	0.0027	1.488	1.4853	0.3873	0.1175	0.0015	246.3	7.32	14
					0.0279	0.0054	0.0224	0.0172	0.0112	0.0457	0.0022	0.0421	0.042	0.0602	0.0102	0.0002	2.2	0.02	
2000	9	20	17	A,B,C	0.2301	0.1046	0.1909	0.0863	0.0392	2.1078	0.2738	1.8057	1.5319	0.3021	ND	ND	142.1	7.29	18
					0.0087	0.0029	0.0052	0.0067	0.0139	0.0289	0.0162	0.0471	0.0543	0.0424			1.4	0.01	
2000	9	20	18	A,B,C	0.4491	0.1661	0.364	0.1979	0.0851	4.188	0.0071	3.2469	3.2398	0.9411	0.1188	0.0761	452	9.49	17
					0.0207	0.0055	0.0105	0.0085	0.0265	0.0215	0.0031	0.0381	0.0377	0.0241	0.0352	0.0223	0.5	0.01	
2000	9	20	19	A,B,C	0.4376	0.2826	0.3903	0.1077	0.0473	2.0202	0.5242	1.8066	1.2824	0.2136	ND	ND	260	7.45	19
					0.0038	0.0179	0.0106	0.0284	0.0091	0.0489	0.0182	0.0142	0.0218	0.055			0.8	0	
2000	9	20	20	A,B,C	0.3932	0.0602	0.2244	0.1642	0.1688	4.9101	ND	3.5085	3.5085	1.4016	ND	ND	523	9.45	19
					0.002	0.0036	0.0103	0.0103	0.0085	0.0919		0.0268	0.0268	0.0913			0.5	0.01	
2000	9	20	21	A,B,C	0.407	0.149	0.3573	0.2084	0.0497	4.6698	0.0232	3.9582	3.935	0.7116	ND	ND	569.7	8.95	19
					0.0143	0.0167	0.0022	0.0188	0.0127	0.0058	0.01	0.0468	0.0479	0.0516			2.3	0.01	
2000	9	20	24-1	A,B,C	0.1413	0.0729	0.125	0.0521	0.0163	28.0881	18.526	26.2608	7.7348	1.8273	0.0126	0.0001	4503.3	7.22	14
					0.0085	0.0111	0.0078	0.0071	0.001	0.2962	1.0343	0.3127	0.9344	0.1687	0.0103	0.0001	11.9	0	
2000	9	20	24-2	A,B,C	0.3936	0.0388	0.2921	0.2534	0.1015	11.6715	2.6909	9.7023	7.0114	1.9692	0.8373	0.0062	3006.7	7.1	11
					0.0383	0.0012	0.0462	0.045	0.0177	0.4174	0.6388	0.4312	0.2142	0.172	0.132	0.0009	48.2	0.01	
2000	9	20	25-2	A,B,C	0.566	0.0284	0.2121	0.1838	0.3538	7.9008	0.0177	5.2632	5.2455	2.6376	1.718	0.0904	922	7.84	16
					0.0163	0	0.0117	0.0117	0.0132	0.1984	0.0144	0.0945	0.0907	0.1096	0.0009	0.0195	2.2	0.01	
2000	9	20	30	A,B,C	3.0041	2.2325	2.8963	0.6638	0.1077	19.5402	0.0224	16.9029	16.8805	2.6373	11.2305	0.0844	725.7	7.28	18
					0.0378	0.0246	0.0114	0.0147	0.0406	0.4048	0.0183	0.2607	0.2435	0.5181	0.0057	0.0314	9.5	0.02	
2000	9	20	31	A,B,C	0.5037	0.3783	0.4152	0.0369	0.0886	1.9758	ND	1.4685	1.4685	0.5073	0.3109	0.0087	369.3	7.68	17
					0.0124	0.0107	0.0265	0.0159	0.0167	0.1264		0.1116	0.1116	0.0582	0.0065	0.0003	3.8	0.01	
2000	9	20	32	A,B,C	0.2801	0.0714	0.1503	0.0789	0.1298	1.7997	0.0348	1.2162	1.1814	0.5835	ND	ND	196.3	7.52	20
					0.007	0.0137	0.0224	0.0182	0.0293	0.0161	0.0284	0.0916	0.0712	0.1075			1	0.01	
2000	9	20	33	A,B,C	0.3802	0.0192	0.1786	0.1594	0.2016	4.7547	0.0216	3.5757	3.5541	1.179	ND	ND	546.3	9.13	19
					0.0076	0.0019	0.0304	0.0285	0.0234	0.2103	0.0141	0.2094	0.1953	0.0144			2.1	0	
2000	9	20	34	A,B,C	0.5439	0.4112	0.5114	0.1002	0.0326	1.2834	0.0168	1.1733	1.1565	0.1101	0.0114	0.0004	376.3	8.15	19
					0.0088	0.0084	0.0154	0.0216	0.0068	0.0416	0.0137	0.034	0.025	0.0347	0.0093	0.0002	1.9	0.4	
2000	10	16	10	A,B,C	2.5205	0.9683	2.4142	1.4459	0.1063	18.651	0.015	16.7427	16.7277	1.9083	12.9912	0.0996	768.3	7.11	9
					0.0337	0.0647	0.0105	0.0688	0.0408	0.2597	0.0063	0.0982	0.092	0.257	0.1337	0.0063	7.3	0.02	
2000	10	16	14	A,B,C	0.2768	0.0895	0.2562	0.1667	0.0206	2.1363	0.5252	1.8786	1.3534	0.2577	0.0817	0.0018	302.7	7.57	9
					0.0018	0.0095	0.0153	0.0204	0.0135	0.1744	0.0812	0.1601	0.1161	0.0626	0.0172	0.0005	2.4	0.02	
2000	10	16	15	A,B,C	0.2404	0.0401	0.1779	0.1379	0.0624	3.5667	0.4698	3.0072	2.5374	0.5595	ND	ND	440.3	8.16	10
					0.0119	0.0011	0.0036	0.0027	0.0153	0.1516	0.1045	0.2461	0.3376	0.0991			5.7	0.01	
2000	10	16	16	A,B,C	0.5611	0.0538	0.4668	0.4131	0.0943	3.3846	0.4318	2.5686	2.1368	0.816	0.567	0.0191	571	7.77	8
					0.0186	0.0053	0.0355	0.0324	0.0209	0.0458	0.1019	0.0963	0.0252	0.0505	0.0037	0.0003	2.1	0.01	
2000	10	16	17	A,B,C	0.177	0.0208	0.1346	0.1138	0.0424	2.0124	0.2478	1.6791	1.4313	0.3333	0.0106	0.0002	141	7.54	8
					0.0026	0.0034	0.0069	0.0101	0.0095	0.0338	0.101	0.0687	0.0332	0.0373	0.0086	0.0002	0.9	0.02	

Table 7. Average values and standard deviations for water quality parameters for all sample events, 1999 and 2000

Year	Month	Date	Location	sample	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	10	16	18	A,B,C	0.4198	0.0247	0.1255	0.1008	0.2943	5.5677	0.0346	3.4734	3.4388	2.0943	0.2965	0.0837	439.3	8.82	9
					0.0056	0.0019	0.0019	0.0011	0.0067	0.2485	0.016	0.3253	0.3094	0.0937	0.0071	0.0033	2.4	0.02	
2000	10	16	19	A,B,C	0.3233	0.019	0.2039	0.1849	0.1194	2.0265	0.0176	1.5972	1.5796	0.4293	0.0313	0.0007	301.3	7.55	9
					0.008	0.0012	0.0036	0.0047	0.0113	0.0825	0.0112	0.0109	0.0221	0.0733	0.0256	0.0005	4	0.02	
2000	10	16	20	A,B,C	0.5771	0.0923	0.3452	0.2529	0.2319	6.177	0.0371	4.7823	4.7452	1.3947	2.1021	0.1644	632.7	8.13	11
					0.0226	0.0413	0.0407	0.0606	0.0406	0.2167	0.0119	0.0544	0.0429	0.2298	0.0287	0.029	9.5	0.08	
2000	10	16	24-1	A,B,C	0.1392	0.0315	0.1346	0.1032	0.0045	18.798	13.1655	18.4407	5.2752	0.3573	0.0704	0.0003	4090	6.95	13
					0.0004	0.0064	0.0037	0.008	0.0035	0.3425	0.4342	0.3335	0.3756	0.1287	0.0153	0.0001	29.4	0.01	
2000	10	16	24-2	A,B,C	0.3862	0.0315	0.2139	0.1824	0.1723	13.92	7.3309	12.732	5.4011	1.188	0.6809	0.0042	3263.3	7.02	10
					0.0415	0.0024	0.0557	0.0533	0.0173	0.2347	0.373	0.314	0.0616	0.2048	0.2778	0.0017	82	0.01	
2000	10	16	30	A,B,C	2.3834	0.9268	2.2071	1.2804	0.1763	18.0642	0.0559	16.6977	16.6418	1.3665	12.7093	0.1398	696.7	7.27	11
					0.0175	0.1432	0.0525	0.0964	0.056	0.101	0.0405	0.1628	0.1838	0.1021	0.0151	0.0039	3.3	0.01	
2000	10	16	31	A,B,C	0.4687	0.0505	0.3643	0.3138	0.1044	2.2263	0.0462	1.8606	1.8144	0.3657	0.4287	0.0102	398	7.61	9
					0.012	0.0094	0.018	0.0268	0.0181	0.1113	0.0173	0.1374	0.1432	0.0372	0.0057	0.0004	5.7	0.02	
2000	10	16	32	A,B,C	0.1533	0.0356	0.1474	0.1118	0.0059	2.3259	0.0026	2.1066	2.104	0.2193	0.3631	0.002	134.5	6.96	11
					0.0033	0.0014	0.0071	0.0057	0.0038	0.0322	0.0021	0.0488	0.0509	0.0214	0.0063	0.0001	0.4	0.02	
2000	10	16	33	A,B,C	0.2263	0.0306	0.1451	0.1145	0.0812	4.8588	0.1033	4.4001	4.2968	0.4587	2.0607	0.0396	659	7.52	14
					0.0049	0.0028	0.0087	0.0092	0.0115	0.0786	0.0061	0.0794	0.079	0.128	0.0217	0.0002	12.6	0.01	

Table 8. Summary of water quality analyses by location (1999 and 2000)

Location 1. Tile Drain: sump type

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	57	0.292	0.205	1.612	0.05	0.317	0.042	0.208	0.376
SRP	57	0.12	0.031	1.27	0	0.288	0.038	0.044	0.197
TFP	57	0.209	0.134	1.378	0.02	0.282	0.037	0.134	0.284
SUP	57	0.089	0.078	0.217	0	0.056	0.007	0.074	0.104
PP	57	0.085	0.073	0.294	0	0.067	0.009	0.067	0.102
TN	57	6.332	4.721	16.846	1.705	4.031	0.534	5.263	7.402
SN	57	1.453	0.052	10.632	0	2.719	0.36	0.732	2.175
TFN	57	5.947	4.39	16.33	1.544	4.082	0.541	4.864	7.03
SON	57	4.493	4.173	9.45	1.276	2.116	0.28	3.932	5.055
PN	57	0.431	0.422	1.148	0	0.287	0.038	0.355	0.507
pH	54	7.55	7.45	8.86	6.75	0.42	0.06	7.44	7.67
NH3	57	0.0049	0.0008	0.0619	0	0.0115	0.0015	0.0019	0.008
ECw	51	1929	1999	3820	1022	690	92	1743	2115
TEMP	51	12.88	13	20	8	3.15	0.44	12	13.77

Location 2. Tile Drain: sump type

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	75	0.416	0.412	0.784	0.201	0.119	0.014	0.389	0.444
SRP	75	0.258	0.234	0.589	0.028	0.137	0.016	0.226	0.289
TFP	75	0.353	0.342	0.763	0.047	0.136	0.016	0.321	0.384
SUP	75	0.096	0.092	0.257	0	0.066	0.008	0.081	0.111
PP	75	0.066	0.058	0.307	0	0.059	0.007	0.052	0.08
TN	75	2.328	1.956	6.053	0.941	1.147	0.132	2.064	2.592
SN	75	0.655	0.032	3.606	0	1.096	0.127	0.402	0.907
TFN	75	1.945	1.517	5.414	0.697	1.143	0.132	1.682	2.208
SON	75	1.29	1.232	3.092	0.273	0.395	0.046	1.2	1.381
PN	75	0.391	0.347	1.525	0	0.28	0.032	0.326	0.455
pH	75	7.68	7.63	9.01	6.64	0.5	0.06	7.57	7.8
NH3	75	0.0002	0	0.0048	0	0.0008	0.0001	0	0.0004
ECw	75	432	416	731	307	94.8	10.9	410.2	453.8
TEMP	72	15.65	17	20	9.4	2.99	0.35	14.94	16.35

Location 5. Tile Drain: sump type

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	54	0.443	0.445	0.574	0.21	0.085	0.012	0.42	0.466
SRP	57	0.308	0.325	0.524	0.029	0.158	0.021	0.266	0.349
TFP	57	0.389	0.404	0.606	0.147	0.109	0.014	0.36	0.418
SUP	57	0.087	0.064	0.365	0	0.088	0.012	0.064	0.111
PP	54	0.054	0.043	0.198	0	0.049	0.007	0.041	0.067
TN	57	1.542	1.345	3.956	0.589	0.7	0.093	1.357	1.728
SN	57	0.141	0.007	1.362	0	0.301	0.04	0.061	0.221
TFN	57	1.183	1.07	2.815	0.227	0.535	0.071	1.042	1.325
SON	57	1.043	0.968	2.438	0.101	0.409	0.054	0.934	1.151
PN	57	0.387	0.282	1.709	0	0.39	0.052	0.283	0.49
pH	54	7.51	7.47	8.98	6.59	0.49	0.07	7.37	7.64
NH3	57	0.0002	0	0.0058	0	0.0009	0.0001	0	0.0005
ECw	51	428.3	424	509	331	49.8	7	414.3	442.3
TEMP	51	15.59	15	20	11	2.5	0.35	14.89	16.29

Location 6. Tile Drain: sump type

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	36	0.466	0.493	0.661	0.131	0.114	0.019	0.427	0.504
SRP	39	0.373	0.416	0.533	0.035	0.134	0.021	0.329	0.416
TFP	39	0.413	0.441	0.549	0.059	0.124	0.02	0.372	0.453
SUP	39	0.044	0.044	0.113	0	0.035	0.006	0.032	0.055
PP	36	0.052	0.044	0.228	0	0.05	0.008	0.035	0.069
TN	39	1.525	1.208	3.25	0.081	0.871	0.14	1.242	1.807
SN	39	0.365	0.03	2.096	0	0.621	0.099	0.163	0.566
TFN	39	1.29	0.914	2.921	0	0.794	0.127	1.033	1.548
SON	39	0.925	0.807	2.112	0	0.467	0.075	0.774	1.077
PN	39	0.273	0.248	1.196	0	0.27	0.043	0.185	0.361
pH	39	7.71	7.6	9.23	6.64	0.63	0.1	7.5	7.91
NH3	39	0.0003	0	0.0078	0	0.0013	0.0002	0	0.0007
ECw	36	599.7	586.5	890	297	168.5	28.1	542.7	656.7
TEMP	39	12.84	13	16	8.9	2.18	0.35	12.13	13.55

Location 10. Irrigation canal near 4322

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	125	1.967	2.06	2.992	0.313	0.557	0.05	1.868	2.066
SRP	125	1.395	1.496	2.055	0.226	0.461	0.041	1.313	1.477
TFP	125	1.793	1.864	2.91	0.575	0.514	0.046	1.702	1.884
SUP	125	0.411	0.295	1.908	0	0.37	0.033	0.346	0.477
PP	125	0.226	0.196	0.99	0	0.21	0.019	0.189	0.263
TN	125	11.51	10.644	19.832	5.556	3.717	0.332	10.852	12.168
SN	125	0.439	0.023	11.433	0	1.799	0.161	0.121	0.758
TFN	125	9.959	9.13	17.505	3.869	3.592	0.321	9.323	10.595
SON	125	9.52	8.874	17.411	1.848	3.646	0.326	8.874	10.165
PN	125	1.635	1.489	5.528	0	1.018	0.091	1.455	1.815
pH	125	7.54	7.32	9.07	6.71	0.56	0.05	7.44	7.64
NH3	113	0.1886	0.0782	1.236	0	0.2858	0.0269	0.1353	0.2418
ECw	122	881.5	841	1575	575	184.6	16.7	848.4	914.6
TEMP	125	11.9	13	20	1	5.41	0.48	10.94	12.85

Location 14. J canal

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	132	0.269	0.224	0.923	0.061	0.158	0.014	0.242	0.296
SRP	132	0.12	0.074	0.616	0.001	0.14	0.012	0.096	0.144
TFP	132	0.188	0.16	0.763	0.027	0.142	0.012	0.163	0.212
SUP	132	0.077	0.062	0.333	0	0.067	0.006	0.065	0.088
PP	132	0.085	0.073	0.517	0	0.073	0.006	0.073	0.098
TN	132	2.248	1.991	5.48	1.203	0.867	0.075	2.099	2.397
SN	132	0.305	0.007	3.01	0	0.657	0.057	0.192	0.418
TFN	132	1.701	1.454	4.316	0	0.755	0.066	1.571	1.831
SON	132	1.399	1.363	3.132	0	0.464	0.04	1.319	1.479
PN	132	0.554	0.439	2.802	0	0.514	0.045	0.466	0.643
pH	130	7.8	7.84	9.06	6.27	0.6	0.05	7.7	7.91
NH3	120	0.0101	0.0023	0.1115	0	0.02	0.0018	0.0064	0.0137
ECw	127	364.3	268	1001	151.9	206.2	18.3	328	400.5
TEMP	132	13.51	15	22	0.6	6.17	0.54	12.45	14.57

Location 15. Irrigation canal near 4465

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	132	0.244	0.198	0.59	0.086	0.125	0.011	0.223	0.266
SRP	132	0.09	0.029	0.469	0	0.123	0.011	0.069	0.111
TFP	132	0.168	0.117	0.513	0.015	0.133	0.012	0.145	0.191
SUP	132	0.083	0.064	0.309	0	0.068	0.006	0.072	0.095
PP	132	0.082	0.079	0.29	0	0.057	0.005	0.073	0.092
TN	132	4.04	2.576	14.931	0.95	3.41	0.297	3.453	4.627
SN	132	1.634	0.022	11.748	0	2.932	0.255	1.129	2.139
TFN	132	3.166	1.901	13.717	0.745	3.061	0.266	2.639	3.693
SON	132	1.582	1.488	4.604	0	0.65	0.057	1.47	1.694
PN	132	0.883	0.585	7.714	0	1.248	0.109	0.668	1.098
pH	132	7.85	7.92	8.95	6.45	0.57	0.05	7.75	7.95
NH3	120	0.009	0.0015	0.0713	0	0.0157	0.0014	0.0062	0.0119
ECw	129	448.7	340	987	210	232.3	20.5	408.2	489.2
TEMP	132	12.35	13.4	22	0.6	7.1	0.62	11.13	13.57

Location 16. Pump 7

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	129	0.318	0.206	0.86	0.034	0.233	0.021	0.278	0.359
SRP	129	0.149	0.029	0.821	0.001	0.23	0.02	0.109	0.189
TFP	129	0.239	0.111	0.806	0.028	0.239	0.021	0.197	0.28
SUP	129	0.101	0.062	0.485	0	0.102	0.009	0.083	0.119
PP	129	0.085	0.081	0.47	0	0.074	0.007	0.072	0.098
TN	129	3.416	2.226	12.193	1.174	2.796	0.246	2.928	3.903
SN	129	1.202	0.008	9.007	0	2.597	0.229	0.75	1.655
TFN	129	2.726	1.573	11.705	0	2.777	0.244	2.242	3.21
SON	129	1.558	1.493	3.731	0	0.69	0.061	1.438	1.678
PN	129	0.713	0.54	3.706	0	0.702	0.062	0.591	0.836
pH	129	7.65	7.68	8.95	6.2	0.67	0.06	7.53	7.76
NH3	117	0.0081	0.0021	0.0809	0	0.0144	0.0013	0.0055	0.0108
ECw	126	443.1	256.5	1224	169.7	336.6	30	383.7	502.5
TEMP	129	11.7	13	20	0.6	6.19	0.55	10.62	12.78

Location 17. D canal at end

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	87	0.162	0.153	0.36	0.054	0.07	0.008	0.147	0.177
SRP	87	0.024	0.017	0.111	0	0.023	0.002	0.019	0.029
TFP	87	0.084	0.07	0.229	0.01	0.055	0.006	0.073	0.096
SUP	87	0.06	0.041	0.223	0	0.049	0.005	0.05	0.071
PP	87	0.083	0.072	0.28	0	0.061	0.006	0.07	0.095
TN	87	2.417	2.164	6.907	1.051	1.087	0.116	2.185	2.649
SN	87	0.03	0.005	0.413	0	0.074	0.008	0.014	0.045
TFN	87	1.722	1.643	4.922	0.171	0.763	0.082	1.559	1.884
SON	87	1.692	1.557	4.922	0.171	0.761	0.082	1.53	1.854
PN	87	0.699	0.624	2.933	0	0.525	0.056	0.587	0.811
pH	87	7.64	7.57	9.41	5.9	0.76	0.08	7.48	7.8
NH3	87	0.0157	0	0.2296	0	0.0445	0.0048	0.0062	0.0252
ECw	84	131	124.8	242	106.1	23.8	2.6	125.8	136.2
TEMP	87	16.39	17	22	8	4.04	0.43	15.53	17.25

Location 18. D pump

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	129	0.333	0.31	0.686	0.109	0.128	0.011	0.311	0.356
SRP	129	0.1	0.078	0.362	0.007	0.08	0.007	0.086	0.114
TFP	129	0.185	0.186	0.463	0	0.093	0.008	0.169	0.202
SUP	129	0.086	0.082	0.34	0	0.053	0.005	0.077	0.095
PP	129	0.149	0.113	0.58	0	0.131	0.012	0.127	0.172
TN	129	3.869	3.236	12.994	1.795	1.67	0.147	3.578	4.16
SN	129	0.124	0.013	2.422	0	0.436	0.038	0.048	0.2
TFN	129	2.625	2.368	5.485	1.416	0.804	0.071	2.485	2.765
SON	129	2.5	2.339	5.309	1.406	0.696	0.061	2.379	2.622
PN	129	1.253	0.878	8.154	0	1.241	0.109	1.036	1.469
pH	129	8.99	8.98	10.83	7.21	0.66	0.06	8.87	9.1
NH3	117	0.1072	0.0379	1.1598	0	0.1928	0.0178	0.0719	0.1425
ECw	126	636.1	627.5	947	327	152.5	13.6	609.2	662.9
TEMP	129	12.62	14	20	1	5.51	0.49	11.66	13.58

Location 19. Lost River

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	132	0.301	0.257	0.804	0.055	0.155	0.013	0.275	0.328
SRP	132	0.142	0.097	0.619	0.004	0.152	0.013	0.116	0.168
TFP	132	0.211	0.175	0.677	0.025	0.155	0.014	0.185	0.238
SUP	132	0.077	0.058	0.322	0	0.069	0.006	0.065	0.089
PP	132	0.094	0.075	0.392	0	0.073	0.006	0.082	0.107
TN	132	2.364	2.025	6.299	1.205	0.984	0.086	2.195	2.533
SN	132	0.344	0.007	2.887	0	0.745	0.065	0.215	0.472
TFN	132	1.709	1.49	4.123	0	0.796	0.069	1.572	1.846
SON	132	1.366	1.37	3.468	0	0.529	0.046	1.275	1.457
PN	132	0.663	0.448	4.51	0	0.719	0.063	0.539	0.787
pH	132	7.93	7.93	9.12	6.2	0.68	0.06	7.81	8.04
NH3	120	0.0091	0.0014	0.0478	0	0.0134	0.0012	0.0067	0.0116
ECw	129	390.2	278	1011	173.6	227.3	20	350.7	429.8
TEMP	132	13.43	15	24	0.6	6.52	0.57	12.31	14.55

Location 20. Klamath Straights Drain Outlet Drain outlet

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	126	0.401	0.352	2.213	0.138	0.236	0.021	0.36	0.443
SRP	126	0.187	0.141	1.416	0.002	0.188	0.017	0.154	0.22
TFP	126	0.281	0.256	1.484	0.009	0.194	0.017	0.247	0.316
SUP	126	0.096	0.082	0.391	0	0.058	0.005	0.085	0.106
PP	126	0.123	0.094	0.729	0	0.109	0.01	0.103	0.142
TN	126	3.995	3.734	10.695	1.904	1.481	0.132	3.734	4.256
SN	126	0.218	0.016	3.812	0	0.714	0.064	0.092	0.344
TFN	126	3.196	2.914	16.601	1.453	1.63	0.145	2.908	3.483
SON	126	2.977	2.736	16.328	1.453	1.511	0.135	2.711	3.244
PN	126	0.855	0.671	5.844	0	0.758	0.068	0.722	0.989
pH	126	8.55	8.64	10.13	7.11	0.71	0.06	8.42	8.67
NH3	117	0.0962	0.0184	3.6768	0	0.3859	0.0357	0.0256	0.1669
ECw	123	713	696	1548	164.1	283.8	25.6	662.3	763.7
TEMP	126	14.7	16	24	0.6	6.87	0.61	13.49	15.92

Location 21. Lower Klamath Refuge Outlet

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	119	0.332	0.341	0.642	0.062	0.119	0.011	0.31	0.354
SRP	119	0.104	0.091	0.313	0.002	0.074	0.007	0.091	0.118
TFP	119	0.2	0.199	0.413	0.025	0.104	0.01	0.182	0.219
SUP	119	0.097	0.085	0.257	0	0.056	0.005	0.087	0.107
PP	119	0.132	0.134	0.36	0	0.078	0.007	0.118	0.147
TN	119	3.417	3.386	6.098	1.831	0.938	0.086	3.247	3.587
SN	119	0.172	0.012	3.114	0	0.536	0.049	0.075	0.269
TFN	119	2.657	2.502	5.201	1.475	0.715	0.066	2.528	2.787
SON	119	2.485	2.353	4.68	1.475	0.602	0.055	2.376	2.595
PN	119	0.772	0.698	2.607	0	0.55	0.05	0.672	0.872
pH	119	8.1	8.19	9.4	6.09	0.78	0.07	7.95	8.24
NH3	110	0.0452	0.013	0.5687	0	0.0967	0.0092	0.0269	0.0634
ECw	116	605.7	558	1352	157.5	242.4	22.5	561.2	650.3
TEMP	119	15.63	18	26	0.6	6.53	0.6	14.44	16.82

Location 22. Tile line

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	39	0.333	0.371	0.643	0.091	0.15	0.024	0.285	0.382
SRP	39	0.199	0.236	0.455	0.004	0.166	0.027	0.145	0.253
TFP	39	0.258	0.315	0.541	0.035	0.159	0.026	0.206	0.309
SUP	39	0.062	0.056	0.292	0	0.054	0.009	0.044	0.08
PP	39	0.077	0.066	0.295	0	0.061	0.01	0.057	0.097
TN	36	3.168	2.484	6.907	1.261	1.659	0.277	2.607	3.73
SN	39	0.035	0.011	0.541	0	0.087	0.014	0.007	0.063
TFN	39	2.629	2.092	5.936	0.203	1.509	0.242	2.14	3.118
SON	39	2.594	2.082	5.936	0.199	1.507	0.241	2.106	3.083
PN	36	0.524	0.425	1.866	0	0.501	0.083	0.355	0.694
pH	36	7.48	7.61	8.41	6.77	0.47	0.08	7.32	7.63
NH3	39	0.0016	0.0007	0.0059	0	0.002	0.0003	0.0009	0.0022
ECw	33	986.6	683	2440	404	664.1	115.6	751.1	1222.1
TEMP	36	15.5	15	20	13	2.32	0.39	14.71	16.29

Location 23. Tile line

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	27	0.531	0.215	3.953	0.092	0.804	0.155	0.213	0.849
SRP	27	0.4	0.037	4.558	0.009	0.927	0.178	0.033	0.767
TFP	27	0.462	0.12	4.267	0.03	0.851	0.164	0.126	0.799
SUP	27	0.078	0.067	0.271	0	0.072	0.014	0.05	0.107
PP	27	0.091	0.055	0.303	0	0.085	0.016	0.057	0.124
TN	27	19.401	20.716	36.789	1.731	12.82	2.467	14.329	24.472
SN	27	10.429	5.832	24.762	0.005	10.462	2.014	6.29	14.568
TFN	27	18.729	20.354	35.959	1.589	12.709	2.446	13.702	23.757
SON	27	8.3	7.733	20.077	1.14	5.592	1.076	6.088	10.512
PN	27	0.78	0.545	4.022	0	0.931	0.179	0.411	1.148
pH	24	7.65	7.55	8.18	7.27	0.29	0.06	7.53	7.77
NH3	27	0.0098	0	0.2453	0	0.0471	0.0091	-0.0088	0.0285
ECE	24	1166.1	1405.5	1900	176	702.9	143.5	869.3	1462.9
TEMP	24	13.5	13	18	11	2.55	0.52	12.42	14.58

Location 24.1. Subsurface tile line

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	69	0.118	0.119	0.489	0.02	0.072	0.009	0.1	0.135
SRP	69	0.031	0.019	0.236	0	0.042	0.005	0.021	0.041
TFP	69	0.086	0.076	0.316	0.02	0.055	0.007	0.072	0.099
SUP	69	0.055	0.053	0.115	0.005	0.026	0.003	0.049	0.061
PP	69	0.035	0.028	0.173	0	0.034	0.004	0.027	0.043
TN	69	32.409	33.079	55.305	3.376	10.347	1.246	29.923	34.895
SN	69	20.743	20.377	39.232	0	9.369	1.128	18.492	22.993
TFN	69	30.969	30.789	54.931	2.684	10.258	1.235	28.505	33.433
SON	69	10.323	8.272	32.301	0	6.594	0.794	8.738	11.907
PN	69	1.581	1.253	11.083	0	1.712	0.206	1.17	1.993
pH	66	7.35	7.22	9.07	6.71	0.46	0.06	7.24	7.46
NH3	69	0.0012	0	0.0272	0	0.0046	0.0006	0.0001	0.0023
ECw	60	2538.6	3070	4530	3.5	1522.6	196.6	2145.3	2932
TEMP	66	12.73	13	16	8	1.9	0.23	12.26	13.19

Location 24.2. Subsurface drain at outlet of drain at location 24.1

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	39	0.591	0.391	2.579	0.118	0.575	0.092	0.405	0.778
SRP	39	0.246	0.048	1.908	0.002	0.451	0.072	0.099	0.392
TFP	39	0.402	0.211	2.363	0.053	0.519	0.083	0.234	0.57
SUP	39	0.156	0.124	0.456	0.006	0.122	0.02	0.117	0.196
PP	39	0.19	0.151	0.678	0	0.136	0.022	0.146	0.234
TN	39	5.805	4.428	14.493	2.018	3.616	0.579	4.633	6.977
SN	39	0.803	0.013	8.001	0	2.071	0.332	0.132	1.474
TFN	39	4.222	3.279	13.268	1.172	3.341	0.535	3.139	5.305
SON	39	3.419	3.045	7.484	1.172	1.776	0.284	2.843	3.995
PN	39	1.583	1.26	6.094	0.131	1.161	0.186	1.207	1.959
pH	39	7.21	7.02	8.63	6.76	0.47	0.08	7.06	7.37
NH3	39	0.025	0.0049	0.3233	0	0.0677	0.0108	0.0031	0.047
ECw	36	1264.5	931	3460	357	910.4	151.7	956.5	1572.5
TEMP	39	13.46	14	16	10	2.23	0.36	12.74	14.19

Location 25.1. Tile line

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	48	0.301	0.206	1.612	0.066	0.308	0.044	0.211	0.39
SRP	48	0.164	0.046	1.339	0.01	0.309	0.045	0.074	0.254
TFP	48	0.225	0.129	1.312	0.03	0.29	0.042	0.141	0.309
SUP	48	0.064	0.063	0.133	0	0.035	0.005	0.053	0.074
PP	48	0.079	0.066	0.3	0	0.068	0.01	0.059	0.099
TN	48	12.568	4.397	49.2	2.167	13.85	1.999	8.546	16.59
SN	48	7.099	0.789	35.508	0	10.882	1.571	3.939	10.259
TFN	48	12.061	3.256	49.401	1.959	13.825	1.995	8.047	16.076
SON	48	4.963	3.119	14.575	1.169	3.757	0.542	3.871	6.054
PN	48	0.592	0.433	2.574	0	0.628	0.091	0.409	0.774
pH	45	7.95	7.82	9.13	7	0.67	0.1	7.75	8.16
NH3	48	0.0072	0	0.0563	0	0.0156	0.0022	0.0027	0.0118
ECw	42	1765.3	1060	4210	3.2	1299	200.4	1360.5	2170.1
TEMP	45	16.67	17	23	9	3.72	0.56	15.55	17.79

Location 25.2. Subsurface drain at outlet of drain at location 25.1

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	36	0.437	0.344	2.428	0.078	0.459	0.077	0.282	0.592
SRP	36	0.139	0.03	1.707	0.002	0.341	0.057	0.024	0.254
TFP	36	0.293	0.208	2.119	0.053	0.403	0.067	0.156	0.429
SUP	36	0.154	0.094	0.411	0.049	0.104	0.017	0.119	0.189
PP	36	0.144	0.119	0.378	0.009	0.107	0.018	0.108	0.18
TN	36	5.09	4.596	10.874	2.452	2.345	0.391	4.297	5.883
SN	36	0.028	0.021	0.122	0	0.031	0.005	0.017	0.038
TFN	36	3.814	3.113	7.979	2.125	1.579	0.263	3.28	4.349
SON	36	3.787	3.039	7.946	2.098	1.58	0.263	3.252	4.321
PN	36	1.279	0.798	3.137	0	1.007	0.168	0.939	1.62
pH	36	8.2	8.27	10.28	6.96	0.84	0.14	7.92	8.48
NH3	36	0.3065	0.0456	3.1386	0	0.7692	0.1282	0.0462	0.5667
ECw	33	897.5	908	1131	593	125.4	21.8	853	942
TEMP	36	17.75	17	23	12	3.13	0.52	16.69	18.81

Location 27. Tile line

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	15	0.615	0.326	1.724	0.123	0.568	0.147	0.301	0.93
SRP	15	0.478	0.194	1.482	0.008	0.561	0.145	0.168	0.789
TFP	15	0.526	0.304	1.55	0.043	0.536	0.138	0.23	0.823
SUP	15	0.054	0.053	0.13	0	0.04	0.01	0.032	0.076
PP	15	0.089	0.097	0.175	0.007	0.053	0.014	0.06	0.118
TN	15	3.482	3.127	6.948	2.298	1.193	0.308	2.821	4.142
SN	15	0.469	0.22	1.523	0	0.558	0.144	0.16	0.778
TFN	15	2.894	2.771	4.81	1.985	0.632	0.163	2.544	3.244
SON	15	2.425	2.655	4.59	1.163	0.891	0.23	1.931	2.918
PN	15	0.59	0.365	2.138	0	0.634	0.164	0.239	0.941
pH	12	8.53	8.75	9.09	7.53	0.63	0.18	8.13	8.93
NH3	15	0.0204	0	0.0856	0	0.0275	0.0071	0.0051	0.0356
ECw	12	899.2	1028.5	1209	334	339.8	98.1	683.3	1115
TEMP	12	18	18	22	14	2.95	0.85	16.12	19.88

Location 28. Tile line

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	33	0.105	0.105	0.197	0.037	0.038	0.007	0.092	0.119
SRP	33	0.028	0.021	0.101	0.006	0.025	0.004	0.019	0.037
TFP	33	0.084	0.082	0.154	0.03	0.036	0.006	0.071	0.096
SUP	33	0.056	0.047	0.127	0.017	0.029	0.005	0.045	0.066
PP	33	0.024	0.018	0.078	0	0.025	0.004	0.015	0.033
TN	33	27.757	31.21	37.189	5.509	9.597	1.671	24.354	31.16
SN	33	19.582	22.14	34.754	0.01	9.415	1.639	16.243	22.92
TFN	33	27.236	30.424	38.348	4.629	9.602	1.671	23.831	30.641
SON	33	7.654	6.802	20.808	1.566	4.233	0.737	6.154	9.155
PN	33	0.936	0.574	3.845	0	1.068	0.186	0.558	1.315
pH	30	7.46	7.56	7.85	6.87	0.31	0.06	7.35	7.58
NH3	33	0.0015	0	0.0193	0	0.0044	0.0008	0	0.0031
ECw	30	2562.4	2750	3150	400	762.9	139.3	2277.6	2847.3
TEMP	30	11.9	11.5	18	8	2.67	0.49	10.9	12.9

Location 30. Tulelake Sewage Plant Discharge

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	126	2.252	2.306	3.091	1.101	0.403	0.036	2.181	2.323
SRP	126	1.537	1.652	2.287	0.099	0.484	0.043	1.452	1.623
TFP	126	2.002	2.047	2.924	0.728	0.452	0.04	1.922	2.081
SUP	126	0.47	0.435	1.681	0	0.324	0.029	0.413	0.528
PP	126	0.257	0.203	1.761	0	0.263	0.023	0.211	0.303
TN	126	14.183	14.313	24.377	6.753	3.683	0.328	13.533	14.832
SN	126	0.493	0.025	12.768	0	2.047	0.182	0.133	0.854
TFN	126	12.205	12.363	21.48	1.39	3.6	0.321	11.57	12.84
SON	126	11.712	11.742	21.357	1.39	3.886	0.346	11.026	12.397
PN	126	2.003	1.637	14.399	0	1.733	0.154	1.698	2.309
pH	126	7.62	7.43	8.99	6.78	0.53	0.05	7.53	7.72
NH3	117	0.3184	0.1375	2.6728	0.0308	0.5027	0.0465	0.2264	0.4105
ECw	123	791.6	815	1257	421	122.5	11	769.7	813.4
TEMP	126	14.79	17	23	2	6.01	0.54	13.73	15.85

Location 31. N Canal

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	123	0.329	0.328	0.719	0.102	0.129	0.012	0.306	0.352
SRP	123	0.147	0.141	0.438	0.007	0.104	0.009	0.128	0.165
TFP	123	0.233	0.232	0.541	0.041	0.104	0.009	0.215	0.252
SUP	123	0.091	0.073	0.367	0	0.069	0.006	0.079	0.103
PP	123	0.096	0.069	0.368	0	0.08	0.007	0.082	0.111
TN	123	2.229	2.045	6.049	1.033	0.883	0.08	2.072	2.387
SN	123	0.111	0	3.383	0	0.411	0.037	0.038	0.184
TFN	123	1.54	1.459	4.832	0	0.654	0.059	1.423	1.657
SON	123	1.429	1.444	2.676	0	0.499	0.045	1.34	1.518
PN	123	0.706	0.527	3.005	0	0.669	0.06	0.587	0.826
pH	123	8	7.96	9.05	6.4	0.65	0.06	7.88	8.11
NH3	120	0.0226	0.0079	0.1474	0	0.0331	0.003	0.0166	0.0286
ECw	120	426.9	396.5	939	212	179	16.3	394.5	459.3
TEMP	123	13.83	16	22	0	6.04	0.54	12.76	14.91

Location 32. ADY Canal

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	126	0.174	0.156	0.445	0.029	0.089	0.008	0.158	0.19
SRP	126	0.033	0.021	0.233	0.003	0.039	0.004	0.026	0.04
TFP	126	0.091	0.073	0.376	0.014	0.067	0.006	0.079	0.102
SUP	126	0.059	0.048	0.268	0	0.049	0.004	0.05	0.067
PP	126	0.084	0.065	0.297	0	0.066	0.006	0.072	0.095
TN	126	2.418	2.306	5.971	0.892	0.91	0.081	2.257	2.578
SN	126	0.129	0.008	1.907	0	0.379	0.034	0.062	0.196
TFN	126	1.726	1.492	4.55	0	0.844	0.075	1.577	1.874
SON	126	1.596	1.457	3.541	0	0.683	0.061	1.476	1.717
PN	126	0.701	0.541	2.797	0	0.555	0.049	0.603	0.799
pH	125	7.88	7.96	9.53	6.1	0.81	0.07	7.73	8.02
NH3	120	0.0379	0.002	0.5877	0	0.0983	0.009	0.0201	0.0556
ECw	123	272.1	170.2	894	125	210.5	19	234.6	309.7
TEMP	126	15.21	17	24	1	6.8	0.61	14.01	16.41

Location 33. Klamath Straits Drain at County Line Road

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	93	0.333	0.317	0.728	0.09	0.138	0.014	0.305	0.361
SRP	93	0.11	0.098	0.349	0.004	0.085	0.009	0.093	0.128
TFP	93	0.212	0.213	0.523	0.024	0.117	0.012	0.188	0.236
SUP	93	0.101	0.098	0.324	0.013	0.055	0.006	0.09	0.113
PP	93	0.122	0.107	0.45	0	0.085	0.009	0.104	0.139
TN	93	3.497	3.346	6.501	1.936	0.929	0.096	3.306	3.689
SN	93	0.115	0.013	2.574	0	0.411	0.043	0.03	0.199
TFN	93	2.459	2.379	5.112	0	0.953	0.099	2.263	2.655
SON	93	2.346	2.372	4.405	0	0.839	0.087	2.173	2.519
PN	93	1.04	0.819	4.648	0	0.96	0.1	0.842	1.237
pH	93	8.04	7.94	10.26	6.59	0.86	0.09	7.87	8.22
NH3	93	0.0284	0.0092	0.3529	0	0.0611	0.0063	0.0159	0.041
ECw	90	594.6	570	1582	131.1	251.5	26.5	541.9	647.2
TEMP	93	15.58	17	25	1	6.42	0.67	14.26	16.9

Location 34. Pump 6

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	84	0.365	0.311	0.924	0.138	0.172	0.019	0.327	0.402
SRP	84	0.186	0.148	0.884	0.008	0.156	0.017	0.152	0.22
TFP	84	0.277	0.225	0.896	0.054	0.174	0.019	0.239	0.315
SUP	84	0.092	0.075	0.292	0	0.067	0.007	0.077	0.106
PP	84	0.088	0.082	0.242	0	0.053	0.006	0.076	0.1
TN	84	2.348	1.901	8.181	0.768	1.494	0.163	2.024	2.672
SN	84	0.459	0	5.903	0	1.299	0.142	0.177	0.741
TFN	84	1.809	1.323	7.899	0	1.496	0.163	1.484	2.134
SON	84	1.35	1.306	3.537	0	0.5	0.055	1.241	1.458
PN	84	0.544	0.441	2.362	0	0.423	0.046	0.452	0.635
pH	84	7.73	7.65	8.7	6.4	0.66	0.07	7.59	7.87
NH3	84	0.0103	0.0011	0.0768	0	0.0186	0.002	0.0062	0.0143
ECw	81	428.5	349	978	225	203.3	22.6	383.6	473.5
TEMP	84	13.64	15.5	22	1	5.81	0.63	12.38	14.9

Location 37. Tile Drain

Variable	N	Mean	Median	Maximum	Minimum	Std Dev	Std Error	CL for Mean Lower 95%	CL for Mean Upper 95%
TP	15	0.353	0.311	0.625	0.228	0.104	0.027	0.296	0.411
SRP	15	0.058	0.037	0.171	0.018	0.046	0.012	0.033	0.083
TFP	15	0.238	0.245	0.405	0.115	0.091	0.024	0.187	0.288
SUP	15	0.18	0.192	0.327	0.055	0.077	0.02	0.137	0.222
PP	15	0.116	0.121	0.22	0.042	0.05	0.013	0.088	0.144
TN	15	15.056	19.155	21.423	3.268	7.061	1.823	11.145	18.966
SN	15	6.106	5.712	15.29	0.016	5.391	1.392	3.121	9.092
TFN	15	12.882	15.34	20.349	2.551	6.175	1.594	9.463	16.302
SON	15	6.776	6.065	15.297	2.534	3.396	0.877	4.895	8.657
PN	15	2.174	1.323	6.024	0.385	1.98	0.511	1.077	3.27
pH	15	7.17	7.1	7.5	6.89	0.2	0.05	7.06	7.28
NH3	15	0.0039	0.0031	0.007	0.0018	0.0017	0.0004	0.0029	0.0048
ECw	15	1404	1477	1630	1096	193.6	50	1296.8	1511.2
TEMP	15	11	11	12	10	0.93	0.24	10.49	11.51

Table 9. Estimated annual average fertilizer application and crop nutrient removal in the TID

	N (t yr^{-1})			P (t yr^{-1})		
Crops and land area	**Fertilizer N application**	**Crop N removal**	**Difference**	**Fertilizer P application**	**Crop P removal**	**Difference**
Small grains (32,530 ac)	1410	1540	-120	150	365	-215
Potatoes and onions (10,860 ac)	1220	860	360	580	230	350
Sugarbeets (5,900 ac)*	265	585	-320	120	70	50
Alfalfa (9,500 ac)		(-2430)		120	160	-40
Total (60,250 ac)**	2930	2985	-102.4	1000	830	170
lb ac^{-1} yr^{-1}			-3.4			5.6

Notes: * After 2000, sugarbeets are no longer being grown. ** Includes approximately 1,500 acres of other crops. Fertilizer inputs are based on recommended rates developed by the university, a survey of farmers' and fertilizer dealers, supplemented by reports from individual farmers about their fertilizer use and the amount of land they cultivate. Crop removal is calculated based on literature values, or in the case of small grain crops, average crude protein values for the barley, wheat, and oats produced in the region. Crop yields and land areas are derived from annual reports by the TID, and are averages. All figures are rounded. Per unit area, potatoes and onions receive the most fertilizer, and for P, applications result in a district-wide surplus. N is in approximate balance if the assumption is made that all N removed by alfalfa is fixed from the atmosphere. If some N is recovered from soil by alfalfa, then N removed by crops is greater than N applied.

Table 10. Water balance equations. Watershed 1

Equation 2: $I_{LR} + I_J + I_{KID} + P_{W1} + C_{W1} = ET_{c\text{-}TID} + ET_S + ET_{d\text{-}TID} + O_D$

Inputs (ac ft /yr)						**Outputs (ac ft /yr)**					
Variable	***mean***	***u95% clm***	***l95% clm***	***max***	***min***	***Variable***	***mean***	***u95% clm***	***l95% clm***	***max***	***min***
I_J	123500	137900	112900	156500	100200	$ET_{c\text{-}TID}$	135000	135000	135000	135000	135000
I_{LR}	26800	29200	24300	60400	12700	ET_S	33500	33500	33500	33500	33500
I_{KID}	39000	39000	39000	47900	31000	$ET_{d\text{-}TID}$	3000	3000	3000	3000	3000
P_{W1}	52400	55070	49730	96940	27250	O_D	88800	97700	97700	145300	32800
C_{W1}	18600	8030	30770	-44940	33150						
Sum	260300	269200	256700	316800	204300		260300	269200	256700	316800	204300

Tulelake Sumps

Equation 3: $I_{LR} + I_S + P_S + C_S = ET_S + O_S + O_D$

Inputs (ac ft /yr)						Outputs (ac ft /yr)					
Variable	*mean*	*u95% clm*	*l95% clm*	*max*	*min*	*Variable*	*mean*	*u95% clm*	*l95% clm*	*max*	*min*
I_{LR}	26800	29200	24300	60400	12700	ET_S	33500	33500	33500	33500	33500
I_S	99000	99000	99000	99000	99000	O_S	36000	36000	36000	36000	36000
P_S	10800	11340	10260	19980	5620	O_D	88800	97700	85200	32800	32800
C_S	21700	27660	21140	35420	-15020						
Sum	158300	167200	154700	214800	102300		158300	167200	154700	214800	102300

TID Crop Land

Equation 4: $I_J + I_{KID} + O_S + P_{TID} + C_{TID} = ET_{c\text{-}TID} + ET_{d\text{-}TID} + I_S$

Inputs (ac ft /yr)						Outputs (ac ft /yr)					
Variable	*mean*	*u95% clm*	*l95% clm*	*max*	*min*	*Variable*	*mean*	*u95% clm*	*l95% clm*	*max*	*min*
I_J	123500	137900	112900	156500	100200	$ET_{c\text{-}TID}$	135000	135000	135000	135000	135000
O_S	36000	36000	36000	36000	36000	$ET_{d\text{-}TID}$	3000	3000	3000	3000	3000
P_{TID}	40000	42000	38000	74000	20800	I_S	99000	99000	99000	99000	99000
I_{KID}	39000	39000	39000	47900	31000						
C_{TID}	-1500	-17900	11100	-77400	49800						
Sum	23700	237000	237000	237000	23700		237000	237000	237000	237000	237000

Watershed 2

Equation 6: $O_D + I_{ADY} + I_N + P_{W2} + C_{W2} = ET_{W2} + O_{KSD}$

Inputs (ac ft /yr)						Outputs (ac ft /yr)					
Variable	*mean*	*u95% clm*	*l95% clm*	*max*	*min*	*Variable*	*mean*	*u95% clm*	*l95% clm*	*max*	*min*
O_D	88800	85200	97700	145300	32800	ET_{W2}	158000	158000	158000	158000	158000
I_{ADY}	71200	75200	67100	102900	37000	O_{KSD}	111800	118700	104900	160300	6100
I_N	31000	31000	31000	15000	47000						
P_{W2}	93300	97970	88640	172600	48520						
C_{W2}	-14500	-12760	-21540	-117500	-1220						
Sum	269800	276700	262900	318300	164100		269800	276700	262900	318300	164100

Watershed 1:Watershed 2 Balance

Equation 7: $I_{LR} + I_J + I_{KID} + I_{ADY} + I_N + P_{W1} + P_{W2} + C_{W1} + C_{W2} = ET_{c\text{-}TID} + ET_S + ET_{d\text{-}TID} + ET_{W2} + O_{KSD}$

Inputs (ac ft /yr)						**Outputs (ac ft /yr)**					
Variable	***mean***	***u95% clm***	***l95% clm***	***max***	***min***	***Variable***	***mean***	***u95% clm***	***l95% clm***	***max***	***min***
I_{LR}	123500	137900	112900	156500	100200	$ET_{c\text{-}TID}$	135000	135000	135000	135000	135000
I_J	26800	29200	24300	60400	12700	ET_S	33500	33500	33500	33500	33500
I_{KID}	3900	39000	39000	47900	31000	$ET_{d\text{-}TID}$	3000	3000	3000	3000	3000
$\mathbf{I_{ADY}}$	71200	75200	67100	102900	37000	ET_{W2}	158000	158000	158000	158000	158000
I_N	31000	31000	31000	15000	47000	O_{KSD}	111600	118700	104900	160300	6100
P_{W1}	52400	55070	49730	96940	27250						
P_{W2}	93300	97970	88640	172600	48520						
C_{W1}	18600	8030	30770	-44940	33150						
C_{W2}	-14500	-12760	-21540	-117500	-1220						
Sum	441300	448200	434400	489800	335600		441300	448200	434400	489800	335600

Table 11. Salt and nutrient transfers in surface waters in the study area

Location		TDS (t/yr)			TP (t/yr)			TN (t/yr)		
	Water vol.	*mean*	*max*	*min*	*mean*	*max*	*min*	*mean*	*max*	*min*
J canal	*Direct calc (99)*	38180	---	---	38.2	---	---	388.5	---	---
(14)	*median*	34270	42200	27020	39.3	48.4	31.0	349.3	430.1	275.4
	mean	46590	57370	36730	47.2	58.1	37.2	394.9	486.3	311.2
	uCLM	51220	63060	40400	52.0	52.3	33.5	421.3	518.7	332.1
	lCLM	41950	51650	33070	42.4	64.0	41.0	368.6	453.9	290.6
Lost River	*Direct calc (99)*	10270	---	---	9.4	---	---	94.8	---	---
(19)	*median*	7500	16890	3550	9.5	21.4	4.5	75.1	169.3	35.6
	mean	10520	23720	4980	11.1	25.1	5.3	87.3	196.9	41.4
	uCLM	11590	26120	5490	12.1	22.9	4.8	93.6	211.0	44.4
	lCLM	9460	21310	4480	10.2	27.4	5.8	81.1	182.7	38.4
KID	*Direct calc (99)*	---	---	---	---	---	---	---	---	---
(16)	*median*	10060	12360	8000	11.1	13.6	8.8	120.1	147.5	95.4
	mean	17380	21360	13820	17.2	21.1	13.7	184.2	226.2	146.4
	uCLM	19720	24220	11970	19.3	18.4	15.4	210.0	193.8	167.0
	lCLM	15060	18490	15670	15.0	13.8	11.9	157.8	258.0	125.4

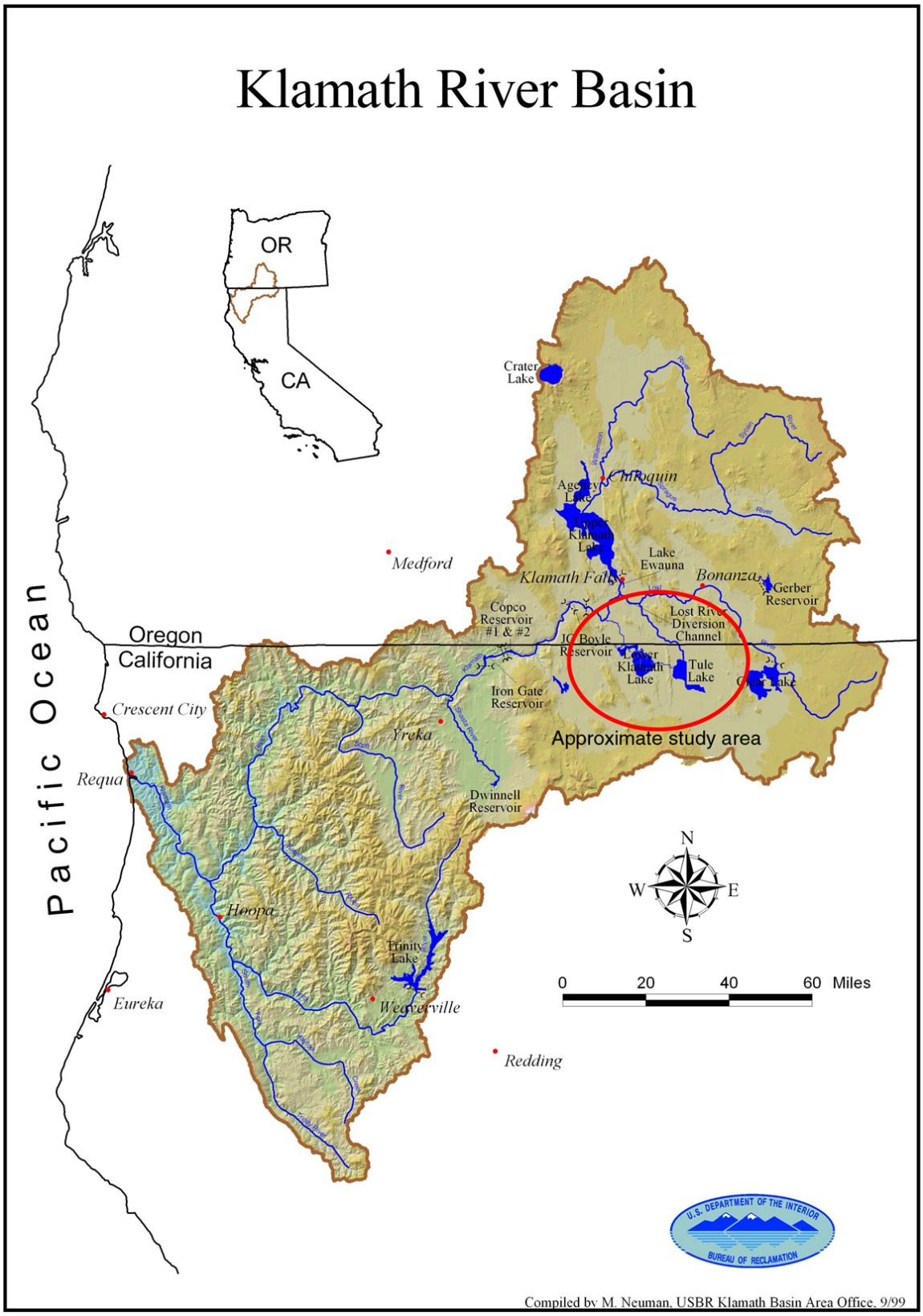
Table 11 (cont.)

Location		**TDS (t/yr)**			**TP (t/yr)**			**TN (t/yr)**		
	Water vol.	*mean*	*max*	*min*	*mean*	*max*	*min*	*mean*	*max*	*min*
D pump	*Direct calc (99)*	68560	---	---	43.5	---	---	525.9	---	---
(18)	*median*	56020	42200	27020	39.3	48.4	31.0	349.3	430.1	275.4
	mean	56830	57370	36730	47.2	58.1	37.2	394.9	486.3	311.2
	uCLM	59240	63060	40400	52.0	52.3	33.5	421.3	518.7	332.1
	lCLM	54430	51650	33070	42.4	64.0	41.0	368.6	453.9	290.6
LK out	*Direct calc (99)*	55420	---	---	27.1	---	---	179.1	---	---
(21)	*median*	32680	65690	3420	27.4	55.1	2.9	272.5	547.7	28.6
	mean	35470	71300	3720	26.7	53.6	2.8	274.9	552.6	28.8
	uCLM	38080	76560	3990	28.5	57.2	2.6	288.5	580.0	27.4
	lCLM	33860	66070	3450	25.0	50.1	3.0	261.2	525.1	30.2
KSD	*Direct calc (99)*	90230	---	---	54.8	---	---	613.6	---	---
(20)	*median*	78290	112260	4270	54.4	77.9	3.0	575.9	825.7	31.4
	mean	80200	11500	4380	61.9	88.8	3.4	617.6	885.5	33.7
	uCLM	85900	123180	4070	68.4	98.1	3.7	657.7	825.7	31.4
	lCLM	74500	106820	4690	55.6	79.7	3.0	575.9	943.0	35.9

Table 11 (cont.)

Location		TDS (t/yr)			TP (t/yr)			TN (t/yr)		
	Water vol.	*mean*	*max*	*min*	*mean*	*max*	*min*	*mean*	*max*	*min*
ADY	*Direct calc (99)*	26550	---	---	19.9	---	---	249.8	---	---
(32)	*median*	12190	17620	6340	15.3	22.2	8.0	227.1	328.3	118.0
	mean	19500	28180	10130	17.1	24.7	8.9	237.9	343.9	123.7
	uCLM	16800	32070	8730	18.6	22.5	8.1	253.7	366.6	131.8
	lCLM	22190	24290	11530	15.5	26.9	9.7	222.2	321.2	115.5

Location		TDS (t/yr)			TP (t/yr)			TN (t/yr)		
	Water vol.	*mean*	*max*	*min*	*mean*	*max*	*min*	*mean*	*max*	*min*
North canal	*Direct calc (99)*	---	---	---	---	---	---	---	---	---
	median	5360	8170	2600	6.7	10.3	3.3	99.9	152.2	48.5
	mean	8570	13060	4160	7.5	11.5	3.7	104.6	159.4	50.8
	uCLM	9750	14860	4740	6.8	12.5	4.0	111.5	148.9	47.4
	lCLM	7390	11260	3590	8.2	10.4	3.3	97.7	170.0	54.2


Klamath River Basin
OR
CA
Pacific Ocean
Oregon
California
Crater Lake
Agency Lake
Upper Klamath Lake
Lake Ewauna
Chiloquin
Klamath Falls
Bonanza
Gerber Reservoir
Medford
Copco Reservoir #1 & #2
J.C. Boyle Reservoir
Lost River Diversion Channel
Lower Klamath Lake
Tule Lake
Clear Lake
Iron Gate Reservoir
Crescent City
Yreka
Approximate study area
Requa
Dwinnell Reservoir
Hoopa
Trinity Lake
Weaverville
Eureka
Redding
N
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E
S
0
20
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60 Miles
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Compiled by M. Neuman, USBR Klamath Basin Area Office, 9/99

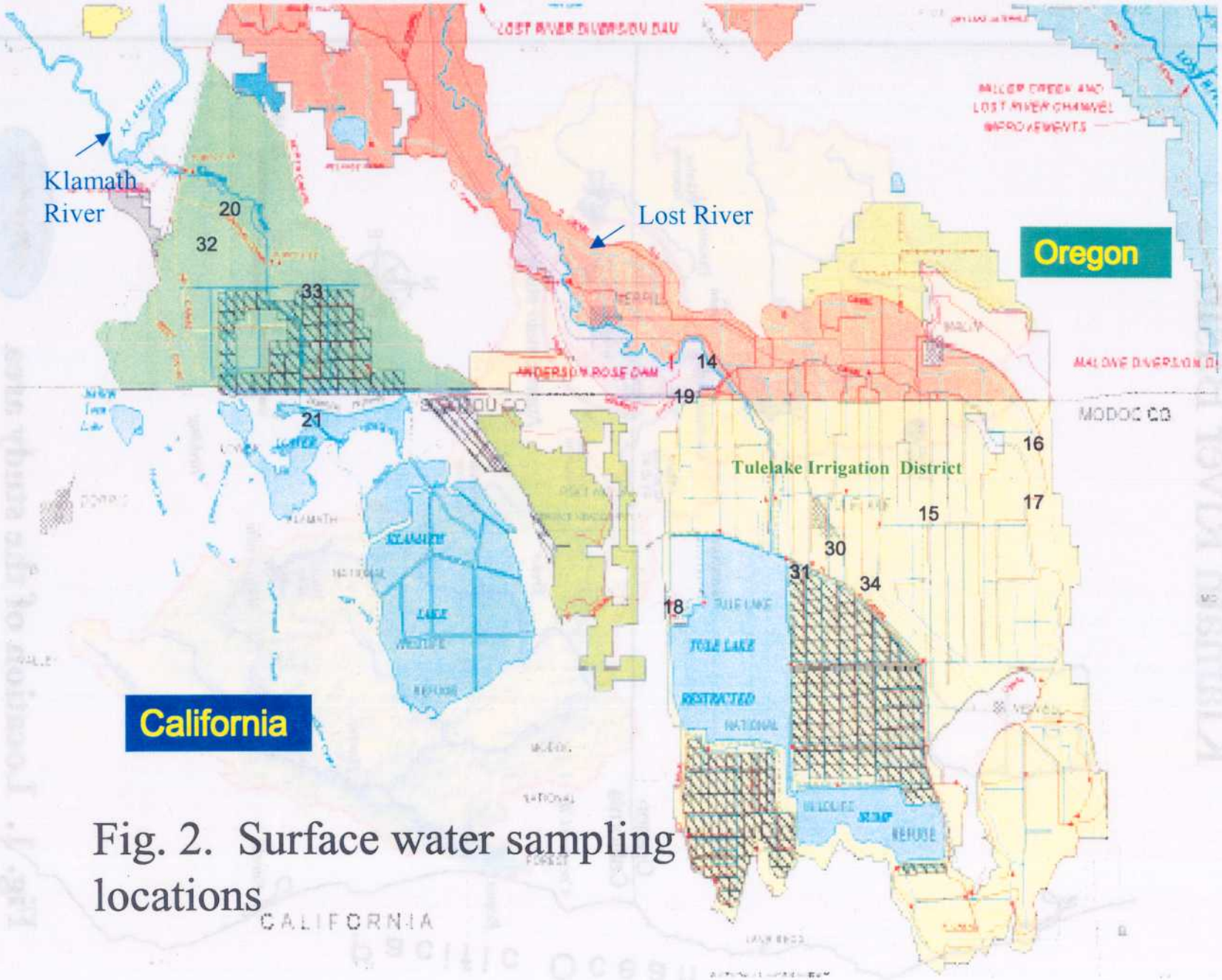
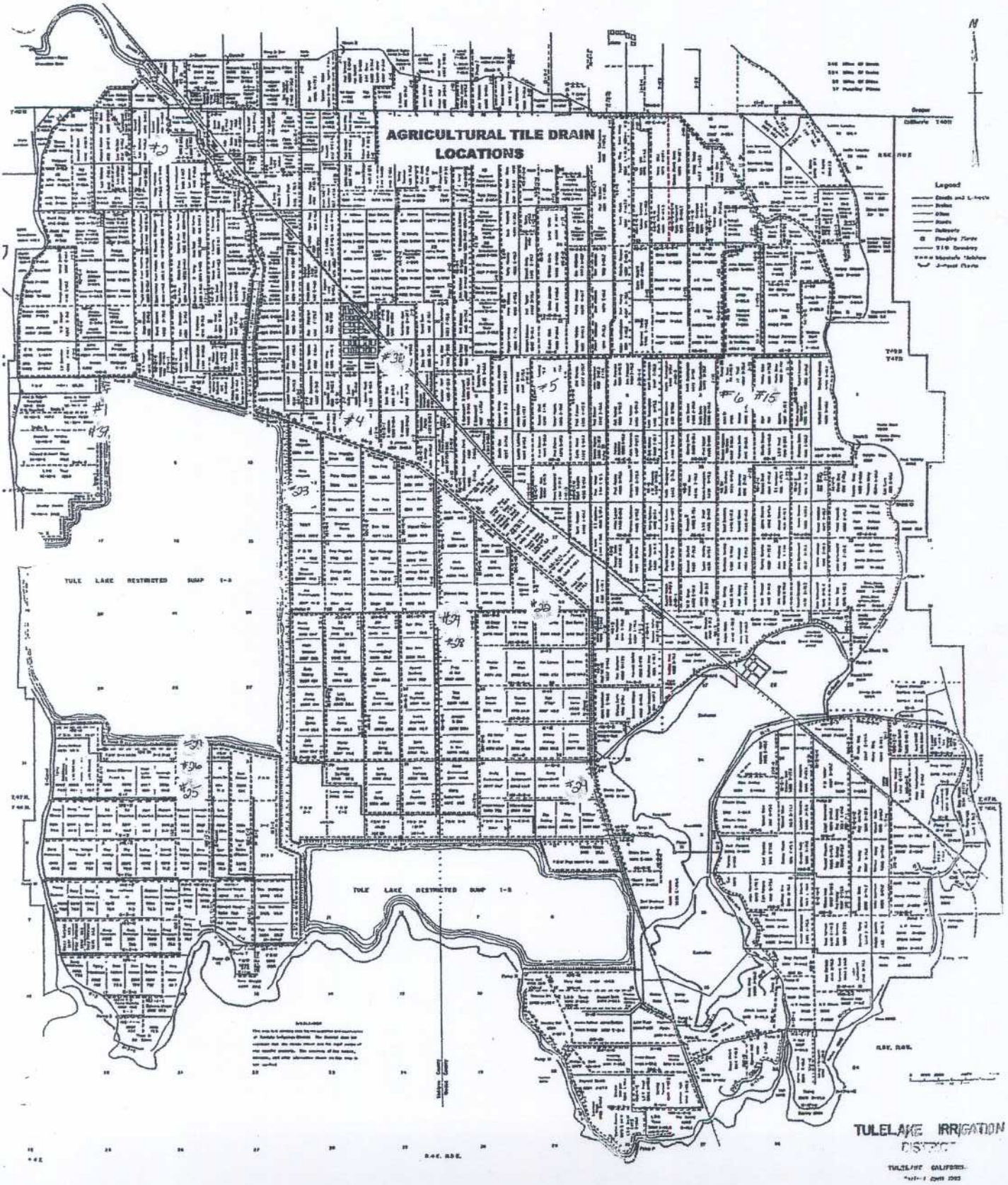
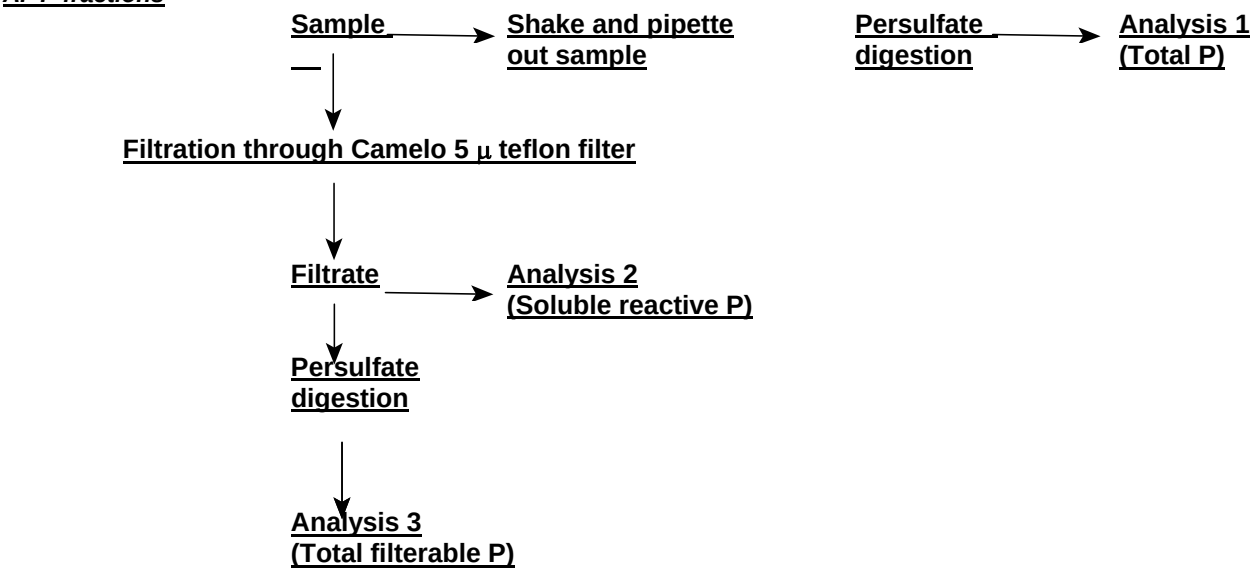


Fig. 2. Surface water sampling locations

Figure 3. Tulelake Irrigation District and map of subsurface agricultural tile drain sample locations.

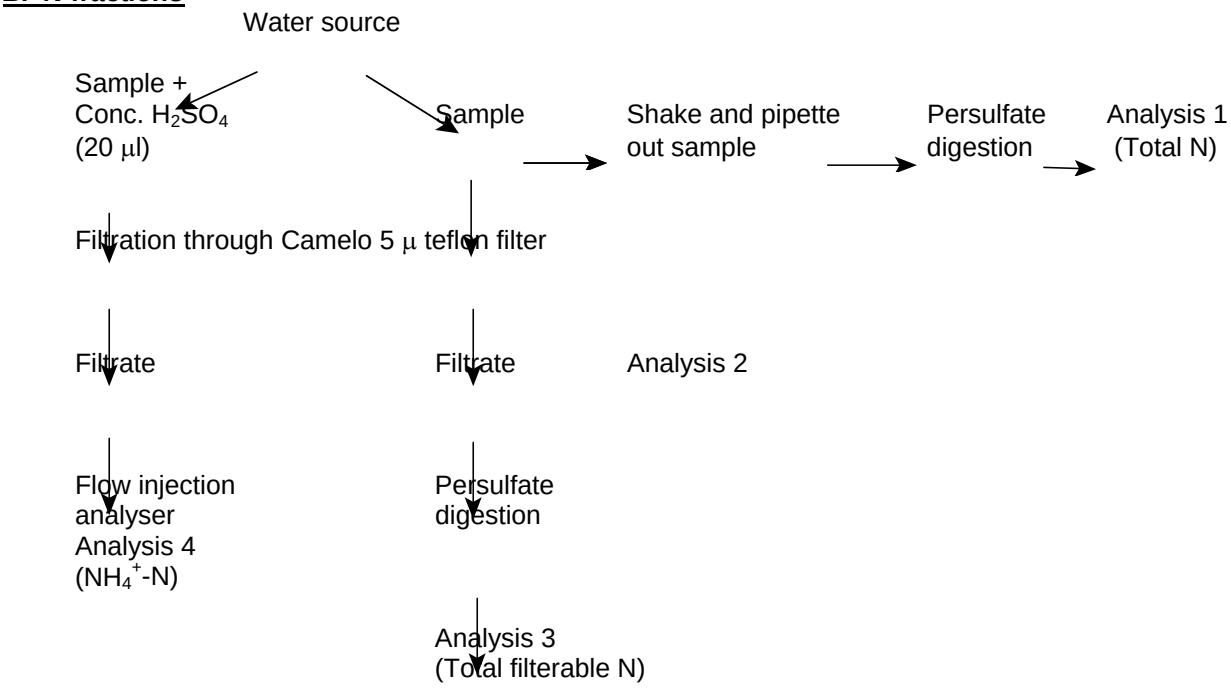


A. P fractions



Total P (TP)	**=**	**Analysis 1**	**Soluble unreactive P (SUP)**	**=**	**TFP-SRP**
Soluble reactive P (SRP)	**=**	**Analysis 2**	**Particulate P (PP)**	**=**	**TP-TFP**
Total filterable P (TFP)	**=**	**Analysis 3**			

B. N-fractions



Total N (TN)	=	Analysis 1	NH_4^+-N	=	Analysis 4
Soluble NO_3 (SN)	=	Analysis 2	NH_3	=	NH_4^+-N x 10^{pH} / $10^{9.22}$
Total filterable N (TFN)	=	Analysis 3			
Soluble organic N (SON)	=	TFN-SN			
Particulate N (PN)	=	TN-TFN			

Fig 4. P and N fractions in water samples, analytical scheme

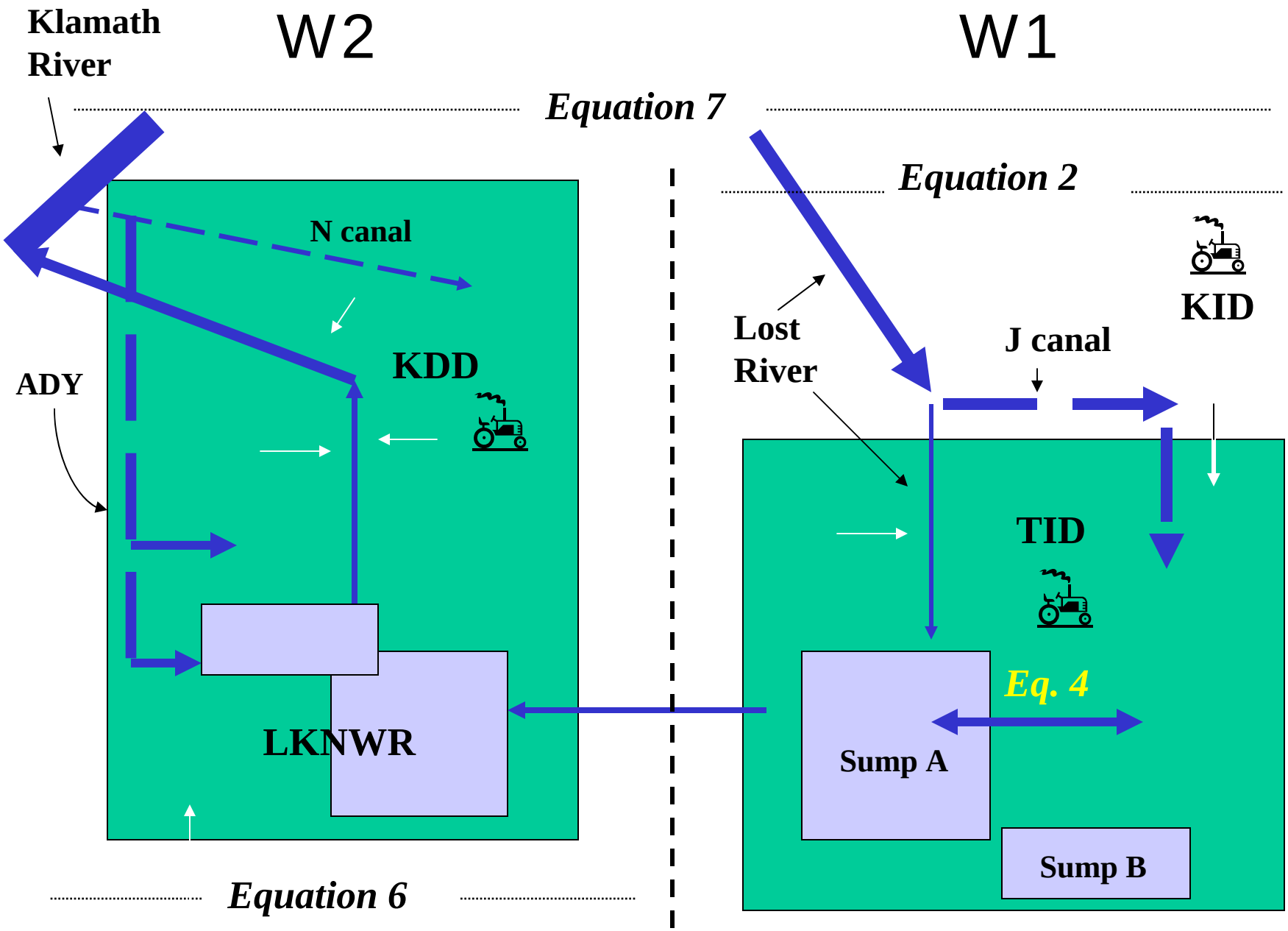


Fig. 5. Diagram of water transfers in the study area

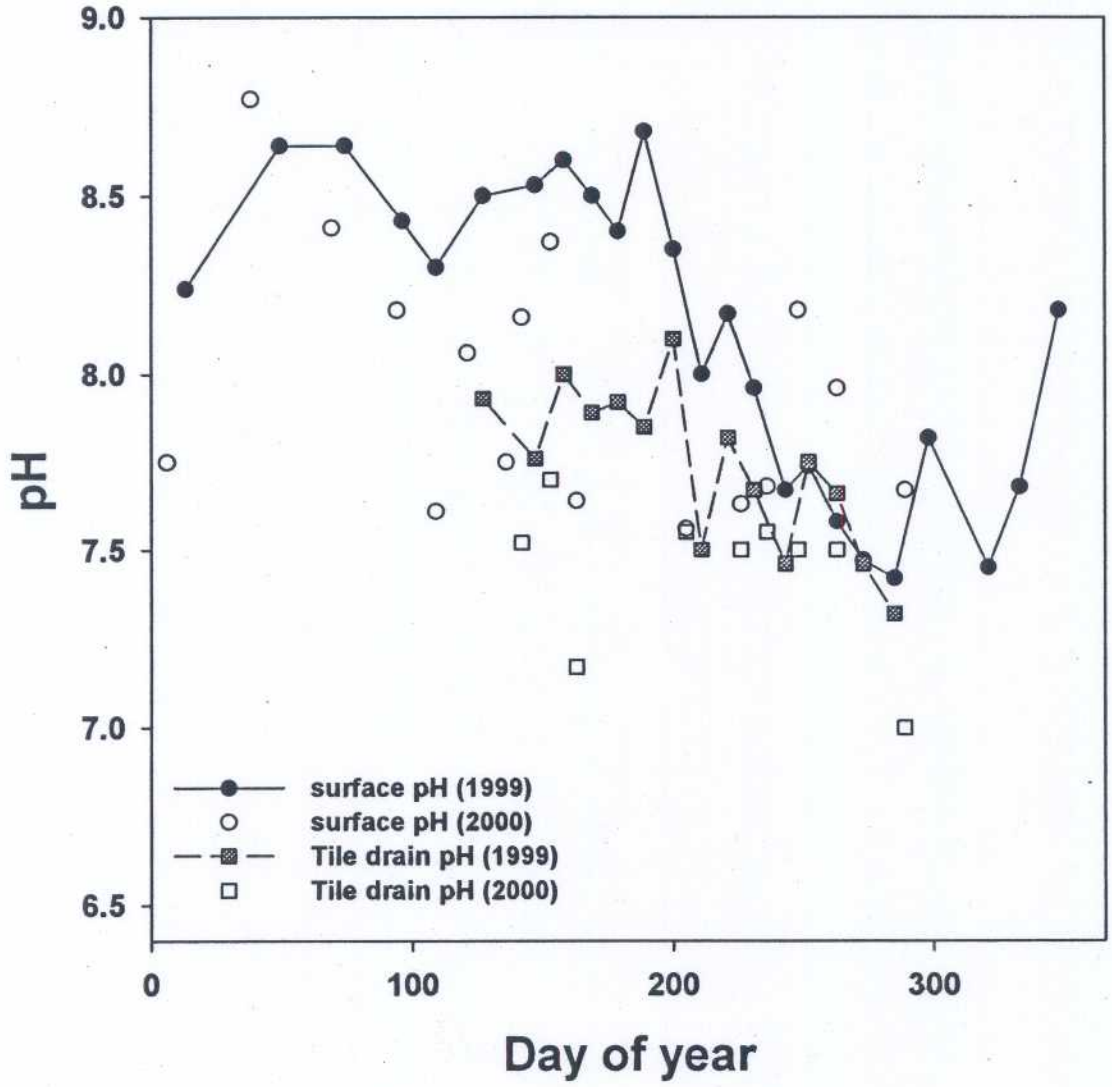


Fig. 6. Average pH of surface water and tile drain samples

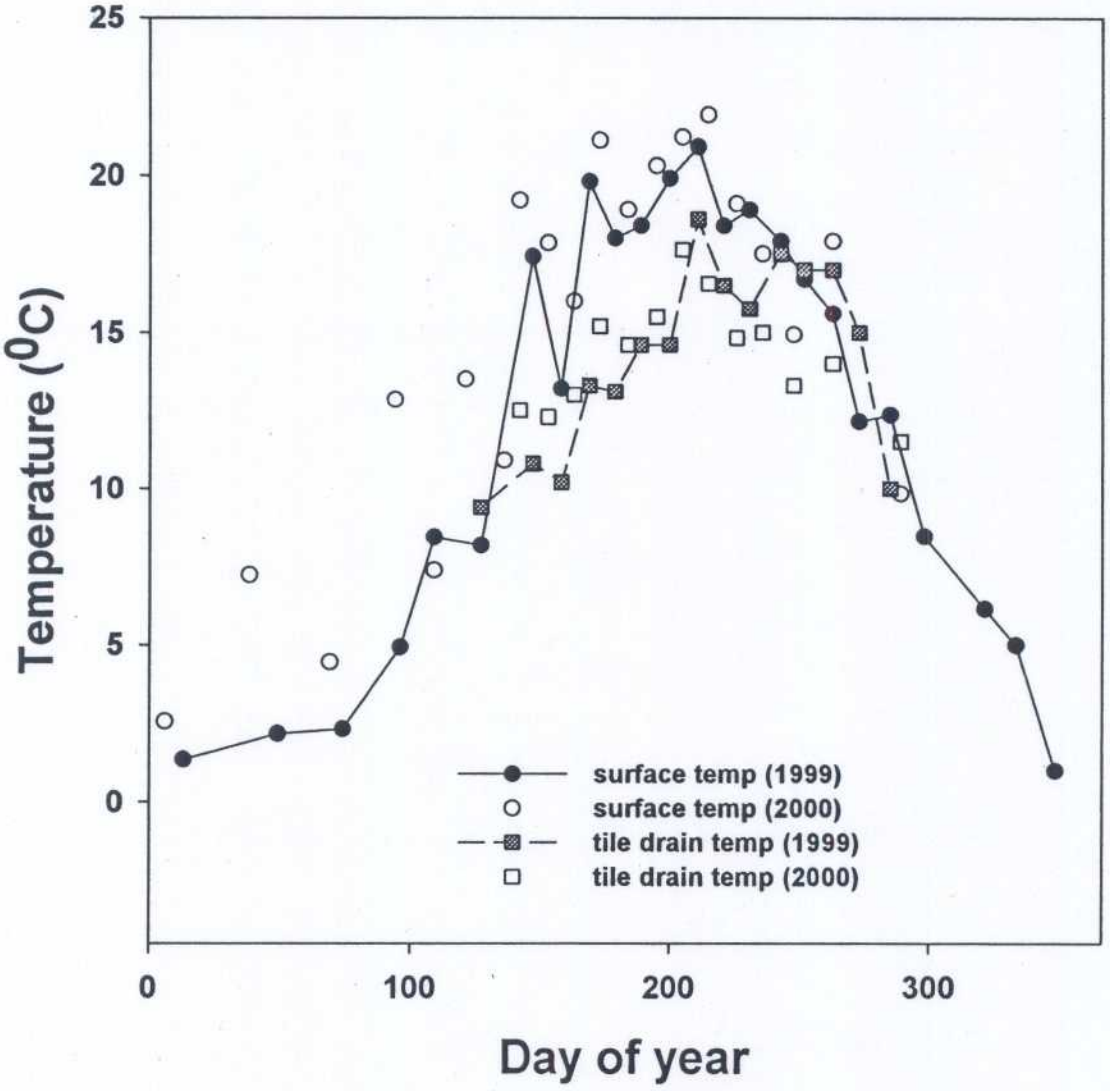


Fig. 7. Average temperature of surafce and tile drain water samples

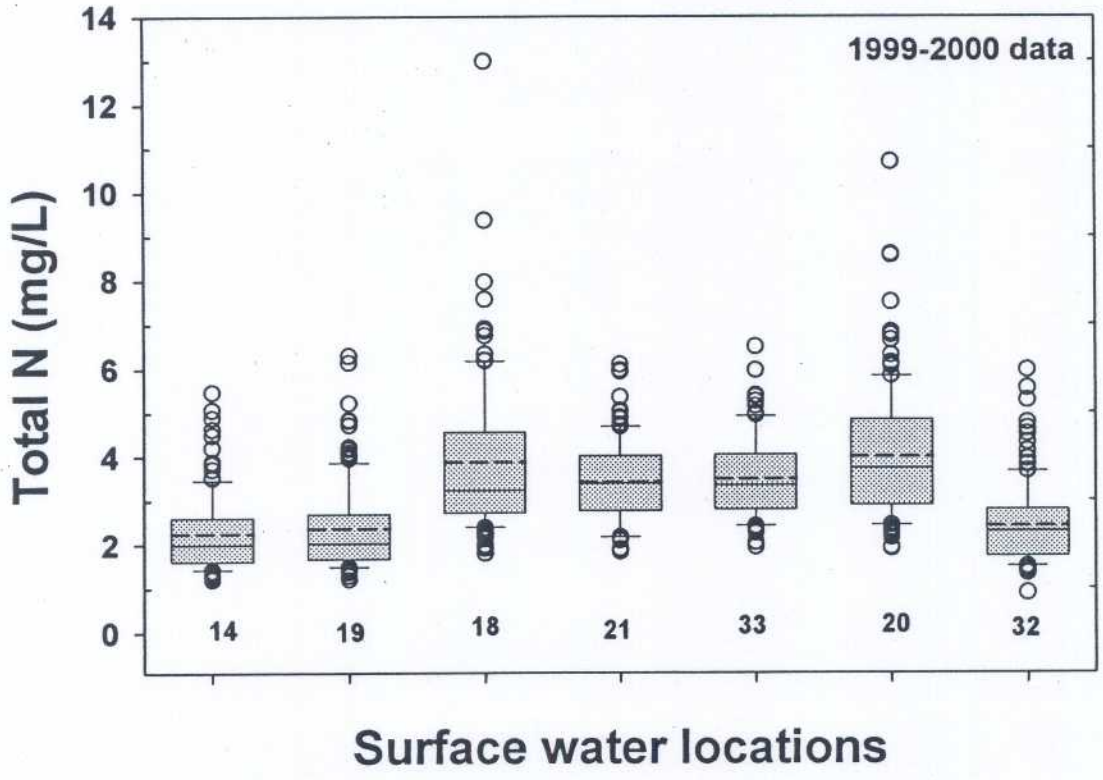


Fig. 8. Box plots for TN for surface water locations

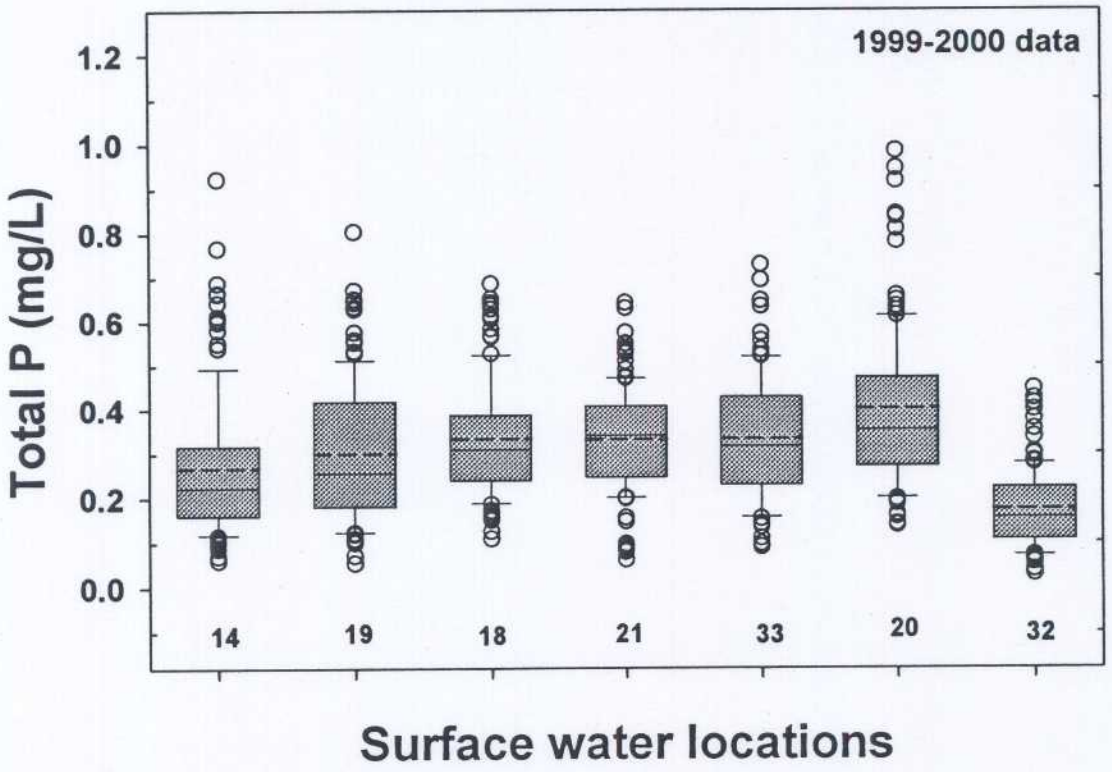


Fig. 9. Box plots for TP for surface water locations

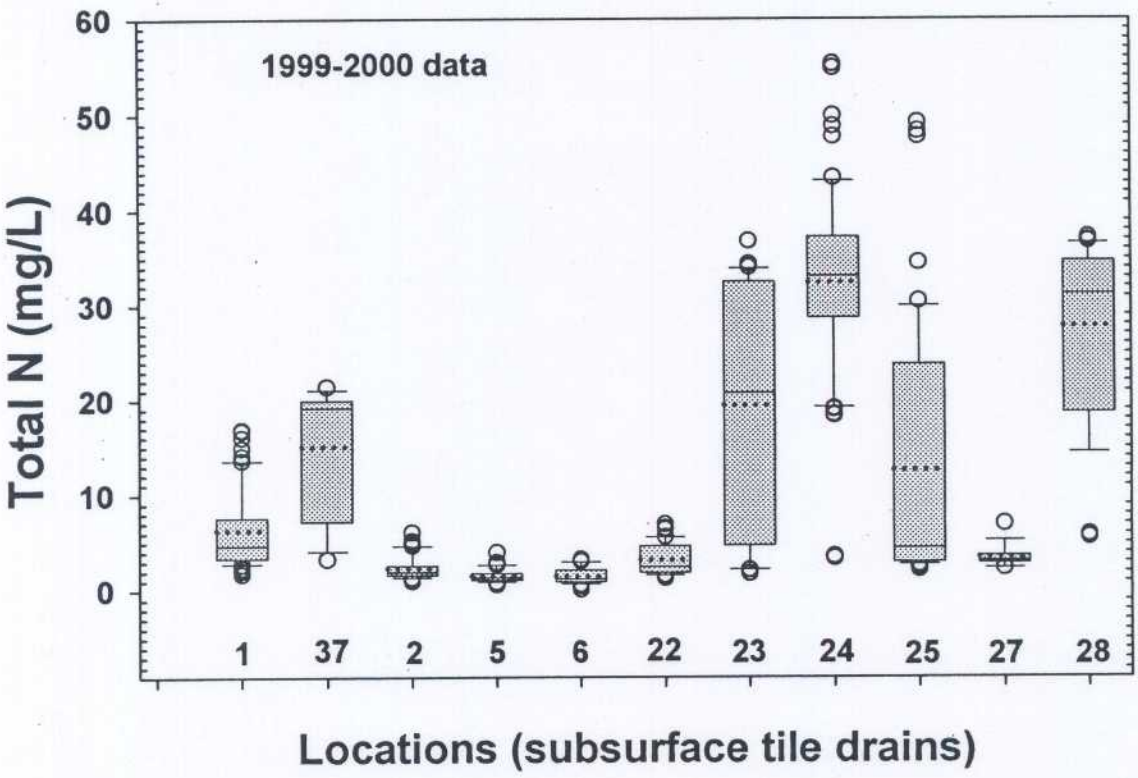


Fig. 10. Box plots for total N in subsurface agricultural tile drains

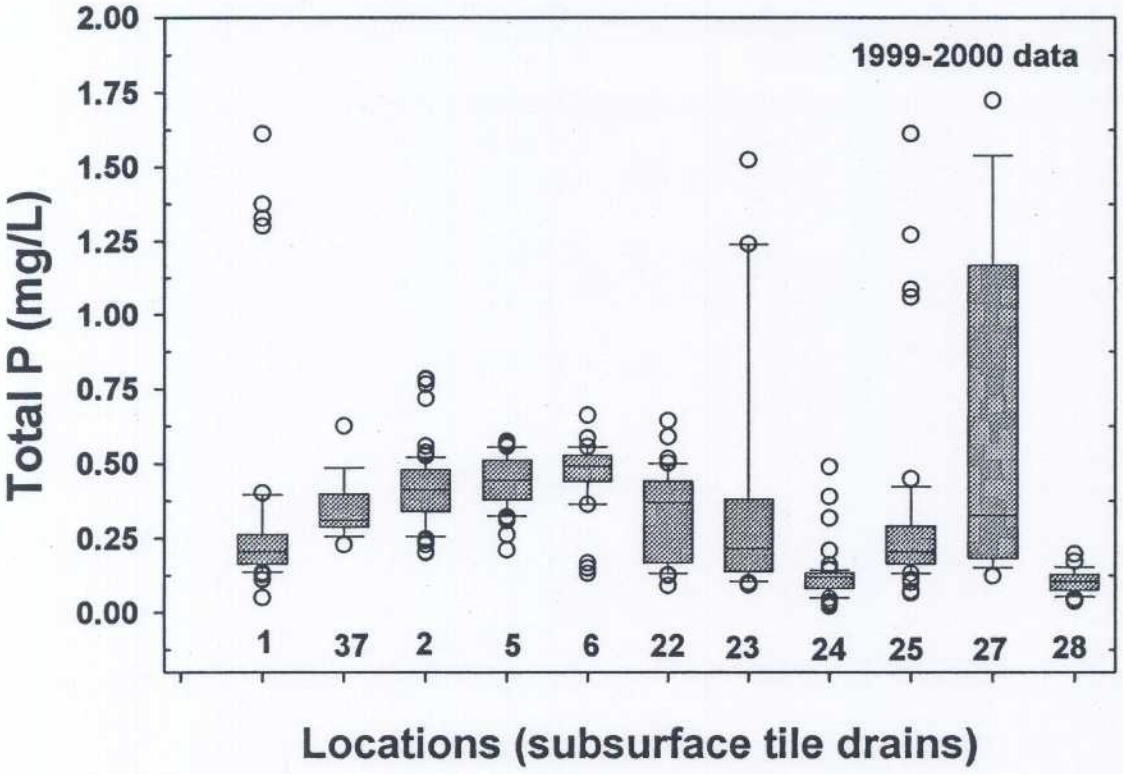


Fig. 11. Box plots for total P in subsurface agricultural tile drains

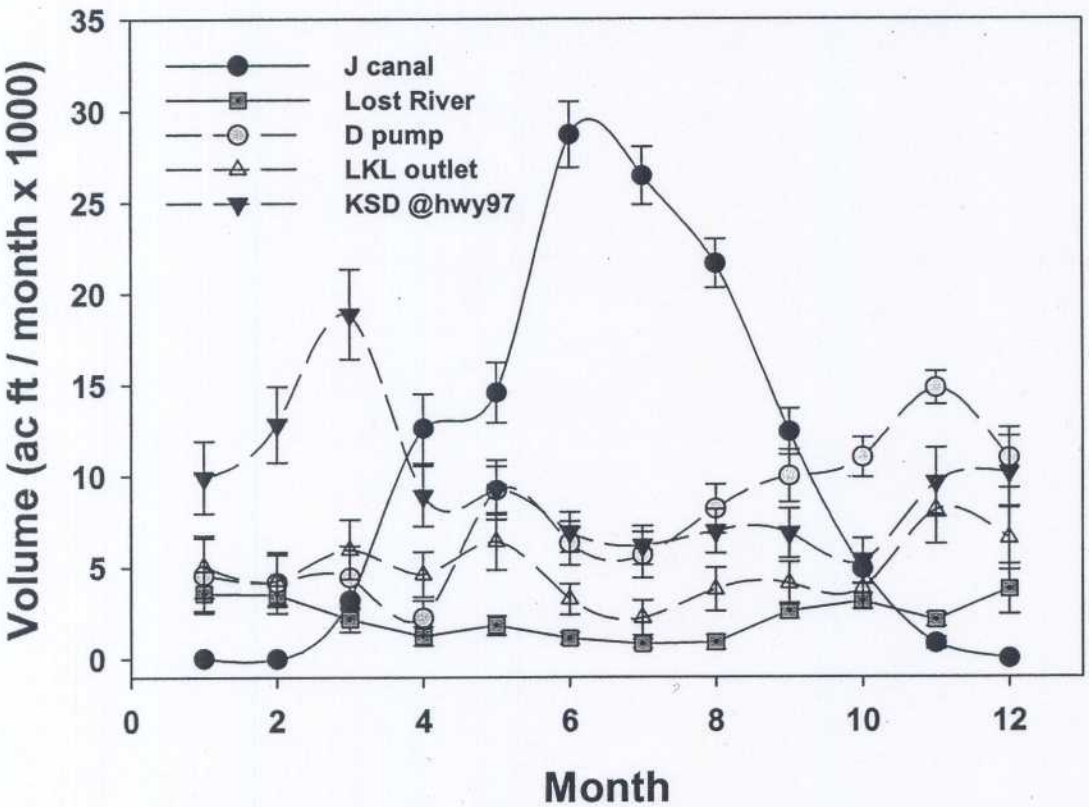


Fig. 12. Average surface water flows by month

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	6	7	1	A	0.152	0.031	0.059	0.029	0.092	16.732	10.632	16.330	5.697	0.402	ND	ND	2460	8.03	8
1999	6	7	1	B	0.177	0.053	0.090	0.037	0.088	16.846	10.518	16.142	5.624	0.705	ND	ND	2490	7.99	8
1999	6	7	1	C	0.143	0.040	0.175	0.136	ND	16.014	7.134	15.882	8.749	0.131	ND	ND	2510	7.93	8
1999	6	18	1	A	0.205	0.021	0.094	0.074	0.111	11.900	3.131	11.795	8.663	0.105	0.351	0.018	2630	7.96	9
1999	6	18	1	B	0.270	0.065	0.111	0.046	0.159	14.894	7.829	14.451	6.622	0.443	0.495	0.023	2630	7.9	9
1999	6	18	1	C	0.205	0.028	0.128	0.100	0.077	14.067	7.073	13.953	6.880	0.114	0.344	0.013	2610	7.83	9
1999	6	28	1	A	0.050	0.034	0.089	0.055	ND	12.498	5.351	12.862	7.511	ND	0.244	0.005	2270	7.53	11
1999	6	28	1	B	0.177	0.034	0.099	0.064	0.079	13.334	6.709	13.793	7.084	ND	ND	ND	2260	7.6	11
1999	6	28	1	C	0.135	0.026	0.092	0.066	0.043	13.600	5.876	13.000	7.124	0.600	0.166	0.004	2270	7.65	11
1999	7	8	1	A	0.211	0.030	0.020	ND	0.191	10.138	0.171	9.621	9.450	0.517	0.425	0.015	2060	7.78	10
1999	7	8	1	B	0.329	0.017	0.035	0.018	0.294	5.694	0.029	7.497	7.468	ND	0.133	0.005	2070	7.77	10
1999	7	8	1	C	0.230	0.034	0.020	ND	0.210	6.597	0.222	5.652	5.430	0.945	ND	ND	2080	7.77	10
1999	7	19	1	A	0.147	ND	0.051	0.051	0.096	4.425	0.081	3.436	3.355	0.989	0.116	0.008	1661	8.1	12
1999	7	19	1	B	0.188	0.003	0.080	0.078	0.108	4.156	0.026	3.955	3.929	0.202	0.147	0.010	1663	8.08	12
1999	7	19	1	C	0.174	0.000	0.065	0.065	0.109	4.126	0.032	3.038	3.007	1.087	0.127	0.009	1662	8.1	12
1999	7	30	1	A	1.327	1.095	1.108	0.013	0.219	3.185	1.179	2.675	1.496	0.510	ND	ND	382	7.55	18
1999	7	30	1	B	1.374	1.104	1.153	0.050	0.221	2.906	1.049	2.390	1.341	0.517	ND	ND	379	7.5	18
1999	7	30	1	C	1.301	1.095	1.129	0.034	0.172	2.783	1.127	2.403	1.276	0.380	ND	ND	380	7.55	18
1999	8	3	1	A	0.401	0.255	0.297	0.042	0.104	2.084	0.496	1.862	1.366	0.221	ND	ND	.	.	.
1999	8	3	1	B	1.612	1.270	1.378	0.108	0.234	1.742	0.027	1.719	1.692	0.023	ND	ND	.	.	.
1999	8	3	1	C	0.200	0.111	0.217	0.107	ND	1.705	ND	1.544	1.544	0.161	ND	ND	.	.	.
1999	5	7	2	A	0.558	0.338	0.366	0.028	0.192	5.201	3.038	4.012	0.974	1.189	ND	ND	585	7.91	9.4
1999	5	7	2	B	0.376	0.354	0.376	0.021	0.000	4.698	3.465	4.433	0.968	0.265	ND	ND	582	7.93	9.4
1999	5	7	2	C	0.407	0.338	0.339	0.000	0.069	4.634	3.463	4.396	0.932	0.239	ND	ND	584	7.95	9.4
1999	5	27	2	A	0.493	0.471	0.498	0.026	ND	5.206	3.604	5.154	1.550	0.051	ND	ND	523	8.08	11.1
1999	5	27	2	B	0.537	0.476	0.496	0.020	0.040	4.901	3.606	4.721	1.115	0.180	ND	ND	525	8.1	11.1
1999	5	27	2	C	0.496	0.476	0.496	0.020	ND	4.901	3.561	4.521	0.960	0.380	ND	ND	523	8.09	11.1
1999	6	7	2	A	0.485	0.376	0.496	0.120	ND	4.143	2.446	3.954	1.508	0.189	ND	ND	463	8.07	13
1999	6	7	2	B	0.452	0.327	0.464	0.137	ND	3.482	1.766	3.185	1.419	0.297	ND	ND	501	8.05	13
1999	6	7	2	C	0.492	0.412	0.477	0.065	0.015	2.712	1.576	2.472	0.897	0.239	ND	ND	428	8.01	13
1999	6	18	2	A	0.441	0.203	0.326	0.123	0.115	2.542	0.284	1.829	1.545	0.713	ND	ND	462	8.01	14
1999	6	18	2	B	0.440	0.239	0.381	0.142	0.059	2.075	0.014	1.552	1.538	0.523	ND	ND	443	7.96	14
1999	6	18	2	C	0.407	0.229	0.361	0.132	0.046	1.992	0.082	1.489	1.407	0.503	ND	ND	419	7.92	14
1999	6	28	2	A	0.784	0.468	0.703	0.235	0.082	6.053	2.322	5.414	3.092	0.639	ND	ND	633	8.37	13
1999	6	28	2	B	0.484	0.234	0.402	0.168	0.082	2.570	0.462	2.339	1.877	0.231	ND	ND	462	8.16	13
1999	6	28	2	C	0.765	0.585	0.712	0.127	0.053	4.811	3.367	5.144	1.777	ND	ND	ND	731	8.38	13
1999	7	8	2	A	0.201	0.116	0.150	0.034	0.051	1.584	0.013	1.330	1.318	0.254	ND	ND	377	8.15	18
1999	7	8	2	B	0.311	0.096	0.194	0.098	0.118	1.632	ND	1.232	1.232	0.400	ND	ND	378	8.08	18
1999	7	8	2	C	0.245	0.132	0.179	0.047	0.066	2.030	0.042	1.037	0.995	0.994	ND	ND	379	8.04	18
1999	7	19	2	A	0.336	0.239	0.332	0.092	0.004	1.916	0.029	1.226	1.197	0.690	ND	ND	358	8.03	18
1999	7	19	2	B	0.366	0.322	0.334	0.012	0.032	2.658	0.044	2.620	2.576	0.038	ND	ND	348	7.98	18
1999	7	19	2	C	0.366	0.231	0.308	0.078	0.058	1.956	0.162	1.137	0.975	0.819	ND	ND	355	7.94	18
1999	7	30	2	A	0.203	0.117	0.169	0.052	0.034	1.216	0.020	0.987	0.967	0.229	ND	ND	375	8.04	19
1999	7	30	2	B	0.248	0.085	0.219	0.134	0.029	1.258	0.032	0.962	0.930	0.296	ND	ND	380	8.04	19
1999	7	30	2	C	0.255	0.055	0.155	0.100	0.100	1.993	0.039	1.600	1.561	0.392	ND	ND	375	8.01	19
1999	8	9	2	A	0.241	0.037	0.047	0.010	0.194	2.127	0.058	1.537	1.479	0.590	ND	ND	416	7.94	19
1999	8	9	2	B	0.365	0.037	0.058	0.022	0.307	2.291	0.004	1.337	1.332	0.955	ND	ND	414	7.89	19
1999	8	9	2	C	0.324	0.190	0.238	0.049	0.086	1.544	0.007	1.197	1.190	0.347	ND	ND	412	7.85	19
1999	8	19	2	A	0.453	0.439	0.471	0.032	ND	2.966	1.666	2.494	0.828	0.473	0.275	0.004	458	7.42	18
1999	8	19	2	B	0.458	0.336	0.424	0.088	0.035	2.228	0.692	1.869	1.178	0.358	0.253	0.005	448	7.51	18
1999	8	19	2	C	0.417	0.277	0.321	0.043	0.096	2.435	0.556	1.787	1.232	0.647	0.122	0.002	392	7.49	18
1999	8	30	2	A	0.364	0.172	0.262	0.090	0.102	1.652	0.005	1.517	1.512	0.135	ND	ND	325	7.65	16
1999	8	30	2	B	0.400	0.181	0.320	0.139	0.080	1.449	ND	1.565	1.565	ND	ND	ND	328	7.6	16
1999	8	30	2	C	0.313	0.142	0.243	0.102	0.070	1.803	ND	1.954	1.954	ND	ND	ND	327	7.63	16
1999	9	9	2	A	0.717	0.511	0.681	0.170	0.036	2.146	0.009	1.418	1.410	0.727	ND	ND	705	8.21	17
1999	9	9	2	B	0.522	0.276	0.412	0.136	0.110	2.171	ND	1.525	1.525	0.646	ND	ND	652	8.12	17
1999	9	9	2	C	0.781	0.589	0.763	0.174	0.017	1.879	ND	1.386	1.386	0.493	ND	ND	708	8.13	17
1999	9	20	2	A	0.369	0.229	0.274	0.045	0.095	2.259	0.064	1.737	1.673	0.522	0.004	0.000	429	7.72	17
1999	9	20	2	B	0.310	0.188	0.237	0.049	0.073	1.580	ND	1.288	1.288	0.292	0.102	0.003	415	7.64	17
1999	9	20	2	C	0.325	0.195	0.252	0.057	0.073	2.362	0.014	1.674	1.661	0.688	ND	ND	420	7.63	17
1999	9	30	2	A	0.368	0.140	0.235	0.096	0.133	2.010	0.024	1.455	1.431	0.554	ND	ND	498	7.51	15
1999	9	30	2	B	0.412	0.178	0.260	0.081	0.153	1.922	0.007	1.425	1.418	0.497	ND	ND	482	7.45	15
1999	9	30	2	C	0.426	0.028	0.223	0.195	0.203	2.577	0.347	1.870	1.523	0.707	ND	ND	482	7.43	15

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	5	27	5	A	0.324	0.029	0.163	0.134	0.161	2.301	0.014	1.195	1.181	1.106	ND	ND	424	7.85	.
1999	5	27	5	B	0.378	0.029	0.180	0.151	0.198	2.109	0.058	1.126	1.068	0.983	ND	ND	422	7.88	.
1999	5	27	5	C	0.412	0.042	0.266	0.224	0.145	3.956	0.016	2.247	2.231	1.709	ND	ND	420	7.83	.
1999	6	7	5	A	0.420	0.052	0.296	0.243	0.125	2.960	ND	2.099	2.099	0.861	ND	ND	508	7.66	11
1999	6	7	5	B	0.420	0.101	0.307	0.206	0.113	2.874	0.237	2.050	1.814	0.824	ND	ND	509	7.72	11
1999	6	7	5	C	0.409	0.107	0.419	0.312	ND	2.896	0.180	2.617	2.438	0.279	ND	ND	509	7.73	11
1999	6	18	5	A	0.309	0.145	0.231	0.086	0.078	1.513	0.114	1.031	0.917	0.482	ND	ND	474	7.87	13
1999	6	18	5	B	0.262	0.119	0.199	0.079	0.064	1.438	0.056	0.793	0.737	0.645	ND	ND	478	7.79	13
1999	6	18	5	C	0.210	0.117	0.147	0.030	0.064	1.437	ND	0.896	0.896	0.541	0.182	0.006	483	7.74	13
1999	6	28	5	A	0.411	0.190	0.271	0.081	0.139	1.761	0.043	1.057	1.014	0.705	ND	ND	466	7.62	14
1999	6	28	5	B	0.386	0.216	0.294	0.078	0.092	2.567	ND	0.927	0.927	1.640	ND	ND	468	7.63	14
1999	6	28	5	C	0.385	0.221	0.348	0.127	0.037	1.680	0.153	1.362	1.209	0.319	ND	ND	465	7.63	14
1999	7	8	5	A	0.366	0.264	0.323	0.059	0.043	1.742	0.049	0.985	0.935	0.757	ND	ND	429	7.91	15
1999	7	8	5	B	0.451	0.325	0.461	0.136	ND	2.455	0.080	1.755	1.675	0.700	ND	ND	432	7.84	15
1999	7	8	5	C	0.429	0.290	0.343	0.053	0.086	2.089	0.035	1.137	1.102	0.952	ND	ND	434	7.79	15
1999	7	19	5	A	0.444	0.381	0.437	0.056	0.007	1.742	0.030	1.070	1.040	0.671	0.099	0.004	420	7.89	15
1999	7	19	5	B	0.500	0.407	0.475	0.068	0.025	1.364	0.032	1.092	1.060	0.272	ND	ND	422	7.86	15
1999	7	19	5	C	0.497	0.398	0.457	0.059	0.040	1.452	0.010	1.219	1.208	0.233	ND	ND	421	7.87	15
1999	7	30	5	A	0.525	0.486	0.485	ND	0.040	1.297	0.216	1.004	0.789	0.293	ND	ND	369	7.48	20
1999	7	30	5	B	0.528	0.477	0.506	0.029	0.022	1.668	0.227	1.059	0.832	0.608	ND	ND	370	7.46	20
1999	7	30	5	C	0.525	0.503	0.548	0.045	ND	1.348	0.242	1.231	0.989	0.117	ND	ND	372	7.47	20
1999	8	3	5	A	0.322	0.201	0.292	0.091	0.030	1.284	ND	1.370	1.370	ND	ND	ND	.	.	.
1999	8	3	5	B	0.508	0.424	0.450	0.026	0.058	0.937	0.126	0.227	0.101	0.710	ND	ND	.	.	.
1999	8	3	5	C	0.374	0.267	0.364	0.097	0.011	1.321	0.006	1.179	1.173	0.142	ND	ND	.	.	.
1999	8	9	5	A	0.489	0.487	0.412	ND	0.077	1.386	ND	1.211	1.211	0.176	ND	ND	357	7.78	18
1999	8	9	5	B	0.445	0.481	0.442	ND	0.003	0.865	ND	0.800	0.800	0.065	ND	ND	361	7.71	18
1999	8	9	5	C	0.421	0.474	0.348	ND	0.073	1.261	ND	1.254	1.254	0.007	ND	ND	360	7.66	18
1999	8	19	5	A	0.486	0.487	0.465	ND	0.021	0.913	ND	0.854	0.854	0.059	0.006	0.000	337	7.12	18
1999	8	19	5	B	0.556	0.491	0.506	0.015	0.050	0.699	ND	0.809	0.809	ND	0.032	0.000	331	7.14	18
1999	8	19	5	C	0.568	0.482	0.522	0.041	0.046	0.734	ND	0.886	0.886	ND	0.029	0.000	335	7.18	18
1999	8	30	5	A	0.512	0.505	0.495	ND	0.017	0.851	ND	1.073	1.073	ND	ND	ND	383	7.3	19
1999	8	30	5	B	0.560	0.498	0.509	0.011	0.051	1.279	ND	1.054	1.054	0.225	ND	ND	380	7.29	19
1999	8	30	5	C	0.574	0.516	0.516	0.000	0.058	0.665	ND	1.094	1.094	ND	ND	ND	383	7.3	19
1999	9	9	5	A	0.536	0.520	0.560	0.039	ND	0.923	ND	0.736	0.736	0.187	ND	ND	418	7.43	17
1999	9	9	5	B	0.571	0.524	0.582	0.058	ND	0.812	ND	0.860	0.860	ND	ND	ND	420	7.32	17
1999	9	9	5	C	0.557	0.516	0.606	0.090	ND	0.947	ND	0.781	0.781	0.166	ND	ND	418	7.3	17
1999	5	27	6	A	0.493	0.422	0.511	0.089	ND	3.250	2.076	2.921	0.845	0.329	ND	ND	887	7.95	8.9
1999	5	27	6	B	0.478	0.425	0.482	0.057	ND	3.026	2.096	2.795	0.698	0.231	ND	ND	888	7.93	8.9
1999	5	27	6	C	0.493	0.434	0.442	0.007	0.052	3.033	2.082	2.834	0.752	0.199	ND	ND	890	7.96	8.9
1999	6	7	6	A	0.166	0.044	0.100	0.056	0.066	2.736	0.032	2.092	2.060	0.644	ND	ND	297	8.63	10
1999	6	7	6	B	0.149	0.035	0.061	0.026	0.088	3.216	0.133	2.020	1.887	1.196	ND	ND	299	8.7	10
1999	6	7	6	C	0.131	0.035	0.059	0.024	0.072	2.528	0.216	2.057	1.840	0.472	ND	ND	301	8.72	10
1999	6	18	6	A	0.401	0.335	0.380	0.045	0.021	2.192	1.046	1.857	0.811	0.336	ND	ND	801	7.92	11
1999	6	18	6	B	0.374	0.047	0.147	0.100	0.228	2.942	0.152	2.264	2.112	0.679	ND	ND	798	7.9	11
1999	6	18	6	C	0.427	0.335	0.380	0.045	0.047	2.372	1.160	2.549	1.389	ND	ND	ND	802	7.87	11
1999	6	28	6	A	0.443	0.390	0.389	ND	0.054	1.750	0.940	1.747	0.807	0.003	ND	ND	722	7.82	11
1999	6	28	6	B	0.444	0.425	0.474	0.049	ND	2.606	1.178	2.633	1.455	ND	ND	ND	722	7.86	11
1999	6	28	6	C	0.443	0.433	0.429	ND	0.014	2.033	1.184	2.011	0.827	0.023	ND	ND	727	7.87	11
1999	1	13	10	A	1.884	1.832	1.830	ND	0.054	15.859	11.202	13.775	2.573	2.084	.	.	895	7.79	1.7
1999	1	13	10	B	1.999	1.747	1.753	ND	0.246	14.717	11.433	14.084	2.652	0.633	.	.	893	7.76	1.7
1999	1	13	10	C	2.118	1.768	1.726	ND	0.392	15.900	11.421	13.269	1.848	2.632	.	.	895	7.78	1.7
1999	2	18	10	A	1.713	1.686	1.536	ND	0.177	12.488	1.476	12.182	10.706	0.307	.	.	1014	7.92	2.2
1999	2	18	10	B	1.834	1.686	1.710	0.024	0.124	12.463	1.523	12.816	11.293	ND	.	.	1011	7.95	2.2
1999	2	18	10	C	1.798	1.692	1.790	0.098	0.008	13.700	1.406	12.466	11.060	1.234	.	.	1013	7.94	2.2
1999	3	15	10	A	0.999	0.891	1.056	0.165	ND	15.221	2.746	9.693	6.948	5.528	.	.	1562	8.46	1.7
1999	3	15	10	B	0.834	0.779	0.982	0.203	ND	11.241	0.094	7.846	7.752	3.395	.	.	1575	8.41	1.7
1999	3	15	10	C	0.917	0.701	0.732	0.030	0.185	6.385	ND	6.666	6.666	ND	.	.	1560	8.33	1.7
1999	4	6	10	A	1.899	1.144	1.444	0.300	0.455	13.100	0.148	9.847	9.699	3.253	5.638	0.225	1387	7.84	5.6
1999	4	6	10	B	1.690	1.272	1.394	0.122	0.296	13.127	0.099	8.798	8.699	4.328	5.214	0.227	1321	7.88	5.6
1999	4	6	10	C	1.439	1.462	1.540	0.078	ND	11.449	0.033	9.960	9.928	1.489	5.307	0.247	1287	7.91	5.6
1999	4	19	10	A	2.041	1.800	1.900	0.101	0.141	12.997	0.187	9.707	9.521	3.290	.	.	1119	7.82	8.9
1999	4	19	10	B	1.475	1.828	1.919	0.091	ND	11.081	0.159	8.961	8.802	2.120	.	.	1136	7.87	8.9
1999	4	19	10	C	2.263	1.820	1.875	0.054	0.388	11.267	0.162	8.752	8.589	2.516	.	.	1135	7.91	8.9
1999	5	7	10	A	2.249	1.939	1.496	ND	0.754	8.534	0.027	5.422	5.395	3.112	1.380	0.185	1194	8.41	6.7

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	5	7	10	B	1.759	1.949	1.471	ND	0.288	8.196	ND	5.711	5.711	2.486	1.268	0.188	1191	8.46	6.7
1999	5	7	10	C	2.128	1.921	2.013	0.092	0.115	8.404	ND	6.090	6.090	2.314	1.315	0.191	1190	8.45	6.7
1999	5	27	10	A	2.965	1.813	2.149	0.336	0.816	11.141	0.865	8.346	7.481	2.795	3.065	1.236	895	9.05	16.7
1999	5	27	10	B	2.367	1.768	2.149	0.381	0.218	9.998	0.830	8.177	7.346	1.822	2.805	1.101	892	9.03	16.7
1999	5	27	10	C	2.566	1.841	2.910	1.070	ND	11.038	0.696	8.454	7.758	2.584	2.931	1.215	893	9.07	16.7
1999	6	7	10	A	2.006	0.895	1.470	0.575	0.536	8.158	ND	6.397	6.397	1.760	2.888	0.231	1014	8.16	12
1999	6	7	10	B	1.957	1.192	1.785	0.593	0.172	8.857	ND	7.149	7.149	1.708	2.883	0.226	1015	8.15	12
1999	6	7	10	C	2.114	1.022	2.104	1.082	0.010	8.178	ND	6.911	6.911	1.267	3.002	0.221	1020	8.12	12
1999	6	18	10	A	0.985	0.671	0.920	0.250	0.065	5.798	0.073	4.647	4.573	1.151	3.058	0.363	887	8.35	19
1999	6	18	10	B	1.280	0.768	0.958	0.190	0.322	5.729	0.036	4.685	4.650	1.043	2.929	0.362	893	8.37	19
1999	6	18	10	C	0.869	0.462	0.798	0.336	0.072	6.013	0.041	4.280	4.239	1.733	2.965	0.374	886	8.38	19
1999	6	28	10	A	1.969	0.963	1.445	0.482	0.524	10.280	0.032	7.370	7.339	2.910	4.076	0.104	849	7.64	18
1999	6	28	10	B	1.712	1.171	1.526	0.355	0.187	8.143	0.021	7.337	7.316	0.806	4.725	0.106	848	7.58	18
1999	6	28	10	C	2.060	1.444	2.196	0.752	ND	10.536	0.018	9.571	9.552	0.966	6.018	0.129	857	7.56	18
1999	7	8	10	A	1.812	1.404	1.513	0.109	0.300	7.838	0.023	6.338	6.315	1.500	3.156	0.115	814	7.8	17
1999	7	8	10	B	2.022	1.583	1.812	0.230	0.210	8.953	0.034	7.373	7.339	1.580	3.414	0.118	816	7.78	17
1999	7	8	10	C	1.997	1.530	1.753	0.223	0.244	8.807	0.023	7.392	7.369	1.415	2.302	0.076	818	7.76	17
1999	7	19	10	A	1.340	1.125	1.336	0.211	0.004	6.662	0.047	5.363	5.317	1.299	3.276	0.151	929	7.91	20
1999	7	19	10	B	1.360	1.132	1.473	0.341	ND	6.048	0.023	5.750	5.727	0.298	2.379	0.118	927	7.94	20
1999	7	19	10	C	1.447	1.156	1.395	0.240	0.052	7.509	0.063	15.121	15.058	ND	2.261	0.107	926	7.92	20
1999	7	30	10	A	1.984	1.611	1.840	0.229	0.144	8.157	0.022	5.965	5.943	2.192	5.260	0.102	814	7.52	16
1999	7	30	10	B	2.120	1.740	1.811	0.072	0.309	9.333	0.115	7.542	7.427	1.791	5.764	0.120	820	7.55	16
1999	7	30	10	C	2.203	1.771	1.725	ND	0.478	8.658	0.035	7.463	7.428	1.195	4.472	0.095	818	7.56	16
1999	8	9	10	A	1.877	1.416	1.443	0.027	0.434	10.007	0.011	7.855	7.845	2.152	ND	ND	737	7.51	18
1999	8	9	10	B	1.776	1.383	1.430	0.047	0.346	9.113	0.015	7.706	7.691	1.407	ND	ND	738	7.46	18
1999	8	9	10	C	1.906	1.551	1.392	ND	0.514	9.377	0.040	8.180	8.140	1.197	ND	ND	742	7.47	18
1999	8	19	10	A	1.925	1.650	1.883	0.234	0.042	8.073	ND	6.934	6.934	1.139	3.723	0.033	673	7.17	15
1999	8	19	10	B	1.876	1.598	1.784	0.186	0.092	7.769	ND	6.771	6.771	0.998	4.358	0.040	668	7.19	15
1999	8	19	10	C	1.980	1.656	1.861	0.205	0.120	7.561	ND	7.189	7.189	0.372	3.400	0.030	668	7.18	15
1999	8	30	10	A	2.024	1.597	1.641	0.045	0.383	10.563	0.006	9.085	9.079	1.479	5.927	0.067	1020	7.28	15
1999	8	30	10	B	1.982	1.316	1.756	0.440	0.226	9.853	ND	8.486	8.486	1.367	1.669	0.015	1025	7.19	15
1999	8	30	10	C	2.033	1.432	1.590	0.159	0.443	10.372	ND	8.541	8.541	1.831	6.184	0.053	1028	7.16	15
1999	9	9	10	A	1.011	0.622	0.859	0.236	0.153	8.528	ND	6.772	6.772	1.757	1.297	0.014	699	7.26	14
1999	9	9	10	B	1.073	0.641	0.801	0.159	0.273	8.868	0.005	7.085	7.080	1.783	5.263	0.047	698	7.18	14
1999	9	9	10	C	1.079	0.680	0.805	0.124	0.274	8.134	ND	6.539	6.539	1.595	1.818	0.016	701	7.17	14
1999	9	20	10	A	2.478	1.834	2.023	0.189	0.456	18.532	4.435	16.844	12.409	1.688	12.872	0.100	799	7.12	12
1999	9	20	10	B	2.340	1.789	2.018	0.229	0.321	16.834	1.289	14.495	13.205	2.339	11.609	0.087	801	7.1	12
1999	9	20	10	C	1.805	1.657	1.804	0.146	0.001	17.137	0.065	15.497	15.432	1.640	10.530	0.073	808	7.07	12
1999	9	30	10	A	2.158	1.715	1.864	0.150	0.293	15.817	0.019	14.806	14.787	1.011	11.766	0.084	832	7.08	8
1999	9	30	10	B	2.078	1.310	2.063	0.753	0.015	16.168	0.019	15.617	15.598	0.551	10.614	0.072	837	7.06	8
1999	9	30	10	C	2.147	1.221	2.225	1.004	ND	16.319	0.025	15.976	15.951	0.343	10.756	0.072	833	7.05	8
1999	10	12	10	A	2.191	1.365	1.201	ND	0.990	10.808	0.024	9.794	9.770	1.014	3.086	0.020	668	7.04	9
1999	10	12	10	B	2.102	1.181	1.151	ND	0.950	10.363	0.124	9.130	9.005	1.233	3.751	0.026	672	7.06	9
1999	10	12	10	C	2.087	1.258	1.151	ND	0.935	10.362	0.054	6.686	6.633	3.676	6.248	0.037	679	7	9
1999	10	25	10	A	2.379	1.305	1.936	0.630	0.443	12.167	0.056	12.020	11.965	0.147	8.893	0.073	749	7.14	5
1999	10	25	10	B	2.346	1.323	2.177	0.853	0.169	12.456	0.009	12.497	12.487	ND	9.594	0.075	743	7.12	5
1999	10	25	10	C	2.360	0.879	2.137	1.258	0.224	11.987	ND	12.017	12.017	ND	9.464	0.076	744	7.13	5
1999	11	17	10	A	2.393	2.013	2.149	0.136	0.244	18.984	0.094	17.505	17.411	1.479	13.394	0.083	762	7.02	6
1999	11	17	10	B	2.248	2.018	2.163	0.145	0.085	18.366	0.044	16.808	16.764	1.559	14.221	0.092	764	7.04	6
1999	11	17	10	C	2.338	2.019	2.309	0.289	0.030	18.179	0.038	16.871	16.834	1.308	14.216	0.088	763	7.02	6
1999	11	29	10	A	2.579	1.069	2.045	0.977	0.534	17.859	0.039	14.200	14.161	3.659	16.058	0.169	736	7.25	5
1999	11	29	10	B	2.577	0.972	2.220	1.248	0.357	18.041	0.006	15.008	15.001	3.034	16.218	0.178	738	7.27	5
1999	11	29	10	C	2.441	0.226	2.134	1.908	0.307	18.005	0.020	14.973	14.953	3.031	16.093	0.161	735	7.23	5
1999	12	14	10	A	2.294	1.624	2.179	0.555	0.115	19.832	0.018	16.745	16.727	3.087	18.207	0.361	747	7.53	1
1999	12	14	10	B	2.216	1.900	2.124	0.224	0.092	19.491	0.007	16.622	16.616	2.869	14.910	0.331	743	7.58	1
1999	12	14	10	C	2.351	1.853	2.384	0.531	ND	19.329	0.014	16.467	16.453	2.862	17.103	0.397	749	7.6	1
1999	1	13	14	A	0.581	0.607	0.550	ND	0.031	5.071	3.010	4.077	1.067	0.994	.	.	881	8.44	0.6
1999	1	13	14	B	0.551	0.616	0.569	ND	ND	4.628	2.881	3.857	0.975	0.771	.	.	883	8.44	0.6
1999	1	13	14	C	0.540	0.603	0.580	ND	ND	4.884	2.769	4.316	1.547	0.568	.	.	883	8.42	0.6
1999	2	18	14	A	0.767	0.596	0.570	ND	0.197	5.480	2.486	3.535	1.050	1.945	.	.	966	8.94	2.2
1999	2	18	14	B	0.664	0.605	0.537	ND	0.127	4.491	2.538	3.706	1.168	0.785	.	.	.	.	2.2
1999	2	18	14	C	0.923	0.605	0.763	0.158	0.160	4.201	2.581	4.058	1.477	0.143	.	.	.	.	2.2
1999	3	15	14	A	0.160	0.114	0.246	0.131	ND	3.438	ND	1.465	1.465	1.973	.	.	996	8.73	3.9
1999	3	15	14	B	0.270	0.140	0.122	ND	0.148	2.619	ND	1.283	1.283	1.337	.	.	995	8.73	3.9

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	3	15	14	C	0.237	0.183	0.109	ND	0.128	2.723	ND	1.209	1.209	1.514	.	.	1001	8.71	3.9
1999	4	6	14	A	0.197	0.030	0.093	0.062	0.104	3.530	1.026	1.375	0.349	2.155	0.304	0.025	565	8.18	6.7
1999	4	6	14	B	0.226	0.066	0.089	0.023	0.138	3.520	1.029	0.948	ND	2.572	0.305	0.029	582	8.24	6.7
1999	4	6	14	C	0.213	0.026	0.099	0.073	0.114	3.436	0.914	0.635	ND	2.802	0.290	0.029	585	8.26	6.7
1999	4	19	14	A	0.375	0.300	0.054	ND	0.321	2.594	0.670	1.139	0.468	1.455	.	.	419	8.03	8.9
1999	4	19	14	B	0.420	0.298	0.035	ND	0.385	2.682	0.659	1.051	0.393	1.631	.	.	439	8.05	8.9
1999	4	19	14	C	0.343	0.289	0.067	ND	0.276	2.705	0.657	1.015	0.358	1.690	.	.	446	8.09	8.9
1999	5	7	14	A	0.092	0.067	0.064	ND	0.027	1.426	ND	1.204	1.204	0.221	0.100	0.013	335	8.4	8.3
1999	5	7	14	B	0.119	0.031	0.079	0.048	0.040	1.264	ND	1.120	1.120	0.144	0.099	0.012	336	8.34	8.3
1999	5	7	14	C	0.119	0.013	0.050	0.037	0.069	1.287	ND	1.077	1.077	0.210	0.112	0.012	332	8.31	8.3
1999	5	27	14	A	0.297	0.196	0.266	0.071	0.030	1.981	0.227	1.594	1.367	0.387	0.168	0.022	151.9	8.41	17.8
1999	5	27	14	B	0.252	0.187	0.243	0.057	0.009	1.978	0.217	1.518	1.301	0.460	0.168	0.023	156.8	8.43	17.8
1999	5	27	14	C	0.281	0.187	0.252	0.065	0.029	1.787	0.217	1.532	1.314	0.255	0.176	0.024	157.7	8.41	17.8
1999	6	7	14	A	0.226	0.031	0.107	0.076	0.119	1.616	0.192	1.510	1.319	0.105	ND	ND	309	8.58	14
1999	6	7	14	B	0.209	0.034	0.136	0.102	0.073	1.481	0.150	1.166	1.016	0.315	ND	ND	309	8.54	14
1999	6	7	14	C	0.209	0.053	0.124	0.071	0.084	1.465	0.088	1.159	1.071	0.306	ND	ND	308	8.51	14
1999	6	18	14	A	0.217	0.049	0.120	0.071	0.096	1.794	0.036	1.177	1.141	0.617	ND	ND	265	7.99	19
1999	6	18	14	B	0.200	0.076	0.137	0.062	0.063	1.461	0.030	1.020	0.990	0.441	ND	ND	265	7.91	19
1999	6	18	14	C	0.192	0.099	0.160	0.060	0.033	1.445	ND	1.184	1.184	0.261	ND	ND	265	7.83	19
1999	6	28	14	A	0.166	0.026	0.105	0.080	0.060	1.838	ND	1.370	1.370	0.468	0.199	0.013	229	8.06	18
1999	6	28	14	B	0.130	0.026	0.080	0.054	0.050	1.590	ND	1.244	1.244	0.347	ND	ND	230	8.08	18
1999	6	28	14	C	0.153	0.026	0.078	0.053	0.074	1.805	0.012	1.267	1.255	0.537	ND	ND	231	8.11	18
1999	7	8	14	A	0.295	0.208	0.296	0.089	ND	2.977	1.133	2.684	1.551	0.293	0.103	0.014	252	8.43	18
1999	7	8	14	B	0.285	0.237	0.270	0.033	0.015	3.056	1.272	2.689	1.417	0.366	0.111	0.017	244	8.49	18
1999	7	8	14	C	0.285	0.250	0.285	0.035	ND	3.418	1.422	2.658	1.236	0.761	0.212	0.031	259	8.46	18
1999	7	19	14	A	0.147	0.035	0.092	0.058	0.055	2.272	0.015	1.582	1.567	0.689	0.577	0.035	246	8.04	20
1999	7	19	14	B	0.140	0.026	0.088	0.062	0.052	2.432	0.034	1.616	1.583	0.815	0.433	0.021	247	7.94	20
1999	7	19	14	C	0.147	0.015	0.079	0.064	0.068	3.717	0.126	3.258	3.132	0.459	0.401	0.017	246	7.88	20
1999	7	30	14	A	0.150	0.028	0.064	0.036	0.086	2.255	0.007	1.481	1.474	0.773	0.213	0.006	231	7.68	20
1999	7	30	14	B	0.126	0.034	0.093	0.059	0.033	1.844	0.030	1.403	1.373	0.441	0.217	0.006	237	7.67	20
1999	7	30	14	C	0.140	0.017	0.076	0.059	0.065	1.899	0.012	1.155	1.142	0.744	0.171	0.005	236	7.68	20
1999	8	9	14	A	0.327	0.185	0.244	0.059	0.083	1.769	ND	1.290	1.290	0.480	ND	ND	267	7.73	19
1999	8	9	14	B	0.318	0.201	0.216	0.015	0.102	1.893	0.016	1.577	1.561	0.316	ND	ND	264	7.71	19
1999	8	9	14	C	0.333	0.176	0.238	0.062	0.095	2.015	0.007	1.399	1.392	0.617	ND	ND	261	7.71	19
1999	8	19	14	A	0.215	0.095	0.173	0.079	0.042	1.487	ND	1.470	1.470	0.017	0.389	0.011	312	7.7	20
1999	8	19	14	B	0.257	0.108	0.173	0.066	0.083	1.818	ND	1.830	1.830	ND	0.276	0.008	311	7.71	20
1999	8	19	14	C	0.243	0.129	0.160	0.030	0.083	1.563	ND	1.561	1.561	0.003	0.255	0.007	311	7.7	20
1999	8	30	14	A	0.190	0.046	0.110	0.064	0.080	2.172	ND	1.738	1.738	0.434	0.623	0.023	224	7.8	19
1999	8	30	14	B	0.245	0.082	0.155	0.073	0.090	2.547	0.006	1.922	1.915	0.626	ND	ND	222	7.85	19
1999	8	30	14	C	0.233	0.010	0.056	0.046	0.177	3.227	ND	2.012	2.012	1.216	0.354	0.013	223	7.82	19
1999	9	9	14	A	0.171	0.018	0.066	0.049	0.105	2.180	ND	1.561	1.561	0.619	0.176	0.003	287	7.45	17
1999	9	9	14	B	0.121	0.030	0.073	0.043	0.048	2.095	0.051	1.541	1.490	0.554	ND	ND	288	7.44	17
1999	9	9	14	C	0.116	0.016	0.047	0.031	0.069	1.916	ND	1.686	1.686	0.230	0.053	0.001	288	7.43	17
1999	9	20	14	A	0.109	0.031	0.036	0.005	0.073	2.117	0.018	1.777	1.759	0.340	0.430	0.006	300	7.36	15
1999	9	20	14	B	0.141	0.014	0.027	0.013	0.114	2.440	0.016	1.505	1.489	0.935	0.486	0.007	293	7.37	15
1999	9	20	14	C	0.104	0.024	0.065	0.041	0.040	2.122	0.267	1.668	1.401	0.455	0.462	0.007	291	7.37	15
1999	9	30	14	A	0.087	0.023	0.087	0.064	ND	1.705	0.011	1.781	1.770	ND	ND	ND	215	7.39	12
1999	9	30	14	B	0.061	0.011	0.064	0.053	ND	1.651	0.011	1.546	1.535	0.104	0.200	0.003	215	7.39	12
1999	9	30	14	C	0.102	0.010	0.041	0.031	0.061	1.841	0.020	1.694	1.674	0.148	ND	ND	215	7.39	12
1999	10	12	14	A	0.114	0.001	0.244	0.242	ND	2.192	0.010	ND	ND	2.192	0.306	0.003	203	7.25	13
1999	10	12	14	B	0.140	0.001	0.228	0.227	ND	2.050	ND	1.688	1.688	0.363	0.331	0.005	201	7.4	13
1999	10	12	14	C	0.138	0.001	0.278	0.276	ND	2.498	0.078	1.956	1.878	0.543	0.327	0.004	202	7.34	13
1999	10	25	14	A	0.178	0.108	0.164	0.056	0.014	1.436	ND	1.109	1.109	0.327	0.202	0.012	460	8.02	9
1999	10	25	14	B	0.142	0.054	0.099	0.045	0.043	1.301	ND	1.107	1.107	0.194	0.179	0.012	463	8.09	9
1999	10	25	14	C	0.181	0.073	0.128	0.055	0.053	1.214	ND	1.269	1.269	ND	0.142	0.010	467	8.08	9
1999	11	17	14	A	0.459	0.411	0.360	ND	0.099	3.340	1.367	2.954	1.587	0.386	0.293	0.011	507	7.81	7
1999	11	17	14	B	0.431	0.411	0.350	ND	0.080	3.025	1.354	2.685	1.331	0.340	0.210	0.008	508	7.79	7
1999	11	17	14	C	0.414	0.416	0.350	ND	0.063	3.075	1.220	2.751	1.531	0.324	0.181	0.007	507	7.81	7
1999	11	29	14	A	0.282	0.102	0.208	0.106	0.073	1.922	ND	1.587	1.587	0.336	0.627	0.037	604	8.02	5
1999	11	29	14	B	0.387	0.125	0.170	0.045	0.217	3.023	ND	1.243	1.243	1.780	0.433	0.025	606	8.01	5
1999	11	29	14	C	0.242	0.107	0.166	0.058	0.076	1.715	ND	1.241	1.241	0.474	0.413	0.025	602	8.04	5
1999	12	14	14	A	0.473	0.325	0.387	0.062	0.086	3.532	1.404	3.096	1.692	0.436	0.474	0.068	594	8.45	1
1999	12	14	14	B	0.415	0.273	0.387	0.114	0.029	3.181	1.448	2.732	1.285	0.448	0.409	0.059	607	8.45	1
1999	12	14	14	C	0.423	0.321	0.394	0.073	0.029	3.314	1.403	3.285	1.882	0.029	0.417	0.064	589	8.48	1

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	1	13	15	A	0.568	0.389	0.364	ND	0.204	14.931	11.363	12.779	1.416	2.152	.	.	812	8.41	1.7
1999	1	13	15	B	0.313	0.402	0.371	ND	ND	14.846	11.748	13.717	1.969	1.129	.	.	814	8.43	1.7
1999	1	13	15	C	0.297	0.411	0.384	ND	ND	14.915	11.658	13.560	1.902	1.355	.	.	815	8.41	1.7
1999	2	18	15	A	0.560	0.469	0.496	0.028	0.064	12.459	8.735	10.813	2.077	1.646	.	.	847	8.59	1.7
1999	2	18	15	B	0.529	0.466	0.463	ND	0.066	11.282	8.731	10.341	1.610	0.941	.	.	846	8.57	1.7
1999	2	18	15	C	0.462	0.454	0.456	0.002	0.006	12.485	8.802	10.690	1.889	1.795	.	.	844	8.65	1.7
1999	3	15	15	A	0.174	0.045	0.159	0.114	0.015	9.483	1.312	1.913	0.601	7.571	.	.	851	8.48	0.6
1999	3	15	15	B	0.125	0.032	0.231	0.198	ND	9.118	1.846	2.178	0.332	6.940	.	.	884	8.44	0.6
1999	3	15	15	C	0.166	0.093	0.217	0.124	ND	9.838	3.358	2.124	ND	7.714	.	.	896	8.41	0.6
1999	4	6	15	A	0.333	0.088	0.213	0.125	0.120	12.199	7.173	8.886	1.713	3.313	0.302	0.027	982	8.21	1.1
1999	4	6	15	B	0.373	0.048	0.184	0.135	0.189	10.984	7.326	8.031	0.704	2.953	0.282	0.027	985	8.24	1.1
1999	4	6	15	C	0.294	0.134	0.244	0.110	0.050	9.853	7.334	8.069	0.734	1.785	0.292	0.031	987	8.3	1.1
1999	4	19	15	A	0.311	0.222	0.029	ND	0.282	4.792	2.787	1.052	ND	3.740	.	.	426	7.96	5
1999	4	19	15	B	0.313	0.228	0.022	ND	0.290	4.875	2.795	0.925	ND	3.950	.	.	435	8.03	5
1999	4	19	15	C	0.309	0.235	0.029	ND	0.281	4.896	2.802	0.944	ND	3.952	.	.	435	8.04	5
1999	5	7	15	A	0.105	0.013	0.050	0.037	0.055	1.351	ND	0.864	0.864	0.487	0.172	0.010	453	8	4.4
1999	5	7	15	B	0.140	0.013	0.060	0.047	0.080	2.934	0.045	1.767	1.722	1.167	0.162	0.011	451	8.1	4.4
1999	5	7	15	C	0.111	0.014	0.083	0.069	0.027	1.499	ND	0.967	0.967	0.533	0.145	0.011	448	8.12	4.4
1999	5	27	15	A	0.417	0.331	0.396	0.064	0.022	2.892	0.961	2.665	1.704	0.227	0.096	0.005	356	7.96	12.8
1999	5	27	15	B	0.409	0.336	0.396	0.060	0.013	2.904	0.961	2.757	1.796	0.148	0.109	0.005	358	7.94	12.8
1999	5	27	15	C	0.386	0.344	0.424	0.080	ND	2.894	1.104	2.624	1.520	0.269	0.116	0.006	357	7.97	12.8
1999	6	7	15	A	0.466	0.382	0.397	0.015	0.069	2.814	1.619	2.301	0.682	0.513	ND	ND	824	8	9
1999	6	7	15	B	0.452	0.407	0.513	0.106	ND	2.804	1.701	2.444	0.744	0.360	ND	ND	841	8	9
1999	6	7	15	C	0.452	0.349	0.370	0.021	0.082	3.511	1.590	3.021	1.431	0.490	ND	ND	842	7.99	9
1999	6	18	15	A	0.246	0.029	0.094	0.065	0.151	3.217	ND	1.454	1.454	1.762	0.408	0.039	340	8.24	22
1999	6	18	15	B	0.157	0.029	0.106	0.077	0.051	1.751	ND	1.400	1.400	0.351	0.083	0.009	338	8.31	22
1999	6	18	15	C	0.153	0.024	0.085	0.061	0.068	2.865	0.098	2.274	2.177	0.590	0.095	0.033	341	8.95	22
1999	6	28	15	A	0.148	0.019	0.061	0.042	0.087	2.415	ND	1.935	1.935	0.480	ND	ND	275	8.71	19
1999	6	28	15	B	0.149	0.019	0.057	0.037	0.092	2.468	ND	2.092	2.092	0.376	ND	ND	279	8.66	19
1999	6	28	15	C	0.148	0.026	0.069	0.043	0.079	3.111	0.057	2.929	2.871	0.183	ND	ND	277	8.71	19
1999	7	8	15	A	0.201	0.030	0.050	0.020	0.151	2.735	0.020	1.547	1.528	1.188	0.208	0.053	286	8.76	19
1999	7	8	15	B	0.133	0.030	0.066	0.036	0.068	2.870	0.104	2.281	2.177	0.590	0.213	0.053	290	8.74	19
1999	7	8	15	C	0.185	0.060	0.094	0.034	0.091	2.974	0.029	1.894	1.864	1.080	0.207	0.051	290	8.74	19
1999	7	19	15	A	0.189	0.025	0.120	0.094	0.070	2.743	0.007	2.360	2.353	0.383	0.796	0.048	238	8.03	21
1999	7	19	15	B	0.157	0.000	0.079	0.078	0.078	2.641	0.010	1.975	1.965	0.666	0.127	0.008	236	8.05	21
1999	7	19	15	C	0.185	0.024	0.092	0.069	0.093	2.590	0.047	1.715	1.667	0.876	0.344	0.021	233	8.03	21
1999	7	30	15	A	0.126	0.010	0.054	0.044	0.072	2.066	0.022	1.485	1.463	0.581	0.326	0.009	262	7.69	20
1999	7	30	15	B	0.147	0.010	0.070	0.060	0.078	2.327	0.017	1.463	1.446	0.864	0.216	0.007	263	7.74	20
1999	7	30	15	C	0.090	0.010	0.053	0.042	0.037	1.963	0.010	1.370	1.360	0.593	0.156	0.005	264	7.73	20
1999	8	9	15	A	0.120	0.006	0.041	0.035	0.079	2.237	0.016	1.306	1.290	0.931	ND	ND	241	7.99	19
1999	8	9	15	B	0.183	0.009	0.041	0.032	0.142	2.688	0.019	1.497	1.477	1.192	0.075	0.003	243	7.89	19
1999	8	9	15	C	0.124	0.006	0.034	0.028	0.091	2.369	ND	1.391	1.391	0.977	0.092	0.004	244	7.89	19
1999	8	19	15	A	0.160	0.018	0.097	0.079	0.063	2.395	ND	1.545	1.545	0.850	0.653	0.007	291	7.23	19
1999	8	19	15	B	0.201	0.015	0.096	0.080	0.106	1.921	ND	1.904	1.904	0.017	0.822	0.011	288	7.34	19
1999	8	19	15	C	0.168	0.034	0.121	0.086	0.047	1.730	ND	1.668	1.668	0.062	0.376	0.005	290	7.35	19
1999	8	30	15	A	0.329	0.073	0.139	0.066	0.190	2.572	0.018	1.922	1.905	0.650	ND	ND	283	7.57	19
1999	8	30	15	B	0.253	0.064	0.111	0.047	0.141	3.277	ND	2.222	2.222	1.055	0.611	0.013	280	7.56	19
1999	8	30	15	C	0.270	0.044	0.124	0.081	0.146	2.580	0.014	1.908	1.894	0.672	0.546	0.011	288	7.54	19
1999	9	9	15	A	0.116	0.007	0.042	0.034	0.074	2.118	ND	1.253	1.253	0.865	0.183	0.005	263	7.71	16
1999	9	9	15	B	0.121	0.009	0.032	0.023	0.090	2.393	ND	1.338	1.338	1.055	0.240	0.007	261	7.73	16
1999	9	9	15	C	0.131	0.016	0.047	0.031	0.084	2.026	ND	1.350	1.350	0.676	0.236	0.008	264	7.74	16
1999	9	20	15	A	0.221	0.082	0.142	0.060	0.079	2.300	0.023	1.677	1.654	0.624	0.207	0.003	336	7.41	14
1999	9	20	15	B	0.134	0.016	0.046	0.030	0.088	2.428	0.149	1.993	1.844	0.436	0.265	0.005	338	7.46	14
1999	9	20	15	C	0.148	0.015	0.039	0.024	0.110	2.271	0.027	1.400	1.373	0.870	0.193	0.003	339	7.46	14
1999	9	30	15	A	0.183	0.010	0.118	0.107	0.066	2.193	0.006	1.418	1.411	0.776	0.359	0.011	284	7.74	12
1999	9	30	15	B	0.118	0.011	0.034	0.022	0.084	2.468	0.025	2.025	2.001	0.443	ND	ND	285	7.76	12
1999	9	30	15	C	0.148	0.007	0.026	0.019	0.122	1.977	0.017	1.422	1.405	0.555	ND	ND	286	7.77	12
1999	10	12	15	A	0.125	0.001	0.216	0.215	ND	1.944	0.108	1.333	1.225	0.611	ND	ND	328	7.43	12
1999	10	12	15	B	0.171	0.001	0.260	0.259	ND	2.342	0.087	1.576	1.489	0.766	ND	ND	337	7.43	12
1999	10	12	15	C	0.110	0.003	0.273	0.270	ND	2.453	0.013	1.495	1.482	0.958	ND	ND	338	7.44	12
1999	10	25	15	A	0.293	0.010	0.070	0.060	0.222	4.311	1.947	3.908	1.961	0.403	0.169	0.019	473	8.32	8
1999	10	25	15	B	0.157	0.015	0.088	0.073	0.069	1.812	1.046	1.730	0.684	0.082	ND	ND	477	8.34	8
1999	10	25	15	C	0.185	0.019	0.070	0.051	0.115	2.868	1.019	3.066	2.047	ND	ND	ND	473	8.4	8
1999	11	17	15	A	0.379	0.353	0.417	0.064	ND	5.568	3.790	5.628	1.838	ND	0.123	0.004	613	7.71	4

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	11	17	15	B	0.386	0.362	0.403	0.041	ND	5.739	3.819	5.504	1.685	0.235	0.266	0.008	615	7.72	4
1999	11	17	15	C	0.388	0.371	0.365	ND	0.024	5.754	3.824	5.493	1.669	0.261	0.132	0.004	612	7.73	4
1999	11	29	15	A	0.269	0.076	0.138	0.061	0.132	6.261	3.501	5.359	1.858	0.903	ND	ND	733	7.12	4
1999	11	29	15	B	0.228	0.063	0.131	0.068	0.097	6.913	4.388	6.135	1.747	0.778	0.075	0.001	731	7.14	4
1999	11	29	15	C	0.236	0.059	0.145	0.086	0.091	7.822	5.270	6.948	1.678	0.874	ND	ND	734	7.15	4
1999	12	14	15	A	0.198	0.101	0.139	0.038	0.059	8.809	6.570	8.376	1.807	0.433	ND	ND	810	8.24	1
1999	12	14	15	B	0.258	0.073	0.100	0.028	0.158	9.365	6.733	8.401	1.667	0.964	ND	ND	823	8.51	1
1999	12	14	15	C	0.215	0.079	0.143	0.064	0.072	8.569	3.163	7.767	4.604	0.802	ND	ND	809	8.26	1
1999	1	13	16	A	0.790	0.791	0.806	0.015	ND	11.232	8.762	9.662	0.900	1.570	.	.	1120	8.51	0.6
1999	1	13	16	B	0.800	0.775	0.803	0.028	ND	12.193	8.549	10.659	2.110	1.535	.	.	1112	8.56	0.6
1999	1	13	16	C	0.740	0.821	0.748	ND	ND	11.067	8.805	10.768	1.963	0.300	.	.	1111	8.57	0.6
1999	2	18	16	A	0.644	0.646	0.624	ND	0.021	9.872	7.975	8.703	0.728	1.169	.	.	1056	8.62	0.6
1999	2	18	16	B	0.715	0.646	0.602	ND	0.112	9.329	7.736	10.310	2.573	ND	.	.	1054	8.62	0.6
1999	2	18	16	C	0.665	0.646	0.626	ND	0.039	10.244	7.804	10.058	2.254	0.185	.	.	1056	8.64	0.6
1999	3	15	16	A	0.052	0.028	0.028	ND	0.025	1.986	ND	1.202	1.202	0.784	.	.	1224	8.56	1.7
1999	3	15	16	B	0.034	0.032	0.041	0.009	ND	1.566	ND	1.796	1.796	ND	.	.	1222	8.6	1.7
1999	3	15	16	C	0.041	0.019	0.034	0.015	0.007	1.812	ND	1.194	1.194	0.617	.	.	1222	8.58	1.7
1999	4	6	16	A	0.494	0.103	0.464	0.361	0.030	7.372	4.419	4.586	0.168	2.786	0.157	0.022	1075	8.44	3.3
1999	4	6	16	B	0.464	0.155	0.445	0.290	0.018	7.372	4.266	3.666	ND	3.706	0.174	0.029	1064	8.53	3.3
1999	4	6	16	C	0.386	0.093	0.386	0.294	ND	7.574	4.120	5.258	1.138	2.316	0.153	0.028	1011	8.56	3.3
1999	4	19	16	A	0.420	0.358	0.072	ND	0.347	4.341	2.308	1.827	ND	2.514	.	.	616	8.24	5.6
1999	4	19	16	B	0.481	0.402	0.067	ND	0.414	4.557	2.574	1.292	ND	3.264	.	.	611	8.32	5.6
1999	4	19	16	C	0.537	0.384	0.067	ND	0.470	4.427	2.447	1.166	ND	3.261	.	.	606	8.35	5.6
1999	5	7	16	A	0.098	0.013	0.078	0.065	0.021	1.315	ND	0.876	0.876	0.439	0.059	0.005	281	8.18	5.6
1999	5	7	16	B	0.135	0.042	0.201	0.160	ND	1.454	ND	1.211	1.211	0.242	0.071	0.007	280	8.23	5.6
1999	5	7	16	C	0.135	0.013	0.167	0.154	ND	1.445	ND	1.073	1.073	0.373	0.062	0.006	291	8.21	5.6
1999	5	27	16	A	0.412	0.143	0.187	0.044	0.224	3.351	0.555	1.585	1.030	1.766	0.080	0.008	251	8.25	12.8
1999	5	27	16	B	0.206	0.139	0.180	0.041	0.026	1.810	0.584	1.543	0.959	0.267	0.062	0.007	253	8.3	12.8
1999	5	27	16	C	0.182	0.136	0.166	0.030	0.016	2.291	0.616	2.061	1.445	0.230	0.064	0.006	250	8.26	12.8
1999	6	7	16	A	0.152	0.023	0.059	0.036	0.092	1.821	0.332	1.042	0.710	0.779	ND	ND	275	8	11
1999	6	7	16	B	0.152	0.026	0.059	0.033	0.092	1.714	0.405	1.157	0.752	0.557	ND	ND	282	7.96	11
1999	6	7	16	C	0.134	0.030	0.049	0.019	0.085	1.818	0.366	1.481	1.114	0.338	ND	ND	281	7.88	11
1999	6	18	16	A	0.118	0.029	0.075	0.046	0.043	1.562	ND	1.178	1.178	0.384	ND	ND	312	8.95	18
1999	6	18	16	B	0.127	0.037	0.088	0.051	0.039	1.367	ND	1.157	1.157	0.211	ND	ND	310	8.01	18
1999	6	18	16	C	0.114	0.029	0.055	0.026	0.059	1.427	ND	1.106	1.106	0.321	ND	ND	308	8.93	18
1999	6	28	16	A	0.173	0.019	0.065	0.046	0.109	2.058	ND	1.327	1.327	0.732	ND	ND	244	7.44	16
1999	6	28	16	B	0.101	0.021	0.084	0.063	0.017	1.536	ND	1.346	1.346	0.190	ND	ND	238	7.4	16
1999	6	28	16	C	0.057	0.017	0.056	0.039	0.002	1.489	ND	1.240	1.240	0.248	ND	ND	237	7.46	16
1999	7	8	16	A	0.179	0.021	0.050	0.028	0.129	2.574	0.116	1.355	1.239	1.219	0.160	0.005	296	7.75	16
1999	7	8	16	B	0.135	0.021	0.032	0.011	0.103	2.547	0.049	1.335	1.285	1.212	0.172	0.007	289	7.84	16
1999	7	8	16	C	0.138	0.056	0.076	0.020	0.062	5.346	0.286	3.342	3.056	2.004	0.183	0.010	289	7.97	16
1999	7	19	16	A	0.213	0.170	0.243	0.072	ND	2.808	0.831	0.133	0.000	2.675	0.299	0.019	183.2	8.05	18
1999	7	19	16	B	0.198	0.015	0.461	0.447	ND	2.549	0.100	ND	0.000	2.549	0.317	0.020	184.3	8.06	18
1999	7	19	16	C	0.153	0.001	0.084	0.083	0.068	2.212	0.010	0.041	0.031	2.171	0.330	0.021	184.7	8.06	18
1999	7	30	16	A	0.112	0.015	0.061	0.047	0.050	1.844	ND	1.353	1.353	0.491	0.048	0.002	186	7.86	19
1999	7	30	16	B	0.126	0.054	0.093	0.039	0.033	1.845	ND	1.493	1.493	0.352	0.079	0.003	195.2	7.74	19
1999	7	30	16	C	0.104	0.024	0.061	0.038	0.043	2.875	0.050	2.391	2.342	0.483	ND	ND	193.3	7.8	19
1999	8	9	16	A	0.142	0.015	0.060	0.045	0.082	1.723	ND	1.506	1.506	0.217	ND	ND	200.2	7.98	17
1999	8	9	16	B	0.128	0.005	0.041	0.036	0.088	1.628	0.041	1.728	1.687	ND	0.073	0.003	199	7.91	17
1999	8	9	16	C	0.152	0.010	0.039	0.029	0.112	1.913	0.008	1.519	1.512	0.394	ND	ND	203	7.84	17
1999	8	19	16	A	0.201	0.013	0.090	0.077	0.111	2.100	ND	1.734	1.734	0.365	0.396	0.003	205	7.04	17
1999	8	19	16	B	0.187	0.017	0.111	0.094	0.077	2.225	ND	1.738	1.738	0.487	0.467	0.003	208	7.08	17
1999	8	19	16	C	0.215	0.015	0.121	0.105	0.095	2.177	ND	2.138	2.138	0.039	0.433	0.003	200	7.09	17
1999	8	30	16	A	0.214	0.010	0.045	0.034	0.170	2.093	ND	1.498	1.498	0.595	ND	ND	226	7.66	16
1999	8	30	16	B	0.277	0.024	0.132	0.108	0.146	2.647	ND	1.797	1.797	0.850	0.418	0.007	225	7.46	16
1999	8	30	16	C	0.212	0.024	0.111	0.088	0.101	2.327	ND	1.755	1.755	0.572	0.844	0.020	251	7.6	16
1999	9	9	16	A	0.135	0.016	0.047	0.031	0.088	2.094	ND	1.466	1.466	0.628	0.555	0.010	227	7.49	15
1999	9	9	16	B	0.157	0.012	0.061	0.049	0.096	2.226	ND	1.562	1.562	0.663	0.491	0.008	231	7.43	15
1999	9	9	16	C	0.172	0.034	0.088	0.054	0.084	2.046	ND	1.308	1.308	0.738	0.319	0.005	230	7.38	15
1999	9	20	16	A	0.270	0.015	0.045	0.030	0.225	3.119	0.023	1.499	1.475	1.620	0.837	0.002	256	6.61	14
1999	9	20	16	B	0.296	0.044	0.148	0.104	0.148	2.992	0.014	2.046	2.032	0.946	0.490	0.001	251	6.67	14
1999	9	20	16	C	0.227	0.031	0.083	0.052	0.145	3.202	0.007	1.961	1.954	1.241	0.800	0.003	247	6.77	14
1999	9	30	16	A	0.209	0.013	0.038	0.025	0.171	2.143	0.008	1.408	1.399	0.735	0.405	0.004	211	7.19	11
1999	9	30	16	B	0.226	0.019	0.041	0.022	0.185	2.367	0.007	1.506	1.499	0.861	0.254	0.002	217	7.15	11

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	9	30	16	C	0.153	0.009	0.055	0.046	0.098	2.066	ND	1.393	1.393	0.673	0.215	0.002	218	7.13	11
1999	10	12	16	A	0.174	0.006	0.239	0.233	ND	2.152	0.013	1.299	1.286	0.853	0.189	0.002	257	7.32	9
1999	10	12	16	B	0.125	0.015	0.209	0.195	ND	1.885	0.016	1.315	1.299	0.570	0.265	0.003	264	7.3	9
1999	10	12	16	C	0.110	0.001	0.212	0.211	ND	1.911	ND	1.392	1.392	0.518	0.295	0.004	266	7.3	9
1999	10	25	16	A	0.716	0.275	0.580	0.304	0.136	3.031	0.716	3.200	2.484	ND	0.340	0.018	716	7.99	6
1999	10	25	16	B	0.697	0.300	0.583	0.283	0.115	3.561	0.843	3.406	2.563	0.156	0.377	0.020	715	7.97	6
1999	10	25	16	C	0.659	0.236	0.644	0.409	0.014	2.809	1.143	3.152	2.009	ND	0.389	0.021	716	7.99	6
1999	11	17	16	A	0.727	0.735	0.621	ND	0.106	4.289	2.699	4.195	1.496	0.094	0.236	0.007	636	7.68	5
1999	11	17	16	B	0.680	0.749	0.628	ND	0.052	4.901	2.837	5.003	2.166	ND	0.142	0.004	638	7.69	5
1999	11	17	16	C	0.672	0.735	0.625	ND	0.047	4.468	2.755	4.370	1.615	0.097	0.319	0.008	636	7.65	5
1999	11	29	16	A	0.802	0.447	0.640	0.193	0.162	3.611	ND	2.940	2.940	0.671	0.190	0.013	874	8.1	5
1999	11	29	16	B	0.670	0.381	0.553	0.172	0.118	2.969	ND	2.147	2.147	0.823	0.254	0.019	870	8.12	5
1999	11	29	16	C	0.700	0.460	0.603	0.142	0.097	3.972	ND	3.012	3.012	0.959	0.222	0.017	873	8.14	5
1999	12	14	16	A	0.860	0.426	0.781	0.355	0.079	9.464	5.951	8.682	2.731	0.781	ND	ND	977	8.28	1
1999	12	14	16	B	0.731	0.467	0.623	0.156	0.108	7.367	3.257	6.988	3.731	0.379	ND	ND	982	8.49	1
1999	12	14	16	C	0.731	0.677	0.745	0.068	ND	8.981	6.509	8.290	1.781	0.691	ND	ND	987	8.29	1
1999	5	7	17	A	0.071	0.012	0.037	0.024	0.034	1.051	ND	0.915	0.915	0.136	ND	ND	106.1	8.04	8.3
1999	5	7	17	B	0.092	0.031	0.037	0.006	0.055	1.611	ND	0.820	0.820	0.791	ND	ND	109.9	8.08	8.3
1999	5	7	17	C	0.072	0.016	0.046	0.030	0.026	1.229	ND	0.917	0.917	0.311	ND	ND	111.5	8.09	8.3
1999	5	27	17	A	0.094	0.067	0.108	0.042	ND	1.490	0.016	0.999	0.983	0.491	ND	ND	124.5	7.99	16.1
1999	5	27	17	B	0.091	0.068	0.101	0.033	ND	1.058	ND	0.886	0.886	0.172	ND	ND	124.2	7.95	16.1
1999	5	27	17	C	0.100	0.065	0.108	0.044	ND	1.709	ND	1.072	1.072	0.637	ND	ND	123.9	7.92	16.1
1999	6	7	17	A	0.080	0.022	0.030	0.008	0.050	1.151	0.023	0.762	0.739	0.389	ND	ND	114.6	8.44	11
1999	6	7	17	B	0.152	0.022	0.034	0.013	0.117	1.847	0.026	0.850	0.824	0.997	ND	ND	115.1	8.5	11
1999	6	7	17	C	0.141	0.022	0.043	0.021	0.098	1.712	0.051	1.234	1.183	0.478	ND	ND	115.4	8.53	11
1999	6	18	17	A	0.137	0.036	0.059	0.023	0.078	1.591	ND	1.020	1.020	0.572	ND	ND	130.5	7.88	21
1999	6	18	17	B	0.153	0.055	0.088	0.032	0.065	1.439	ND	1.020	1.020	0.419	ND	ND	131	7.81	21
1999	6	18	17	C	0.114	0.047	0.087	0.040	0.027	1.273	ND	1.065	1.065	0.208	ND	ND	131	7.77	21
1999	6	28	17	A	0.122	0.021	0.051	0.030	0.070	2.404	0.013	1.900	1.887	0.504	ND	ND	117.9	8.87	17
1999	6	28	17	B	0.103	0.018	0.042	0.024	0.061	2.183	0.023	1.643	1.621	0.539	ND	ND	118.7	8.94	17
1999	6	28	17	C	0.117	0.018	0.051	0.034	0.065	2.155	0.027	1.969	1.942	0.185	ND	ND	118.1	8.97	17
1999	7	8	17	A	0.250	0.017	0.010	ND	0.240	5.061	0.044	2.696	2.652	2.364	0.214	0.116	122.9	9.3	17
1999	7	8	17	B	0.211	0.017	0.039	0.023	0.172	5.289	0.007	3.301	3.295	1.988	0.369	0.214	123.2	9.37	17
1999	7	8	17	C	0.167	0.019	0.025	0.006	0.143	4.711	0.042	3.071	3.029	1.640	0.382	0.230	123	9.41	17
1999	7	19	17	A	0.229	0.061	0.133	0.073	0.096	3.061	0.044	0.944	0.900	2.117	0.271	0.029	140.3	8.3	20
1999	7	19	17	B	0.202	0.008	0.058	0.050	0.144	2.704	0.011	2.077	2.066	0.626	0.255	0.028	141.4	8.32	20
1999	7	19	17	C	0.214	0.006	0.047	0.041	0.167	3.124	0.017	1.924	1.908	1.200	0.300	0.036	143.2	8.36	20
1999	7	30	17	A	0.069	0.007	0.047	0.040	0.022	2.381	0.054	1.201	1.147	1.180	ND	ND	131.6	7.7	21
1999	7	30	17	B	0.074	0.010	0.047	0.037	0.027	2.008	0.038	1.291	1.253	0.717	0.040	0.001	132.2	7.68	21
1999	7	30	17	C	0.054	0.010	0.040	0.030	0.014	1.917	0.027	1.293	1.266	0.624	ND	ND	131.1	7.69	21
1999	8	9	17	A	0.156	0.006	0.019	0.013	0.137	2.149	ND	1.372	1.372	0.778	0.069	0.003	117.6	7.9	19
1999	8	9	17	B	0.110	0.006	0.026	0.020	0.083	2.051	0.012	1.594	1.582	0.457	ND	ND	117.8	7.84	19
1999	8	9	17	C	0.142	0.012	0.041	0.029	0.101	3.042	0.104	2.317	2.212	0.725	0.087	0.005	117.2	8.01	19
1999	8	19	17	A	0.228	0.015	0.104	0.089	0.124	2.231	ND	2.022	2.022	0.209	0.078	0.001	135.8	7.18	16
1999	8	19	17	B	0.243	0.015	0.143	0.127	0.100	3.296	0.008	2.475	2.468	0.821	0.358	0.003	134.9	7.19	16
1999	8	19	17	C	0.194	0.025	0.132	0.107	0.063	2.885	0.020	2.129	2.110	0.755	0.546	0.004	134.8	7.12	16
1999	8	30	17	A	0.313	0.024	0.088	0.064	0.225	4.721	ND	3.407	3.407	1.315	1.674	0.110	110.1	8.07	19
1999	8	30	17	B	0.329	0.021	0.132	0.111	0.197	5.867	ND	4.922	4.922	0.945	1.811	0.121	112.1	8.08	19
1999	8	30	17	C	0.360	0.019	0.079	0.060	0.280	6.907	0.089	3.974	3.884	2.933	0.767	0.049	114	8.06	19
1999	9	9	17	A	0.137	0.020	0.061	0.041	0.076	2.282	ND	1.508	1.508	0.774	0.150	0.003	122.4	7.54	16
1999	9	9	17	B	0.088	0.018	0.033	0.015	0.055	1.895	ND	1.406	1.406	0.489	0.143	0.003	122.3	7.49	16
1999	9	9	17	C	0.116	0.010	0.028	0.018	0.088	3.214	0.029	1.675	1.646	1.539	0.185	0.003	122.5	7.45	16
1999	9	20	17	A	0.128	0.014	0.031	0.017	0.096	2.452	0.006	1.594	1.588	0.858	0.310	0.003	137.5	7.15	14
1999	9	20	17	B	0.164	0.018	0.033	0.015	0.132	2.751	ND	1.751	1.751	1.001	0.277	0.002	138.5	7.16	14
1999	9	20	17	C	0.106	0.018	0.033	0.015	0.073	2.431	ND	1.744	1.744	0.687	0.307	0.003	133.5	7.16	14
1999	9	30	17	A	0.215	0.020	0.037	0.017	0.179	3.342	ND	1.759	1.759	1.583	0.315	0.003	129	7.19	10
1999	9	30	17	B	0.231	0.014	0.041	0.027	0.189	2.814	0.009	1.653	1.644	1.161	ND	ND	129.1	7.13	10
1999	9	30	17	C	0.195	0.019	0.041	0.022	0.154	2.788	ND	1.844	1.844	0.944	0.308	0.003	128.4	7.14	10
1999	10	12	17	A	0.065	ND	0.208	0.208	ND	1.876	ND	1.189	1.189	0.687	ND	ND	140.5	7.12	11
1999	10	12	17	B	0.078	0.001	0.221	0.220	ND	1.990	0.017	1.469	1.452	0.521	ND	ND	139.9	7.13	11
1999	10	12	17	C	0.104	0.006	0.229	0.223	ND	2.057	0.009	1.518	1.509	0.538	ND	ND	140.9	7.12	11
1999	1	13	18	A	0.263	0.207	0.197	ND	0.066	4.569	1.799	3.566	1.766	1.004	.	.	783	8.21	2.2
1999	1	13	18	B	0.190	0.202	0.200	ND	ND	4.566	1.763	3.638	1.875	0.928	.	.	785	8.24	2.2
1999	1	13	18	C	0.173	0.194	0.197	ND	ND	4.751	1.672	3.477	1.805	1.274	.	.	782	8.23	2.2

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	2	18	18	A	0.686	0.299	0.463	0.163	0.224	7.969	2.380	4.841	2.461	3.128	.	.	715	8.83	2.8
1999	2	18	18	B	0.307	0.257	0.393	0.136	ND	12.994	2.247	4.840	2.594	8.154	.	.	718	8.85	2.8
1999	2	18	18	C	0.629	0.244	0.400	0.155	0.229	9.374	2.422	4.820	2.397	4.554	.	.	716	8.83	2.8
1999	3	15	18	A	0.258	0.045	0.041	ND	0.217	3.816	0.024	1.588	1.564	2.228	.	.	784	8.91	1.7
1999	3	15	18	B	0.217	0.035	0.082	0.047	0.135	4.303	ND	2.165	2.165	2.138	.	.	790	8.9	1.7
1999	3	15	18	C	0.239	0.067	0.093	0.026	0.146	4.406	ND	2.293	2.293	2.113	.	.	794	8.9	1.7
1999	4	6	18	A	0.373	0.030	0.086	0.056	0.287	6.913	0.231	2.260	2.029	4.653	ND	ND	913	8.81	5.6
1999	4	6	18	B	0.386	0.030	0.054	0.024	0.332	7.574	0.227	2.219	1.991	5.355	ND	ND	947	8.86	5.6
1999	4	6	18	C	0.360	0.026	0.111	0.085	0.249	5.107	0.278	2.655	2.377	2.452	ND	ND	944	8.86	5.6
1999	4	19	18	A	0.421	0.062	0.061	ND	0.361	4.494	ND	1.890	1.890	2.604	.	.	878	8.73	8.3
1999	4	19	18	B	0.511	0.040	0.208	0.168	0.303	4.559	ND	2.508	2.508	2.050	.	.	877	8.81	8.3
1999	4	19	18	C	0.517	0.036	0.068	0.032	0.449	4.980	ND	1.967	1.967	3.012	.	.	880	8.84	8.3
1999	5	7	18	A	0.380	0.028	0.092	0.063	0.288	3.819	0.021	2.039	2.017	1.780	0.559	0.207	889	8.99	10
1999	5	7	18	B	0.387	0.030	0.105	0.075	0.281	3.812	ND	1.914	1.914	1.898	0.501	0.199	892	9.04	10
1999	5	7	18	C	0.399	0.031	0.105	0.074	0.294	5.585	0.030	2.712	2.681	2.873	0.535	0.216	888	9.05	10
1999	5	27	18	A	0.215	0.091	0.186	0.095	0.029	2.318	ND	1.914	1.914	0.403	0.089	0.055	841	9.43	16.1
1999	5	27	18	B	0.241	0.119	0.187	0.068	0.053	2.255	0.027	1.893	1.866	0.362	0.109	0.067	849	9.43	16.1
1999	5	27	18	C	0.220	0.124	0.210	0.087	0.010	2.471	0.028	2.049	2.022	0.422	0.099	0.060	905	9.41	16.1
1999	6	7	18	A	0.340	0.116	0.252	0.136	0.088	2.767	0.025	2.442	2.417	0.325	0.600	0.061	876	8.27	11
1999	6	7	18	B	0.235	0.102	0.252	0.150	ND	2.623	0.019	2.506	2.486	0.117	0.296	0.119	892	9.05	11
1999	6	7	18	C	0.249	0.128	0.210	0.082	0.039	2.593	ND	2.262	2.262	0.331	0.322	0.128	881	9.04	11
1999	6	18	18	A	0.283	0.130	0.205	0.075	0.078	2.727	0.014	2.072	2.057	0.655	0.098	0.059	809	9.39	19
1999	6	18	18	B	0.361	0.134	0.231	0.097	0.130	3.020	0.015	2.143	2.128	0.878	ND	ND	805	9.4	19
1999	6	18	18	C	0.290	0.143	0.212	0.069	0.078	2.746	0.017	2.179	2.162	0.567	0.122	0.074	808	9.41	19
1999	6	28	18	A	0.251	0.095	0.150	0.055	0.101	2.847	0.015	2.131	2.116	0.716	0.165	0.101	836	9.4	14
1999	6	28	18	B	0.283	0.078	0.150	0.072	0.133	3.222	0.019	3.042	3.023	0.180	0.112	0.069	835	9.42	14
1999	6	28	18	C	0.251	0.154	0.227	0.073	0.024	2.764	0.033	2.921	2.889	ND	0.165	0.101	845	9.42	14
1999	7	8	18	A	0.109	0.039	0.047	0.008	0.062	2.867	0.043	2.273	2.230	0.595	0.116	0.081	763	9.6	17
1999	7	8	18	B	0.167	0.043	0.050	0.007	0.118	3.218	0.015	1.979	1.964	1.239	0.198	0.139	765	9.61	17
1999	7	8	18	C	0.197	0.021	0.035	0.014	0.162	3.465	0.019	2.014	1.996	1.451	0.365	0.260	766	9.63	17
1999	7	19	18	A	0.371	0.225	0.229	0.004	0.142	5.873	0.112	4.995	4.884	0.878	0.657	0.527	570	9.85	17
1999	7	19	18	B	0.319	0.268	0.308	0.040	0.010	5.591	0.008	3.898	3.890	1.693	0.649	0.513	572	9.82	17
1999	7	19	18	C	0.214	0.156	0.229	0.073	ND	3.591	ND	2.359	2.359	1.232	0.396	0.319	570	9.86	17
1999	7	30	18	A	0.265	0.156	0.232	0.076	0.033	2.234	0.019	2.283	2.264	ND	0.215	0.144	487	9.54	19
1999	7	30	18	B	0.269	0.153	0.234	0.081	0.036	2.381	0.011	3.092	3.080	ND	0.246	0.169	491	9.57	19
1999	7	30	18	C	0.219	0.144	0.212	0.068	0.007	2.751	0.012	1.774	1.762	0.977	0.092	0.063	490	9.57	19
1999	8	9	18	A	0.354	0.210	0.245	0.036	0.108	4.157	ND	1.687	1.687	2.471	ND	ND	446	9.55	16
1999	8	9	18	B	0.305	0.225	0.245	0.021	0.060	2.423	ND	1.977	1.977	0.446	ND	ND	446	9.59	16
1999	8	9	18	C	0.355	0.210	0.232	0.022	0.123	2.390	ND	2.083	2.083	0.307	ND	ND	445	9.6	16
1999	8	19	18	A	0.342	0.185	0.262	0.077	0.079	2.285	ND	2.040	2.040	0.245	0.234	0.182	574	9.78	18
1999	8	19	18	B	0.340	0.205	0.278	0.073	0.063	2.127	ND	2.092	2.092	0.035	0.251	0.196	575	9.79	18
1999	8	19	18	C	0.365	0.196	0.248	0.052	0.117	2.294	ND	2.067	2.067	0.227	0.224	0.175	576	9.79	18
1999	8	30	18	A	0.389	0.176	0.258	0.082	0.131	3.160	0.010	1.904	1.895	1.256	ND	ND	328	8.12	14
1999	8	30	18	B	0.328	0.175	0.210	0.035	0.118	2.623	0.016	2.078	2.062	0.545	ND	ND	327	8.14	14
1999	8	30	18	C	0.364	0.215	0.227	0.013	0.136	3.158	0.007	1.949	1.943	1.209	0.044	0.004	329	8.16	14
1999	9	9	18	A	0.217	0.132	0.212	0.080	0.004	2.693	0.006	2.367	2.362	0.326	0.238	0.148	617	9.45	17
1999	9	9	18	B	0.219	0.150	0.199	0.049	0.020	2.565	ND	2.339	2.339	0.226	ND	ND	618	9.49	17
1999	9	9	18	C	0.236	0.163	0.181	0.018	0.055	2.658	0.007	2.312	2.305	0.346	0.111	0.071	614	9.49	17
1999	9	20	18	A	0.214	0.069	0.109	0.039	0.105	2.802	0.052	2.237	2.185	0.565	0.367	0.192	559	9.27	17
1999	9	20	18	B	0.262	0.070	0.091	0.021	0.171	3.135	0.006	2.327	2.321	0.807	0.395	0.216	559	9.31	17
1999	9	20	18	C	0.150	0.079	0.106	0.027	0.044	2.983	0.250	2.491	2.241	0.491	0.421	0.233	560	9.32	17
1999	9	30	18	A	0.232	0.045	0.121	0.075	0.112	2.534	0.022	2.163	2.141	0.372	ND	ND	571	9.25	14
1999	9	30	18	B	0.209	0.063	0.118	0.055	0.092	2.651	0.027	2.196	2.169	0.455	ND	ND	572	9.27	14
1999	9	30	18	C	0.153	0.077	0.217	0.140	ND	2.650	0.031	2.561	2.530	0.089	ND	ND	573	9.27	14
1999	10	12	18	A	0.363	0.081	0.421	0.340	ND	3.791	0.065	2.728	2.663	1.063	0.936	0.255	613	8.8	15
1999	10	12	18	B	0.378	0.089	0.170	0.081	0.209	3.427	0.018	2.264	2.247	1.163	0.949	0.272	609	8.83	15
1999	10	12	18	C	0.340	0.087	0.147	0.060	0.193	3.845	0.036	2.230	2.195	1.615	0.915	0.280	613	8.87	15
1999	10	25	18	A	0.300	0.045	0.128	0.083	0.172	3.108	0.015	2.364	2.350	0.743	0.660	0.239	593	8.98	9
1999	10	25	18	B	0.296	0.032	0.099	0.067	0.197	3.303	ND	2.414	2.414	0.889	0.647	0.237	598	8.99	9
1999	10	25	18	C	0.322	0.037	0.111	0.073	0.211	3.236	ND	2.534	2.534	0.703	0.673	0.244	594	8.98	9
1999	11	17	18	A	0.614	0.352	0.417	0.065	0.197	6.891	0.270	5.397	5.128	1.494	2.751	0.127	492	7.91	6
1999	11	17	18	B	0.583	0.349	0.388	0.039	0.194	6.751	0.176	5.485	5.309	1.266	1.880	0.089	490	7.92	6
1999	11	17	18	C	0.611	0.362	0.360	ND	0.251	6.858	0.141	5.191	5.050	1.667	2.631	0.130	492	7.94	6
1999	11	29	18	A	0.527	0.041	0.152	0.111	0.375	6.339	0.022	3.326	3.305	3.012	2.320	0.159	563	8.09	5

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	11	29	18	B	0.518	0.028	0.125	0.098	0.393	5.903	0.006	2.812	2.805	3.092	2.453	0.157	566	8.06	5
1999	11	29	18	C	0.498	0.037	0.159	0.122	0.339	6.186	0.006	3.478	3.472	2.708	2.525	0.165	564	8.07	5
1999	12	14	18	A	0.473	0.017	0.129	0.112	0.344	5.899	0.026	3.859	3.833	2.039	0.376	0.069	588	8.58	1
1999	12	14	18	B	0.565	0.141	0.286	0.146	0.278	6.188	ND	4.215	4.215	1.974	1.934	0.406	609	8.65	1
1999	12	14	18	C	0.444	0.021	0.157	0.136	0.287	5.563	ND	3.866	3.866	1.697	0.885	0.176	627	8.62	1
1999	1	13	19	A	0.440	0.594	0.524	ND	ND	4.836	2.887	3.549	0.662	1.287	.	.	885	8.44	0.6
1999	1	13	19	B	0.429	0.603	0.594	ND	ND	4.819	2.886	3.884	0.998	0.934	.	.	885	8.42	0.6
1999	1	13	19	C	0.552	0.607	0.575	ND	ND	4.714	2.857	4.123	1.266	0.591	.	.	883	8.42	0.6
1999	2	18	19	A	0.528	0.577	0.503	ND	0.025	4.090	2.603	3.543	0.940	0.546	.	.	999	8.98	2.8
1999	2	18	19	B	0.644	0.610	0.597	ND	0.047	4.051	2.709	3.928	1.219	0.123	.	.	998	8.97	2.8
1999	2	18	19	C	0.497	0.619	0.677	0.059	ND	4.174	2.545	3.864	1.319	0.311	.	.	998	8.98	2.8
1999	3	15	19	A	0.261	0.192	0.231	0.039	0.030	2.421	ND	0.401	0.401	2.020	.	.	1011	8.76	4.4
1999	3	15	19	B	0.168	0.131	0.183	0.052	ND	2.627	ND	ND	ND	2.627	.	.	1008	8.74	4.4
1999	3	15	19	C	0.168	0.201	0.251	0.050	ND	2.342	ND	ND	ND	2.342	.	.	1001	8.8	4.4
1999	4	6	19	A	0.277	0.102	0.213	0.111	0.064	6.143	1.515	1.633	0.117	4.510	0.293	0.028	697	8.25	5.6
1999	4	6	19	B	0.277	0.079	0.191	0.113	0.086	6.299	1.428	1.858	0.430	4.442	0.289	0.030	713	8.28	5.6
1999	4	6	19	C	0.386	0.121	0.253	0.132	0.133	5.225	1.886	1.923	0.038	3.301	0.310	0.035	719	8.32	5.6
1999	4	19	19	A	0.389	0.237	0.080	ND	0.309	2.944	0.744	0.944	0.200	2.000	.	.	474	7.96	8.9
1999	4	19	19	B	0.465	0.244	0.073	ND	0.392	2.818	0.770	1.086	0.317	1.732	.	.	480	8.03	8.9
1999	4	19	19	C	0.435	0.272	0.054	ND	0.381	2.819	0.764	1.102	0.337	1.717	.	.	485	8.02	8.9
1999	5	7	19	A	0.160	0.016	0.064	0.048	0.096	1.562	ND	0.922	0.922	0.640	0.066	0.005	292	8.14	8.3
1999	5	7	19	B	0.125	0.016	0.065	0.050	0.059	1.373	ND	1.051	1.051	0.322	0.061	0.006	278	8.26	8.3
1999	5	7	19	C	0.140	0.013	0.046	0.033	0.093	1.287	ND	1.078	1.078	0.209	0.063	0.007	276	8.29	8.3
1999	5	27	19	A	0.320	0.241	0.298	0.057	0.022	1.643	0.230	1.262	1.032	0.381	ND	ND	323	8.9	18.3
1999	5	27	19	B	0.292	0.234	0.284	0.050	0.009	1.517	0.235	1.299	1.064	0.219	ND	ND	325	8.93	18.3
1999	5	27	19	C	0.297	0.229	0.302	0.073	ND	1.536	0.237	1.237	0.999	0.300	ND	ND	327	8.91	18.3
1999	6	7	19	A	0.123	0.026	0.074	0.048	0.049	1.815	0.012	1.548	1.536	0.267	ND	ND	240	9.05	14
1999	6	7	19	B	0.177	0.023	0.074	0.050	0.104	1.375	0.162	1.014	0.852	0.361	ND	ND	235	9.12	14
1999	6	7	19	C	0.183	0.031	0.059	0.029	0.124	1.488	0.268	0.942	0.674	0.545	ND	ND	236	9.09	14
1999	6	18	19	A	0.231	0.125	0.163	0.038	0.068	2.336	0.097	1.774	1.677	0.563	ND	ND	281	8.04	19
1999	6	18	19	B	0.205	0.099	0.147	0.047	0.059	1.496	ND	1.292	1.292	0.204	ND	ND	283	7.99	19
1999	6	18	19	C	0.205	0.098	0.144	0.046	0.061	1.769	ND	1.122	1.122	0.646	ND	ND	283	7.96	19
1999	6	28	19	A	0.199	0.035	0.092	0.057	0.107	2.449	0.065	1.974	1.909	0.475	ND	ND	266	8.18	19
1999	6	28	19	B	0.180	0.022	0.074	0.052	0.106	1.697	ND	1.369	1.369	0.329	ND	ND	261	8.19	19
1999	6	28	19	C	0.186	0.021	0.069	0.048	0.117	1.667	ND	1.274	1.274	0.393	ND	ND	260	8.2	19
1999	7	8	19	A	0.259	0.009	0.065	0.056	0.194	2.951	0.010	1.229	1.219	1.723	0.118	0.048	264	9.06	18
1999	7	8	19	B	0.293	0.131	0.198	0.067	0.096	2.651	0.011	1.706	1.695	0.946	0.110	0.046	265	9.08	18
1999	7	8	19	C	0.202	0.067	0.094	0.027	0.108	1.678	0.024	1.397	1.373	0.281	0.119	0.046	267	9.03	18
1999	7	19	19	A	0.124	0.017	0.068	0.050	0.057	1.988	0.023	1.893	1.870	0.095	0.319	0.035	272	8.31	19
1999	7	19	19	B	0.124	0.030	0.087	0.057	0.037	1.619	0.007	1.680	1.674	ND	0.371	0.040	274	8.3	19
1999	7	19	19	C	0.139	0.022	0.080	0.059	0.058	1.664	ND	1.303	1.303	0.361	0.386	0.043	272	8.32	19
1999	7	30	19	A	0.255	0.095	0.203	0.109	0.052	1.789	0.015	1.757	1.742	0.032	0.293	0.013	312	7.88	21
1999	7	30	19	B	0.246	0.103	0.146	0.043	0.100	2.291	0.016	1.724	1.708	0.566	0.147	0.009	311	8.03	21
1999	7	30	19	C	0.225	0.112	0.162	0.050	0.063	1.850	0.021	1.467	1.446	0.383	0.147	0.009	312	8.02	21
1999	8	9	19	A	0.209	0.087	0.099	0.012	0.110	1.894	ND	1.521	1.521	0.373	ND	ND	278	7.9	19
1999	8	9	19	B	0.172	0.048	0.072	0.024	0.101	1.891	0.007	2.055	2.048	ND	ND	ND	269	7.82	19
1999	8	9	19	C	0.238	0.048	0.114	0.066	0.124	2.278	ND	1.562	1.562	0.716	ND	ND	267	7.77	19
1999	8	19	19	A	0.361	0.202	0.305	0.103	0.056	2.027	ND	1.424	1.424	0.603	0.403	0.021	295	7.97	21
1999	8	19	19	B	0.365	0.209	0.279	0.070	0.086	2.091	ND	1.330	1.330	0.761	0.389	0.017	292	7.89	21
1999	8	19	19	C	0.342	0.181	0.278	0.097	0.064	1.715	ND	1.414	1.414	0.302	0.641	0.025	294	7.84	21
1999	8	30	19	A	0.197	0.014	0.058	0.044	0.139	2.219	ND	1.567	1.567	0.653	1.175	0.020	174.4	7.46	16
1999	8	30	19	B	0.245	0.012	0.072	0.060	0.173	2.699	ND	2.052	2.052	0.647	1.377	0.024	173.6	7.48	16
1999	8	30	19	C	0.220	0.039	0.110	0.071	0.110	2.252	ND	1.821	1.821	0.431	1.363	0.023	175.2	7.46	16
1999	9	9	19	A	0.192	0.026	0.077	0.051	0.114	2.048	0.009	1.508	1.499	0.539	0.682	0.009	253	7.33	17
1999	9	9	19	B	0.171	0.020	0.043	0.023	0.128	2.235	ND	1.398	1.398	0.837	0.623	0.007	253	7.26	17
1999	9	9	19	C	0.212	0.038	0.098	0.061	0.114	2.594	ND	1.625	1.625	0.969	0.365	0.004	252	7.22	17
1999	9	20	19	A	0.267	0.058	0.091	0.033	0.175	2.490	ND	1.452	1.452	1.039	0.391	0.006	293	7.43	15
1999	9	20	19	B	0.110	0.040	0.069	0.030	0.041	1.900	ND	1.532	1.532	0.368	0.611	0.008	297	7.35	15
1999	9	20	19	C	0.123	0.024	0.062	0.038	0.061	1.860	0.012	1.490	1.478	0.371	0.549	0.007	294	7.32	15
1999	9	30	19	A	0.107	0.010	0.041	0.032	0.066	1.930	0.012	1.573	1.561	0.356	ND	ND	272	7.29	11
1999	9	30	19	B	0.055	0.010	0.049	0.039	0.006	1.644	0.011	1.357	1.347	0.287	0.303	0.003	274	7.22	11
1999	9	30	19	C	0.072	0.009	0.056	0.048	0.015	1.694	0.006	1.470	1.463	0.224	0.503	0.005	268	7.26	11
1999	10	12	19	A	0.147	0.010	0.076	0.065	0.071	2.071	ND	1.649	1.649	0.422	0.364	0.003	201	7.19	12
1999	10	12	19	B	0.175	0.056	0.117	0.062	0.057	2.175	ND	1.685	1.685	0.491	ND	ND	200	7.28	12

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	10	12	19	C	0.147	0.016	0.097	0.082	0.049	2.147	0.013	1.735	1.723	0.412	0.505	0.005	199.9	7.25	12
1999	10	25	19	A	0.104	0.005	0.033	0.029	0.071	1.205	ND	1.120	1.120	0.085	1.001	0.020	565	7.54	8
1999	10	25	19	B	0.329	0.037	0.174	0.137	0.155	1.436	ND	1.924	1.924	ND	1.076	0.020	566	7.49	8
1999	10	25	19	C	0.235	0.037	0.064	0.027	0.171	1.485	ND	1.430	1.430	0.055	0.901	0.020	572	7.59	8
1999	11	17	19	A	0.474	0.411	0.365	ND	0.110	3.107	1.385	2.766	1.381	0.341	0.295	0.011	519	7.8	6
1999	11	17	19	B	0.456	0.425	0.386	ND	0.070	2.778	1.280	2.675	1.395	0.103	0.225	0.009	519	7.82	6
1999	11	17	19	C	0.445	0.429	0.400	ND	0.045	3.038	1.320	2.691	1.371	0.347	0.136	0.005	520	7.81	6
1999	11	29	19	A	0.282	0.134	0.221	0.087	0.061	1.767	ND	1.427	1.427	0.339	0.335	0.018	616	7.98	6
1999	11	29	19	B	0.242	0.116	0.197	0.081	0.044	1.514	ND	1.211	1.211	0.302	0.336	0.019	585	7.99	6
1999	11	29	19	C	0.242	0.107	0.193	0.086	0.048	1.707	ND	1.260	1.260	0.447	0.320	0.021	597	8.08	6
1999	12	14	19	A	0.344	0.072	0.143	0.071	0.201	2.508	0.014	1.218	1.204	1.291	ND	ND	633	8.44	1
1999	12	14	19	B	0.444	0.274	0.272	ND	0.172	3.484	1.508	2.893	1.385	0.591	0.310	0.039	598	8.38	1
1999	12	14	19	C	0.559	0.345	0.358	0.013	0.201	4.219	2.181	3.233	1.052	0.986	ND	ND	608	8.41	1
1999	1	13	20	A	0.246	0.233	0.237	0.003	0.009	6.057	2.984	4.746	1.762	1.311	.	.	878	8.06	0.6
1999	1	13	20	B	0.201	0.233	0.262	0.029	ND	6.049	3.183	4.869	1.686	1.180	.	.	875	8.08	0.6
1999	1	13	20	C	0.201	0.260	0.257	ND	ND	6.308	3.021	5.801	2.779	0.508	.	.	873	8.06	0.6
1999	2	18	20	A	0.342	0.250	0.309	0.059	0.034	4.833	1.243	3.354	2.111	1.479	.	.	675	9.07	1.1
1999	2	18	20	B	0.426	0.245	0.315	0.070	0.111	4.067	1.324	3.564	2.240	0.503	.	.	675	9.06	1.1
1999	2	18	20	C	0.483	0.241	0.342	0.101	0.141	4.460	1.086	3.777	2.692	0.682	.	.	673	9.06	1.1
1999	4	6	20	A	0.359	0.039	0.117	0.078	0.242	5.231	ND	2.691	2.691	2.540	0.334	0.070	1094	8.64	5
1999	4	6	20	B	0.426	0.066	0.140	0.074	0.286	5.009	ND	3.095	3.095	1.914	0.140	0.031	1116	8.67	5
1999	4	6	20	C	0.373	0.032	0.099	0.067	0.274	5.435	ND	3.528	3.528	1.907	0.129	0.029	1113	8.69	5
1999	4	19	20	A	0.340	0.046	0.061	0.015	0.280	3.731	0.015	1.866	1.850	1.866	.	.	830	8.69	8.3
1999	4	19	20	B	0.404	0.035	0.054	0.020	0.350	3.912	ND	1.861	1.861	2.051	.	.	857	8.74	8.3
1999	4	19	20	C	0.274	0.032	0.079	0.047	0.196	3.857	0.021	2.779	2.758	1.077	.	.	855	8.75	8.3
1999	5	7	20	A	0.304	0.067	0.111	0.044	0.194	3.393	ND	2.033	2.033	1.360	0.320	0.120	888	9	9.4
1999	5	7	20	B	0.311	0.044	0.222	0.178	0.089	3.468	ND	2.367	2.367	1.101	0.305	0.097	892	8.89	9.4
1999	5	7	20	C	0.304	0.022	0.101	0.079	0.203	3.647	ND	2.233	2.233	1.414	0.320	0.125	895	9.03	9.4
1999	5	27	20	A	0.472	0.371	0.482	0.111	ND	4.192	0.061	4.009	3.947	0.184	0.276	0.028	164.1	8.27	22.2
1999	5	27	20	B	0.511	0.386	0.491	0.105	0.020	4.101	0.012	3.567	3.554	0.535	0.263	0.026	164.6	8.26	22.2
1999	5	27	20	C	0.493	0.386	0.554	0.168	ND	3.829	ND	3.508	3.508	0.320	0.270	0.025	164.8	8.23	22.2
1999	6	7	20	A	0.409	0.135	0.284	0.149	0.125	5.716	0.108	5.039	4.931	0.677	0.296	0.124	1347	9.08	16
1999	6	7	20	B	0.305	0.143	0.320	0.177	ND	5.625	ND	5.314	5.314	0.311	0.368	0.153	1355	9.07	16
1999	6	7	20	C	0.399	0.155	0.316	0.161	0.083	5.645	0.015	5.353	5.339	0.292	0.435	0.188	1336	9.1	16
1999	6	18	20	A	0.316	0.228	0.264	0.035	0.052	2.940	0.029	2.521	2.492	0.419	ND	ND	896	9.58	20
1999	6	18	20	B	0.257	0.216	0.264	0.047	ND	2.741	0.038	2.467	2.429	0.274	ND	ND	890	9.57	20
1999	6	18	20	C	0.321	0.217	0.264	0.047	0.057	2.949	0.027	2.458	2.431	0.491	ND	ND	889	9.68	20
1999	6	28	20	A	0.302	0.394	0.285	ND	0.018	3.239	0.037	2.793	2.755	0.446	ND	ND	1036	9.36	19
1999	6	28	20	B	0.283	0.177	0.312	0.134	ND	3.097	0.040	3.122	3.082	ND	ND	ND	1037	9.37	19
1999	6	28	20	C	0.233	0.186	0.321	0.135	ND	2.970	0.039	3.285	3.247	ND	ND	ND	1007	9.36	19
1999	7	8	20	A	0.511	0.224	0.373	0.149	0.138	4.339	0.025	3.422	3.397	0.917	0.356	0.007	751	9.4	20
1999	7	8	20	B	0.548	0.242	0.390	0.148	0.158	3.965	0.015	2.512	2.497	1.453	0.315	0.008	762	9.41	20
1999	7	8	20	C	0.536	0.285	0.436	0.151	0.100	3.422	0.007	2.599	2.592	0.823	0.445	0.008	751	9.46	20
1999	7	19	20	A	0.623	0.394	0.475	0.081	0.149	3.695	0.047	3.137	3.089	0.558	0.420	0.117	1056	8.81	22
1999	7	19	20	B	0.657	0.432	0.588	0.156	0.070	3.587	ND	3.381	3.381	0.205	0.091	0.026	1060	8.82	22
1999	7	19	20	C	0.612	0.396	0.475	0.078	0.137	3.820	0.010	3.565	3.555	0.255	0.324	0.091	1057	8.82	22
1999	7	30	20	A	2.213	1.416	1.484	0.068	0.729	10.695	0.273	16.601	16.328	ND	2.642	0.770	650	8.84	22
1999	7	30	20	B	0.984	0.504	0.563	0.060	0.420	8.598	0.049	6.623	6.575	1.975	6.211	1.809	651	8.84	22
1999	7	30	20	C	0.646	0.233	0.351	0.119	0.295	4.633	0.017	3.265	3.248	1.368	10.317	3.677	677	8.97	22
1999	8	9	20	A	0.260	0.157	0.202	0.044	0.058	2.813	0.020	2.736	2.717	0.077	ND	ND	787	9.24	17
1999	8	9	20	B	0.187	0.073	0.120	0.046	0.067	2.750	ND	2.572	2.572	0.178	ND	ND	792	9.24	17
1999	8	9	20	C	0.232	0.135	0.194	0.059	0.038	2.893	ND	2.913	2.913	ND	ND	ND	790	9.2	17
1999	8	19	20	A	0.330	0.164	0.250	0.086	0.081	2.533	ND	1.979	1.979	0.554	0.149	0.062	525	9.08	20
1999	8	19	20	B	0.330	0.271	0.278	0.006	0.053	2.335	0.005	2.019	2.014	0.316	0.191	0.085	517	9.13	20
1999	8	19	20	C	0.319	0.205	0.254	0.049	0.065	2.291	ND	1.935	1.935	0.356	0.218	0.106	528	9.2	20
1999	8	30	20	A	0.288	0.237	0.245	0.008	0.043	2.731	ND	2.247	2.247	0.483	0.032	0.001	290	7.53	19
1999	8	30	20	B	0.319	0.183	0.245	0.062	0.074	2.732	ND	2.343	2.343	0.390	ND	ND	288	7.55	19
1999	8	30	20	C	0.344	0.201	0.291	0.090	0.053	2.629	ND	2.446	2.446	0.183	0.099	0.002	290	7.5	19
1999	9	9	20	A	0.529	0.193	0.263	0.070	0.266	5.304	ND	3.188	3.188	2.116	ND	ND	1064	8.69	17
1999	9	9	20	B	0.495	0.044	0.126	0.082	0.369	6.109	ND	3.351	3.351	2.759	ND	ND	1067	8.71	17
1999	9	9	20	C	0.412	0.103	0.181	0.078	0.232	4.989	ND	3.410	3.410	1.579	ND	ND	1068	8.71	17
1999	9	20	20	A	0.411	0.048	0.081	0.033	0.330	4.531	0.024	2.478	2.454	2.053	0.056	0.010	743	8.54	16
1999	9	20	20	B	0.343	0.025	0.059	0.034	0.283	3.911	0.025	2.501	2.476	1.410	ND	ND	744	8.62	16
1999	9	20	20	C	0.299	0.016	0.047	0.032	0.251	3.971	0.008	2.515	2.507	1.456	0.086	0.018	753	8.64	16

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	9	30	20	A	0.467	0.087	0.240	0.152	0.228	4.610	0.019	2.885	2.866	1.724	ND	ND	568	7.65	13
1999	9	30	20	B	0.356	0.097	0.217	0.120	0.139	3.253	0.020	2.400	2.380	0.852	ND	ND	439	7.57	13
1999	9	30	20	C	0.408	0.100	0.231	0.130	0.177	4.517	0.033	3.304	3.271	1.213	ND	ND	623	7.73	13
1999	10	12	20	A	0.239	0.067	0.138	0.070	0.102	2.361	ND	1.614	1.614	0.747	0.715	0.011	247	7.4	14
1999	10	12	20	B	0.239	0.066	0.147	0.081	0.093	2.314	ND	1.453	1.453	0.861	0.536	0.010	246	7.48	14
1999	10	12	20	C	0.164	0.010	0.062	0.051	0.102	2.228	ND	1.611	1.611	0.617	0.293	0.005	249	7.47	14
1999	10	25	20	A	0.142	0.016	0.009	ND	0.133	2.152	ND	1.811	1.811	0.341	0.436	0.008	374	7.47	8
1999	10	25	20	B	0.250	0.041	0.078	0.037	0.172	2.636	ND	1.920	1.920	0.716	0.430	0.007	374	7.46	8
1999	10	25	20	C	0.164	0.015	0.088	0.073	0.076	2.864	0.049	2.003	1.955	0.860	0.342	0.006	378	7.47	8
1999	11	17	20	A	0.159	0.137	0.177	0.040	ND	2.866	0.455	2.673	2.218	0.193	0.484	0.007	364	7.4	7
1999	11	17	20	B	0.245	0.098	0.149	0.051	0.096	3.185	0.390	2.184	1.794	1.001	0.489	0.008	362	7.42	7
1999	11	17	20	C	0.197	0.123	0.177	0.054	0.020	3.351	0.484	3.155	2.671	0.196	0.369	0.005	364	7.4	7
1999	11	29	20	A	0.159	0.011	0.055	0.044	0.104	2.433	ND	1.560	1.560	0.873	0.244	0.019	425	8.15	5
1999	11	29	20	B	0.138	0.011	0.041	0.030	0.097	2.441	ND	1.625	1.625	0.816	0.437	0.035	428	8.17	5
1999	11	29	20	C	0.157	0.002	0.048	0.046	0.109	2.752	0.032	1.875	1.843	0.878	0.461	0.035	429	8.14	5
1999	12	14	20	A	0.193	0.010	0.043	0.033	0.151	6.764	3.318	6.207	2.889	0.557	0.320	0.018	646	8.01	1
1999	12	14	20	B	0.198	0.010	0.071	0.062	0.126	6.831	3.273	6.102	2.830	0.729	0.915	0.055	644	8.03	1
1999	12	14	20	C	0.193	0.037	0.079	0.041	0.115	7.505	3.812	6.870	3.058	0.635	0.746	0.057	642	8.14	1
1999	1	13	21	A	0.252	0.229	0.231	0.003	0.020	6.098	2.954	4.748	1.794	1.349	.	.	893	8.07	0.6
1999	1	13	21	B	0.219	0.223	0.205	ND	0.015	5.974	3.114	4.759	1.645	1.215	.	.	895	8.06	0.6
1999	1	13	21	C	0.201	0.225	0.281	0.056	ND	5.936	3.105	5.201	2.096	0.735	.	.	893	8.07	0.6
1999	2	18	21	A	0.377	0.218	0.275	0.057	0.102	4.323	1.531	3.624	2.093	0.698	.	.	681	9.04	0.6
1999	2	18	21	B	0.405	0.232	0.262	0.030	0.144	4.670	1.645	3.659	2.013	1.012	.	.	683	9.02	0.6
1999	2	18	21	C	0.381	0.232	0.275	0.043	0.106	4.738	1.580	3.781	2.201	0.957	.	.	681	9.03	0.6
1999	4	6	21	A	0.226	0.023	0.061	0.037	0.166	4.905	0.150	2.853	2.703	2.052	0.316	0.042	1001	8.41	5
1999	4	6	21	B	0.226	0.026	0.086	0.060	0.140	5.006	0.208	2.561	2.353	2.445	0.299	0.043	1010	8.45	5
1999	4	6	21	C	0.346	0.023	0.061	0.037	0.286	4.850	0.238	3.265	3.027	1.585	0.303	0.047	1025	8.48	5
1999	4	19	21	A	0.374	0.110	0.054	ND	0.320	4.108	0.147	1.995	1.849	2.112	.	.	750	8.24	10.6
1999	4	19	21	B	0.449	0.081	0.089	0.007	0.360	4.240	0.163	1.992	1.829	2.248	.	.	757	8.4	10.6
1999	4	19	21	C	0.383	0.097	0.054	ND	0.329	4.231	0.154	1.945	1.791	2.286	.	.	760	8.42	10.6
1999	5	7	21	A	0.245	0.043	0.092	0.049	0.154	2.950	ND	2.139	2.139	0.811	0.413	0.116	914	8.81	11.1
1999	5	7	21	B	0.212	0.022	0.081	0.058	0.132	3.089	ND	2.056	2.056	1.033	0.386	0.115	918	8.85	11.1
1999	5	7	21	C	0.229	0.022	0.092	0.069	0.137	3.216	ND	2.250	2.250	0.966	0.412	0.121	917	8.83	11.1
1999	5	27	21	A	0.424	0.302	0.389	0.087	0.036	3.221	0.108	3.001	2.892	0.221	0.351	0.035	166.5	8.26	19.4
1999	5	27	21	B	0.424	0.311	0.406	0.095	0.019	3.263	0.109	3.017	2.908	0.247	0.317	0.030	166.7	8.24	19.4
1999	5	27	21	C	0.412	0.313	0.386	0.072	0.026	3.497	0.115	2.922	2.808	0.574	0.343	0.032	166.9	8.23	19.4
1999	6	7	21	A	0.335	0.077	0.190	0.112	0.145	3.965	0.182	3.334	3.151	0.631	0.359	0.057	843	8.5	16
1999	6	7	21	B	0.295	0.079	0.190	0.111	0.105	3.619	0.119	3.197	3.077	0.422	0.229	0.073	843	8.89	16
1999	6	7	21	C	0.319	0.082	0.219	0.137	0.100	3.761	0.157	3.226	3.068	0.536	0.216	0.078	838	8.97	16
1999	6	18	21	A	0.342	0.152	0.205	0.054	0.137	3.018	0.019	2.210	2.191	0.807	0.273	0.137	748	9.22	21
1999	6	18	21	B	0.257	0.160	0.216	0.055	0.042	2.702	0.013	2.114	2.101	0.588	0.365	0.188	739	9.25	21
1999	6	18	21	C	0.342	0.169	0.251	0.082	0.091	3.070	0.016	2.414	2.398	0.656	0.362	0.187	742	9.25	21
1999	6	28	21	A	0.238	0.071	0.139	0.068	0.099	2.709	ND	2.086	2.086	0.623	0.741	0.062	536	8.18	21
1999	6	28	21	B	0.237	0.047	0.139	0.092	0.098	2.807	ND	2.272	2.272	0.536	0.457	0.038	534	8.18	21
1999	6	28	21	C	0.310	0.034	0.150	0.116	0.160	3.209	0.044	2.502	2.458	0.707	0.407	0.035	535	8.19	21
1999	7	8	21	A	0.474	0.072	0.128	0.056	0.347	3.606	0.018	2.370	2.352	1.237	0.175	0.057	407	8.91	20
1999	7	8	21	B	0.406	0.016	0.066	0.050	0.340	3.348	0.011	2.009	1.998	1.339	0.226	0.071	409	8.89	20
1999	7	8	21	C	0.371	0.042	0.117	0.075	0.254	3.077	0.025	2.112	2.087	0.965	0.431	0.136	408	8.89	20
1999	7	19	21	A	0.341	0.121	0.227	0.107	0.114	2.345	0.009	2.714	2.705	ND	0.472	0.032	480	9.36	20
1999	7	19	21	B	0.352	0.108	0.168	0.060	0.184	2.354	0.024	2.055	2.031	0.300	0.575	0.040	472	8.1	20
1999	7	19	21	C	0.383	0.097	0.190	0.094	0.193	2.494	0.011	2.195	2.184	0.299	0.457	0.033	474	8.11	20
1999	7	30	21	A	0.246	0.123	0.213	0.089	0.033	2.484	0.020	2.369	2.349	0.115	0.098	0.006	540	8.02	23
1999	7	30	21	B	0.215	0.070	0.152	0.082	0.064	2.351	0.006	2.402	2.397	ND	0.401	0.023	539	8.01	23
1999	7	30	21	C	0.248	0.114	0.199	0.085	0.049	2.327	0.008	2.301	2.294	0.025	0.401	0.023	538	8.01	23
1999	8	9	21	A	0.251	0.011	0.054	0.043	0.197	2.804	0.016	2.417	2.400	0.388	ND	ND	596	8.6	18
1999	8	9	21	B	0.202	0.017	0.095	0.077	0.108	2.568	0.007	2.233	2.226	0.335	ND	ND	598	8.59	18
1999	8	9	21	C	0.237	0.008	0.073	0.065	0.164	2.355	0.032	2.002	1.970	0.354	ND	ND	595	8.58	18
1999	8	19	21	A	0.285	0.109	0.222	0.113	0.063	2.091	0.021	2.924	2.903	ND	0.285	0.036	448	8.39	20
1999	8	19	21	B	0.286	0.136	0.236	0.100	0.050	2.087	ND	1.892	1.892	0.195	0.269	0.038	446	8.44	20
1999	8	19	21	C	0.310	0.136	0.226	0.090	0.083	2.178	ND	1.826	1.826	0.352	0.217	0.032	447	8.46	20
1999	8	30	21	A	0.355	0.166	0.226	0.060	0.129	2.977	ND	2.217	2.217	0.761	ND	ND	536	8.66	20
1999	8	30	21	B	0.372	0.156	0.219	0.063	0.153	3.180	ND	3.380	3.380	ND	ND	ND	535	8.64	20
1999	8	30	21	C	0.316	0.184	0.277	0.093	0.039	2.830	ND	2.183	2.183	0.647	ND	ND	536	8.66	20
1999	9	9	21	A	0.254	0.045	0.098	0.054	0.156	3.485	ND	2.273	2.273	1.212	0.454	0.012	431	7.66	18

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	9	9	21	B	0.199	0.033	0.084	0.051	0.114	3.253	ND	2.214	2.214	1.039	0.112	0.003	429	7.63	18
1999	9	9	21	C	0.245	0.038	0.098	0.061	0.147	3.090	ND	2.510	2.510	0.580	0.085	0.002	432	7.62	18
1999	9	20	21	A	0.207	0.069	0.120	0.051	0.086	2.575	0.006	2.254	2.248	0.321	ND	ND	402	7.56	18
1999	9	20	21	B	0.208	0.044	0.120	0.077	0.088	2.750	0.017	2.178	2.161	0.572	0.197	0.004	474	7.53	18
1999	9	20	21	C	0.233	0.044	0.065	0.021	0.168	2.943	0.018	2.161	2.143	0.782	0.608	0.011	470	7.5	18
1999	9	30	21	A	0.270	0.045	0.119	0.074	0.151	2.992	0.031	2.291	2.259	0.701	ND	ND	358	7.3	15
1999	9	30	21	B	0.275	0.063	0.134	0.072	0.141	3.033	0.014	2.210	2.197	0.823	ND	ND	358	7.3	15
1999	9	30	21	C	0.156	0.048	0.108	0.060	0.047	2.345	0.021	2.149	2.128	0.195	ND	ND	355	7.29	15
1999	10	12	21	A	0.085	0.003	0.025	0.022	0.060	2.159	ND	1.706	1.706	0.453	0.155	0.004	375	7.67	14
1999	10	12	21	B	0.147	0.004	0.071	0.067	0.076	2.858	0.051	2.402	2.351	0.456	ND	ND	376	7.73	14
1999	10	12	21	C	0.093	0.002	0.054	0.052	0.039	2.095	0.019	1.697	1.679	0.398	0.393	0.011	377	7.69	14
1999	10	25	21	A	0.243	0.015	0.078	0.063	0.165	2.965	ND	2.266	2.266	0.698	0.673	0.055	787	8.17	12
1999	10	25	21	B	0.271	0.021	0.099	0.078	0.172	3.121	ND	2.382	2.382	0.739	0.729	0.060	789	8.18	12
1999	10	25	21	C	0.283	0.023	0.099	0.076	0.184	3.065	0.006	2.475	2.469	0.590	0.578	0.048	783	8.18	12
1999	11	17	21	A	0.086	0.047	0.093	0.046	ND	2.567	0.494	2.112	1.618	0.455	0.258	0.001	608	6.61	7
1999	11	17	21	B	0.098	0.042	0.086	0.043	0.012	2.172	0.485	2.152	1.667	0.020	0.232	0.001	607	6.6	7
1999	11	17	21	C	0.079	0.040	0.083	0.043	ND	2.357	0.487	2.110	1.623	0.248	0.221	0.001	609	6.62	7
1999	11	29	21	A	0.089	0.037	0.048	0.011	0.042	1.900	ND	1.742	1.742	0.158	0.173	0.001	158.5	7.07	5
1999	11	29	21	B	0.083	0.037	0.045	0.009	0.037	1.895	ND	1.475	1.475	0.419	0.192	0.001	158.8	6.97	5
1999	11	29	21	C	0.062	0.019	0.041	0.022	0.021	1.882	0.033	1.580	1.547	0.302	ND	ND	157.5	7.13	5
1999	6	7	22	A	0.338	0.239	0.349	0.111	ND	2.806	0.040	2.490	2.451	0.316	ND	ND	687	8.34	13
1999	6	7	22	B	0.438	0.230	0.311	0.082	0.126	3.560	0.032	3.419	3.387	0.141	ND	ND	683	8.36	13
1999	6	7	22	C	0.409	0.246	0.378	0.132	0.031	2.739	0.023	2.615	2.592	0.123	ND	ND	683	8.41	13
1999	7	8	22	A	0.265	0.012	0.035	0.023	0.230	4.968	0.006	3.562	3.557	1.406	0.180	0.005	1731	7.69	16
1999	7	8	22	B	0.197	0.015	0.043	0.028	0.154	4.334	0.019	3.577	3.558	0.757	0.217	0.006	1733	7.67	16
1999	7	8	22	C	0.197	0.012	0.040	0.029	0.157	5.027	0.033	3.496	3.462	1.532	0.195	0.005	1749	7.65	16
1999	7	19	22	A	0.195	0.091	0.160	0.069	0.036	1.609	0.016	1.405	1.389	0.204	0.053	0.002	404	7.84	15
1999	7	19	22	B	0.158	0.061	0.129	0.068	0.029	1.995	0.102	2.000	1.898	ND	0.123	0.005	406	7.82	15
1999	7	19	22	C	0.318	0.172	0.216	0.044	0.102	1.640	0.013	1.495	1.482	0.145	0.042	0.002	404	7.84	15
1999	7	30	22	A	0.443	0.448	0.423	ND	0.020	2.158	0.064	1.698	1.634	0.460	ND	ND	427	7.61	20
1999	7	30	22	B	0.436	0.443	0.419	ND	0.017	1.807	0.083	1.904	1.822	ND	ND	ND	430	7.58	20
1999	7	30	22	C	0.502	0.448	0.404	ND	0.098	1.885	0.090	1.752	1.662	0.132	ND	ND	446	7.54	20
1999	8	3	22	A	0.389	0.312	0.326	0.014	0.063	1.878	0.004	0.203	0.199	1.675	ND	ND	.	.	.
1999	8	3	22	B	0.483	0.394	0.434	0.040	0.049	2.282	0.010	0.417	0.407	1.866	ND	ND	.	.	.
1999	8	3	22	C	0.464	0.390	0.367	ND	0.097	1.948	0.005	0.612	0.607	1.336	ND	ND	.	.	.
1999	8	9	22	A	0.589	0.236	0.294	0.059	0.295	2.579	0.022	2.118	2.096	0.461	ND	ND	655	7.73	16
1999	8	9	22	B	0.468	0.387	0.453	0.066	0.016	2.287	0.006	1.967	1.961	0.320	ND	ND	657	7.6	16
1999	8	9	22	C	0.517	0.366	0.395	0.029	0.122	2.149	0.006	2.200	2.193	ND	ND	ND	654	7.67	16
1999	8	19	22	A	0.643	0.429	0.528	0.100	0.114	2.018	0.014	1.446	1.432	0.572	0.052	0.002	433	7.86	15
1999	8	19	22	B	0.499	0.455	0.541	0.086	ND	1.724	ND	1.299	1.299	0.426	0.116	0.004	432	7.77	15
1999	8	19	22	C	0.499	0.423	0.470	0.047	0.029	1.616	ND	1.435	1.435	0.181	0.150	0.005	435	7.73	15
1999	6	7	23	A	3.953	4.558	4.267	ND	ND	36.789	24.762	35.959	11.197	0.831	2.936	0.245	1288	8.18	11
1999	6	7	23	B	0.392	0.310	0.581	0.271	ND	33.516	24.099	31.810	7.711	1.706	ND	ND	1279	8.14	11
1999	6	7	23	C	0.120	0.052	0.211	0.159	ND	32.507	24.629	33.303	8.673	ND	0.115	0.009	1276	8.15	11
1999	6	18	23	A	0.101	0.034	0.049	0.015	0.052	33.366	24.465	31.874	7.410	1.491	ND	ND	1786	7.96	14
1999	6	18	23	B	0.122	0.038	0.068	0.030	0.053	34.367	24.350	33.483	9.133	0.885	ND	ND	1810	7.98	14
1999	6	18	23	C	0.101	0.034	0.066	0.032	0.035	34.014	24.676	33.549	8.874	0.464	ND	ND	1787	8.18	14
1999	6	28	23	A	0.092	0.022	0.092	0.070	0.000	31.235	22.932	31.360	8.427	ND	ND	ND	1848	7.51	11
1999	6	28	23	B	0.135	0.021	0.096	0.075	0.039	33.038	23.387	34.282	10.895	ND	ND	ND	1861	7.49	11
1999	6	28	23	C	0.135	0.021	0.099	0.077	0.036	32.421	22.081	28.399	6.318	4.022	ND	ND	1848	7.48	11
1999	7	8	23	A	0.147	0.037	0.092	0.056	0.055	23.320	5.315	21.285	15.970	2.035	ND	ND	1894	7.51	11
1999	7	8	23	B	0.176	0.050	0.188	0.139	ND	22.556	6.069	22.631	16.562	ND	ND	ND	1900	7.5	11
1999	7	8	23	C	0.174	0.045	0.120	0.075	0.055	25.582	4.035	24.112	20.077	1.470	ND	ND	1892	7.5	11
1999	7	19	23	A	0.345	0.009	0.042	0.033	0.303	4.717	0.010	3.483	3.473	1.234	0.104	0.003	181.9	7.62	12
1999	7	19	23	B	0.283	0.013	0.063	0.049	0.220	5.829	0.006	3.829	3.823	2.001	0.131	0.004	182.2	7.66	12
1999	7	19	23	C	0.194	0.013	0.030	0.017	0.164	4.724	0.009	3.449	3.440	1.275	0.203	0.005	183.4	7.62	12
1999	7	30	23	A	1.240	1.098	1.052	ND	0.188	2.147	0.852	2.525	1.673	ND	ND	ND	627	7.64	18
1999	7	30	23	B	1.197	1.088	1.044	ND	0.153	2.382	0.937	2.436	1.500	ND	ND	ND	630	7.59	18
1999	7	30	23	C	1.229	1.089	1.035	ND	0.194	2.327	0.834	1.974	1.140	0.353	ND	ND	602	7.53	18
1999	8	3	23	A	0.215	0.051	0.125	0.074	0.090	2.134	0.005	1.589	1.584	0.545	ND	ND	.	.	.
1999	8	3	23	B	1.523	1.211	1.278	0.067	0.245	2.542	0.108	2.421	2.313	0.121	ND	ND	.	.	.
1999	8	3	23	C	1.001	0.862	0.905	0.043	0.095	1.731	0.006	1.872	1.866	ND	ND	ND	.	.	.
1999	8	9	23	A	0.244	0.015	0.079	0.064	0.165	20.716	12.680	20.065	7.385	0.652	ND	ND	176.2	7.57	16
1999	8	9	23	B	0.181	0.018	0.112	0.094	0.069	18.712	10.351	18.767	8.416	ND	ND	ND	176	7.52	16

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	8	9	23	C	0.202	0.010	0.086	0.076	0.116	19.868	1.489	19.921	18.432	ND	ND	ND	176	7.5	16
1999	8	19	23	A	0.275	0.019	0.196	0.176	0.080	19.266	2.606	18.166	15.560	1.101	ND	ND	1528	7.27	15
1999	8	19	23	B	0.268	0.053	0.229	0.176	0.039	20.663	5.832	20.354	14.522	0.310	ND	ND	1523	7.28	15
1999	8	19	23	C	0.290	0.037	0.281	0.244	0.009	23.348	15.062	22.795	7.733	0.553	ND	ND	1532	7.29	15
1999	5	27	24	A	0.127	0.024	0.100	0.076	0.027	21.762	16.293	21.104	4.811	0.658	ND	ND	3220	7.46	13
1999	5	27	24	B	0.048	0.019	0.068	0.049	ND	22.010	16.922	21.957	5.035	0.052	ND	ND	3210	7.49	13
1999	5	27	24	C	0.094	0.021	0.080	0.058	0.014	23.094	16.772	21.893	5.121	1.201	ND	ND	3240	7.48	13
1999	6	7	24	A	0.123	0.017	0.065	0.048	0.058	19.427	13.199	19.428	6.229	ND	ND	ND	3080	7.81	8
1999	6	7	24	B	0.037	0.017	0.033	0.016	0.004	19.094	13.423	19.566	6.143	ND	ND	ND	3170	7.8	8
1999	6	7	24	C	0.020	0.049	0.094	0.045	ND	18.982	13.671	18.879	5.208	0.103	ND	ND	3220	7.82	8
1999	6	18	24	A	0.208	0.034	0.038	0.005	0.169	54.858	37.869	52.346	14.477	2.512	ND	ND	3040	7.8	14
1999	6	18	24	B	0.133	0.034	0.068	0.035	0.065	54.862	39.232	52.292	13.060	2.570	ND	ND	3050	7.76	14
1999	6	18	24	C	0.127	0.047	0.101	0.054	0.026	55.305	38.765	54.931	16.166	0.374	0.281	0.009	3080	7.75	14
1999	6	28	24	A	0.077	0.015	0.030	0.015	0.047	48.840	37.051	44.688	7.637	4.153	ND	ND	3370	7.56	14
1999	6	28	24	B	0.030	0.015	0.058	0.043	ND	47.742	36.995	45.470	8.474	2.273	ND	ND	3400	7.55	14
1999	6	28	24	C	0.074	0.021	0.069	0.048	0.005	49.907	36.763	52.871	16.107	ND	ND	ND	3380	7.54	14
1999	7	8	24	A	0.054	0.004	0.034	0.030	0.020	40.965	26.872	38.864	11.992	2.102	ND	ND	3870	7.52	16
1999	7	8	24	B	0.037	0.007	0.052	0.045	ND	42.681	32.836	42.874	10.038	ND	ND	ND	3860	7.5	16
1999	7	8	24	C	0.088	0.007	0.043	0.036	0.045	43.451	33.707	41.410	7.703	2.041	ND	ND	3890	7.49	16
1999	7	19	24	A	0.035	0.005	0.038	0.034	ND	37.673	17.590	35.983	18.393	1.690	ND	ND	4040	7.45	14
1999	7	19	24	B	0.098	0.005	0.029	0.024	0.070	39.778	14.299	39.316	25.016	0.463	ND	ND	4060	7.45	14
1999	7	19	24	C	0.059	0.005	0.021	0.016	0.039	38.403	6.270	38.571	32.301	ND	ND	ND	4020	7.47	14
1999	7	30	24	A	0.120	0.052	0.094	0.042	0.026	34.277	28.313	33.068	4.755	1.210	ND	ND	398	7.24	16
1999	7	30	24	B	0.112	0.052	0.080	0.028	0.032	33.899	29.750	33.547	3.797	0.352	ND	ND	405	7.2	16
1999	7	30	24	C	0.107	0.056	0.120	0.064	ND	33.260	30.587	32.924	2.337	0.336	ND	ND	396	7.22	16
1999	8	3	24	A	0.140	0.060	0.113	0.053	0.027	31.079	26.850	34.008	7.159	ND	ND	ND	.	.	.
1999	8	3	24	B	0.128	0.039	0.076	0.037	0.052	31.335	26.900	20.253	ND	11.083	ND	ND	.	.	.
1999	8	3	24	C	0.128	0.056	0.110	0.054	0.018	32.569	27.321	35.593	8.272	ND	ND	ND	.	.	.
1999	8	9	24	A	0.317	0.170	0.266	0.095	0.052	3.563	0.006	3.160	3.154	0.403	ND	ND	2840	7.62	13
1999	8	9	24	B	0.389	0.236	0.296	0.060	0.094	3.376	0.023	3.117	3.094	0.259	ND	ND	2850	7.64	13
1999	8	9	24	C	0.489	0.201	0.316	0.115	0.173	3.535	ND	2.684	2.684	0.851	ND	ND	2840	7.63	13
1999	8	19	24	A	0.117	0.005	0.094	0.089	0.023	27.739	4.643	26.369	21.726	1.370	ND	ND	3480	7.09	12
1999	8	19	24	B	0.094	0.005	0.071	0.066	0.023	30.148	22.979	29.983	7.003	0.166	ND	ND	3460	7.11	12
1999	8	19	24	C	0.094	0.002	0.080	0.078	0.015	30.700	23.714	30.386	6.672	0.314	0.005	0.000	3480	7.13	12
1999	5	27	25	A	0.072	0.029	0.080	0.051	ND	22.304	16.614	21.221	4.607	1.083	ND	ND	3320	7.54	10
1999	5	27	25	B	0.131	0.029	0.137	0.108	ND	22.323	16.410	22.476	6.066	ND	ND	ND	3350	7.54	10
1999	5	27	25	C	0.223	0.033	0.080	0.046	0.144	22.309	15.903	21.437	5.534	0.872	ND	ND	3370	7.52	10
1999	6	7	25	A	0.280	0.022	0.045	0.023	0.236	28.579	21.139	26.388	5.249	2.191	ND	ND	3600	7.79	9
1999	6	7	25	B	0.066	0.031	0.030	ND	0.036	27.486	21.057	26.407	5.350	1.079	ND	ND	3580	7.84	9
1999	6	7	25	C	0.101	0.035	0.059	0.024	0.042	27.473	19.970	27.328	7.358	0.146	ND	ND	3590	7.83	9
1999	6	18	25	A	0.186	0.046	0.111	0.065	0.074	47.745	33.904	46.612	12.708	1.133	ND	ND	4140	7.84	18
1999	6	18	25	B	0.163	0.047	0.111	0.065	0.052	49.200	35.508	49.176	13.668	0.024	ND	ND	4210	7.81	18
1999	6	18	25	C	0.163	0.051	0.094	0.043	0.069	48.318	34.826	49.401	14.575	ND	ND	ND	4150	7.85	18
1999	6	28	25	A	0.135	0.021	0.069	0.048	0.066	5.786	1.668	5.054	3.386	0.732	ND	ND	1091	9.1	17
1999	6	28	25	B	0.135	0.026	0.078	0.053	0.056	4.961	1.285	4.861	3.576	0.100	ND	ND	1101	9.11	17
1999	6	28	25	C	0.148	0.033	0.099	0.065	0.049	4.973	1.423	5.252	3.830	ND	ND	ND	1092	9.13	17
1999	7	8	25	A	0.206	0.024	0.077	0.053	0.129	25.863	11.873	23.289	11.416	2.574	ND	ND	3120	7.82	16
1999	7	8	25	B	0.177	0.059	0.060	0.001	0.117	26.746	19.737	25.438	5.700	1.309	ND	ND	3140	7.8	16
1999	7	8	25	C	0.189	0.027	0.088	0.061	0.101	25.200	11.663	24.512	12.850	0.688	ND	ND	3.17	7.77	16
1999	7	19	25	A	0.284	0.104	0.152	0.047	0.132	4.041	0.297	3.646	3.349	0.395	0.068	0.030	1080	9.12	18
1999	7	19	25	B	0.262	0.045	0.116	0.071	0.146	3.560	0.031	2.748	2.717	0.812	0.119	0.052	1084	9.12	18
1999	7	19	25	C	0.254	0.078	0.137	0.059	0.117	4.949	0.153	3.954	3.801	0.995	0.095	0.040	1080	9.08	18
1999	7	30	25	A	1.271	1.085	0.991	ND	0.279	3.174	1.511	3.346	1.835	ND	ND	ND	380	7.56	16
1999	7	30	25	B	1.059	1.089	1.145	0.055	ND	2.344	1.031	2.906	1.875	ND	ND	ND	386	7.48	16
1999	7	30	25	C	1.085	1.065	1.062	ND	0.024	2.167	0.916	2.397	1.481	ND	ND	ND	382	7.54	16
1999	8	3	25	A	0.171	0.038	0.073	0.035	0.099	2.558	0.676	2.696	2.020	ND	ND	ND	.	.	.
1999	8	3	25	B	1.612	1.339	1.312	ND	0.300	2.897	1.108	2.951	1.843	ND	ND	ND	.	.	.
1999	8	3	25	C	0.449	0.331	0.346	0.015	0.103	2.367	0.901	2.070	1.169	0.297	ND	ND	.	.	.
1999	8	9	25	A	0.145	0.011	0.076	0.064	0.069	30.434	23.613	31.047	7.435	ND	ND	ND	1075	8.38	17
1999	8	9	25	B	0.200	0.010	0.079	0.069	0.121	34.524	25.875	32.994	7.119	1.530	ND	ND	1028	8.32	17
1999	8	9	25	C	0.112	0.010	0.080	0.070	0.032	28.821	19.076	29.606	10.531	ND	ND	ND	1038	8.83	17
1999	8	19	25	A	0.319	0.185	0.307	0.122	0.012	3.151	0.069	2.820	2.751	0.331	0.126	0.023	952	8.58	18
1999	8	19	25	B	0.362	0.194	0.274	0.080	0.088	3.328	0.010	3.165	3.156	0.163	0.085	0.017	943	8.62	18
1999	8	19	25	C	0.365	0.193	0.317	0.124	0.048	3.194	ND	2.707	2.707	0.487	0.114	0.023	955	8.62	18

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	7	8	27	A	0.197	0.012	0.043	0.032	0.154	5.189	0.436	3.574	3.138	1.615	0.144	0.046	1158	8.9	18
1999	7	8	27	B	0.123	0.012	0.043	0.032	0.080	3.691	0.041	2.696	2.655	0.995	0.263	0.086	1209	8.91	18
1999	7	8	27	C	0.151	0.008	0.054	0.046	0.097	6.948	0.220	4.810	4.590	2.138	0.177	0.060	1199	8.93	18
1999	7	19	27	A	0.269	0.082	0.168	0.086	0.102	3.628	0.028	2.717	2.690	0.911	ND	ND	1060	9.09	14
1999	7	19	27	B	0.176	0.056	0.126	0.069	0.050	3.213	0.010	3.093	3.083	0.120	0.119	0.049	1068	9.07	14
1999	7	19	27	C	0.176	0.043	0.097	0.053	0.079	3.127	0.018	2.761	2.744	0.365	ND	ND	1062	9.09	14
1999	7	30	27	A	1.112	1.066	1.006	ND	0.106	2.298	0.821	1.985	1.163	0.313	ND	ND	379	7.53	22
1999	7	30	27	B	1.185	1.092	1.052	ND	0.132	2.337	0.797	2.371	1.574	ND	ND	ND	334	7.53	22
1999	7	30	27	C	1.247	1.102	1.125	0.023	0.122	3.154	1.192	2.777	1.584	0.377	ND	ND	335	7.56	22
1999	8	3	27	A	0.314	0.246	0.304	0.058	0.010	2.714	0.483	2.630	2.147	0.085	ND	ND	.	.	.
1999	8	3	27	B	1.539	1.378	1.393	0.015	0.146	3.999	1.459	2.929	1.470	1.070	ND	ND	.	.	.
1999	8	3	27	C	1.724	1.482	1.550	0.067	0.175	3.091	1.523	2.954	1.430	0.137	ND	ND	.	.	.
1999	8	19	27	A	0.336	0.194	0.317	0.124	0.019	2.980	0.007	2.771	2.764	0.209	0.121	0.021	994	8.54	18
1999	8	19	27	B	0.355	0.215	0.297	0.082	0.058	2.816	ND	2.793	2.793	0.023	0.114	0.021	995	8.59	18
1999	8	19	27	C	0.326	0.188	0.319	0.130	0.007	3.040	ND	2.548	2.548	0.492	0.120	0.023	997	8.6	18
1999	5	27	28	A	0.047	0.024	0.049	0.025	ND	16.558	12.429	16.277	3.847	0.282	0.057	0.002	3100	7.73	11
1999	5	27	28	B	0.094	0.029	0.095	0.067	ND	17.059	12.259	17.262	5.003	ND	0.061	0.002	3060	7.64	11
1999	5	27	28	C	0.105	0.015	0.072	0.057	0.033	17.668	12.398	16.621	4.223	1.047	ND	ND	3100	7.63	11
1999	6	7	28	A	0.086	0.034	0.074	0.039	0.012	18.615	12.418	17.558	5.140	1.057	ND	ND	3090	7.85	9
1999	6	7	28	B	0.037	0.026	0.094	0.068	ND	17.613	12.671	17.632	4.961	-0.019	ND	ND	3110	7.81	9
1999	6	7	28	C	0.077	0.023	0.066	0.043	0.011	18.572	12.722	17.997	5.275	0.574	ND	ND	3150	7.84	9
1999	6	28	28	A	0.103	0.026	0.042	0.017	0.061	35.215	26.776	33.378	6.602	1.837	ND	ND	2870	7.85	14
1999	6	28	28	B	0.109	0.021	0.123	0.102	ND	35.814	26.732	38.251	11.519	ND	0.515	0.019	2910	7.81	14
1999	6	28	28	C	0.109	0.030	0.082	0.053	0.027	37.189	25.961	38.348	12.387	ND	0.448	0.016	2880	7.8	14
1999	7	8	28	A	0.153	0.058	0.151	0.093	0.002	34.280	29.881	32.282	2.402	1.998	ND	ND	2800	7.54	11
1999	7	8	28	B	0.143	0.101	0.154	0.053	ND	36.482	30.462	34.717	4.255	1.766	ND	ND	2900	7.57	11
1999	7	8	28	C	0.197	0.101	0.136	0.035	0.062	36.449	34.754	36.320	1.566	0.130	ND	ND	2890	7.6	11
1999	7	19	28	A	0.043	0.011	0.030	0.019	0.013	5.790	0.014	4.629	4.615	1.161	ND	ND	2930	7.62	13
1999	7	19	28	B	0.076	0.012	0.058	0.046	0.018	5.702	0.010	5.245	5.235	0.456	ND	ND	2940	7.64	13
1999	7	19	28	C	0.063	0.010	0.030	0.021	0.032	5.509	0.017	5.566	5.549	ND	ND	ND	2970	7.71	13
1999	7	30	28	A	0.172	0.052	0.099	0.047	0.073	34.489	28.907	31.676	2.770	2.813	ND	ND	403	7.16	18
1999	7	30	28	B	0.153	0.061	0.080	0.019	0.073	36.542	28.385	35.491	7.106	1.051	ND	ND	400	7.16	18
1999	7	30	28	C	0.113	0.057	0.100	0.043	0.013	33.895	29.617	33.962	4.345	ND	ND	ND	400	7.17	18
1999	8	3	28	A	0.128	0.051	0.134	0.083	ND	31.210	27.383	34.668	7.285	ND	ND	ND	.	.	.
1999	8	3	28	B	0.121	0.023	0.065	0.042	0.055	31.045	24.439	34.167	9.728	ND	ND	ND	.	.	.
1999	8	3	28	C	0.128	0.046	0.091	0.044	0.037	32.280	27.030	34.798	7.768	ND	ND	ND	.	.	.
1999	8	19	28	A	0.129	0.011	0.131	0.120	ND	30.340	22.652	28.857	6.205	1.483	ND	ND	2460	7.49	12
1999	8	19	28	B	0.102	0.011	0.094	0.084	0.007	30.674	23.007	30.424	7.417	0.250	0.009	0.000	2470	7.4	12
1999	8	19	28	C	0.100	0.006	0.087	0.081	0.013	31.428	17.103	29.934	12.831	1.494	ND	ND	2460	7.35	12
1999	1	13	30	A	1.997	1.925	1.925	ND	0.072	16.760	12.538	15.417	2.879	1.343	.	.	887	7.98	2.8
1999	1	13	30	B	1.951	1.938	2.103	0.164	ND	16.490	12.768	15.370	2.602	1.120	.	.	888	7.97	2.8
1999	1	13	30	C	2.190	1.921	2.065	0.144	0.126	16.592	12.543	15.144	2.602	1.448	.	.	887	7.98	2.8
1999	2	18	30	A	1.934	1.415	1.871	0.456	0.063	13.460	0.045	12.948	12.904	0.511	.	.	909	8.01	5.6
1999	2	18	30	B	1.977	1.591	1.965	0.374	0.012	14.741	0.194	14.292	14.098	0.449	.	.	911	7.99	5.6
1999	2	18	30	C	1.898	1.663	1.777	0.114	0.121	14.900	0.018	14.585	14.567	0.316	.	.	908	8.02	5.6
1999	4	6	30	A	1.879	1.330	1.683	0.354	0.195	15.857	0.630	12.562	11.932	3.295	6.199	0.155	1257	7.63	6.7
1999	4	6	30	B	1.586	1.268	1.702	0.434	ND	15.500	0.644	11.147	10.504	4.352	6.346	0.166	1006	7.65	6.7
1999	4	6	30	C	2.052	1.409	1.790	0.381	0.262	16.249	0.618	13.343	12.726	2.905	6.225	0.178	999	7.69	6.7
1999	4	19	30	A	1.929	1.487	1.521	0.034	0.409	13.342	0.207	9.683	9.476	3.659	.	.	896	8.72	10
1999	4	19	30	B	2.024	1.526	1.576	0.050	0.448	14.115	0.209	11.098	10.889	3.017	.	.	899	8.75	10
1999	4	19	30	C	2.147	1.543	1.508	ND	0.639	13.702	0.222	10.674	10.452	3.028	.	.	888	8.78	10
1999	5	7	30	A	1.746	1.803	1.615	ND	0.130	11.486	0.085	9.692	9.607	1.794	7.541	2.479	857	8.91	8.3
1999	5	7	30	B	1.931	1.882	1.475	ND	0.456	14.447	ND	10.264	10.264	4.183	6.895	2.409	854	8.95	8.3
1999	5	7	30	C	1.835	1.869	2.050	0.181	ND	11.506	ND	11.692	11.692	ND	7.212	2.673	851	8.99	8.3
1999	5	27	30	A	2.494	1.777	2.136	0.359	0.358	11.566	0.418	10.072	9.654	1.494	5.264	1.402	421	8.78	17.8
1999	5	27	30	B	2.192	1.813	2.045	0.233	0.147	10.542	0.252	8.713	8.461	1.829	4.797	1.277	423	8.78	17.8
1999	5	27	30	C	2.192	1.804	1.955	0.150	0.237	10.393	0.251	9.507	9.256	0.887	5.021	1.292	426	8.76	17.8
1999	6	7	30	A	1.935	1.136	1.634	0.499	0.300	7.893	0.159	7.026	6.868	0.867	3.957	1.108	818	8.81	14
1999	6	7	30	B	1.880	1.179	1.611	0.432	0.269	7.783	0.016	6.389	6.373	1.394	3.587	1.089	825	8.86	14
1999	6	7	30	C	1.979	1.170	1.668	0.498	0.311	8.608	ND	6.470	6.470	2.138	3.718	1.222	828	8.91	14
1999	6	18	30	A	1.788	1.432	1.677	0.246	0.111	10.606	0.799	9.562	8.763	1.044	5.618	0.229	870	7.85	21
1999	6	18	30	B	1.768	1.633	1.503	ND	0.265	9.816	0.037	8.883	8.846	0.933	5.592	0.218	873	7.83	21
1999	6	18	30	C	1.938	1.759	2.113	0.354	ND	10.768	0.124	10.196	10.072	0.572	5.755	0.225	877	7.83	21
1999	6	28	30	A	2.042	1.031	1.468	0.436	0.575	10.474	0.394	8.960	8.566	1.514	4.860	0.152	860	7.73	19

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	6	28	30	B	2.154	1.410	1.856	0.446	0.298	10.701	0.118	10.245	10.127	0.456	4.936	0.165	860	7.76	19
1999	6	28	30	C	1.970	1.462	1.674	0.212	0.296	10.249	0.033	10.032	10.000	0.217	5.044	0.173	871	7.77	19
1999	7	8	30	A	2.311	1.516	1.695	0.179	0.616	10.247	0.184	7.185	7.000	3.063	3.495	0.162	834	7.91	19
1999	7	8	30	B	2.415	1.522	1.830	0.308	0.585	8.168	0.093	6.905	6.812	1.264	3.921	0.189	835	7.93	19
1999	7	8	30	C	2.208	1.596	1.676	0.080	0.532	7.808	0.030	6.863	6.833	0.945	3.894	0.184	836	7.92	19
1999	7	19	30	A	2.502	1.888	2.166	0.278	0.336	12.713	0.055	13.626	13.571	ND	6.649	0.252	880	7.82	21
1999	7	19	30	B	2.569	1.929	2.317	0.387	0.252	12.677	0.022	12.613	12.591	0.065	6.604	0.240	882	7.8	21
1999	7	19	30	C	2.892	1.927	2.410	0.483	0.482	13.845	ND	12.920	12.920	0.924	6.743	0.267	882	7.84	21
1999	7	30	30	A	2.401	1.810	2.023	0.213	0.378	11.547	0.199	8.199	8.000	3.348	6.382	0.151	829	7.61	22
1999	7	30	30	B	2.264	1.929	2.084	0.155	0.180	10.510	0.033	8.320	8.287	2.191	5.658	0.144	826	7.64	22
1999	7	30	30	C	2.393	1.876	2.005	0.129	0.389	11.435	0.010	7.672	7.662	3.763	6.124	0.159	828	7.65	22
1999	8	9	30	A	1.236	0.571	0.799	0.228	0.437	9.839	0.081	7.722	7.641	2.117	5.664	0.215	799	7.82	20
1999	8	9	30	B	1.407	0.944	1.315	0.371	0.092	10.077	0.030	9.018	8.988	1.059	5.614	0.195	803	7.78	20
1999	8	9	30	C	1.482	0.792	1.186	0.394	0.296	10.968	0.008	8.581	8.572	2.388	6.488	0.220	804	7.77	20
1999	8	19	30	A	2.769	2.188	2.692	0.504	0.077	10.902	0.059	8.754	8.695	2.147	4.071	0.154	692	7.82	20
1999	8	19	30	B	2.884	2.149	2.387	0.238	0.498	10.273	ND	8.505	8.505	1.768	3.893	0.154	684	7.84	20
1999	8	19	30	C	2.783	2.114	2.737	0.623	0.046	10.611	0.016	8.726	8.710	1.886	3.775	0.156	683	7.86	20
1999	8	30	30	A	2.488	0.175	0.728	0.553	1.761	15.531	0.008	9.573	9.566	5.958	4.623	0.065	1040	7.38	20
1999	8	30	30	B	2.304	0.506	0.983	0.477	1.321	15.789	ND	1.390	1.390	14.399	4.507	0.071	1045	7.43	20
1999	8	30	30	C	2.243	0.759	0.979	0.220	1.265	15.084	ND	10.000	10.000	5.084	4.604	0.076	1040	7.45	20
1999	9	9	30	A	2.344	1.539	1.728	0.190	0.615	16.298	0.007	12.130	12.123	4.168	5.997	0.089	727	7.4	18
1999	9	9	30	B	2.248	1.362	1.400	0.038	0.848	15.767	ND	11.607	11.607	4.160	6.107	0.088	729	7.39	18
1999	9	9	30	C	2.355	1.475	1.534	0.058	0.821	14.906	0.010	11.746	11.736	3.160	5.042	0.070	726	7.37	18
1999	9	20	30	A	2.604	1.743	2.286	0.543	0.318	18.016	0.030	11.778	11.748	6.238	11.102	0.122	803	7.27	17
1999	9	20	30	B	2.535	1.800	2.334	0.534	0.202	18.048	0.011	15.962	15.950	2.086	11.327	0.109	799	7.21	17
1999	9	20	30	C	2.607	1.824	1.859	0.035	0.748	17.246	0.201	17.011	16.810	0.235	10.743	0.098	803	7.19	17
1999	9	30	30	A	1.974	1.348	1.816	0.468	0.158	17.322	0.051	13.470	13.420	3.852	11.068	0.139	771	7.33	14
1999	9	30	30	B	2.087	1.618	1.848	0.230	0.239	16.582	0.028	12.584	12.556	3.998	10.680	0.132	765	7.32	14
1999	9	30	30	C	2.004	1.639	1.966	0.327	0.038	16.613	0.023	12.200	12.178	4.413	11.259	0.142	778	7.33	14
1999	10	12	30	A	2.764	1.982	2.619	0.637	0.145	14.088	4.069	12.671	8.602	1.417	4.042	0.056	706	7.37	14
1999	10	12	30	B	2.885	2.023	2.602	0.579	0.283	14.081	3.669	13.050	9.381	1.031	7.934	0.147	704	7.5	14
1999	10	12	30	C	2.670	2.002	2.526	0.524	0.144	14.275	6.600	12.957	6.357	1.318	6.190	0.089	714	7.39	14
1999	10	25	30	A	2.557	0.723	2.403	1.681	0.154	14.721	ND	14.635	14.635	0.086	12.107	0.124	742	7.24	10
1999	10	25	30	B	2.649	1.232	2.423	1.192	0.225	15.150	ND	15.494	15.494	ND	11.965	0.126	743	7.25	10
1999	10	25	30	C	2.663	1.298	2.406	1.108	0.257	14.422	ND	14.893	14.893	ND	11.804	0.118	747	7.23	10
1999	11	17	30	A	2.610	2.179	2.586	0.407	0.024	22.510	0.124	19.579	19.455	2.931	18.431	0.144	704	7.12	7
1999	11	17	30	B	2.442	2.161	2.510	0.349	ND	22.106	0.125	18.925	18.801	3.181	18.058	0.135	704	7.1	7
1999	11	17	30	C	2.348	2.112	2.261	0.149	0.087	22.573	0.253	19.174	18.921	3.399	18.444	0.138	702	7.1	7
1999	11	29	30	A	2.383	1.289	2.324	1.034	0.059	18.999	0.006	16.731	16.725	2.268	18.413	0.298	681	7.44	6
1999	11	29	30	B	2.393	1.332	2.337	1.006	0.055	19.327	ND	17.340	17.340	1.986	18.874	0.279	684	7.4	6
1999	11	29	30	C	2.351	1.409	2.330	0.921	0.021	18.967	0.035	17.348	17.313	1.618	19.221	0.304	682	7.43	6
1999	12	14	30	A	2.523	1.771	2.186	0.415	0.337	22.949	0.061	20.159	20.098	2.790	22.234	0.738	763	7.76	2
1999	12	14	30	B	2.596	1.810	2.480	0.670	0.116	24.377	0.123	21.480	21.357	2.896	25.035	0.992	752	7.84	2
1999	12	14	30	C	2.537	1.792	2.430	0.638	0.108	23.026	0.105	20.417	20.312	2.609	25.647	0.778	726	7.72	2
1999	4	6	31	A	0.520	0.161	0.368	0.207	0.151	4.424	ND	1.418	1.418	3.005	0.226	0.058	928	8.76	4.4
1999	4	6	31	B	0.460	0.130	0.243	0.113	0.217	3.840	ND	1.336	1.336	2.505	0.211	0.056	939	8.78	4.4
1999	4	6	31	C	0.413	0.163	0.248	0.085	0.165	4.005	0.019	1.372	1.352	2.633	0.184	0.050	930	8.79	4.4
1999	4	19	31	A	0.551	0.358	0.184	ND	0.368	3.227	0.769	1.400	0.631	1.826	.	.	546	8.35	8.3
1999	4	19	31	B	0.505	0.376	0.189	ND	0.317	3.137	0.935	1.018	0.083	2.119	.	.	547	8.45	8.3
1999	4	19	31	C	0.536	0.384	0.229	ND	0.307	3.341	0.782	1.154	0.372	2.187	.	.	566	8.49	8.3
1999	5	7	31	A	0.339	0.093	0.275	0.182	0.063	2.319	ND	2.676	2.676	ND	0.157	0.046	456	8.84	8.3
1999	5	7	31	B	0.229	0.099	0.256	0.158	ND	1.400	ND	1.418	1.418	ND	0.138	0.047	465	8.93	8.3
1999	5	7	31	C	0.278	0.120	0.203	0.083	0.076	1.473	ND	1.240	1.240	0.233	0.159	0.058	467	8.98	8.3
1999	5	27	31	A	0.407	0.250	0.353	0.103	0.055	1.788	ND	1.364	1.364	0.424	0.239	0.048	399	8.62	17.2
1999	5	27	31	B	0.381	0.223	0.320	0.097	0.062	1.476	ND	1.208	1.208	0.268	0.240	0.051	401	8.65	17.2
1999	5	27	31	C	0.358	0.227	0.345	0.118	0.013	2.075	0.033	1.841	1.807	0.234	0.256	0.052	398	8.63	17.2
1999	6	7	31	A	0.435	0.208	0.277	0.068	0.158	2.294	0.106	1.401	1.295	0.893	0.251	0.094	440	9	14
1999	6	7	31	B	0.378	0.210	0.306	0.096	0.072	2.051	0.075	1.364	1.289	0.688	0.130	0.050	445	9.01	14
1999	6	7	31	C	0.420	0.236	0.327	0.091	0.093	1.919	0.047	1.491	1.444	0.428	0.167	0.068	441	9.05	14
1999	6	18	31	A	0.257	0.125	0.166	0.041	0.091	1.974	ND	1.400	1.400	0.574	0.170	0.011	229	8.07	19
1999	6	18	31	B	0.268	0.134	0.179	0.045	0.089	1.792	ND	1.119	1.119	0.673	0.127	0.007	231	7.99	19
1999	6	18	31	C	0.476	0.165	0.205	0.040	0.271	4.018	ND	1.214	1.214	2.804	0.265	0.012	231	7.91	19
1999	6	28	31	A	0.161	0.024	0.096	0.072	0.065	2.092	0.024	1.733	1.709	0.358	0.277	0.015	471	7.98	17
1999	6	28	31	B	0.155	0.030	0.109	0.080	0.046	1.739	ND	1.745	1.745	ND	0.224	0.012	470	7.99	17

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	6	28	31	C	0.122	0.021	0.096	0.075	0.026	1.713	ND	1.723	1.723	ND	0.235	0.014	467	8.02	17
1999	7	8	31	A	0.134	0.031	0.074	0.043	0.060	2.151	0.016	1.613	1.597	0.538	0.356	0.061	432	8.54	19
1999	7	8	31	B	0.219	0.058	0.131	0.073	0.088	2.543	0.015	1.759	1.743	0.785	0.362	0.066	439	8.57	19
1999	7	8	31	C	0.250	0.064	0.123	0.060	0.126	2.369	0.014	1.836	1.822	0.533	0.309	0.059	433	8.6	19
1999	7	19	31	A	0.156	0.060	0.085	0.026	0.071	3.343	0.264	2.057	1.794	1.285	0.336	0.020	213	8.03	19
1999	7	19	31	B	0.153	0.035	0.055	0.020	0.099	1.977	0.023	2.269	2.246	ND	0.309	0.020	215	8.06	19
1999	7	19	31	C	0.160	0.052	0.097	0.045	0.063	1.622	0.017	2.171	2.154	ND	0.275	0.017	212	8.04	19
1999	7	30	31	A	0.298	0.172	0.206	0.034	0.093	2.315	0.018	1.696	1.677	0.619	0.252	0.008	315	7.73	22
1999	7	30	31	B	0.259	0.159	0.215	0.056	0.044	1.904	0.015	2.585	2.569	ND	0.172	0.006	319	7.79	22
1999	7	30	31	C	0.292	0.178	0.252	0.074	0.040	2.265	0.011	1.291	1.279	0.975	0.331	0.012	317	7.8	22
1999	8	9	31	A	0.329	0.216	0.332	0.116	ND	2.002	ND	1.990	1.990	0.012	ND	ND	282	7.85	18
1999	8	9	31	B	0.342	0.220	0.284	0.064	0.058	2.411	ND	1.389	1.389	1.022	ND	ND	283	7.81	18
1999	8	9	31	C	0.294	0.184	0.312	0.128	ND	2.183	0.051	1.403	1.352	0.779	ND	ND	280	7.82	18
1999	8	19	31	A	0.326	0.246	0.315	0.069	0.011	1.625	ND	1.267	1.267	0.357	0.142	0.002	289	7.41	19
1999	8	19	31	B	0.333	0.249	0.353	0.104	ND	1.560	ND	1.703	1.703	ND	0.167	0.003	288	7.51	19
1999	8	19	31	C	0.337	0.260	0.319	0.059	0.019	1.484	ND	1.139	1.139	0.345	0.261	0.005	287	7.5	19
1999	8	30	31	A	0.388	0.105	0.195	0.090	0.193	2.796	ND	1.591	1.591	1.205	0.133	0.003	356	7.56	18
1999	8	30	31	B	0.354	0.083	0.193	0.111	0.160	2.732	ND	1.238	1.238	1.494	0.110	0.003	376	7.61	18
1999	8	30	31	C	0.432	0.130	0.192	0.062	0.241	2.569	ND	1.335	1.335	1.234	ND	ND	379	7.58	18
1999	9	9	31	A	0.271	0.227	0.235	0.007	0.036	1.867	ND	1.386	1.386	0.481	0.175	0.006	312	7.76	17
1999	9	9	31	B	0.271	0.192	0.232	0.040	0.039	1.922	0.021	1.529	1.508	0.392	0.188	0.007	313	7.79	17
1999	9	9	31	C	0.292	0.195	0.225	0.030	0.067	1.590	ND	1.306	1.306	0.284	0.173	0.006	313	7.8	17
1999	9	20	31	A	0.240	0.193	0.223	0.030	0.018	1.979	0.005	1.655	1.650	0.324	0.441	0.008	315	7.5	16
1999	9	20	31	B	0.272	0.148	0.208	0.060	0.064	1.805	ND	1.436	1.436	0.369	0.237	0.005	324	7.51	16
1999	9	20	31	C	0.153	0.121	0.157	0.036	ND	1.861	ND	1.487	1.487	0.374	0.401	0.008	318	7.53	16
1999	9	30	31	A	0.191	0.051	0.101	0.050	0.090	2.250	ND	ND	ND	2.250	ND	ND	308	7.63	12
1999	9	30	31	B	0.200	0.095	0.146	0.051	0.054	1.794	0.017	0.000	ND	1.794	ND	ND	304	7.71	12
1999	9	30	31	C	0.211	0.059	0.110	0.051	0.101	2.410	ND	0.091	0.091	2.319	ND	ND	311	7.67	12
1999	10	12	31	A	0.150	0.025	0.108	0.084	0.042	1.689	0.067	1.344	1.276	0.346	0.411	0.006	310	7.41	12
1999	10	12	31	B	0.193	0.051	0.131	0.080	0.062	2.092	0.060	1.540	1.480	0.552	0.508	0.007	316	7.38	12
1999	10	12	31	C	0.238	0.033	0.107	0.073	0.131	2.290	ND	1.295	1.295	0.995	0.335	0.052	319	7.42	12
1999	10	25	31	A	0.356	0.199	0.271	0.072	0.085	2.065	ND	1.616	1.616	0.449	0.418	0.025	517	7.81	9
1999	10	25	31	B	0.365	0.163	0.257	0.094	0.108	2.091	ND	1.544	1.544	0.546	0.296	0.016	517	7.97	9
1999	10	25	31	C	0.350	0.172	0.241	0.069	0.109	1.923	ND	1.823	1.823	0.100	0.248	0.009	518	7.81	9
1999	11	17	31	A	0.465	0.438	0.456	0.018	0.009	3.528	0.674	2.814	2.140	0.714	0.696	0.027	550	7.83	6
1999	11	17	31	B	0.332	0.389	0.403	0.014	ND	3.236	0.617	2.317	1.700	0.919	0.476	0.018	552	7.81	6
1999	11	17	31	C	0.388	0.434	0.407	ND	ND	3.202	0.695	2.663	1.968	0.539	0.577	0.022	550	7.82	6
1999	11	29	31	A	0.719	0.381	0.463	0.082	0.256	3.036	ND	1.967	1.967	1.069	1.574	0.056	749	7.79	5
1999	11	29	31	B	0.612	0.178	0.338	0.161	0.274	2.806	ND	2.082	2.082	0.725	1.428	0.055	752	7.83	5
1999	11	29	31	C	0.712	0.262	0.401	0.139	0.311	2.836	ND	1.700	1.700	1.136	1.437	0.053	748	7.81	5
1999	12	14	31	A	0.351	0.080	0.179	0.099	0.172	3.099	ND	1.639	1.639	1.460	0.509	0.137	580	8.79	0
1999	12	14	31	B	0.308	0.056	0.152	0.095	0.156	2.372	ND	1.328	1.328	1.043	ND	ND	572	8.7	0
1999	12	14	31	C	0.403	0.106	0.215	0.109	0.188	3.275	0.266	1.680	1.414	1.595	ND	ND	587	8.68	0
1999	1	13	32	A	0.377	0.233	0.231	ND	0.146	4.769	1.836	3.468	1.632	1.301	.	.	576	8.43	2.2
1999	1	13	32	B	0.185	0.233	0.206	ND	ND	4.634	1.783	3.245	1.462	1.390	.	.	575	8.42	2.2
1999	1	13	32	C	0.234	0.211	0.214	0.003	0.020	4.508	1.907	3.434	1.527	1.074	.	.	578	8.44	2.2
1999	4	6	32	A	0.113	0.041	0.038	ND	0.076	2.705	ND	1.742	1.742	0.963	0.059	0.021	620	8.96	5.6
1999	4	6	32	B	0.106	0.023	0.034	0.010	0.073	2.488	ND	1.802	1.802	0.686	ND	ND	642	9	5.6
1999	4	6	32	C	0.093	0.022	0.035	0.013	0.058	2.516	ND	1.443	1.443	1.074	ND	ND	652	9.01	5.6
1999	4	19	32	A	0.245	0.048	0.038	ND	0.208	2.590	0.100	1.514	1.414	1.076	.	.	417	8.05	10
1999	4	19	32	B	0.097	0.062	0.035	ND	0.062	2.045	0.061	1.203	1.142	0.842	.	.	422	8.07	10
1999	4	19	32	C	0.184	0.051	0.035	ND	0.149	2.408	0.061	1.498	1.437	0.911	.	.	424	8.06	10
1999	5	7	32	A	0.140	0.019	0.125	0.106	0.015	1.756	ND	1.501	1.501	0.255	0.260	0.029	384	8.31	9.4
1999	5	7	32	B	0.140	0.016	0.057	0.041	0.082	2.027	0.044	1.492	1.448	0.535	0.257	0.029	385	8.32	9.4
1999	5	7	32	C	0.057	0.016	0.107	0.091	ND	1.555	ND	1.430	1.430	0.125	0.264	0.028	385	8.3	9.4
1999	5	27	32	A	0.190	0.029	0.173	0.144	0.017	2.082	0.086	1.850	1.764	0.232	0.180	0.036	352	8.5	21.7
1999	5	27	32	B	0.187	0.024	0.123	0.098	0.065	2.356	0.142	1.535	1.392	0.822	0.172	0.037	356	8.52	21.7
1999	5	27	32	C	0.209	0.028	0.187	0.160	0.022	2.407	0.025	2.435	2.410	ND	0.184	0.032	354	8.54	21.7
1999	6	7	32	A	0.106	0.031	0.065	0.034	0.041	1.507	0.075	1.427	1.353	0.079	ND	ND	131.8	8.64	16
1999	6	7	32	B	0.106	0.026	0.074	0.048	0.032	1.459	0.045	1.085	1.041	0.374	ND	ND	131.2	8.59	16
1999	6	7	32	C	0.134	0.044	0.108	0.064	0.026	0.892	ND	1.063	1.063	ND	ND	ND	130.5	8.57	16
1999	6	18	32	A	0.107	0.033	0.075	0.042	0.033	1.556	0.319	1.037	0.718	0.519	ND	ND	172.2	8.9	20
1999	6	18	32	B	0.133	0.048	0.081	0.034	0.052	1.556	0.282	1.064	0.781	0.492	ND	ND	172.5	8.86	20
1999	6	18	32	C	0.133	0.037	0.081	0.044	0.052	1.445	0.033	1.115	1.082	0.330	ND	ND	172.9	8.84	20

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	6	28	32	A	0.219	0.017	0.109	0.093	0.109	3.943	0.035	2.920	2.884	1.023	ND	ND	149.5	9.53	19
1999	6	28	32	B	0.264	0.021	0.150	0.129	0.114	4.316	ND	3.452	3.452	0.864	ND	ND	148.6	9.53	19
1999	6	28	32	C	0.283	0.030	0.123	0.093	0.160	4.119	0.022	3.448	3.426	0.671	ND	ND	148.9	9.52	19
1999	7	8	32	A	0.236	0.016	0.066	0.050	0.169	3.056	0.259	3.800	3.541	ND	0.301	0.042	205	8.43	21
1999	7	8	32	B	0.188	0.020	0.074	0.054	0.114	2.625	0.082	2.013	1.931	0.612	0.318	0.046	202	8.45	21
1999	7	8	32	C	0.220	0.023	0.106	0.083	0.114	3.049	0.014	2.164	2.150	0.886	0.287	0.043	204	8.47	21
1999	7	19	32	A	0.216	0.008	0.053	0.045	0.163	2.256	0.065	1.937	1.872	0.320	0.948	0.169	125.8	8.56	22
1999	7	19	32	B	0.224	0.005	0.061	0.057	0.163	2.796	0.020	1.625	1.605	1.172	0.943	0.177	125	8.59	22
1999	7	19	32	C	0.257	0.009	0.056	0.047	0.200	2.843	0.028	1.814	1.787	1.029	0.929	0.181	125	8.61	22
1999	7	30	32	A	0.172	0.007	0.056	0.049	0.115	1.820	0.026	1.380	1.354	0.440	0.517	0.027	143.1	7.96	24
1999	7	30	32	B	0.109	0.006	0.056	0.051	0.053	1.624	0.025	1.295	1.270	0.329	0.535	0.030	140	7.99	24
1999	7	30	32	C	0.127	0.007	0.074	0.066	0.053	1.598	0.024	1.256	1.232	0.342	0.529	0.029	141.2	7.99	24
1999	8	9	32	A	0.112	0.010	0.054	0.045	0.058	1.781	ND	1.277	1.277	0.504	ND	ND	134.5	7.27	20
1999	8	9	32	B	0.108	0.011	0.073	0.062	0.035	1.774	ND	1.265	1.265	0.509	ND	ND	134.8	7.29	20
1999	8	9	32	C	0.100	0.009	0.073	0.064	0.027	1.697	0.024	1.338	1.315	0.359	ND	ND	139.4	7.26	20
1999	8	19	32	A	0.190	0.014	0.104	0.090	0.085	1.697	ND	1.211	1.211	0.487	0.241	0.010	198.5	7.87	21
1999	8	19	32	B	0.167	0.019	0.131	0.111	0.036	1.355	0.005	1.380	1.375	ND	0.254	0.008	196.4	7.75	21
1999	8	19	32	C	0.181	0.024	0.116	0.092	0.065	1.484	ND	1.448	1.448	0.036	0.233	0.007	198	7.69	21
1999	8	30	32	A	0.412	0.078	0.147	0.069	0.264	2.506	ND	1.319	1.319	1.186	0.373	0.006	285	7.4	18
1999	8	30	32	B	0.354	0.021	0.101	0.080	0.252	2.530	ND	1.366	1.366	1.164	0.378	0.006	284	7.42	18
1999	8	30	32	C	0.398	0.054	0.101	0.048	0.297	2.827	ND	1.464	1.464	1.363	0.375	0.006	284	7.4	18
1999	9	9	32	A	0.243	0.018	0.034	0.017	0.209	3.068	0.014	1.761	1.748	1.307	0.217	0.007	187.2	7.75	17
1999	9	9	32	B	0.211	0.011	0.020	0.009	0.191	2.935	ND	1.952	1.952	0.983	0.412	0.014	232	7.76	17
1999	9	9	32	C	0.187	0.011	0.034	0.023	0.153	2.953	0.009	2.219	2.210	0.734	0.282	0.009	222	7.74	17
1999	9	20	32	A	0.094	0.014	0.020	0.006	0.075	2.187	0.005	1.488	1.482	0.699	0.290	0.005	175.1	7.46	18
1999	9	20	32	B	0.039	0.014	0.026	0.012	0.013	2.199	ND	1.425	1.425	0.774	0.278	0.004	173.2	7.42	18
1999	9	20	32	C	0.120	0.016	0.026	0.010	0.095	2.462	0.007	1.511	1.504	0.951	0.297	0.004	171.3	7.39	18
1999	9	30	32	A	0.125	0.006	0.035	0.029	0.090	2.534	ND	ND	ND	2.534	0.455	0.003	133.8	7.01	14
1999	9	30	32	B	0.087	0.023	0.035	0.011	0.053	2.361	ND	ND	ND	2.361	0.389	0.002	135	6.97	14
1999	9	30	32	C	0.071	0.003	0.021	0.018	0.050	1.949	ND	ND	ND	1.949	0.376	0.002	135.9	6.96	14
1999	10	12	32	A	0.084	0.008	0.048	0.040	0.036	1.829	0.007	1.363	1.355	0.466	0.300	0.001	134.5	6.91	13
1999	10	12	32	B	0.079	0.008	0.054	0.046	0.025	1.658	0.046	1.409	1.364	0.248	0.308	0.002	134.3	6.93	13
1999	10	12	32	C	0.091	0.006	0.039	0.033	0.053	2.524	0.041	2.085	2.045	0.438	0.432	0.002	134.2	6.9	13
1999	10	25	32	A	0.114	0.016	0.042	0.025	0.072	2.262	0.042	2.080	2.038	0.182	0.413	0.003	170.6	7.06	11
1999	10	25	32	B	0.070	0.015	0.042	0.027	0.029	1.609	ND	1.437	1.437	0.172	0.252	0.002	170.4	7.04	11
1999	10	25	32	C	0.070	0.015	0.036	0.022	0.034	1.561	0.012	1.483	1.471	0.077	0.327	0.002	170.2	7.01	11
1999	11	17	32	A	0.104	0.050	0.104	0.054	ND	2.913	0.527	2.516	1.989	0.397	0.296	0.003	532	7.21	6
1999	11	17	32	B	0.062	0.046	0.036	ND	0.025	2.283	0.492	2.120	1.628	0.163	0.206	0.002	530	7.21	6
1999	11	17	32	C	0.093	0.041	0.076	0.034	0.017	2.375	0.487	2.219	1.732	0.156	0.278	0.003	532	7.27	6
1999	11	29	32	A	0.297	0.019	0.048	0.029	0.249	5.971	1.813	4.550	2.737	1.421	0.688	0.103	790	8.47	4
1999	11	29	32	B	0.269	0.016	0.048	0.032	0.221	5.558	1.710	4.289	2.579	1.269	0.606	0.102	792	8.53	4
1999	11	29	32	C	0.271	0.019	0.062	0.043	0.209	5.278	1.374	3.992	2.617	1.286	0.477	0.079	793	8.52	4
1999	12	14	32	A	0.215	0.089	0.165	0.076	0.050	3.349	0.195	2.638	2.443	0.711	0.371	0.053	133	8.45	1
1999	12	14	32	B	0.301	0.153	0.222	0.068	0.079	3.939	0.623	3.787	3.165	0.152	0.392	0.019	139	7.94	1
1999	12	14	32	C	0.165	0.044	0.043	ND	0.122	2.219	0.045	1.471	1.425	0.748	ND	ND	143.1	7.84	1
1999	7	30	33	A	0.226	0.132	0.242	0.110	ND	3.088	0.076	2.309	2.233	0.779	0.595	0.060	563	8.27	22
1999	7	30	33	B	0.232	0.096	0.185	0.088	0.048	2.426	0.043	2.490	2.447	ND	0.481	0.054	564	8.33	22
1999	7	30	33	C	0.279	0.096	0.173	0.076	0.106	2.715	0.039	2.778	2.740	ND	0.507	0.066	565	8.4	22
1999	8	9	33	A	0.246	0.110	0.227	0.117	0.019	2.568	ND	2.329	2.329	0.239	ND	ND	656	9.12	19
1999	8	9	33	B	0.227	0.057	0.159	0.102	0.068	2.881	ND	2.596	2.596	0.285	ND	ND	653	9.16	19
1999	8	9	33	C	0.217	0.048	0.158	0.110	0.059	2.905	ND	2.608	2.608	0.297	ND	ND	655	9.17	19
1999	8	19	33	A	0.317	0.145	0.259	0.115	0.058	2.284	ND	2.014	2.014	0.270	0.236	0.103	515	9.1	21
1999	8	19	33	B	0.282	0.182	0.239	0.057	0.043	2.445	ND	2.115	2.115	0.330	0.245	0.113	509	9.14	21
1999	8	19	33	C	0.275	0.147	0.288	0.141	ND	2.324	ND	2.089	2.089	0.235	0.206	0.096	510	9.12	21
1999	8	30	33	A	0.339	0.182	0.232	0.050	0.107	2.830	ND	2.602	2.602	0.228	ND	ND	566	7.41	19
1999	8	30	33	B	0.330	0.159	0.239	0.080	0.091	2.931	0.009	2.725	2.716	0.206	0.262	0.004	560	7.42	19
1999	8	30	33	C	0.328	0.141	0.266	0.125	0.062	2.714	ND	2.326	2.326	0.389	ND	ND	562	7.45	19
1999	9	9	33	A	0.633	0.116	0.183	0.067	0.450	5.397	0.011	2.156	2.144	3.242	ND	ND	466	7.59	19
1999	9	9	33	B	0.424	0.079	0.120	0.042	0.304	4.114	0.013	2.268	2.255	1.846	ND	ND	462	7.6	19
1999	9	9	33	C	0.535	0.075	0.132	0.056	0.404	5.151	0.013	2.289	2.276	2.862	0.583	0.013	468	7.58	19
1999	9	20	33	A	0.343	0.088	0.158	0.070	0.184	3.784	0.021	2.571	2.551	1.212	0.483	0.024	579	7.94	17
1999	9	20	33	B	0.270	0.090	0.150	0.060	0.120	3.286	0.041	2.513	2.472	0.773	0.153	0.009	574	8.01	17
1999	9	20	33	C	0.284	0.081	0.128	0.046	0.156	3.414	0.010	2.180	2.170	1.234	ND	ND	575	8.05	17
1999	9	30	33	A	0.170	0.015	0.059	0.044	0.111	2.902	0.024	ND	ND	2.902	ND	ND	288	7.23	13

Appendix Table 1A. Water Quality Data, Upper Klamath Basin, January 1, 1999 to December 31, 1999)

YEAR	MONTH	DAY	LOCATION	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	ECE	pH	TEMP
					mg/L												uS.cm^{-1}		(deg C)
1999	9	30	33	B	0.153	0.023	0.080	0.056	0.074	3.302	0.146	0.104	ND	3.199	ND	ND	273	7.2	13
1999	9	30	33	C	0.110	0.017	0.035	0.017	0.075	2.284	0.077	ND	ND	2.284	0.241	0.002	285	7.21	13
1999	10	12	33	A	0.198	0.017	0.082	0.065	0.116	2.711	0.010	1.569	1.559	1.142	0.363	0.009	333	7.64	14
1999	10	12	33	B	0.178	0.008	0.071	0.063	0.107	2.766	0.006	1.891	1.885	0.875	0.495	0.013	332	7.66	14
1999	10	12	33	C	0.193	0.008	0.071	0.063	0.122	2.529	0.016	1.769	1.752	0.761	0.536	0.014	334	7.65	14
1999	10	25	33	A	0.135	0.015	0.037	0.023	0.098	2.249	0.034	1.709	1.676	0.540	0.518	0.025	506	7.92	8
1999	10	25	33	B	0.157	0.016	0.052	0.036	0.105	2.244	ND	1.937	1.937	0.307	0.539	0.027	503	7.95	8
1999	10	25	33	C	0.142	0.024	0.063	0.040	0.079	2.044	ND	1.915	1.915	0.128	0.541	0.027	505	7.95	8
1999	11	17	33	A	0.090	0.047	0.083	0.036	0.007	2.388	0.498	2.066	1.569	0.321	0.265	0.002	544	7.05	6
1999	11	17	33	B	0.097	0.047	0.090	0.043	0.007	2.508	0.497	2.100	1.603	0.409	0.235	0.002	542	7.06	6
1999	11	17	33	C	0.090	0.047	0.073	0.026	0.017	2.442	0.489	2.214	1.725	0.228	0.300	0.002	544	7.05	6
1999	12	14	33	A	0.157	0.004	0.043	0.039	0.115	5.368	1.592	4.269	2.676	1.099	ND	ND	468	7.83	1
1999	12	14	33	B	0.272	0.093	0.150	0.057	0.122	6.501	2.574	5.112	2.539	1.389	0.378	0.013	475	7.78	1
1999	12	14	33	C	0.229	0.098	0.120	0.023	0.109	5.965	2.574	5.111	2.537	0.854	0.492	0.017	466	7.77	1
1999	8	19	34	A	0.369	0.224	0.336	0.112	0.033	1.517	ND	1.298	1.298	0.220	0.583	0.011	287	7.51	18
1999	8	19	34	B	0.310	0.211	0.266	0.056	0.043	1.320	ND	1.190	1.190	0.131	0.446	0.009	283	7.52	18
1999	8	19	34	C	0.340	0.214	0.275	0.061	0.065	1.766	ND	1.316	1.316	0.450	0.164	0.003	282	7.52	18
1999	8	30	34	A	0.330	0.087	0.164	0.077	0.166	2.299	ND	1.304	1.304	0.995	0.200	0.003	344	7.44	18
1999	8	30	34	B	0.339	0.159	0.239	0.080	0.100	1.785	ND	1.458	1.458	0.327	0.083	0.001	368	7.47	18
1999	8	30	34	C	0.388	0.196	0.282	0.087	0.105	2.220	ND	1.147	1.147	1.074	0.076	0.001	363	7.45	18
1999	9	9	34	A	0.313	0.175	0.243	0.068	0.070	1.796	ND	1.408	1.408	0.389	0.064	0.001	318	7.53	16
1999	9	9	34	B	0.299	0.203	0.243	0.039	0.056	1.793	0.005	1.303	1.298	0.490	ND	ND	320	7.57	16
1999	9	9	34	C	0.294	0.211	0.239	0.027	0.056	1.814	0.028	1.286	1.259	0.528	ND	ND	324	7.58	16
1999	9	20	34	A	0.369	0.240	0.281	0.041	0.088	2.141	0.005	1.236	1.231	0.905	0.367	0.006	331	7.43	15
1999	9	20	34	B	0.281	0.159	0.204	0.045	0.077	1.902	ND	1.553	1.553	0.348	0.247	0.004	346	7.41	15
1999	9	20	34	C	0.284	0.157	0.208	0.051	0.076	2.142	ND	1.411	1.411	0.731	0.107	0.002	326	7.45	15
1999	9	30	34	A	0.230	0.032	0.080	0.047	0.151	2.362	ND	ND	ND	2.362	ND	ND	317	7.37	11
1999	9	30	34	B	0.179	0.044	0.084	0.040	0.095	1.900	ND	ND	ND	1.900	ND	ND	308	7.35	11
1999	9	30	34	C	0.205	0.046	0.125	0.079	0.080	2.253	0.025	1.316	1.290	0.937	ND	ND	318	7.37	11
1999	10	12	34	A	0.249	0.096	0.178	0.082	0.071	1.858	ND	1.381	1.381	0.477	0.325	0.027	321	7.15	11
1999	10	12	34	B	0.244	0.082	0.179	0.097	0.065	1.931	0.006	1.486	1.480	0.446	0.409	0.004	323	7.17	11
1999	10	12	34	C	0.246	0.087	0.108	0.021	0.137	1.592	0.008	1.420	1.412	0.172	0.117	0.001	325	7.16	11
1999	10	25	34	A	0.487	0.263	0.365	0.102	0.122	2.333	1.082	2.419	1.337	ND	0.578	0.026	528	7.89	7
1999	10	25	34	B	0.465	0.270	0.400	0.131	0.065	2.364	1.034	2.495	1.461	ND	0.570	0.028	524	7.94	7
1999	10	25	34	C	0.372	0.154	0.243	0.089	0.129	2.025	1.008	1.510	0.502	0.515	0.559	0.030	526	7.97	7
1999	11	17	34	A	0.543	0.537	0.555	0.017	ND	3.150	0.951	2.758	1.807	0.392	0.623	0.017	544	7.67	7
1999	11	17	34	B	0.501	0.553	0.519	ND	ND	3.052	0.939	2.743	1.805	0.309	0.270	0.007	542	7.65	7
1999	11	17	34	C	0.538	0.472	0.501	0.030	0.037	3.039	0.921	2.777	1.857	0.262	0.293	0.008	544	7.67	7
1999	11	29	34	A	0.705	0.306	0.525	0.219	0.180	2.849	0.011	1.913	1.902	0.936	1.441	0.039	748	7.67	5
1999	11	29	34	B	0.670	0.248	0.470	0.221	0.201	2.630	ND	1.939	1.939	0.691	1.173	0.029	742	7.63	5
1999	11	29	34	C	0.684	0.297	0.477	0.180	0.208	2.671	ND	1.624	1.624	1.048	1.148	0.028	744	7.62	5
1999	12	14	34	A	0.924	0.884	0.896	0.011	0.029	5.090	1.453	4.990	3.537	0.101	ND	ND	855	7.96	1
1999	12	14	34	B	0.543	0.420	0.466	0.046	0.077	2.107	0.091	1.549	1.458	0.558	ND	ND	840	7.99	1
1999	12	14	34	C	0.874	0.345	0.638	0.292	0.237	4.637	0.944	3.078	2.134	1.559	1.337	0.077	855	8.01	1

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	5	16	1	A	0.183	0.0109	0.0885	0.0776	0.0945	4.7205	0.0746	4.2633	4.1887	0.4572	0.2582	0.0033	1666	7.33	.
2000	5	16	1	B	0.2086	0.0290	0.1755	0.1465	0.0331	3.8628	0.0211	3.6549	3.6338	0.2079	ND	ND	1646	7.37	.
2000	5	16	1	C	0.2401	0.0254	0.2386	0.2132	0.0015	5.3199	0.9038	5.2164	4.3126	0.1035	ND	ND	1651	7.36	.
2000	5	22	1	A	0.2731	0.0290	0.1440	0.1150	0.1291	4.608	0.0798	4.4091	4.3293	0.1989	ND	ND	1651	7.29	9
2000	5	22	1	B	0.2911	0.0381	0.1335	0.0954	0.1576	4.5837	ND	3.6081	3.6081	0.9756	ND	ND	1690	7.29	9
2000	5	22	1	C	0.2506	0.0190	0.1155	0.0965	0.1351	4.59	0.0079	4.1805	4.1726	0.4095	ND	ND	1726	7.4	9
2000	6	2	1	A	0.1709	0.0106	0.1335	0.1229	0.0374	7.5744	1.1645	7.0452	5.8807	0.5292	0.0625	0.0015	1223	7.6	11
2000	6	2	1	B	0.214	0.0153	0.1767	0.1615	0.0373	5.8194	0.1472	5.3973	5.2501	0.4221	0.0640	0.0016	1239	7.63	11
2000	6	2	1	C	0.1263	0.0106	0.0660	0.0554	0.0603	7.0524	1.2743	6.3162	5.0419	0.7362	0.0664	0.0016	1249	7.63	11
2000	6	22	1	A	0.1577	0.0208	0.0682	0.0475	0.0895	2.8854	0.0219	2.8089	2.787	0.0765	0.1373	0.0007	1055	6.95	16
2000	6	22	1	B	0.1521	0.0171	0.0738	0.0567	0.0783	2.9448	0.0053	2.4066	2.4013	0.5382	0.2353	0.001	1022	6.86	16
2000	6	22	1	C	0.1088	0.0144	0.0528	0.0384	0.0560	2.6946	ND	2.2644	2.2644	0.4302	0.1615	0.0005	1069	6.75	16
2000	7	3	1	A	0.1654	0.0300	0.0604	0.0304	0.1050	8.2908	3.7096	7.4043	3.6947	0.8865	0.0813	0.0005	1244	7	14
2000	7	3	1	B	0.1909	0.0335	0.1172	0.0837	0.0737	7.2189	1.4967	6.7797	5.283	0.4392	0.1506	0.0014	1246	7.2	14
2000	7	3	1	C	0.1597	0.0335	0.1370	0.1035	0.0227	4.5756	0.0181	4.1886	4.1705	0.387	0.0851	0.0008	1253	7.2	14
2000	7	14	1	A	0.1123	0.0046	0.0510	0.0464	0.0613	3.1032	0.0163	2.6865	2.6702	0.4167	0.2274	0.0039	1103	7.47	15
2000	7	14	1	B	0.1693	0.0163	0.0963	0.0801	0.0730	2.7549	ND	2.5767	2.5767	0.1782	0.2540	0.0037	1084	7.4	15
2000	7	14	1	C	0.1269	0.0100	0.0598	0.0498	0.0671	2.817	0.0103	2.3913	2.381	0.4257	0.2949	0.0052	1089	7.48	15
2000	7	24	1	A	0.231	0.0251	0.0844	0.0593	0.1466	3.4623	0.045	3.033	2.988	0.4293	ND	ND	.	7.46	20
2000	7	24	1	B	0.1943	0.0350	0.1782	0.1432	0.0161	4.3137	0.5799	3.9168	3.3369	0.3969	0.0955	0.0015	.	7.43	20
2000	7	24	1	C	0.2383	0.0296	0.1870	0.1574	0.0513	3.1941	0.018	2.9088	2.8908	0.2853	0.0881	0.0013	.	7.4	20
2000	8	3	1	A	0.2601	0.0521	0.2227	0.1706	0.0374	7.5591	0.0521	7.362	7.3099	0.1971	0.2512	0.0567	205	8.69	14
2000	8	3	1	B	0.1702	0.0370	0.1477	0.1107	0.0225	7.3413	0.0489	7.056	7.0071	0.2853	0.2897	0.0619	208	8.66	14
2000	8	3	1	C	0.2676	0.0433	0.2212	0.1780	0.0464	7.9776	0.0341	7.3368	7.3027	0.6408	0.0000	ND	201	8.86	14
2000	8	14	1	A	0.2475	0.0578	0.2001	0.1424	0.0474	7.5096	0.0159	7.0911	7.0752	0.4185	0.6458	0.0059	1886	7.19	12
2000	8	14	1	B	0.3713	0.0309	0.2475	0.2166	0.1238	5.1399	0.008	4.1877	4.1797	0.9522	0.5304	0.0049	1999	7.19	12
2000	8	14	1	C	0.4016	0.0425	0.2576	0.2151	0.1440	8.163	0.0146	7.0146	7	1.1484	1.0238	0.01	2020	7.22	12
2000	8	24	1	A	0.2376	0.0316	0.2184	0.1868	0.0192	6.0291	0.0064	5.4288	5.4224	0.6003	0.1021	0.001	1919	7.22	13
2000	8	24	1	B	0.2235	0.0168	0.1997	0.1830	0.0238	4.9077	0.0267	4.3902	4.3635	0.5175	0.0520	0.0007	1656	7.37	13
2000	8	24	1	C	0.1546	0.0194	0.1036	0.0842	0.0510	2.3652	ND	1.8558	1.8558	0.5094	0.0749	0.0008	1460	7.27	13
2000	9	5	1	A	0.1482	0.0228	0.1337	0.1110	0.0145	3.8691	0.0244	3.2868	3.2624	0.5823	ND	ND	2150	7.34	13
2000	9	5	1	B	0.1919	0.0306	0.1482	0.1176	0.0437	4.6251	ND	3.9987	3.9987	0.6264	ND	ND	2170	7.34	13
2000	9	5	1	C	0.1861	0.0306	0.1511	0.1205	0.0350	5.0085	0.0352	4.4802	4.445	0.5283	ND	ND	2160	7.31	13
2000	9	20	1	A	0.2507	0.2066	0.2292	0.0226	0.0215	5.6331	1.4999	5.3649	3.865	0.2682	ND	ND	2110	7.35	14
2000	9	20	1	B	0.2722	0.2111	0.2435	0.0324	0.0287	4.4721	1.3863	4.4541	3.0678	0.018	ND	ND	2020	7.35	14
2000	9	20	1	C	0.2837	0.2155	0.2507	0.0352	0.0330	4.5162	1.4054	4.2021	2.7967	0.3141	ND	ND	2050	7.34	14
2000	5	16	2	A	0.4843	0.4590	0.4624	0.0034	0.0219	3.5343	1.8863	3.1176	1.2313	0.4167	ND	ND	444	7.28	10
2000	5	16	2	B	0.4843	0.4681	0.4551	ND	0.0292	4.2507	1.8549	2.7261	0.8712	1.5246	ND	ND	448	7.26	10
2000	5	16	2	C	0.4697	0.4499	0.4843	0.0344	ND	2.9079	1.9043	2.7009	0.7966	0.207	ND	ND	448	7.3	10
2000	5	22	2	A	0.4787	0.2531	0.3886	0.1355	0.0901	2.4723	0.759	2.2086	1.4496	0.2637	ND	ND	430	7.4	12
2000	5	22	2	B	0.4937	0.2875	0.4637	0.1762	0.0300	2.9853	1.5815	2.8728	1.2913	0.1125	ND	ND	456	7.45	12
2000	5	22	2	C	0.4937	0.3229	0.4337	0.1108	0.0600	2.7144	0.7412	2.3922	1.651	0.3222	ND	ND	442	7.42	12
2000	6	2	2	A	0.3002	0.1630	0.1925	0.0295	0.1077	1.3869	0.0457	1.1394	1.0937	0.2475	ND	ND	388	7.47	14
2000	6	2	2	B	0.2284	0.1714	0.2212	0.0498	0.0072	0.9414	0.0067	0.9	0.8933	0.0414	ND	ND	386	7.49	14
2000	6	2	2	C	0.2284	0.1750	0.2816	0.1066	-0.0532	1.2969	ND	1.0701	1.0701	0.2268	ND	ND	390	7.48	14
2000	6	22	2	A	0.4583	0.2153	0.3255	0.1103	0.1328	2.043	ND	1.2942	1.2942	0.7488	ND	ND	425	6.64	14
2000	6	22	2	B	0.408	0.2253	0.3814	0.1562	0.0266	1.8918	ND	1.6884	1.6884	0.2034	ND	ND	424	6.65	14
2000	6	22	2	C	0.408	0.2425	0.4793	0.2368	ND	2.016	ND	1.6632	1.6632	0.3528	ND	ND	505	6.66	14
2000	7	3	2	A	0.4435	0.2958	0.3442	0.0485	0.0993	1.3968	ND	1.2132	1.2132	0.1836	ND	ND	396	6.9	17
2000	7	3	2	B	0.4435	0.3495	0.4010	0.0515	0.0425	1.3257	0.1227	0.9999	0.8772	0.3258	ND	ND	402	7	17
2000	7	3	2	C	0.4691	0.2889	0.3655	0.0766	0.1036	1.3167	ND	1.1349	1.1349	0.1818	ND	ND	401	6.9	17
2000	7	14	2	A	0.2656	0.1020	0.2349	0.1329	0.0307	1.4733	ND	1.0827	1.0827	0.3906	ND	ND	465	6.78	17
2000	7	14	2	B	0.3138	0.1336	0.2481	0.1145	0.0657	1.3959	ND	1.1898	1.1898	0.2061	ND	ND	479	6.65	17
2000	7	14	2	C	0.3736	0.1426	0.3415	0.1989	0.0321	1.5606	ND	1.1205	1.1205	0.4401	ND	ND	460	6.71	17
2000	8	3	2	A	0.3276	0.1743	0.2302	0.0560	0.0974	1.8684	ND	1.3275	1.3275	0.5409	ND	ND	343	8.91	18
2000	8	3	2	B	0.4475	0.3444	0.3876	0.0432	0.0599	1.6929	0.2455	1.4004	1.1549	0.2925	ND	ND	341	9.01	18
2000	8	3	2	C	0.512	0.0828	0.3051	0.2224	0.2069	1.8684	ND	1.4427	1.4427	0.4257	ND	ND	340	9.01	18
2000	8	14	2	A	0.354	0.0980	0.3051	0.2071	0.0489	1.6983	ND	1.1835	1.1835	0.5148	ND	ND	317	7.4	20
2000	8	14	2	B	0.3353	0.0623	0.3195	0.2573	0.0158	1.5876	ND	1.3401	1.3401	0.2475	ND	ND	323	7.42	20

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	8	14	2	C	0.3497	0.1473	0.3224	0.1752	0.0273	1.0944	0.4235	0.6966	0.2731	0.3978	ND	ND	322	7.41	20
2000	8	24	2	A	0.5259	0.2896	0.4292	0.1396	0.0967	1.3689	ND	1.1484	1.1484	0.2205	ND	ND	339	7.53	19
2000	8	24	2	B	0.4795	0.2810	0.4191	0.1381	0.0604	1.4481	ND	1.2564	1.2564	0.1917	ND	ND	308	7.46	19
2000	8	24	2	C	0.4696	0.3019	0.4693	0.1674	0.0003	1.4076	ND	1.3599	1.3599	0.0477	ND	ND	307	7.45	19
2000	9	5	2	A	0.3899	0.1955	0.3229	0.1274	0.0670	1.5939	0.0093	1.1475	1.1382	0.4464	ND	ND	380	7.51	17
2000	9	5	2	B	0.3521	0.1495	0.3492	0.1997	0.0029	1.6659	ND	1.2024	1.2024	0.4635	ND	ND	372	7.51	17
2000	9	5	2	C	0.3666	0.1590	0.2006	0.0416	0.1660	1.5372	ND	1.0125	1.0125	0.5247	ND	ND	361	7.49	17
2000	9	20	2	A	0.4587	0.3788	0.4243	0.0456	0.0344	1.8153	0.859	1.7766	0.9176	0.0387	ND	ND	352	7.57	.
2000	9	20	2	B	0.4257	0.4240	0.3870	-0.0370	0.0387	1.7271	0.8852	1.5642	0.679	0.1629	ND	ND	350	7.54	.
2000	9	20	2	C	0.473	0.4285	0.4300	0.0015	0.0430	1.7397	0.8829	1.7172	0.8343	0.0225	ND	ND	358	7.54	.
2000	6	2	5	A	0.3132	0.2558	0.3505	0.0947	ND	1.8513	0.0232	1.0989	1.0757	0.7524	ND	ND	430	7.34	12
2000	6	2	5	B	0.5115	0.2429	0.3793	0.1364	0.1322	1.827	0.1024	1.2717	1.1693	0.5553	ND	ND	424	7.38	12
2000	6	2	5	C	0.4871	0.2576	0.3678	0.1102	0.1193	1.3446	ND	1.0809	1.0809	0.2637	ND	ND	423	7.42	12
2000	6	12	5	A	0.4691	0.0966	0.4450	0.3484	0.0241	2.6019	1.2078	2.8152	1.6074	ND	ND	ND	439	6.93	13
2000	6	12	5	B	0.4663	0.0591	0.4238	0.3647	0.0425	2.6964	1.3615	2.5974	1.2359	0.099	ND	ND	442	6.96	13
2000	6	12	5	C	0.5116	0.0815	0.3954	0.3139	0.1162	2.6703	0.7981	2.2563	1.4582	0.414	0.0250	0.0001	443	6.97	13
2000	6	22	5	A	.	0.2244	0.2905	0.0661	.	1.1034	ND	1.1574	1.1574	ND	ND	ND	485	6.96	14
2000	6	22	5	B	.	0.3401	0.4038	0.0637	.	1.3113	ND	0.9675	0.9675	0.3438	ND	ND	488	7.08	14
2000	6	22	5	C	.	0.2569	0.2919	0.0350	.	1.1997	ND	0.8892	0.8892	0.3105	0.1829	0.001	490	6.97	14
2000	7	3	5	A	0.4691	0.4353	0.4733	0.0381	ND	1.7433	0.9678	1.6425	0.6747	0.1008	ND	ND	475	7.5	15
2000	7	3	5	B	0.4435	0.3720	0.4435	0.0715	0.0000	1.3383	0.5697	1.3761	0.8064	ND	ND	ND	476	7.3	15
2000	7	3	5	C	0.4435	0.4024	0.4577	0.0553	ND	1.4616	0.7771	1.611	0.8339	ND	ND	ND	476	7.2	15
2000	7	14	5	A	0.3371	0.1651	0.2174	0.0523	0.1197	1.2834	ND	0.8451	0.8451	0.4383	ND	ND	483	6.63	17
2000	7	14	5	B	0.3546	0.1958	0.3138	0.1181	0.0408	1.2231	ND	0.9162	0.9162	0.3069	ND	ND	480	6.65	17
2000	7	14	5	C	0.3517	0.1715	0.2845	0.1130	0.0672	0.9621	ND	0.7848	0.7848	0.1773	ND	ND	485	6.59	17
2000	7	24	5	A	0.3658	0.2579	0.3189	0.0610	0.0469	0.5886	0.0065	0.6507	0.6442	ND	ND	ND	.	7.27	17
2000	7	24	5	B	0.3687	0.3555	0.3365	ND	0.0322	1.1277	0.0068	0.5958	0.589	0.5319	ND	ND	.	7.21	17
2000	7	24	5	C	0.5152	0.3644	0.4757	0.1113	0.0395	0.9189	0.0061	0.8469	0.8408	0.072	ND	ND	.	7.2	17
2000	8	3	5	A	0.5225	0.4685	0.4325	ND	0.0900	1.2096	0.2752	0.8649	0.5897	0.3447	ND	ND	374	8.8	17
2000	8	3	5	B	0.5075	0.3959	0.4595	0.0636	0.0480	1.0782	ND	0.4716	0.4716	0.6066	ND	ND	375	8.88	17
2000	8	3	5	C	0.425	0.3621	0.3996	0.0375	0.0254	0.8559	ND	0.5742	0.5742	0.2817	ND	ND	379	8.98	17
2000	6	22	6	A	.	0.2976	0.3591	0.0615	.	1.3788	ND	0.7695	0.7695	0.6093	ND	ND	644	6.7	12
2000	6	22	6	B	.	0.2876	0.4010	0.1134	.	1.9854	0.338	1.6542	1.3162	0.3312	ND	ND	649	6.64	12
2000	6	22	6	C	.	0.3158	0.3814	0.0657	.	1.638	ND	0.9576	0.9576	0.6804	ND	ND	649	6.68	12
2000	7	3	6	A	0.3626	0.2595	0.2931	0.0336	0.0695	1.0071	0.2265	1.4643	1.2378	ND	ND	ND	695	7.2	12
2000	7	3	6	B	0.6606	0.3764	0.4790	0.1026	0.1816	1.5624	0.5567	1.7847	1.228	ND	ND	ND	699	7.3	12
2000	7	3	6	C	0.4336	0.3305	0.4151	0.0846	0.0185	0.9477	0.0049	0.8892	0.8843	0.0585	ND	ND	703	7.1	12
2000	7	14	6	A	0.4612	0.3095	0.4013	0.0918	0.0599	1.2078	ND	0.8109	0.8109	0.3969	ND	ND	722	7.04	13
2000	7	14	6	B	0.4933	0.3203	0.4145	0.0943	0.0788	1.6173	0.0143	1.2951	1.2808	0.3222	ND	ND	725	7.03	13
2000	7	14	6	C	0.4539	0.3185	0.4145	0.0960	0.0394	1.1835	ND	1.0332	1.0332	0.1503	ND	ND	728	7.02	13
2000	7	24	6	A	0.4874	0.3985	0.4508	0.0523	0.0366	0.6336	ND	0.5436	0.5436	0.09	ND	ND	.	7.42	13
2000	7	24	6	B	0.4361	0.4056	0.4214	0.0158	0.0147	0.8874	0.0091	0.7542	0.7451	0.1332	ND	ND	.	7.44	13
2000	7	24	6	C	0.4874	0.4164	0.4434	0.0270	0.0440	0.4356	0.0065	0.4662	0.4597	ND	ND	ND	.	7.5	13
2000	8	3	6	A	0.494	0.4064	0.4175	0.0111	0.0765	1.1349	ND	0.8748	0.8748	0.2601	ND	ND	524	9.05	15
2000	8	3	6	B	0.5225	0.4631	0.5075	0.0444	0.0150	1.6812	0.0225	1.2762	1.2537	0.405	ND	ND	527	9.14	15
2000	8	3	6	C	0.545	0.4774	0.5300	0.0526	0.0150	0.927	0.0299	0.6615	0.6316	0.2655	ND	ND	528	9.23	15
2000	8	14	6	A	0.5498	0.5058	0.5455	0.0398	0.0043	0.9405	ND	0.693	0.693	0.2475	0.3940	0.0078	462	7.53	15
2000	8	14	6	B	0.5282	0.4968	0.5066	0.0099	0.0216	1.287	0.0197	0.6345	0.6148	0.6525	0.1152	0.0022	460	7.52	15
2000	8	14	6	C	0.5239	0.5326	0.4951	-0.0375	0.0288	0.9081	0.0399	0.5715	0.5316	0.3366	ND	ND	460	7.55	15
2000	8	24	6	A	0.5259	0.4335	0.5123	0.0788	0.0136	0.8649	ND	0.5256	0.5256	0.3393	ND	ND	462	7.51	16
2000	8	24	6	B	0.547	0.4466	0.4765	0.0299	0.0705	0.081	ND	0.639	0.639	ND	ND	ND	466	7.55	16
2000	8	24	6	C	0.5188	0.4554	0.4406	-0.0148	0.0782	0.531	0.009	0.4644	0.4554	0.0666	ND	ND	469	7.55	16
2000	9	5	6	A	0.5559	0.4558	0.3957	ND	0.1602	0.684	ND	0.7155	0.7155	ND	ND	ND	438	7.6	15
2000	9	5	6	B	0.5836	0.4991	0.5486	0.0495	0.0350	0.684	ND	ND	ND	0.684	ND	ND	442	7.61	15
2000	9	5	6	C	0.585	0.4948	0.5341	0.0394	0.0509	0.6966	0.0056	0.5436	0.538	0.153	ND	ND	444	7.59	15
2000	9	20	6	A	0.5017	0.4781	0.4587	-0.0194	0.0430	0.9324	0.2388	0.9144	0.6756	0.018	ND	ND	517	7.62	15
2000	9	20	6	B	0.5548	0.4985	0.5074	0.0089	0.0474	1.017	0.211	0.7614	0.5504	0.2556	ND	ND	529	7.63	15
2000	9	20	6	C	0.5132	0.4950	0.4988	0.0038	0.0144	0.9207	0.2053	0.8433	0.638	0.0774	ND	ND	514	7.65	15
2000	2	7	10	A	1.5656	1.1444	1.5335	0.3891	0.0321	14.2497	0.4708	14.4135	13.9427	ND	11.5293	0.9541	827	8.18	15

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	2	7	10	B	1.4375	1.3363	1.6098	0.2736	ND	13.2786	0.4619	14.301	13.8391	ND	10.8960	0.9404	825	8.2	7
2000	2	7	10	C	1.7272	1.0786	1.6906	0.6120	0.0366	12.4002	0.4199	13.4451	13.0252	ND	11.2051	0.8888	828	8.16	7
2000	4	4	10	A	2.5715	1.9271	2.4789	0.5518	0.0926	15.1083	0.025	13.0608	13.0358	2.0475	5.0403	0.656	910	8.4	11
2000	4	4	10	B	2.6143	1.8216	1.9543	0.1327	0.6600	13.2147	0.0396	11.133	11.0934	2.0817	4.8190	0.6023	908	8.38	11
2000	4	4	10	C	2.429	1.9226	2.1610	0.2384	0.2680	13.4244	0.0094	11.9403	11.9309	1.4841	5.2250	0.6666	900	8.39	11
2000	4	19	10	A	2.6587	2.0549	2.6021	0.5472	0.0566	15.1551	0.0255	11.3562	11.3307	3.7989	5.7603	0.0619	833	7.26	7
2000	4	19	10	B	2.7691	2.0404	2.6131	0.5727	0.1560	14.7537	ND	11.2275	11.2275	3.5262	5.7741	0.0606	845	7.25	7
2000	4	19	10	C	2.7222	2.0141	2.5262	0.5121	0.1960	14.4909	0.0124	11.034	11.0216	3.4569	5.7573	0.0632	857	7.27	7
2000	5	1	10	A	2.6666	1.7941	2.3994	0.6053	0.2672	13.4667	0.028	11.4228	11.3948	2.0439	6.7920	0.0713	896	7.25	10
2000	5	1	10	B	2.5492	1.8266	2.4156	0.5890	0.1336	13.8051	ND	12.1572	12.1572	1.6479	6.8328	0.0734	890	7.26	10
2000	5	1	10	C	2.4626	1.8664	2.4420	0.5756	0.0206	13.6197	0.0084	12.7962	12.7878	0.8235	6.7988	0.0698	892	7.24	10
2000	5	16	10	A	2.0381	1.5630	1.9259	0.3629	0.1122	12.2022	0.241	10.521	10.28	1.6812	6.5638	0.0808	864	7.32	12
2000	5	16	10	B	2.1662	1.3964	1.9405	0.5441	0.2257	12.501	0.7381	11.3166	10.5785	1.1844	6.3504	0.0782	876	7.32	12
2000	5	16	10	C	2.1298	1.5511	2.0424	0.4913	0.0874	13.2516	0.244	10.6614	10.4174	2.5902	6.2637	0.0864	874	7.37	12
2000	5	22	10	A	0.5087	1.5066	2.2960	0.7894	ND	12.8583	0.0108	11.7369	11.7261	1.1214	7.1715	0.0883	796	7.32	17
2000	5	22	10	B	2.2345	1.4250	2.1760	0.7510	0.0585	11.8143	ND	11.0781	11.0781	0.7362	6.4626	0.0743	804	7.29	17
2000	5	22	10	C	2.4716	1.4568	2.2345	0.7778	0.2371	12.2238	ND	11.3292	11.3292	0.8946	6.6397	0.0855	803	7.34	17
2000	6	2	10	A	0.3132	1.4961	1.9888	0.4927	ND	12.7026	0.0096	11.5722	11.5626	1.1304	7.9432	0.1927	909	7.62	15
2000	6	2	10	B	2.4257	1.4484	2.2188	0.7704	0.2069	15.2487	ND	13.9716	13.9716	1.2771	7.9652	0.1932	916	7.62	15
2000	6	2	10	C	2.3754	1.5530	2.1742	0.6212	0.2012	13.3218	0.0339	12.3156	12.2817	1.0062	7.9572	0.1974	916	7.63	15
2000	6	12	10	A	2.4684	1.4345	2.1241	0.6896	0.3443	10.2384	0.0126	8.6706	8.658	1.5678	5.8252	0.0301	748	6.94	16
2000	6	12	10	B	2.5832	1.5688	2.3820	0.8133	0.2012	10.5345	0.0142	9.8379	9.8237	0.6966	5.9044	0.0285	749	6.91	16
2000	6	12	10	C	2.4854	1.5079	2.3395	0.8316	0.1459	10.6443	0.0086	9.0963	9.0877	1.548	5.8258	0.0275	753	6.9	16
2000	6	22	10	A	0.5282	1.8415	1.9657	0.1242	ND	9.1512	ND	8.8776	8.8776	0.2736	6.3537	0.0233	784	6.79	18
2000	6	22	10	B	2.146	1.9084	2.1223	0.2139	0.0237	9.8046	ND	8.874	8.874	0.9306	6.3763	0.0223	790	6.77	18
2000	6	22	10	C	2.0873	1.8451	2.0482	0.2031	0.0391	9.5337	ND	8.6175	8.6175	0.9162	6.3118	0.0193	787	6.71	18
2000	7	3	10	A	0.9543	0.5669	0.6734	0.1065	0.2809	9.4536	0.0208	7.7274	7.7066	1.7262	5.4769	0.027	1075	6.9	16
2000	7	3	10	B	1.0224	0.5833	0.6776	0.0943	0.3448	10.0701	0.0193	8.6886	8.6693	1.3815	5.6404	0.0212	1080	6.8	16
2000	7	3	10	C	1.1643	0.6803	0.8479	0.1677	0.3164	11.4777	0.156	10.1691	10.0131	1.3086	5.5091	0.026	1089	6.9	16
2000	7	14	10	A	2.2361	1.8358	2.2010	0.3653	0.0351	9.8064	0.0261	9.1989	9.1728	0.6075	6.2663	0.0317	1070	6.93	18
2000	7	14	10	B	2.293	1.8276	2.2842	0.4566	0.0088	10.1124	0.0231	9.3636	9.3405	0.7488	6.3126	0.0326	1058	6.94	18
2000	7	14	10	C	2.3222	1.8610	2.2696	0.4086	0.0526	10.0359	0.0235	9.7614	9.7379	0.2745	6.3249	0.0237	1074	6.8	18
2000	7	24	10	A	1.3153	0.5685	1.0867	0.5182	0.2286	5.9472	0.014	5.2758	5.2618	0.6714	2.7531	0.0476	.	7.47	17
2000	7	24	10	B	1.1688	1.0144	1.0281	0.0137	0.1407	5.7717	0.0688	5.3604	5.2916	0.4113	2.7657	0.0427	.	7.42	17
2000	7	24	10	C	1.0281	0.2265	0.5753	0.3488	0.4528	5.5557	0.0146	3.8691	3.8545	1.6866	2.7702	0.0418	.	7.41	17
2000	8	3	10	A	2.2974	1.7353	1.8716	0.1364	0.4258	8.5023	0.0216	6.1632	6.1416	2.3391	2.6672	0.8416	1095	8.89	17
2000	8	3	10	B	2.4338	1.7839	2.0785	0.2946	0.3553	9.1179	0.0087	7.0416	7.0329	2.0763	3.2754	1.2194	1095	9	17
2000	8	3	10	C	2.3273	1.7131	1.9541	0.2410	0.3732	9.2259	0.0301	6.417	6.3869	2.8089	3.2751	1.0826	1101	8.92	17
2000	8	14	10	A	1.6508	1.3211	1.4810	0.1599	0.1698	7.3521	0.0676	6.0246	5.957	1.3275	4.8463	0.0424	926	7.17	14
2000	8	14	10	B	1.8509	1.1195	1.5386	0.4191	0.3123	7.0812	0.0321	6.0795	6.0474	1.0017	4.8893	0.0438	921	7.18	14
2000	8	14	10	C	1.8523	1.1535	1.7444	0.5909	0.1079	7.4898	0.0322	6.6744	6.6422	0.8154	4.9006	0.0439	930	7.18	14
2000	8	24	10	A	1.9745	0.7693	1.3326	0.5634	0.6419	7.4232	0.0145	4.3812	4.3667	3.042	3.9567	0.0323	623	7.14	13
2000	8	24	10	B	1.703	0.7701	1.2724	0.5023	0.4306	6.9066	ND	5.1012	5.1012	1.8054	3.9081	0.0327	629	7.15	13
2000	8	24	10	C	1.869	0.8241	1.6624	0.8383	0.2066	7.173	0.0092	5.7528	5.7436	1.4202	3.9149	0.0335	627	7.16	13
2000	9	5	10	A	1.6115	0.5599	1.1965	0.6366	0.4150	8.1252	0.0066	6.1137	6.1071	2.0115	4.1514	0.0407	575	7.22	10
2000	9	5	10	B	1.1907	0.5945	1.1543	0.5598	0.0364	7.785	0.0102	6.5511	6.5409	1.2339	4.2323	0.0424	578	7.23	10
2000	9	5	10	C	1.3174	0.3083	1.0073	0.6991	0.3101	7.1397	ND	5.7897	5.7897	1.35	4.2316	0.0415	581	7.22	10
2000	9	20	10	A	2.9831	1.8570	2.5815	0.7245	0.4016	15.1695	0.006	12.2202	12.2142	2.9493	9.1733	0.0653	798	7.08	17
2000	9	20	10	B	2.9917	1.7328	2.7694	1.0367	0.2223	15.1272	ND	12.8466	12.8466	2.2806	9.2349	0.0688	799	7.1	17
2000	9	20	10	C	2.897	1.8375	2.7393	0.9018	0.1577	13.7817	ND	11.7657	11.7657	2.016	9.1611	0.0748	811	7.14	17
2000	10	16	10	A	2.6024	1.1235	2.4013	1.2778	0.2011	18.4527	ND	16.5033	16.5033	1.9494	12.7938	0.087	768	7.06	9
2000	10	16	10	B	2.4874	0.8626	2.4013	1.5387	0.0861	19.2735	0.0193	16.8417	16.8224	2.4318	13.3161	0.1138	753	7.16	9
2000	10	16	10	C	2.4716	0.9188	2.4400	1.5213	0.0316	18.2268	0.0258	16.8831	16.8573	1.3437	12.8638	0.0981	784	7.11	9
2000	1	6	14	A	0.2556	0.0921	0.1326	0.0405	0.1230	2.0034	0.019	1.377	1.358	0.6264	0.6474	0.0146	420	7.59	3
2000	1	6	14	B	0.2157	0.0449	0.1265	0.0816	0.0892	1.7901	ND	1.3365	1.3365	0.4536	0.2798	0.0111	422	7.84	3
2000	1	6	14	C	0.3478	0.1486	0.1941	0.0455	0.1537	2.2617	ND	1.2123	1.2123	1.0494	ND	ND	420	7.87	3
2000	2	7	14	A	0.6125	0.2375	0.4753	0.2378	0.1372	3.8412	0.9716	3.2085	2.2369	0.6327	ND	ND	785	9.04	7
2000	2	7	14	B	0.6659	0.1805	0.5134	0.3329	0.1525	3.8871	0.9794	2.943	1.9636	0.9441	ND	ND	785	9.06	7
2000	2	7	14	C	0.643	0.1893	0.5134	0.3242	0.1296	3.8637	0.9846	3.1032	2.1186	0.7605	ND	BD	786	9.04	7

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	3	10	14	A	0.6063	0.2285	0.4469	0.2184	0.1594	3.078	0.0443	2.5398	2.4955	0.5382	0.2818	0.0044	797	7.42	10
2000	3	10	14	B	0.6032	0.1775	0.4772	0.2997	0.1260	3.0546	ND	2.2338	2.2338	0.8208	0.2637	0.0042	795	7.43	10
2000	3	10	14	C	0.5987	0.2248	0.4772	0.2525	0.1215	2.8269	ND	2.3715	2.3715	0.4554	0.2673	0.0043	796	7.44	10
2000	4	4	14	A	0.2907	0.1675	0.2294	0.0619	0.0613	1.4598	0.0054	1.188	1.1826	0.2718	0.0690	0.0062	468	8.22	14
2000	4	4	14	B	0.3135	0.1423	0.1639	0.0217	0.1496	1.6695	ND	1.2258	1.2258	0.4437	ND	ND	469	8.26	14
2000	4	4	14	C	0.2979	0.1513	0.2252	0.0740	0.0727	1.4157	ND	1.0998	1.0998	0.3159	ND	ND	468	8.29	14
2000	4	19	14	A	0.0711	0.0028	0.0297	0.0270	0.0414	1.3464	0.0161	1.1682	1.1521	0.1782	0.1149	0.0017	232	7.39	8
2000	4	19	14	B	0.1056	0.0028	0.0366	0.0339	0.0690	1.5138	ND	1.287	1.287	0.2268	0.0903	0.0015	234	7.44	8
2000	4	19	14	C	0.0987	0.0073	0.0366	0.0294	0.0621	1.6029	ND	1.1709	1.1709	0.432	0.0792	0.0012	242	7.41	8
2000	5	1	14	A	0.215	0.0785	0.1724	0.0939	0.0426	1.5444	0.0834	1.3032	1.2198	0.2412	ND	ND	324	8.31	14
2000	5	1	14	B	0.2032	0.0965	0.1651	0.0686	0.0381	1.458	ND	1.1997	1.1997	0.2583	ND	ND	326	8.34	14
2000	5	1	14	C	0.2223	0.0424	0.1107	0.0683	0.1116	1.7379	0.0994	0.945	0.8456	0.7929	ND	ND	325	8.36	14
2000	5	16	14	A	0.2076	0.0841	0.2032	0.1191	0.0044	1.6371	ND	1.6353	1.6353	0.0018	ND	ND	268	7.54	11
2000	5	16	14	B	0.2076	0.0823	0.1493	0.0671	0.0583	1.5642	ND	1.0926	1.0926	0.4716	ND	ND	271	7.54	11
2000	5	16	14	C	0.2149	0.0950	0.1522	0.0572	0.0627	1.4229	ND	1.2582	1.2582	0.1647	ND	ND	271	7.56	11
2000	5	22	14	A	0.2086	0.0925	0.1635	0.0710	0.0451	1.773	0.0067	1.5219	1.5152	0.2511	0.0000	ND	278	7.98	19
2000	5	22	14	B	0.1936	0.1053	0.1755	0.0703	0.0181	2.2365	0.0569	2.1636	2.1067	0.0729	0.0000	ND	279	8.01	19
2000	5	22	14	C	0.2311	0.1098	0.2010	0.0913	0.0301	1.4067	0.0368	1.2555	1.2187	0.1512	0.0000	ND	279	8.01	19
2000	6	2	14	A	0.6882	0.1025	0.1709	0.0684	0.5173	2.1105	ND	2.9961	2.9961	-0.8856	0.0333	ND	244	7.85	19
2000	6	2	14	B	0.2772	0.1391	0.1953	0.0562	0.0819	1.6272	ND	1.4634	1.4634	0.1638	ND	ND	244	7.87	19
2000	6	2	14	C	0.2787	0.1264	0.2356	0.1092	0.0431	1.6191	ND	1.4013	1.4013	0.2178	ND	ND	242	7.85	19
2000	6	12	14	A	0.1007	0.0036	0.0398	0.0362	0.0609	1.9476	ND	1.4445	1.4445	0.5031	ND	ND	228	7.91	16
2000	6	12	14	B	0.112	0.0036	0.0412	0.0376	0.0708	1.845	ND	1.3887	1.3887	0.4563	ND	ND	229	7.95	16
2000	6	12	14	C	0.129	0.0126	0.0440	0.0314	0.0850	1.9998	ND	1.4778	1.4778	0.522	ND	ND	227	7.36	16
2000	6	22	14	A	0.1787	0.0216	0.0598	0.0382	0.1189	2.3337	ND	1.8504	1.8504	0.4833	0.2231	0.0003	202	6.33	22
2000	6	22	14	B	0.1255	0.0253	0.0808	0.0556	0.0447	2.0403	ND	1.4391	1.4391	0.6012	0.1048	0.0001	201	6.31	22
2000	6	22	14	C	0.1647	0.0253	0.0738	0.0486	0.0909	2.0862	ND	1.3203	1.3203	0.7659	0.1865	0.0002	201	6.27	22
2000	7	3	14	A	0.1995	0.0205	0.0462	0.0257	0.1533	1.5021	ND	1.2492	1.2492	0.2529	0.3293	0.0006	237	6.5	18
2000	7	3	14	B	0.1995	0.0361	0.0817	0.0456	0.1178	1.3986	ND	1.3932	1.3932	0.0054	0.3028	0.0006	237	6.5	18
2000	7	3	14	C	0.1881	0.0161	0.0320	0.0159	0.1561	1.3743	ND	1.1952	1.1952	0.1791	0.3078	0.0006	234	6.5	18
2000	7	14	14	A	0.1386	0.0263	0.0744	0.0482	0.0642	1.8315	0.0072	1.395	1.3878	0.4365	0.3526	0.0009	247	6.61	18
2000	7	14	14	B	0.1795	0.0443	0.1342	0.0900	0.0453	1.7541	ND	1.4193	1.4193	0.3348	0.3244	0.0006	244	6.48	18
2000	7	14	14	C	0.2262	0.0479	0.1225	0.0746	0.1037	1.9818	0.0059	1.3923	1.3864	0.5895	0.3409	0.0006	245	6.47	18
2000	7	24	14	A	0.2192	0.0251	0.1137	0.0886	0.1055	1.4211	ND	1.2186	1.2186	0.2025	0.3231	0.0022	.	7.06	21
2000	7	24	14	B	0.294	0.0135	0.0844	0.0709	0.2096	1.2033	0.0107	1.1691	1.1584	0.0342	0.3242	0.0022	.	7.05	21
2000	7	24	14	C	0.2705	0.0251	0.1870	0.1619	0.0835	1.4886	ND	1.08	1.08	0.4086	0.3156	0.0021	.	7.05	21
2000	8	3	14	A	0.3186	0.0565	0.2077	0.1512	0.1109	2.43	ND	1.5786	1.5786	0.8514	0.4888	0.1026	229	8.65	22
2000	8	3	14	B	0.2377	0.0654	0.1627	0.0973	0.0750	2.0979	ND	1.3518	1.3518	0.7461	0.4855	0.1115	230	8.7	22
2000	8	3	14	C	0.3351	0.0698	0.2077	0.1380	0.1274	2.0763	0.107	1.7649	1.6579	0.3114	0.4802	0.1083	227	8.69	22
2000	8	14	14	A	0.321	0.0838	0.2332	0.1495	0.0878	1.9449	ND	1.3086	1.3086	0.6363	0.3098	0.0025	229	7.13	19
2000	8	14	14	B	0.3339	0.0389	0.2332	0.1943	0.1007	2.1276	ND	1.5966	1.5966	0.531	0.2720	0.0023	226	7.15	19
2000	8	14	14	C	0.19	0.0824	0.1713	0.0889	0.0187	1.7487	ND	1.3554	1.3554	0.3933	0.2998	0.0026	227	7.16	19
2000	8	24	14	A	0.1602	0.0194	0.0706	0.0512	0.0896	1.8792	0.0077	1.3392	1.3315	0.54	0.1197	0.0009	196	7.12	17
2000	8	24	14	B	0.1419	0.0368	0.1108	0.0741	0.0311	1.2321	ND	1.1286	1.1286	0.1035	0.0781	0.0007	192.6	7.17	17
2000	8	24	14	C	0.1729	0.0281	0.1108	0.0827	0.0621	1.4697	0.013	1.0494	1.0364	0.4203	0.0309	0.0003	193.8	7.14	17
2000	9	5	14	A	0.221	0.0566	0.1628	0.1062	0.0582	2.9835	0.0438	2.6523	2.6085	0.3312	0.1783	0.0034	260	7.51	15
2000	9	5	14	B	0.3011	0.0176	0.1191	0.1015	0.1820	2.1222	ND	1.773	1.773	0.3492	0.1301	0.0032	259	7.63	15
2000	9	5	14	C	0.2574	0.0480	0.2370	0.1890	0.0204	2.1393	0.0055	1.8045	1.799	0.3348	0.1336	0.0031	256	7.6	15
2000	9	20	14	A	0.43	0.1623	0.2579	0.0957	0.1721	2.5002	0.0149	1.8126	1.7977	0.6876	0.1269	0.0019	268	7.4	18
2000	9	20	14	B	0.43	0.1889	0.2980	0.1091	0.1320	2.0448	ND	1.4157	1.4157	0.6291	0.1128	0.0015	264	7.34	18
2000	9	20	14	C	0.3999	0.1845	0.2693	0.0848	0.1306	2.1096	ND	1.296	1.296	0.8136	0.1192	0.0016	266	7.36	18
2000	10	16	14	A	0.2753	0.1120	0.2538	0.1418	0.0215	2.5587	0.6359	2.2617	1.6258	0.297	0.1203	0.0029	298	7.61	9
2000	10	16	14	B	0.2811	0.0729	0.2897	0.2168	-0.0086	1.8693	0.6129	1.7595	1.1466	0.1098	0.0479	0.001	302	7.57	9
2000	10	16	14	C	0.2739	0.0835	0.2251	0.1416	0.0488	1.9809	0.3267	1.6146	1.2879	0.3663	0.0771	0.0016	308	7.54	9
2000	1	6	15	A	0.1634	0.0283	0.1019	0.0737	0.0615	2.0088	0.0066	1.2735	1.2669	0.7353	0.4887	0.0121	531	7.63	1
2000	1	6	15	B	0.1603	0.0190	0.0635	0.0445	0.0968	6.1767	3.4712	4.932	1.4608	1.2447	0.2889	0.0073	533	7.64	1
2000	1	6	15	C	0.3094	0.0375	0.1864	0.1489	0.1230	10.0521	6.5811	6.5844	0.0033	3.4677	0.3631	0.009	533	7.63	1
2000	2	7	15	A	0.4158	0.1148	0.3914	0.2767	0.0244	9.7371	7.2649	9.8406	2.5757	ND	0.3548	0.0655	864	8.58	6
2000	2	7	15	B	0.4219	0.1411	0.3762	0.2351	0.0457	9.7524	7.2821	10.1025	2.8204	ND	0.3570	0.0684	867	8.6	6

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	2	7	15	C	0.3777	0.1324	0.3838	0.2514	ND	9.7101	7.2965	10.0944	2.7979	ND	0.3586	0.0713	866	8.62	6
2000	3	10	15	A	0.4469	0.0309	0.3072	0.2763	0.1397	11.5911	7.3678	9.8748	2.507	1.7163	0.1475	0.017	930	8.34	2
2000	3	10	15	B	0.4165	0.1019	0.3330	0.2311	0.0835	11.0412	8.5647	10.3554	1.7907	0.6858	0.1371	0.0152	934	8.32	2
2000	3	10	15	C	0.4544	0.1113	0.3846	0.2734	0.0698	11.295	9.0112	10.3887	1.3775	0.9063	0.1451	0.0171	935	8.35	2
2000	4	4	15	A	0.5188	0.2270	0.3877	0.1607	0.1311	2.727	0.0264	1.9467	1.9203	0.7803	0.2733	0.0141	645	7.96	10
2000	4	4	15	B	0.4874	0.2758	0.4147	0.1390	0.0727	3.1194	0.144	3.0132	2.8692	0.1062	0.2411	0.0127	646	7.97	10
2000	4	4	15	C	0.4618	0.2144	0.3150	0.1006	0.1468	1.6686	ND	1.3293	1.3293	0.3393	0.2481	0.0131	650	7.97	10
2000	4	19	15	A	0.0862	0.0028	0.0145	0.0118	0.0717	1.4976	0.0099	1.1124	1.1025	0.3852	ND	ND	398	7.44	7
2000	4	19	15	B	0.1263	0.0119	0.0780	0.0661	0.0483	1.7847	ND	1.332	1.332	0.4527	ND	ND	401	7.46	7
2000	4	19	15	C	0.0987	0.0028	0.0338	0.0311	0.0649	1.9026	ND	1.2492	1.2492	0.6534	ND	ND	403	7.47	7
2000	5	1	15	A	0.1929	0.0108	0.1122	0.1015	0.0807	2.8683	0.8886	2.4003	1.5117	0.468	ND	ND	355	7.59	10
2000	5	1	15	B	0.1709	0.0153	0.0755	0.0603	0.0954	2.6307	0.4804	1.8918	1.4114	0.7389	ND	ND	358	7.56	10
2000	5	1	15	C	0.2032	0.0270	0.1166	0.0896	0.0866	2.799	ND	2.3229	2.3229	0.4761	ND	ND	362	7.54	10
2000	5	16	15	A	0.1988	0.0950	0.1857	0.0907	0.0131	2.6388	1.141	2.5002	1.3592	0.1386	ND	ND	349	7.41	11
2000	5	16	15	B	0.2076	0.1041	0.1930	0.0889	0.0146	3.2202	1.1402	3.2094	2.0692	0.0108	ND	ND	354	7.46	11
2000	5	16	15	C	0.2192	0.0323	0.1420	0.1098	0.0772	2.4795	0.1005	2.007	1.9065	0.4725	ND	ND	355	7.46	11
2000	5	22	15	A	0.2656	0.0653	0.1485	0.0833	0.1171	1.8513	ND	1.3671	1.3671	0.4842	ND	ND	329	8	20
2000	5	22	15	B	0.2986	0.0799	0.1485	0.0686	0.1501	2.1492	ND	1.4274	1.4274	0.7218	ND	ND	330	8	20
2000	5	22	15	C	0.2806	0.0200	0.1635	0.1435	0.1171	2.4012	ND	1.7991	1.7991	0.6021	0.2951	0.0117	334	7.84	20
2000	6	2	15	A	0.1637	0.0106	0.0947	0.0841	0.0690	1.9971	ND	1.3419	1.3419	0.6552	ND	ND	252	8.47	18
2000	6	2	15	B	0.1565	0.0070	0.0703	0.0633	0.0862	2.0421	ND	1.2384	1.2384	0.8037	ND	ND	254	8.51	18
2000	6	2	15	C	0.1565	0.0106	0.0804	0.0698	0.0761	1.3581	ND	1.296	1.296	0.0621	ND	ND	256	8.51	18
2000	6	12	15	A	0.1404	0.0099	0.0596	0.0497	0.0808	1.8549	ND	1.4823	1.4823	0.3726	ND	ND	240	7.06	16
2000	6	12	15	B	0.1234	0.0036	0.0596	0.0560	0.0638	1.9377	ND	1.6686	1.6686	0.2691	ND	ND	241	7.1	16
2000	6	12	15	C	0.1503	0.0161	0.0539	0.0378	0.0964	2.0916	ND	1.5147	1.5147	0.5769	ND	ND	239	7.13	16
2000	6	22	15	A	0.1367	0.0126	0.0738	0.0612	0.0629	2.0997	ND	2.0979	2.0979	0.0018	0.3754	0.0007	338	6.49	20
2000	6	22	15	B	0.1088	0.0144	0.0682	0.0538	0.0406	1.935	ND	1.4814	1.4814	0.4536	0.3992	0.0008	336	6.54	20
2000	6	22	15	C	0.1297	0.0144	0.0556	0.0412	0.0741	2.3436	0.0221	1.8918	1.8697	0.4518	0.4241	0.0007	337	6.47	20
2000	7	3	15	A	0.1569	0.0161	0.0689	0.0528	0.0880	1.5768	ND	1.4193	1.4193	0.1575	0.2949	0.0007	324	6.6	20
2000	7	3	15	B	0.1597	0.0144	0.0604	0.0460	0.0993	1.4733	ND	1.4553	1.4553	0.018	0.2969	0.0006	322	6.5	20
2000	7	3	15	C	0.1385	0.0161	0.0760	0.0599	0.0625	2.1762	0.0135	1.8981	1.8846	0.2781	0.3553	0.0007	322	6.6	20
2000	7	14	15	A	0.1503	0.0109	0.0481	0.0372	0.1022	1.8243	0.0066	1.4526	1.446	0.3717	0.3111	0.0008	361	6.63	15
2000	7	14	15	B	0.1152	0.0091	0.0656	0.0565	0.0496	1.6011	ND	1.2204	1.2204	0.3807	0.3198	0.0007	356	6.55	15
2000	7	14	15	C	0.1371	0.0154	0.0744	0.0590	0.0627	1.8909	0.0163	1.6794	1.6631	0.2115	0.2920	0.0005	356	6.45	15
2000	7	24	15	A	0.1797	0.0609	0.0947	0.0338	0.0850	0.9504	ND	0.7506	0.7506	0.1998	0.6515	0.0202	.	7.73	20
2000	7	24	15	B	0.2002	0.0851	0.1211	0.0360	0.0791	1.242	ND	0.7452	0.7452	0.4968	0.1917	0.0037	.	7.52	20
2000	7	24	15	C	0.4713	0.1505	0.2090	0.0585	0.2623	1.0971	ND	1.0629	1.0629	0.0342	0.1420	0.0019	.	7.35	20
2000	8	3	15	A	0.4835	0.1894	0.3396	0.1502	0.1439	2.6577	ND	2.0637	2.0637	0.594	0.0984	0.0255	273	8.77	22
2000	8	3	15	B	0.4775	0.1761	0.3801	0.2040	0.0974	2.6226	ND	2.4966	2.4966	0.126	0.1038	0.0269	280	8.77	22
2000	8	3	15	C	0.5899	0.1983	0.5075	0.3093	0.0824	3.3408	ND	3.2346	3.2346	0.1062	0.2046	0.0596	282	8.84	22
2000	8	14	15	A	0.285	0.0290	0.2044	0.1754	0.0806	2.1303	ND	1.5777	1.5777	0.5526	0.1260	0.0014	216	7.29	21
2000	8	14	15	B	0.2691	0.0255	0.1857	0.1602	0.0834	2.1024	ND	1.3815	1.3815	0.7209	0.1398	0.0016	210	7.3	21
2000	8	14	15	C	0.2619	0.0246	0.1785	0.1539	0.0834	2.0385	ND	1.359	1.359	0.6795	0.1332	0.0018	215	7.36	21
2000	8	24	15	A	0.1602	0.0011	0.0391	0.0380	0.1211	1.5183	ND	0.9549	0.9549	0.5634	0.0000	ND	210	7.5	17
2000	8	24	15	B	0.1602	0.0071	0.0534	0.0463	0.1068	1.2573	ND	0.9252	0.9252	0.3321	0.0000	ND	211	7.55	17
2000	8	24	15	C	0.2544	0.0194	0.1567	0.1373	0.0977	1.6587	ND	1.4481	1.4481	0.2106	0.0000	ND	212	7.52	17
2000	9	5	15	A	0.1934	0.0089	0.0754	0.0665	0.1180	2.034	0.0066	1.332	1.3254	0.702	0.0000	ND	233	8.01	15
2000	9	5	15	B	0.1482	0.0080	0.0638	0.0558	0.0844	2.0961	ND	1.2906	1.2906	0.8055	0.0000	ND	237	8	15
2000	9	5	15	C	0.1118	0.0089	0.0900	0.0811	0.0218	1.8837	0.0057	1.3248	1.3191	0.5589	0.0000	ND	236	7.98	15
2000	9	20	15	A	0.3152	0.0824	0.2579	0.1755	0.0573	2.115	0.4538	1.7199	1.2661	0.3951	0.0000	ND	313	7.86	17
2000	9	20	15	B	0.3124	0.1118	0.2980	0.1863	0.0144	2.3859	0.6631	2.034	1.3709	0.3519	0.0000	ND	312	7.85	17
2000	9	20	15	C	0.3267	0.1668	0.3152	0.1485	0.0115	2.4102	0.5981	2.0853	1.4872	0.3249	0.0000	ND	314	7.86	17
2000	10	16	15	A	0.2258	0.0419	0.1793	0.1374	0.0465	3.9141	0.2333	3.5973	3.364	0.3168	ND	ND	436	8.14	10
2000	10	16	15	B	0.2258	0.0410	0.1848	0.1438	0.0410	3.5064	0.6727	2.8188	2.1461	0.6876	ND	ND	431	8.17	10
2000	10	16	15	C	0.2695	0.0374	0.1697	0.1323	0.0998	3.2796	0.5034	2.6055	2.1021	0.6741	ND	ND	454	8.18	10
2000	2	7	16	A	0.7421	0.5441	0.6964	0.1523	0.0457	10.9962	8.5586	11.5254	2.9668	ND	0.4303	0.0809	1068	8.59	5
2000	2	7	16	B	0.8108	0.5704	0.7116	0.1412	0.0992	11.4561	8.349	11.7054	3.3564	ND	0.4101	0.0675	1070	8.52	5
2000	2	7	16	C	0.8031	0.5450	0.7421	0.1971	0.0610	10.6047	8.471	10.9161	2.4451	ND	0.3608	0.0606	1069	8.53	5
2000	3	10	16	A	0.7657	0.5379	0.6670	0.1291	0.0987	11.0898	8.875	9.8667	0.9917	1.2231	0.1769	0.0177	1117	8.27	5

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	3	10	16	B	0.7171	0.5748	0.6366	0.0619	0.0805	11.3706	9.0066	9.9918	0.9852	1.3788	0.1908	0.0199	1118	8.29	2
2000	3	10	16	C	0.7202	0.5369	0.6974	0.1605	0.0228	10.7127	8.6073	10.3977	1.7904	0.315	0.2116	0.0211	1121	8.27	2
2000	4	4	16	A	0.6542	0.5498	0.6115	0.0618	0.0427	1.9854	ND	1.6632	1.6632	0.3222	0.1504	0.0114	799	8.14	7
2000	4	4	16	B	0.6542	0.4668	0.6043	0.1376	0.0499	3.6972	0.0379	3.3741	3.3362	0.3231	0.1823	0.0142	798	8.15	7
2000	4	4	16	C	0.6328	0.4633	0.5402	0.0770	0.0926	2.4057	0.0233	1.6803	1.657	0.7254	0.1631	0.0119	804	8.12	7
2000	4	19	16	A	0.147	0.0073	0.0448	0.0376	0.1022	1.8234	ND	1.107	1.107	0.7164	ND	ND	308	7.09	8
2000	4	19	16	B	0.1539	0.0119	0.0435	0.0316	0.1104	1.8855	0.021	1.5273	1.5063	0.3582	ND	ND	318	7.27	8
2000	4	19	16	C	0.1332	0.0073	0.0752	0.0680	0.0580	1.872	ND	1.2519	1.2519	0.6201	ND	ND	315	7.2	8
2000	5	1	16	A	0.1929	0.0270	0.0902	0.0632	0.1027	1.8495	ND	1.1682	1.1682	0.6813	ND	ND	269	7.06	11
2000	5	1	16	B	0.2032	0.0108	0.0682	0.0575	0.1350	2.3778	0.0159	1.5579	1.542	0.8199	ND	ND	270	7.63	11
2000	5	1	16	C	0.2003	0.0153	0.0461	0.0309	0.1542	1.8279	0.0078	1.1817	1.1739	0.6462	ND	ND	272	7.18	11
2000	5	16	16	A	0.1493	0.0223	0.1202	0.0980	0.0291	1.8126	0.0259	1.7451	1.7192	0.0675	ND	ND	225	6.97	10
2000	5	16	16	B	0.1493	0.0223	0.1348	0.1126	0.0145	1.8099	ND	1.6452	1.6452	0.1647	ND	ND	219	7	10
2000	5	16	16	C	0.1843	0.0395	0.1057	0.0662	0.0786	1.8045	ND	1.5147	1.5147	0.2898	ND	ND	218	7	10
2000	5	22	16	A	0.1605	0.0336	0.0885	0.0549	0.0720	1.4787	ND	1.0764	1.0764	0.4023	ND	ND	225	7.32	16
2000	5	22	16	B	0.174	0.0290	0.0735	0.0445	0.1005	1.5102	0.0124	1.2303	1.2179	0.2799	ND	ND	230	7.3	16
2000	5	22	16	C	0.1635	0.0336	0.0915	0.0579	0.0720	1.5516	ND	1.1214	1.1214	0.4302	ND	ND	230	7.36	16
2000	6	2	16	A	0.1637	0.0134	0.1235	0.1101	0.0402	1.9008	0.1718	1.557	1.3852	0.3438	ND	ND	209	7.28	16
2000	6	2	16	B	0.1781	0.0061	0.0890	0.0829	0.0891	1.863	0.0808	1.2825	1.2017	0.5805	ND	ND	212	7.32	16
2000	6	2	16	C	0.1565	0.0106	0.1192	0.1086	0.0373	3.4038	0.3505	2.9043	2.5538	0.4995	ND	ND	215	7.4	16
2000	6	12	16	A	0.258	0.0126	0.0483	0.0357	0.2097	3.6882	ND	2.4723	2.4723	1.2159	ND	ND	172.8	6.73	16
2000	6	12	16	B	0.129	0.0036	0.0553	0.0517	0.0737	2.6037	0.1914	2.0637	1.8723	0.54	ND	ND	169.7	6.71	16
2000	6	12	16	C	0.1715	0.0081	0.0327	0.0246	0.1388	2.4642	ND	1.3986	1.3986	1.0656	ND	ND	169.7	6.73	16
2000	6	22	16	A	0.1577	0.0216	0.0668	0.0452	0.0909	2.502	ND	1.7613	1.7613	0.7407	0.2994	0.0004	199	6.41	20
2000	6	22	16	B	0.2108	0.0144	0.1018	0.0874	0.1090	2.691	0.0062	1.7406	1.7344	0.9504	0.2368	0.0003	199	6.28	20
2000	6	22	16	C	0.1787	0.0216	0.0808	0.0592	0.0979	2.2572	ND	1.8225	1.8225	0.4347	0.1440	0.0002	194.7	6.29	20
2000	7	3	16	A	0.1328	0.0161	0.0604	0.0443	0.0724	1.9008	ND	1.2987	1.2987	0.6021	0.3327	0.0005	246	6.4	18
2000	7	3	16	B	0.0817	0.0170	0.0604	0.0434	0.0213	1.3626	ND	1.3914	1.3914	ND	0.3407	0.0003	240	6.2	18
2000	7	3	16	C	0.1456	0.0179	0.0675	0.0496	0.0781	1.9467	ND	1.4526	1.4526	0.4941	0.3182	0.0003	243	6.2	18
2000	7	14	16	A	0.2525	0.0046	0.0598	0.0552	0.1927	1.9764	ND	1.3509	1.3509	0.6255	0.4266	0.0007	274	6.44	20
2000	7	14	16	B	0.1996	0.0064	0.0919	0.0855	0.1077	2.2338	0.0078	1.6335	1.6257	0.6003	0.4152	0.0006	270	6.39	20
2000	7	14	16	C	0.2691	0.0046	0.0656	0.0610	0.2035	2.5452	0.0113	2.1969	2.1856	0.3483	0.4109	0.0005	279	6.31	20
2000	7	24	16	A	0.2119	0.0851	0.1137	0.0286	0.0982	1.1736	ND	0.7821	0.7821	0.3915	0.3776	0.0025	.	7.04	20
2000	7	24	16	B	0.2412	0.0493	0.0830	0.0338	0.1582	1.8099	ND	1.2177	1.2177	0.5922	0.3589	0.0024	.	7.05	20
2000	7	24	16	C	0.187	0.0224	0.1123	0.0899	0.0747	2.0106	0.011	1.7352	1.7242	0.2754	0.3749	0.0024	.	7.03	20
2000	8	3	16	A	0.3276	0.0521	0.2826	0.2305	0.0450	2.4282	ND	2.0907	2.0907	0.3375	0.3325	0.045	172.6	8.42	20
2000	8	3	16	B	0.3441	0.0309	0.2901	0.2592	0.0540	2.4399	ND	2.2041	2.2041	0.2358	0.3433	0.0576	177.4	8.53	20
2000	8	3	16	C	0.2976	0.0565	0.1222	0.0657	0.1754	2.1798	0.0078	1.2897	1.2819	0.8901	0.3144	0.0489	175.9	8.49	20
2000	8	14	16	A	0.2547	0.0300	0.1900	0.1600	0.0647	2.3319	ND	1.5165	1.5165	0.8154	0.1242	0.0009	183	7.07	18
2000	8	14	16	B	0.2763	0.0290	0.2188	0.1898	0.0575	2.0979	0.0278	1.3527	1.3249	0.7452	0.1269	0.0008	176.6	7.04	18
2000	8	14	16	C	0.2792	0.0335	0.2432	0.2097	0.0360	2.3796	ND	1.7325	1.7325	0.6471	0.1118	0.0008	172.1	7.07	18
2000	8	24	16	A	0.2291	0.0106	0.2370	0.2264	-0.0079	1.935	ND	1.7037	1.7037	0.2313	0.0000	ND	184.6	7.03	17
2000	8	24	16	B	0.1841	0.0106	0.0965	0.0859	0.0876	1.6659	ND	1.3167	1.3167	0.3492	0.0000	ND	187.2	7.03	17
2000	8	24	16	C	0.2094	0.0176	0.1854	0.1678	0.0240	2.7963	ND	2.5056	2.5056	0.2907	0.0000	ND	176.1	7.05	17
2000	9	5	16	A	0.1919	0.0089	0.0900	0.0811	0.1019	1.9386	ND	1.4319	1.4319	0.5067	0.1193	0.0014	251	7.29	13
2000	9	5	16	B	0.1992	0.0089	0.0900	0.0811	0.1092	1.9278	ND	1.4175	1.4175	0.5103	0.1628	0.0021	248	7.33	13
2000	9	5	16	C	0.1948	0.0219	0.1773	0.1554	0.0175	2.0052	ND	1.6902	1.6902	0.315	0.1215	0.0014	252	7.3	13
2000	9	20	16	A	0.2753	0.0329	0.1748	0.1419	0.1005	1.8207	ND	1.395	1.395	0.4257	0.1076	0.0012	250	7.26	14
2000	9	20	16	B	0.3831	0.0551	0.2696	0.2145	0.1135	1.818	ND	1.5732	1.5732	0.2448	0.1422	0.0019	241	7.35	14
2000	9	20	16	C	0.3716	0.0390	0.2251	0.1861	0.1465	1.9872	0.0082	1.4958	1.4876	0.4914	0.1026	0.0013	248	7.34	14
2000	10	16	16	A	0.5156	0.0419	0.3898	0.3479	0.1258	3.2724	0.1883	2.3328	2.1445	0.9396	0.5712	0.019	566	7.76	8
2000	10	16	16	B	0.5839	0.0553	0.5402	0.4850	0.0437	3.4416	0.506	2.6919	2.1859	0.7497	0.5579	0.0185	574	7.76	8
2000	10	16	16	C	0.5839	0.0641	0.4705	0.4064	0.1134	3.4398	0.6012	2.6811	2.0799	0.7587	0.5719	0.0197	573	7.78	8
2000	5	1	17	A	0.1915	0.0090	0.0461	0.0371	0.1454	1.3644	ND	1.0206	1.0206	0.3438	ND	ND	111.3	7.65	14
2000	5	1	17	B	0.0755	0.0153	0.0652	0.0500	0.0103	1.3347	ND	1.0224	1.0224	0.3123	ND	ND	111.4	7.74	14
2000	5	1	17	C	0.0755	0.0153	0.0608	0.0456	0.0147	1.089	ND	1.0242	1.0242	0.0648	ND	ND	111.5	7.79	14
2000	5	16	17	A	0.099	0.0109	0.0705	0.0596	0.0285	1.7082	0.0061	1.4715	1.4654	0.2367	ND	ND	111.4	7.15	11
2000	5	16	17	B	0.1485	0.0109	0.0525	0.0416	0.0960	1.287	ND	1.089	1.089	0.198	ND	ND	113.2	7.17	11
2000	5	16	17	C	0.123	0.0100	0.0735	0.0635	0.0495	1.458	ND	1.116	1.116	0.342	ND	ND	113.8	7.19	11

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	5	22	17	A	0.108	0.0518	0.0885	0.0368	0.0195	1.1142	ND	1.1898	1.1898	ND	ND	ND	236	8.36	14
2000	5	22	17	B	0.108	0.0608	0.0885	0.0278	0.0195	1.1151	0.0084	1.0791	1.0707	0.036	ND	ND	239	8.41	14
2000	5	22	17	C	0.084	0.0563	0.0930	0.0368	-0.0090	1.8333	0.0624	2.061	1.9986	ND	ND	ND	242	8.4	14
2000	6	12	17	A	0.1007	0.0064	0.0539	0.0475	0.0468	2.9565	ND	2.4813	2.4813	0.4752	ND	ND	114.1	7.58	17
2000	6	12	17	B	0.0979	0.0036	0.0440	0.0404	0.0539	3.0744	ND	2.7243	2.7243	0.3501	ND	ND	114.5	7.52	17
2000	6	12	17	C	0.0894	0.0036	0.0313	0.0277	0.0581	2.8719	ND	2.4552	2.4552	0.4167	ND	ND	113.5	7.52	17
2000	6	22	17	A	0.2458	0.0306	0.1088	0.0782	0.1370	3.9474	0.0056	2.6991	2.6935	1.2483	0.4810	0.0011	123.6	6.6	20
2000	6	22	17	B	0.1927	0.0080	0.0556	0.0476	0.1371	3.3318	ND	2.2032	2.2032	1.1286	0.3872	0.0007	123.3	6.45	20
2000	6	22	17	C	0.2626	0.0144	0.1088	0.0944	0.1538	3.7116	ND	2.6127	2.6127	1.0989	0.3009	0.0005	123.3	6.43	20
2000	7	3	17	A	0.1285	0.0256	0.0774	0.0518	0.0511	2.2176	0.0053	1.6146	1.6093	0.603	0.0923	0.0001	150.1	6.1	20
2000	7	3	17	B	0.1328	0.0361	0.1001	0.0640	0.0327	2.3301	0.0209	1.998	1.9771	0.3321	0.1550	0.0001	150.3	6	20
2000	7	3	17	C	0.093	0.0126	0.0391	0.0265	0.0539	1.8234	ND	1.4058	1.4058	0.4176	0.1457	0.0001	148.7	5.9	20
2000	7	14	17	A	0.2539	0.0109	0.0933	0.0824	0.1606	3.5343	ND	2.2347	2.2347	1.2996	0.0638	0.0001	149.1	6.25	20
2000	7	14	17	B	0.2043	0.0064	0.1094	0.1030	0.0949	3.1797	0.0084	2.3562	2.3478	0.8235	ND	ND	146.5	6.27	20
2000	7	14	17	C	0.1897	0.0046	0.0656	0.0610	0.1241	3.0339	0.0058	2.3733	2.3675	0.6606	ND	ND	146.4	6.18	20
2000	7	24	17	A	0.187	0.0600	0.1430	0.0830	0.0440	1.989	0.0344	1.8423	1.8079	0.1467	0.1874	0.0024	.	7.33	21
2000	7	24	17	B	0.231	0.0359	0.0771	0.0412	0.1539	2.1753	ND	1.4967	1.4967	0.6786	0.1771	0.0018	.	7.23	21
2000	7	24	17	C	0.1709	0.0296	0.0698	0.0402	0.1011	1.5237	0.0066	1.251	1.2444	0.2727	0.1901	0.0018	.	7.2	21
2000	8	3	17	A	0.3351	0.0476	0.2077	0.1601	0.1274	2.9304	ND	2.1762	2.1762	0.7542	0.6996	0.1066	132.7	8.48	22
2000	8	3	17	B	0.2976	0.0300	0.2197	0.1897	0.0779	2.8035	ND	2.3814	2.3814	0.4221	0.7377	0.1361	133.3	8.58	22
2000	8	3	17	C	0.2751	0.0415	0.1597	0.1182	0.1154	2.4939	ND	2.5407	2.5407	ND	0.7255	0.1339	134.8	8.58	22
2000	8	14	17	A	0.1909	0.0131	0.0764	0.0633	0.1145	2.0304	ND	1.2483	1.2483	0.7821	0.4355	0.003	123.4	7.07	20
2000	8	14	17	B	0.1627	0.0104	0.0425	0.0321	0.1202	1.3221	ND	0.5481	0.5481	0.774	0.4307	0.0027	123.2	7.03	20
2000	8	14	17	C	0.2178	0.0131	0.0807	0.0676	0.1371	1.5795	ND	0.7245	0.7245	0.855	0.4423	0.0028	123.2	7.03	20
2000	8	24	17	A	0.1236	0.0011	0.0420	0.0409	0.0816	1.9224	ND	1.0665	1.0665	0.8559	0.0000	ND	118.6	7.14	19
2000	8	24	17	B	0.0857	0.0011	0.0391	0.0380	0.0466	1.251	ND	0.171	0.171	1.08	0.0000	ND	118.1	7.21	19
2000	8	24	17	C	0.1672	0.0011	0.0821	0.0810	0.0851	2.241	0.0704	1.4706	1.4002	0.7704	0.0000	ND	118.7	7.24	19
2000	9	5	17	A	0.1773	0.0168	0.1337	0.1170	0.0436	2.8629	0.0067	1.9764	1.9697	0.8865	0.0000	ND	125.1	8.43	15
2000	9	5	17	B	0.1773	0.0159	0.1118	0.0959	0.0655	2.421	0.0097	1.6785	1.6688	0.7425	0.0000	ND	125.3	8.52	15
2000	9	5	17	C	0.221	0.0219	0.2065	0.1846	0.0145	2.8629	ND	2.3481	2.3481	0.5148	0.0000	ND	126.3	8.51	15
2000	9	20	17	A	0.2507	0.1046	0.1790	0.0744	0.0717	2.1636	0.2783	1.9107	1.6324	0.2529	ND	ND	144	7.26	18
2000	9	20	17	B	0.2148	0.0984	0.2005	0.1021	0.0143	2.0421	0.2374	1.7946	1.5572	0.2475	ND	ND	138.6	7.31	18
2000	9	20	17	C	0.2249	0.1109	0.1933	0.0824	0.0316	2.1177	0.3056	1.7118	1.4062	0.4059	ND	ND	143.6	7.29	18
2000	10	16	17	A	0.1834	0.0285	0.1178	0.0893	0.0656	2.0556	0.413	1.8027	1.3897	0.2529	ND	ND	139.8	7.54	8
2000	10	16	17	B	0.1738	0.0143	0.1424	0.1282	0.0314	1.9296	0.0057	1.5183	1.5126	0.4113	0.0317	0.0006	139.9	7.5	8
2000	10	16	17	C	0.1738	0.0196	0.1437	0.1241	0.0301	2.052	0.3246	1.7163	1.3917	0.3357	ND	ND	143.3	7.57	8
2000	2	7	18	A	0.643	0.0105	0.1856	0.1751	0.4574	6.1758	0.2466	3.2805	3.0339	2.8953	2.0172	1.1244	637	9.33	8
2000	2	7	18	B	0.6064	0.0140	0.1932	0.1792	0.4132	6.2046	0.1987	3.2499	3.0512	2.9547	2.0200	1.1598	634	9.36	8
2000	2	7	18	C	0.6278	0.0184	0.1779	0.1595	0.4499	6.3324	0.2009	3.51	3.3091	2.8224	1.7739	0.9987	635	9.34	8
2000	3	10	18	A	0.5683	0.0101	0.0748	0.0647	0.4935	5.2956	0.0533	2.0538	2.0005	3.2418	0.0700	0.0235	666	8.93	5
2000	3	10	18	B	0.6518	0.0168	0.0718	0.0551	0.5800	5.6871	0.0246	2.448	2.4234	3.2391	ND	ND	668	8.95	5
2000	3	10	18	C	0.6366	0.0384	0.0718	0.0334	0.5648	5.3199	0.0133	1.7532	1.7399	3.5667	ND	ND	666	8.93	5
2000	4	4	18	A	0.3264	0.0161	0.1297	0.1136	0.1967	4.1607	ND	2.3706	2.3706	1.7901	0.1280	0.0379	666	8.85	14
2000	4	4	18	B	0.4475	0.0071	0.1268	0.1197	0.3207	4.5441	0.0365	2.3445	2.308	2.1996	0.1164	0.0292	665	8.75	14
2000	4	4	18	C	0.4832	0.0161	0.1553	0.1392	0.3279	4.5792	0.041	2.3598	2.3188	2.2194	0.1266	0.0328	668	8.77	14
2000	4	19	18	A	0.2988	0.0119	0.0642	0.0523	0.2346	3.8187	ND	1.8369	1.8369	1.9818	ND	ND	715	8.31	6
2000	4	19	18	B	0.1497	0.0164	0.0918	0.0754	0.0579	3.9573	ND	2.2914	2.2914	1.6659	ND	ND	716	8.32	6
2000	4	19	18	C	0.2919	0.0164	0.0642	0.0478	0.2277	3.9609	ND	2.1033	2.1033	1.8576	ND	ND	719	8.35	6
2000	5	1	18	A	0.3691	0.0614	0.1357	0.0743	0.2334	3.789	0.0225	2.2455	2.223	1.5435	0.0000	ND	700	8.64	11
2000	5	1	18	B	0.397	0.0334	0.1166	0.0832	0.2804	3.8457	0.0113	2.3238	2.3125	1.5219	0.1346	0.0283	698	8.65	11
2000	5	1	18	C	0.4058	0.0469	0.1034	0.0565	0.3024	4.0653	ND	2.2662	2.2662	1.7991	ND	ND	698	8.66	11
2000	5	16	18	A	0.3095	0.0723	0.2076	0.1354	0.1019	2.7486	ND	2.3859	2.3859	0.3627	0.1573	0.0171	550	8.31	10
2000	5	16	18	B	0.3095	0.0723	0.2076	0.1354	0.1019	2.9097	ND	2.385	2.385	0.5247	0.1930	0.0214	560	8.32	10
2000	5	16	18	C	0.3095	0.0759	0.2367	0.1608	0.0728	2.835	ND	2.2761	2.2761	0.5589	0.1981	0.0224	563	8.33	10
2000	5	22	18	A	0.3136	0.0563	0.1695	0.1133	0.1441	3.294	ND	2.3958	2.3958	0.8982	ND	ND	702	8.61	17
2000	5	22	18	B	0.3031	0.0653	0.1665	0.1013	0.1366	3.5856	ND	2.376	2.376	1.2096	ND	ND	719	8.6	17
2000	5	22	18	C	0.3631	0.0653	0.1785	0.1133	0.1846	4.4757	ND	2.3886	2.3886	2.0871	ND	ND	707	8.62	17
2000	6	2	18	A	0.2772	0.0520	0.1350	0.0830	0.1422	3.1437	0.0303	2.3814	2.3511	0.7623	ND	ND	766	9	14
2000	6	2	18	B	0.2715	0.0510	0.1479	0.0969	0.1236	3.0951	0.0086	2.3373	2.3287	0.7578	ND	ND	775	9.02	14

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	6	2	18	C	0.2643	0.0474	0.1350	0.0876	0.1293	3.2715	ND	2.4021	2.4021	0.8694	ND	ND	777	9.03	14
2000	6	12	18	A	0.1857	0.0073	0.0894	0.0822	0.0963	2.9259	ND	2.4507	2.4507	0.4752	ND	ND	668	8.68	15
2000	6	12	18	B	0.1857	0.0073	0.0724	0.0652	0.1133	2.9124	ND	2.2509	2.2509	0.6615	ND	ND	670	8.7	15
2000	6	12	18	C	0.2041	0.0180	0.1149	0.0969	0.0892	3.105	0.0196	2.8206	2.801	0.2844	ND	ND	663	8.72	15
2000	6	22	18	A	0.1913	0.0144	0.1088	0.0944	0.0825	2.826	ND	2.2869	2.2869	0.5391	0.1695	0.0022	636	7.34	18
2000	6	22	18	B	0.1857	0.0144	0.1088	0.0944	0.0769	2.7189	ND	2.4597	2.4597	0.2592	0.1584	0.0015	628	7.21	18
2000	6	22	18	C	0.1255	0.0116	0.0962	0.0846	0.0293	2.5974	ND	2.1825	2.1825	0.4149	0.1599	0.0018	628	7.29	18
2000	7	3	18	A	0.1611	0.0690	0.1129	0.0439	0.0482	3.2013	ND	2.7594	2.7594	0.4419	0.1022	0.0196	680	8.6	16
2000	7	3	18	B	0.1569	0.0188	0.0718	0.0531	0.0851	3.1563	ND	2.6946	2.6946	0.4617	0.1437	0.01	670	8.1	16
2000	7	3	18	C	0.1697	0.0170	0.0604	0.0434	0.1093	3.1329	0.0155	2.4219	2.4064	0.711	0.1183	0.0027	668	7.6	16
2000	7	14	18	A	0.2364	0.0858	0.1663	0.0806	0.0701	2.1789	0.0163	2.2797	2.2634	ND	0.1268	0.0078	527	8.04	19
2000	7	14	18	B	0.2349	0.0858	0.2086	0.1229	0.0263	2.3958	0.017	2.1762	2.1592	0.2196	0.0000	ND	521	8.08	19
2000	7	14	18	C	0.2933	0.0903	0.2393	0.1491	0.0540	2.439	0.0197	2.412	2.3923	0.027	0.0917	0.0172	524	8.59	19
2000	7	24	18	A	0.2603	0.1675	0.2603	0.0928	0.0000	2.2068	0.0157	2.1798	2.1641	0.027	0.0000	ND	.	9.17	20
2000	7	24	18	B	0.2969	0.1675	0.2529	0.0854	0.0440	2.5623	0.016	2.3679	2.3519	0.1944	0.0000	ND	.	9.12	20
2000	7	24	18	C	0.2808	0.1639	0.2661	0.1022	0.0147	2.5632	0.0162	2.3787	2.3625	0.1845	0.0000	ND	.	9.12	20
2000	8	3	18	A	0.3141	0.1655	0.2796	0.1141	0.0345	3.0159	ND	2.8971	2.8971	0.1188	0.0000	ND	461	10.79	20
2000	8	3	18	B	0.3201	0.1788	0.2796	0.1009	0.0405	2.9151	ND	2.7891	2.7891	0.126	0.0000	ND	462	10.8	20
2000	8	3	18	C	0.2901	0.1708	0.2796	0.1089	0.0105	2.9277	ND	2.8386	2.8386	0.0891	0.0000	ND	458	10.83	20
2000	8	14	18	A	0.297	0.1383	0.2291	0.0909	0.0679	1.7946	0.0098	1.4157	1.4059	0.3789	0.1108	0.0843	376	9.74	17
2000	8	14	18	B	0.3069	0.1428	0.2645	0.1218	0.0424	1.9107	0.0102	1.5939	1.5837	0.3168	0.1215	0.0914	379	9.72	17
2000	8	14	18	C	0.3069	0.1518	0.2772	0.1255	0.0297	1.9827	0.0091	1.6002	1.5911	0.3825	0.1131	0.0856	376	9.73	17
2000	8	24	18	A	0.2404	0.1240	0.2714	0.1474	-0.0310	2.7261	ND	2.2959	2.2959	0.4302	0.0000	ND	407	9.87	17
2000	8	24	18	B	0.2938	0.0848	0.2714	0.1867	0.0224	2.6316	0.0125	2.3715	2.359	0.2601	0.0000	ND	408	9.89	17
2000	8	24	18	C	0.3107	0.1066	0.2714	0.1648	0.0393	2.7774	0.018	2.5326	2.5146	0.2448	0.0000	ND	410	9.89	17
2000	9	5	18	A	0.3265	0.1674	0.2764	0.1090	0.0501	3.7377	0.042	3.3534	3.3114	0.3843	0.0387	0.0263	486	9.56	14
2000	9	5	18	B	0.3265	0.1074	0.2263	0.1189	0.1002	3.3453	0.0151	3.2472	3.2321	0.0981	0.0000	ND	482	9.59	14
2000	9	5	18	C	0.3623	0.1283	0.2492	0.1210	0.1131	3.6	ND	2.9403	2.9403	0.6597	0.0982	0.0686	480	9.6	14
2000	9	20	18	A	0.4874	0.1543	0.3411	0.1869	0.1463	4.2012	0.013	3.3183	3.3053	0.8829	0.1613	0.1022	451	9.47	17
2000	9	20	18	B	0.4013	0.1774	0.3654	0.1880	0.0359	4.1373	0.0084	3.159	3.1506	0.9783	0.1626	0.1047	452	9.49	17
2000	9	20	18	C	0.4587	0.1668	0.3855	0.2188	0.0732	4.2255	ND	3.2634	3.2634	0.9621	0.0326	0.0214	453	9.51	17
2000	10	16	18	A	0.4335	0.0250	0.1232	0.0982	0.3103	5.2848	0.0121	2.9772	2.9651	2.3076	0.2830	0.076	438	8.79	9
2000	10	16	18	B	0.413	0.0285	0.1301	0.1016	0.2829	6.1758	0.0736	4.2615	4.1879	1.9143	0.3128	0.0853	445	8.8	9
2000	10	16	18	C	0.413	0.0205	0.1232	0.1027	0.2898	5.2425	0.0181	3.1815	3.1634	2.061	0.2937	0.0898	435	8.87	9
2000	1	6	19	A	0.5015	0.4543	0.3816	ND	0.1199	3.6819	2.3579	3.672	1.3141	0.0099	0.5582	0.0231	410	7.86	3
2000	1	6	19	B	0.4493	0.4459	0.4400	ND	0.0093	3.8142	2.3403	3.7278	1.3875	0.0864	0.5219	0.0226	409	7.88	3
2000	1	6	19	C	0.4708	0.4551	0.4093	ND	0.0615	3.9564	2.3746	3.726	1.3514	0.2304	0.4397	0.0178	410	7.85	3
2000	2	7	19	A	0.6522	0.2069	0.5287	0.3218	0.1235	3.9933	0.9787	2.7756	1.7969	1.2177	ND	ND	819	8.92	6
2000	2	7	19	B	0.6278	0.2111	0.4982	0.2871	0.1296	4.0158	0.9979	2.7693	1.7714	1.2465	ND	ND	817	8.93	6
2000	2	7	19	C	0.6507	0.1936	0.4372	0.2436	0.2135	3.546	0.9909	2.8404	1.8495	0.7056	ND	ND	816	8.92	6
2000	3	10	19	A	0.5759	0.2153	0.5152	0.3000	0.0607	3.1104	0.0123	2.6199	2.6076	0.4905	0.2658	0.0339	783	8.39	5
2000	3	10	19	B	0.5045	0.2370	0.4059	0.1689	0.0986	2.7747	ND	1.4094	1.4094	1.3653	0.2611	0.0346	785	8.4	5
2000	3	10	19	C	0.5334	0.2370	0.4696	0.2326	0.0638	2.6856	ND	1.7397	1.7397	0.9459	0.2853	0.0386	786	8.42	5
2000	4	4	19	A	0.6428	0.3541	0.6043	0.2502	0.0385	2.6694	ND	3.0357	3.0357	ND	0.0000	ND	625	8.55	13
2000	4	4	19	B	0.6328	0.3226	0.5031	0.1805	0.1297	2.5362	ND	1.8234	1.8234	0.7128	0.0000	ND	628	8.54	13
2000	4	4	19	C	0.8039	0.3469	0.5174	0.1705	0.2865	2.9241	ND	2.3445	2.3445	0.5796	0.0000	ND	635	8.55	13
2000	4	19	19	A	0.1332	0.0109	0.0918	0.0809	0.0414	1.5336	ND	1.1457	1.1457	0.3879	ND	ND	227	7.6	8
2000	4	19	19	B	0.1194	0.0344	0.1028	0.0684	0.0166	1.6722	ND	1.1709	1.1709	0.5013	ND	ND	228	7.62	8
2000	4	19	19	C	0.1208	0.0164	0.0656	0.0492	0.0552	1.6173	0.0186	1.0395	1.0209	0.5778	ND	ND	229	7.62	8
2000	5	1	19	A	0.3251	0.1056	0.1636	0.0580	0.1615	2.0241	0.0693	1.314	1.2447	0.7101	ND	ND	335	8.29	15
2000	5	1	19	B	0.215	0.0920	0.1636	0.0716	0.0514	1.4274	0.0663	1.1133	1.047	0.3141	ND	ND	337	8.33	15
2000	5	1	19	C	0.237	0.0911	0.1636	0.0725	0.0734	2.4147	0.0332	1.8036	1.7704	0.6111	ND	ND	346	8.25	15
2000	5	16	19	A	0.2149	0.0075	0.2076	0.2001	0.0073	1.7037	0.1812	1.3887	1.2075	0.315	0.0000	ND	266	7.54	11
2000	5	16	19	B	0.2076	0.1278	0.1959	0.0682	0.0117	1.4805	0.2079	1.4364	1.2285	0.0441	0.0000	ND	269	7.46	11
2000	5	16	19	C	0.2221	0.0768	0.1566	0.0799	0.0655	2.0133	0.0338	1.2537	1.2199	0.7596	0.0000	ND	271	7.49	11
2000	5	22	19	A	0.2356	0.1470	0.1965	0.0495	0.0391	1.6479	ND	1.3752	1.3752	0.2727	ND	ND	232	8.59	22
2000	5	22	19	B	0.2356	0.1334	0.2086	0.0752	0.0270	1.4679	0.0173	1.2915	1.2742	0.1764	ND	ND	230	8.59	22
2000	5	22	19	C	0.2491	0.1370	0.2086	0.0716	0.0405	1.413	0.0061	1.161	1.1549	0.252	ND	ND	233	8.56	22
2000	6	2	19	A	0.3649	0.1759	0.2212	0.0453	0.1437	2.0997	ND	1.2627	1.2627	0.837	ND	ND	246	8.47	22

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	6	2	19	B	0.329	0.1824	0.2528	0.0704	0.0762	1.6344	ND	1.2375	1.2375	0.3969	ND	ND	242	8.52	20
2000	6	2	19	C	0.3649	0.1998	0.2600	0.0603	0.1049	1.8171	ND	1.1925	1.1925	0.6246	ND	ND	241	8.43	20
2000	6	12	19	A	0.1276	0.0036	0.0695	0.0659	0.0581	1.8909	ND	1.4895	1.4895	0.4014	ND	ND	211	7.16	16
2000	6	12	19	B	0.1673	0.0036	0.0624	0.0588	0.1049	1.9791	ND	1.5975	1.5975	0.3816	ND	ND	212	7.32	16
2000	6	12	19	C	0.1574	0.0081	0.0582	0.0501	0.0992	2.0232	ND	1.5021	1.5021	0.5211	ND	ND	213	7.36	16
2000	6	22	19	A	0.4653	0.1438	0.4024	0.2587	0.0629	3.6756	0.0065	3.474	3.4675	0.2016	1.4709	0.0056	263	6.81	21
2000	6	22	19	B	0.4709	0.1438	0.3884	0.2447	0.0825	3.6396	ND	3.1437	3.1437	0.4959	1.5160	0.0054	258	6.78	21
2000	6	22	19	C	0.4485	0.0868	0.3479	0.2612	0.1006	3.5865	ND	2.502	2.502	1.0845	1.4938	0.0043	256	6.68	21
2000	7	3	19	A	0.3016	0.0214	0.0405	0.0191	0.2611	3.2292	0.0151	1.2375	1.2224	1.9917	0.4373	0.0005	267	6.3	20
2000	7	3	19	B	0.103	0.0126	0.0249	0.0123	0.0781	1.5012	ND	1.2294	1.2294	0.2718	0.4040	0.0004	266	6.2	20
2000	7	3	19	C	0.1001	0.0119	0.0264	0.0145	0.0737	1.5777	ND	1.197	1.197	0.3807	0.4329	0.0004	267	6.2	20
2000	7	14	19	A	0.1036	0.0091	0.0598	0.0507	0.0438	1.4904	ND	1.3527	1.3527	0.1377	0.6782	0.0032	290	6.9	19
2000	7	14	19	B	0.1561	0.0046	0.0641	0.0595	0.0920	1.7991	ND	1.296	1.296	0.5031	0.7439	0.0022	285	6.7	19
2000	7	14	19	C	0.1736	0.0244	0.1079	0.0835	0.0657	1.6587	ND	1.4184	1.4184	0.2403	0.7870	0.0019	283	6.6	19
2000	7	24	19	A	0.4141	0.2033	0.2339	0.0307	0.1802	2.3256	ND	1.395	1.395	0.9306	0.3692	0.009	.	7.62	24
2000	7	24	19	B	0.6706	0.2391	0.2822	0.0431	0.3884	3.1392	0.0395	1.4436	1.4041	1.6956	0.4003	0.0063	.	7.43	24
2000	7	24	19	C	0.4068	0.1630	0.2603	0.0973	0.1465	1.7766	ND	1.1439	1.1439	0.6327	0.2234	0.0042	.	7.51	24
2000	8	3	19	A	0.3951	0.1921	0.2437	0.0516	0.1514	2.3958	ND	1.6587	1.6587	0.7371	0.1255	0.0354	235	8.82	22
2000	8	3	19	B	0.4175	0.2218	0.2976	0.0759	0.1199	1.9179	ND	1.1772	1.1772	0.7407	0.1204	0.0356	234	8.85	22
2000	8	3	19	C	0.419	0.1053	0.2976	0.1924	0.1214	1.989	ND	1.6695	1.6695	0.3195	0.1206	0.0405	235	8.93	22
2000	8	14	19	A	0.3069	0.0265	0.1627	0.1362	0.1442	1.5651	ND	0.6408	0.6408	0.9243	0.1185	0.0009	206	7.12	17
2000	8	14	19	B	0.239	0.0158	0.0920	0.0763	0.1470	1.5255	ND	0.684	0.684	0.8415	0.1213	0.0008	204	7.07	17
2000	8	14	19	C	0.3069	0.0801	0.1754	0.0953	0.1315	1.3968	0.0097	0.7722	0.7625	0.6246	0.1207	0.0008	203	7.06	17
2000	8	24	19	A	0.2896	0.1415	0.2327	0.0912	0.0569	1.7613	ND	1.7379	1.7379	0.0234	0.0000	ND	209	7.34	16
2000	8	24	19	B	0.2685	0.0804	0.1567	0.0763	0.1118	1.8252	0.0091	1.224	1.2149	0.6012	0.0000	ND	208	7.35	16
2000	8	24	19	C	0.2291	0.0351	0.1567	0.1216	0.0724	1.575	0.0096	1.1268	1.1172	0.4482	0.0000	ND	210	7.36	16
2000	9	5	19	A	0.2549	0.0379	0.1962	0.1583	0.0587	2.4066	ND	1.9818	1.9818	0.4248	0.0000	ND	222	7.38	14
2000	9	5	19	B	0.2191	0.0161	0.0587	0.0426	0.1604	2.4363	ND	1.6389	1.6389	0.7974	0.0000	ND	220	7.41	14
2000	9	5	19	C	0.1905	0.0284	0.1117	0.0833	0.0788	2.2266	0.1657	1.7973	1.6316	0.4293	0.0000	ND	222	7.4	14
2000	9	20	19	A	0.4286	0.2883	0.3827	0.0945	0.0459	2.0943	0.5348	1.7739	1.2391	0.3204	ND	ND	259	7.45	19
2000	9	20	19	B	0.44	0.3175	0.3726	0.0551	0.0674	2.0646	0.5563	1.8333	1.277	0.2313	ND	ND	259	7.46	19
2000	9	20	19	C	0.4443	0.2421	0.4156	0.1735	0.0287	1.9017	0.4815	1.8126	1.3311	0.0891	ND	ND	262	7.44	19
2000	10	16	19	A	0.3351	0.0205	0.2025	0.1820	0.1326	2.223	ND	1.6164	1.6164	0.6066	ND	ND	295	7.51	9
2000	10	16	19	B	0.331	0.0205	0.1971	0.1766	0.1339	1.9692	0.0082	1.6038	1.5956	0.3654	ND	ND	298	7.57	9
2000	10	16	19	C	0.3037	0.0160	0.2121	0.1961	0.0916	1.8873	0.0446	1.5714	1.5268	0.3159	0.0940	0.002	311	7.57	9
2000	2	7	20	A	0.4219	0.1516	0.3457	0.1941	0.0762	3.7134	0.0089	3.0375	3.0286	0.6759	1.2963	0.5536	880	9.1	7
2000	2	7	20	B	0.4219	0.1499	0.2999	0.1500	0.1220	4.0221	0.0064	3.177	3.1706	0.8451	0.8748	0.3785	882	9.11	7
2000	2	7	20	C	0.3914	0.1324	0.3182	0.1858	0.0732	4.4028	0.0265	3.6306	3.6041	0.7722	0.9950	0.4249	880	9.1	7
2000	3	10	20	A	0.3254	0.0479	0.1204	0.0725	0.2050	4.0266	0.2627	2.3382	2.0755	1.6884	0.0669	0.0044	603	8.07	4
2000	3	10	20	B	0.3861	0.0195	0.0718	0.0523	0.3143	4.4415	0.227	2.5551	2.3281	1.8864	0.1341	0.0092	605	8.09	4
2000	3	10	20	C	0.3527	0.0195	0.0597	0.0402	0.2930	4.2597	0.1057	2.0565	1.9508	2.2032	0.1020	0.0071	606	8.1	4
2000	4	4	20	A	0.8424	0.6003	0.6799	0.0796	0.1625	5.193	0.0827	3.7071	3.6244	1.4859	0.7315	0.0952	1036	8.4	16
2000	4	4	20	B	0.9165	0.5975	0.6614	0.0639	0.2551	5.5728	ND	3.9582	3.9582	1.6146	0.3007	0.0399	1044	8.41	16
2000	4	4	20	C	0.945	0.6101	0.6614	0.0513	0.2836	5.8455	0.023	4.4154	4.3924	1.4301	0.1674	0.0241	1066	8.45	16
2000	4	19	20	A	0.216	0.0706	0.1525	0.0819	0.0635	2.5218	ND	1.8171	1.8171	0.7047	0.2214	0.0109	417	7.94	6
2000	4	19	20	B	0.2298	0.0841	0.1470	0.0629	0.0828	2.484	ND	1.9143	1.9143	0.5697	0.2337	0.0118	425	7.95	6
2000	4	19	20	C	0.2574	0.0886	0.1539	0.0653	0.1035	2.7549	0.0253	2.214	2.1887	0.5409	0.2528	0.013	426	7.96	6
2000	5	1	20	A	0.3985	0.1335	0.3104	0.1769	0.0881	3.0177	0.0423	2.4831	2.4408	0.5346	0.2414	0.0398	476	8.52	15
2000	5	1	20	B	0.3515	0.1326	0.2664	0.1338	0.0851	3.4389	0.0307	2.5992	2.5685	0.8397	0.2314	0.0374	465	8.51	15
2000	5	1	20	C	0.6334	0.0740	0.3060	0.2320	0.3274	8.5707	0.0276	2.727	2.6994	5.8437	0.4487	0.0725	467	8.51	15
2000	5	16	20	A	0.4333	0.2270	0.3678	0.1408	0.0655	3.7539	0.0772	3.3093	3.2321	0.4446	0.2339	0.019	789	8.17	12
2000	5	16	20	B	0.426	0.1951	0.3590	0.1639	0.0670	3.8331	0.1485	3.1716	3.0231	0.6615	0.2975	0.0246	785	8.18	12
2000	5	16	20	C	0.5061	0.2361	0.3823	0.1462	0.1238	5.3082	0.0642	3.2445	3.1803	2.0637	0.3313	0.0274	787	8.18	12
2000	5	22	20	A	0.4937	0.2921	0.4082	0.1161	0.0855	3.2688	0.0522	2.9124	2.8602	0.3564	0.1791	0.0289	801	8.51	23
2000	5	22	20	B	0.5432	0.3003	0.4187	0.1185	0.1245	3.2652	0.115	2.9781	2.8631	0.2871	0.2089	0.0337	804	8.51	23
2000	5	22	20	C	0.5507	0.3130	0.4787	0.1657	0.0720	3.4488	0.0129	2.9151	2.9022	0.5337	0.1811	0.0293	798	8.51	23
2000	6	2	20	A	0.3577	0.1300	0.2499	0.1199	0.1078	3.6729	ND	2.9286	2.9286	0.7443	0.1264	0.0424	819	8.93	20
2000	6	2	20	B	0.3491	0.1391	0.2384	0.0993	0.1107	3.5811	ND	2.8413	2.8413	0.7398	0.1176	0.0425	816	8.98	20
2000	6	2	20	C	0.3577	0.1429	0.2672	0.1243	0.0905	3.6639	0.033	3.0726	3.0396	0.5913	0.0844	0.0712	824	8.98	20

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	6	12	20	A	0.2962	0.0815	0.2041	0.1226	0.0921	3.8682	ND	3.6504	3.6504	0.2178	ND	ND	852	8.59	16
2000	6	12	20	B	0.2707	0.0975	0.2282	0.1307	0.0425	3.5991	0.016	3.9735	3.9575	ND	ND	ND	860	8.56	16
2000	6	12	20	C	0.2707	0.1119	0.2112	0.0993	0.0595	3.3264	ND	3.708	3.708	ND	0.0445	0.0079	868	8.56	16
2000	6	22	20	A	0.8079	0.6633	0.7450	0.0818	0.0629	4.9788	ND	4.5819	4.5819	0.3969	0.2973	0.0053	1359	7.48	24
2000	6	22	20	B	0.8359	0.6660	0.8023	0.1363	0.0336	5.0211	ND	4.5648	4.5648	0.4563	0.2651	0.0028	1546	7.26	24
2000	6	22	20	C	0.7799	0.6886	0.7450	0.0564	0.0349	5.4261	ND	4.8105	4.8105	0.6156	0.2835	0.0047	1548	7.45	24
2000	7	3	20	A	0.5882	0.3928	0.5145	0.1218	0.0737	3.7368	0.0279	3.3498	3.3219	0.387	0.2791	0.0052	871	7.5	20
2000	7	3	20	B	0.567	0.3486	0.4932	0.1446	0.0738	3.7791	0.0383	3.177	3.1387	0.6021	0.1663	0.002	788	7.3	20
2000	7	3	20	C	0.5854	0.3998	0.5287	0.1290	0.0567	3.8178	0.028	3.4146	3.3866	0.4032	0.1339	0.0031	840	7.6	20
2000	7	14	20	A	0.2466	0.1219	0.2057	0.0838	0.0409	2.5605	0.0254	2.2878	2.2624	0.2727	0.1995	0.0023	705	7.3	23
2000	7	14	20	B	0.2247	0.1336	0.2174	0.0838	0.0073	2.4525	0.021	2.4597	2.4387	ND	0.2024	0.0015	696	7.11	23
2000	7	14	20	C	0.2773	0.1174	0.2349	0.1175	0.0424	2.7216	0.0195	2.5371	2.5176	0.1845	0.2122	0.0026	695	7.32	23
2000	7	24	20	A	0.2896	0.1863	0.2661	0.0799	0.0235	2.1447	0.0328	2.0727	2.0399	0.072	0.0907	0.0247	.	8.8	23
2000	7	24	20	B	0.2881	0.1871	0.2735	0.0864	0.0146	2.1654	0.0133	2.2419	2.2286	ND	0.1168	0.0335	.	8.83	23
2000	7	24	20	C	0.3555	0.1863	0.2881	0.1019	0.0674	2.2752	0.0274	2.1528	2.1254	0.1224	0.1117	0.0325	.	8.84	23
2000	8	3	20	A	0.3351	0.1629	0.2676	0.1047	0.0675	2.8683	ND	2.5407	2.5407	0.3276	0.0000	ND	503	10.03	22
2000	8	3	20	B	0.3651	0.1761	0.2706	0.0945	0.0945	3.0447	ND	2.3562	2.3562	0.6885	0.1030	0.0857	503	9.94	22
2000	8	3	20	C	0.3426	0.1593	0.2227	0.0635	0.1199	2.9196	0.0172	2.2527	2.2355	0.6669	0.0000	ND	493	10.13	22
2000	8	14	20	A	0.3168	0.2590	0.2927	0.0337	0.0241	1.9044	0.0097	1.5372	1.5275	0.3672	0.0824	0.0352	531	9.1	19
2000	8	14	20	B	0.4157	0.3171	0.3875	0.0704	0.0282	2.9034	0.0129	2.1087	2.0958	0.7947	0.0977	0.0456	530	9.17	19
2000	8	14	20	C	0.3747	0.2590	0.3606	0.1016	0.0141	1.9278	0.0151	1.4931	1.478	0.4347	0.0619	0.0292	532	9.18	19
2000	8	24	20	A	0.2966	0.1328	0.2685	0.1358	0.0281	3.8322	ND	3.3111	3.3111	0.5211	0.1873	0.0831	540	9.13	19
2000	8	24	20	B	0.2404	0.1371	0.2399	0.1028	0.0005	2.9835	0.0192	2.3256	2.3064	0.6579	0.2139	0.0962	541	9.14	19
2000	8	24	20	C	0.2685	0.1545	0.2542	0.0997	0.0143	2.925	0.0166	2.3715	2.3549	0.5535	0.2109	0.0948	535	9.14	19
2000	9	5	20	A	0.3551	0.0335	0.1976	0.1641	0.1575	4.4352	ND	3.6504	3.6504	0.7848	0.0484	0.0322	488	9.53	16
2000	9	5	20	B	0.4124	0.0293	0.2391	0.2099	0.1733	4.9419	ND	4.077	4.077	0.8649	0.0000	ND	486	9.57	16
2000	9	5	20	C	0.3408	0.0293	0.1976	0.1684	0.1432	4.6305	ND	3.8097	3.8097	0.8208	0.0000	ND	481	9.57	16
2000	9	20	20	A	0.3884	0.0558	0.2005	0.1448	0.1879	4.7043	ND	3.4722	3.4722	1.2321	ND	ND	522	9.45	19
2000	9	20	20	B	0.3956	0.0691	0.2292	0.1601	0.1664	4.9338	ND	3.5739	3.5739	1.3599	ND	ND	523	9.44	19
2000	9	20	20	C	0.3956	0.0558	0.2435	0.1878	0.1521	5.0922	ND	3.4794	3.4794	1.6128	ND	ND	524	9.47	19
2000	10	16	20	A	0.5976	0.0374	0.2668	0.2294	0.3308	6.1488	0.008	4.6512	4.6432	1.4976	2.1567	0.1747	614	8.17	11
2000	10	16	20	B	0.6113	0.0463	0.4377	0.3915	0.1736	6.6501	0.0529	4.8276	4.7747	1.8225	2.1132	0.22	654	8.28	11
2000	10	16	20	C	0.5224	0.1933	0.3310	0.1378	0.1914	5.7321	0.0504	4.8681	4.8177	0.864	2.0365	0.0984	630	7.93	11
2000	2	7	21	A	0.4067	0.1551	0.3152	0.1601	0.0915	3.726	0.0058	2.7144	2.7086	1.0116	ND	ND	850	8.85	8
2000	2	7	21	B	0.4067	0.1586	0.3381	0.1795	0.0686	3.6432	ND	2.8917	2.8917	0.7515	0.8544	0.2449	852	8.83	8
2000	2	7	21	C	0.399	0.1464	0.2237	0.0773	0.1753	3.5748	ND	2.8971	2.8894	0.6777	1.0348	0.3015	850	8.84	8
2000	3	10	21	A	0.3527	0.0404	0.1508	0.1104	0.2019	3.9834	0.3346	2.5317	2.1971	1.4517	0.3257	0.0339	1351	8.29	5
2000	3	10	21	B	0.3649	0.0195	0.0748	0.0553	0.2901	4.1382	0.2032	2.4318	2.2286	1.7064	0.1893	0.0201	1352	8.3	5
2000	3	10	21	C	0.3254	0.0243	0.1735	0.1493	0.1519	4.4154	0.2662	2.9835	2.7173	1.4319	0.2196	0.0253	1351	8.34	5
2000	4	4	21	A	0.3691	0.0928	0.2052	0.1125	0.1639	4.5351	ND	3.1761	3.1761	1.359	0.4149	0.0157	976	7.82	17
2000	4	4	21	B	0.3763	0.0495	0.2408	0.1913	0.1355	4.5738	ND	3.6738	3.6738	0.9	0.4308	0.0174	975	7.85	17
2000	4	4	21	C	0.3976	0.0874	0.2337	0.1463	0.1639	4.4712	0.006	3.222	3.216	1.2492	0.4410	0.0179	977	7.85	17
2000	4	19	21	A	0.354	0.1203	0.1953	0.0751	0.1587	3.8637	ND	2.871	2.871	0.9927	0.4534	0.0067	848	7.4	8
2000	4	19	21	B	0.2367	0.0661	0.1387	0.0726	0.0980	3.2841	ND	2.8287	2.8287	0.4554	0.4486	0.0065	852	7.39	8
2000	4	19	21	C	0.3333	0.1023	0.1608	0.0586	0.1725	3.7305	ND	3.141	3.141	0.5895	0.4405	0.0064	860	7.39	8
2000	5	1	21	A	0.4058	0.1824	0.3691	0.1867	0.0367	3.6639	0.39	3.213	2.823	0.4509	0.3044	0.0113	583	7.81	17
2000	5	1	21	B	0.3985	0.1940	0.3471	0.1531	0.0514	3.6189	0.3841	3.1509	2.7668	0.468	0.3689	0.0134	589	7.8	17
2000	5	1	21	C	0.4132	0.2049	0.3471	0.1422	0.0661	3.5982	0.3803	3.4353	3.055	0.1629	0.3610	0.0125	584	7.78	17
2000	5	16	21	A	0.4333	0.1951	0.3095	0.1144	0.1238	3.7458	0.1031	2.8206	2.7175	0.9252	0.2677	0.0226	647	8.19	10
2000	5	16	21	B	0.4697	0.1588	0.3343	0.1756	0.1354	3.996	0.0138	2.709	2.6952	1.287	0.2412	0.0208	654	8.2	10
2000	5	16	21	C	0.4115	0.1633	0.3372	0.1740	0.0743	3.4443	0.1432	2.8512	2.708	0.5931	0.2253	0.0194	654	8.2	10
2000	5	22	21	A	0.5323	0.2206	0.3939	0.1733	0.1384	4.5153	0.0555	3.6594	3.6039	0.8559	0.3197	0.0424	752	8.41	20
2000	5	22	21	B	0.4708	0.1653	0.2863	0.1211	0.1845	5.3613	ND	2.754	2.754	2.6073	0.3717	0.0503	751	8.42	20
2000	5	22	21	C	0.5384	0.2059	0.4046	0.1987	0.1338	3.4173	ND	2.8899	2.8899	0.5274	ND	ND	760	8.42	20
2000	6	2	21	A	0.4224	0.2035	0.3204	0.1169	0.1020	5.049	ND	4.3011	4.3011	0.7479	0.2667	0.053	755	8.62	19
2000	6	2	21	B	0.4497	0.2053	0.3362	0.1310	0.1135	3.6153	0.0554	2.7108	2.6554	0.9045	0.2622	0.0541	751	8.64	19
2000	6	2	21	C	0.4368	0.1851	0.3434	0.1583	0.0934	3.2391	0.0313	2.7459	2.7146	0.4932	0.2774	0.0572	758	8.64	19
2000	6	12	21	A	0.2991	0.1029	0.2041	0.1012	0.0950	2.8026	ND	2.6901	2.6901	0.1125	0.0357	0.0042	553	8.38	16
2000	6	12	21	B	0.3487	0.0850	0.1857	0.1007	0.1630	3.0798	ND	2.7117	2.7117	0.3681	ND	ND	563	8.39	16

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	6	12	21	C	0.3189	0.0519	0.1574	0.1055	0.1615	3.2553	ND	2.8719	2.8719	0.3834	ND	ND	566	8.38	16
2000	6	22	21	A	0.4617	0.0475	0.2239	0.1764	0.2378	4.6782	0.0085	3.4119	3.4034	1.2663	0.7293	0.0005	392	6.09	26
2000	6	22	21	B	0.4477	0.1261	0.2714	0.1453	0.1763	3.5856	0.0095	2.3958	2.3863	1.1898	0.6790	0.0005	391	6.1	26
2000	6	22	21	C	0.4896	0.1095	0.3260	0.2165	0.1636	4.0338	0.0099	2.8062	2.7963	1.2276	0.7754	0.0007	395	6.17	26
2000	7	3	21	A	0.3703	0.0711	0.2256	0.1545	0.1447	3.735	0.0327	2.7486	2.7159	0.9864	0.5866	0.0017	523	6.7	20
2000	7	3	21	B	0.5475	0.0940	0.3511	0.2571	0.1964	4.527	0.0231	3.1392	3.1161	1.3878	0.6224	0.0012	521	6.5	20
2000	7	3	21	C	0.4545	0.1159	0.2625	0.1466	0.1920	3.4542	0.0063	2.4696	2.4633	0.9846	0.6036	0.0014	520	6.6	20
2000	7	14	21	A	0.333	0.0908	0.2024	0.1117	0.1306	2.4912	0.0276	2.2419	2.2143	0.2493	0.3897	0.0024	480	7.02	23
2000	7	14	21	B	0.333	0.0596	0.1837	0.1241	0.1493	2.1654	ND	1.8081	1.8081	0.3573	0.3707	0.002	475	6.96	23
2000	7	14	21	C	0.3272	0.0819	0.2124	0.1305	0.1148	2.3589	0.0103	1.4886	1.4783	0.8703	0.4106	0.0018	477	6.88	23
2000	7	24	21	A	0.3174	0.1183	0.1709	0.0527	0.1465	1.8567	0.0115	1.8117	1.8002	0.045	0.2934	0.0102	.	7.78	23
2000	7	24	21	B	0.3262	0.1236	0.2090	0.0854	0.1172	1.8306	0.0105	1.8288	1.8183	0.0018	0.2940	0.0109	.	7.81	23
2000	7	24	21	C	0.3833	0.1325	0.1929	0.0604	0.1904	1.8639	0.0065	1.8045	1.798	0.0594	0.3019	0.012	.	7.84	23
2000	8	3	21	A	0.4475	0.0716	0.2676	0.1960	0.1799	3.5298	ND	2.6973	2.6973	0.8325	1.0071	0.4986	408	9.22	24
2000	8	3	21	B	0.3576	0.0875	0.2377	0.1502	0.1199	3.4362	0.0076	2.5101	2.5025	0.9261	0.9859	0.544	405	9.32	24
2000	8	3	21	C	0.4475	0.0504	0.1477	0.0973	0.2998	3.5118	ND	2.1852	2.1852	1.3266	0.9905	0.5687	404	9.36	24
2000	8	14	21	A	0.5741	0.1768	0.3634	0.1867	0.2107	3.5496	0.0056	2.1042	2.0986	1.4454	0.7081	0.0112	435	7.43	21
2000	8	14	21	B	0.6419	0.2590	0.3747	0.1157	0.2672	3.591	0.0105	2.2194	2.2089	1.3716	0.6541	0.0106	430	7.44	21
2000	8	14	21	C	0.6292	0.2125	0.4129	0.2004	0.2163	3.3858	0.0111	1.9665	1.9554	1.4193	0.6901	0.0109	432	7.43	21
2000	8	24	21	A	0.5498	0.1153	0.3144	0.1992	0.2354	4.0311	0.0065	2.7342	2.7277	1.2969	0.8840	0.0153	317	7.47	18
2000	8	24	21	B	0.509	0.1153	0.2972	0.1820	0.2118	4.0239	ND	3.9744	3.9744	0.0495	0.8957	0.0148	317	7.45	18
2000	8	24	21	C	0.5273	0.1328	0.3689	0.2362	0.1584	4.185	ND	2.6847	2.6847	1.5003	0.9050	0.0146	316	7.44	18
2000	9	5	21	A	0.2864	0.0240	0.1532	0.1292	0.1332	4.0041	0.0133	3.2724	3.2591	0.7317	0.0000	ND	451	9.36	17
2000	9	5	21	B	0.2749	0.0284	0.1461	0.1177	0.1288	4.8978	0.0421	4.7223	4.6802	0.1755	0.0000	ND	445	9.38	17
2000	9	5	21	C	0.2492	0.0318	0.1747	0.1430	0.0745	4.0824	0.0075	3.3228	3.3153	0.7596	0.0000	ND	446	9.4	17
2000	9	20	21	A	0.3726	0.1694	0.3540	0.1846	0.0186	4.6602	0.0279	4.0707	4.0428	0.5895	ND	ND	564	8.97	19
2000	9	20	21	B	0.4185	0.1694	0.3554	0.1860	0.0631	4.6836	0.0418	3.8826	3.8408	0.801	ND	ND	572	8.94	19
2000	9	20	21	C	0.43	0.1081	0.3626	0.2545	0.0674	4.6656	ND	3.9213	3.9213	0.7443	ND	ND	573	8.94	19
2000	6	2	22	A	0.1278	0.0079	0.0588	0.0509	0.0690	4.6665	0.0125	4.2237	4.2112	0.4428	0.1253	0.0053	1762	7.87	15
2000	6	2	22	B	0.1235	0.0290	0.0804	0.0514	0.0431	4.6233	0.0612	4.3749	4.3137	0.2484	0.1125	0.0048	1768	7.87	15
2000	6	2	22	C	0.1378	0.0051	0.0372	0.0321	0.1006	4.5963	ND	4.2336	4.2336	0.3627	0.1316	0.0057	1790	7.88	15
2000	6	12	22	A	0.3841	0.0260	0.3175	0.2915	0.0666	.	0.5409	2.9538	2.4129	.	ND	ND	493	6.83	13
2000	6	12	22	B	0.3458	0.0036	0.1985	0.1949	0.1473	.	ND	1.9368	1.9368	.	ND	ND	488	6.89	13
2000	6	12	22	C	0.3232	0.0921	0.2041	0.1120	0.1191	.	ND	2.1258	2.1258	.	ND	ND	498	6.94	13
2000	6	22	22	A	0.091	0.0169	0.0602	0.0433	0.0308	6.4881	ND	5.9364	5.9364	0.5517	0.3240	0.0011	2400	6.77	14
2000	6	22	22	B	0.126	0.0221	0.0392	0.0171	0.0868	6.3459	ND	5.6844	5.6844	0.6615	0.3330	0.0013	2410	6.83	14
2000	6	22	22	C	0.14	0.0221	0.0742	0.0521	0.0658	6.9066	ND	5.9301	5.9301	0.9765	0.3629	0.0014	2440	6.8	14
2000	7	3	22	A	0.3851	0.2629	0.3216	0.0587	0.0635	2.4516	0.0108	1.9737	1.9629	0.4779	0.0825	0.0005	741	7	16
2000	7	3	22	B	0.3748	0.2584	0.3363	0.0779	0.0385	2.5155	0.0094	2.0916	2.0822	0.4239	0.0766	0.0007	715	7.2	16
2000	7	3	22	C	0.4294	0.2858	0.3659	0.0802	0.0635	2.646	0.0114	2.0349	2.0235	0.6111	0.0764	0.0007	716	7.2	16
2000	7	14	22	A	0.1536	0.0231	0.0818	0.0587	0.0718	5.2047	0.0402	4.5081	4.4679	0.6966	0.1965	0.0011	1116	6.99	13
2000	7	14	22	B	0.1536	0.0365	0.0675	0.0310	0.0861	5.5944	0.0386	4.5954	4.5568	0.999	0.2435	0.0013	1086	6.95	13
2000	7	14	22	C	0.1493	0.0188	0.0818	0.0631	0.0675	4.8627	0.0474	4.7034	4.656	0.1593	0.2188	0.0012	1086	6.98	13
2000	7	24	22	A	0.3946	0.2663	0.3286	0.0624	0.0660	1.6137	ND	1.404	1.404	0.2097	0.0760	0.0006	.	7.16	20
2000	7	24	22	B	0.3454	0.2536	0.3145	0.0609	0.0309	1.2735	ND	1.4049	1.4049	ND	0.0000	ND	.	7.16	20
2000	7	24	22	C	0.3707	0.3120	0.3679	0.0559	0.0028	1.2609	ND	1.3194	1.3194	ND	0.0000	ND	.	7.11	20
2000	6	2	28	A	0.0554	0.0055	0.0317	0.0262	0.0237	33.7626	22.1404	31.6629	9.5225	2.0997	0.0473	0.007	2630	7.42	8
2000	6	2	28	B	0.1	0.0100	0.0735	0.0635	0.0265	36.8028	26.1563	32.958	6.8017	3.8448	0.0583	0.0013	2670	7.57	8
2000	6	2	28	C	0.0735	0.0091	0.0526	0.0435	0.0209	36.7299	26.1477	33.0003	6.8526	3.7296	ND	ND	2700	7.48	8
2000	6	12	28	A	0.1492	0.0064	0.0911	0.0847	0.0581	30.2409	22.1398	29.7675	7.6277	0.4734	0.0827	0.0006	2570	7.1	11
2000	6	12	28	B	0.1222	0.0118	0.0938	0.0821	0.0284	28.1565	13.8354	28.1637	14.3283	ND	0.1107	0.0009	2630	7.13	11
2000	6	12	28	C	0.1384	0.0118	0.1384	0.1267	0.0000	29.0295	19.8231	29.6964	9.8733	ND	0.0943	0.0007	2610	7.11	11
2000	6	22	28	A	0.1162	0.0134	0.0379	0.0245	0.0783	27.7443	5.5133	26.3214	20.8081	1.4229	0.0739	0.0003	2570	6.88	12
2000	6	22	28	B	0.0602	0.0134	0.0392	0.0258	0.0210	31.2219	15.3502	30.204	14.8538	1.0179	0.1085	0.0005	2590	6.92	12
2000	6	22	28	C	0.07	0.0134	0.0686	0.0552	0.0014	31.8699	17.06	30.9564	13.8964	0.9135	0.1121	0.0005	2610	6.87	12
2000	1	6	30	A	2.7963	1.7990	2.2383	0.4393	0.5580	19.98	0.0123	17.1567	17.1444	2.8233	20.6788	0.2852	444	7.37	4
2000	1	6	30	B	2.6456	1.7703	2.2076	0.4374	0.4380	19.7586	0.0182	18.1296	18.1114	1.629	20.9362	0.3021	446	7.39	4
2000	1	6	30	C	2.5765	1.7638	2.1477	0.3840	0.4288	19.341	ND	17.0964	17.0964	2.2446	20.8073	0.3072	442	7.4	4
2000	2	7	30	A	2.0611	1.5439	2.0352	0.4913	0.0259	14.5953	0.1612	14.3316	14.1704	0.2637	12.1849	0.6149	813	7.95	8

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	2	7	30	B	2.2289	1.5790	2.1313	0.5523	0.0976	14.6943	0.1644	15.1785	15.0141	ND	12.3575	0.5589	817	7.9	8
2000	2	7	30	C	1.6342	1.5089	1.6266	0.1177	0.0076	14.7924	0.168	15.5655	15.3975	ND	12.2224	0.5776	815	7.92	8
2000	4	4	30	A	2.3078	1.6658	1.9229	0.2572	0.3849	16.3602	ND	14.0913	14.0913	2.2689	7.5449	0.2797	862	7.81	14
2000	4	4	30	B	2.2679	1.6748	1.9272	0.2525	0.3407	16.4502	ND	14.2551	14.2551	2.1951	7.5249	0.2553	861	7.77	14
2000	4	4	30	C	2.2394	1.7063	2.0127	0.3065	0.2267	16.7337	0.012	14.6259	14.6139	2.1078	7.5862	0.2691	863	7.79	14
2000	4	19	30	A	2.402	1.5676	2.0004	0.4328	0.4016	14.5359	ND	10.1313	10.1313	4.4046	4.7675	0.0704	779	7.4	9
2000	4	19	30	B	2.3413	0.9384	1.9203	0.9819	0.4210	14.3505	ND	9.2511	9.2511	5.0994	4.8353	0.0799	768	7.45	9
2000	4	19	30	C	2.2585	1.3389	2.0239	0.6850	0.2346	14.0832	ND	9.9144	9.9144	4.1688	4.8193	0.0762	759	7.43	9
2000	5	1	30	A	2.2115	1.3743	1.9355	0.5613	0.2760	12.3723	0.0178	11.1015	11.0837	1.2708	6.4637	0.0678	849	7.25	13
2000	5	1	30	B	2.3128	1.6406	2.1969	0.5563	0.1159	13.1994	0.1366	13.0149	12.8783	0.1845	6.5002	0.0652	848	7.23	13
2000	5	1	30	C	2.3554	1.7788	2.2717	0.4930	0.0837	13.1535	0.1327	13.1814	13.0487	ND	6.6277	0.0665	843	7.23	13
2000	5	16	30	A	2.6905	1.9470	2.3191	0.3721	0.3714	16.1946	0.1204	13.6143	13.4939	2.5803	8.9520	0.0582	835	7.04	12
2000	5	16	30	B	2.59	1.9515	2.3191	0.3676	0.2709	16.1289	0.1661	14.238	14.0719	1.8909	9.5719	0.0666	839	7.07	12
2000	5	16	30	C	2.5885	1.8879	2.2638	0.3759	0.3247	16.3971	0.1696	13.995	13.8254	2.4021	9.1672	0.0624	842	7.06	12
2000	5	22	30	A	2.7573	1.8835	2.4529	0.5694	0.3044	13.8159	ND	12.2499	12.2499	1.566	9.9190	0.0972	820	7.22	19
2000	5	22	30	B	2.6958	1.9019	2.5913	0.6894	0.1045	14.0706	ND	13.3803	13.3803	0.6903	9.8278	0.0986	823	7.23	19
2000	5	22	30	C	2.8342	1.9610	2.6774	0.7164	0.1568	14.4153	ND	13.491	13.491	0.9243	9.8468	0.0965	827	7.22	19
2000	6	2	30	A	2.6047	1.8191	2.2937	0.4746	0.3110	17.4132	0.1364	14.9751	14.8387	2.4381	9.1857	0.1356	811	7.4	18
2000	6	2	30	B	2.4764	1.7771	2.4513	0.6742	0.0251	16.4286	0.1068	13.8654	13.7586	2.5632	9.2214	0.1243	813	7.36	18
2000	6	2	30	C	2.5573	1.8209	2.3397	0.5188	0.2176	16.2585	0.159	14.2389	14.0799	2.0196	9.2010	0.1269	813	7.37	18
2000	6	12	30	A	2.2178	1.9295	2.0490	0.1195	0.1688	13.6224	0.1782	13.3083	13.1301	0.3141	9.7974	0.0651	829	7.05	17
2000	6	12	30	B	2.3258	1.9278	2.0827	0.1550	0.2431	13.4838	ND	12.7854	12.7854	0.6984	9.8501	0.064	833	7.04	17
2000	6	12	30	C	2.3366	1.9494	2.0490	0.0996	0.2876	13.2687	0.0073	13.1553	13.148	0.1134	9.8667	0.0806	834	7.14	17
2000	6	22	30	A	2.6325	2.0190	2.5619	0.5429	0.0706	15.5106	0.0104	13.9158	13.9054	1.5948	11.4800	0.0541	840	6.9	21
2000	6	22	30	B	2.557	2.0749	2.5318	0.4569	0.0252	15.5673	0.0076	14.1768	14.1692	1.3905	11.6222	0.0548	839	6.9	21
2000	6	22	30	C	2.536	1.9831	2.2409	0.2578	0.2951	15.5268	0.0136	13.2948	13.2812	2.232	11.5635	0.06	843	6.94	21
2000	7	3	30	A	2.2415	2.0856	2.1869	0.1013	0.0546	14.8545	0.1655	12.6945	12.529	2.16	8.7459	0.1619	881	7.5	20
2000	7	3	30	B	2.0229	1.8565	2.1322	0.2757	ND	14.4765	0.0206	11.5749	11.5543	2.9016	8.8013	0.0656	890	7.1	20
2000	7	3	30	C	2.1588	2.0126	2.1160	0.1034	0.0428	15.1623	0.0406	12.4767	12.4361	2.6856	8.8647	0.0661	884	7.1	20
2000	7	14	30	A	1.854	0.6948	1.7033	1.0086	0.1507	11.925	0.011	10.1187	10.1077	1.8063	8.5267	0.0335	856	6.8	21
2000	7	14	30	B	1.9114	0.7954	1.8684	1.0730	0.0430	11.8467	0.0147	10.4571	10.4424	1.3896	8.5969	0.0308	862	6.78	21
2000	7	14	30	C	1.9975	0.9590	1.8368	0.8778	0.1607	11.8116	0.0426	11.232	11.1894	0.5796	8.5601	0.0352	858	6.84	21
2000	7	24	30	A	1.7324	1.2458	1.6467	0.4010	0.0857	11.1168	0.0066	9.8892	9.8826	1.2276	6.5129	0.0919	.	7.38	23
2000	7	24	30	B	1.7745	0.9899	1.6073	0.6174	0.1672	10.6524	ND	9.2709	9.2709	1.3815	6.5802	0.0867	.	7.35	23
2000	7	24	30	C	1.8055	1.0481	1.7352	0.6871	0.0703	11.0043	ND	10.1736	10.1736	0.8307	6.5930	0.083	.	7.33	23
2000	8	3	30	A	1.7141	0.9690	1.5429	0.5739	0.1712	9.6264	ND	7.7328	7.7328	1.8936	5.6179	1.4567	769	8.77	23
2000	8	3	30	B	1.766	1.0836	1.5932	0.5096	0.1728	10.1448	0.0356	8.82	8.7844	1.3248	5.8209	1.6682	760	8.83	23
2000	8	3	30	C	1.2478	0.9851	1.2550	0.2699	ND	9.5211	0.006	8.0028	7.9968	1.5183	5.7850	1.6042	780	8.81	23
2000	8	14	30	A	2.2014	0.9396	1.8592	0.9196	0.3422	7.0398	ND	5.0625	5.0625	1.9773	4.8001	0.0776	731	7.44	20
2000	8	14	30	B	2.1165	0.8716	1.8295	0.9579	0.2870	6.7527	0.0066	5.427	5.4204	1.3257	5.1013	0.0825	736	7.44	20
2000	8	14	30	C	2.2834	1.0326	2.0784	1.0458	0.2050	7.4844	ND	6.0894	6.0894	1.395	5.0886	0.0822	731	7.44	20
2000	8	24	30	A	2.638	1.9533	2.5943	0.6411	0.0437	13.32	ND	11.7549	11.7549	1.5651	8.9884	0.1082	664	7.31	19
2000	8	24	30	B	2.7254	1.8604	2.6555	0.7951	0.0699	12.9303	0.01	11.2851	11.2751	1.6452	9.0716	0.1067	666	7.3	19
2000	8	24	30	C	2.6962	2.0748	2.6453	0.5706	0.0509	13.2786	ND	12.2184	12.2184	1.0602	9.0350	0.1063	659	7.3	19
2000	9	5	30	A	1.101	0.0986	0.8991	0.8005	0.2019	9.9207	ND	8.8785	8.8785	1.0422	6.4622	0.0852	663	7.35	16
2000	9	5	30	B	1.2785	0.2290	1.1568	0.9278	0.1217	9.8775	ND	9.1368	9.1368	0.7407	6.5177	0.0899	662	7.37	16
2000	9	5	30	C	1.1926	0.1265	0.9636	0.8371	0.2290	10.0476	ND	9.1413	9.1413	0.9063	6.5060	0.0897	670	7.37	16
2000	9	20	30	A	3.0907	2.2275	2.8839	0.6564	0.2068	20.3031	ND	16.416	16.416	3.8871	11.2186	0.1381	720	7.32	18
2000	9	20	30	B	2.9327	2.1830	2.8810	0.6980	0.0517	19.7073	0.0673	17.5041	17.4368	2.2032	11.2303	0.1126	748	7.23	18
2000	9	20	30	C	2.9888	2.2871	2.9241	0.6370	0.0647	18.6102	ND	16.7886	16.7886	1.8216	11.2427	0.1322	709	7.3	18
2000	10	16	30	A	2.4021	0.6801	2.0891	1.4090	0.3130	17.8371	0.1549	16.5006	16.3457	1.3365	12.6725	0.1491	689	7.3	11
2000	10	16	30	B	2.3406	0.8341	2.2217	1.3876	0.1189	18.0927	ND	16.4961	16.4961	1.5966	12.7296	0.1336	698	7.25	11
2000	10	16	30	C	2.4076	1.2660	2.3105	1.0445	0.0971	18.2628	0.0127	17.0964	17.0837	1.1664	12.7259	0.1367	703	7.26	11
2000	1	6	31	A	0.3017	0.0161	0.0635	0.0474	0.2382	2.9034	ND	1.2555	1.2555	1.6479	0.7066	0.1304	436	8.58	2
2000	1	6	31	B	0.3125	0.0375	0.0927	0.0552	0.2198	2.583	ND	1.2321	1.2321	1.3509	0.6202	0.1166	438	8.59	2
2000	1	6	31	C	0.3279	0.0440	0.1204	0.0764	0.2075	2.5767	ND	1.4589	1.4589	1.1178	0.6509	0.1247	436	8.6	2
2000	2	7	31	A	0.4093	0.0976	0.3079	0.2103	0.1014	2.9682	ND	2.0061	2.0061	0.9621	0.5588	0.1474	895	8.78	8
2000	2	7	31	B	0.4093	0.0338	0.1803	0.1466	0.2290	3.4497	ND	1.7982	1.7982	1.6515	0.4158	0.1042	892	8.75	8
2000	2	7	31	C	0.44	0.0459	0.2556	0.2097	0.1844	3.5343	ND	2.5254	2.5254	1.0089	0.4290	0.1075	895	8.75	8

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	3	10	31	A	0.5987	0.2134	0.5410	0.3276	0.0577	6.0489	3.3832	4.8321	1.4489	1.2168	0.2217	0.05	900	8.69	3
2000	3	10	31	B	0.5987	0.0876	0.3937	0.3061	0.2050	5.9211	2.491	4.2669	1.7759	1.6542	0.2222	0.0501	889	8.69	3
2000	3	10	31	C	0.6291	0.0999	0.3193	0.2194	0.3098	5.31	0.878	3.4839	2.6059	1.8261	0.2590	0.0595	902	8.7	3
2000	4	4	31	A	0.496	0.3000	0.3691	0.0691	0.1269	2.0214	0.0144	1.4904	1.476	0.531	ND	ND	581	8.63	11
2000	4	4	31	B	0.4832	0.2505	0.3477	0.0972	0.1355	2.1123	ND	1.4427	1.4427	0.6696	ND	ND	583	8.65	11
2000	4	4	31	C	0.4247	0.2865	0.3192	0.0327	0.1055	1.7406	0.0065	1.3932	1.3867	0.3474	ND	ND	586	8.64	11
2000	4	19	31	A	0.3871	0.1520	0.2160	0.0640	0.1711	2.1699	ND	1.2456	1.2456	0.9243	0.1619	0.0084	501	7.96	6
2000	4	19	31	B	0.3595	0.1330	0.1884	0.0554	0.1711	2.7027	ND	1.4508	1.4508	1.2519	0.1699	0.0098	502	8.01	6
2000	4	19	31	C	0.3678	0.1474	0.2560	0.1086	0.1118	1.9944	ND	1.3302	1.3302	0.6642	0.1452	0.0085	498	8.02	6
2000	5	1	31	A	0.3515	0.2139	0.3236	0.1097	0.0279	2.0448	0.0929	1.9521	1.8592	0.0927	0.0941	0.0252	461	8.79	14
2000	5	1	31	B	0.3735	0.2320	0.3089	0.0769	0.0646	1.674	0.096	1.6524	1.5564	0.0216	0.0495	0.0135	458	8.8	14
2000	5	1	31	C	0.353	0.2139	0.3251	0.1112	0.0279	1.6884	0.0109	1.5471	1.5362	0.1413	ND	ND	461	8.9	14
2000	5	16	31	A	0.228	0.1496	0.2221	0.0725	0.0059	1.9251	0.3374	1.8207	1.4833	0.1044	ND	ND	324	8.34	10
2000	5	16	31	B	0.2105	0.1405	0.2076	0.0671	0.0029	1.3878	0.0454	1.1925	1.1471	0.1953	ND	ND	329	8.35	10
2000	5	16	31	C	0.2221	0.1450	0.2352	0.0902	-0.0131	1.1034	0.068	1.1754	1.1074	ND	ND	ND	328	8.37	10
2000	5	22	31	A	0.3124	0.1653	0.2555	0.0903	0.0569	1.5813	ND	1.638	1.638	ND	ND	ND	347	8.64	19
2000	5	22	31	B	0.3124	0.1790	0.2432	0.0642	0.0692	1.476	ND	1.0845	1.0845	0.3915	ND	ND	348	8.65	19
2000	5	22	31	C	0.3016	0.1468	0.2432	0.0965	0.0584	1.3662	ND	1.1934	1.1934	0.1728	ND	ND	350	8.65	19
2000	6	2	31	A	0.2729	0.1885	0.2590	0.0705	0.0139	2.1123	0.0774	1.8585	1.7811	0.2538	ND	ND	292	8.79	18
2000	6	2	31	B	0.2841	0.1430	0.1893	0.0463	0.0948	1.737	0.0746	1.7145	1.6399	0.0225	ND	ND	293	8.82	18
2000	6	2	31	C	0.3008	0.1706	0.2200	0.0494	0.0808	1.6371	0.0871	1.6371	1.55	ND	ND	ND	293	8.84	18
2000	6	12	31	A	0.1532	0.0388	0.1222	0.0835	0.0310	1.4112	ND	1.3689	1.3689	0.0423	0.1002	0.0016	274	7.48	15
2000	6	12	31	B	0.1911	0.0711	0.1586	0.0875	0.0325	1.3941	ND	1.0809	1.0809	0.3132	ND	ND	271	7.53	15
2000	6	12	31	C	0.2194	0.0746	0.1762	0.1016	0.0432	1.512	ND	1.1898	1.1898	0.3222	ND	ND	274	7.51	15
2000	6	22	31	A	0.1022	0.0256	0.0462	0.0206	0.0560	2.2374	0.0126	1.7919	1.7793	0.4455	0.3201	0.0009	409	6.65	20
2000	6	22	31	B	0.1162	0.0178	0.0406	0.0229	0.0756	2.3121	ND	1.7721	1.7721	0.54	0.2891	0.0007	412	6.6	20
2000	6	22	31	C	0.1302	0.0221	0.0742	0.0521	0.0560	2.3166	0.0097	1.8684	1.8587	0.4482	0.2583	0.0006	410	6.58	20
2000	7	3	31	A	0.1045	0.0073	0.0558	0.0486	0.0487	1.9782	0.0473	1.8369	1.7896	0.1413	0.4742	0.0009	423	6.5	18
2000	7	3	31	B	0.134	0.0100	0.0558	0.0458	0.0782	2.1402	0.0053	1.5453	1.54	0.5949	0.4020	0.001	421	6.6	18
2000	7	3	31	C	0.1193	0.0073	0.0558	0.0486	0.0635	2.07	0.0154	1.4904	1.475	0.5796	0.3938	0.0006	416	6.4	18
2000	7	14	31	A	0.2038	0.0774	0.1249	0.0475	0.0789	1.4283	ND	1.1295	1.1295	0.2988	0.1981	0.0007	390	6.77	20
2000	7	14	31	B	0.2583	0.1148	0.2038	0.0891	0.0545	1.1421	0.0062	1.0557	1.0495	0.0864	0.1832	0.0007	399	6.78	20
2000	7	14	31	C	0.1895	0.0631	0.1292	0.0661	0.0603	1.1529	ND	0.9513	0.9513	0.2016	0.1398	0.0005	395	6.75	20
2000	7	24	31	A	0.3117	0.2446	0.3103	0.0657	0.0014	1.0449	ND	0.9864	0.9864	0.0585	0.0768	0.0008	.	7.25	20
2000	7	24	31	B	0.3286	0.2401	0.3004	0.0603	0.0282	1.1124	ND	0.963	0.963	0.1494	ND	ND	.	7.15	20
2000	7	24	31	C	0.3004	0.1998	0.2723	0.0726	0.0281	1.7829	ND	1.422	1.422	0.3609	0.0577	0.0005	.	7.15	20
2000	8	3	31	A	0.3627	0.1651	0.3022	0.1371	0.0605	2.0151	0.0761	1.6128	1.5367	0.4023	0.2540	0.0372	267	8.46	22
2000	8	3	31	B	0.3555	0.1410	0.2044	0.0634	0.1511	2.799	ND	2.0673	2.0673	0.7317	0.2063	0.0297	267	8.45	22
2000	8	3	31	C	0.3339	0.0489	0.2044	0.1555	0.1295	2.1042	ND	1.5228	1.5228	0.5814	0.2055	0.0424	265	8.64	22
2000	8	14	31	A	0.3634	0.0265	0.3139	0.2874	0.0495	1.2915	ND	0.8523	0.8523	0.4392	0.1270	0.0013	247	7.24	21
2000	8	14	31	B	0.3465	0.0176	0.2348	0.2172	0.1117	1.0332	ND	0.7632	0.7632	0.27	0.1280	0.0013	250	7.23	21
2000	8	14	31	C	0.3634	0.0265	0.1839	0.1574	0.1795	1.0935	ND	0.5661	0.5661	0.5274	0.1075	0.001	251	7.18	21
2000	8	24	31	A	0.2501	0.0306	0.1191	0.0885	0.1310	1.8675	0.0066	1.3788	1.3722	0.4887	0.1098	0.0014	215	7.33	18
2000	8	24	31	B	0.3375	0.1738	0.2938	0.1201	0.0437	1.6218	0.0078	1.3941	1.3863	0.2277	0.0836	0.0011	216	7.36	18
2000	8	24	31	C	0.2793	0.1504	0.2501	0.0997	0.0292	1.4643	0.0126	1.368	1.3554	0.0963	0.0733	0.001	215	7.36	18
2000	9	5	31	A	0.2692	0.1335	0.2320	0.0985	0.0372	1.5777	ND	0.1305	0.1305	1.4472	0.1249	0.0059	292	7.92	16
2000	9	5	31	B	0.2535	0.0813	0.1933	0.1121	0.0602	1.4274	ND	0.1026	0.1026	1.3248	0.0809	0.0043	296	7.97	16
2000	9	5	31	C	0.3064	0.0458	0.2520	0.2063	0.0544	1.548	ND	0.3177	0.3177	1.2303	0.1232	0.0065	295	7.97	16
2000	9	20	31	A	0.4865	0.3534	0.3572	0.0038	0.1293	2.2779	ND	1.6776	1.6776	0.6003	0.3204	0.0083	361	7.65	17
2000	9	20	31	B	0.4908	0.3836	0.4190	0.0354	0.0718	1.7658	ND	1.2114	1.2114	0.5544	0.2950	0.0082	377	7.68	17
2000	9	20	31	C	0.5339	0.3979	0.4693	0.0714	0.0646	1.8837	ND	1.5165	1.5165	0.3672	0.3174	0.0092	370	7.7	17
2000	10	16	31	A	0.4664	0.0676	0.3215	0.2539	0.1449	2.4732	0.0258	2.1888	2.163	0.2844	0.4424	0.0103	384	7.6	9
2000	10	16	31	B	0.4951	0.0285	0.3953	0.3668	0.0998	2.2032	0.0887	1.7613	1.6726	0.4419	0.4194	0.0109	405	7.65	9
2000	10	16	31	C	0.4445	0.0553	0.3761	0.3209	0.0684	2.0025	0.0242	1.6317	1.6075	0.3708	0.4245	0.0094	405	7.58	9
2000	1	6	32	A	0.0712	0.0144	0.0558	0.0414	0.0154	1.7289	0.131	1.3986	1.2676	0.3303	0.0000	ND	836	7.45	3
2000	1	6	32	B	0.0912	0.0190	0.0635	0.0445	0.0277	2.0952	0.4004	1.8855	1.4851	0.2097	0.0000	ND	837	7.47	3
2000	1	6	32	C	0.0712	0.0190	0.0712	0.0522	0.0000	1.7784	0.0173	1.5039	1.4866	0.2745	0.0000	ND	835	7.48	3
2000	2	7	32	A	0.4448	0.1086	0.3762	0.2676	0.0686	3.8088	ND	3.2688	3.2688	0.54	1.3583	0.5877	894	9.11	8
2000	2	7	32	B	0.4234	0.1280	0.3533	0.2253	0.0701	3.6666	0.0064	3.0762	3.0698	0.5904	0.3493	0.157	892	9.14	8

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	2	7	32	C	0.4448	0.1193	0.3304	0.2112	0.1144	3.825	0.0084	3.2436	3.2352	0.5814	1.0164	0.4455	894	9.12	8
2000	3	10	32	A	0.0597	0.0205	0.0399	0.0194	0.0198	1.4958	ND	1.1142	1.1142	0.3816	ND	ND	513	8.81	5
2000	3	10	32	B	0.0551	0.0089	0.0399	0.0310	0.0152	1.5057	ND	0.9036	0.9036	0.6021	ND	ND	515	8.82	5
2000	3	10	32	C	0.0293	0.0148	0.0141	-0.0007	0.0152	1.3338	ND	0.8973	0.8973	0.4365	ND	ND	514	8.84	5
2000	4	4	32	A	0.1054	0.0071	0.0341	0.0270	0.0713	1.827	0.027	1.3671	1.3401	0.4599	ND	ND	152.5	7.54	12
2000	4	4	32	B	0.1125	0.0071	0.0441	0.0370	0.0684	1.4832	ND	1.2033	1.2033	0.2799	ND	ND	152	7.58	12
2000	4	4	32	C	0.1054	0.0044	0.0541	0.0497	0.0513	1.5453	0.0064	1.1916	1.1852	0.3537	ND	ND	152.2	7.57	12
2000	4	19	32	A	0.1194	0.0299	0.0642	0.0343	0.0552	1.6596	0.026	1.3653	1.3393	0.2943	ND	ND	128.4	7.12	9
2000	4	19	32	B	0.1249	0.0209	0.0711	0.0502	0.0538	1.4481	ND	1.1196	1.1196	0.3285	ND	ND	132.4	7.15	9
2000	4	19	32	C	0.147	0.0245	0.0766	0.0521	0.0704	1.4535	ND	1.0881	1.0881	0.3654	ND	ND	134	7.16	9
2000	5	1	32	A	0.1122	0.0243	0.0902	0.0660	0.0220	1.3842	ND	1.143	1.143	0.2412	ND	ND	136.8	8.25	15
2000	5	1	32	B	0.121	0.0289	0.1034	0.0745	0.0176	1.449	0.0101	1.1214	1.1113	0.3276	ND	ND	136.1	8.29	15
2000	5	1	32	C	0.1166	0.0243	0.0564	0.0322	0.0602	1.4013	0.0327	1.1142	1.0815	0.2871	ND	ND	135.8	8.32	15
2000	5	16	32	A	0.1057	0.0423	0.0751	0.0329	0.0306	1.6263	0.0188	1.3968	1.378	0.2295	ND	ND	139.4	8	11
2000	5	16	32	B	0.1202	0.0495	0.1057	0.0562	0.0145	1.5795	0.0184	1.44	1.4216	0.1395	ND	ND	141.2	8	11
2000	5	16	32	C	0.1115	0.0395	0.0911	0.0516	0.0204	1.5678	0.0181	1.4436	1.4255	0.1242	ND	ND	141.4	8.02	11
2000	5	22	32	A	0.1017	0.0035	0.0402	0.0367	0.0615	1.5669	ND	1.3239	1.3239	0.243	ND	ND	148.3	8.42	23
2000	5	22	32	B	0.1325	0.0054	0.0402	0.0348	0.0923	2.0097	ND	1.0809	1.0809	0.9288	ND	ND	147.5	8.44	23
2000	5	22	32	C	0.1125	0.0128	0.0633	0.0506	0.0492	2.4597	0.0529	2.5416	2.4887	-0.0819	ND	ND	147.5	8.45	23
2000	6	2	32	A	0.1405	0.0100	0.0456	0.0356	0.0949	2.25	0.072	1.7073	1.6353	0.5427	ND	ND	172.1	8.65	19
2000	6	2	32	B	0.1335	0.0260	0.0735	0.0475	0.0600	2.1762	0.0789	1.8045	1.7256	0.3717	ND	ND	170.3	8.63	19
2000	6	2	32	C	0.1419	0.0100	0.0596	0.0496	0.0823	2.2239	0.0685	1.9125	1.844	0.3114	ND	ND	169.5	8.65	19
2000	6	12	32	A	0.2046	0.0324	0.0857	0.0533	0.1189	2.2536	ND	1.6956	1.6956	0.558	ND	ND	159.8	8.11	16
2000	6	12	32	B	0.2194	0.0433	0.1222	0.0790	0.0972	2.6802	ND	1.989	1.989	0.6912	0.0452	0.002	156.7	7.9	16
2000	6	12	32	C	0.2127	0.0253	0.1046	0.0794	0.1081	3.0096	0.0283	2.3931	2.3648	0.6165	0.0000	ND	161.4	8.14	16
2000	6	22	32	A	0.1721	0.0178	0.0183	0.0005	0.1538	2.6964	ND	1.6965	1.6965	0.9999	0.4070	0.0006	133.7	6.4	23
2000	6	22	32	B	0.1539	0.0195	0.0462	0.0267	0.1077	2.6055	0.0399	1.4922	1.4523	1.1133	0.4354	0.0006	133.2	6.39	23
2000	6	22	32	C	0.14	0.0178	0.0392	0.0215	0.1008	2.4111	ND	1.4814	1.4814	0.9297	0.4325	0.0006	134.1	6.36	23
2000	7	3	32	A	0.3363	0.0100	0.0853	0.0753	0.2510	3.6585	ND	1.6875	1.6875	1.971	0.7281	0.0007	183.4	6.2	20
2000	7	3	32	B	0.2182	0.0209	0.1296	0.1087	0.0886	2.7963	ND	2.3697	2.3697	0.4266	0.7172	0.0007	180.9	6.2	20
2000	7	3	32	C	0.2522	0.0154	0.0705	0.0551	0.1817	2.9718	ND	1.5696	1.5696	1.4022	0.8621	0.0006	180.1	6.1	20
2000	7	14	32	A	0.1979	0.0108	0.0244	0.0137	0.1735	2.3715	ND	0.8352	0.8352	1.5363	0.4456	0.0011	166.9	6.6	23
2000	7	14	32	B	0.174	0.0108	0.0388	0.0281	0.1352	2.2086	ND	1.0368	1.0368	1.1718	0.4739	0.001	165.3	6.54	23
2000	7	14	32	C	0.1754	0.0063	0.0316	0.0254	0.1438	2.0709	ND	1.0017	1.0017	1.0692	0.4584	0.0008	166.6	6.46	23
2000	7	24	32	A	0.188	0.0248	0.0897	0.0650	0.0983	1.9935	ND	1.1862	1.1862	0.8073	0.4583	0.0025	.	6.97	23
2000	7	24	32	B	0.2344	0.0248	0.0897	0.0650	0.1447	1.8927	ND	1.5228	1.5228	0.3699	0.4710	0.003	.	7.04	23
2000	7	24	32	C	0.2442	0.0248	0.1880	0.1633	0.0562	2.3328	ND	1.5921	1.5921	0.7407	0.4684	0.0028	.	7.01	23
2000	8	3	32	A	0.2763	0.0246	0.1857	0.1611	0.0906	3.078	ND	1.8828	1.8828	1.1952	0.9914	0.3585	170.1	8.98	24
2000	8	3	32	B	0.2475	0.0219	0.1857	0.1638	0.0618	3.1491	ND	1.872	1.872	1.2771	1.0067	0.4131	168	9.07	24
2000	8	3	32	C	0.2792	0.0273	0.2332	0.2060	0.0460	3.2607	0.2007	2.043	1.8423	1.2177	0.9977	0.4039	168.3	9.06	24
2000	8	14	32	A	0.2291	0.0355	0.1146	0.0791	0.1145	2.9169	ND	2.2113	2.2113	0.7056	1.4968	0.0131	137.1	7.17	23
2000	8	14	32	B	0.2503	0.0265	0.1188	0.0923	0.1315	2.4012	ND	1.2627	1.2627	1.1385	1.4790	0.0129	135	7.17	23
2000	8	14	32	C	0.2616	0.0265	0.1047	0.0782	0.1569	2.4669	ND	1.2528	1.2528	1.2141	1.4519	0.0136	135.4	7.2	23
2000	8	24	32	A	0.1045	0.0089	0.0536	0.0447	0.0509	2.6964	ND	2.3373	2.3373	0.3591	1.4132	0.2196	424	8.49	20
2000	8	24	32	B	0.0536	0.0045	0.0317	0.0272	0.0219	3.06	0.0399	2.8359	2.796	0.2241	1.4124	0.2282	422	8.51	20
2000	8	24	32	C	0.0681	0.0210	0.0172	-0.0038	0.0509	2.3607	ND	1.863	1.863	0.4977	1.3997	0.2261	421	8.51	20
2000	9	5	32	A	0.169	0.0370	0.1676	0.1306	0.0014	2.3715	ND	0.18	0.18	2.1915	0.7620	0.0082	134.8	7.26	17
2000	9	5	32	B	0.2048	0.0639	0.1404	0.0765	0.0644	2.9583	ND	0.1611	0.1611	2.7972	0.7957	0.0073	134.6	7.19	17
2000	9	5	32	C	0.2119	0.0639	0.1690	0.1051	0.0429	2.3283	ND	ND	ND	2.3283	0.7651	0.0062	132.7	7.14	17
2000	9	20	32	A	0.2753	0.0996	0.1532	0.0536	0.1221	1.7892	ND	1.2456	1.2456	0.5436	ND	ND	197	7.5	20
2000	9	20	32	B	0.2969	0.0418	0.1015	0.0598	0.1954	1.8378	ND	1.0089	1.0089	0.8289	ND	ND	193.8	7.53	20
2000	9	20	32	C	0.2682	0.0729	0.1963	0.1234	0.0719	1.7721	0.1044	1.3941	1.2897	0.378	ND	ND	198	.	20
2000	10	16	32	A	0.1451	0.0321	0.1301	0.0980	0.0150	2.3877	ND	2.1699	2.1699	0.2178	0.3755	0.0023	133.6	7.01	11
2000	10	16	32	B	0.1574	0.0374	0.1547	0.1173	0.0027	2.2527	0.0077	1.9872	1.9795	0.2655	0.3491	0.0018	135.4	6.93	11
2000	10	16	32	C	0.1574	0.0374	0.1574	0.1200	0.0000	2.3373	ND	2.1627	2.1627	0.1746	0.3646	0.0019	134.4	6.95	11
2000	1	6	33	A	0.3171	0.0115	0.0450	0.0335	0.2721	4.0662	0.0067	1.449	1.4423	2.6172	2.0552	0.0446	151.5	7.57	2
2000	1	6	33	B	0.3171	0.0098	0.0404	0.0307	0.2767	3.7602	ND	1.4256	1.4256	2.3346	1.0233	0.0212	153.2	7.55	2
2000	1	6	33	C	0.271	0.0144	0.0404	0.0260	0.2306	3.0753	0.0131	1.4229	1.4098	1.6524	0.8833	0.0196	153.3	7.58	2
2000	2	7	33	A	0.4829	0.0036	0.3274	0.3238	0.1555	4.0401	0.0265	2.871	2.8445	1.1691	ND	ND	924	8.96	9

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	2	7	33	B	0.46	0.1235	0.3304	0.2069	0.1296	3.8547	ND	2.9754	2.9754	0.8793	ND	ND	924	8.96	9
2000	2	7	33	C	0.428	0.1333	0.3365	0.2033	0.0915	3.6945	ND	3.1185	3.1185	0.576	ND	ND	922	8.95	9
2000	3	10	33	A	0.4696	0.1046	0.2115	0.1069	0.2581	3.9627	0.024	2.349	2.325	1.6137	0.1947	0.0447	1580	8.7	5
2000	3	10	33	B	0.462	0.1150	0.2343	0.1193	0.2277	4.0392	0.0469	2.6127	2.5658	1.4265	0.1753	0.041	1578	8.71	5
2000	3	10	33	C	0.4469	0.1189	0.2312	0.1123	0.2157	4.0221	0.0634	2.5812	2.5178	1.4409	0.1746	0.043	1582	8.74	5
2000	4	4	33	A	0.2109	0.0161	0.0726	0.0565	0.1383	2.9754	0.0308	2.2356	2.2048	0.7398	0.1764	0.0045	558	7.64	17
2000	4	4	33	B	0.1867	0.0071	0.0726	0.0655	0.1141	3.0069	ND	2.0052	2.0052	1.0017	0.1853	0.0048	557	7.65	17
2000	4	4	33	C	0.1867	0.0116	0.0242	0.0126	0.1625	2.9376	0.0148	2.1618	2.147	0.7758	0.1882	0.0053	558	7.69	17
2000	4	19	33	A	0.3402	0.1023	0.1967	0.0945	0.1435	3.4065	ND	2.5254	2.5254	0.8811	0.3721	0.0066	675	7.48	7
2000	4	19	33	B	0.3678	0.1411	0.2422	0.1011	0.1256	3.645	ND	2.7576	2.7576	0.8874	0.3567	0.0065	678	7.49	7
2000	4	19	33	C	0.3705	0.1474	0.2919	0.1445	0.0786	3.573	ND	2.6685	2.6685	0.9045	0.3464	0.0061	685	7.48	7
2000	5	1	33	A	0.4719	0.2771	0.4278	0.1507	0.0441	4.3164	0.0939	3.204	3.1101	1.1124	0.3359	0.0357	658	8.3	17
2000	5	1	33	B	0.5159	0.1236	0.2223	0.0987	0.2936	3.5811	0.0815	1.8522	1.7707	1.7289	0.3310	0.0352	652	8.3	17
2000	5	1	33	C	0.5233	0.2184	0.4352	0.2168	0.0881	3.384	0.0925	3.0942	3.0017	0.2898	0.3252	0.036	650	8.32	17
2000	5	16	33	A	0.3605	0.2279	0.3255	0.0976	0.0350	3.3786	0.0734	3.249	3.1756	0.1296	0.2403	0.0207	737	8.2	11
2000	5	16	33	B	0.3925	0.2206	0.3532	0.1326	0.0393	3.4533	0.074	3.393	3.319	0.0603	0.2624	0.0236	744	8.22	11
2000	5	16	33	C	0.3969	0.2379	0.3226	0.0847	0.0743	3.4587	0.0839	3.4137	3.3298	0.045	0.2537	0.0233	745	8.23	11
2000	5	22	33	A	0.4892	0.2456	0.3647	0.1191	0.1245	3.1599	ND	2.8548	2.8548	0.3051	0.1966	0.0256	792	8.4	20
2000	5	22	33	B	0.5169	0.2530	0.3724	0.1194	0.1445	3.1725	ND	2.8134	2.8134	0.3591	0.2268	0.0301	798	8.41	20
2000	5	22	33	C	0.5553	0.2623	0.4247	0.1625	0.1306	3.1167	ND	2.6127	2.6127	0.504	0.2252	0.0299	797	8.41	20
2000	6	2	33	A	0.2827	0.1439	0.2311	0.0872	0.0516	3.7332	0.0371	3.3966	3.3595	0.3366	0.1406	0.0423	798	8.86	19
2000	6	2	33	B	0.3455	0.1546	0.2451	0.0905	0.1004	4.2003	0.1281	3.5748	3.4467	0.6255	0.1283	0.0398	793	8.88	19
2000	6	2	33	C	0.3427	0.1573	0.2478	0.0906	0.0949	4.1733	0.1504	3.9177	3.7673	0.2556	0.1572	0.0496	792	8.89	19
2000	6	12	33	A	0.2937	0.1196	0.2127	0.0931	0.0810	2.8035	ND	2.3814	2.3814	0.4221	0.1115	0.0094	710	8.19	16
2000	6	12	33	B	0.2613	0.1331	0.2302	0.0971	0.0311	2.5461	ND	2.5218	2.5218	0.0243	0.0881	0.0098	715	8.32	16
2000	6	12	33	C	0.2721	0.1151	0.2262	0.1111	0.0459	2.7324	ND	2.5128	2.5128	0.2196	0.1152	0.0153	707	8.41	16
2000	6	22	33	A	0.4337	0.1139	0.1931	0.0792	0.2406	4.3776	0.1985	2.9646	2.7661	1.413	0.5421	0.0013	640	6.59	23
2000	6	22	33	B	0.4309	0.1445	0.2141	0.0696	0.2168	4.0302	0.0305	2.8692	2.8387	1.161	0.3977	0.001	632	6.61	23
2000	6	22	33	C	0.3959	0.1349	0.2281	0.0932	0.1678	4.0401	0.0239	2.8998	2.8759	1.1403	0.3801	0.0009	633	6.62	23
2000	7	3	33	A	0.521	0.2291	0.3733	0.1442	0.1477	4.3821	0.0145	2.3697	2.3552	2.0124	0.4929	0.0015	645	6.7	20
2000	7	3	33	B	0.4914	0.2173	0.3556	0.1384	0.1358	3.8313	0.0202	2.3715	2.3513	1.4598	0.5113	0.0019	640	6.8	20
2000	7	3	33	C	0.2965	0.0703	0.1370	0.0668	0.1595	3.3219	0.0225	2.3697	2.3472	0.9522	0.4768	0.0014	646	6.7	20
2000	7	14	33	A	0.2253	0.1059	0.1579	0.0520	0.0674	2.4183	0.0183	2.1636	2.1453	0.2547	0.2724	0.0012	605	6.87	25
2000	7	14	33	B	0.1536	0.0551	0.1292	0.0741	0.0244	1.9359	0.013	1.7343	1.7213	0.2016	0.2537	0.001	602	6.82	25
2000	7	14	33	C	0.3272	0.0916	0.2110	0.1194	0.1162	2.6667	0.0141	2.0313	2.0172	0.6354	0.2650	0.0012	599	6.88	25
2000	7	24	33	A	0.5084	0.2761	0.4115	0.1354	0.0969	2.8728	ND	2.1024	2.1024	0.7704	0.0000	ND	.	7.5	22
2000	7	24	33	B	0.4269	0.2886	0.4030	0.1144	0.0239	2.7639	ND	2.1762	2.1762	0.5877	0.0000	ND	.	7.53	22
2000	7	24	33	C	0.5717	0.2653	0.4550	0.1898	0.1167	3.8187	ND	2.3364	2.3364	1.4823	0.0000	ND	.	7.64	22
2000	8	3	33	A	0.2332	0.0801	0.2188	0.1387	0.0144	3.0771	ND	2.2995	2.2995	0.7776	0.3411	0.3095	524	10.26	24
2000	8	3	33	B	0.3497	0.1025	0.2475	0.1450	0.1022	3.1977	ND	2.3787	2.3787	0.819	0.4034	0.3529	518	10.1	24
2000	8	3	33	C	0.2936	0.0935	0.2691	0.1756	0.0245	3.3462	ND	2.3805	2.3805	0.9657	0.3877	0.3444	518	10.16	24
2000	8	14	33	A	0.6928	0.3485	0.5232	0.1747	0.1696	4.1652	0.0151	2.4966	2.4815	1.6686	0.1472	0.0282	596	8.6	20
2000	8	14	33	B	0.6462	0.3306	0.5020	0.1714	0.1442	4.2876	0.0164	2.6289	2.6125	1.6587	0.1595	0.0305	593	8.6	20
2000	8	14	33	C	0.7282	0.2859	0.4171	0.1312	0.3111	4.0212	0.0168	2.3886	2.3718	1.6326	0.1611	0.0314	591	8.61	20
2000	8	24	33	A	0.3375	0.0930	0.2065	0.1135	0.1310	2.9475	0.0055	2.0772	2.0717	0.8703	0.1887	0.0012	132.8	7.02	18
2000	8	24	33	B	0.2938	0.0914	0.1919	0.1005	0.1019	2.8467	0.0066	2.1015	2.0949	0.7452	0.2174	0.0014	131.2	7.03	18
2000	8	24	33	C	0.2997	0.1174	0.2210	0.1036	0.0787	3.078	0.0113	2.0574	2.0461	1.0206	0.2091	0.0012	131.1	7	18
2000	9	5	33	A	0.3036	0.0293	0.1690	0.1398	0.1346	4.3227	ND	0.2376	0.2376	4.0851	0.0000	ND	457	9.36	16
2000	9	5	33	B	0.3365	0.0691	0.2835	0.2144	0.0530	4.941	ND	0.2934	0.2934	4.6476	0.0753	0.0441	448	9.38	16
2000	9	5	33	C	0.3623	0.0396	0.2234	0.1838	0.1389	4.9824	ND	0.3573	0.3573	4.6251	0.0000	ND	446	9.4	16
2000	9	20	33	A	0.3888	0.0195	0.1877	0.1682	0.2011	4.4343	ND	3.285	3.285	1.1493	ND	ND	542	9.12	19
2000	9	20	33	B	0.3902	0.0230	0.2380	0.2150	0.1522	4.5657	0.009	3.3552	3.3462	1.2105	ND	ND	546	9.14	19
2000	9	20	33	C	0.3615	0.0150	0.1101	0.0951	0.2514	5.2641	0.0557	4.0869	4.0312	1.1772	ND	ND	551	9.13	19
2000	10	16	33	A	0.2189	0.0285	0.1656	0.1371	0.0533	4.6701	0.0912	4.4964	4.4052	0.1737	2.0602	0.039	634	7.51	14
2000	10	16	33	B	0.2383	0.0374	0.1396	0.1022	0.0987	4.986	0.1169	4.4982	4.3813	0.4878	2.0150	0.0399	687	7.53	14
2000	10	16	33	C	0.2217	0.0259	0.1301	0.1042	0.0916	4.9203	0.1018	4.2057	4.1039	0.7146	2.1071	0.0399	656	7.51	14
2000	2	7	34	A	0.7574	0.4864	0.7345	0.2481	0.0229	7.902	5.5307	7.4214	1.8907	0.4806	0.3060	0.069	978	8.69	7
2000	2	7	34	B	0.8413	0.5030	0.7650	0.2620	0.0763	8.181	5.9027	7.8993	1.9966	0.2817	0.3266	0.0661	976	8.63	7
2000	2	7	34	C	0.7955	0.5468	0.7528	0.2061	0.0427	7.9371	5.8976	7.7445	1.8469	0.1926	0.2907	0.0599	975	8.64	7

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	3	10	34	A	0.4575	0.2096	0.3937	0.1841	0.0638	6.1623	4.0336	5.3019	1.2683	0.8604	0.2505	0.0454	899	8.69	3
2000	3	10	34	B	0.5455	0.1434	0.4301	0.2867	0.1154	6.1317	4.0448	5.1867	1.1419	0.945	0.2487	0.041	892	8.52	3
2000	3	10	34	C	0.5349	0.1661	0.4393	0.2732	0.0956	6.0246	3.9869	5.1435	1.1566	0.8811	0.2603	0.0445	894	8.54	3
2000	4	4	34	A	0.3477	0.2279	0.2195	ND	0.1282	1.6785	0.0072	1.206	1.1988	0.4725	ND	ND	571	8.38	11
2000	4	4	34	B	0.4005	0.2613	0.2537	ND	0.1468	1.6533	ND	1.2699	1.2699	0.3834	ND	ND	569	8.41	11
2000	4	4	34	C	0.4147	0.2685	0.3007	0.0322	0.1140	1.8774	0.0113	1.3707	1.3594	0.5067	ND	ND	580	8.41	11
2000	4	19	34	A	0.3471	0.1023	0.1470	0.0448	0.2001	2.5047	ND	1.0773	1.0773	1.4274	ND	ND	365	8.25	7
2000	4	19	34	B	0.3471	0.1068	0.1622	0.0555	0.1849	2.0664	ND	0.9972	0.9972	1.0692	ND	ND	365	8.26	7
2000	4	19	34	C	0.3333	0.1203	0.1746	0.0544	0.1587	2.2671	ND	1.0449	1.0449	1.2222	ND	ND	360	8.3	7
2000	5	1	34	A	0.3544	0.2004	0.2664	0.0660	0.0880	1.4742	0.0873	1.4454	1.3581	0.0288	0.0000	ND	397	8.7	13
2000	5	1	34	B	0.4058	0.1056	0.1636	0.0580	0.2422	1.89	0.0671	0.972	0.9049	0.918	0.0000	ND	393	8.67	13
2000	5	1	34	C	0.3647	0.1850	0.2810	0.0960	0.0837	1.6668	0.0911	1.3185	1.2274	0.3483	0.2643	0.0607	395	8.7	13
2000	5	16	34	A	0.2731	0.1450	0.2367	0.0917	0.0364	1.7955	ND	1.3545	1.3545	0.441	ND	ND	294	8.15	10
2000	5	16	34	B	0.244	0.1286	0.2076	0.0790	0.0364	1.4733	ND	1.2249	1.2249	0.2484	ND	ND	297	8.18	10
2000	5	16	34	C	0.2367	0.1405	0.2163	0.0758	0.0204	1.5201	ND	0.9738	0.9738	0.5463	ND	ND	299	8.19	10
2000	5	22	34	A	0.2509	0.1411	0.2247	0.0836	0.0262	1.647	ND	1.3203	1.3203	0.3267	ND	ND	389	8.39	20
2000	5	22	34	B	0.2832	0.1348	0.2247	0.0900	0.0585	1.5804	ND	1.3212	1.3212	0.2592	ND	ND	390	8.41	20
2000	5	22	34	C	0.297	0.1421	0.2355	0.0934	0.0615	1.6695	ND	1.2438	1.2438	0.4257	ND	ND	391	8.42	20
2000	6	2	34	A	0.2744	0.1350	0.1753	0.0403	0.0991	3.0285	0.1408	3.1644	3.0236	ND	0.0342	ND	315	8.63	17
2000	6	2	34	B	0.2618	0.1234	0.1753	0.0519	0.0865	2.2833	0.0415	1.9053	1.8638	0.378	ND	ND	316	8.66	17
2000	6	2	34	C	0.2702	0.1350	0.2032	0.0682	0.0670	2.2401	0.0892	1.8	1.7108	0.4401	ND	ND	322	8.66	17
2000	6	12	34	A	0.1384	0.0118	0.1046	0.0929	0.0338	1.827	ND	1.6056	1.6056	0.2214	0.1575	0.0011	349	7.09	16
2000	6	12	34	B	0.2019	0.0154	0.1317	0.1163	0.0702	1.944	ND	1.7316	1.7316	0.2124	0.1325	0.001	352	7.11	16
2000	6	12	34	C	0.1924	0.0118	0.1317	0.1200	0.0607	1.9314	ND	1.6983	1.6983	0.2331	0.1328	0.001	354	7.1	16
2000	6	22	34	A	0.27	0.1174	0.1679	0.0505	0.1021	2.115	ND	1.5219	1.5219	0.5931	0.4350	0.0008	307	6.48	20
2000	6	22	34	B	0.2281	0.0659	0.1414	0.0755	0.0867	2.0016	0.0135	1.5606	1.5471	0.441	0.4037	0.0006	306	6.42	20
2000	6	22	34	C	0.2589	0.0894	0.1512	0.0618	0.1077	3.0366	ND	1.5624	1.5624	1.4742	0.3937	0.0006	300	6.42	20
2000	7	3	34	A	0.3216	0.0711	0.1296	0.0585	0.1920	2.097	0.0064	1.2609	1.2545	0.8361	0.3742	0.0007	343	6.5	18
2000	7	3	34	B	0.2418	0.1259	0.1931	0.0672	0.0487	1.7307	0.0093	1.3248	1.3155	0.4059	0.3822	0.0007	340	6.5	18
2000	7	3	34	C	0.1783	0.0300	0.0927	0.0627	0.0856	1.9359	0.0099	1.242	1.2321	0.6939	0.3890	0.0006	337	6.4	18
2000	7	14	34	A	0.1723	0.0080	0.0574	0.0494	0.1149	1.4472	ND	1.0971	1.0971	0.3501	0.4419	0.0012	368	6.65	20
2000	7	14	34	B	0.1966	0.0196	0.0962	0.0766	0.1004	1.494	ND	1.0872	1.0872	0.4068	0.5744	0.0015	363	6.64	20
2000	7	14	34	C	0.1608	0.0108	0.0574	0.0467	0.1034	1.5192	ND	0.8001	0.8001	0.7191	0.4986	0.0013	362	6.63	20
2000	7	24	34	A	0.2864	0.1450	0.1922	0.0472	0.0942	1.4544	ND	0.8091	0.8091	0.6453	0.1496	0.0012	.	7.14	20
2000	7	24	34	B	0.3004	0.1414	0.1894	0.0480	0.1110	1.5201	ND	0.756	0.756	0.7641	0.1281	0.0011	.	7.18	20
2000	7	24	34	C	0.3679	0.1971	0.3117	0.1146	0.0562	1.5435	ND	1.1601	1.1601	0.3834	0.1377	0.0012	.	7.15	20
2000	8	3	34	A	0.2979	0.0219	0.1828	0.1609	0.1151	2.2689	ND	1.5174	1.5174	0.7515	0.1752	0.0368	243	8.65	22
2000	8	3	34	B	0.3267	0.0246	0.2188	0.1942	0.1079	2.1483	ND	1.4868	1.4868	0.6615	0.0989	0.0223	243	8.69	22
2000	8	3	34	C	0.3339	0.0264	0.2432	0.2168	0.0907	2.5416	0.0164	2.0052	1.9888	0.5364	0.1965	0.0261	242	8.41	22
2000	8	14	34	A	0.3069	0.0801	0.1938	0.1137	0.1131	0.9324	ND	0.5742	0.5742	0.3582	0.0906	0.001	264	7.25	18
2000	8	14	34	B	0.3465	0.1776	0.2758	0.0982	0.0707	0.7677	ND	0.6345	0.6345	0.1332	0.0988	0.0011	265	7.26	18
2000	8	14	34	C	0.2744	0.1615	0.2249	0.0634	0.0495	0.8019	ND	0.4815	0.4815	0.3204	0.0874	0.0011	264	7.31	18
2000	8	24	34	A	0.1919	0.0566	0.1118	0.0552	0.0801	1.5678	ND	1.0962	1.0962	0.4716	0.1638	0.0029	225	7.48	17
2000	8	24	34	B	0.1409	0.0133	0.0536	0.0404	0.0873	1.4877	0.0066	1.1331	1.1265	0.3546	0.1587	0.0029	226	7.49	17
2000	8	24	34	C	0.2793	0.0575	0.1846	0.1271	0.0947	1.6434	ND	1.2681	1.2681	0.3753	0.1626	0.0029	229	7.48	17
2000	9	5	34	A	0.2821	0.1681	0.2692	0.1011	0.0129	1.3401	ND	0.99	0.99	0.3501	0.0000	ND	292	8.05	15
2000	9	5	34	B	0.2406	0.1725	0.2391	0.0666	0.0015	1.4787	ND	1.3077	1.3077	0.171	0.0000	ND	295	8.05	15
2000	9	5	34	C	0.2549	0.1508	0.2248	0.0741	0.0301	1.8351	ND	1.6974	1.6974	0.1377	0.0000	ND	295	8.07	15
2000	9	20	34	A	0.5439	0.3934	0.5166	0.1232	0.0273	1.3743	ND	1.1871	1.1871	0.1872	ND	ND	380	7.65	19
2000	9	20	34	B	0.5253	0.4290	0.4764	0.0474	0.0489	1.1979	ND	1.0953	1.0953	0.1026	ND	ND	372	7.68	19
2000	9	20	34	C	0.5626	0.4113	0.5411	0.1299	0.0215	1.278	0.0504	1.2375	1.1871	0.0405	0.0341	0.0008	377	7.7	19
2000	5	22	37	A	0.3662	0.1283	0.2970	0.1688	0.0692	18.1053	7.9898	16.4952	8.5054	1.6101	0.3924	0.0041	1623	7.25	10
2000	5	22	37	B	0.4862	0.1708	0.3939	0.2232	0.0923	19.1547	10.9379	17.2152	6.2773	1.9395	0.5046	0.0062	1630	7.32	10
2000	5	22	37	C	0.6245	0.0775	0.4046	0.3271	0.2199	19.2186	7.9917	13.2021	5.2104	6.0165	0.5382	0.006	1629	7.28	10
2000	6	2	37	A	0.2548	0.0180	0.1154	0.0974	0.1394	21.0276	15.1987	19.4022	4.2035	1.6254	0.2989	0.0046	1536	7.42	10
2000	6	2	37	B	0.2869	0.0270	0.2451	0.2181	0.0418	21.0825	15.2899	20.349	5.0591	0.7335	0.3322	0.0059	1531	7.48	10
2000	6	2	37	C	0.4082	0.0279	0.2869	0.2590	0.1213	19.8144	10.8859	18.4914	7.6055	1.323	0.3769	0.007	1528	7.5	10
2000	6	22	37	A	0.2281	0.0396	0.1162	0.0766	0.1119	4.7907	0.0731	3.8403	3.7672	0.9504	0.3806	0.002	1422	6.95	11
2000	6	22	37	B	0.298	0.1183	0.1735	0.0553	0.1245	15.5448	4.6003	14.5278	9.9275	1.017	0.3855	0.0018	1477	6.89	11

Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	6	22	37	C	0.27	0.0283	0.1302	0.1020	0.1398	14.3487	7.1859	13.2507	6.0648	1.098	0.3973	0.0022	1493	6.97	11
2000	7	3	37	A	0.3112	0.0465	0.2684	0.2219	0.0428	20.0232	5.4904	15.3396	9.8492	4.6836	0.3819	0.0028	1291	7.1	12
2000	7	3	37	B	0.3068	0.0328	0.1739	0.1412	0.1329	19.4058	5.712	15.4062	9.6942	3.9996	0.4041	0.0038	1298	7.2	12
2000	7	3	37	C	0.4471	0.0346	0.2965	0.2619	0.1506	21.4227	0.1024	15.399	15.2966	6.0237	0.4153	0.0031	1304	7.1	12
2000	7	14	37	A	0.3617	0.0258	0.1751	0.1494	0.1866	4.0995	0.017	3.7143	3.6973	0.3852	0.4543	0.0026	1096	6.99	12
2000	7	14	37	B	0.287	0.0365	0.2282	0.1917	0.0588	4.5315	0.1054	4.0509	3.9455	0.4806	0.4558	0.0028	1098	7.02	12
2000	7	14	37	C	0.3617	0.0551	0.2583	0.2032	0.1034	3.2679	0.0163	2.5506	2.5343	0.7173	0.4641	0.0031	1104	7.05	12
2000	5	22	24-1	A	0.1186	0.0073	0.0633	0.0561	0.0553	33.1623	11.1393	32.2074	21.0681	0.9549	ND	ND	3060	7.22	10
2000	5	22	24-1	B	0.1432	0.0035	0.0402	0.0367	0.1030	35.1279	28.213	33.9282	5.7152	1.1997	ND	ND	3080	7.21	10
2000	5	22	24-1	C	0.1125	0.0035	0.0710	0.0675	0.0415	33.1173	14.5285	33.0993	18.5708	0.018	ND	ND	3080	7.2	10
2000	6	2	24-1	A	0.0516	0.0015	0.0200	0.0185	0.0316	34.5411	12.6647	33.2883	20.6236	1.2528	0.0000	ND	3100	7.16	9
2000	6	2	24-1	B	0.0631	0.0004	0.0286	0.0282	0.0345	36.3204	6.8215	35.577	28.7555	0.7434	0.0836	0.0007	3110	7.18	9
2000	6	2	24-1	C	0.0372	0.0015	0.0229	0.0214	0.0143	35.8632	19.0585	35.0154	15.9569	0.8478	ND	ND	3130	7.17	9
2000	6	12	24-1	A	0.1404	0.0170	0.0879	0.0709	0.0525	41.2623	27.902	39.8799	11.9779	1.3824	0.0668	0.0004	2720	6.98	11
2000	6	12	24-1	B	0.1262	0.0081	0.0681	0.0600	0.0581	42.3405	31.8334	40.9626	9.1292	1.3779	0.1300	0.0007	2930	6.94	11
2000	6	12	24-1	C	0.1276	0.0161	0.0837	0.0676	0.0439	40.7268	31.1	40.3344	9.2344	0.3924	0.0841	0.0005	2760	6.97	11
2000	6	22	24-1	A	0.0868	0.0213	0.0462	0.0250	0.0406	36.171	10.8471	33.4089	22.5618	2.7621	0.1569	0.0005	3040	6.77	12
2000	6	22	24-1	B	0.084	0.0221	0.0462	0.0241	0.0378	37.4121	26.2782	35.5941	9.3159	1.818	0.1024	0.0003	3060	6.71	12
2000	6	22	24-1	C	0.0742	0.0353	0.0462	0.0110	0.0280	39.4848	25.4054	38.3247	12.9193	1.1601	0.1350	0.0004	3000	6.72	12
2000	7	3	24-1	A	0.134	0.0118	0.0558	0.0441	0.0782	33.8697	19.4221	29.3787	9.9566	4.491	0.1124	0.0007	.	7	12
2000	7	3	24-1	B	0.1237	0.0073	0.0543	0.0471	0.0694	34.3782	21.6917	29.628	7.9363	4.7502	0.1217	0.0009	.	7.1	12
2000	7	3	24-1	C	0.1178	0.0026	0.0558	0.0532	0.0620	33.0786	5.9108	29.3274	23.4166	3.7512	0.0825	0.0005	.	7	12
2000	7	14	24-1	A	0.0747	0.0108	0.0431	0.0324	0.0316	37.2006	22.2248	35.46	13.2352	1.7406	0.1265	0.0007	466	6.94	13
2000	7	14	24-1	B	0.0862	0.0108	0.0431	0.0324	0.0431	36.8811	22.1476	35.0802	12.9326	1.8009	0.0571	0.0003	464	6.98	13
2000	7	14	24-1	C	0.1034	0.0151	0.0646	0.0495	0.0388	35.9748	19.4197	33.0543	13.6346	2.9205	0.1124	0.0006	465	6.93	13
2000	7	24	24-1	A	0.1459	0.0238	0.0897	0.0660	0.0562	34.7166	25.8528	33.084	7.2312	1.6326	0.0785	0.0011	.	7.38	13
2000	7	24	24-1	B	0.129	0.0248	0.0995	0.0748	0.0295	32.4423	15.6258	30.789	15.1632	1.6533	0.0000	ND	.	7.41	13
2000	7	24	24-1	C	0.1234	0.0248	0.1206	0.0959	0.0028	33.7761	25.6621	31.3029	5.6408	2.4732	0.0970	0.0015	.	7.42	13
2000	8	3	24-1	A	0.1297	0.0255	0.1177	0.0922	0.0120	31.3803	22.784	27.8955	5.1115	3.4848	0.0822	0.0272	373	8.92	14
2000	8	3	24-1	B	0.1402	0.0273	0.0728	0.0456	0.0674	31.3956	23.5614	29.6919	6.1305	1.7037	0.0000	ND	379	9.02	14
2000	8	3	24-1	C	0.1177	0.0291	0.1102	0.0811	0.0075	32.598	24.7117	30.2778	5.5661	2.3202	0.0636	0.0261	378	9.07	14
2000	8	14	24-1	A	0.1344	0.0489	0.1273	0.0784	0.0071	30.7575	20.9266	26.0856	5.159	4.6719	0.0803	0.0006	423	7.12	13
2000	8	14	24-1	B	0.1372	0.0409	0.1089	0.0680	0.0283	28.7631	18.1482	25.9812	7.833	2.7819	0.0714	0.0006	432	7.14	13
2000	8	14	24-1	C	0.1231	0.0265	0.1061	0.0796	0.0170	30.3444	22.2949	27.7605	5.4656	2.5839	0.1071	0.0009	431	7.16	13
2000	8	24	24-1	A	0.0688	0.0011	0.0549	0.0538	0.0139	28.6407	17.9357	26.8632	8.9275	1.7775	0.0435	0.0004	459	7.16	13
2000	8	24	24-1	B	0.1321	0.0150	0.1251	0.1101	0.0070	30.7566	18.7554	27.9306	9.1752	2.826	0.0732	0.0007	448	7.2	13
2000	8	24	24-1	C	0.1279	0.0106	0.0850	0.0744	0.0429	31.7259	22.2124	28.3509	6.1385	3.375	0.1080	0.0009	460	7.17	13
2000	9	5	24-1	A	0.0816	0.0179	0.0831	0.0652	ND	27.801	15.3905	26.9901	11.5996	0.8109	0.1197	0.0011	4440	7.2	13
2000	9	5	24-1	B	0.1074	0.0119	0.0545	0.0426	0.0529	29.9187	19.4403	29.6604	10.2201	0.2583	0.1234	0.0012	4470	7.22	13
2000	9	5	24-1	C	0.0759	0.0119	0.0974	0.0855	ND	29.322	16.6468	29.0043	12.3575	0.3177	0.1221	0.0012	4440	7.22	13
2000	9	20	24-1	A	0.1389	0.0551	0.1245	0.0694	0.0144	27.6012	16.1025	26.1261	10.0236	1.4751	0.0377	0.0004	4530	7.22	14
2000	9	20	24-1	B	0.1604	0.0996	0.1417	0.0421	0.0187	28.7973	20.3772	26.9811	6.6039	1.8162	ND	ND	4500	7.21	14
2000	9	20	24-1	C	0.1245	0.0640	0.1087	0.0447	0.0158	27.8658	19.0982	25.6752	6.577	2.1906	ND	ND	4480	7.22	14
2000	10	16	24-1	A	0.1396	0.0196	0.1301	0.1105	0.0095	18.4374	13.3397	17.8398	4.5001	0.5976	0.0633	0.0003	4110	6.96	13
2000	10	16	24-1	B	0.1396	0.0285	0.1437	0.1152	-0.0041	18.3222	12.1699	18.2619	6.092	0.0603	0.0422	0.0002	4020	6.96	13
2000	10	16	24-1	C	0.1383	0.0463	0.1301	0.0839	0.0082	19.6344	13.987	19.2204	5.2334	0.414	0.1057	0.0005	4140	6.94	13
2000	5	22	24-2	A	0.2124	0.0018	0.0556	0.0539	0.1568	4.0905	0.2212	2.7405	2.5193	1.35	0.5961	0.0126	1104	7.56	16
2000	5	22	24-2	B	0.2124	0.0119	0.1248	0.1129	0.0876	3.0888	ND	2.4201	2.4201	0.6687	0.2533	0.0061	1159	7.62	16
2000	5	22	24-2	C	0.1632	0.0081	0.0633	0.0552	0.0999	2.5803	ND	1.9674	1.9674	0.6129	0.2447	0.0059	1055	7.62	16
2000	6	2	24-2	A	0.3247	0.0051	0.0531	0.0480	0.2716	3.3309	ND	1.8522	1.8522	1.4787	0.2023	0.0042	887	7.55	13
2000	6	2	24-2	B	0.2442	0.0290	0.1307	0.1017	0.1135	2.6271	0.0969	1.9377	1.8408	0.6894	0.2684	0.0054	878	7.54	13
2000	6	2	24-2	C	0.1853	0.0015	0.0602	0.0587	0.1251	2.2383	ND	1.7154	1.7154	0.5229	0.2600	0.006	873	7.6	13
2000	6	12	24-2	A	0.1181	0.0081	0.0641	0.0560	0.0540	2.1375	0.026	2.0061	1.9801	0.1314	0.2305	0.0011	854	6.9	14
2000	6	12	24-2	B	0.4287	0.1835	0.3382	0.1547	0.0905	3.5586	ND	2.8296	2.8296	0.729	0.2623	0.0016	666	7.02	14
2000	6	12	24-2	C	0.2194	0.0478	0.1721	0.1244	0.0473	2.0178	ND	1.7811	1.7811	0.2367	0.3505	0.002	687	6.98	14
2000	6	22	24-2	A	0.2281	0.0370	0.1022	0.0652	0.1259	4.8105	0.0283	3.5343	3.506	1.2762	1.2407	0.0042	1670	6.76	16
2000	6	22	24-2	B	0.4477	0.0920	0.1861	0.0941	0.2616	6.0336	0.0105	3.5685	3.558	2.4651	1.2520	0.0049	1635	6.82	16
2000	6	22	24-2	C	0.2421	0.0353	0.0840	0.0488	0.1581	3.8862	ND	2.7378	2.7378	1.1484	0.7937	0.0033	1549	6.84	16
2000	7	3	24-2	A	0.391	0.0985	0.2108	0.1123	0.1802	3.3705	ND	2.2095	2.2095	1.161	4.3977	0.0165	765	6.8	14

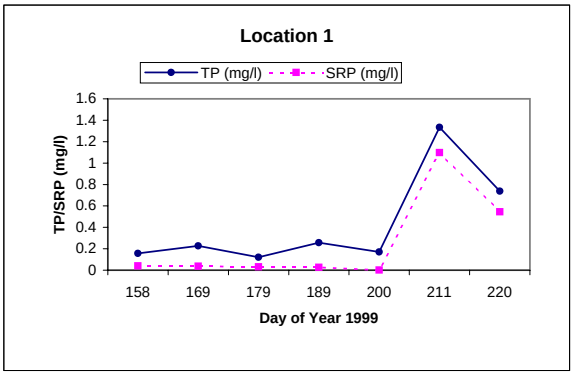
Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

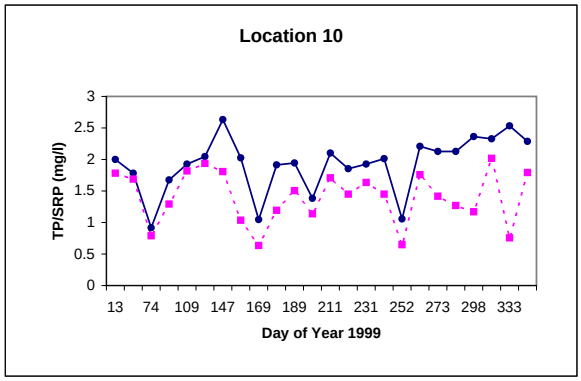
YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	7	3	24-2	B	0.2773	0.0164	0.0853	0.0689	0.1920	7.4061	0.0557	5.4243	5.3686	1.9818	4.0128	0.0189	1179	6.9	15
2000	7	3	24-2	C	0.7026	0.1396	0.4693	0.3297	0.2333	5.6295	0.0182	4.4154	4.3972	1.2141	4.1490	0.0156	798	6.8	15
2000	7	14	24-2	A	0.3114	0.0908	0.1536	0.0629	0.1578	4.401	0.0309	3.4344	3.4035	0.9666	ND	ND	1141	7.04	15
2000	7	14	24-2	B	0.5209	0.0819	0.4162	0.3343	0.1047	6.1686	0.0269	5.2938	5.2669	0.8748	ND	ND	1147	6.97	15
2000	7	14	24-2	C	0.8926	0.3043	0.7419	0.4377	0.1507	8.127	0.0277	6.408	6.3803	1.719	ND	ND	1143	6.9	15
2000	7	24	24-2	A	0.7614	0.6621	0.7895	0.1274	-0.0281	3.9807	0.013	3.5217	3.5087	0.459	0.2370	0.0031	.	7.35	15
2000	7	24	24-2	B	0.4382	0.0696	0.3145	0.2449	0.1237	2.9844	0.0102	2.4561	2.4459	0.5283	0.2246	0.0022	.	7.21	15
2000	7	24	24-2	C	0.3004	0.0248	0.1599	0.1352	0.1405	4.428	0.1418	3.4254	3.2836	1.0026	0.3985	0.004	.	7.23	15
2000	8	3	24-2	A	2.5791	1.9080	2.3633	0.4553	0.2158	9.1278	0.0507	5.8131	5.7624	3.3147	1.8541	0.3233	518	8.55	16
2000	8	3	24-2	B	1.9343	1.5048	1.6652	0.1605	0.2691	7.1676	0.0079	4.0338	4.0259	3.1338	0.6806	0.1378	520	8.63	16
2000	8	3	24-2	C	2.1488	1.3076	1.4709	0.1633	0.6779	9.801	0.0077	3.7071	3.6994	6.0939	1.3166	0.2666	535	8.63	16
2000	8	14	24-2	A	1.9653	1.2134	1.6698	0.4564	0.2955	7.1721	0.0086	3.996	3.9874	3.1761	7.1079	0.0412	933	6.99	11
2000	8	14	24-2	B	0.3309	0.1875	0.1938	0.0063	0.1371	2.2347	0.0071	1.3149	1.3078	0.9198	3.0274	0.0188	929	7.02	11
2000	8	14	24-2	C	0.3875	0.0176	0.0990	0.0814	0.2885	4.2651	0.01	1.9836	1.9736	2.2815	4.3579	0.0236	1168	6.96	11
2000	8	24	24-2	A	0.8873	0.2286	0.2901	0.0615	0.5972	5.7015	0.1964	1.8414	1.645	3.8601	1.4009	0.0083	479	7	13
2000	8	24	24-2	B	0.8212	0.2626	0.4550	0.1924	0.3662	4.5054	0.0133	1.7199	1.7066	2.7855	0.2984	0.0017	357	6.98	13
2000	8	24	24-2	C	0.4795	0.2418	0.3861	0.1444	0.0934	2.6811	ND	1.1718	1.1718	1.5093	0.2625	0.0016	545	7.02	13
2000	9	5	24-2	A	0.4696	0.0293	0.0759	0.0467	0.3937	4.5378	0.2336	3.2787	3.0451	1.2591	0.1458	0.001	605	7.07	10
2000	9	5	24-2	B	0.5555	0.2376	0.2978	0.0602	0.2577	2.8557	ND	1.3977	1.3977	1.458	0.1700	0.0012	421	7.07	10
2000	9	5	24-2	C	0.5412	0.2811	0.4224	0.1413	0.1188	2.6631	ND	1.4031	1.4031	1.26	0.2558	0.0015	512	7	10
2000	9	20	24-2	A	0.4764	0.0418	0.4046	0.3629	0.0718	10.8009	1.1735	8.6571	7.4836	2.1438	1.1604	0.0083	2890	7.08	11
2000	9	20	24-2	B	0.3141	0.0373	0.2251	0.1879	0.0890	12.5712	3.7801	10.3572	6.5771	2.214	0.6837	0.0051	3080	7.1	11
2000	9	20	24-2	C	0.3902	0.0373	0.2466	0.2094	0.1436	11.6424	3.1192	10.0926	6.9734	1.5498	0.6677	0.0051	3050	7.11	11
2000	10	16	24-2	A	0.4814	0.0374	0.3488	0.3114	0.1326	14.4927	8.0006	13.2678	5.2672	1.2249	0.3997	0.0024	3200	7.01	10
2000	10	16	24-2	B	0.3078	0.0285	0.1287	0.1002	0.1791	13.5891	6.4579	11.9862	5.5283	1.6029	0.2849	0.0019	3130	7.04	10
2000	10	16	24-2	C	0.3693	0.0285	0.1642	0.1357	0.2051	13.6782	7.5341	12.942	5.4079	0.7362	1.3581	0.0084	3460	7.02	10
2000	6	2	25-1	A	0.199	0.0100	0.0526	0.0426	0.1464	3.7701	0.1432	2.8764	2.7332	0.8937	0.2916	0.0427	860	8.46	16
2000	6	2	25-1	B	0.199	0.0100	0.0596	0.0496	0.1394	4.752	0.1372	2.8044	2.6672	1.9476	0.3437	0.0484	866	8.44	16
2000	6	2	25-1	C	0.16	0.0100	0.0666	0.0566	0.0934	4.8483	0.1085	2.7981	2.6896	2.0502	0.3551	0.0563	852	8.5	16
2000	6	12	25-1	A	0.1654	0.0208	0.1384	0.1177	0.0270	13.3749	1.8838	13.0149	11.1311	0.36	0.0693	0.0007	3090	7.22	13
2000	6	12	25-1	B	0.1452	0.0118	0.1114	0.0997	0.0338	12.9006	0.0143	12.4317	12.4174	0.4689	0.0877	0.0008	3320	7.2	13
2000	6	12	25-1	C	0.1992	0.0163	0.1492	0.1330	0.0500	7.5132	ND	7.2198	7.2198	0.2934	0.1177	0.0011	3430	7.19	13
2000	6	22	25-1	A	0.3078	0.0379	0.1581	0.1202	0.1497	3.1365	0.0202	2.6181	2.5979	0.5184	0.1886	0.0012	897	7.02	23
2000	6	22	25-1	B	0.2281	0.0876	0.1679	0.0803	0.0602	2.9376	0.0272	2.4921	2.4649	0.4455	0.1372	0.0008	885	7	23
2000	6	22	25-1	C	0.2421	0.1130	0.1861	0.0731	0.0560	2.9178	0.0201	2.448	2.4279	0.4698	0.1396	0.0012	889	7.18	23
2000	7	3	25-1	A	0.2226	0.1214	0.2389	0.1175	ND	3.0735	0.0056	2.6964	2.6908	0.3771	0.0806	0.0019	915	7.6	17
2000	7	3	25-1	B	0.2374	0.1369	0.2315	0.0946	0.0059	2.961	0.019	2.5398	2.5208	0.4212	ND	ND	905	7.5	17
2000	7	3	25-1	C	0.2522	0.1223	0.2197	0.0975	0.0325	2.9097	0.0239	2.5488	2.5249	0.3609	0.1006	0.0019	899	7.5	17
2000	7	14	25-1	A	0.1909	0.0641	0.1249	0.0608	0.0660	2.7333	0.0237	2.205	2.1813	0.5283	0.1414	0.001	1045	7.07	20
2000	7	14	25-1	B	0.2053	0.0819	0.1321	0.0502	0.0732	2.7387	0.0229	1.9593	1.9364	0.7794	0.1393	0.0009	1027	7.04	20
2000	7	14	25-1	C	0.2253	0.0596	0.1436	0.0840	0.0817	3.0276	0.0157	2.2068	2.1911	0.8208	0.1126	0.0007	1023	7.02	20
2000	7	24	25-1	A	0.3314	0.2223	0.3004	0.0782	0.0310	2.7711	0.02	2.7153	2.6953	0.0558	ND	ND	.	8.2	22
2000	7	24	25-1	B	0.3117	0.2268	0.3286	0.1019	-0.0169	3.2814	ND	3.0816	3.0816	0.1998	ND	ND	.	8.2	22
2000	7	24	25-1	C	0.3004	0.2313	0.3145	0.0833	-0.0141	2.8503	0.0171	2.3859	2.3688	0.4644	0.0444	0.003	.	8.08	22
2000	5	22	25-2	A	0.194	0.0035	0.0525	0.0490	0.1415	3.3084	ND	2.7603	2.7603	0.5481	0.2255	0.0212	1118	8.24	18
2000	5	22	25-2	B	0.174	0.0020	0.0633	0.0613	0.1107	4.0977	0.051	3.312	3.261	0.7857	0.2141	0.0201	1131	8.24	18
2000	5	22	25-2	C	0.2048	0.0018	0.0817	0.0800	0.1231	3.42	ND	3.5514	3.5514	ND	0.1967	0.0205	1078	8.29	18
2000	6	2	25-2	A	0.1949	0.0135	0.0735	0.0600	0.1214	5.2083	0.1097	2.8746	2.7649	2.3337	0.3650	0.0535	858	8.46	15
2000	6	2	25-2	B	0.1502	0.0100	0.0638	0.0538	0.0864	5.3676	0.1089	2.7936	2.6847	2.574	0.3544	0.054	855	8.48	15
2000	6	2	25-2	C	0.2269	0.0100	0.0777	0.0677	0.1492	6.0156	0.1222	3.1194	2.9972	2.8962	0.3772	0.0575	855	8.48	15
2000	6	12	25-2	A	0.1438	0.0028	0.0682	0.0655	0.0756	3.3174	ND	2.5263	2.5263	0.7911	0.3563	0.0249	940	8.1	16
2000	6	12	25-2	B	0.0776	0.0028	0.0682	0.0655	0.0094	2.9853	ND	2.6703	2.6703	0.315	0.3452	0.0252	977	8.12	16
2000	6	12	25-2	C	0.1452	0.0028	0.0709	0.0682	0.0743	3.1491	ND	2.5686	2.5686	0.5805	0.3465	0.0232	983	8.08	16
2000	6	22	25-2	A	0.14	0.0178	0.0742	0.0565	0.0658	3.0267	0.0354	2.583	2.5476	0.4437	0.1682	0.001	892	7	23
2000	6	22	25-2	B	0.126	0.0221	0.1022	0.0801	0.0238	3.1743	0.0275	2.6757	2.6482	0.4986	0.3240	0.0018	891	6.96	23
2000	6	22	25-2	C	0.14	0.0178	0.0742	0.0565	0.0658	3.0645	0.0239	2.6307	2.6068	0.4338	0.2172	0.0012	893	6.97	23
2000	7	3	25-2	A	0.2817	0.0711	0.1665	0.0954	0.1152	3.2553	0.0219	2.7792	2.7573	0.4761	0.1106	0.0013	908	7.3	16
2000	7	3	25-2	B	0.1636	0.0620	0.1370	0.0750	0.0266	3.0528	0.0165	2.7639	2.7474	0.2889	0.1427	0.0011	911	7.1	16
2000	7	3	25-2	C	0.3068	0.1195	0.2847	0.1652	0.0221	3.2796	0.0263	3.1068	3.0805	0.1728	0.0824	0.0037	916	7.9	16

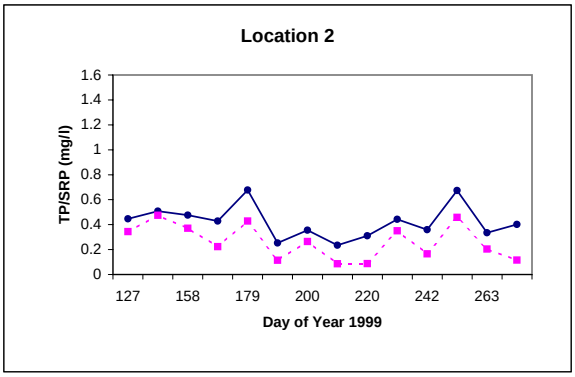
Appendix table 1. Water Quality Data, Upper Klamath Basin, (January 1, 2000 to October 31, 2000, arranged by location)

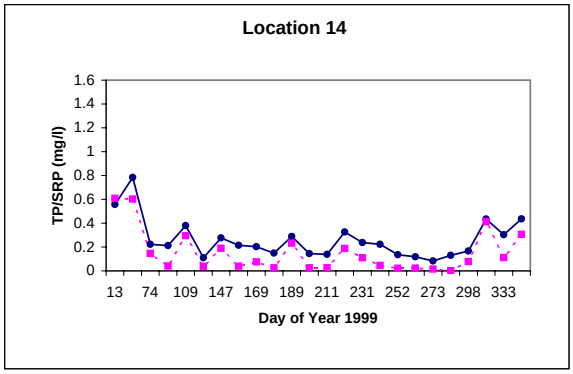
YEAR	MONTH	DAY	LOC	SAMPLE	TP	SRP	TFP	SUP	PP	TN	SN	TFN	SON	PN	NH4-N	NH3-N	EC	pH	TEMP
					mg/L												uS.cm^{-1}		deg C
2000	7	14	25-2	A	0.2512	0.1130	0.2038	0.0908	0.0474	2.4516	0.0265	2.1249	2.0984	0.3267	0.1311	0.0009	1036	7.08	20
2000	7	14	25-2	B	0.2325	0.0730	0.1536	0.0806	0.0789	2.5875	0.0238	2.2293	2.2055	0.3582	0.1121	0.0007	1026	7.05	20
2000	7	14	25-2	C	0.2296	0.0908	0.1723	0.0816	0.0573	2.7828	0.023	2.5101	2.4871	0.2727	6.2022	0.0376	1020	7.01	20
2000	7	24	25-2	A	0.3806	0.1235	0.2161	0.0926	0.1645	3.3777	0.0172	2.6892	2.672	0.6885	ND	ND	.	8.27	21
2000	7	24	25-2	B	0.455	0.1863	0.2709	0.0847	0.1841	3.5388	0.0193	2.6316	2.6123	0.9072	ND	ND	.	8.29	21
2000	7	24	25-2	C	0.3848	0.2088	0.3440	0.1353	0.0408	2.9385	0.0265	2.5038	2.4773	0.4347	0.1306	0.013	.	8.27	21
2000	8	3	25-2	A	1.3126	0.5909	0.9600	0.3691	0.3526	10.8738	0.0327	7.9785	7.9458	2.8953	3.0847	2.6607	814	10.05	22
2000	8	3	25-2	B	2.428	1.7073	2.1186	0.4114	0.3094	10.0512	0.0209	7.3818	7.3609	2.6694	2.9324	2.5721	815	10.11	22
2000	8	3	25-2	C	1.6004	1.1554	1.3860	0.2306	0.2144	10.2024	0.0506	7.5267	7.4761	2.6757	3.4461	3.1386	816	10.28	22
2000	8	14	25-2	A	0.5161	0.0355	0.3889	0.3534	0.1272	6.4386	0.0135	4.3335	4.32	2.1051	1.2884	0.3228	863	8.75	18
2000	8	14	25-2	B	0.6575	0.0265	0.3069	0.2804	0.3506	6.9498	0.0158	3.8124	3.7966	3.1374	0.0885	0.2179	865	8.74	18
2000	8	14	25-2	C	0.4525	0.0265	0.2121	0.1856	0.2404	5.094	0.0164	3.2247	3.2083	1.8693	1.2298	0.2977	867	8.73	18
2000	8	24	25-2	A	0.3957	0.0306	0.2501	0.2195	0.1456	5.8131	0.0431	4.5747	4.5316	1.2384	0.9147	0.2453	601	8.79	16
2000	8	24	25-2	B	0.454	0.0254	0.3375	0.3121	0.1165	5.7069	0.0181	4.6026	4.5845	1.1043	0.8868	0.2583	593	8.84	16
2000	8	24	25-2	C	0.3957	0.0306	0.3229	0.2923	0.0728	5.2011	ND	4.4001	4.4001	0.801	0.8929	0.2601	599	8.84	16
2000	9	5	25-2	A	0.4124	0.0379	0.2220	0.1841	0.1904	6.2658	ND	4.9878	4.9878	1.278	1.5903	0.1589	914	8.27	12
2000	9	5	25-2	B	0.4267	0.0491	0.2764	0.2273	0.1503	6.318	ND	5.5233	5.5233	0.7947	1.6034	0.1669	911	8.29	12
2000	9	5	25-2	C	0.3837	0.0466	0.3079	0.2613	0.0758	7.2216	0.0528	5.778	5.7252	1.4436	1.6240	0.1691	906	8.29	12
2000	9	20	25-2	A	0.5439	0.0284	0.1834	0.1550	0.3605	8.1738	0.053	5.3406	5.2876	2.8332	1.7189	0.0666	917	7.83	16
2000	9	20	25-2	B	0.5483	0.0284	0.2251	0.1967	0.3232	7.416	ND	5.0355	5.0355	2.3805	1.7193	0.0666	926	7.83	16
2000	9	20	25-2	C	0.6057	0.0284	0.2279	0.1995	0.3778	8.1126	ND	5.4135	5.4135	2.6991	1.7157	0.0695	923	7.85	16

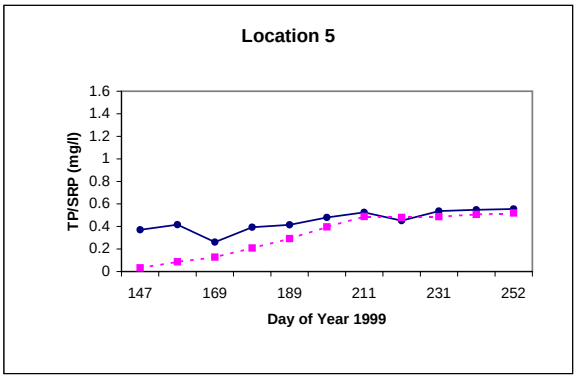
Appendix Figure 1A. Plots of mean TP and SRP values for all locations during 1999 and 2000.

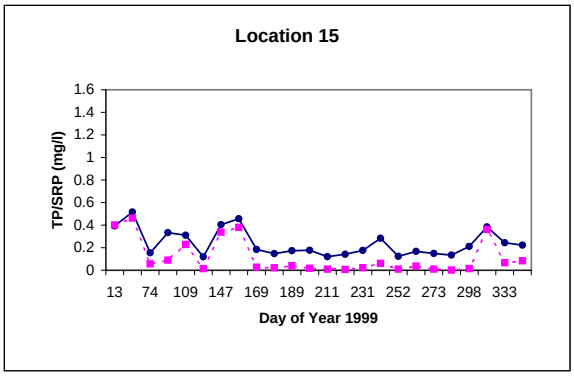


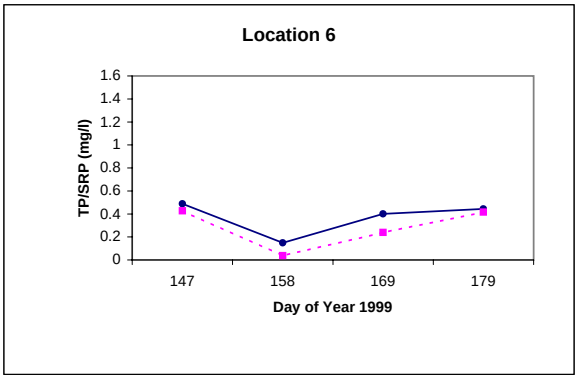


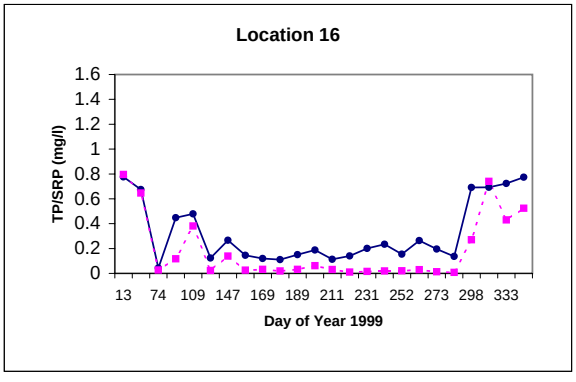


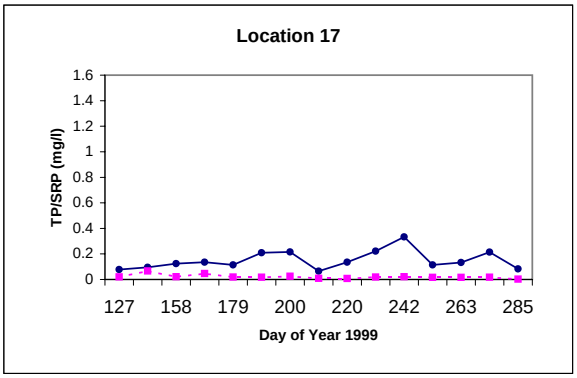








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TP/SRP (mg/l)
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1.2
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0.8
0.6
0.4
0.2
0
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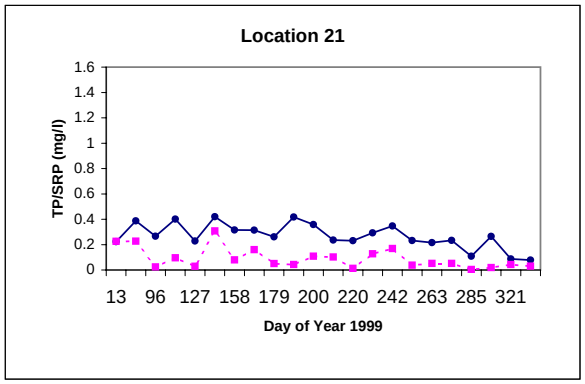
Day of Year 1999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0
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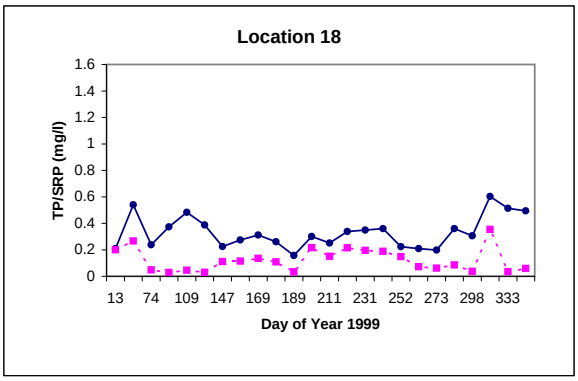
Day of Year 1999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0.6
0.4
0.2
0
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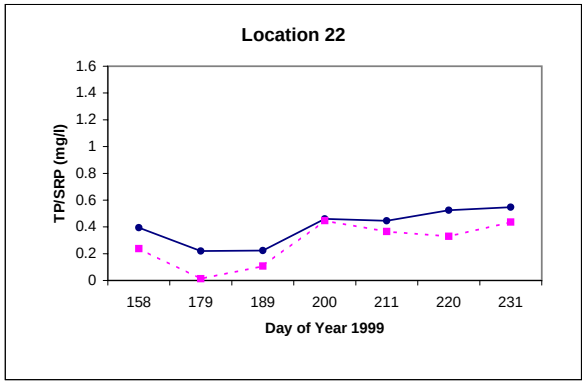
Day of Year 1999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TP/SRP (mg/l)
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1.2
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0.6
0.4
0.2
0
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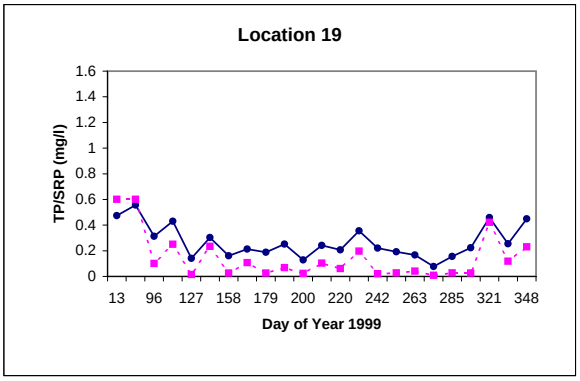
Day of Year 1999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TP/SRP (mg/l)
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1.2
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0.6
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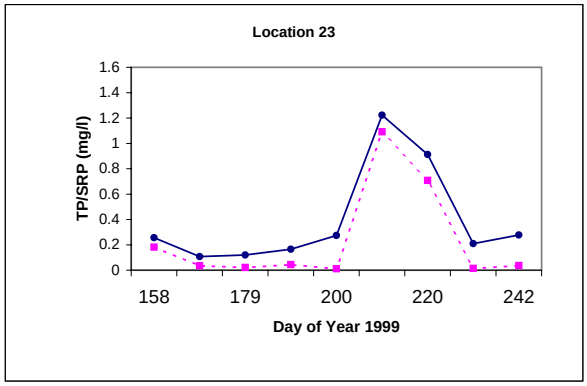
0.2
0
13 96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999


Location 23
TP/SRP (mg/l)
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1.2
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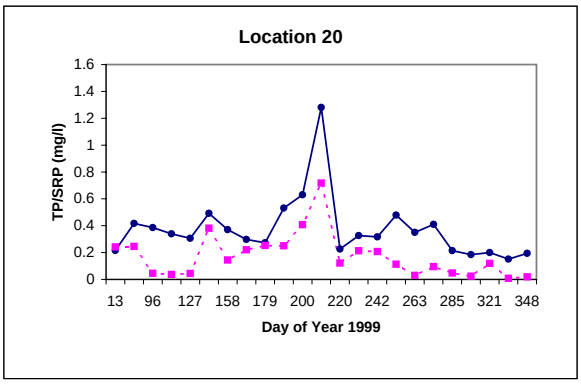
0.2
0
158 179 200 220 242
Day of Year 1999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TP/SRP (mg/l)
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1
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0.6
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0
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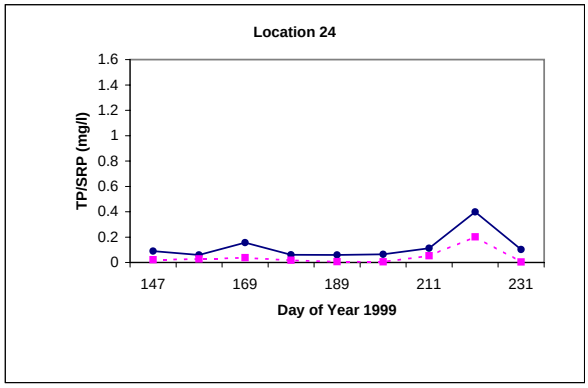
Day of Year 1999


Location 24
TP/SRP (mg/l)
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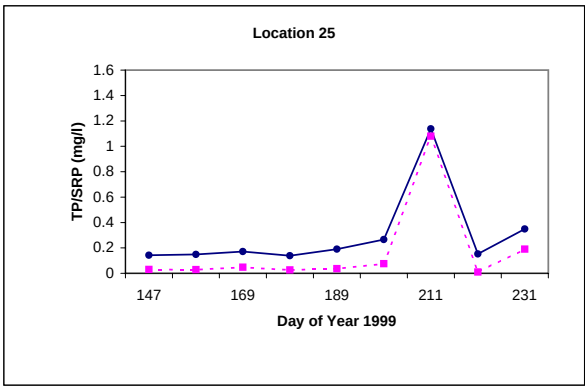
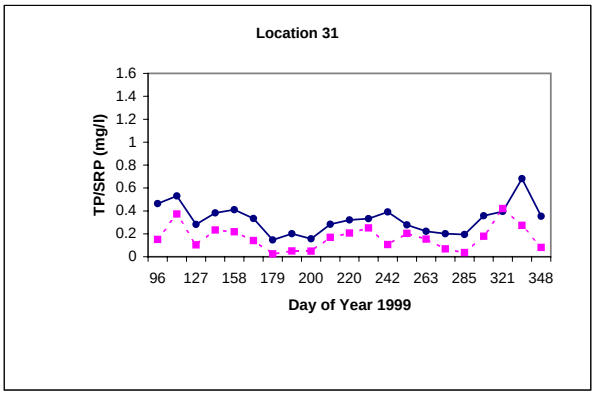
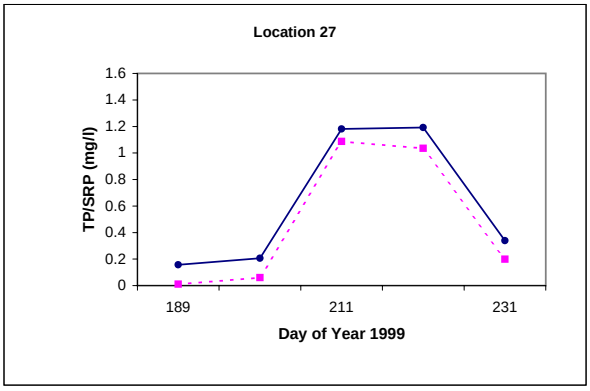
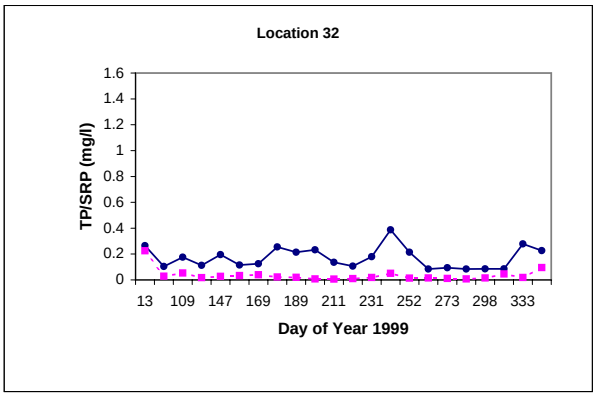
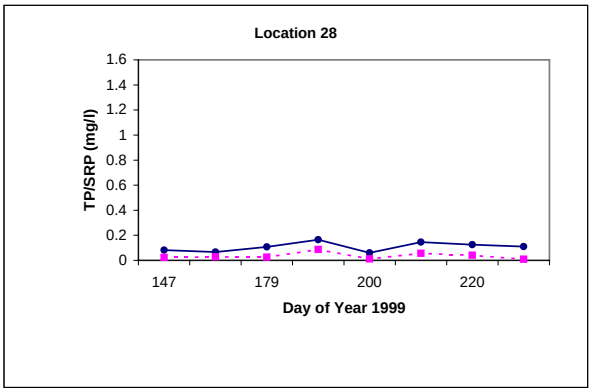
1.4
1.2
1
0.8
0.6
0.4
0.2
0
147 169 189 211 231
Day of Year 1999

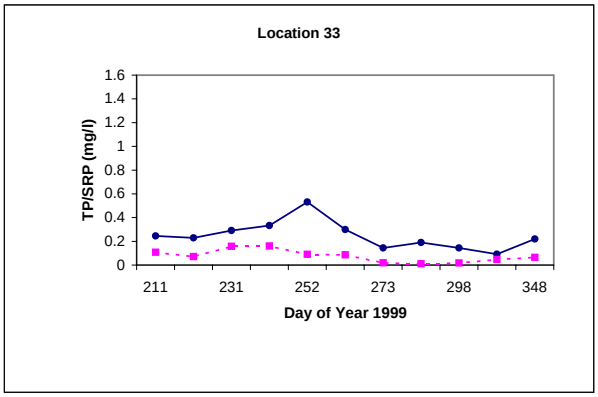

Location 25
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
147
169
189
211
231
Day of Year 1999

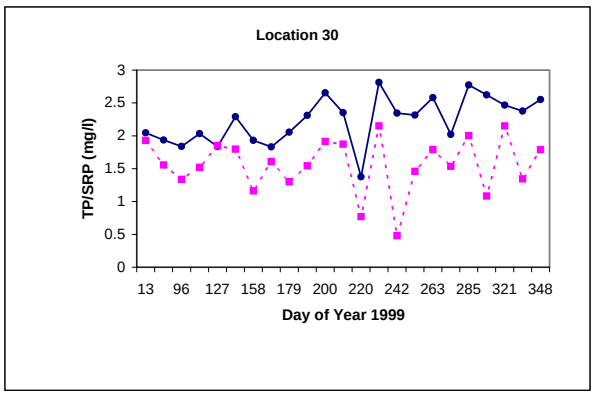

Location 31
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
96
127
158
179
200
220
242
263
285
321
348
Day of Year 1999

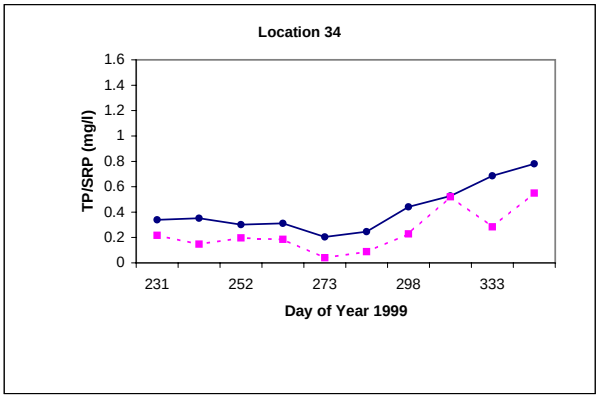

Location 27
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
189
211
231
Day of Year 1999

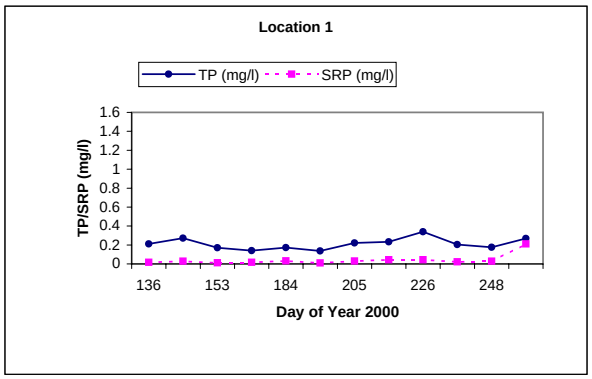

Location 32
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
13
109
147
169
189
211
231
252
273
298
333
Day of Year 1999

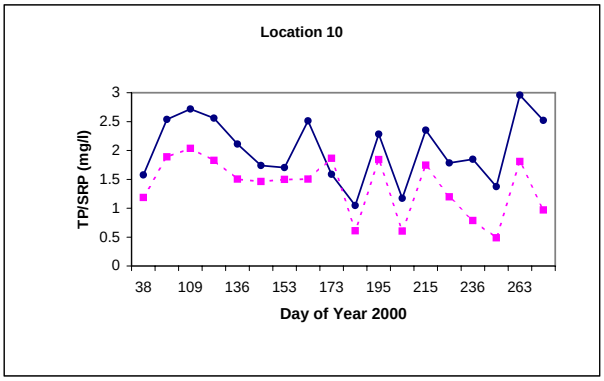

Location 28
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
147
179
200
220
Day of Year 1999

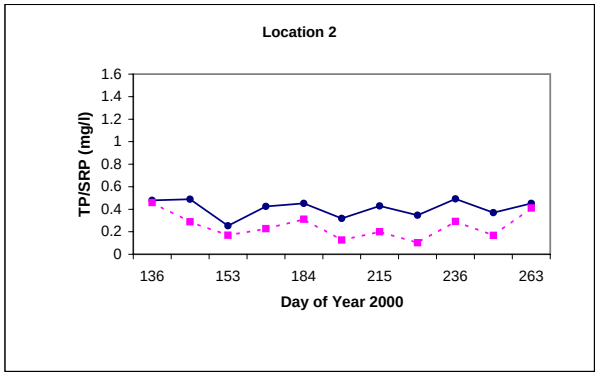

Location 33
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
211
231
252
273
298
348
Day of Year 1999

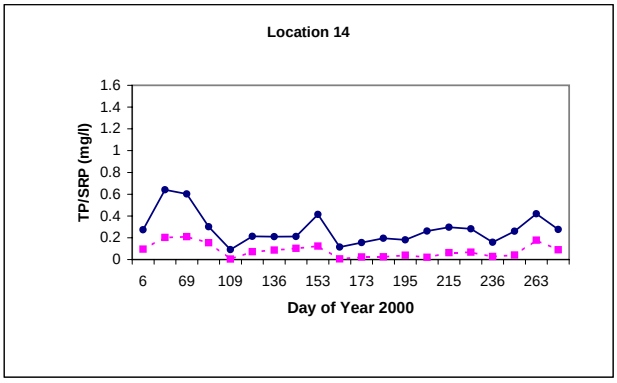

Location 30
TP/SRP (mg/l)
3
2.5
2
1.5
1
0.5
0
13
96
127
158
179
200
220
242
263
285
321
348
Day of Year 1999

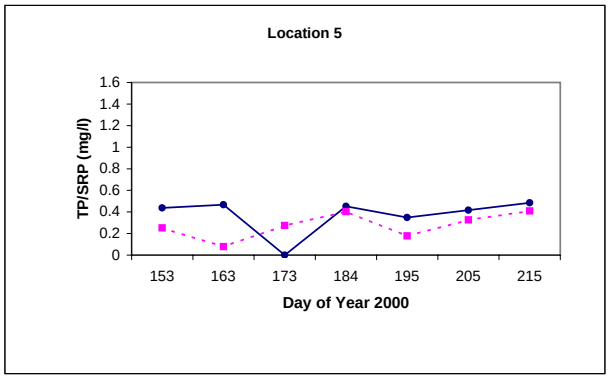

Location 34
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
231
252
273
298
333
Day of Year 1999

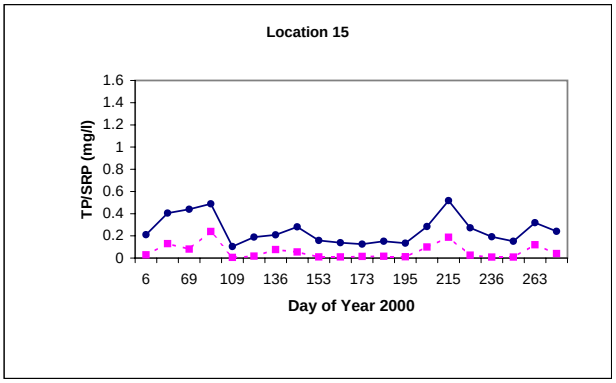

Location 1
TP (mg/l)
SRP (mg/l)
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
136
153
184
205
226
248
Day of Year 2000

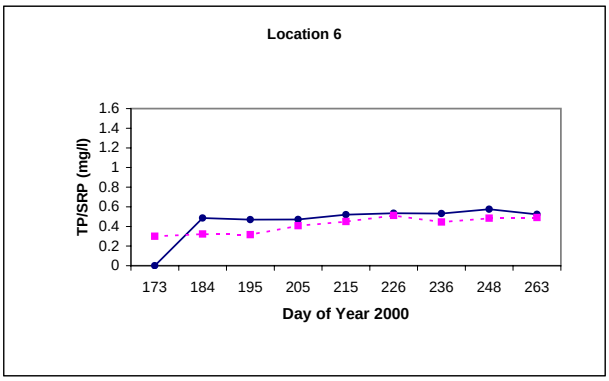

Location 10
TP/SRP (mg/l)
3
2.5
2
1.5
1
0.5
0
38
109
136
153
173
195
215
236
263
Day of Year 2000

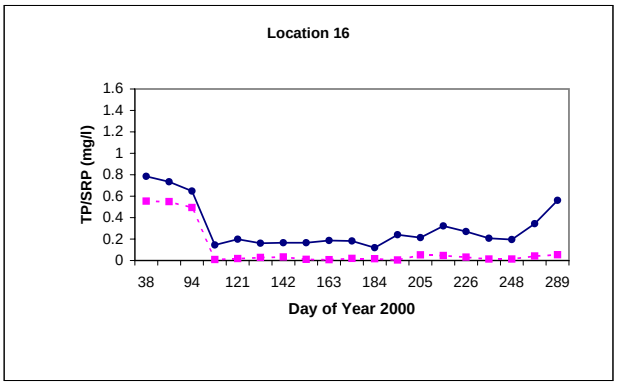

Location 2
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
136
153
184
215
236
263
Day of Year 2000

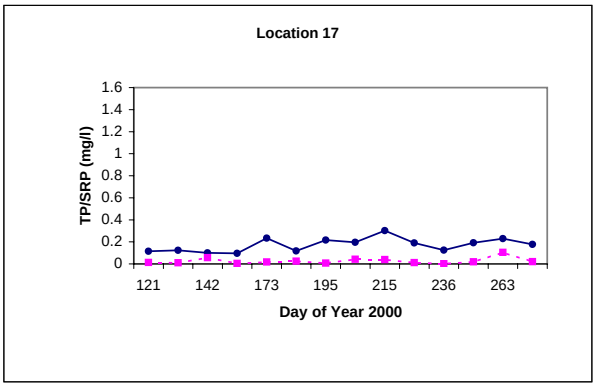

Location 14
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

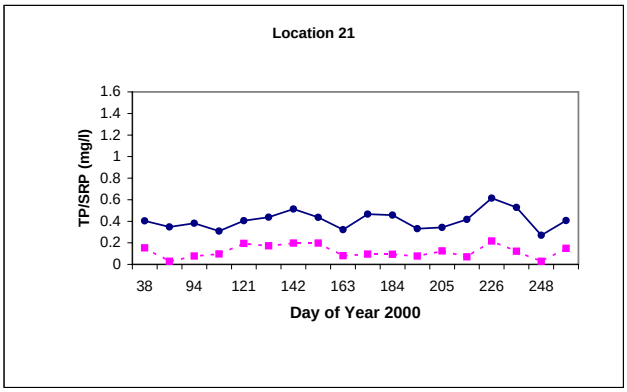

Location 5
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
153
163
173
184
195
205
215
Day of Year 2000

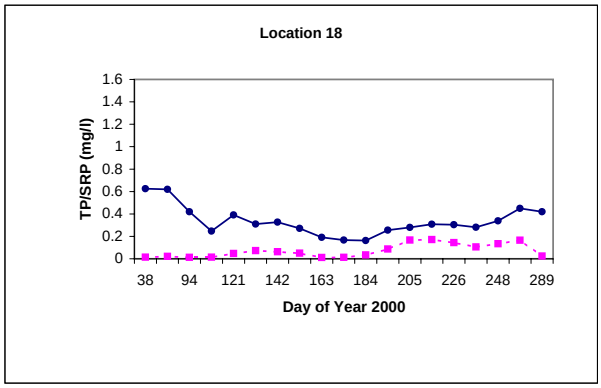

Location 15
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

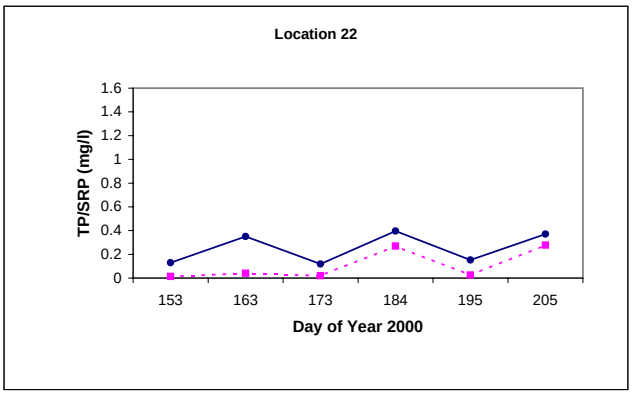

Location 6
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
173
184
195
205
215
226
236
248
263
Day of Year 2000

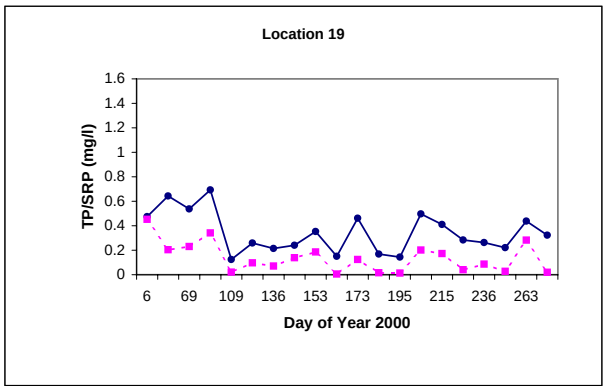

Location 16
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
38
94
121
142
163
184
205
226
248
289
Day of Year 2000

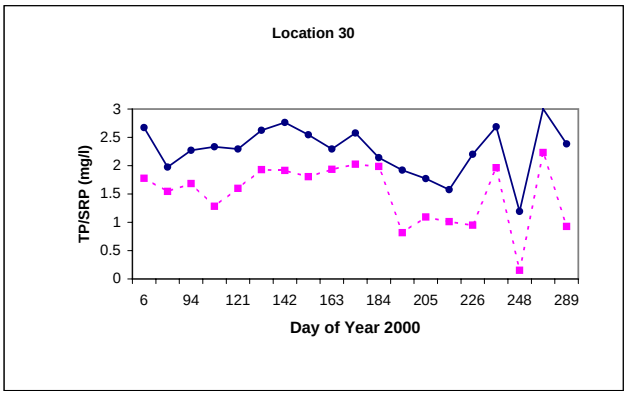

Location 17
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
121 142 173 195 215 236 263
Day of Year 2000

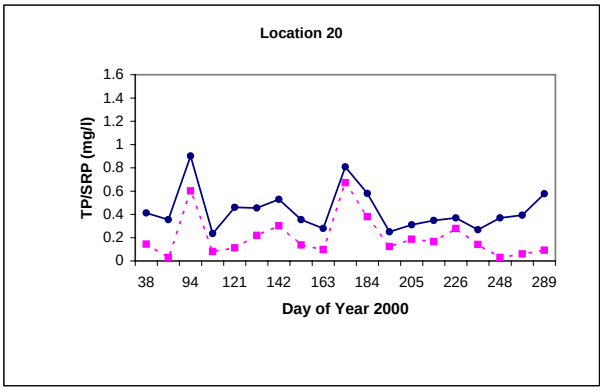

Location 21
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
38 94 121 142 163 184 205 226 248
Day of Year 2000

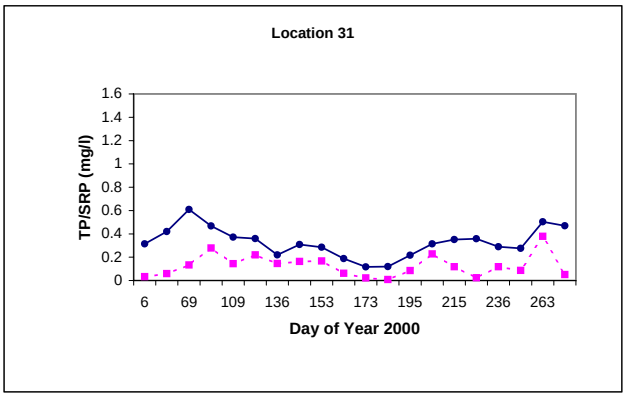

Location 18
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
38 94 121 142 163 184 205 226 248 289
Day of Year 2000

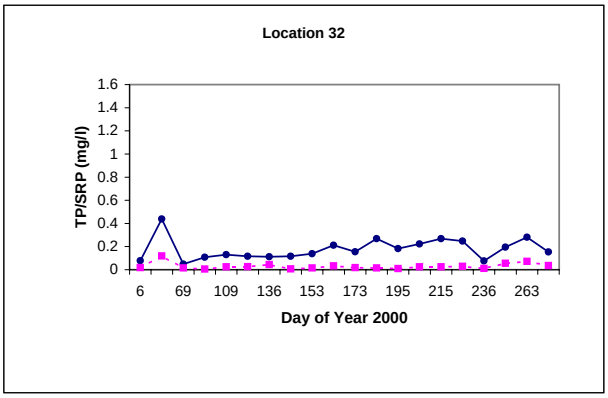

Location 22
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
153 163 173 184 195 205
Day of Year 2000

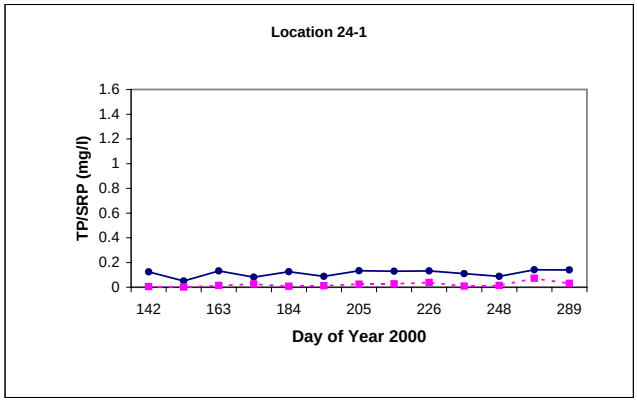

Location 19
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

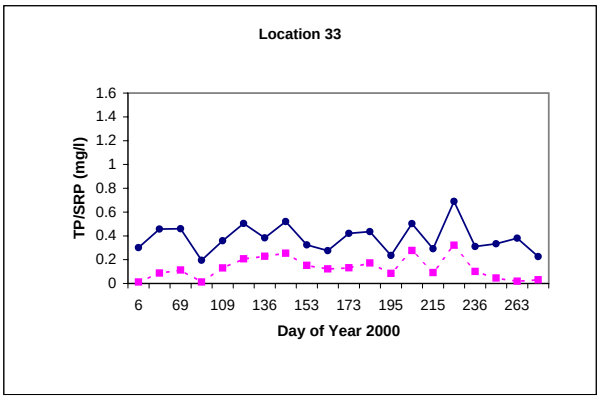

Location 30
TP/SRP (mg/l)
3
2.5
2
1.5
1
0.5
0
6 94 121 142 163 184 205 226 248 289
Day of Year 2000

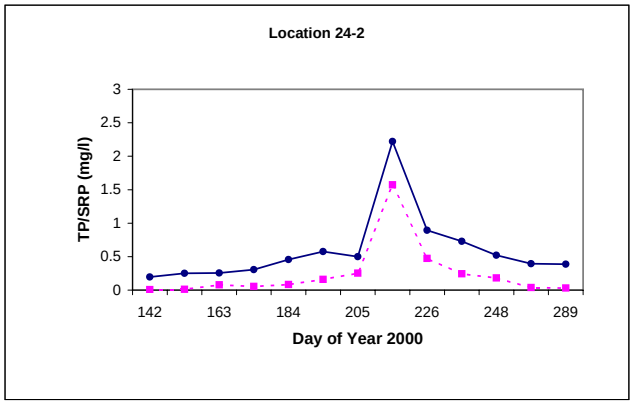

Location 20
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
38 94 121 142 163 184 205 226 248 289
Day of Year 2000

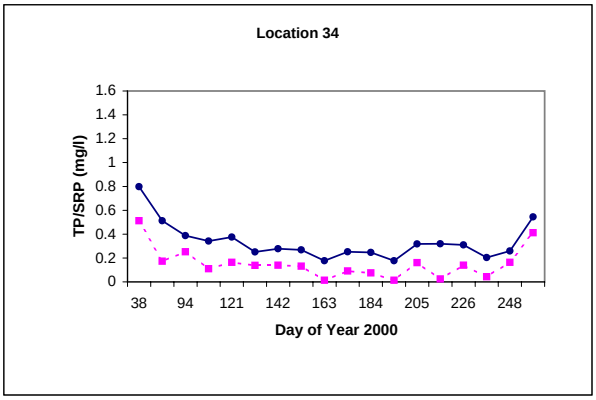

Location 31
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

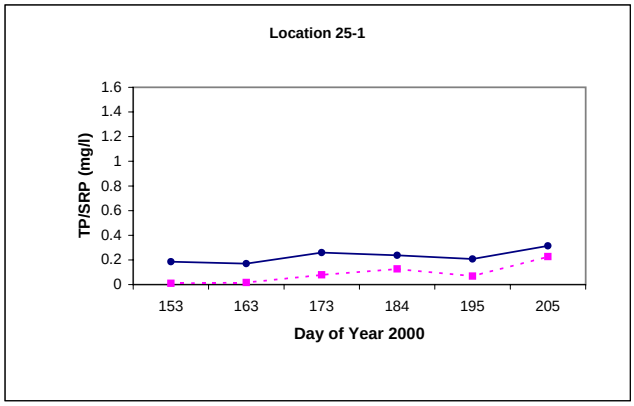

Location 32
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

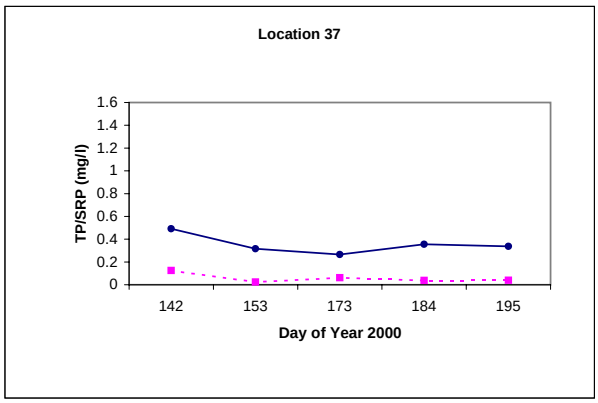

Location 24-1
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
142 163 184 205 226 248 289
Day of Year 2000

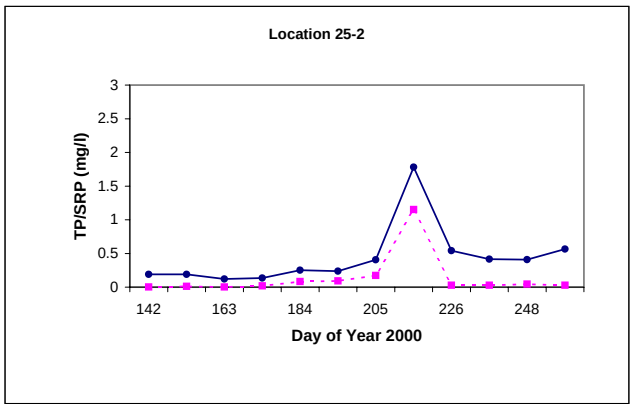

Location 33
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6 69 109 136 153 173 195 215 236 263
Day of Year 2000


Location 24-2
TP/SRP (mg/l)
3
2.5
2
1.5
1
0.5
0
142 163 184 205 226 248 289
Day of Year 2000

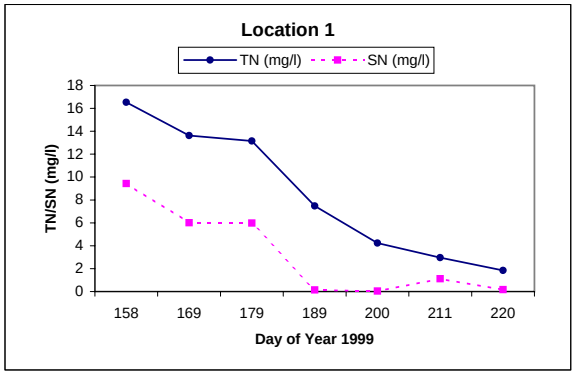

Location 34
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
38 94 121 142 163 184 205 226 248
Day of Year 2000

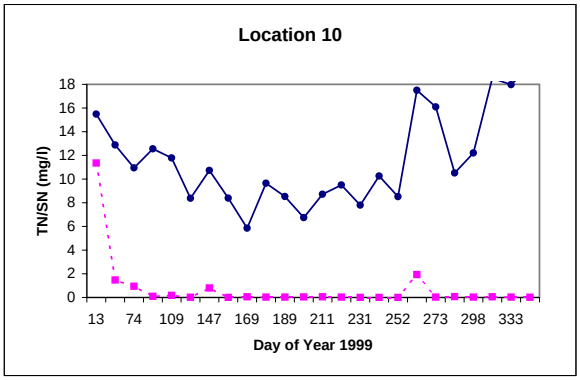

Location 25-1
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
153 163 173 184 195 205
Day of Year 2000

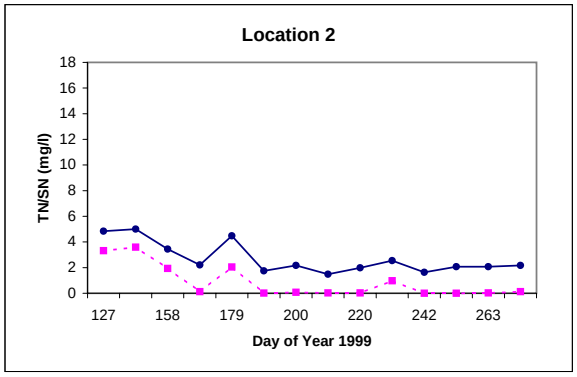

Location 37
TP/SRP (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
142 153 173 184 195
Day of Year 2000

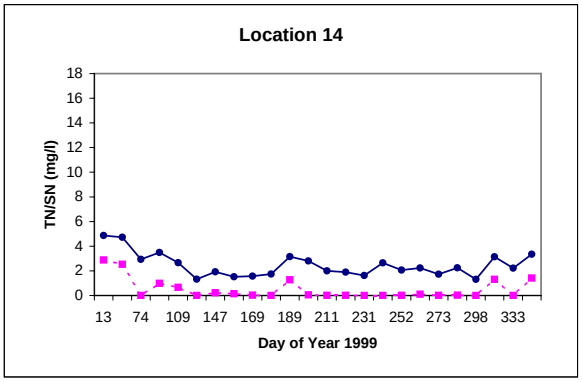

Location 25-2
TP/SRP (mg/l)
3
2.5
2
1.5
1
0.5
0
142 163 184 205 226 248
Day of Year 2000

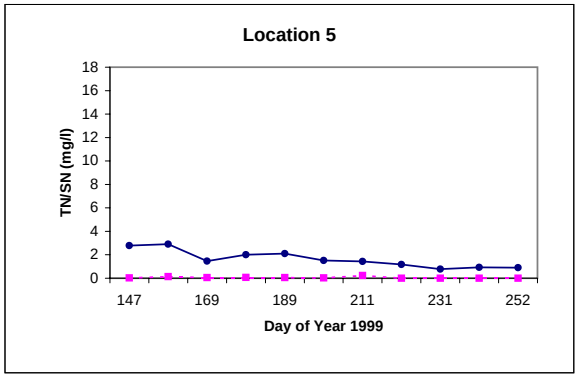
Appendix Figure 2A. Plots of mean TN and SN values for all locations during 1999 and 2000.

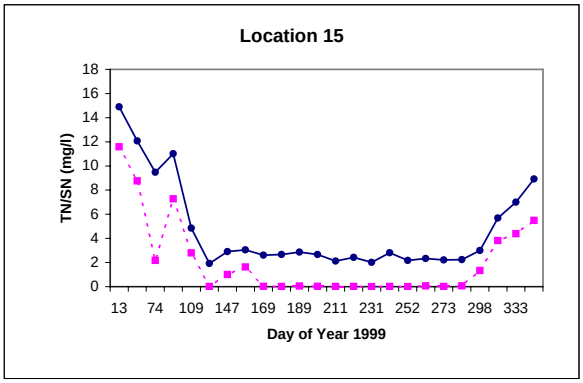


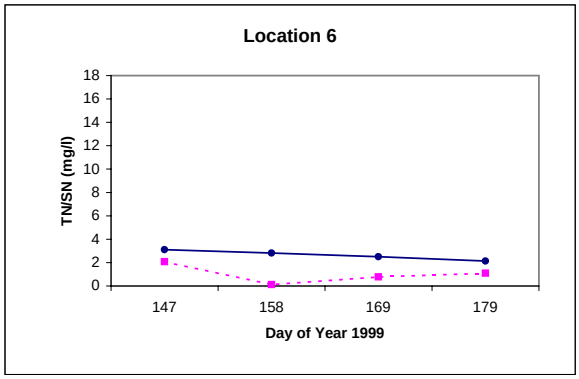


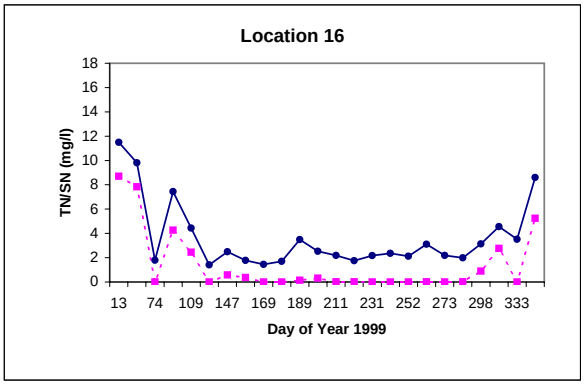


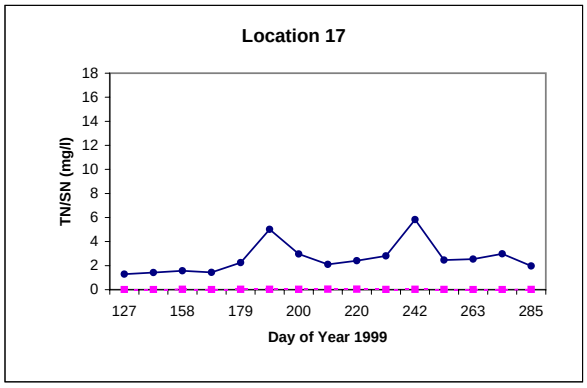


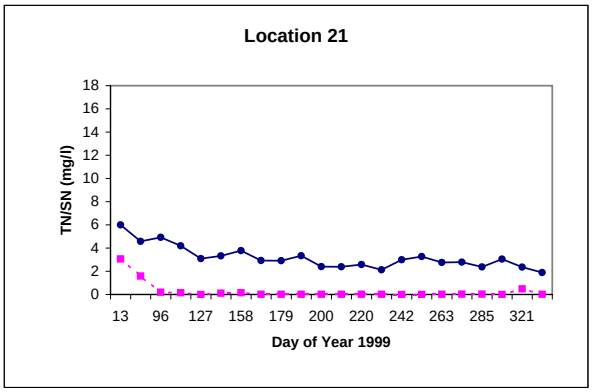


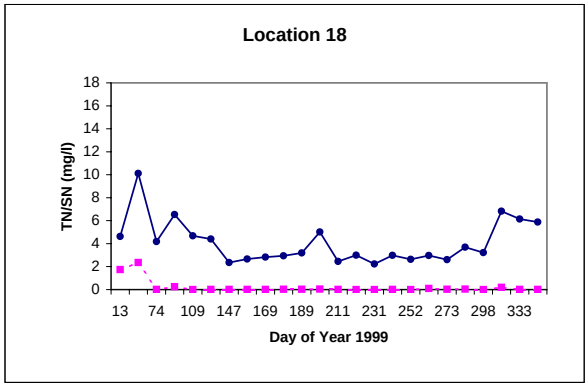


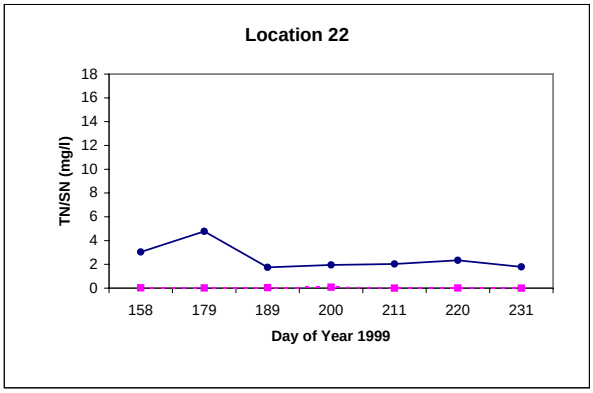


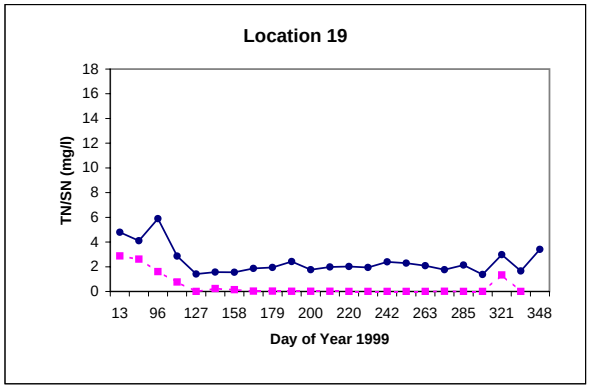


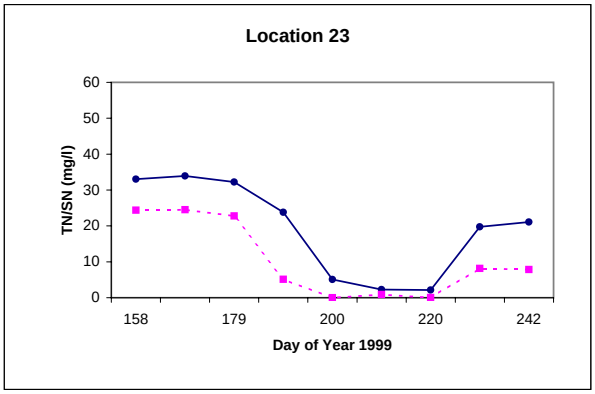

Location 17
TN/SN (mg/l)
0 2 4 6 8 10 12 14 16 18
127 158 179 200 220 242 263 285
Day of Year 1999

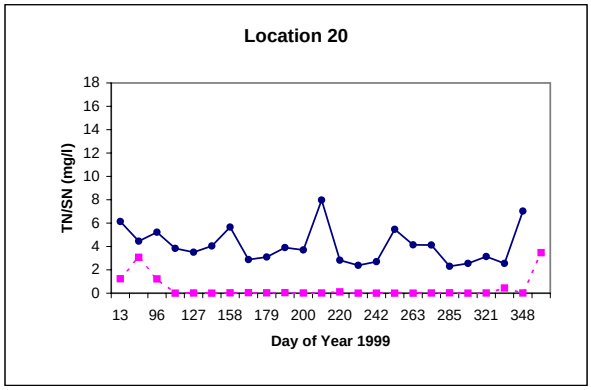

Location 21
TN/SN (mg/l)
0 2 4 6 8 10 12 14 16 18
13 96 127 158 179 200 220 242 263 285 321
Day of Year 1999

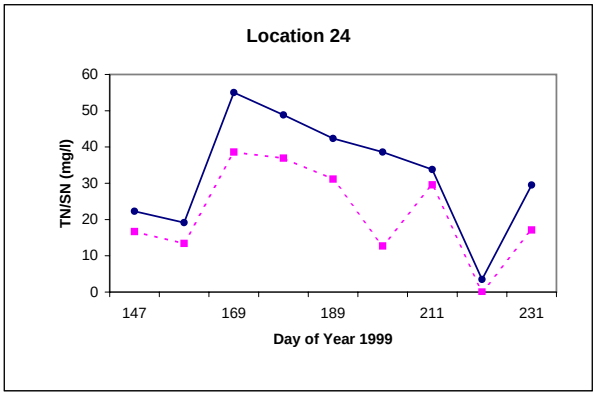

Location 18
TN/SN (mg/l)
0 2 4 6 8 10 12 14 16 18
13 74 109 147 169 189 211 231 252 273 298 333
Day of Year 1999


Location 22
TN/SN (mg/l)
0 2 4 6 8 10 12 14 16 18
158 179 189 200 211 220 231
Day of Year 1999


Location 19
TN/SN (mg/l)
0 2 4 6 8 10 12 14 16 18
13 96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999


Location 23
TN/SN (mg/l)
0 10 20 30 40 50 60
158 179 200 220 242
Day of Year 1999


Location 20
TN/SN (mg/l)
0 2 4 6 8 10 12 14 16 18
13 96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999


Location 24
TN/SN (mg/l)
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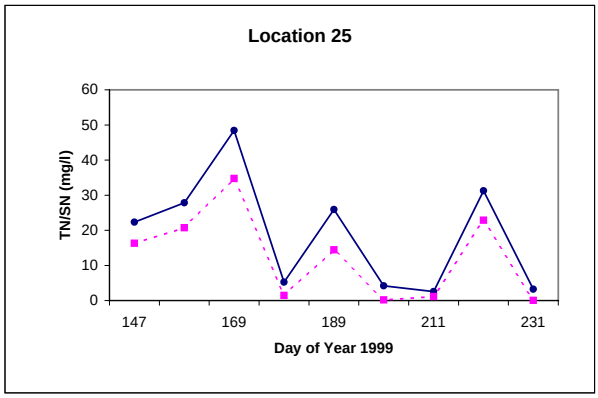
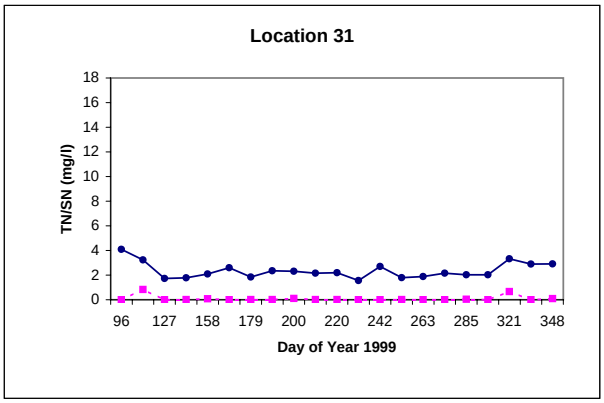
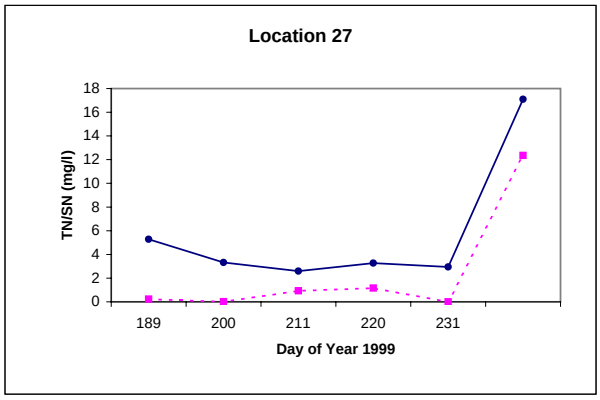
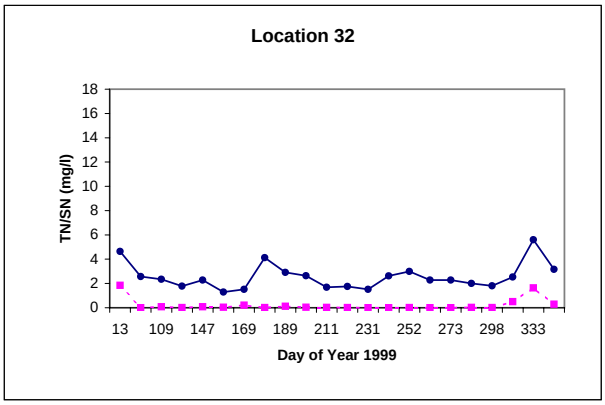
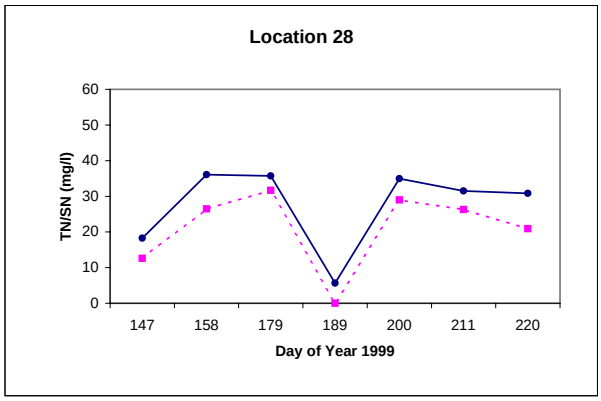
147 169 189 211 231
Day of Year 1999

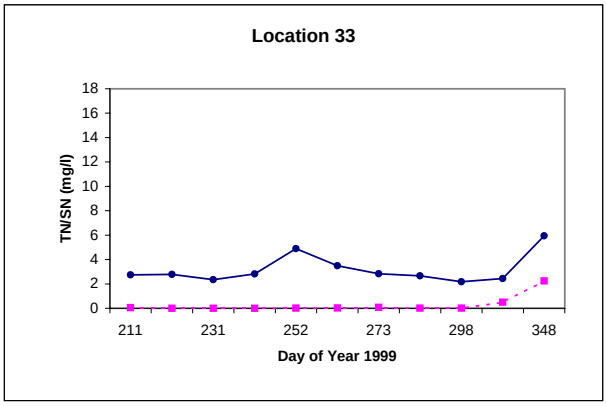

Location 25
TN/SN (mg/l)
60
50
40
30
20
10
0
147
169
189
211
231
Day of Year 1999

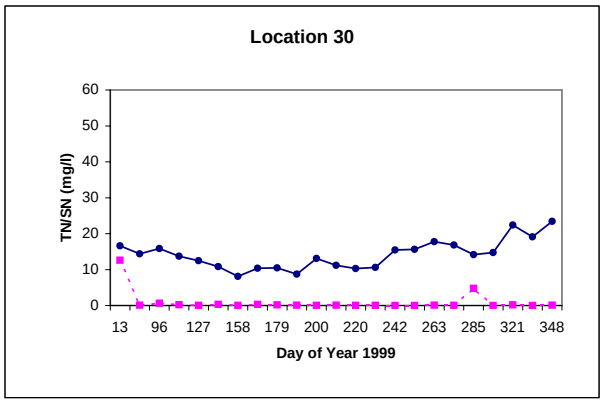

Location 31
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
96
127
158
179
200
220
242
263
285
321
348
Day of Year 1999

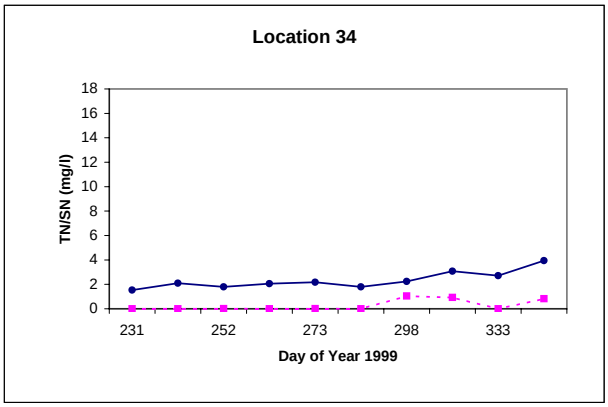

Location 27
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
189
200
211
220
231
Day of Year 1999

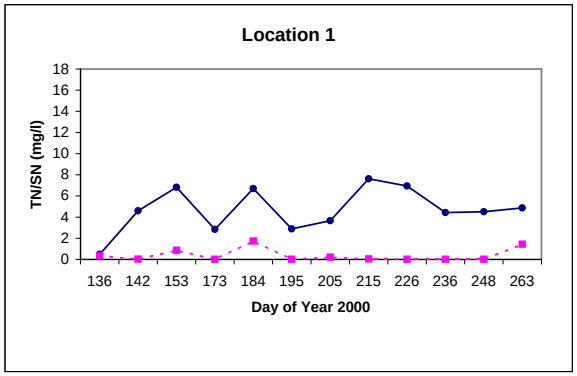

Location 32
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
13
109
147
169
189
211
231
252
273
298
333
Day of Year 1999

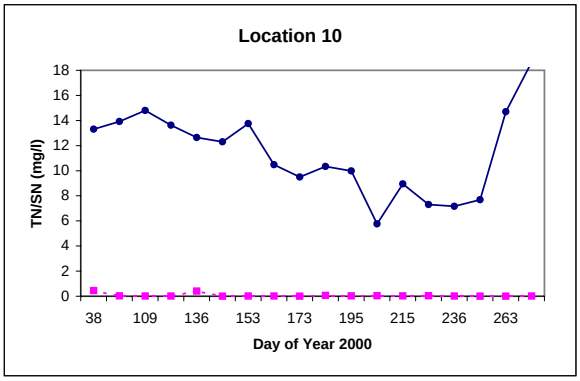

Location 28
TN/SN (mg/l)
60
50
40
30
20
10
0
147
158
179
189
200
211
220
Day of Year 1999

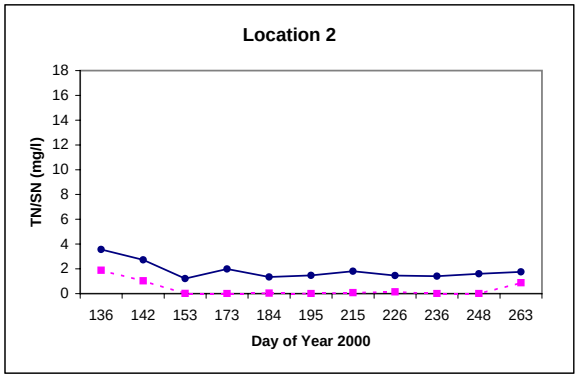

Location 33
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
211
231
252
273
298
348
Day of Year 1999

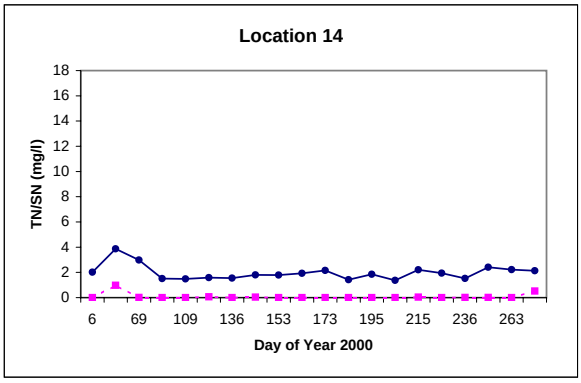

Location 30
TN/SN (mg/l)
60
50
40
30
20
10
0
13
96
127
158
179
200
220
242
263
285
321
348
Day of Year 1999

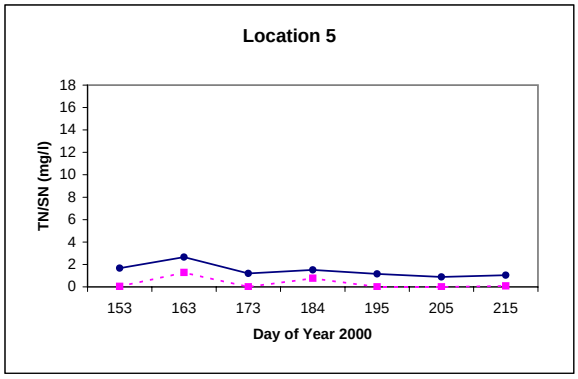

Location 34
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
231
252
273
298
333
Day of Year 1999

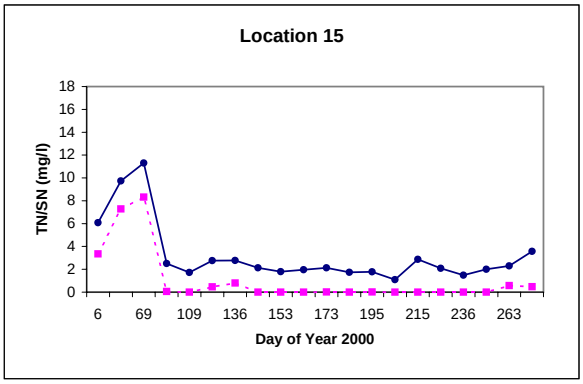

Location 1
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
136 142 153 173 184 195 205 215 226 236 248 263
Day of Year 2000

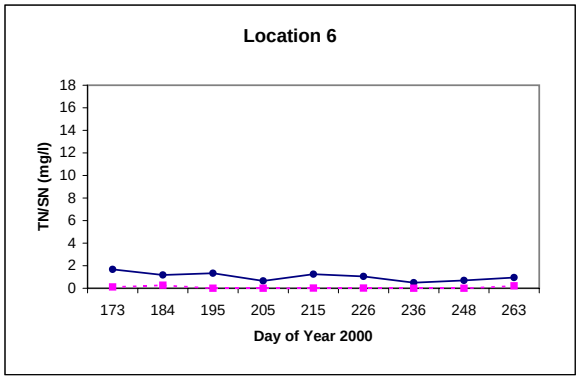

Location 10
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
38 109 136 153 173 195 215 236 263
Day of Year 2000

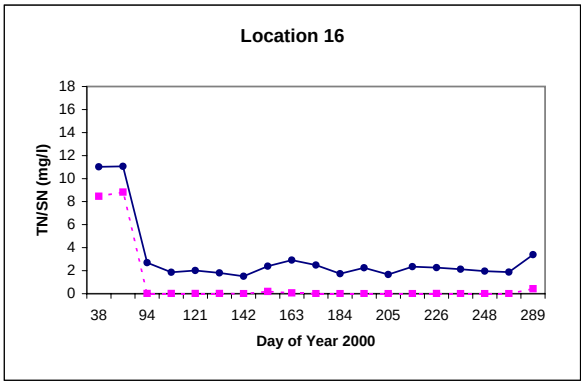

Location 2
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
136 142 153 173 184 195 215 226 236 248 263
Day of Year 2000

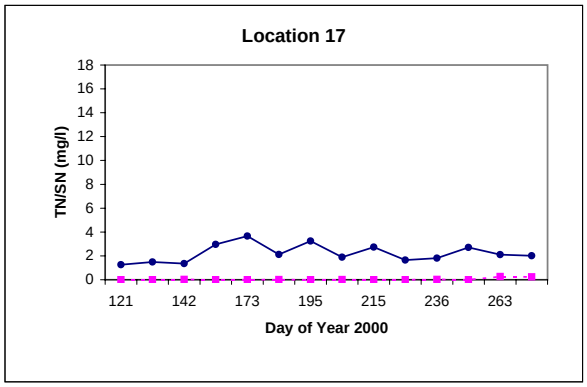

Location 14
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

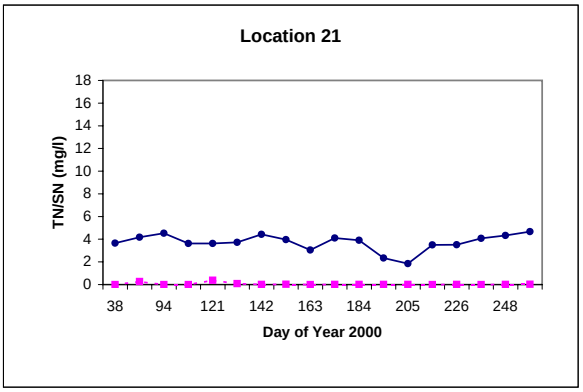

Location 5
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
153 163 173 184 195 205 215
Day of Year 2000

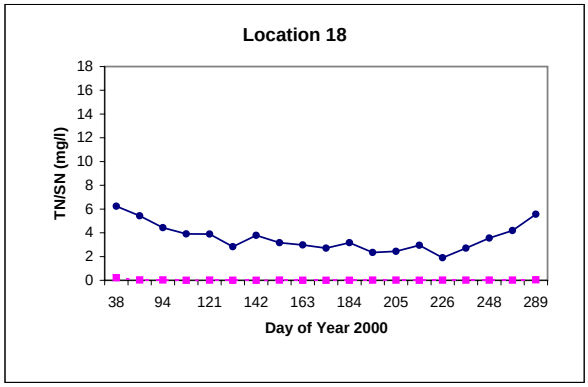

Location 15
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

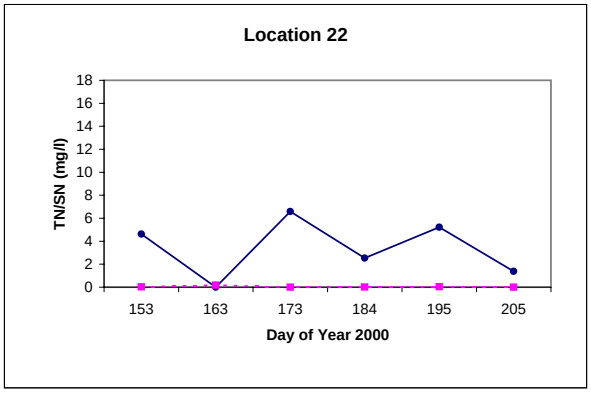

Location 6
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
173 184 195 205 215 226 236 248 263
Day of Year 2000

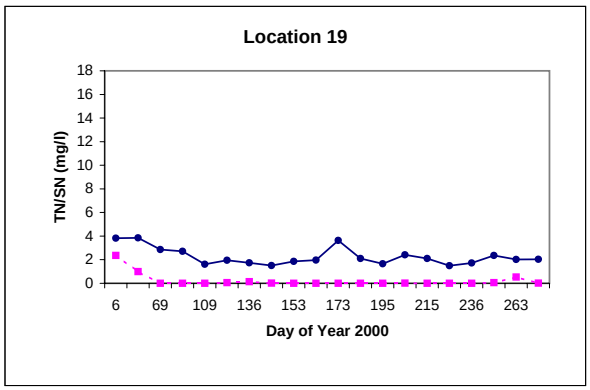

Location 16
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
38 94 121 142 163 184 205 226 248 289
Day of Year 2000

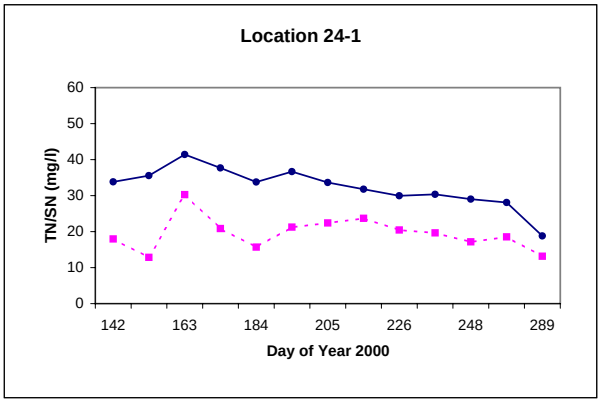

Location 17
TN/SN (mg/l)
0
2
4
6
8
10
12
14
16
18
121
142
173
195
215
236
263
Day of Year 2000

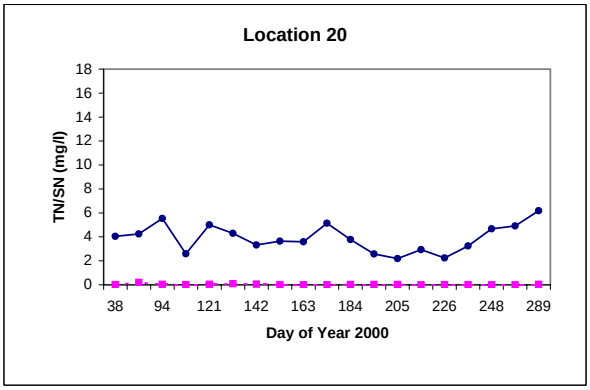

Location 21
TN/SN (mg/l)
0
2
4
6
8
10
12
14
16
18
38
94
121
142
163
184
205
226
248
Day of Year 2000

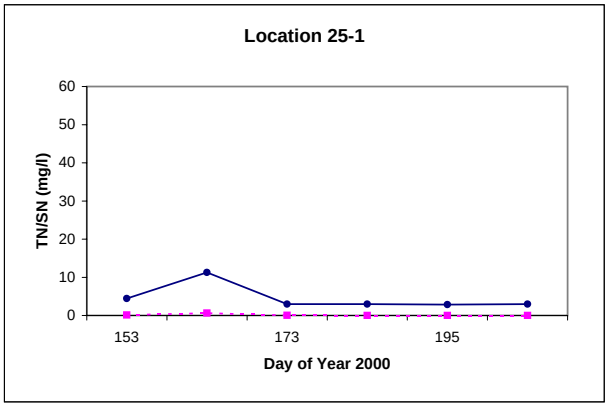

Location 18
TN/SN (mg/l)
0
2
4
6
8
10
12
14
16
18
38
94
121
142
163
184
205
226
248
289
Day of Year 2000

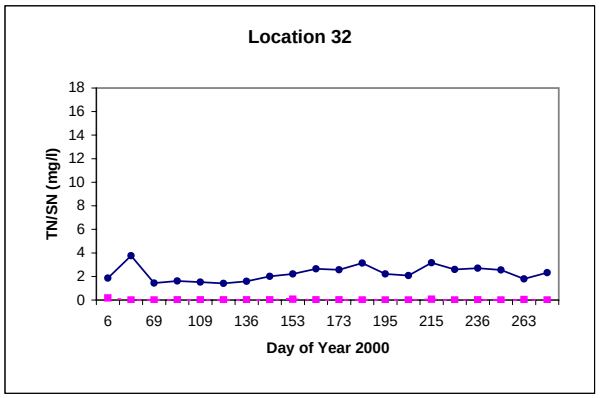

Location 22
TN/SN (mg/l)
0
2
4
6
8
10
12
14
16
18
153
163
173
184
195
205
Day of Year 2000

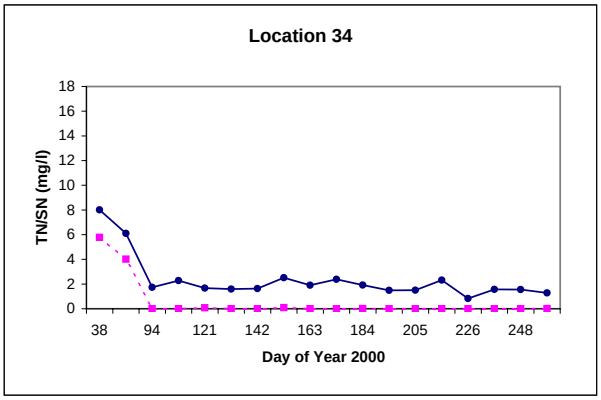

Location 19
TN/SN (mg/l)
0
2
4
6
8
10
12
14
16
18
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

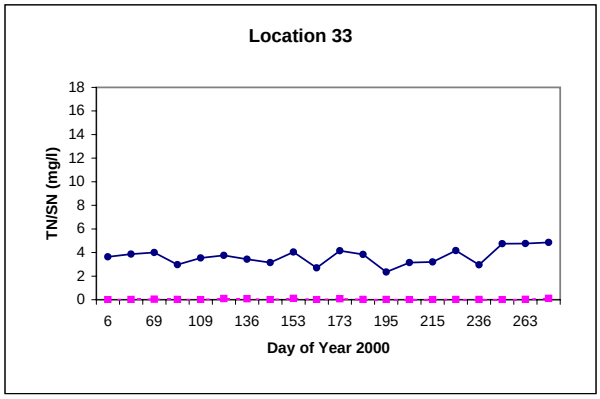

Location 24-1
TN/SN (mg/l)
0
10
20
30
40
50
60
142
163
184
205
226
248
289
Day of Year 2000

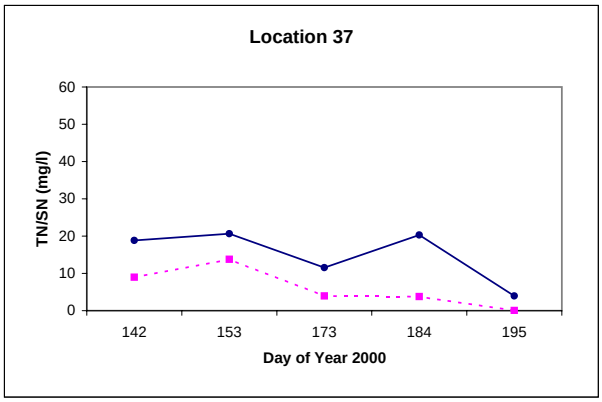

Location 20
TN/SN (mg/l)
0
2
4
6
8
10
12
14
16
18
38
94
121
142
163
184
205
226
248
289
Day of Year 2000


Location 25-1
TN/SN (mg/l)
0
10
20
30
40
50
60
153
173
195
Day of Year 2000

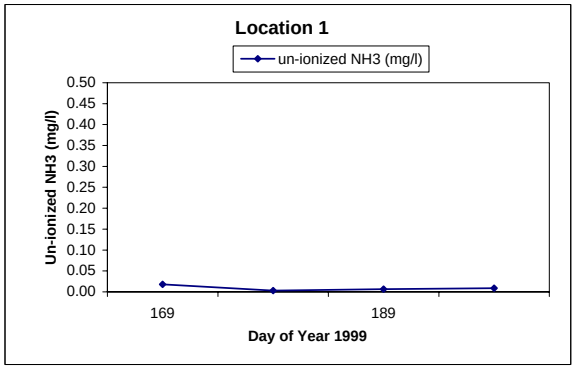

Location 32
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

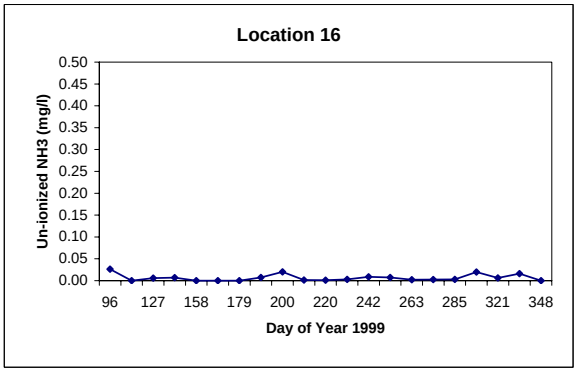

Location 34
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
38
94
121
142
163
184
205
226
248
Day of Year 2000

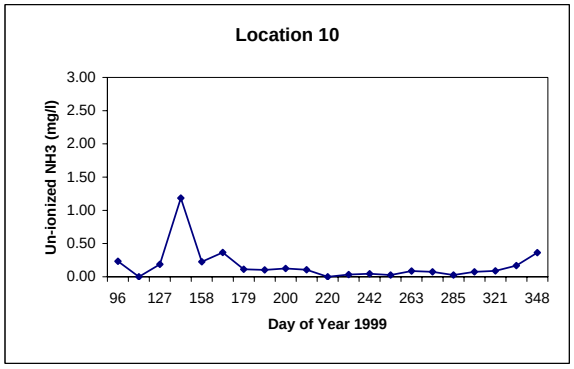

Location 33
TN/SN (mg/l)
18
16
14
12
10
8
6
4
2
0
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

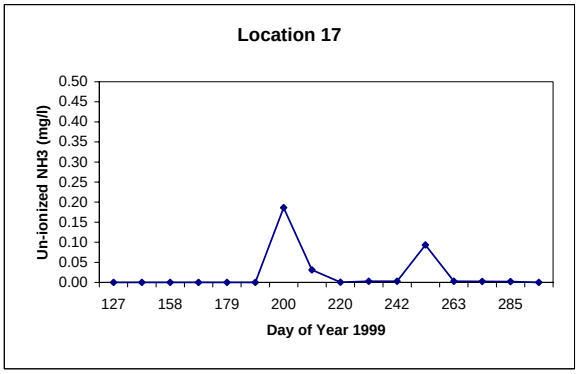

Location 37
TN/SN (mg/l)
60
50
40
30
20
10
0
142
153
173
184
195
Day of Year 2000

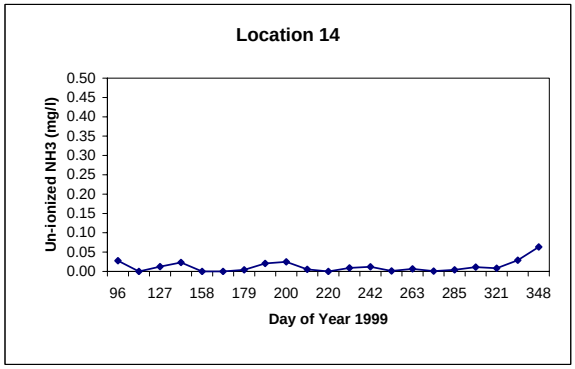
Appendix Figure 3A. Plots of mean NH3-N for all locations sampled in 1999 and 2000.

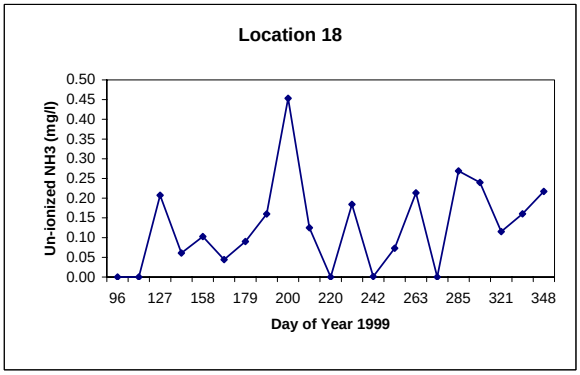


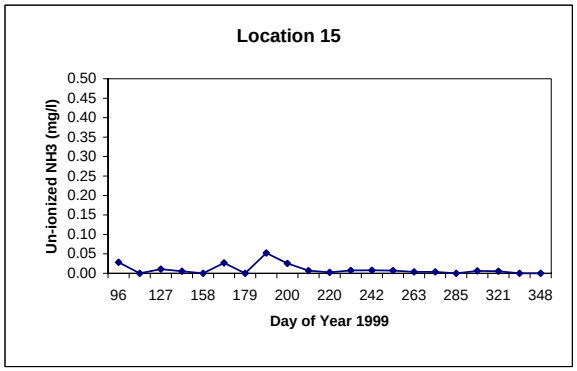


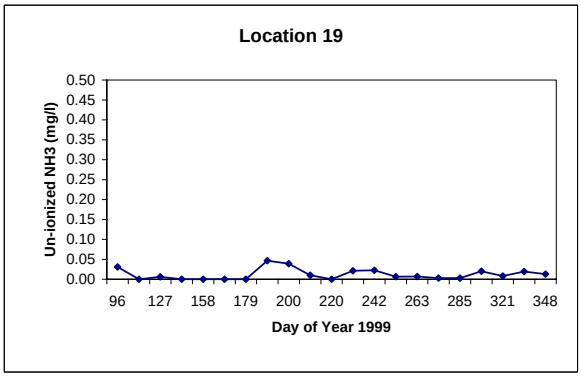


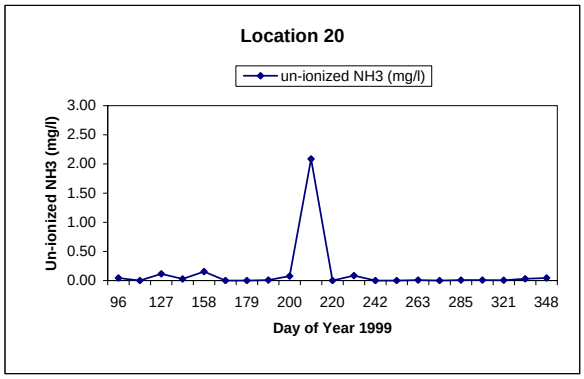


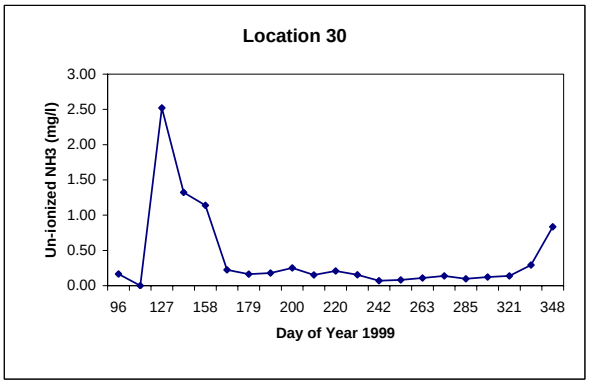


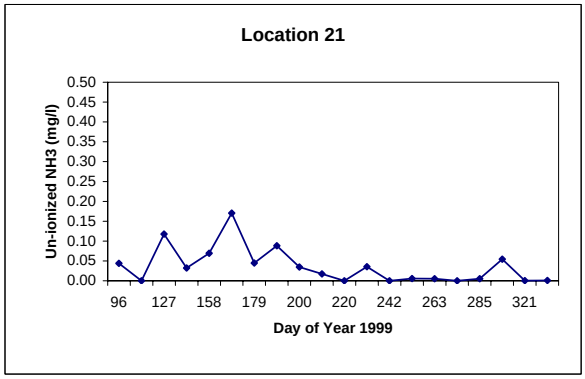


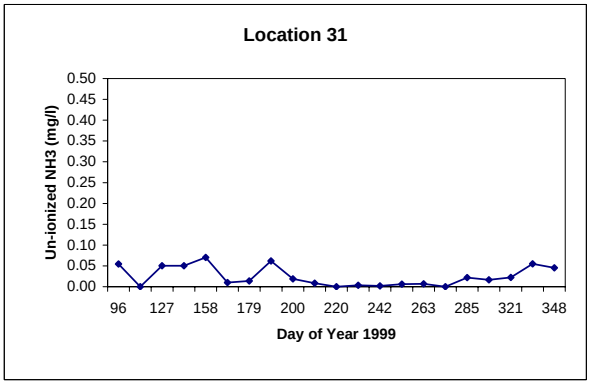


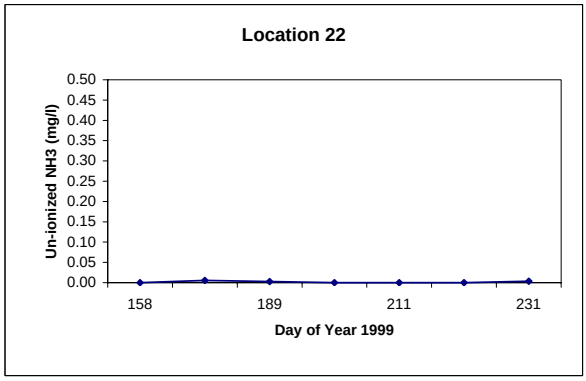


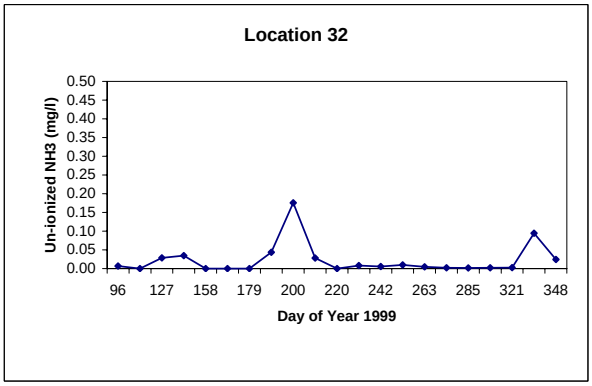

Location 20
un-ionized NH3 (mg/l)
Un-ionized NH3 (mg/l)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999

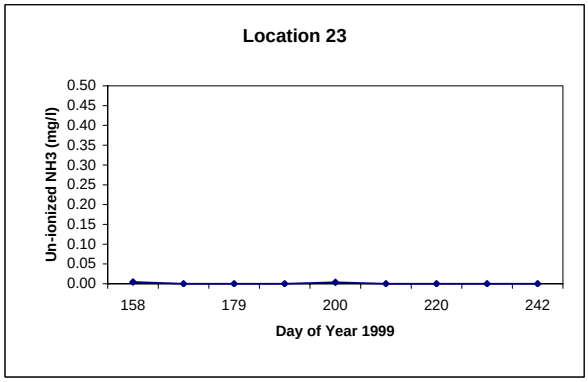

Location 30
Un-ionized NH3 (mg/l)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999

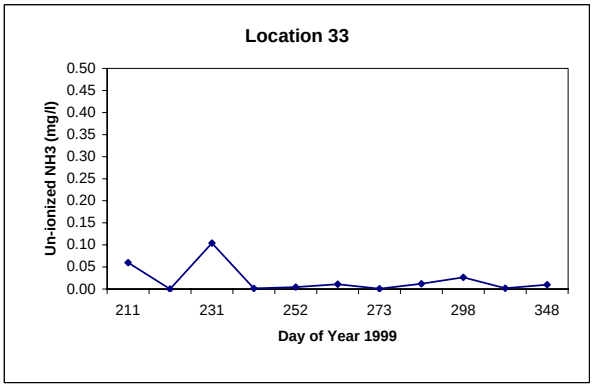

Location 21
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
96 127 158 179 200 220 242 263 285 321
Day of Year 1999

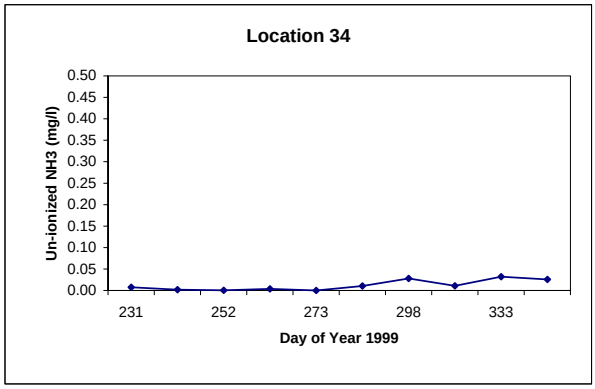

Location 31
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999

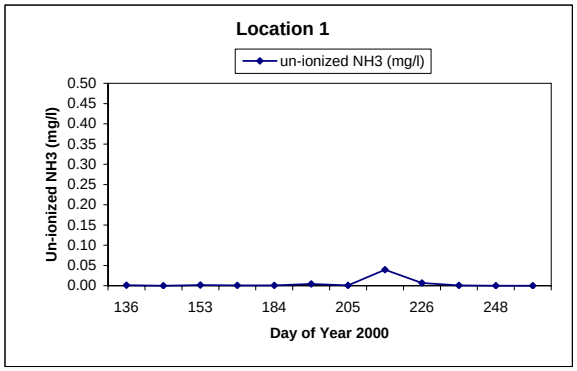

Location 22
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
158 189 211 231
Day of Year 1999

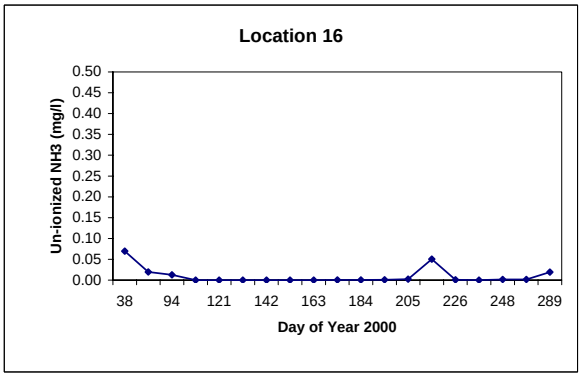

Location 32
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
96 127 158 179 200 220 242 263 285 321 348
Day of Year 1999

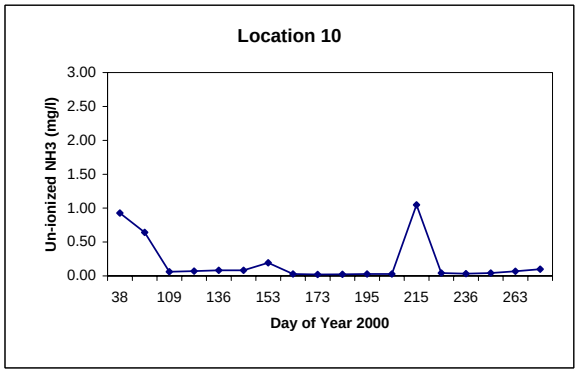

Location 23
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
158 179 200 220 242
Day of Year 1999

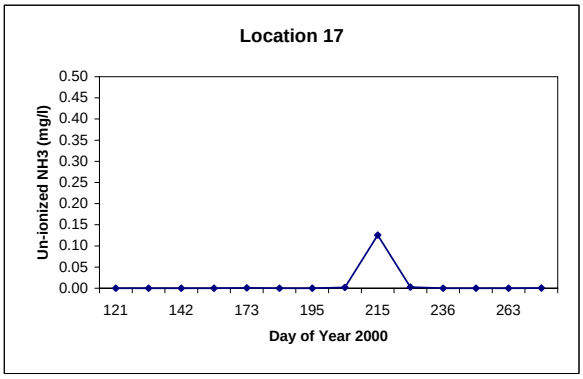

Location 33
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
211 231 252 273 298 348
Day of Year 1999

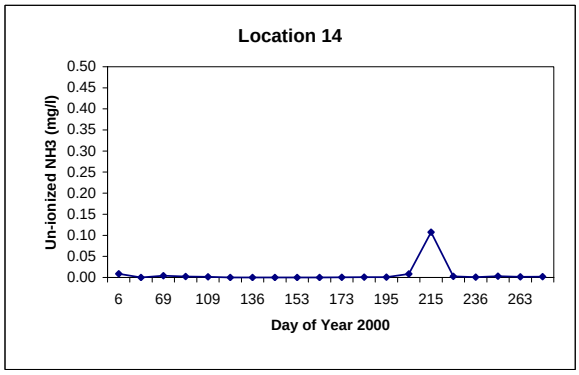

Location 34
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
231
252
273
298
333
Day of Year 1999

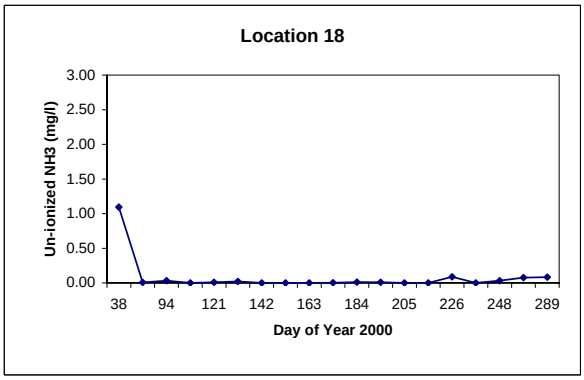

Location 1
un-ionized NH3 (mg/l)
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
136
153
184
205
226
248
Day of Year 2000

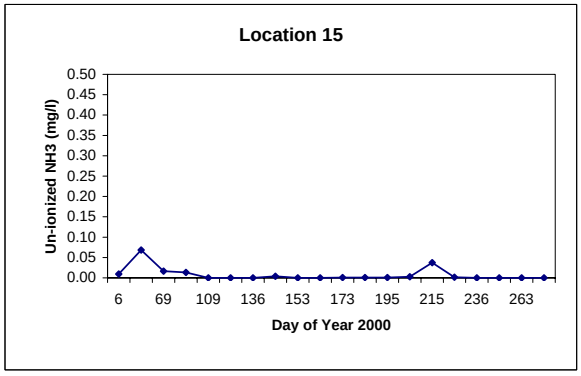

Location 16
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
38
94
121
142
163
184
205
226
248
289
Day of Year 2000

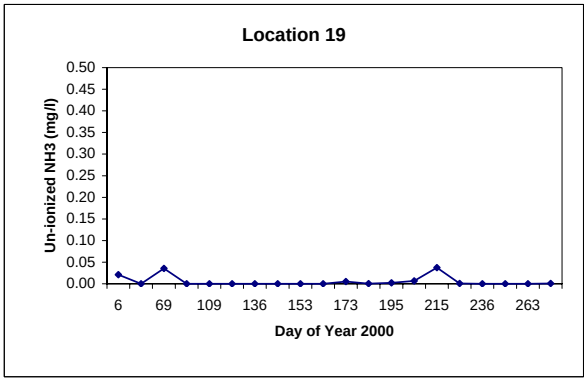

Location 10
Un-ionized NH3 (mg/l)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
38
109
136
153
173
195
215
236
263
Day of Year 2000

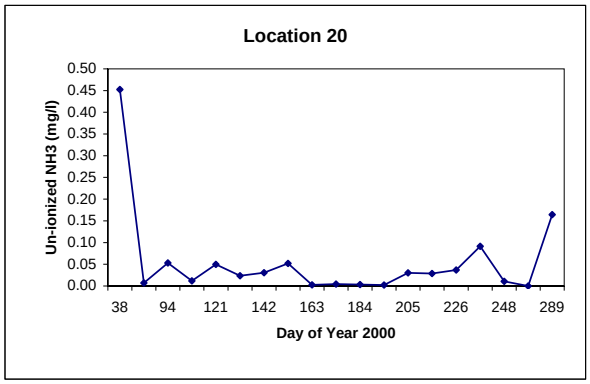

Location 17
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
121
142
173
195
215
236
263
Day of Year 2000

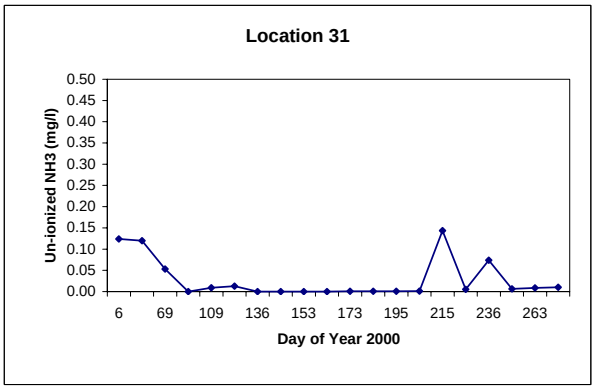

Location 14
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

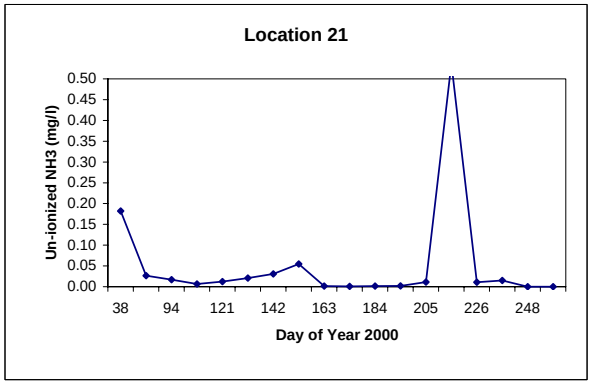

Location 18
Un-ionized NH3 (mg/l)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
38
94
121
142
163
184
205
226
248
289
Day of Year 2000

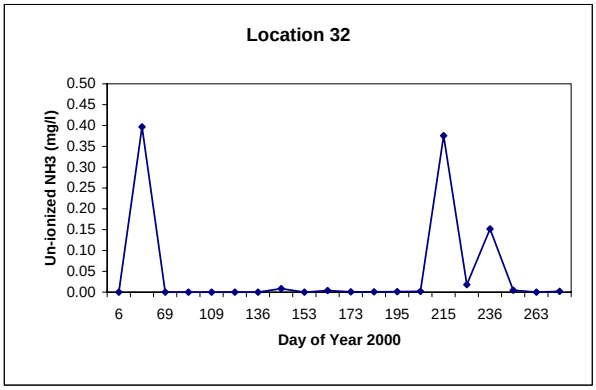

Location 15
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

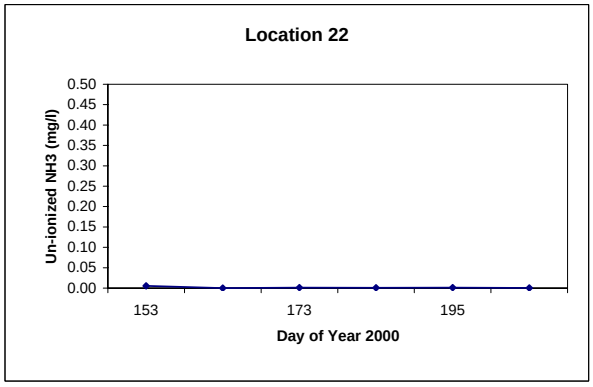

Location 19
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6
69
109
136
153
173
195
215
236
263
Day of Year 2000

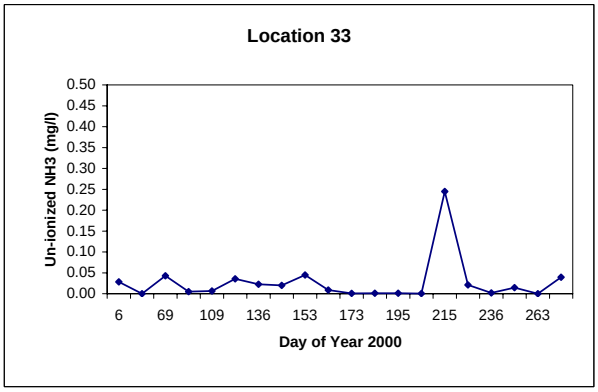

Location 20
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
38 94 121 142 163 184 205 226 248 289
Day of Year 2000

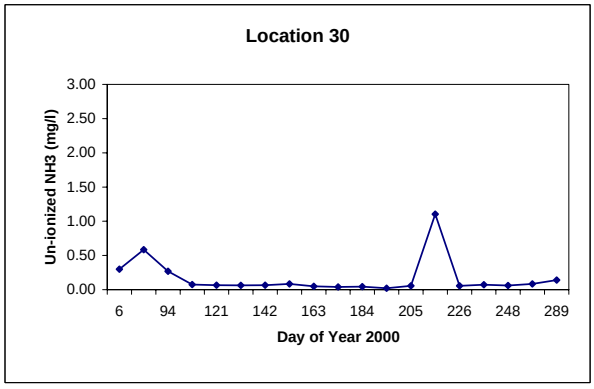

Location 31
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

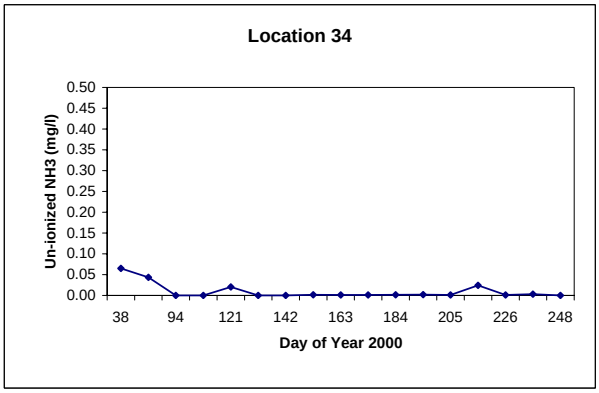

Location 21
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
38 94 121 142 163 184 205 226 248
Day of Year 2000

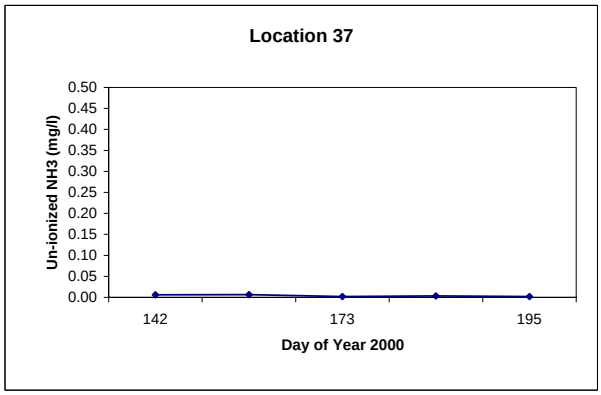

Location 32
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

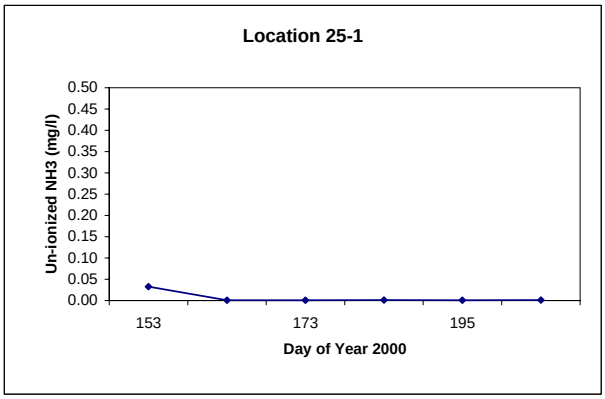

Location 22
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
153 173 195
Day of Year 2000

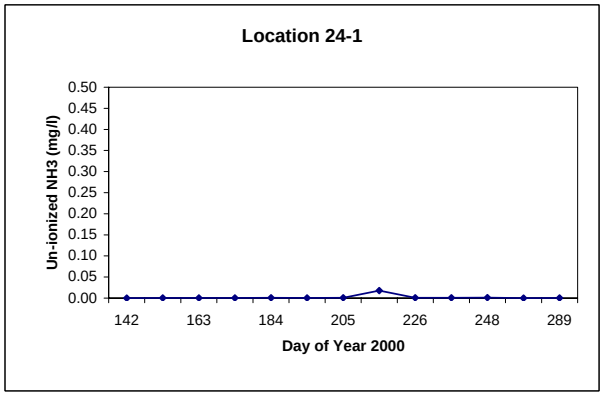

Location 33
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
6 69 109 136 153 173 195 215 236 263
Day of Year 2000

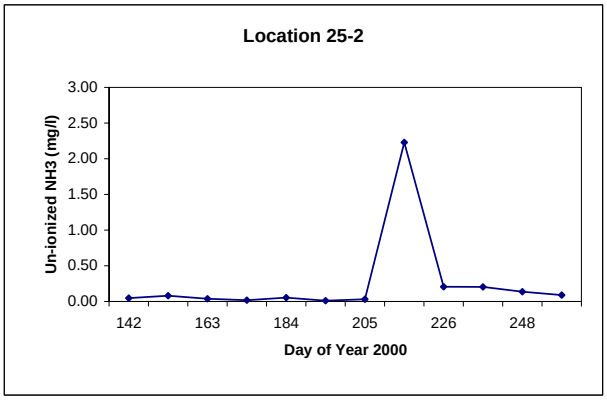

Location 30
Un-ionized NH3 (mg/l)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
6 94 121 142 163 184 205 226 248 289
Day of Year 2000

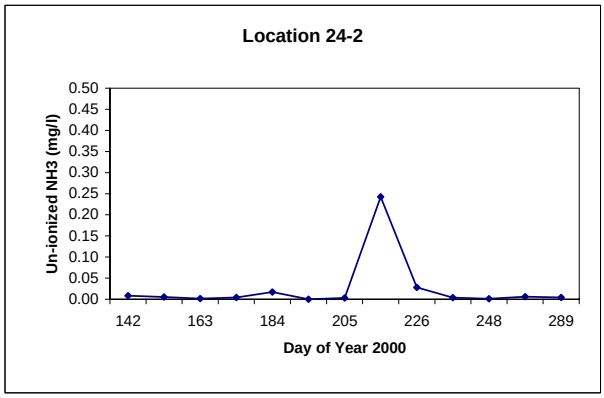

Location 34
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
38 94 121 142 163 184 205 226 248
Day of Year 2000


Location 37
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
142
173
195
Day of Year 2000


Location 25-1
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
153
173
195
Day of Year 2000


Location 24-1
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
142
163
184
205
226
248
289
Day of Year 2000


Location 25-2
Un-ionized NH3 (mg/l)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
142
163
184
205
226
248
Day of Year 2000


Location 24-2
Un-ionized NH3 (mg/l)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
142
163
184
205
226
248
289
Day of Year 2000