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LAKE AND RESERVOIR PRODUCTIVITY

April 1, 1992 to March 31, 1993

Project No.: F-73-R-15
Subproject No.: III
Study No.: IV

Job 1. Lake and Reservoir Limnological Data Base
Job 2. Review of Sportfish Yields

By

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TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF APPENDICES

JOB PERFORMANCE REPORT

State of: Idaho

Name: Lake and Reservoir Productivity

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Title: Lake and Reservoir Limnological Data Base

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ABSTRACT

This report provides a synopsis of limnological data for approximately 46 Idaho lakes and reservoirs. Standard water quality variables were collected from the late spring to early fall. Some variables were consistent during this time period (e.g. conductivity) while others showed a great deal of within season variability (e.g. temperature, dissolved oxygen concentration). Reservoirs in Southern Idaho (Regions 4 and **5)** stratified earlier than those in Northern Idaho (Regions 1 and 2).

Fall overturn in northern Idaho was quite pronounced.

The differences between Cascade and Lucky Peak reservoirs were also examined. Cascade Reservoir appeared to be more like a typical reservoir, with pronounced temperature and dissolved oxygen stratification occurring early in the season and being maintained throughout. Lucky Peak Reservoir was atypical in that it stratified early, but this stratification broke down during the re-filling of the reservoir through the summer. In August, the refilling stopped and stratification began to set up.

Zooplankton samples were analyzed for species composition and size structure. In many reservoirs, there did not appear to be any cropping of cladoceran populations. Time series information from Lucky Peak and Cascade reservoirs documented the changes in size structure through the season. Neither reservoir showed any effects of cropping.

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INTRODUCTION

Limnological data for Idaho lakes and reservoirs is, with the exception of some of the larger lakes in Region 1, limited primarily to single-year, single-waterbody investigations done by regional biologists. Other states, such as Wyoming and Colorado, have investigated relationships between limnological variables and fish production and factors affecting the latter, especially reservoir draw-down. They have established synoptic field efforts designed to collect these data on a state-wide scale. Need for a similar program in Idaho was prioritized by regional fishery managers.

Standardization of collection and analysis techniques is desirable. Presently, the only large-scale database for limnological information on Idaho's lakes and reservoirs is that compiled by Milligan et al. (1983). As an example of the need for standardized data sets and sampling protocols, the chlorophyll a data in this work were based on a single sample taken during the summer. The dynamics of phytoplankton production are well-known and peak during the times following spring and fall overturn. Therefore, a single value may not represent the summer mean.

Most of the game fish in Idaho lakes and reservoirs are second- or third-level consumers. As such, they feed upon zooplankton, zoobenthos, or fishes. Zooplankton populations are good indicators of grazing pressure, and therefore, indirectly, population size. This study will also determine the zooplankton composition of each lake and reservoir, and analyze the size structure to determine if cropping does occur.

The sampling effort will also eliminate variables which contribute little to the understanding of the relationship between fish yield and limnological factors (see Job 2). It has been demonstrated that depth-delineated nutrient and chlorophyll data did not increase the ability of the model to predict fish yields (Hanna and Peters 1991). This information allows the use of depth-integrated sampling for these parameters.

Goal - To use limnological information to determine fish production for acceptable fisheries.

OBJECTIVES

1. To conduct a statewide limnological sampling effort and standardize collection of limnological information.

2. To determine the seasonal sensitivity of limnological variables in selected reservoirs.

3. To compare limnological variation between Lucky Peak and Cascade reservoirs.

4. To compare zooplankton composition and size information to determine effects of cropping.

METHODS

Regional fishery managers prioritized study lakes and reservoirs. Three sampling stations were established in each water body, one in the deepest location (usually near the dam in reservoirs), and two others spaced as close as possible to the mid-section and upper end of each waterbody. Each lake or reservoir was sampled twice, when possible. The initial sample period lasted all of May. All lakes and reservoirs were sampled at this time. Waterbodies in Regions 4, 5, and 6 were sampled again in late June and early July (as part of the statewide *hatchery* trout evaluation). Lakes and reservoirs in the McCall subregion, and Regions 1 and 2 were sampled again in September. Lucky Peak and Cascade reservoirs were sampled weekly, starting in early June.

Depth-integrated water samples for nutrient analysis were collected using a 10 m long, 1.27 cm diameter piece of soft plastic tubing. Conductivity was measured at the surface at each station using a conductivity meter. Secchi transparency (in meters) was determined at each station. The depths at which the disk disappeared and reappeared were recorded and averaged. Waterbodies were considered to be eutrophic if Secchi transparency ranged between 0-3 m, mesotrophic from 3-7 m, and oligotrophic at depths greater than 7 m. Dissolved oxygen profiles were recorded at 1 m intervals (when total depth was 10 m or less), and at 5 m intervals at depths greater than 10 m, using a YSI dissolved oxygen meter. The meter was calibrated by Winkler titration of surface water samples. Temperature profiles were done at the same time, using the same meter and probe. Surface temperatures were calibrated using a hand-held thermometer.

A vertical zooplankton haul was done at the deepest station, using a .5 m net. Depth was determined using the dissolved oxygen probe and the net was lowered to either just off the bottom, or 50 m, whichever came first. The zooplankton samples were preserved in the field using 10% formalin.

Zooplankton samples were rinsed in the lab, then washed into a 250 ml beaker. We then took a 2 ml subsample using a Hensen-Stempel pipette. Organisms were then identified, counted, and measured. Cladocerans were identified to genus (i.e. Bosmina, Daphnia, Holopedium, Eurycerus, and Leptodora), measured, and enumerated. Copepods were simply identified as such and enumerated, as were rotifers. Cladoceran measurements were made as carapace length, not to the end of the spine. Cladocerans of 1.25 mm carapace length were probably about 1.5 mm in total length. We considered the presence of cladocerans greater than 1.25 mm in length (uncorrected) to be evidence that cropping did not occur (after Mills and Schiavone 1982 and Mills et al. 1987). Size groups of cladocerans ranged from .5-3 mm. Small size classes were considered to be those from .5-.75 mm. Moderate size classes were >.75 mm to <1.25 mm. Large were 1.25 mm and greater. Chlorophyll a samples were filtered and frozen in the field on dry ice; water for other nutrient samples were frozen at the same time and stored in a freezer at Eagle, Idaho. Total phosphorous, alkalinity, and chlorophyll a determinations will be done subsequent to completion of this report.

RESULTS

Temperature and dissolved oxygen profiles were similar in most sections of most reservoirs (Appendix A). Conductivity changed slightly, but this was probably the result of the precision of the instrument rather than appreciable changes in specific conductance. Secchi transparency demonstrated considerably greater variability than the above parameters (see data summaries in Appendix B).

In May, when sampling began, most of the waterbodies were not yet stratified, or stratification was just beginning. Late June/early July sampling in Southern Idaho showed that most of the waterbodies had become stratified and that oxygen depletion was occurring at lower depths (Appendix A Figures 4, 5, and 6). Subsequent sampling in the Northern portions of the State in September showed that stratification was maintained (Appendix A Figures 1 and 2, Appendix B).

An examination of the data from Lucky Peak and Cascade reservoirs showed weekly fluctuations in temperature and dissolved oxygen profiles and Secchi transparency, but no substantial changes in conductivity (Appendix A, Figure 3). These two reservoirs showed marked differences in temperature/dissolved oxygen profile patterns. Cascade Reservoir resembled the "typical" summer pattern for a lake or reservoir (Appendix A Figure 3). Stratification commenced in mid-May and showed marked discontinuities in dissolved oxygen throughout the summer. Alternatively, Lucky Peak Reservoir initially appeared to stratify through May and mid-June, but stratification broke down through the remainder of June, July, and mid-August (Appendix A Figure 3). Sampling concluded at this time. There were marked depth-related discontinuities in dissolved oxygen during the early part of June, with values as low as .4 mg/l at depths of 20-30 m (Appendix A Figure 3).

Conductivities were lowest in the oligotrophic lakes of northern Idaho (e.g. Hayden Lake, Spirit Lake, Granite Lake, and Dawson Lake)(Appendix B) and highest in some of the reservoirs of southern Idaho (e.g. Devil's Creek, Deep Creek, Twin Lakes, and Chesterfield) (Appendix B). Little seasonal variation was evident.

Observations of Secchi transparency showed marked temporal variation, and generally less marked spatial variation in all locations, although there were considerable differences in some waterbodies (Appendix B). The ranges seen at Cascade Reservoir, for example, were considerable both within and among stations (Appendix B). Station A showed the widest range (.4-2.8 m), and Station C the narrowest (.7-1.8 m). Lower values were obtained later in the season when the phytoplankton blooms appeared greater, decreasing light penetration. Lucky Peak Reservoir Secchi transparencies were less variable at Station 1 (near the dam). Station 2 samples, taken in the Silver Shores area, showed greater seasonal variation, probably due to greater sedimentation in that area. See the section of Regional Summaries (below) for an overview of limnology in the sampled lakes and reservoirs.

Zooplankton composition was not variable at the taxonomic level of this project as the majority of animals were cladocerans, copepods, or rotifers. Sizes did vary although the patterns were inconsistent (see below and

Appendix C). Samples were dominated by Bosmina and Daphnia (cladocerans) and Limnocalanus (copepod). The samples taken were non-quantitative, so any reference to numbers is strictly intra-sample, for comparing proportions only.

Zooplankton Results

Region 1

The zooplankton populations from lakes in this region had variable size structures. In early samples (late May) in this region, size groups of both Daphnia and Bosmina were small (<1.25 mm). The exceptions were Shepard and Cocolalla lakes. These lakes both had some larger Daphnia in both early and late samples. Rotifers were present in the late sample at Shepard Lake. Late samples in Hayden, Dawson, and Hauser lakes had large size classes of Daphnia present. Dawson and Hayden lake had moderate size Daphnia, while early samples from Hauser Lake contained the larger size classes of Daphnia. Both Dawson and Hauser contained a good representation of copepods. Late samples in the other lakes (Jewel, Granite, and Spirit) had small Bosmina and Daphnia. The late sample in Jewel Lake contained some large Daphnia, as did the late sample from Granite Lake (Appendix C).

Region 2

The reservoirs in this region were equally difficult to characterize. Spring Valley Reservoir and Lake Waha contained mainly small Bosmina and some small Daphnia (Lake Waha was sampled only during mid-September). Winchester Lake had some large (>1.25 mm) Daphnia early in the season (late May), as well as in the late sample (mid-September). Soldier's Meadow Reservoir contained larger Daphnia late in the season (mid-September). *Mann's* Lake had moderate-sized (1.0-1.25 mm) Daphnia during both sampling periods (Appendix C). Elk Creek and Moose Creek reservoirs were only sampled in mid-September and had small- to moderate-size classes of Daphnia and Bosmina.

Region 3

Bodies of water in this region generally *contained* large Daphnia. The exception was Deadwood Reservoir, which had only small Daphnia. Arrowrock had large Daphnia in early samples, while Lucky Peak Reservoir and Lake Lowell had large Daphnia throughout the summer (Appendix C).

McCall Subregion

With the exception of Horsethief and Cascade reservoirs, the zooplankton in most of the waterbodies in this region could be characterized as being small to moderate in size. Horsethief Reservoir had larger Daphnia in the early season (mid-May), but only smaller Daphnia by early September. Cascade Reservoir had larger size classes of zooplankton in June, July, and most of August but had declined to moderate to large by the end of August (Appendix C). The mid-May sample from Cascade Reservoir contained small Daphnia and Bosmina. The higher elevation waterbodies such as Goose Lake had only small Bosmina. Upper Payette and Little Payette lakes had only small to moderate-sized zooplankton, as did Warm Lake. Lost Valley Reservoir contained small Bosmina and large Daphnia early (mid-May), but had small to moderate-sized Daphnia in early September.

Region 4

Anderson Ranch and Little Wood reservoirs were characterized by moderate- to large-sized Daphnia in the early season (early May) and larger Daphnia later in the season. Anderson Ranch Reservoir also had some Leptodora, a large (8.5-9.5 mm) predaceous cladoceran in the late season sample. Magic Reservoir had small- to moderate-sized Daphnia early in the season, with larger Daphnia appearing in the late June sample. Salmon Falls Creek Reservoir had some larger Daphnia in the early sample (early May), which were mostly gone by early July. Lower Salmon Falls Reservoir had mostly small Bosmina, with a few small Daphnia and Eurycerus (another small cladoceran) in both the May and early July samples (Appendix C). Oakley Reservoir was sampled only in early July and had mainly copepods and a few small Daphnia.

Region 5

Most of the reservoirs in this region (Daniels, Blackfoot, Alexander, Treasureton, Twenty-four Mile, Deep Creek, Devil's Creek and Twin lakes) had moderate to large size class Daphnia in both May and June/July. Oneida Reservoir contained small- to moderate-sized Daphnia. Winder Reservoir had small to moderate sized Daphnia, but more small Bosmina in the later sample (Appendix C). Later samples from Daniels Reservoir, and Deep Creek, and Devil's Creek Reservoir contained moderate to large-sized Daphnia. Springfield Lake contained small Bosmina and Daphnia, but also a considerable size range of Eurycerus, including some large ones. Chesterfield Reservoir was only sampled in early May, but had a good representation of larger size classes of Daphnia.

Region 6

Island Park, Palisades, and Ririe reservoirs all contained moderate to large-sized Daphnia in May and June. Samples taken in Island Park reservoir in late August, just prior to treatment contained similar size classes. Palisades Reservoir did not have the larger size classes of Daphnia in May, but did so in June (Table II).

Weekly Sampling

Cascade and Lucky Peak reservoirs were sampled on a weekly basis, to determine variability in size classes through time. Both reservoirs had a wide range of large Daphnia size classes. Size composition became larger as the season progressed (Appendix C). The August 20, 1992 sample from Cascade Reservoir did show some loss of the larger size classes of Daphnia.

DISCUSSION

Objective 1 was fulfilled with the transcription of the data into a Lotus 1-2-3 data entry format. This allows the data to be entered into either a database management program (e.g. Dbase), or utilized by regional fishery managers and biologists in the spreadsheet format. It is also available to other agencies in this format, and can be easily adapted into the existing Idaho Department of Fish and Game Lake and Reservoir database (consisting primarily of data from Milligan et al. 1983).

Little horizontal variation in temperature and dissolved oxygen profiles was seen in any of the reservoirs studied (Appendix A). Temperature and dissolved oxygen profiles varied between sampling periods, but these variations are, for most direct management purposes, not of concern. A secondary function would be to determine the critical "crunch" period for fish habitat depletion. By the end of June in most of the reservoirs in Regions 4 and 5, low levels of oxygen were seen near the bottom. Most of these waterbodies had sufficient depth that this should not have posed a problem. Later in the season (late August), sampling in Island Park and Blackfoot reservoirs showed some bottom habitat available, compared with May. To more adequately document this decline in habitat and its potential effects would require more frequent monitoring in all waterbodies, which was (and is) beyond the current scope and capabilities of this project. In all examples where the data showed that stratification had occurred, temperature discontinuities moved up in the water column with time, as would be expected. These variables need only be recorded at a single station, preferably the deepest point in the reservoir.

The utility of obtaining weekly measurements lies in their inclusion in models of fish habitat depletion in draw-down reservoirs. This, with the exception of Lucky Peak and Cascade reservoirs, was also outside the scope of this project, but has been proposed as a possible direction for next year.

Specific conductance (or conductivity) did not show extensive spatial or temporal variation. This is expected as specific conductance measures the ionic concentration of the water, which should not change unless the surrounding soil and rock composition changes. This suggests that this variable need not be recorded at more than one station per reservoir. As is pointed out in the discussion of yield prediction models below, this may be the most important variable collected, as total dissolved solids is calculated from it as well.

Secchi transparency demonstrated sufficient spatial and temporal variability throughout the season, as to render it questionable for any sort of limnological assessment. Secchi transparency is dependent upon a number of factors (e.g. turbidity and primary productivity) which are known to be variable through time and under some influence from meteorological conditions. It appears to be very effective in oligotrophic situations for assessment of kokanee production (Rieman and Myers 1992), but is probably not so useful for productivity determination in Southern Idaho draw-down reservoirs. The vulnerability of this technique to wind-generated turbidity and cloudy conditions, for example, make it less precise. If a function for this variable can be determined, it probably needs to be recorded at a number of stations, at least in a larger reservoir such as Cascade or Lucky Peak reservoirs.

The zooplankton analysis is less easily interpreted. Mills and Schiavone (1982) and Mills et al. (1987) determined that the presence of any large zooplankters (specifically cladocerans greater than or equal to 1.5 mm in length) means that significant cropping has not occurred. As was pointed out in the Methods section, we measured carapace length as opposed to total length. Measurements are not strictly comparable between the two studies. Early season samples are somewhat deceptive in size structure, as growth is slow when water temperatures are low, and food supplies limited until the spring diatom increase (Wetzel 1975). Early samples from Cascade Reservoir contained only the smaller size classes of Daphnia, providing support for this idea.

Lakes and reservoirs with moderate- to large-sized (1.25-1.5 mm and greater) Daphnia probably do not show any effect of cropping. Some lakes and reservoirs showing potential cropping effects include Hayden, Spirit, and Jewel lakes in Region 1, Spring Valley Reservoir and Lake Waha in Region 2, Deadwood Reservoir in Region 3, Warm Lake, Little Payette Lake, Horsethief Reservoir, and Lost Valley Reservoir in the McCall subregion, and Oneida and Winder reservoirs in Region 5. A large number of other reservoirs have shown no apparent signs of cropping. This is unusual in that some of these (e.g. Twin Lakes, Cascade, Ririe, Palisades, and Island Park reservoirs) have large numbers of bluegill Lepomis macrochirus, yellow perch Perca flavescens, or Utah chub Gila atraria which may exert a great deal of grazing pressure on cladocerans.

If zooplankton cropping is to be considered as a primary factor in the decision to rehabilitate, it would be advantageous to have a clearer picture of numbers, change in size and density through time, and the amount of overlap and competition in diet between sport and nongame fishes. A single sample, taken non-quantitatively, is probably insufficient to characterize the trophic dynamics of a waterbody. It is effective as a snapshot of the broad-scale conditions. We may want to have a better understanding of the dynamics of our systems before we depend on any single piece of data to determine a management decision.

RECOMMENDATIONS

1. Discontinue extensive, statewide sampling as the information gained is insufficient for management purposes, as dissolved oxygen, temperature, Secchi transparency, and chlorophyll a need to be measured more frequently.

   Conductivity and alkalinity need only be measured one time during the season.

   A more appropriate format for limnological sampling would be to identify lakes and reservoirs of interest (these could be problem waterbodies or simply representatives of a certain type) and sample these on a more intense level. The work done in Cascade and Lucky Peak reservoirs has demonstrated that weekly sampling is probably sufficient for all variables, and less frequent sampling is probably optimal for most.

2. Take more zooplankton samples at more frequent intervals to determine if cropping occurs, and if so the spatial and temporal extent.

REGIONAL SUMMARIES

Region 1

The lakes in this region are mainly quite small, with the exception of Hayden Lake. Conductivities were generally lower than in other regions, but there did not appear to be the problems with temperature and oxygen, and potential loss of fish habitat seen in Regions 4 and 5. Secchi transparencies ranged from oligotrophic values in Hayden and Spirit lakes, to mesotrophic in places like Hauser, Cocolalla, and Jewel lakes, to eutrophic in Dawson and Shepard lakes. These values, especially in Shepard Lake, showed a great deal of seasonal variability. Shepard had Secchi transparencies bordering on oligotrophic in late May, and eutrophic in mid-September. Zooplankters were generally small, although Shepard and Cocolalla lakes had a good proportion of large Daphnia (Shepard Lake during both sampling periods, Cocolalla Lake only in mid-September). Hayden Lake appeared typical of a deep, cold, oligotrophic waterbody and had small, sparse zooplankters. The other lakes appeared to have experienced some cropping, as the size structure of the zooplankton populations is generally small.

Region 2

Lakes and reservoirs surveyed in this region are all small. Productivity is probably high (although it was not measured) as we saw phytoplankton blooms occurring in both spring and fall. Secchi transparencies in all systems were in the meso- to eutrophic range. Zooplankton population size-structure is generally small in Lake Waha and Spring Valley Reservoir, Waha probably because of the problems with sedimentation and the fish community (primarily warm-water species) and Spring Valley Reservoir due to its warmwater fish community. Mann's and Winchester lakes both had a relatively high proportion of larger zooplankters, as did Soldier's Meadow Reservoir. These are primarily put-and take lakes, as opposed to fingerling plants. Oxygen depletion may be a problem in the latter two reservoirs, as both are shallow and subject to irrigation draw-down.

Region 3

Lucky Peak Reservoir was somewhat surprising. The long period during which no stratification occurred was atypical of most reservoirs but was related to the continual drawing down and refilling during the summer. Zooplankton size classes remained large. Proportionally, the large zooplankters occupied a great deal of the sample. Arrowrock and Anderson Ranch reservoirs are both sources of water for Lucky Peak Reservoir later in the season. The continual drawing down and refilling of Lucky Peak Reservoir may explain the high percentage of large zooplankters we observed. Oxygen depletion occurs in the deeper sections of the reservoir late in the summer, when Anderson Ranch and Arrowrock reservoirs have been draw-down sufficiently so that little water comes in to Lucky Peak Reservoir.

Deadwood Reservoir showed signs of cropping. The zooplankters were small. Considerable numbers of kokanee salmon Oncorhynchus nerka, Atlantic salmon Salmo salar, and mountain whitefish Prosopium williamsoni - all planktivorous at some stage of their life cycle - reside in this reservoir. It may prove useful to monitor the growth of these species to see if cropping is a real concern. Observed conductivities and Secchi transparencies are more characteristic of an oligotrophic system. Temperatures were cool and there were no signs of severe oxygen depletion in mid-July.

Lake Lowell has the characteristics of a typical shallow, eutrophic lake. Temperatures were warm in May, but oxygen depletion was not a problem. Secchi transparencies in both May and July and personal observations suggest that it is quite productive, as a phytoplankton bloom was going on through the summer. Zooplankton size classes were variable, with good representation of the larger size classes. By July, stratification had been set up, and oxygen depletion was occurring at the lower depths. This coincided with the extensive draw-down of the system.

Arrowrock Reservoir was only sampled in early May, as it was very quickly drawn down to run of the river. During this time, zooplankters were large and water was generally cool. Secchi transparencies were in the meso-trophic range, and there was a great deal of oxygen throughout the water column.

McCall Subregion

Lakes and reservoirs in this region are highly variable in their physiography, and therefore, their limnological characteristics. Some of the higher elevation waterbodies (Goose Lake, Granite Lake, and Brundage Reservoir), could be considered more oligotrophic. They are quite cool, even late in the season, with low conductivities. Brundage Reservoir had Secchi transparencies that were uncharacteristic of an oligotrophic system. It is likely that the shallow nature of the above small waterbodies keeps them from being oligotrophic. They showed no signs of severe oxygen depletion.

Warm Lake, although located at a higher altitude, was not so oligotrophic, and experienced some oxygen depletion near the bottom early in the season. Secchi transparencies were remarkably consistent, and were more indicative of a mesotrophic system.

Lost Valley, Horsethief, and Cascade reservoirs were all meso-to eutrophic. Lost Valley Reservoir was interesting in that May Secchi transparencies were characteristic of an oligotrophic waterbody but by September they were those of a eutrophic system. A defective dissolved oxygen meter prevented us from taking any measurements of temperature and dissolved oxygen in the fall. Fall surface values for all these waterbodies appeared comparable, but were not low. In August, Cascade Reservoir showed definite signs of oxygen depletion at lower depths. Cascade and Horsethief reservoirs had populations of larger zooplankters, at least at the start of the summer. Horsethief showed definite signs of cropping by the end of the summer. Cascade showed some loss of the larger size classes of Daphnia by the end of the season.

Region 4

Lakes and reservoirs in this region also showed a great deal of physiographic variability. Anderson Ranch and Little Wood reservoirs were lower in conductivity and slightly more oligotrophic than were Magic, Salmon Falls Creek, Lower Salmon Falls, and Oakley reservoirs. All had moderate to high conductivities, though not as high as those in Region 5. All began the season with moderate to high levels of dissolved oxygen. Relatively high dissolved oxygen were maintained through June and early July, despite continued draw-down and warmer temperatures.

Secchi transparencies in Anderson Ranch and Little Wood reservoirs were indicative of meso- to oligotrophic systems in the early season and eutrophic by late June/early July. The remaining waterbodies were all eutrophic, according to this variable.

Magic, Little Wood, and Anderson Ranch reservoirs all had the larger size classes of Daphnia; Magic Reservoir in the later sample period, and the other two reservoirs during both sample periods. The fish communities of these reservoirs are primarily salmonid. These reservoirs would not be expected to have as much cropping (although Anderson Ranch Reservoir does have populations of planktivorous kokanee salmon and mountain whitefish) as they would with populations of yellow perch.

The other reservoirs have more diverse fish communities. Lower Salmon Falls Reservoir, with its populations of planktivorous redside shiners Richardsonius balteatus, speckled dace Rhinichthys osculus, and yellow perch, would be expected to show evidence of cropping and did. Oakley Reservoir also has large populations of redside shiners, which would have an impact on the zooplankton populations.

Region 5

With the exception of Blackfoot and Oneida reservoirs, the reservoirs in Region 5 were all small, high conductivity waters. The above-mentioned larger reservoirs also had high conductivities. All had warm temperatures, and low dissolved oxygen near the bottom, early in the season, as temperature stratification had already begun. The oxygen levels continued to decline into Late June/early July. There appeared to be sufficient oxygen to carry over fish through August, after which temperatures could be expected to decline. Blackfoot Reservoir still had dissolved oxygen concentrations of greater than 3 mg/l in late August, despite being extremely shallow. This may have been the result, in part, of the late August cold snap in Southeastern Idaho. Secchi transparencies in all reservoirs were in the eutrophic range.

Blackfoot, Deep Creek, Devil's Creek, Daniels, and Twin Lakes reservoirs all had moderate to large Daphnia, at least early in the season - Blackfoot Reservoir continued to have the larger size classes throughout the summer. The last four are primarily hatchery catchable and fingerling reservoirs, although Twin Lakes Reservoir has a substantial population of small bluegill.

Oneida, Alexander, and Winder reservoirs and Springfield Lake had small- to moderate-sized Daphnia and Bosmina, Oneida Reservoir during the month of May. Oneida Reservoir has populations of yellow perch and green sunfish Lepomis cyanellus, which may account for this cropping. Winder Reservoir, with its populations of smallmouth bass Micropterus dolomieui, bluegill, yellow perch, and green sunfish (and hatchery catchables) should and does, show the same phenomenon. Springfield Lake has large Eurycerus, which probably provide the same sort of fish food as Daphnia.

Region 6

The three reservoirs sampled in this region (Island Park, Ririe, and Palisades) had moderate to high levels of oxygen early in the summer. Ririe Reservoir showed some depletion later in the season. Temperatures were cool in the early season, but warmed by late June/early July. While the lower levels for Ririe Reservoir were out of the preference range for trout, there still remained sufficient supplies of oxygen for survival and avoidance of anoxia during the day. All three reservoirs had high conductivities and could be expected to be moderately productive. Secchi transparencies were in the mesotrophic range, although Palisades Reservoir in early May was nearly oligotrophic.

All three reservoirs had large size classes of Daphnia during the summer, Palisades Reservoir only during late June. Island Park Reservoir samples taken during late August still had large Daphnia. This suggests that cropping is not a problem in any of these reservoirs, despite suspected high populations of non-game fishes (primarily Utah chub and Utah suckers Catostomus ardens) in all three. This may require re-evaluation of the perceived relationship between some non-game fishes and cropping. Marrin and Erman (1982) found this to be the case when they examined the relationship between tui chub Gila bicolor, Sacramento suckers Catostomus occidentalis, and native rainbow trout O. mykiss in a California reservoir.

JOB PERFORMANCE REPORT

State of: Idaho

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ABSTRACT

The various empirical equations for prediction of fish yields are reviewed and evaluated in light of their utility for Idaho reservoirs and lakes. Idaho Department of Fish and Game management reports were reviewed and information from creel surveys used to calculate yields for a number of lakes and reservoirs in the state. Limnological variables collected for Job 1 were utilized in a number of these equations and compared with the actual yields. As a rule, estimates of sportfish potential yield were higher than actual. It was concluded that in the absence of waterbody-specific models, MEI-based predictive equations were probably most useful. The feasibility of utilizing other habitat-based models for lake and reservoir productivity is also discussed.

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INTRODUCTION

The relationship of limnology to fish production has been recognized since the early 20th century (Leach et al. 1987). Ryder (1965) developed the morphoedaphic index, an empirical regression model relating fish production (as yield) to total dissolved solids, as a quick way to determine the potential productivity of a system. Ryder then applied the model to 23 northern-temperate lakes to successfully estimate potential fish production. A number of more recent empirical models have been devised utilizing other lake productivity variables (eg. chlorophyll a, phosphorus, zooplankton biomass and particle size). These do not appear to have the universal applicability of the morphoedaphic index (see Leach et al. (1987). Modifications to the morphoedaphic index have been proposed, most importantly the inclusion of a regression component rather than a ratio (Schneider and Haedrich 1987; Rempel and Colby 1991).

The greatest use of empirical models is in the estimation of potential fish harvest (or yield) in bodies of water where the detailed trophic data such as primary and secondary production rates, fish feeding data, standing crops, and growth desired for such predictions are unavailable (Ryder et al. 1974; Leach et al. 1987). These potential yields will enable managers to compare the body of water of interest with those having similar characteristics, and determine factors influencing production. This predictive capability, in turn, allows evaluation of current management strategies (is an individual waterbody achieving its potential?). A comparison of actual and potential yields will also aid in future management direction.

OBJECTIVES

1. To review the literature on empirical models for the prediction of fish yields.

2. To assess the productivity of Idaho's lakes and reservoirs using a variety of physiographic and biological variables, use these data to predict potential fish yields, and develop a mechanism enabling managers to quickly evaluate the potential and status of their fisheries.

3. To utilize the limnological variables collected in Job 1 in existing empirical equations and calculate potential yields.

4. To calculate yields from literature (IDFG reports) to compare with potential yields from above.

METHODS

We reviewed the available literature to determine the most applicable models for our purposes. Existing empirical equations were used to calculate potential fish yields for Idaho waters. These include the Morphoedaphic index (Ryder 1965;

Matuszek 1978; Schlesinger & McCombie 1983), chlorophyll a (Oglesby 1977; Jones & Hoyer 1982; Oglesby et al 1987), and total dissolved solids (Guenther 1989). The last equation predicts standing stock, so it is included only as an example in this study.

Chlorophyll a and total phosphorous values were taken from Milligan et al. (1983). Conductivity values (for calculation of total dissolved solids) were taken from the present study (Job 1).

Actual yields were generated by examination of old IDFG reports for complete creel census data (opener to November). Census years varied from 1976 to 1989. Harvest information was evaluated as to species composition. Hatchery catchable trout stocked the same year as the census were not included in yield calculations. Fish were not generally weighed during these censuses, so mean weight for mean length had to be taken from other sources (ie. Carlander 1969).

A total of 10 reservoirs and lakes had creel censuses that provided adequate length data. These are Coeur d'Alene Lake, Mann's Lake, Lake Waha, Anderson Ranch Reservoir, Arrowrock Reservoir, Cascade Reservoir, Blackfoot Reservoir, Island Park Reservoir, Ririe Reservoir, and Palisades Reservoir. These actual yields were then paired with potential yields and an attempt made to determine any reasons(s) for the disparities in the numbers (see equations in Table 1).

RESULTS

Synopsis of Current Yield Models

Criticisms of the morphoedaphic index usually focus on the relationship of total dissolved solids to productivity. Oglesby (1977) stated that the relationship of total dissolved solids and productivity did not hold true in lakes receiving large amounts of sewage. Sewage is nutrient rich and contains a high ratio of nutrients to other dissolved materials (nutrients comprise a minor component of total dissolved solids).

As well, Oglesby observed that yields from lakes in which the phosphorous content of the drainage waters is dependent upon the parent rocks are not estimated well by the MEI. He developed a model that instead correlated summer phytoplankton standing crop (as measured by the mean of lognormal transformations of summer chlorophyll a) with fish yield.

Chlorophyll a and Secchi transparency have been found to correlate well with kokanee salmon biomass (standing crop) and growth estimates in Idaho lakes (Rieman and Myers 1991). This methodology shows some promise for yield determination. The major difficulty is in the logistics of collecting, filtering, and processing the samples (see methods section), and the expense of analyzing each sample. Another limitation is the necessity for repeated samples throughout the summer to track the known changes in phytoplankton productivity.

Table 1. Potential and actual fish yields from Idaho lakes and reservoirs.

Lake	Actual	MEI(1)	TDS	MEI(3)	MEI(4)	Chl a(1)	Chl a(2)
Coeur d'Alene	2.5	53.1	10.6	16.5	20.9	2.5	11.5
Coeur d'Alene	3.3	53.1	10.6	16.5	20.9	2.5	11.5
Mann's	12.6	64.6	5.7	17.1	21.9	0.1	1.4
Lake Waha	12.4	9.9	18.4	12.3	14.2	12.0	51.9
And Ran	1.6	4.6	13.9	10.7	11.9	3.4	15.5
Arrow	1.1	4.3	10.6	10.6	11.7	4.8	21.6
Cascade	0.9	10.8	2.5	12.5	11.5	6.8	29.8
Cascade	13.6	10.8	2.5	12.5	11.5	6.8	29.8
Black	3.4	12.4	45.1	19.2	25.4	4.4	19.6
Island Park	12.4	72.9	30.4	17.5	22.5	3.0	13.6
Island Park	2.7	72.9	30.4	17.5	22.5	3.0	13.6
Island Park	3.8	72.9	30.4	17.5	22.5	3.0	13.6
Ririe	29.9	38.2	43.5	15.6	19.4	0.8	4.4
Ririe	28.7	38.2	43.5	15.6	19.4	0.8	4.3
Ririe	44.9	38.2	43.5	15.6	19.4	0.8	4.3
Ririe	34.7	38.2	43.5	15.6	19.4	0.8	4.3
Palis	3.6	20.1	37.3	13.9	16.7	0.3	2.2
Palis	1.5	20.1	37.3	13.9	16.7	0.3	2.2
Palis	1.1	20.1	37.3	13.9	16.7	0.3	2.2

Method Equation (x = MEI, y = yield)

1. Ryder (1965) $y = 2.094\ (x^{0.4416})$
3. Matuszek (1978) $\log(y) = 0.092 = 0.533\log(x)$
4. Schlesinger & McCombie (1983) $\log_{10}(y) = 0.408(\log_{10} x) + 0.009$

Jones and Hoyer (1982) found good correlations with fish yield and chlorophyll a despite the following problems; they were using both natural lakes and reservoirs, the data used were not from the same years, and the waterbodies differed in morphology, hydrology, trophic status and fish communities. The single outlier was a carp lake that had been poisoned the year before the creel survey. They cautioned that the relationship may not apply in the following circumstances: lakes with high inputs of allocthonous organic matter, lakes treated with algicides, lakes with winter-kill or high concentrations of toxicants, lakes with high densities of non-sportfishes, and lakes outside a specific region. The same problems as those stated above also apply to this model.

Matuszek (1978) used a model that evaluated total dissolved solids, mean depth, benthic fauna biomass, and water body stratification (as presence/absence). He found that total dissolved solids was a reliable predictor of fish yield, but not as good as benthic faunal biomass. Stratification proved to be insignificant. The one outlier in Matuszek's data set was a lake that was completely windswept, and, therefore, continuously circulated. The problem with Matuszek's work, in terms of its applicability to Idaho waters, may be that the major fish species of interest was lake whitefish Coreqonus clupeiformes, which are present only as an introduced species in northern Idaho lakes. This explains the high correlation between yield and benthic biomass, as this species is known to feed extensively on these organisms.

Hanson and Leggett (1982) used both univariate and multivariate models to predict fish yield and standing crop in a number of lakes and reservoirs. They found that the best univariate predictor was total phosphorous and the best multivariate predictors were total phosphorous, total dissolved solids, and depth. Hanson and Leggett determined that the major reason for the association between total dissolved solids and fish yield was the relationship between the former and total phosphorous. Total phosphorous does not present the same level of logistic problems associated with chlorophyll a as the samples do not have to be filtered, only quick frozen on dry ice. Total phosphorous is not as easy to collect as conductivity (which can be used to determine total dissolved solids) and is more expensive to analyze. Despite these constraints, the method does show some promise.

The Wyoming lake and reservoir productivity assessment program has developed a Reservoir Quality Index consisting of a regression equation using nitrogen, phosphorous, total dissolved solids, dissolved oxygen, and alkalinity. Nitrogen is a very expensive variable to obtain, so this method may not have the universal applicability of some of the others. Dissolved oxygen presents the same problems as chlorophyll a, ie. it must be measured more than once in a season.

The Ohio Department of Natural Resources used a multiple regression model consisting of dissolved oxygen, morphoedaphic index, and the ratio of watershed area to lake area to predict predator yield (Stein and Johnson 1987). Other models in use, including one in Iowa (Hill 1980, 1984), also depend a great deal on morphometric variables (the calculation of a siltation index using lake contours, surface area and mean depth and a watershed index, for example). These models may have their greatest utility in Idaho as a more specialized, regional submodel standpoint.

Wyoming Department of Game and Fish has also tested a number of different multiple regression models to determine the relationship between small reservoirs and fish production. Whitworth (1984), in his review of the morphoedaphic index and reservoirs, acknowledged the major difficulty in its application to reservoirs to be the mean depth component. This problem had already been identified by Jenkins (1968) and Jenkins and Morais (1971). Reservoirs are regarded as nothing more than "hybrids" between rivers and lakes and are thought to have zones within them that correspond to riverine, transition, and lacustrine conditions. The concept of mean depth as a representation of a nutrient sink which is generally true for lakes may not necessarily be applicable. However, Whitworth found that standing stock could be adequately represented by an equation using total dissolved solids and mean depth.

Guenther (1989), in an expansion of Whitworth's study, developed a number of models applicable to the study of Wyoming reservoirs. The most informative model for the purpose of this study demonstrated that the production of trout per hectare is directly related to total dissolved solids, similar to the findings of Whitworth (1984), but that depth did not appear to be important. Guenther also found that most of the detailed models did not significantly increase predictive capability above those using only total dissolved solids, at least on a broad scale.

The models showing the most potential utility for Idaho waters are the morphoedaphic index (and its various derivatives), the chlorophyll a models, total dissolved solids, and the Usable Trout Habitat (which has already been applied in American Falls Reservoir - see Heimer 1989) and Bass Habitat models. The morphoedaphic index, despite criticisms in the literature, has been shown to have the greatest utility over a wide area. Conductivity is quite easy to obtain, and does not appear to vary greatly through time. No expensive chemical analyses need to be done to obtain these data. Total dissolved solids can be estimated from conductivity.

Chlorophyll a models have already been used to predict kokanee salmon biomass and growth in the state (Rieman and Myers 1991). The problems with this methodology have already been outlined (see above). Secchi transparency, if applicable, has the same value in terms of ease of sampling as conductivity. It also has the advantage of being able to serve as a surrogate for chlorophyll a estimation if turbidity is not a problem.

The major shortcomings of the Habitat models are: 1) their lack of universal applicability - a new one must be calculated for each reservoir, 2) the amounts of data and data collection time required to set the parameters, and 3) they do not really relate well to predictions of yield or standing crop or some other surrogate for fish density. The above constraints render them useful only on a case study basis.

The most obvious disparity in the numbers in Table 1 is that for almost every reservoir actual yields are lower than predicted. No one empirical method appears to be consistent in its predictive ability. Yields in Lake Coeur D'Alene Lake, and Blackfoot, Island Park, and Palisades reservoirs were best predicted by chlorophyll a values. Ryther's method of calculating yield from MEI did not really come very close to any actual yield, overestimating everything but Lake

Waha. This method did calculate a value from Ririe Reservoir that fell within the range of actual yields obtained from Ririe Reservoir. Schlesinger and McCombie's (1983) method of calculating yield from MEI best represented actual yield in Mann's Lake, Lake Waha, Cascade Reservoir, and Island Park Reservoir. Matuszek's (1978) method of calculating yield from MEI best predicted yields from Cascade Reservoir and Lake Waha.

DISCUSSION

Efficiency of Prediction

No evidence suggests a need to move away from the more traditional method of MEI-based yield calculations toward one based on chlorophyll a or some other such parameter. Ryther's method of calculating yield from MEI came closest to predicting actual yield in only one reservoir, so it is probably the least valuable method. Given the constraints of the calculations, either of the other two methods of calculating yield from MEI would probably be more suitable, most likely that of Schlesinger and McCombie (1982).

The problem of the MEI and depth of reservoirs is one that cannot be resolved with the present data. As mentioned above, both Whitworth (1984) and Guenther (1989) felt that this was not a problem in small Wyoming reservoirs. I suspect that it would become a greater problem in Lower Salmon Falls and Oneida reservoirs, which are flow-through, minimum residence time reservoirs.

The chlorophyll a predictors need more evaluation. Oglesby (1977) felt that lakes with a relatively short retention time should be excluded from the analysis. This could have presented a problem in Idaho draw down reservoirs but did not for all. Blackfoot Reservoir and Lake Waha were both best predicted by this model. The major problem with using mean summer chlorophyll *a* as a predictor is that the logistics of obtaining it are difficult.

The utility of total dissolved solids as a predictor appears questionable, simply because it deals with standing stock. Estimates of standing stock are even more difficult to come by than yields. Guenther (1989) suggested that in reservoirs with a high non-game fish population, standing stocks would be lower than predicted by her equation. If there **is** some way to obtain the necessary standing stock values, this equation may be quite useful, as it could lead to a determination of the relationship between non-game standing stocks and those of sportfish. The total dissolved solids values are also extremely easy to obtain.

The data are far too limited at the moment to be able to draw any conclusions about the feasibility of yield prediction. The relationships above may simply be the result of random results. No regional or reservoir-type trends in yield can be identified with the present data. What is needed to better evaluate the empirical models are more yield estimates from a wider range of waterbodies. It is difficult to determine, without some recent time series for harvest, what equation to use and how to best evaluate it in terms of effects of limnological variables on fish production. The other problems include the use of weight data from Carlander to calculate yield. This information was not available for Idaho lakes and reservoirs. This introduces another source of bias.

A more appropriate approach to these disparities may be to blame the reservoir, not the equation. Even if the methodology used to calculate actual yields in this report is flawed, it seems that Idaho reservoirs are not achieving their sportfish potential, at least as it is reflected by yield. The problem then becomes one of trying to sort out how much of the biomass of the lake or reservoir is tied up in non-game or less desirable fish, and what the influence of this percentage is on sportfish yield. This requires more intensive study of the reservoir in question.

Whatever approach we take to try to establish a predictive component, or some classification technique for Idaho lakes and reservoirs; future will be fruitless unless more information about the fish populations is available. We need to determine if yield is indeed the yardstick by which management success can be evaluated. It may be necessary to come to grips with the percentage of total fish biomass tied up in non-game species. Conventional fisheries wisdom would state that the former is perhaps the greatest problem. If so, then we should substantiate this with data from more intensive study of energy flows and the effects of shortages in potential food sources on fish populations. This would enable us to direct our energies toward optimal management approaches. For instance, the study done by Marrin and Ehrman (1982) demonstrated that the conventional wisdom was wrong, and that competition between rainbow and brown trout Salmo trutta was the problem, not competition between game and non-game fish (but see Hayes et al. 1992 for comments on sucker-perch interaction). This suggests that the usual strategy of dealing with non-game species would not have produced the desired result. A number of other authors have found that yellow perch (not always considered a game fish) have been implicated in competition with more desired salmonid species (Schneidervin and Hubert 1987, Guenther 1989, and others).

It may be necessary to determine the appropriate (or desired) mix of game fishes for a waterbody prior to any calculation of yield, or development of a method of classification. As an example of where the approach of determining the appropriate mix of gamefish has been applied, the Iowa lake classification system used standing stock and the percentage of fish acceptable to anglers (using size as **a** criterion) (Hill 1987). Our expectations for this classification procedure may be somewhat elevated. Jenkins using MEI as a yield predictor was only able to explain 8-29% of the variation in reservoirs in the Southeastern United States. Jenkins and Morais used length of growing season, surface area and reservoir age to explain 17% of the variation in reservoir fish yield. Standing crop of fish in reservoirs appears to be more accurately predicted. Methods using alkalinity predicted 69% of the variation (Carlander 1955), retention time explained 72% of the variation (Jenkins 1976, MEI explained between 21-72% (Jenkins 1982) and a multiple model utilizing length of growing season, annual outflow volume, shoreline development, and total dissolved solids explained 52% of the variance (Aggus and Lewis 1978). Carline (1986) in his examination of the models used for yield and standing crop prediction suggested that the best results were obtained when the reservoirs could be subdivided into similar operational or chemical groups (see also Jenkins 1982). He also suggests that models could be improved by incorporating fishing pressure into the equation (as per Schlesinger and Regier 1982)

It may be that other, more specific models that do not deal with yield will be of greater value for fisheries managers. These may include habitat models, but it should be cautioned that these do not assess the productivity or yield for a particular system, only the available habitat. While this is important in smaller to moderate-sized reservoirs in the current drought situation, it does not directly address the problem of fish for anglers in the system., as it assumes that habitat is a limiting factor for fish production. It may be, but this has not been determined. In order to calculate more specific measures such as the Useable and Maximum Trout Habitat and the Useable Bass Habitat, it is necessary to establish a number of regular sampling days. These indices require measurement of dissolved oxygen and water temperature profiles which are then compared with habitat preferences and tolerances to delineate species-specific habitat availability. The time to do this, and to establish the contours of the lake/reservoir under different levels of drawdown is not inconsequential.

These models will have their greatest applicability in an individual, problem-solving role, as was the case with American Falls Reservoir (Heimer 1989), although the production of a generic model may be feasible. Development of a flexible model for easy management application would be of benefit both from the point of assisting in the determination of planting guidelines which will also tie into fingerling evaluations and evaluation of loss of habitat due to irrigation draw-down.

RECOMMENDATIONS

1. More yield estimates-or some population parameter, with weights taken on a subsample for length-weight relationship.

2. MEI-based empirical equations most useful for predicting potential yields.

3. Determine appropriate techniques for estimating sportfish production in lakes and reservoirs.

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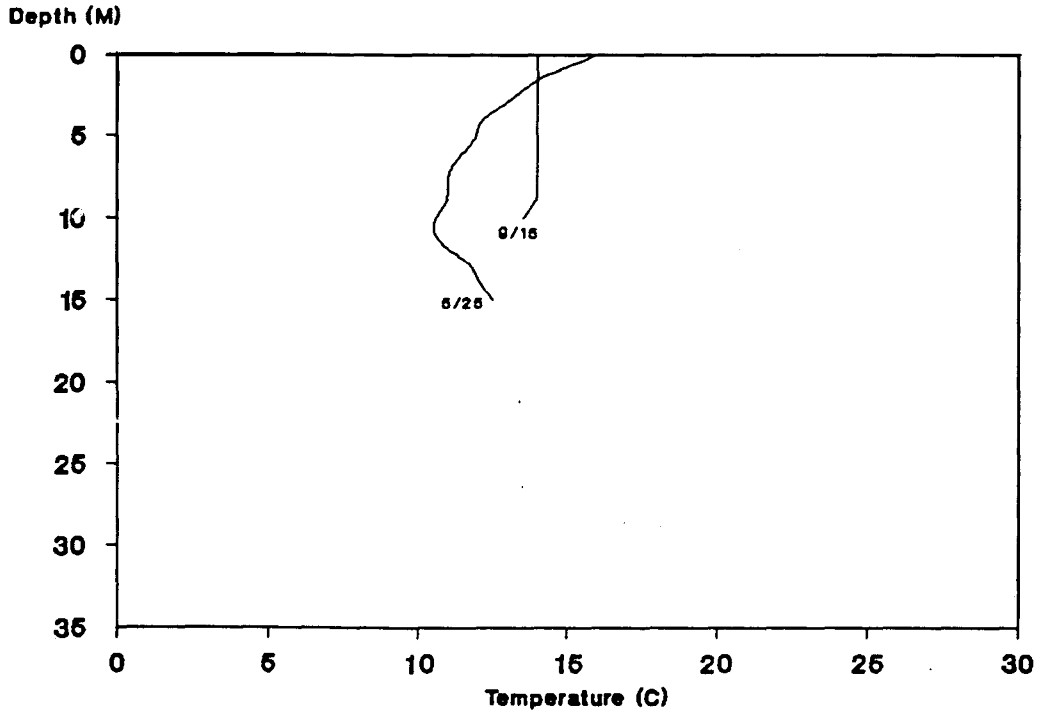
APPENDICES

Appendix A.

Results of temperature and dissolved oxygen sampling in regional lakes and reservoirs.

Appendix A. Figure 1. Results of temperature and dissolved oxygen sampling in Region 1 lakes and reservoirs.



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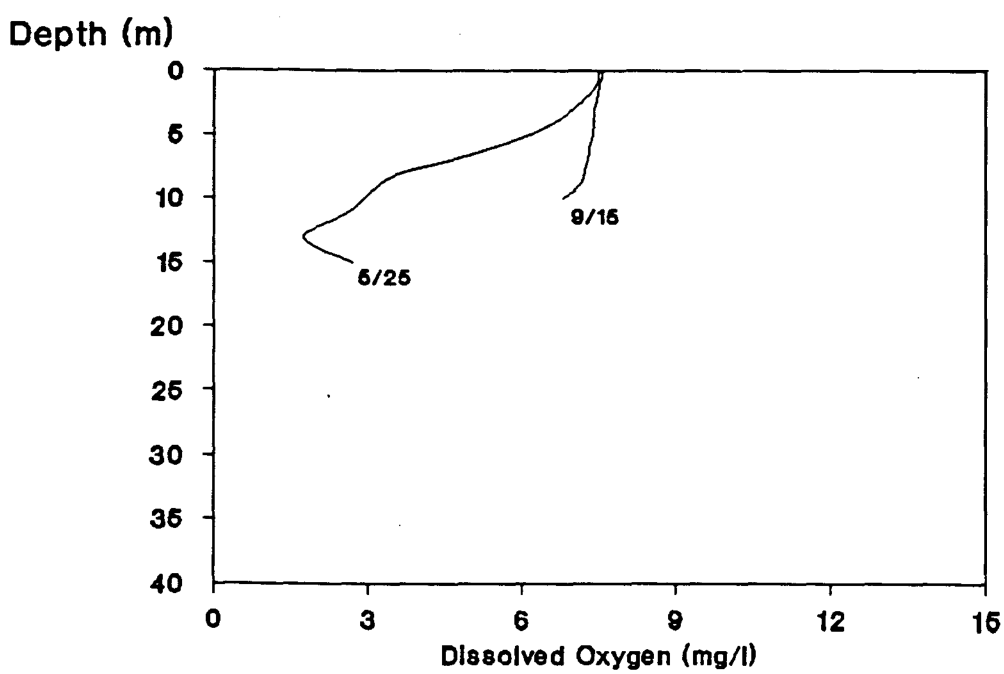
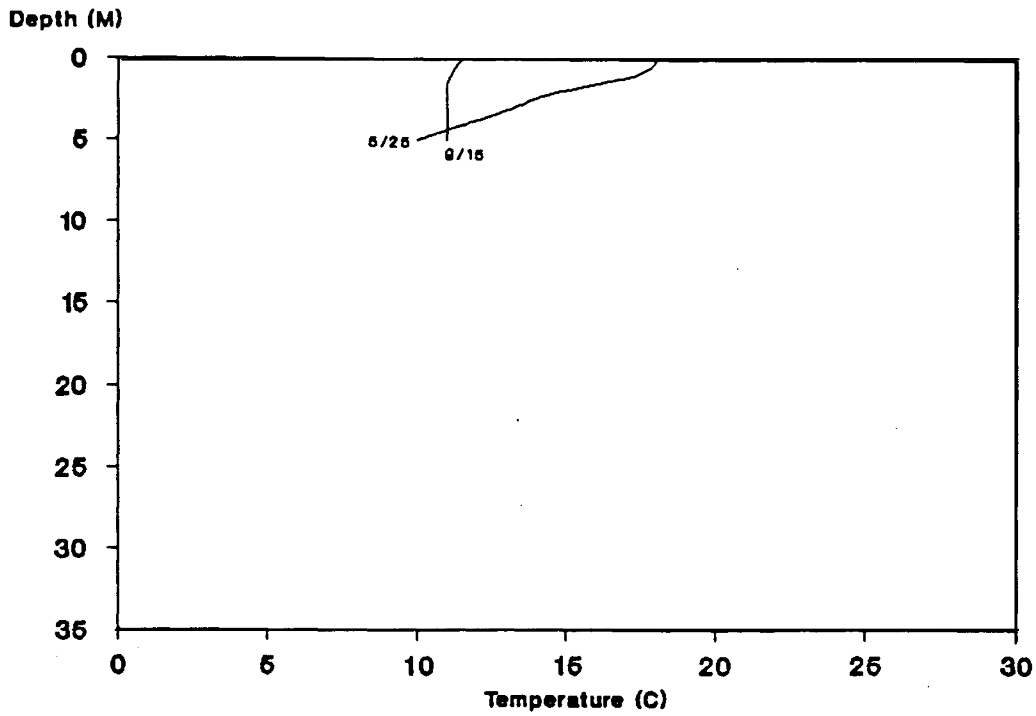


Appendix A. Figure 1. (continued)



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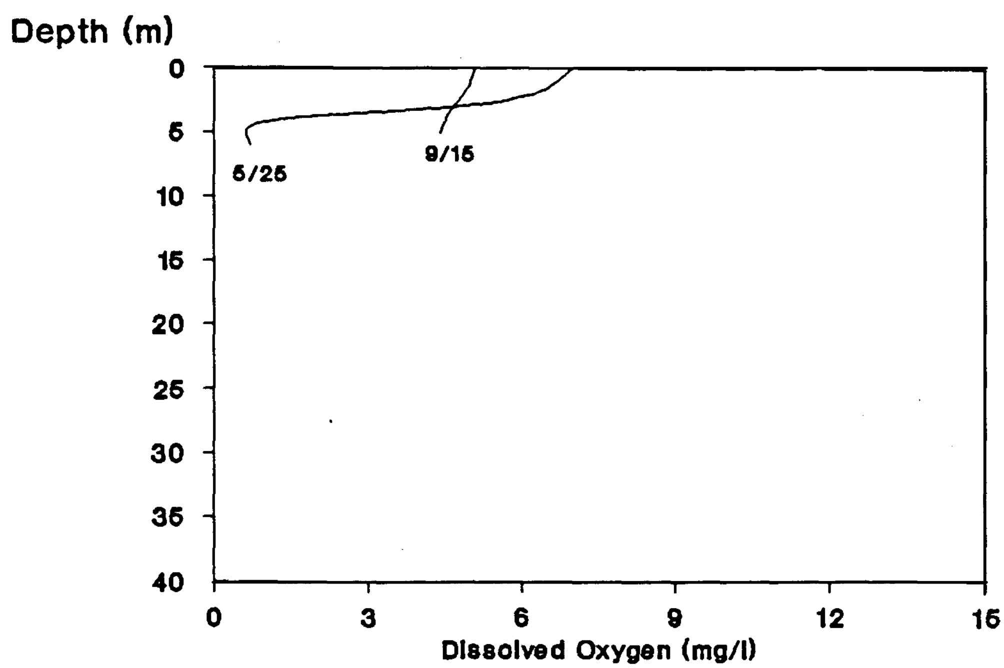

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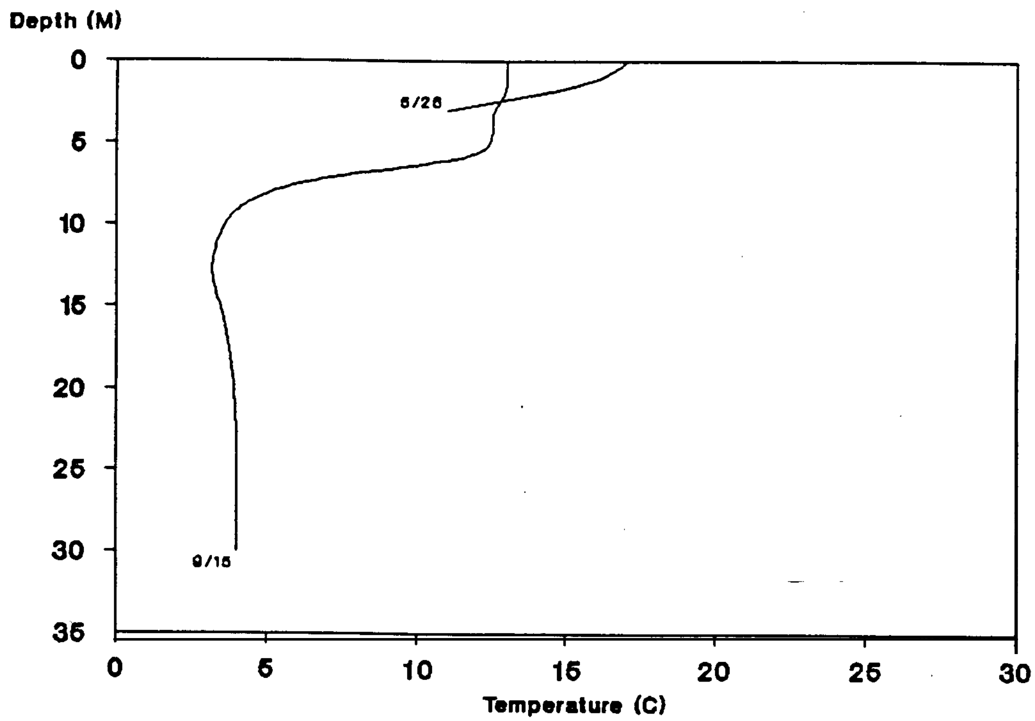
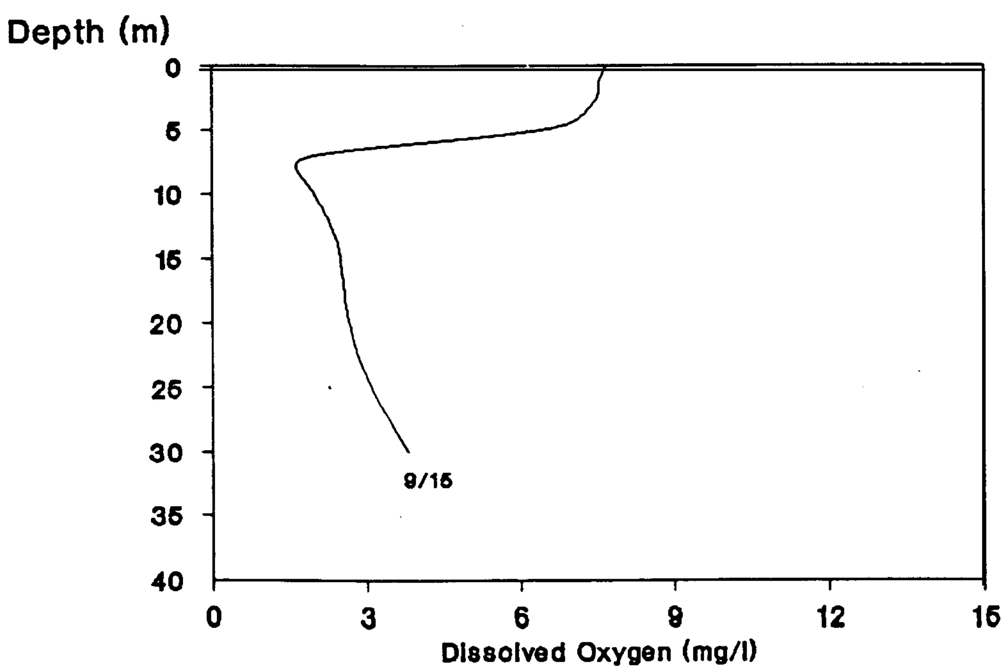


Granite Lake



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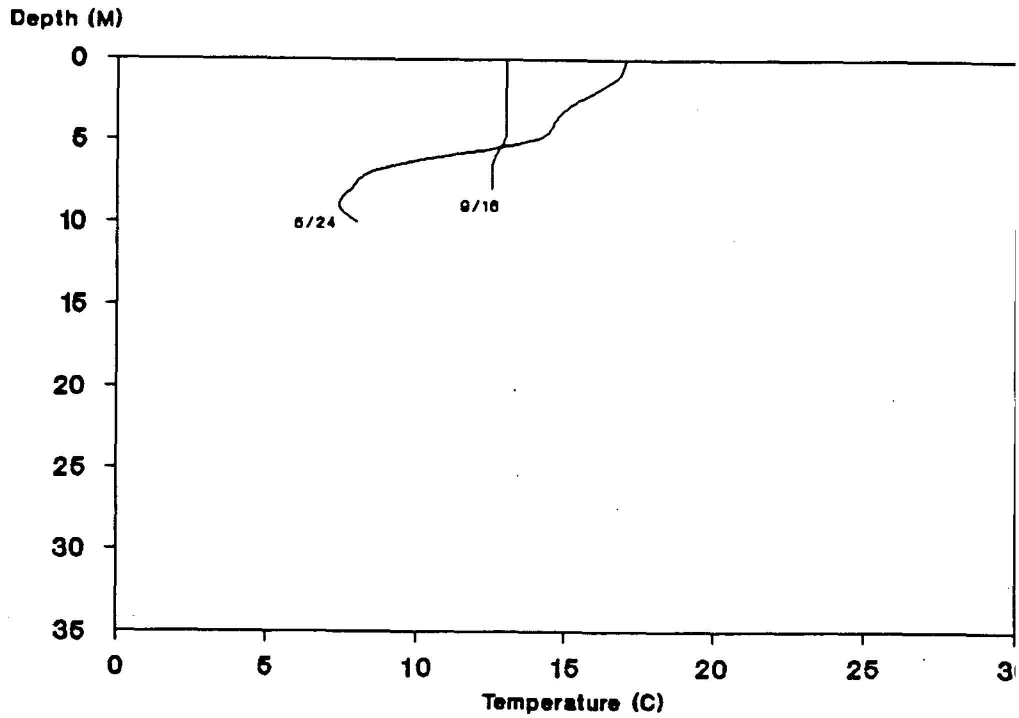
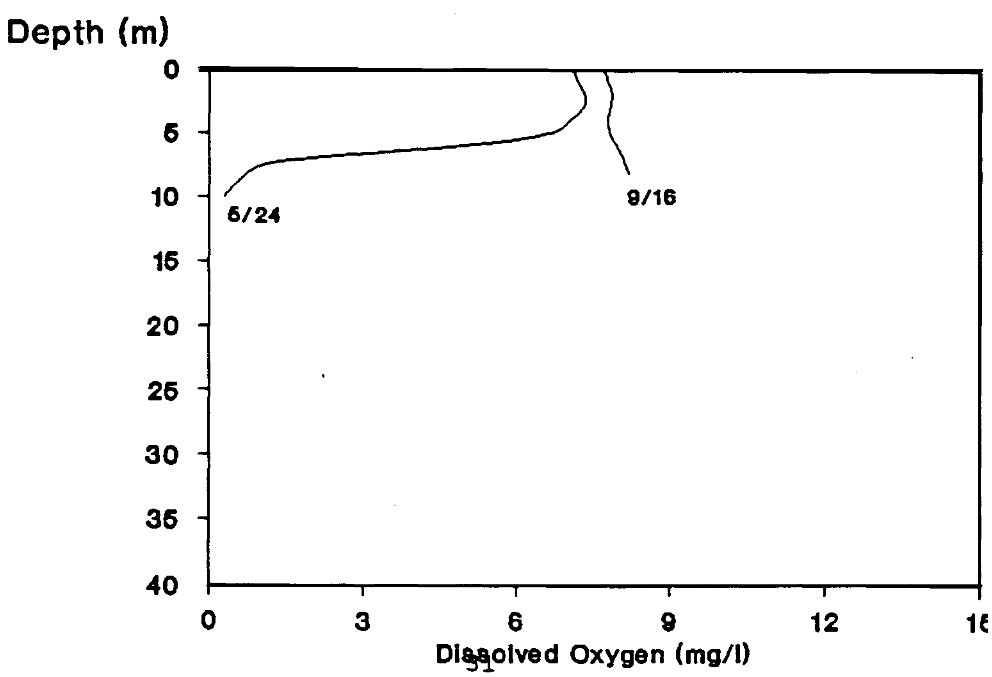


Hauser Lake



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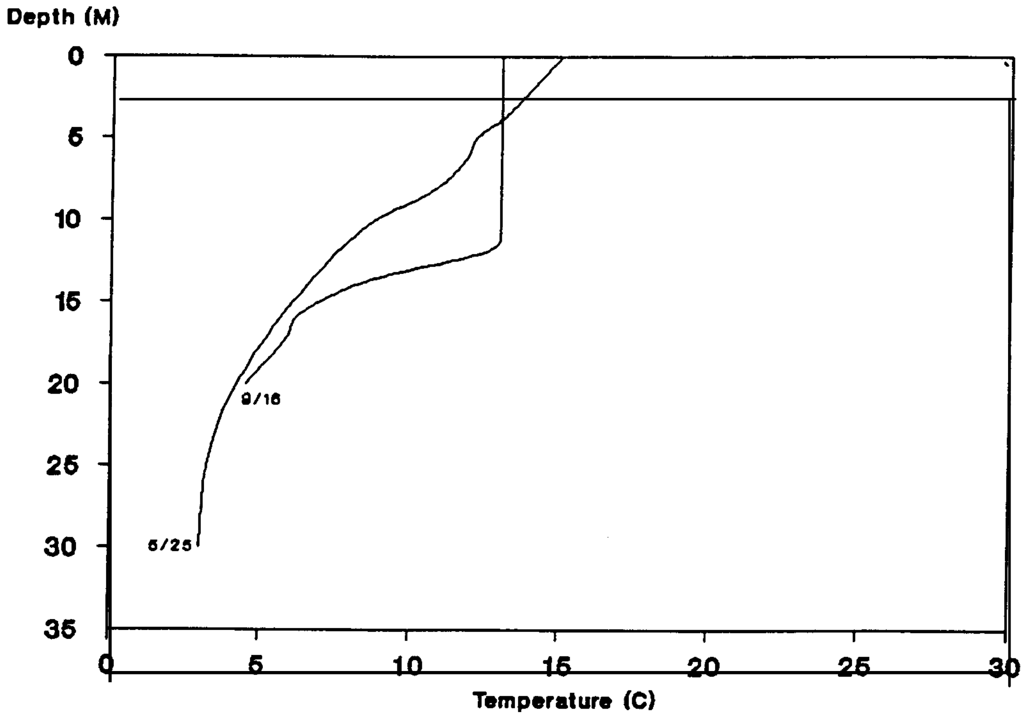

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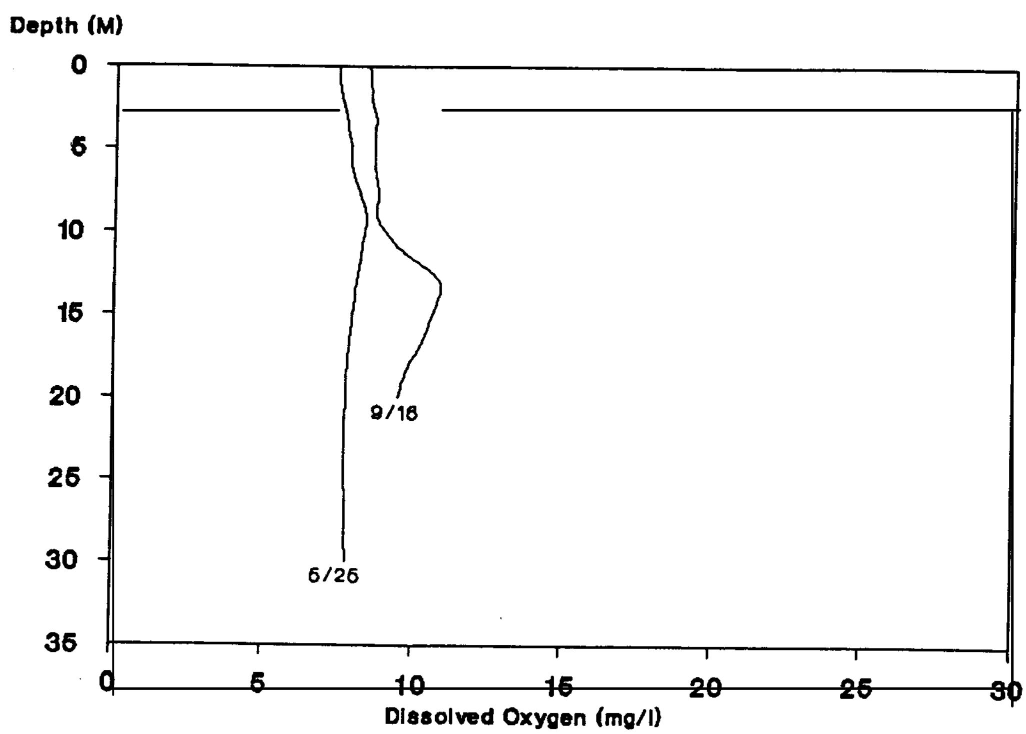
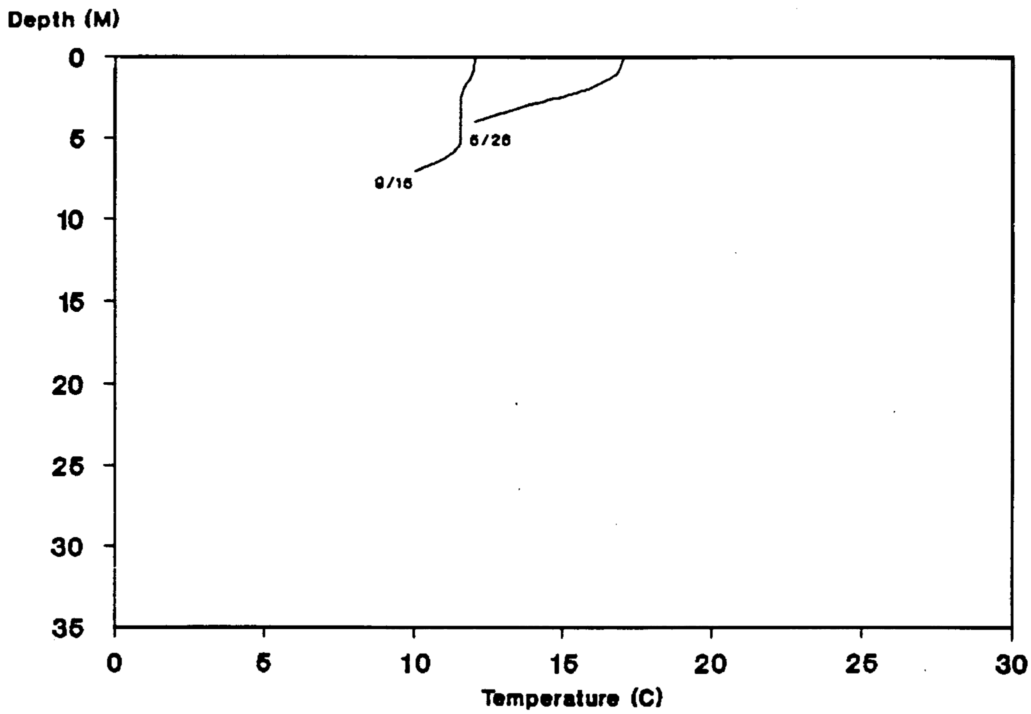
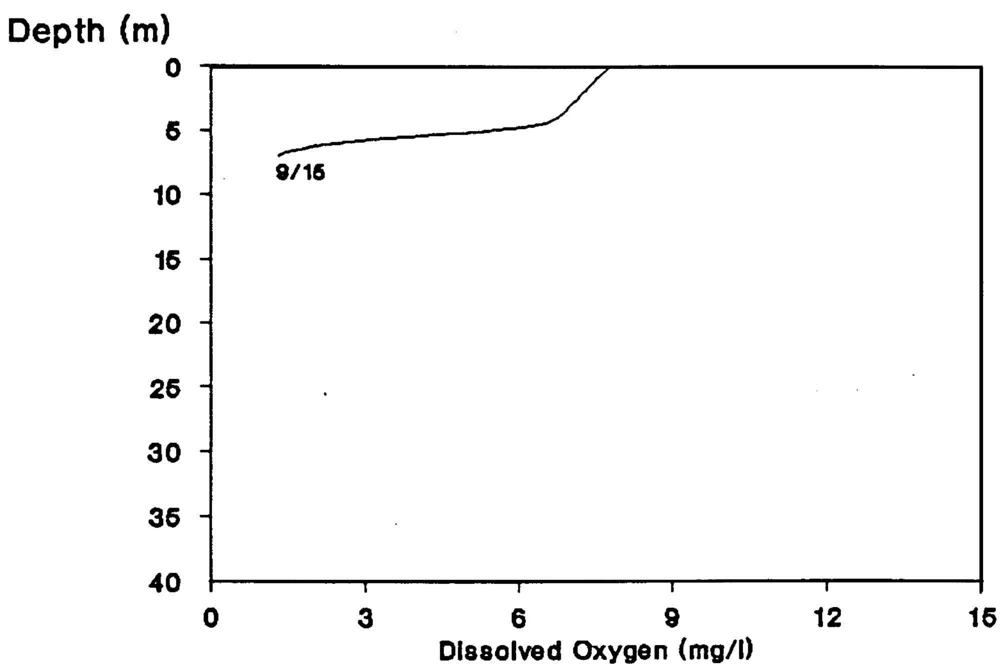


Appendix A. Figure 1. (continued)



Jewel Lake



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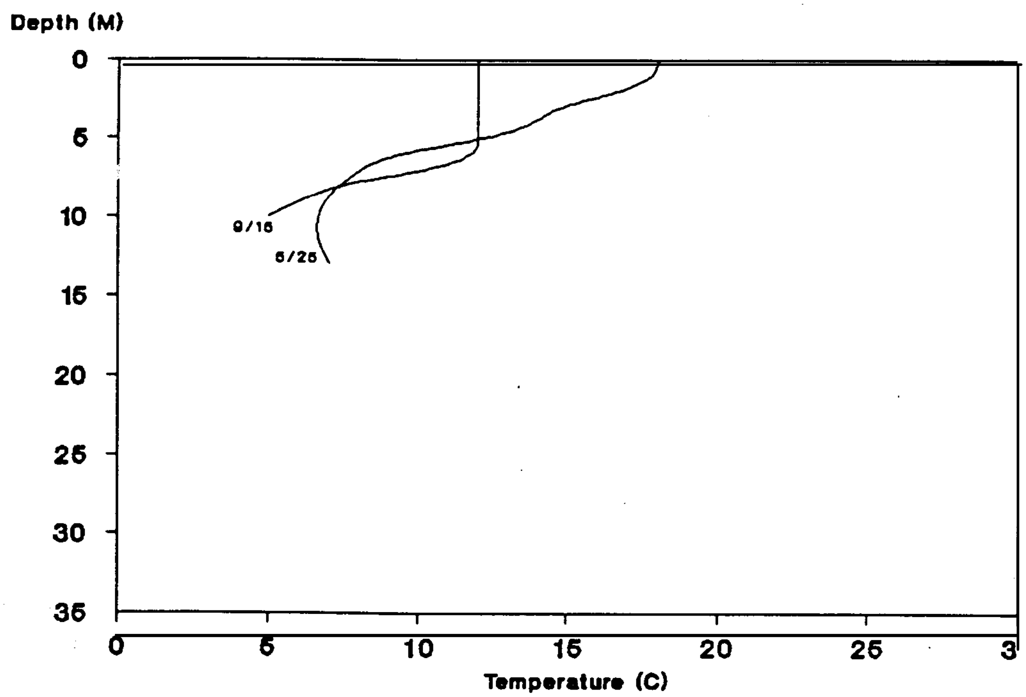

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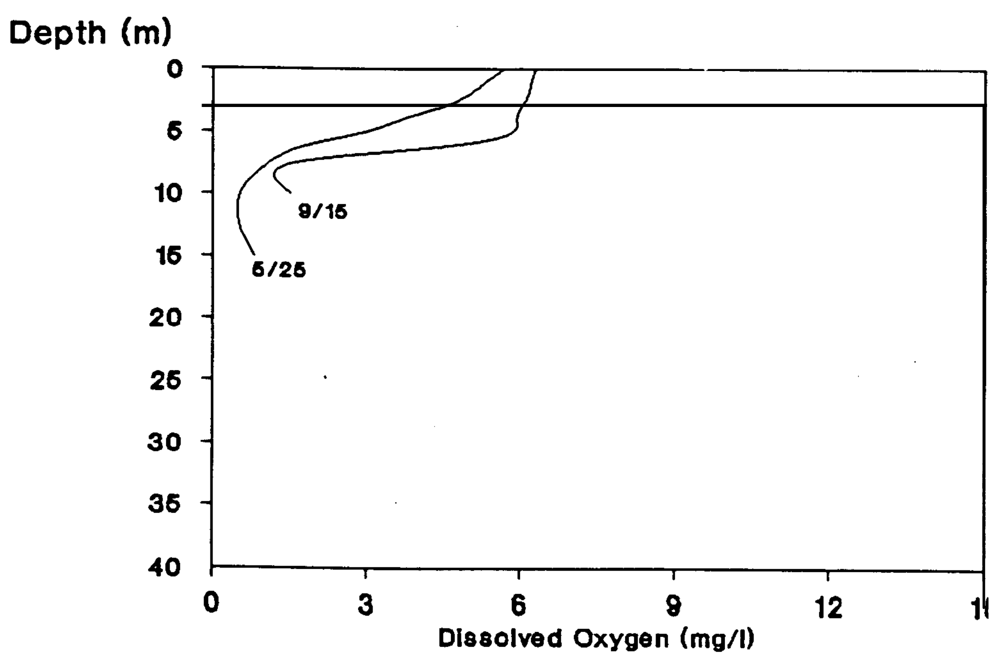

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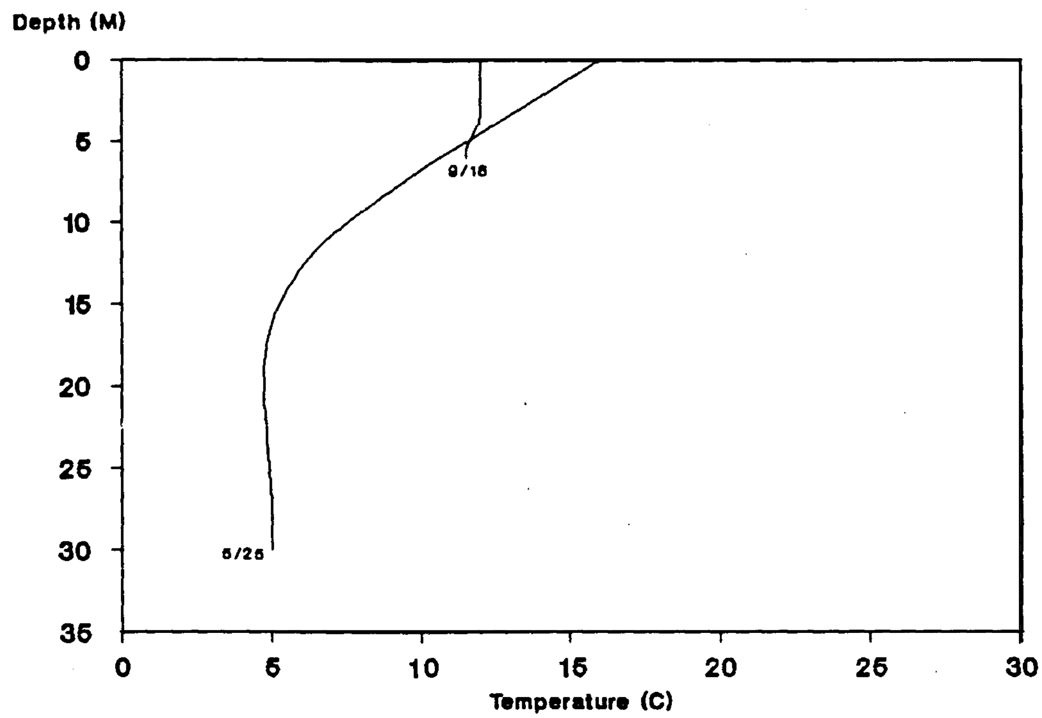
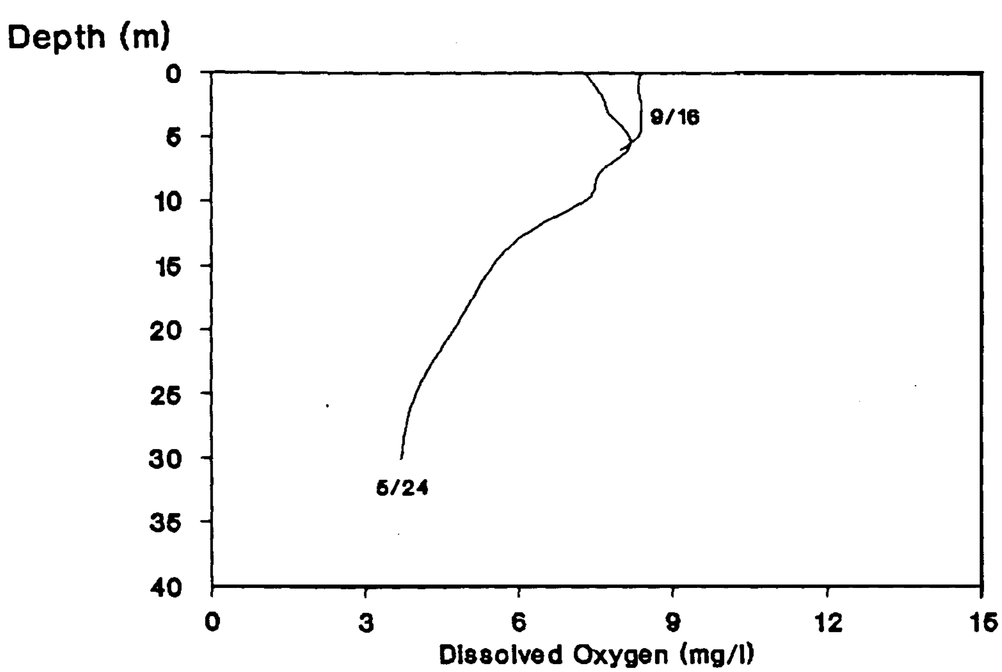
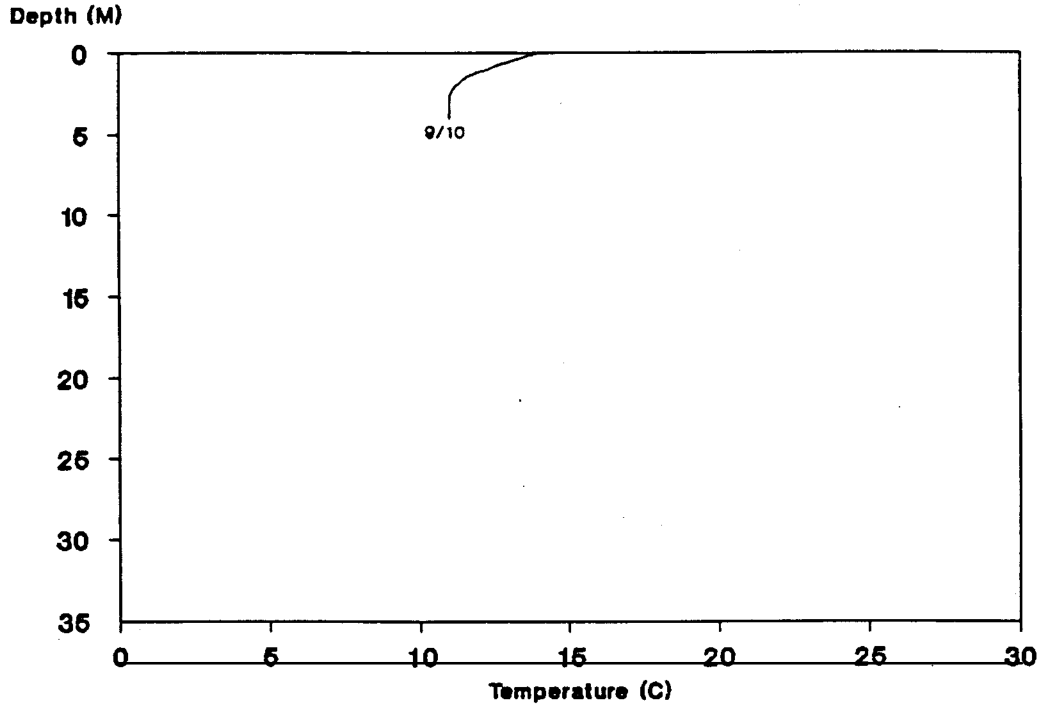


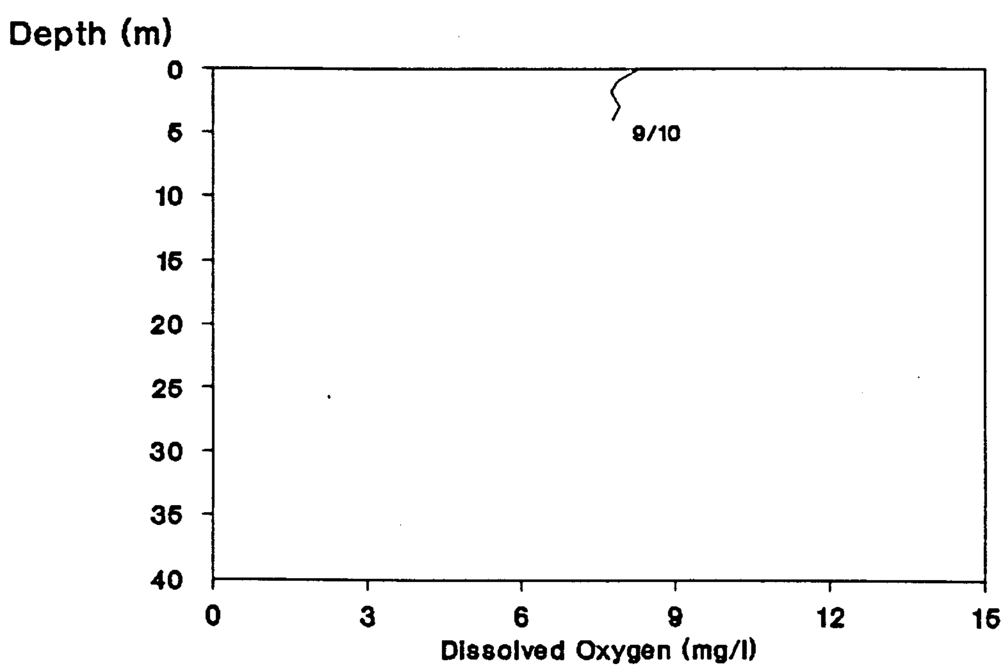
Spirit Lake



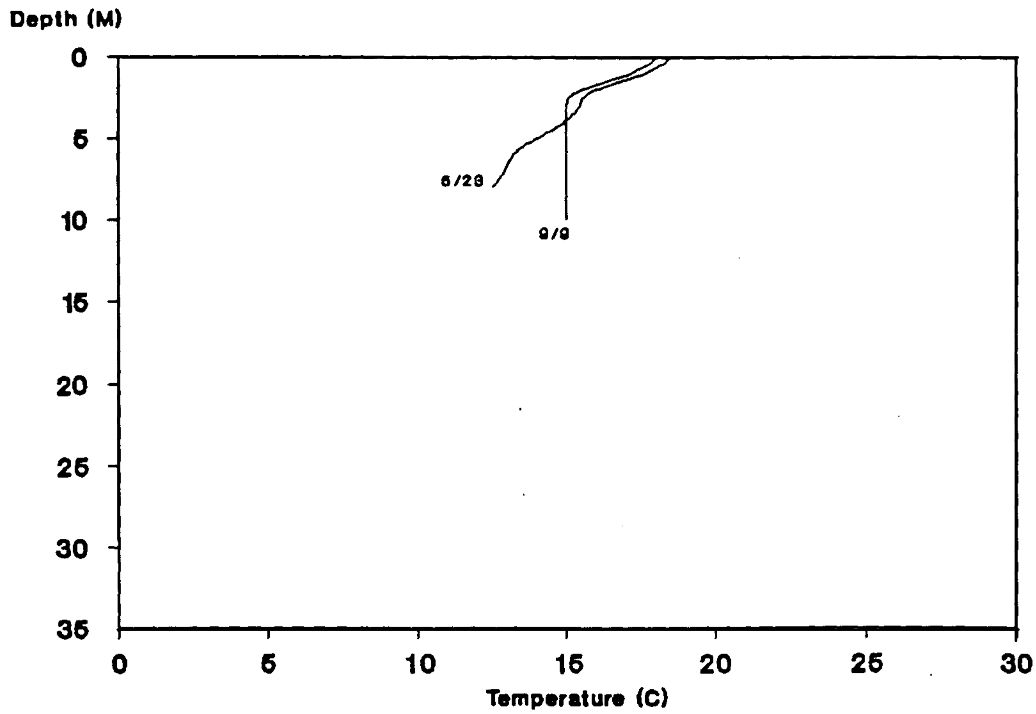
Appendix A. Figure 2. Results of temperature and dissolved oxygen sampling in Region 2 lakes and reservoirs.



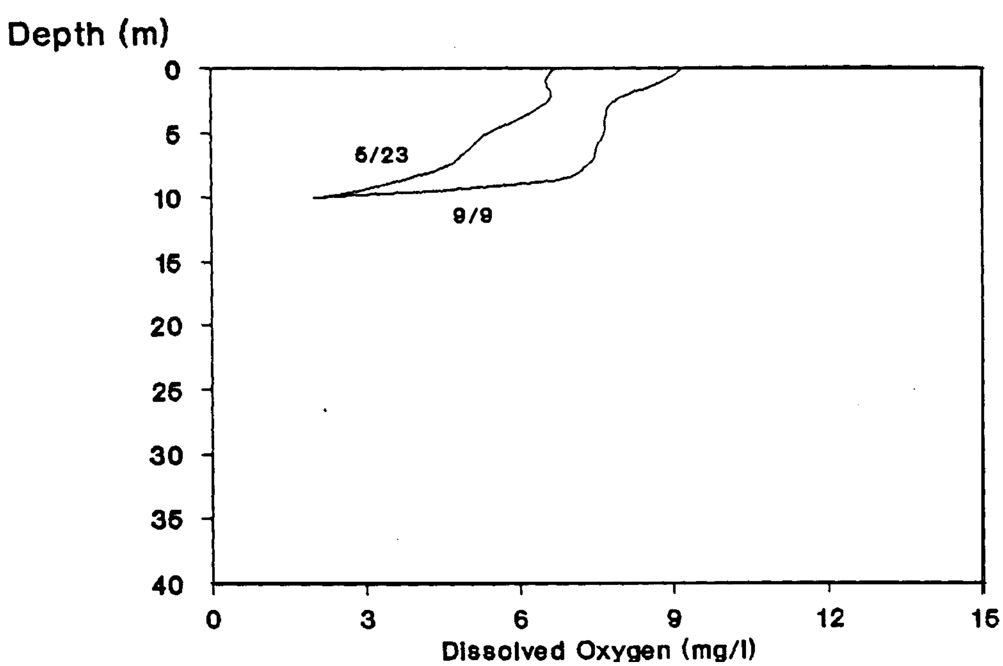
Elk Creek Reservoir



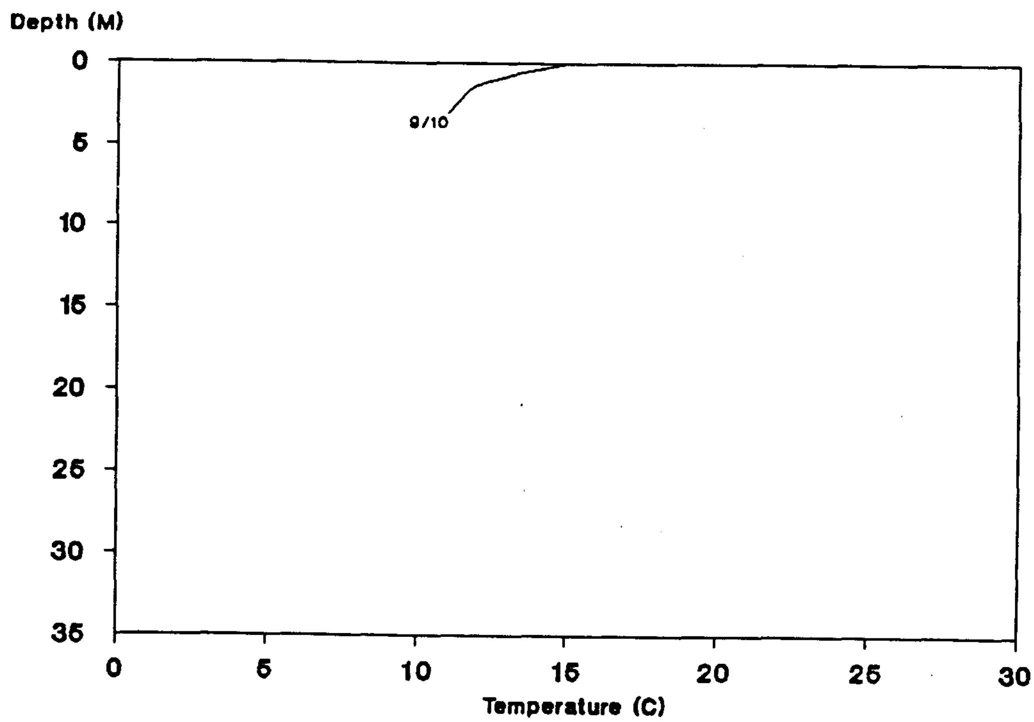
Appendix A. Figure 2. (continued)



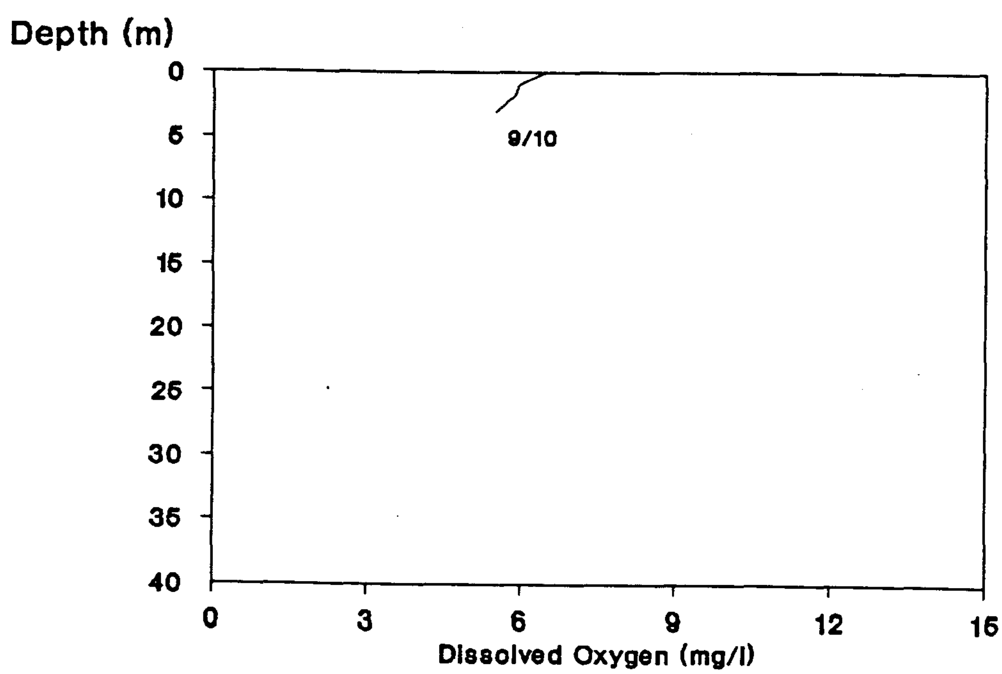
Manns Lake



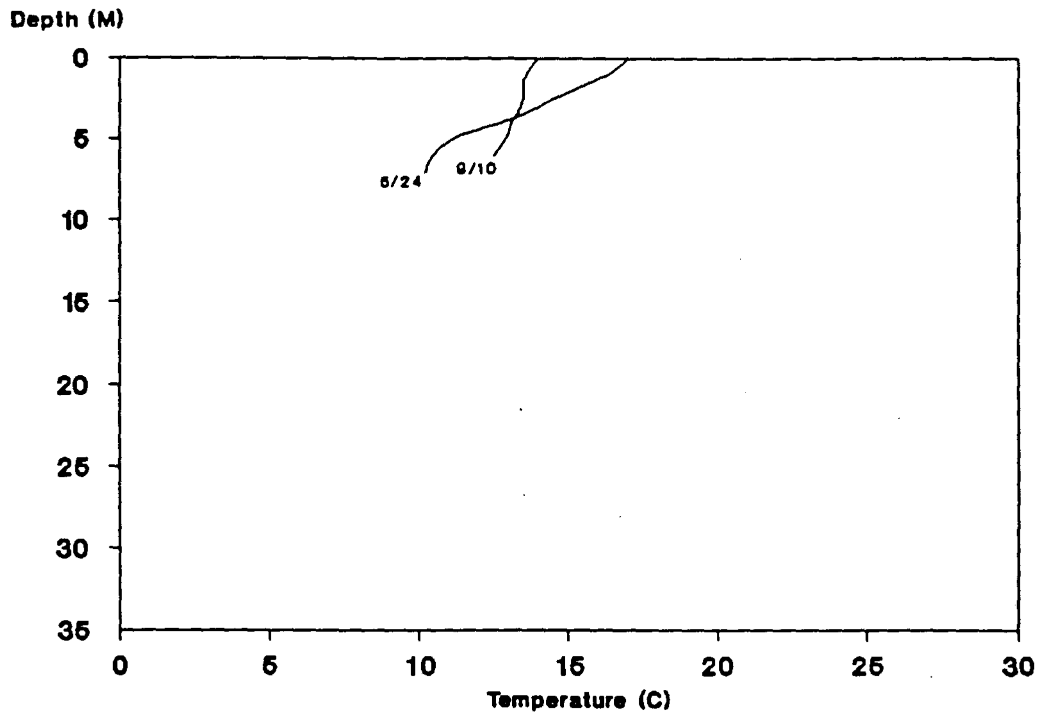
Appendix A. Figure 2. (continued)



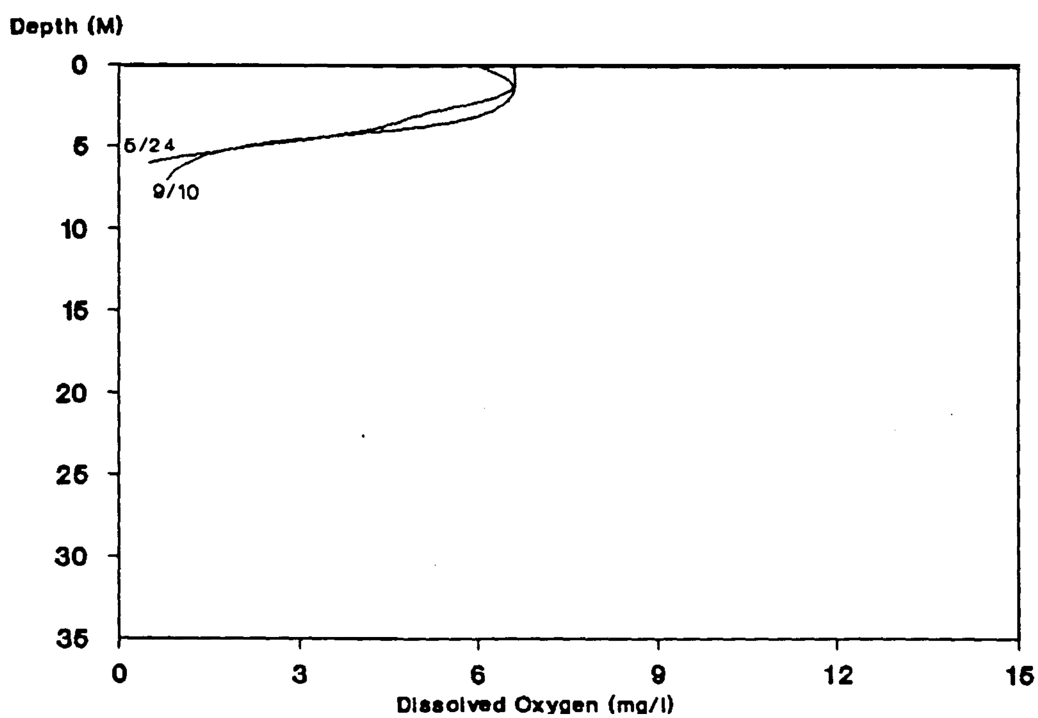
Moose Creek Reservoir



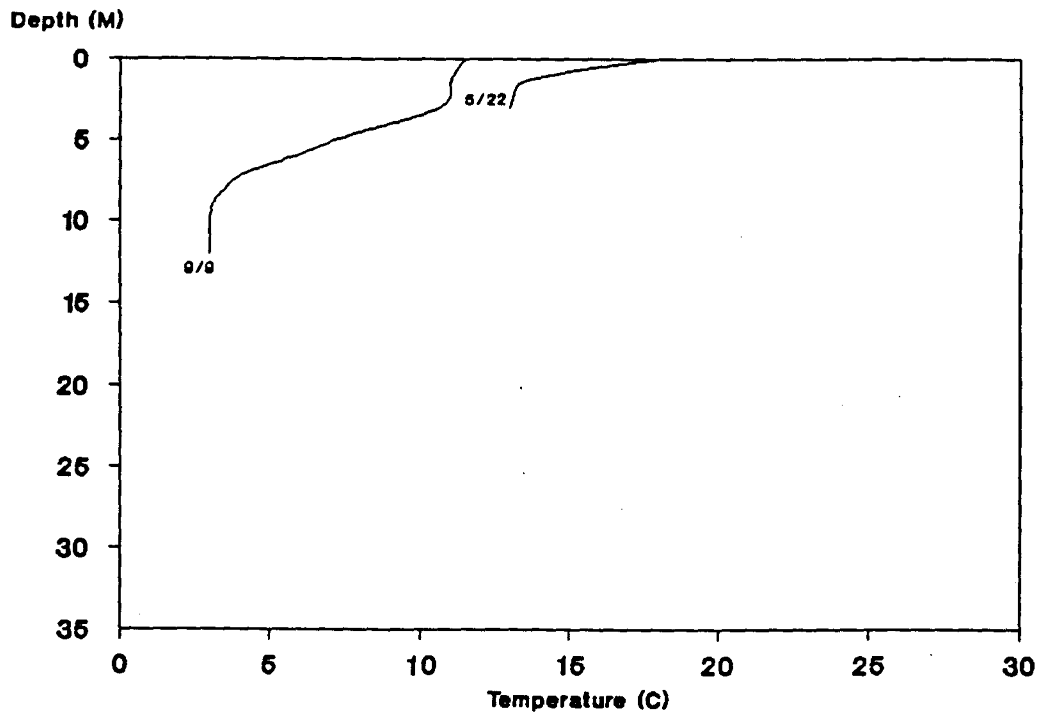
Appendix A. Figure 2. (continued)



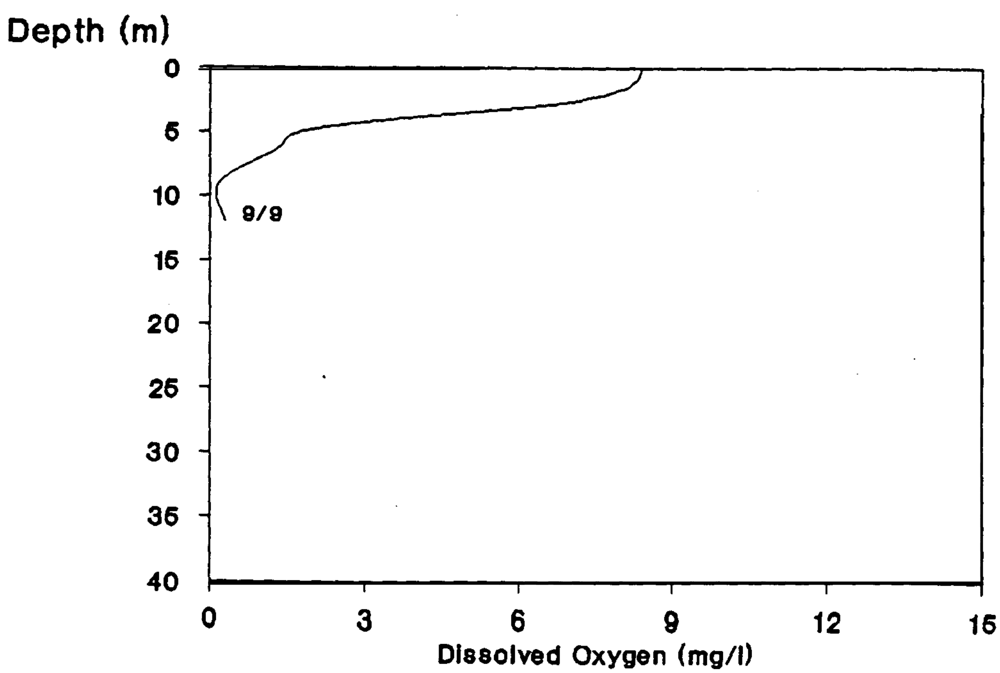
Spring Valley Reservoir



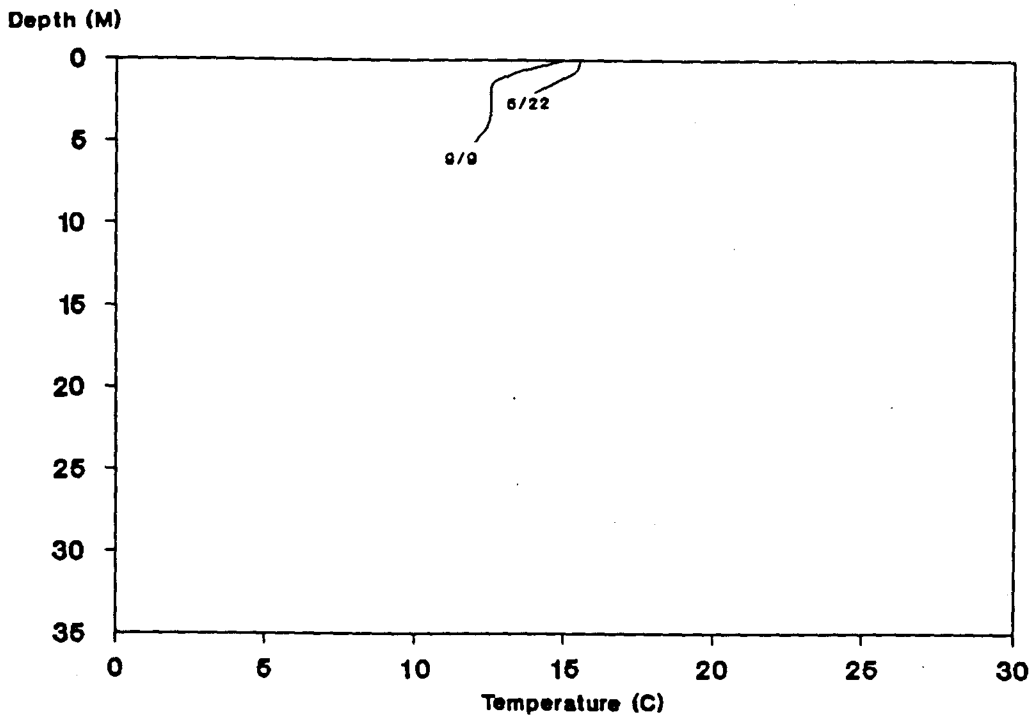
Appendix A. Figure 2. (continued)



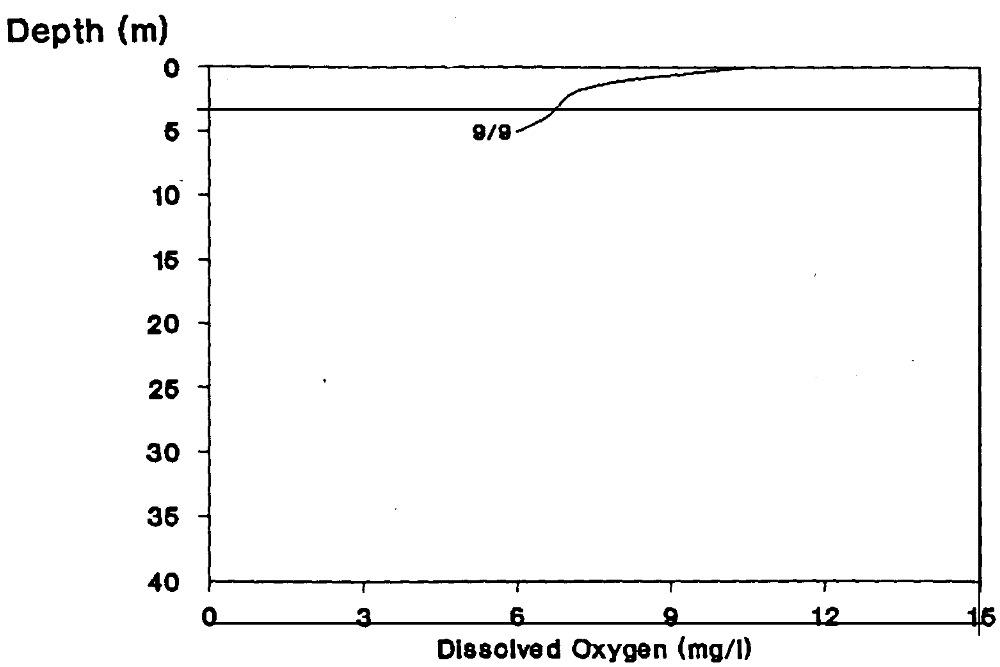
Waha Lake



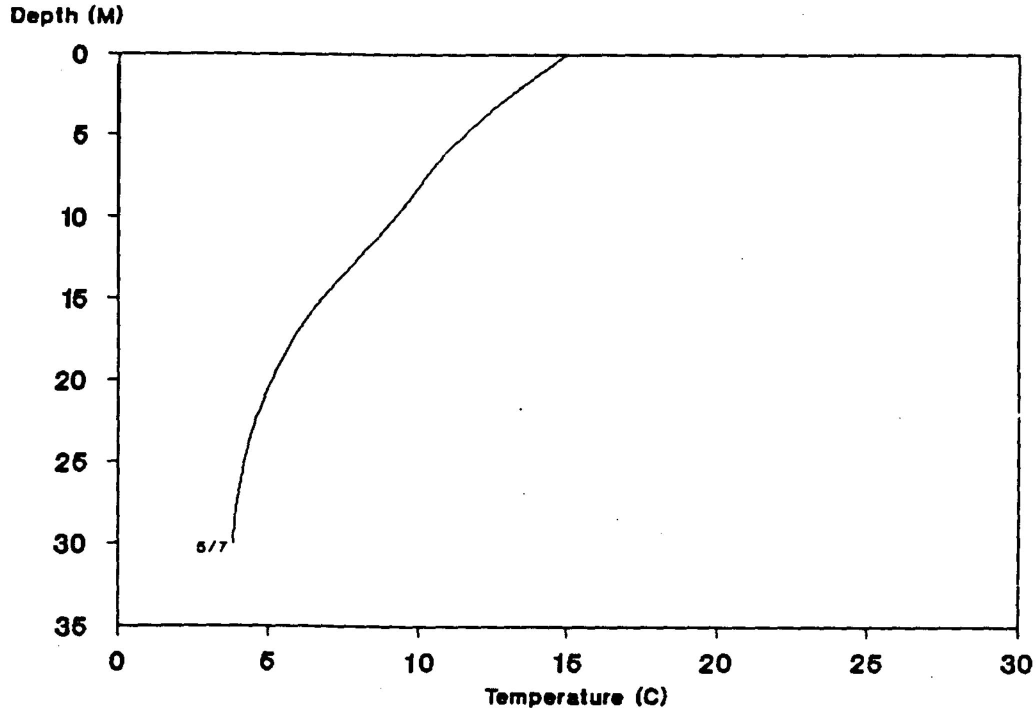
Appendix A. Figure 2. (continued)



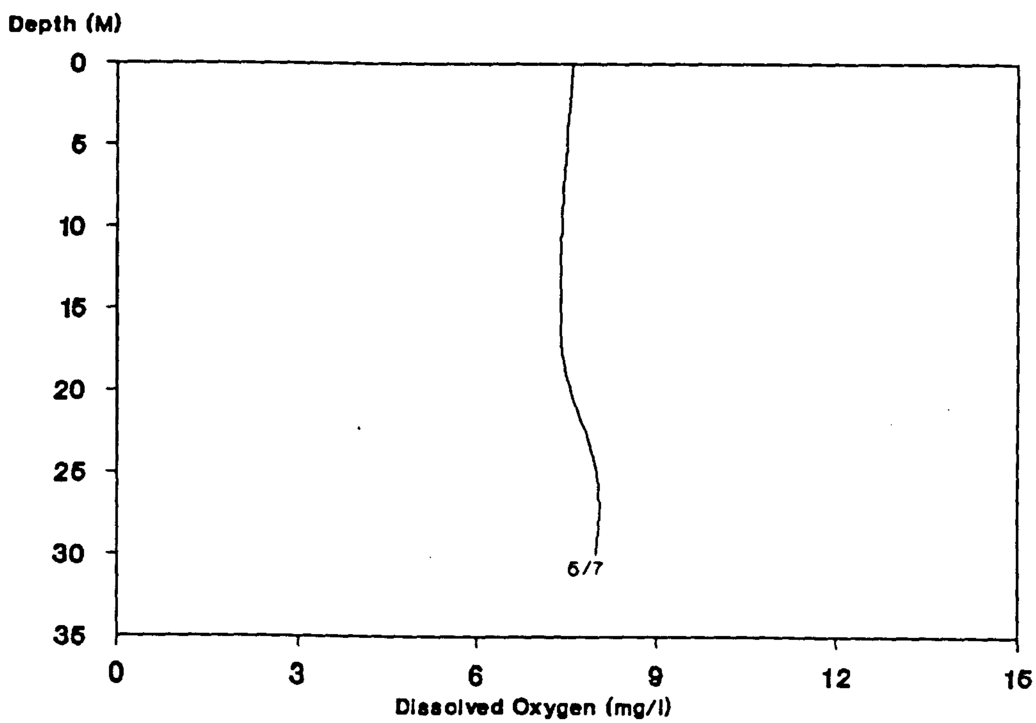
Winchester Lake



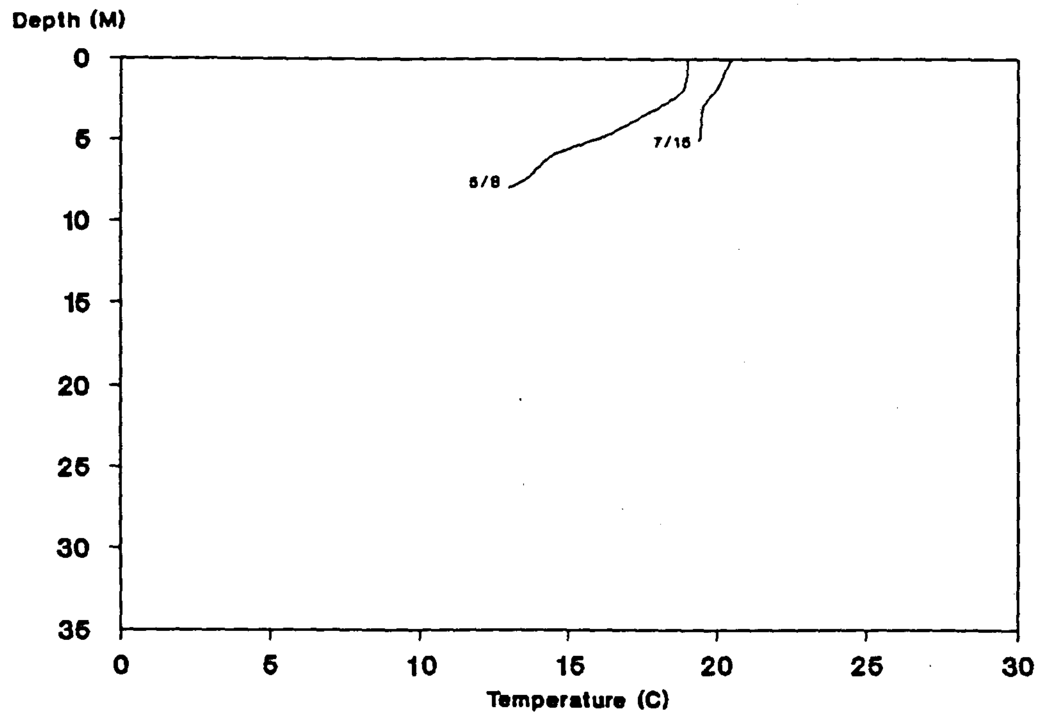
Appendix A. Figure 3. Results of temperature and dissolved oxygen sampling in Region 3 lakes and reservoirs.



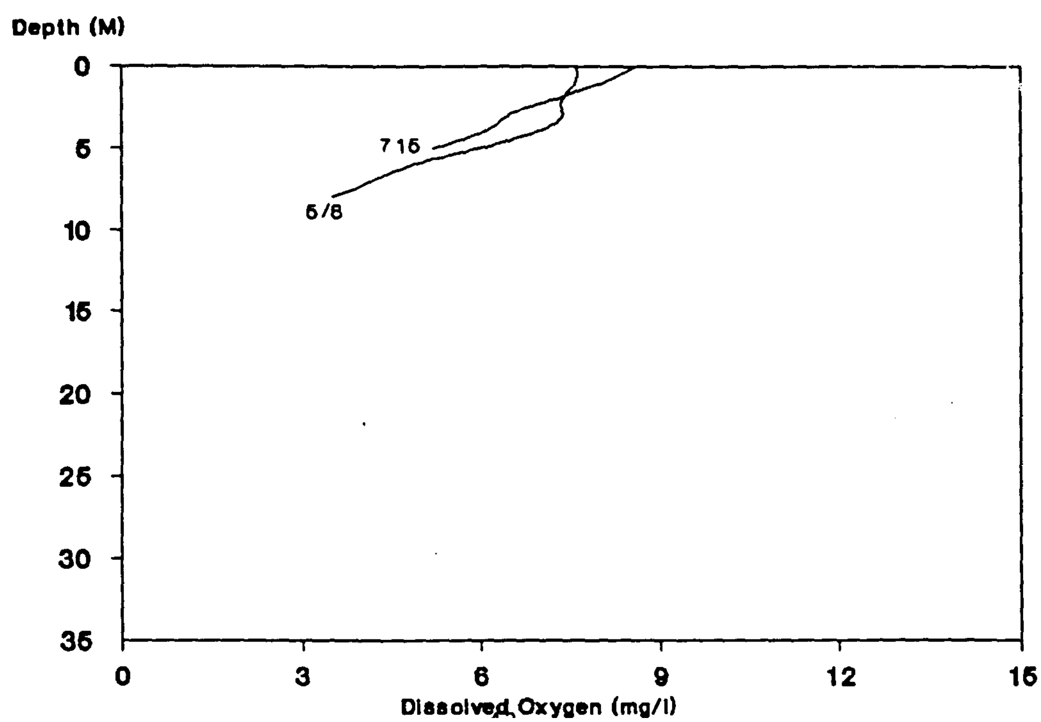
Arrowrock Reservoir



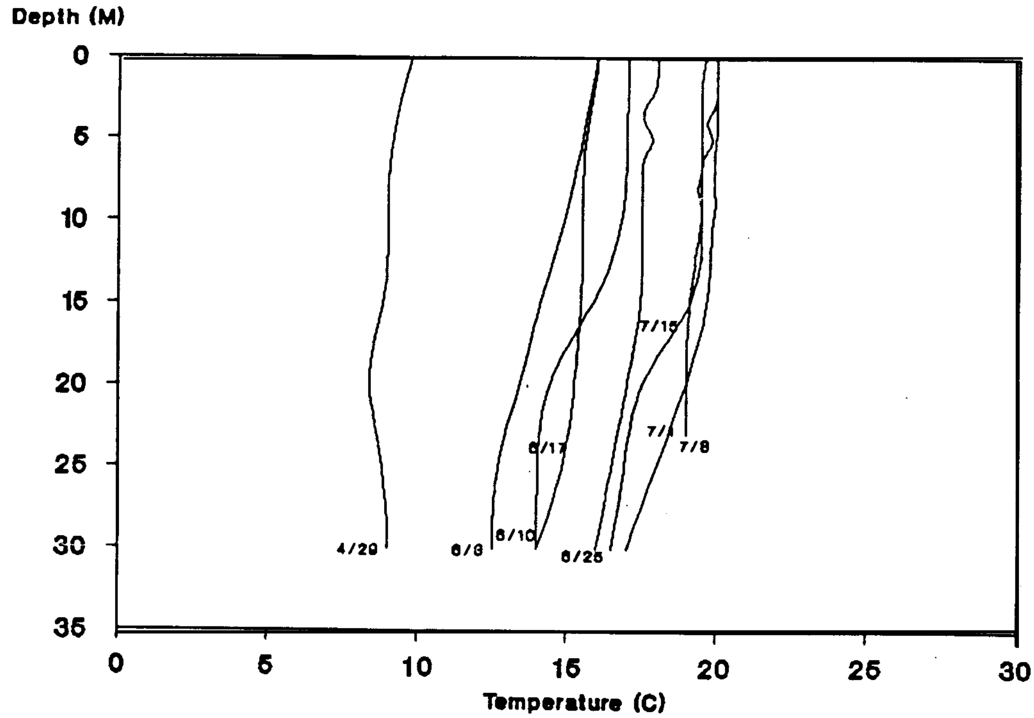
Appendix A. Figure 3. (continued)



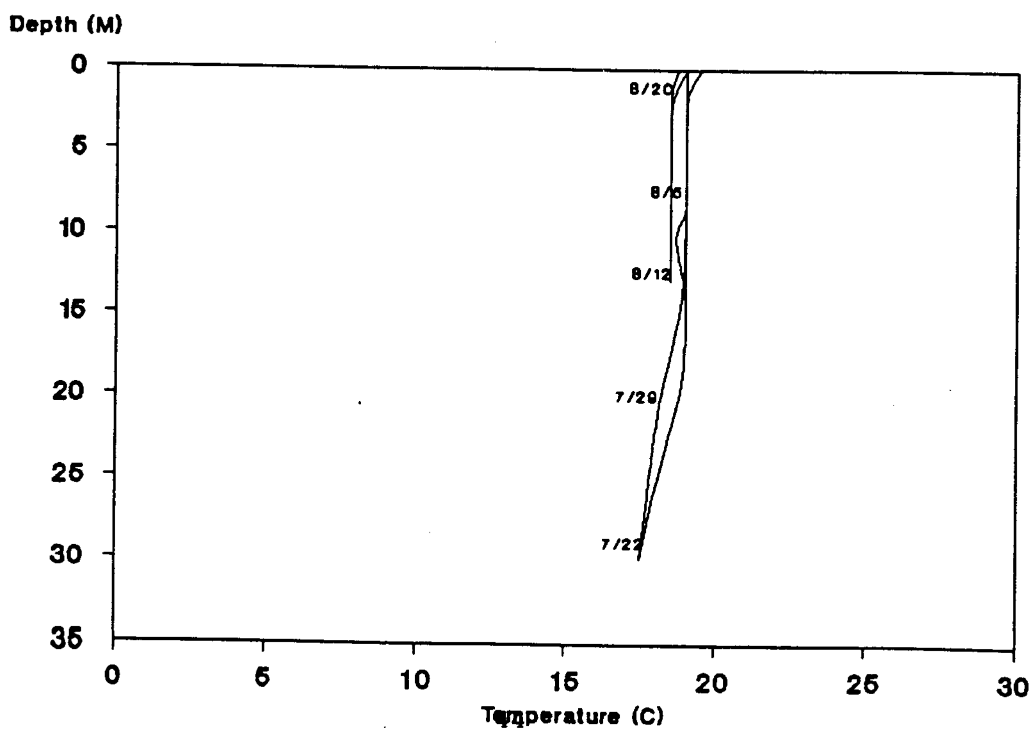
Lake Lowell



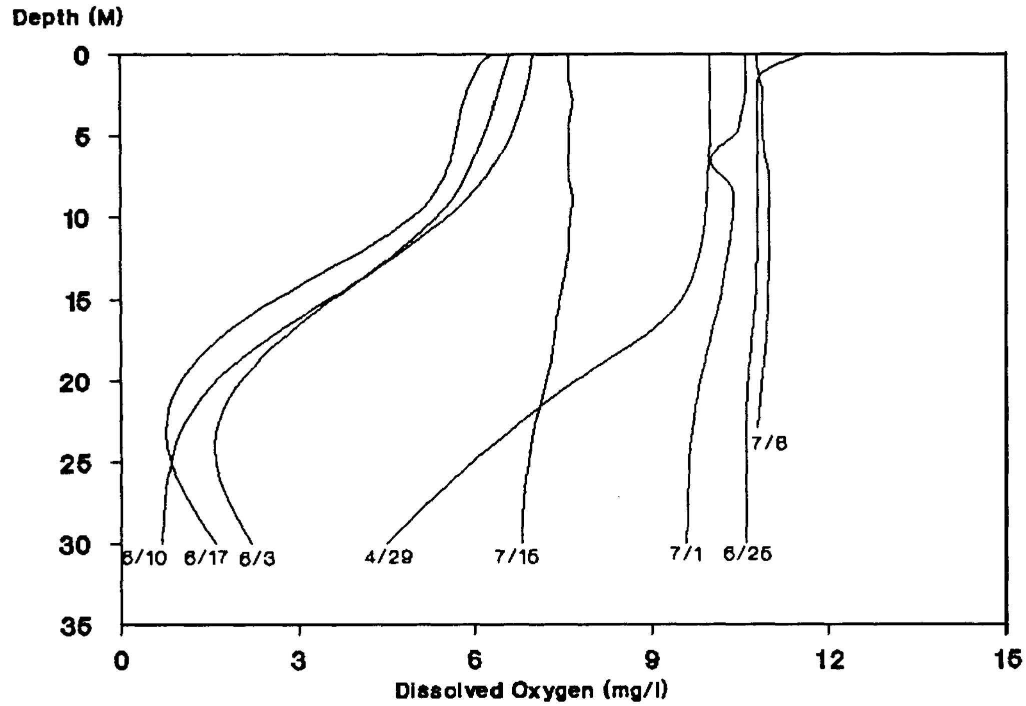
Appendix A. Figure 3. (continued)



Lucky Peak Reservoir

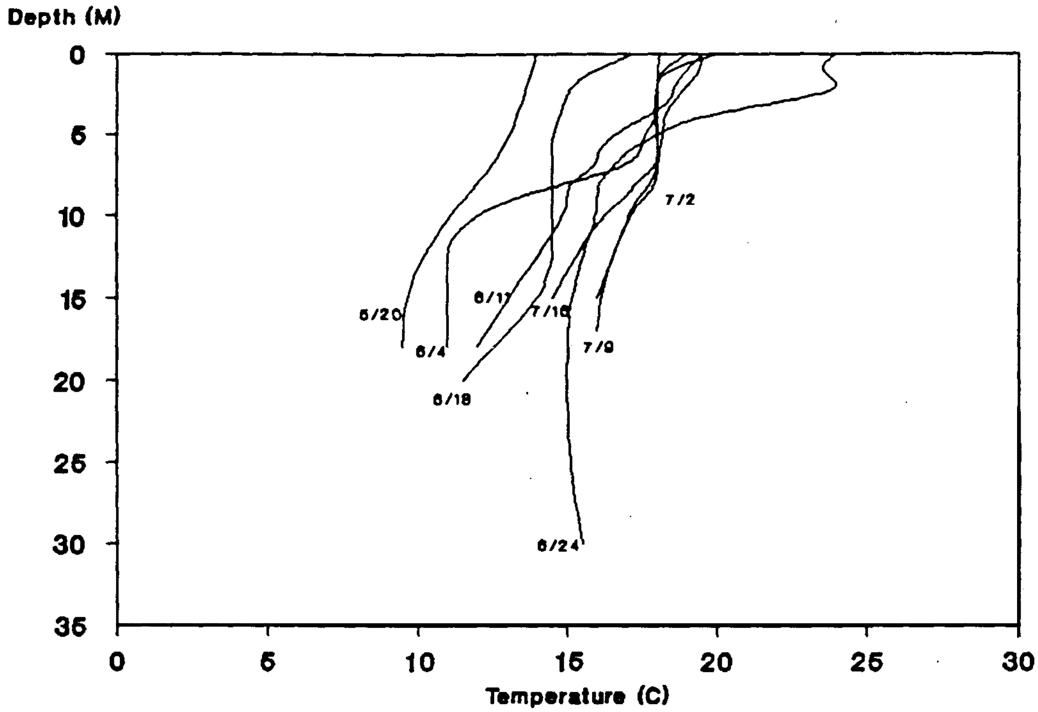


Appendix A. Figure 3. (continued)

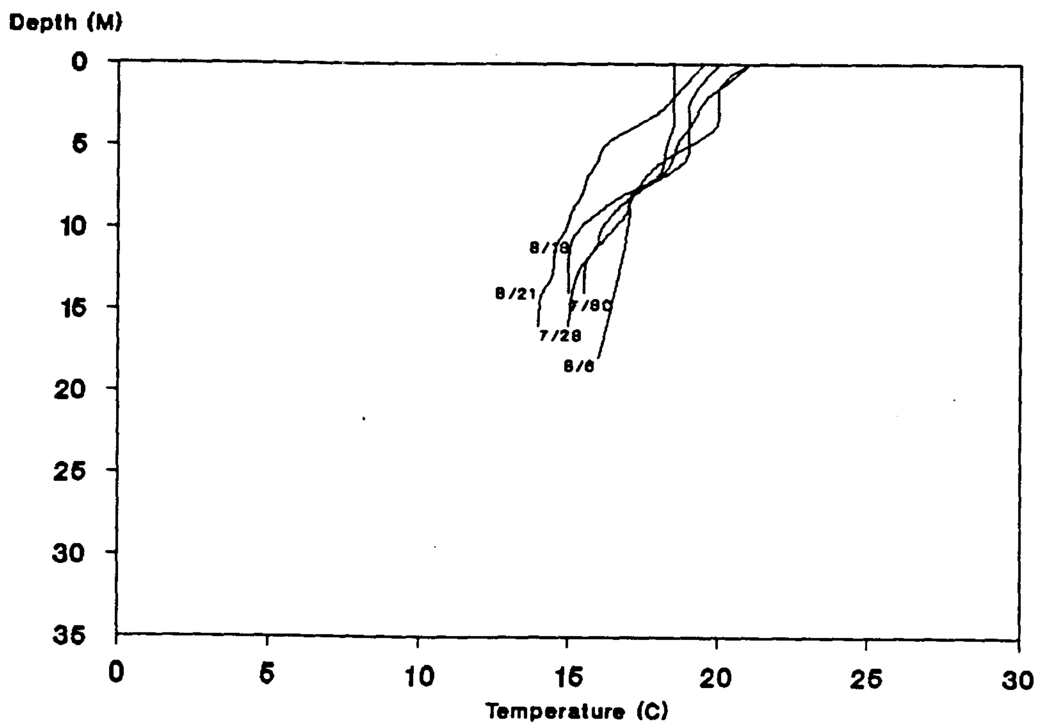


Lucky Peak Reservoir (continued)

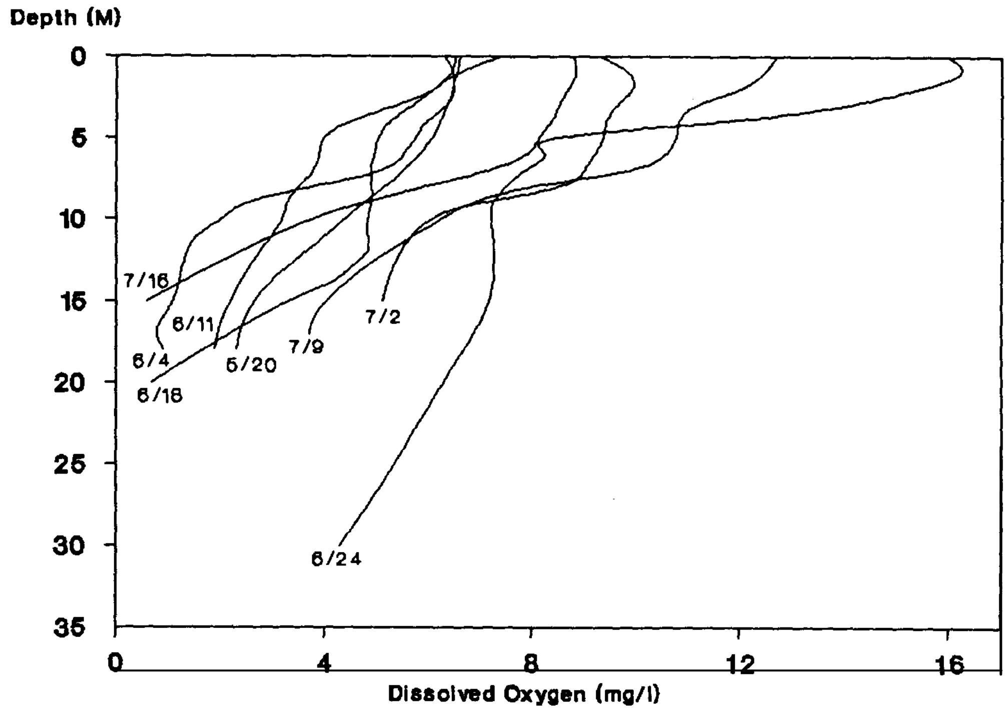
Appendix A. Figure 4. Results of temperature and dissolved oxygen sampling in Region 3-McCall Subregion lakes and reservoirs.



Cascade Reservoir

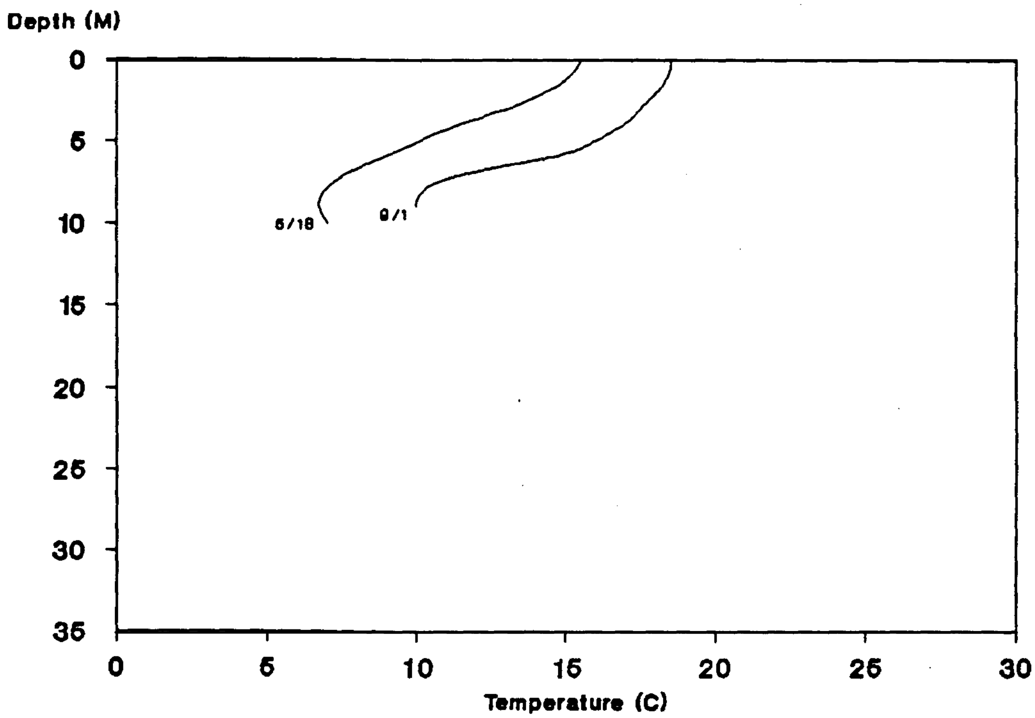


Appendix A. Figure 4. (continued)

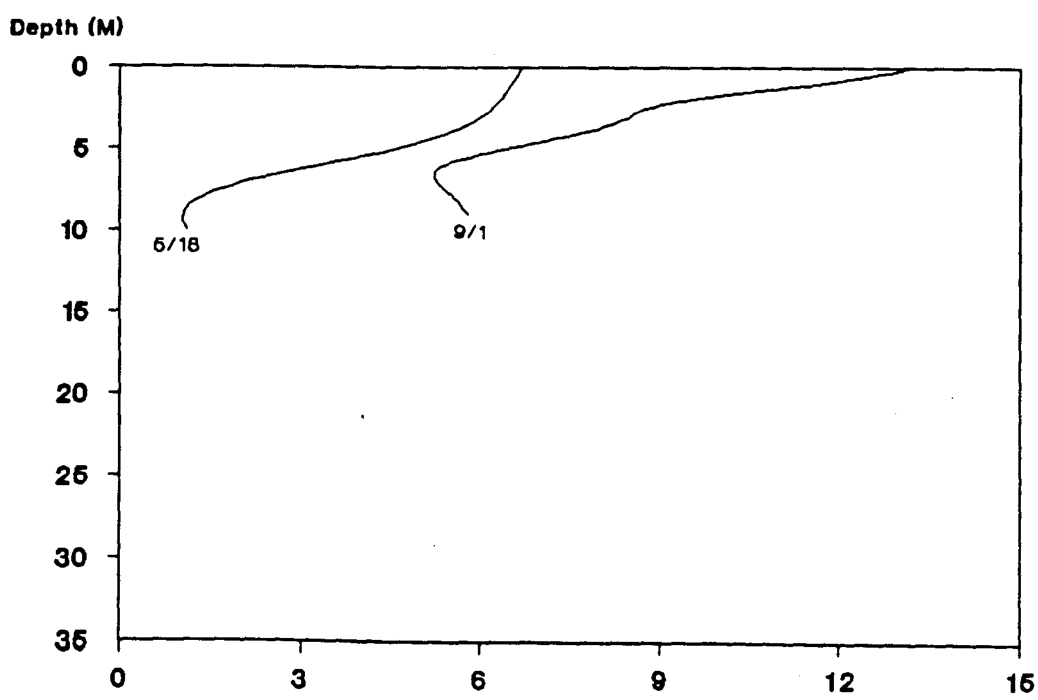


Cascade Reservoir (continued)

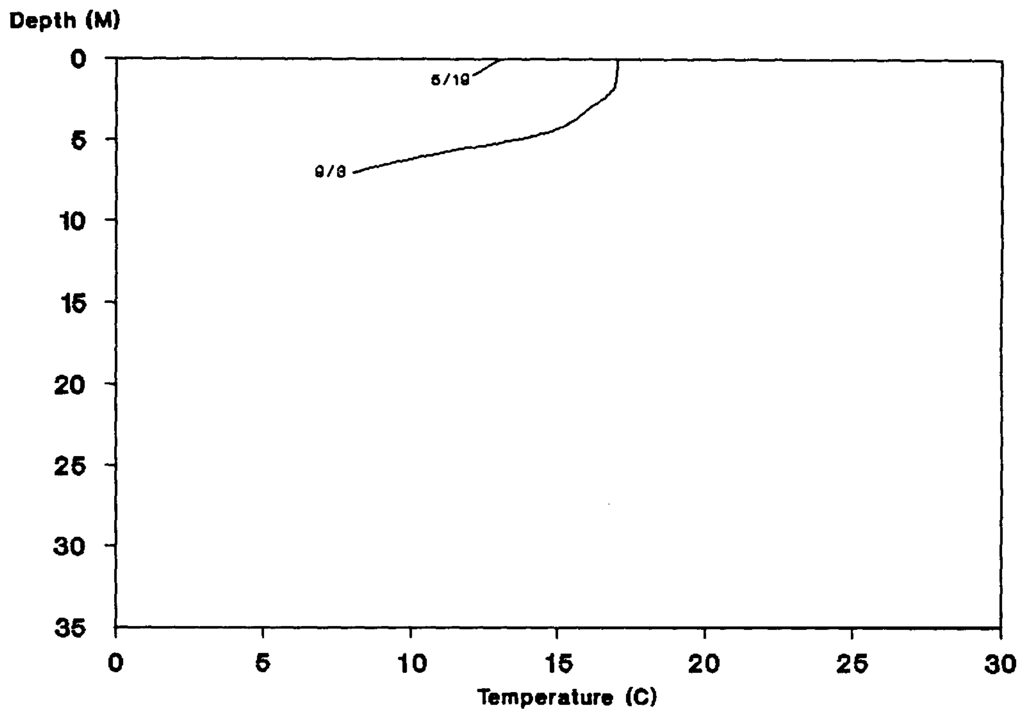
Appendix A. Figure 4. (continued)



Horsethief Reservoir

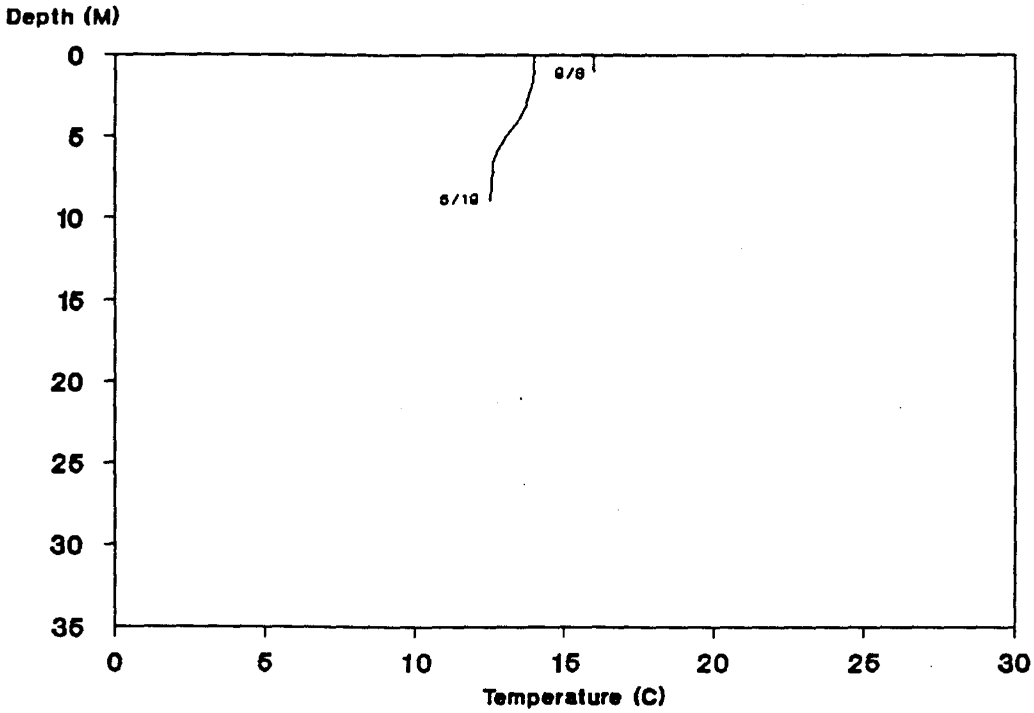


Appendix A. Figure 4. (continued)

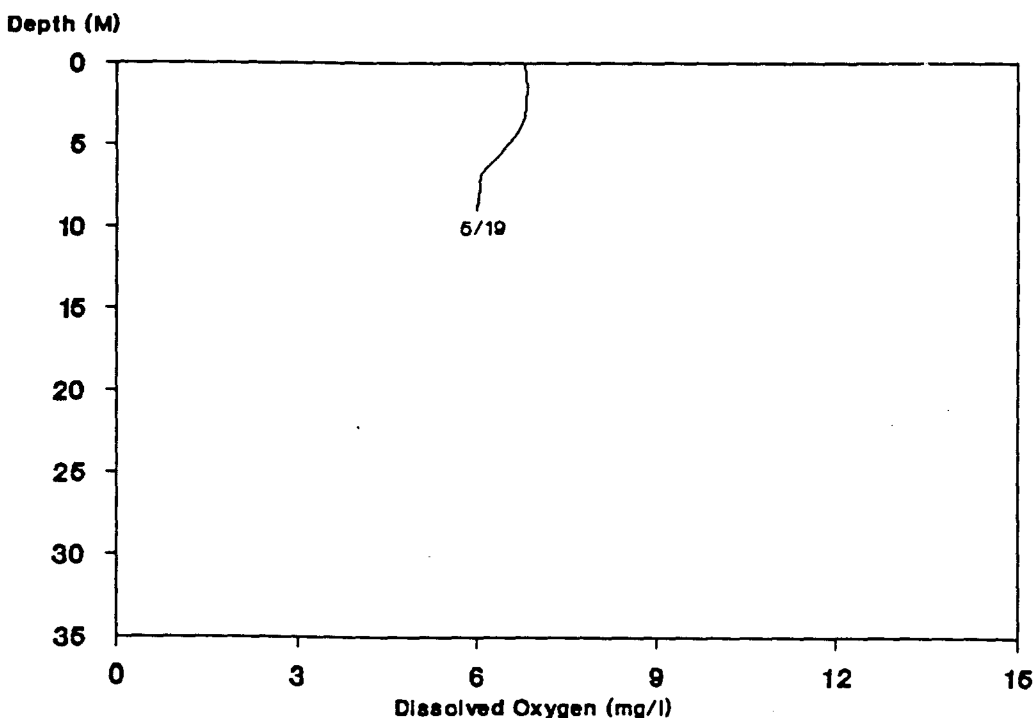


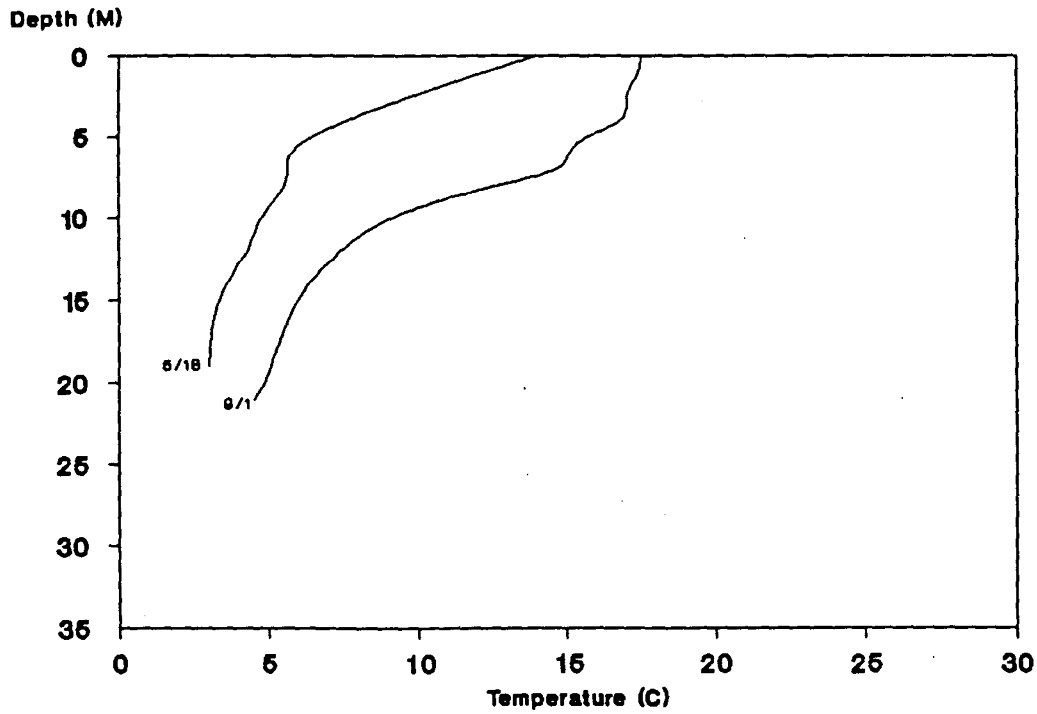
Little Payette Reservoir

Appendix A. Figure 4. (continued)

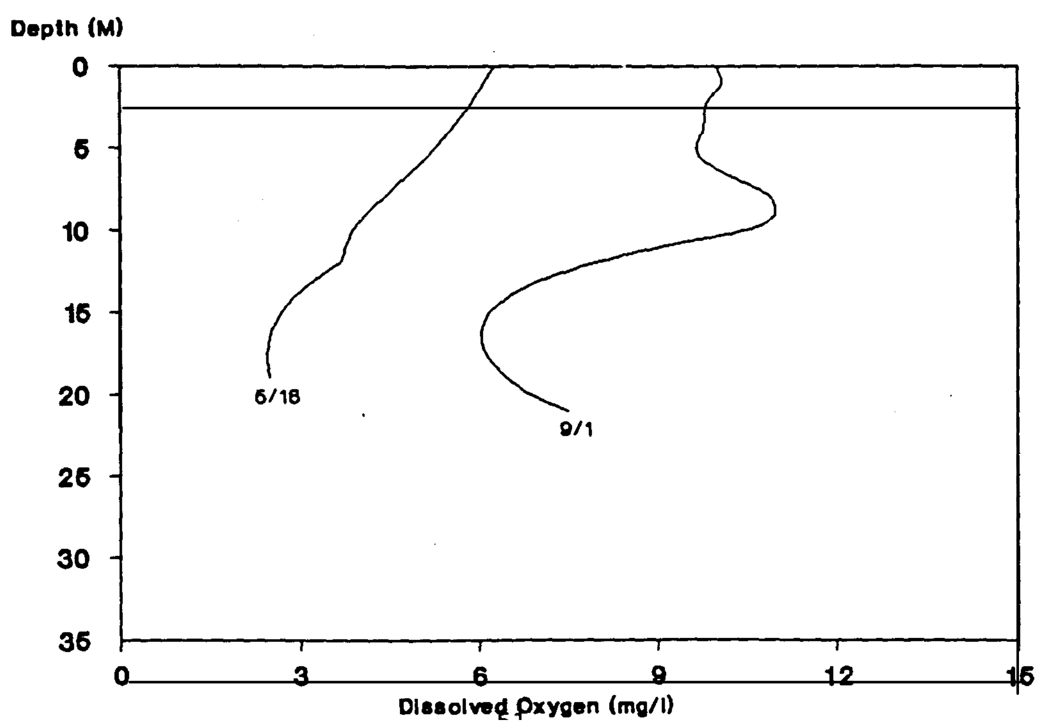


Lost Valley Reservoir

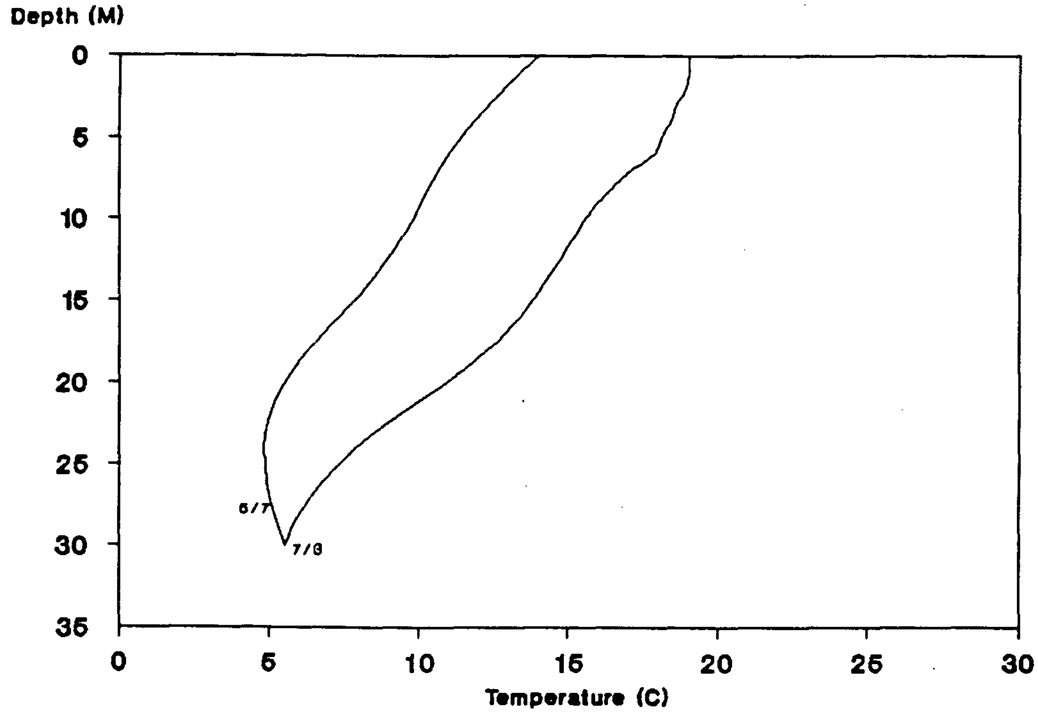



Depth (M)
0
5
10
15
20
25
30
35
0
5
10
15
20
25
30
Temperature (C)
5/18
9/1

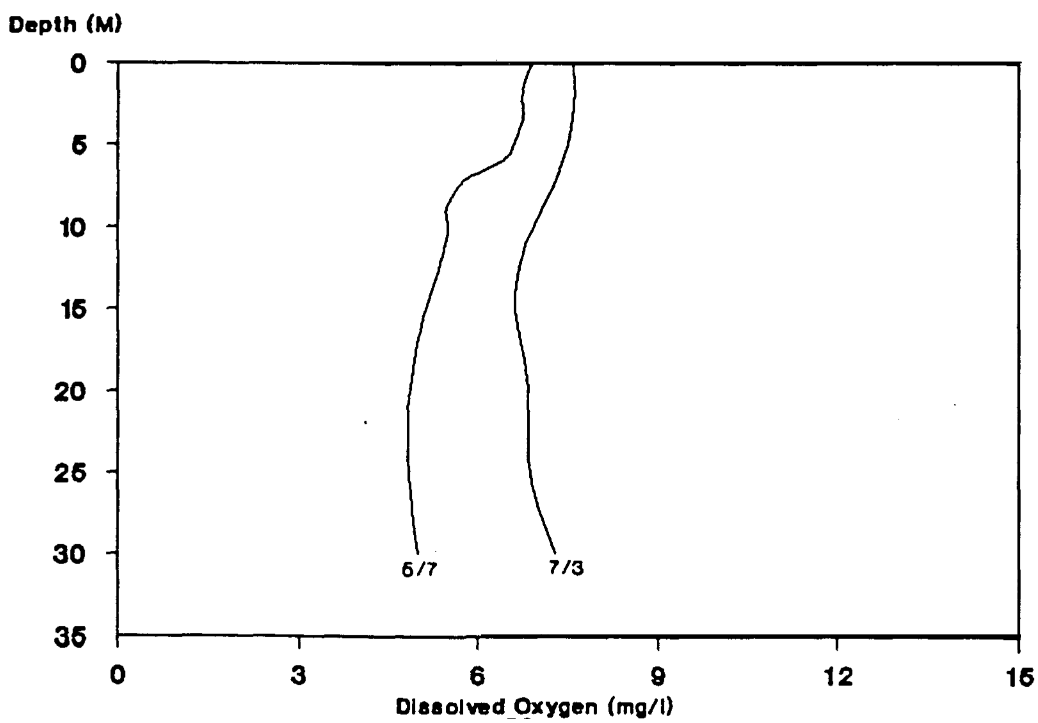
Warm Lake


Depth (M)
0
5
10
15
20
25
30
35
0
3
6
9
12
15
Dissolved Oxygen (mg/l)
5/18
9/1

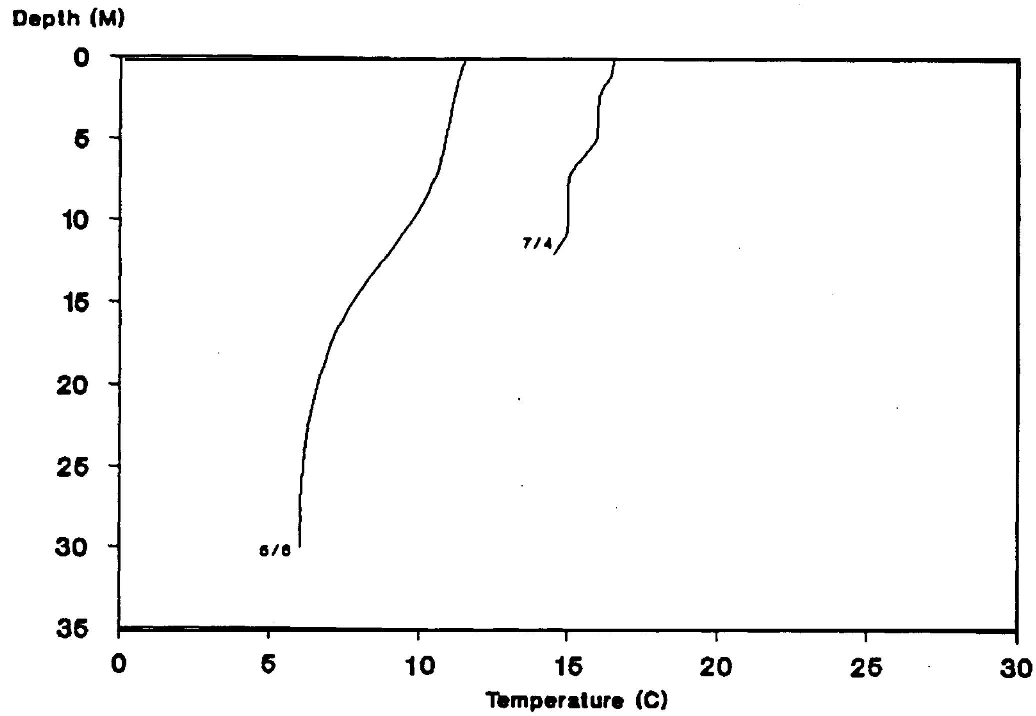
Appendix A. Figure 5. Results of temperature and dissolved oxygen sampling in Region 4 lakes and reservoirs.



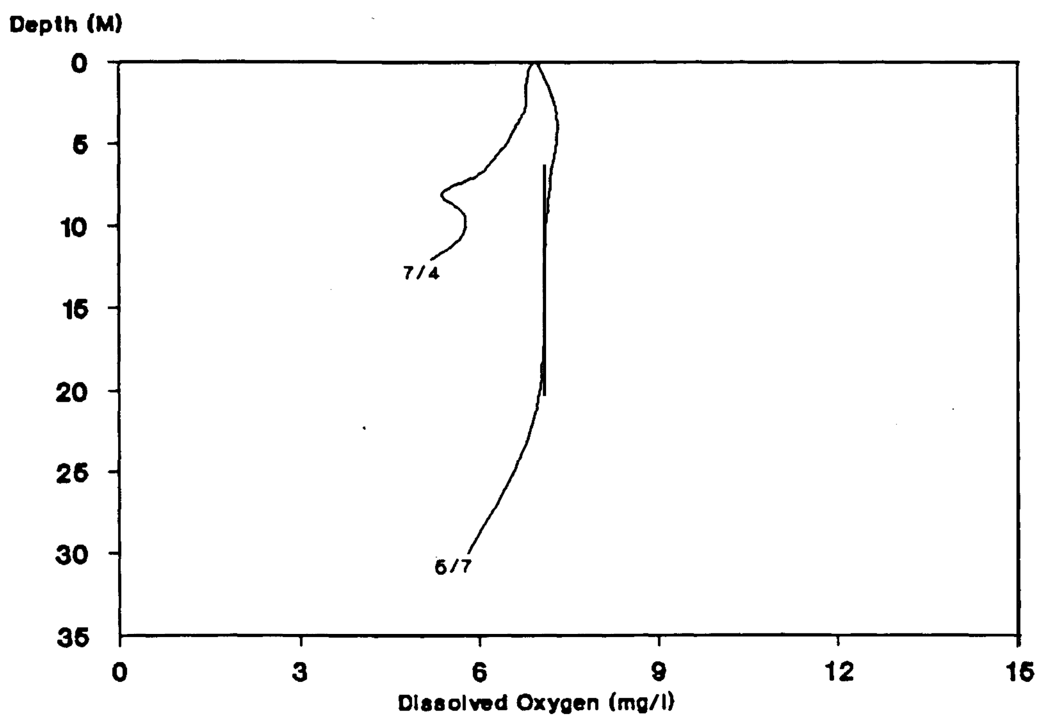
Anderson Ranch Reservoir



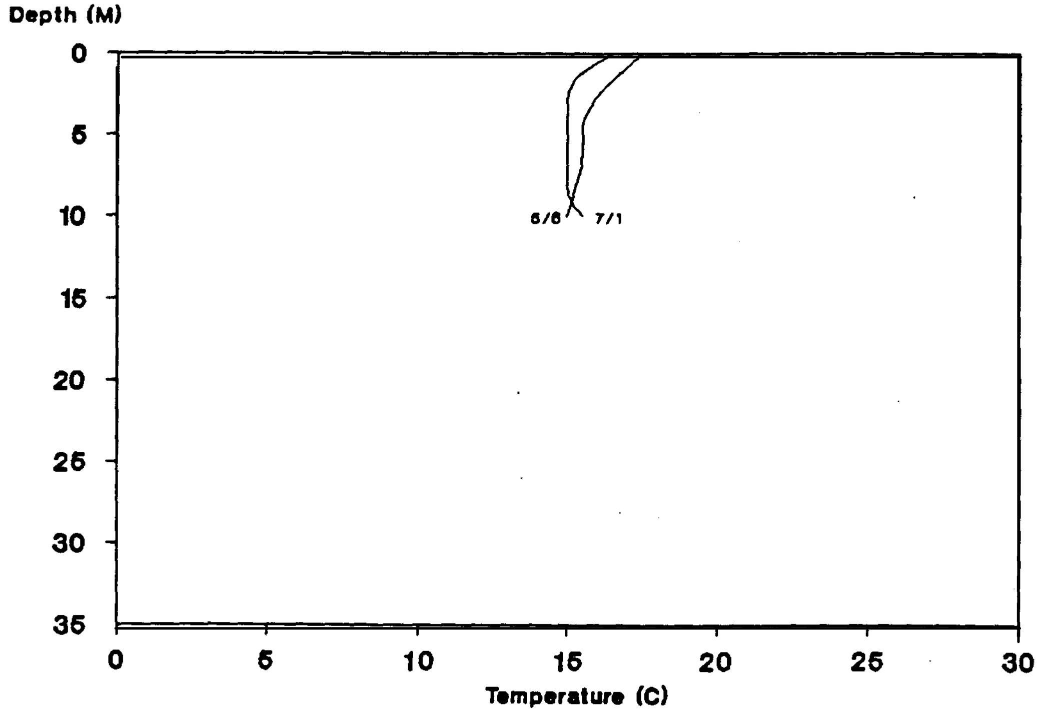
Appendix A. Figure 5. (continued)



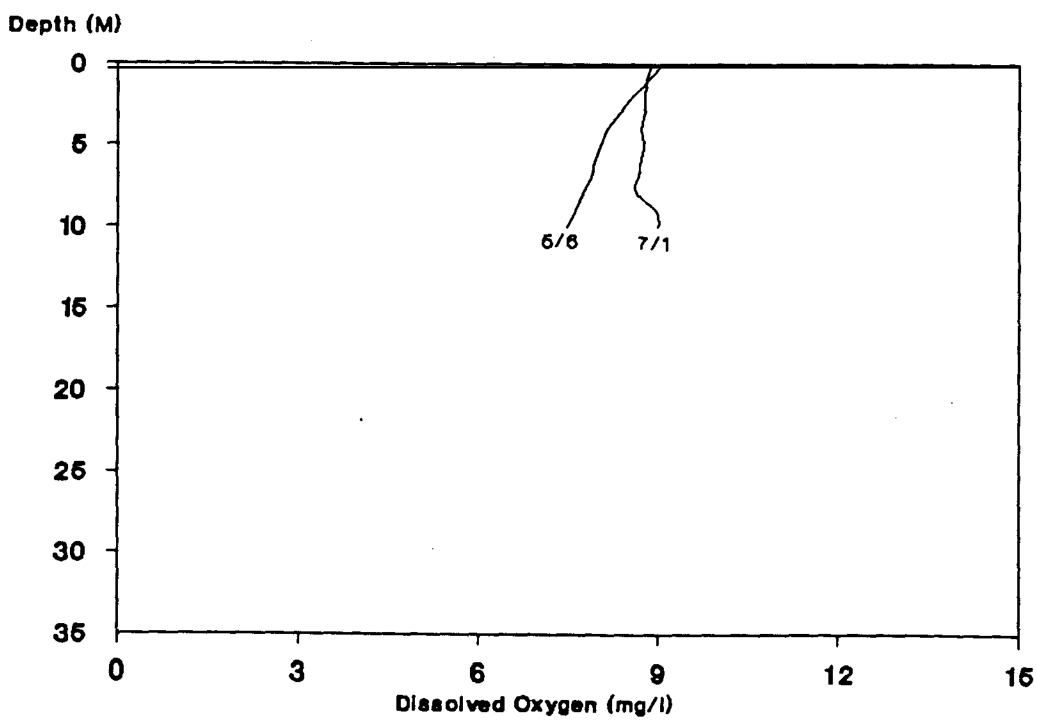
Little Wood Reservoir



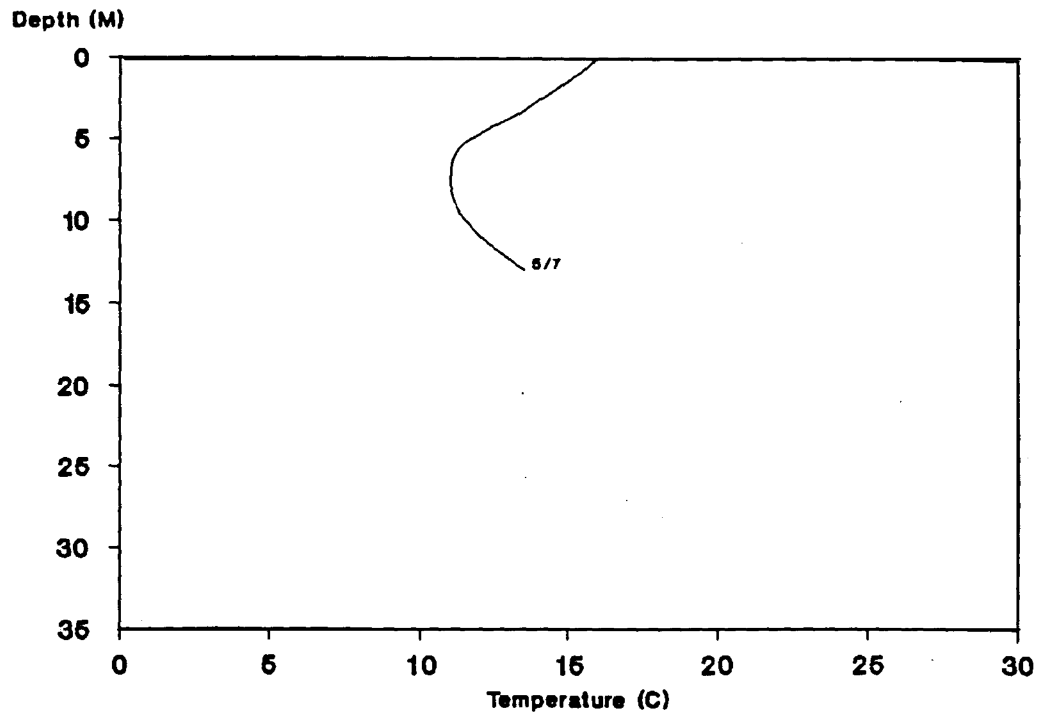
Appendix A. Figure 5. (continued)



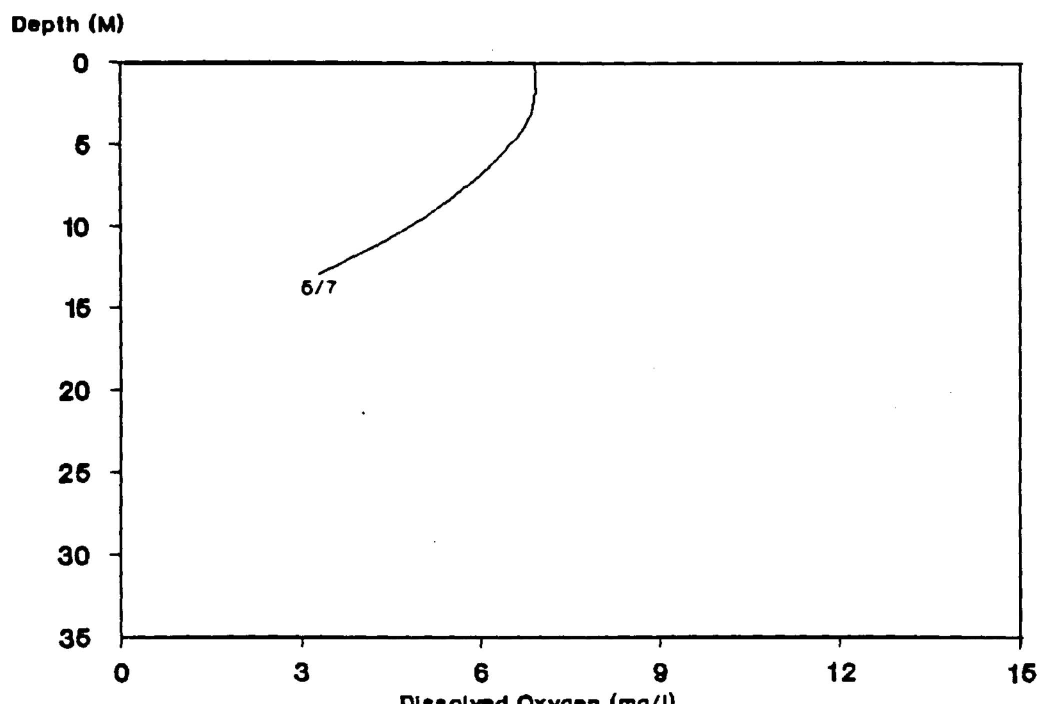
Lower Salmon Falls Reservoir



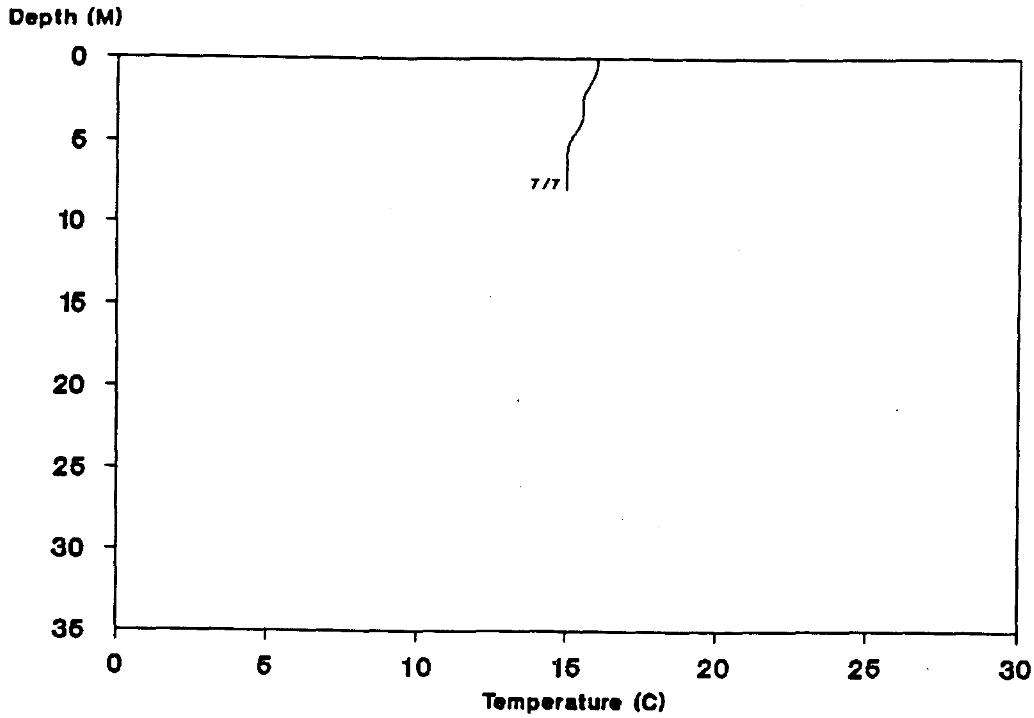
Appendix A. Figure 5. (continued)



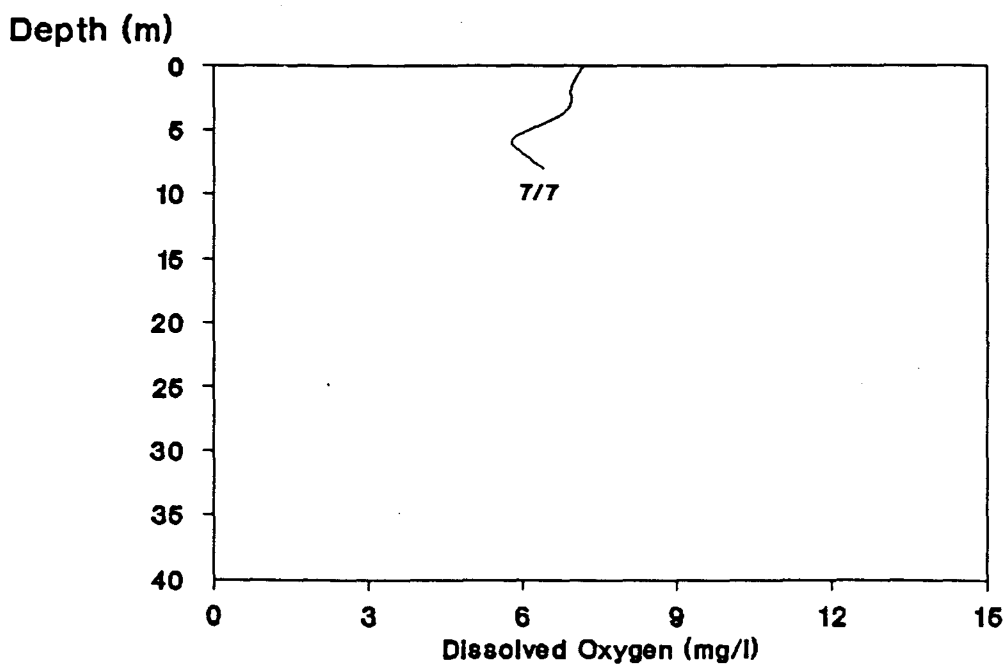
Magic Reservoir



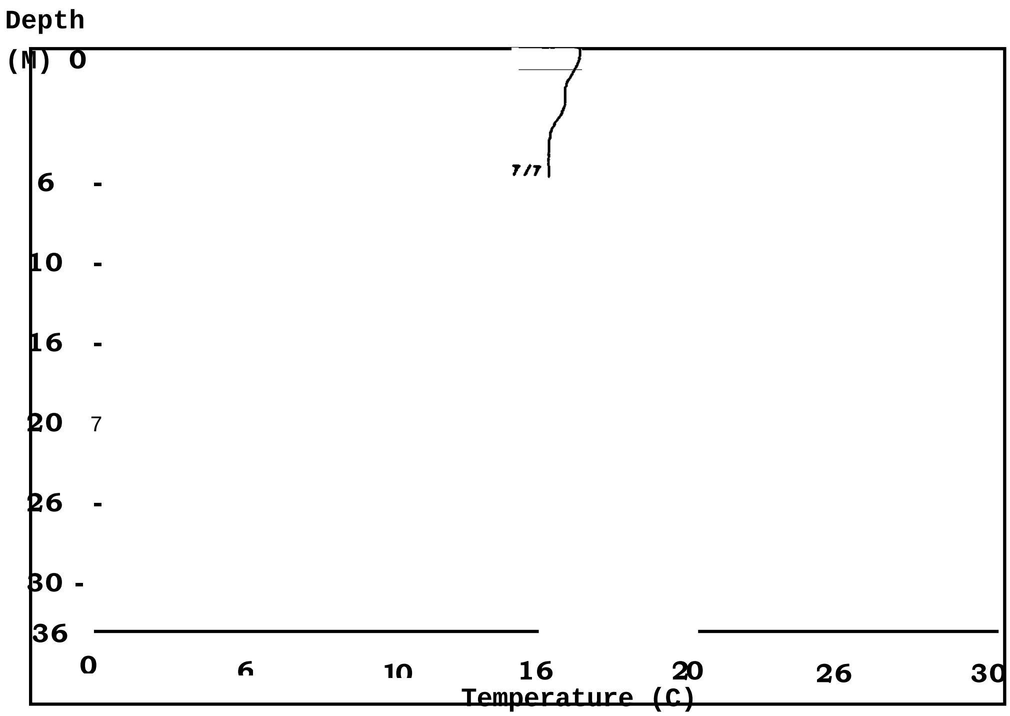
Appendix A. Figure 5. (continued)



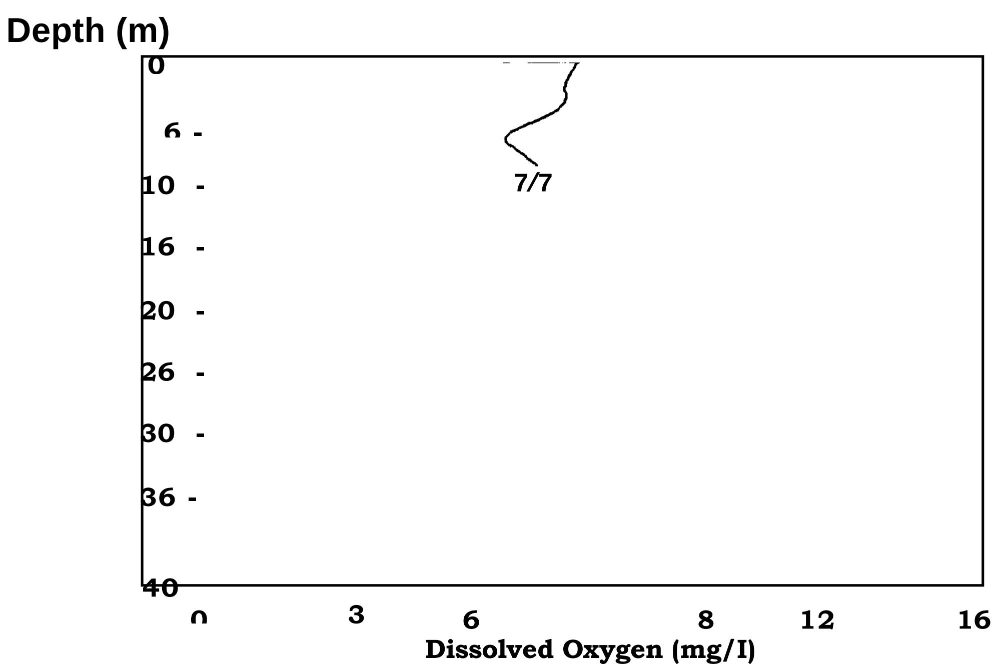
Oakley Reservoir



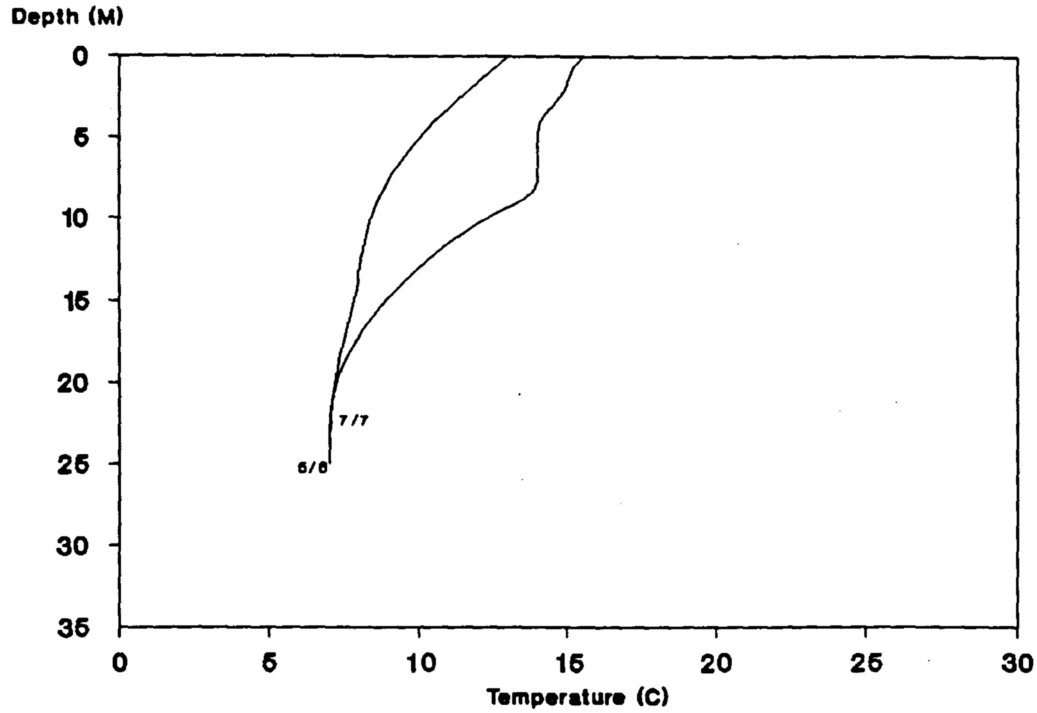
Appendix A. Figure 5. (continued)



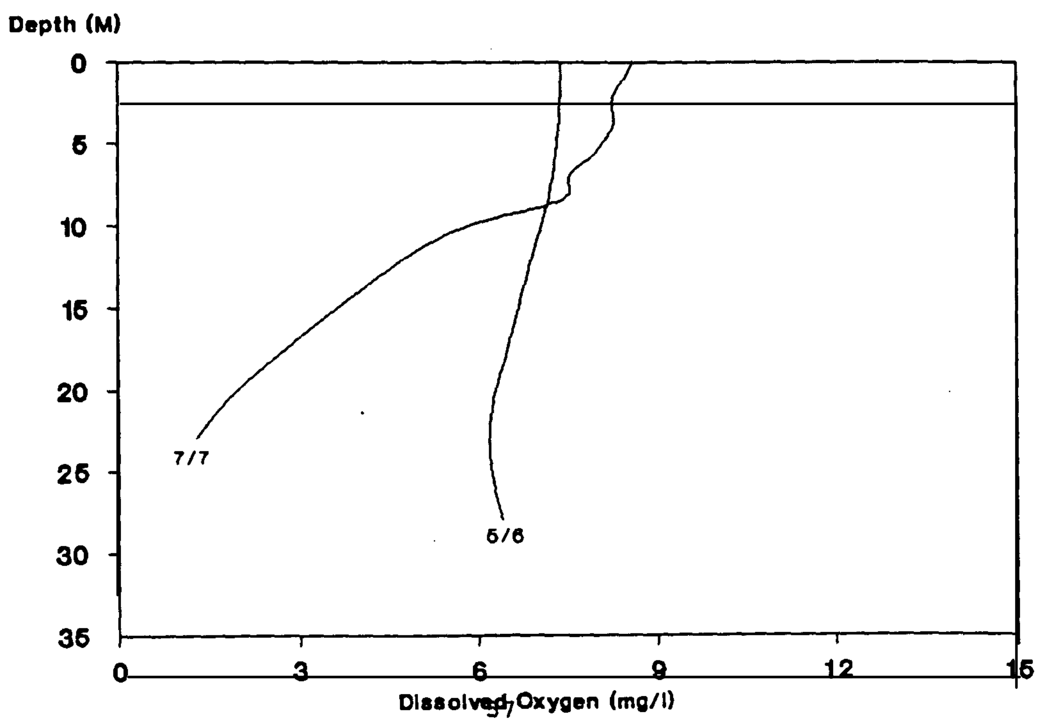
Oakley **Reservoir**



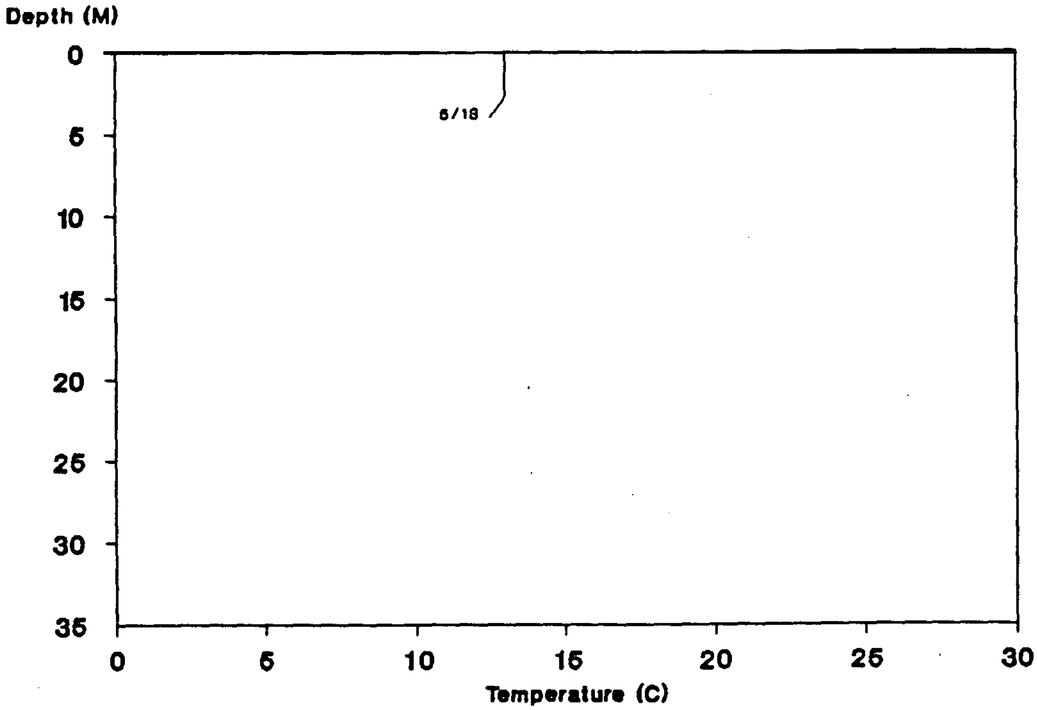
Appendix A. Figure 5. (continued)



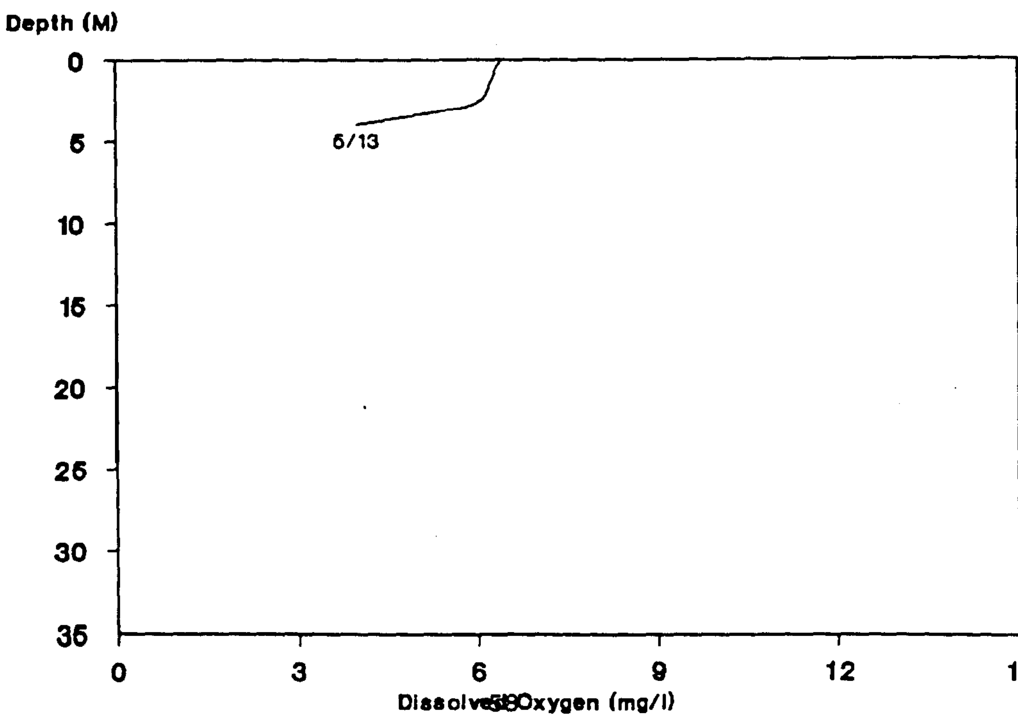
Salmon Falls Creek Reservoir



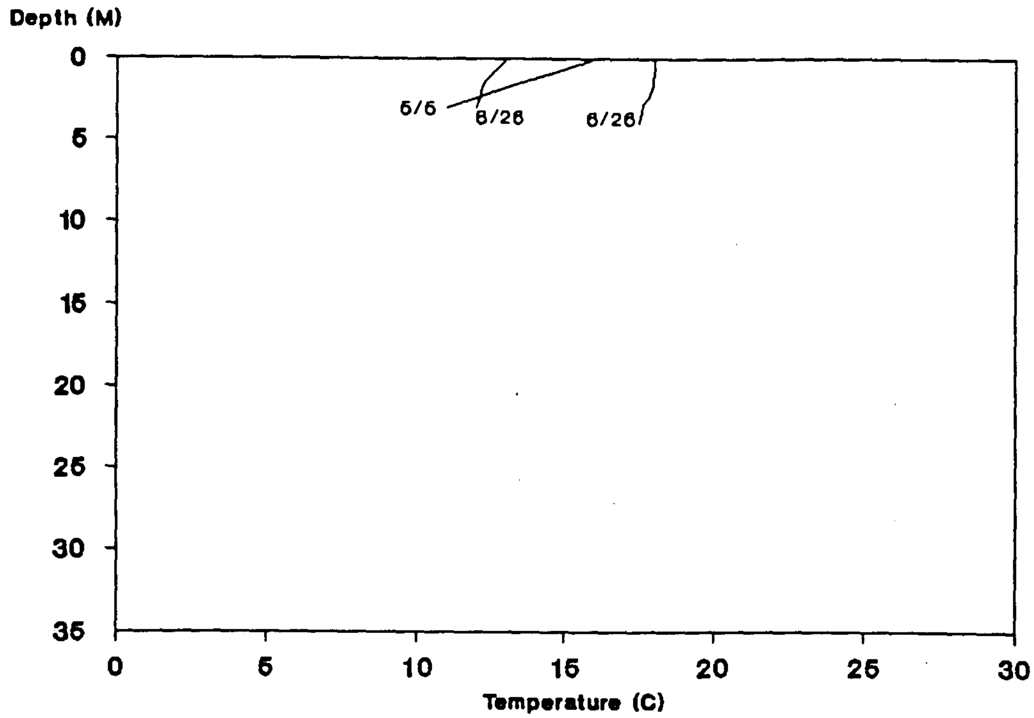
Appendix A. Figure 6. Results of temperature and dissolved oxygen sampling in Region 5 lakes and reservoirs.



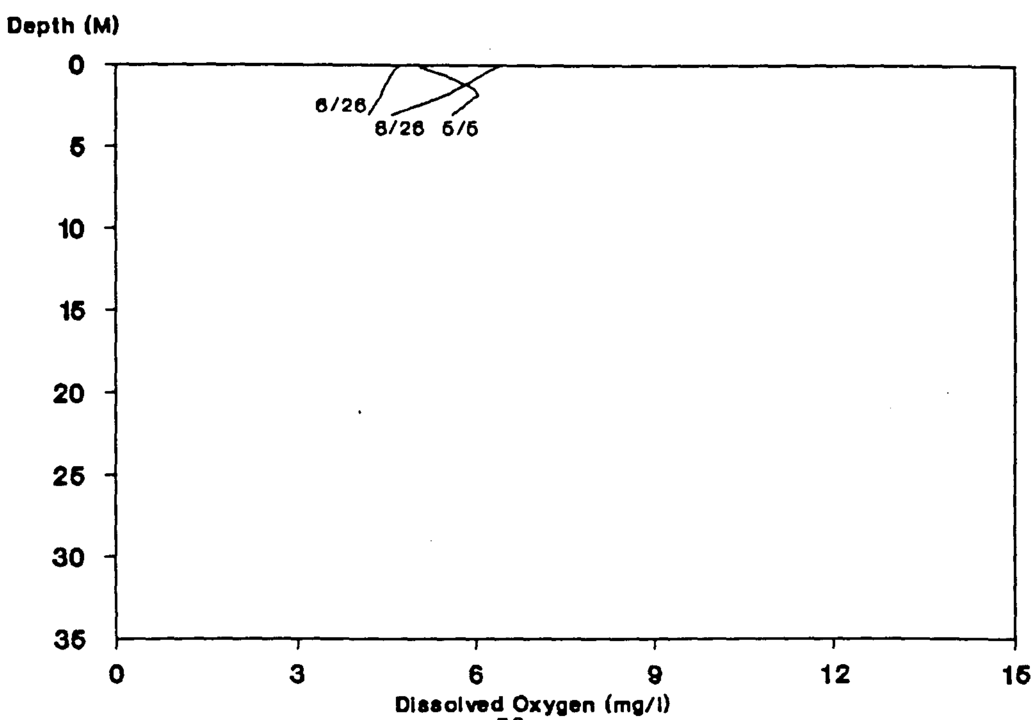
Alexander Reservoir



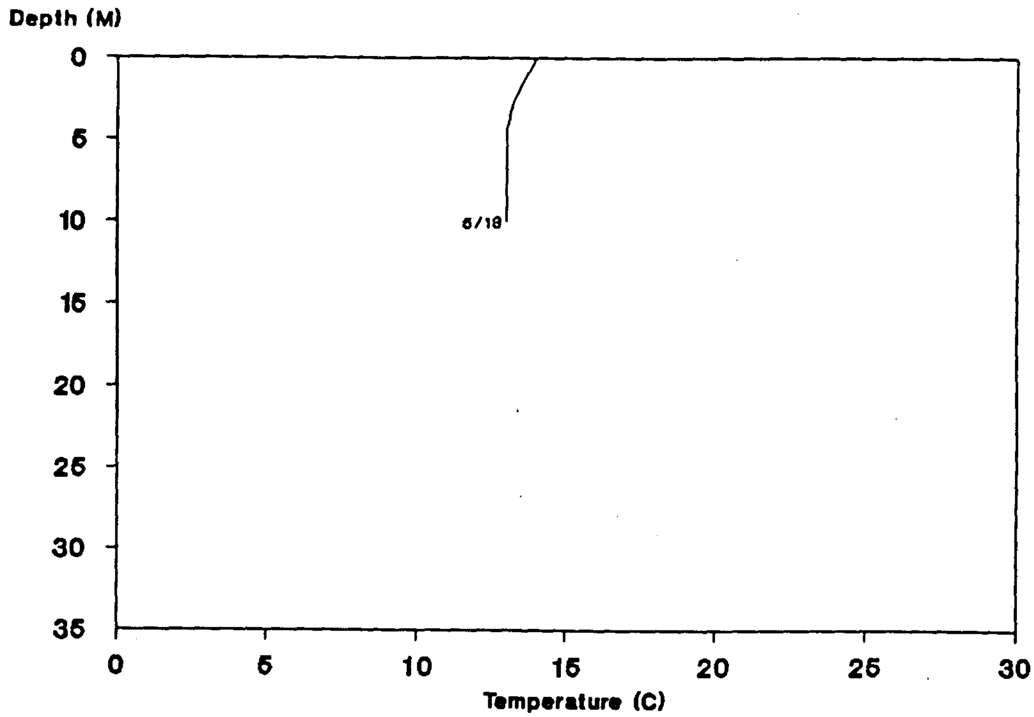
Appendix A. Figure 6. (continued)



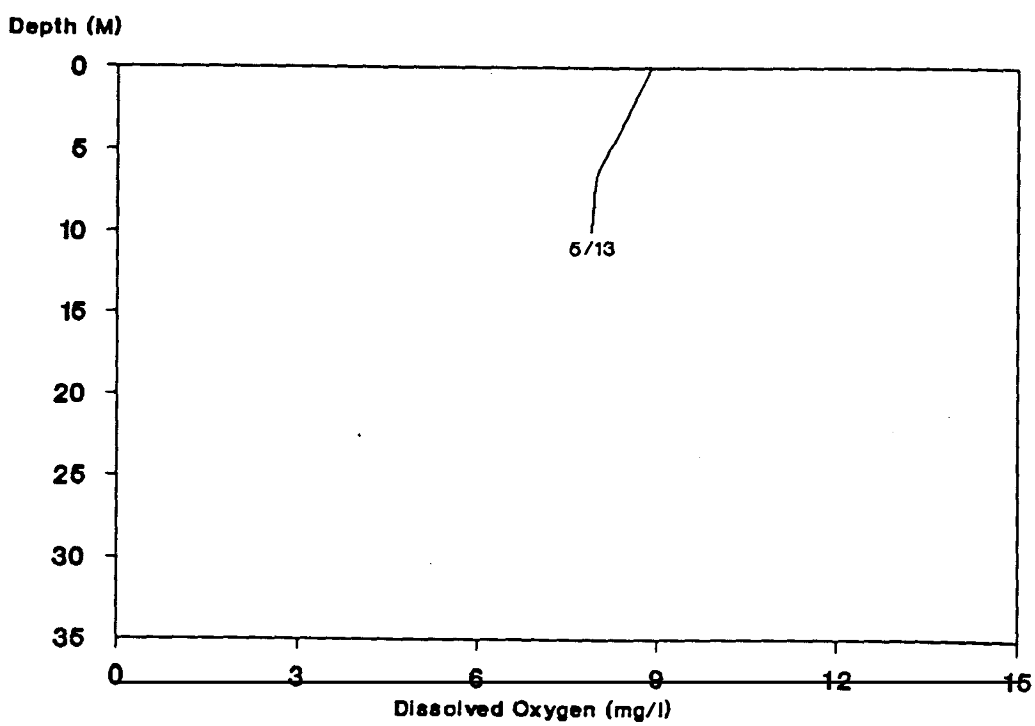
Blackfoot Reservoir



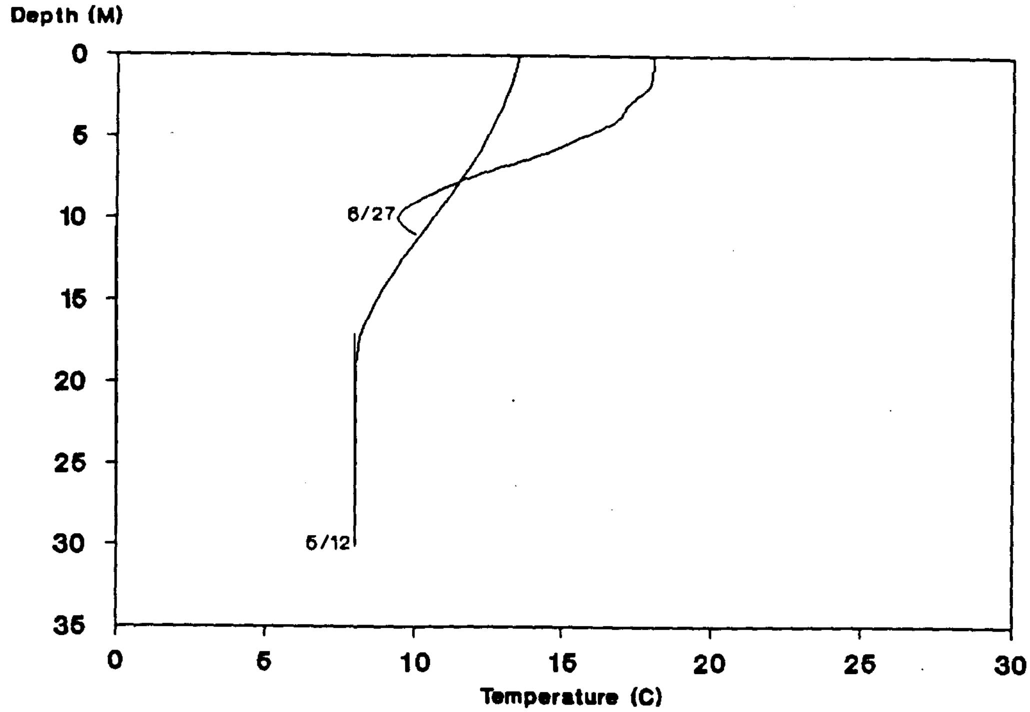
Appendix A. Figure 6. (continued)



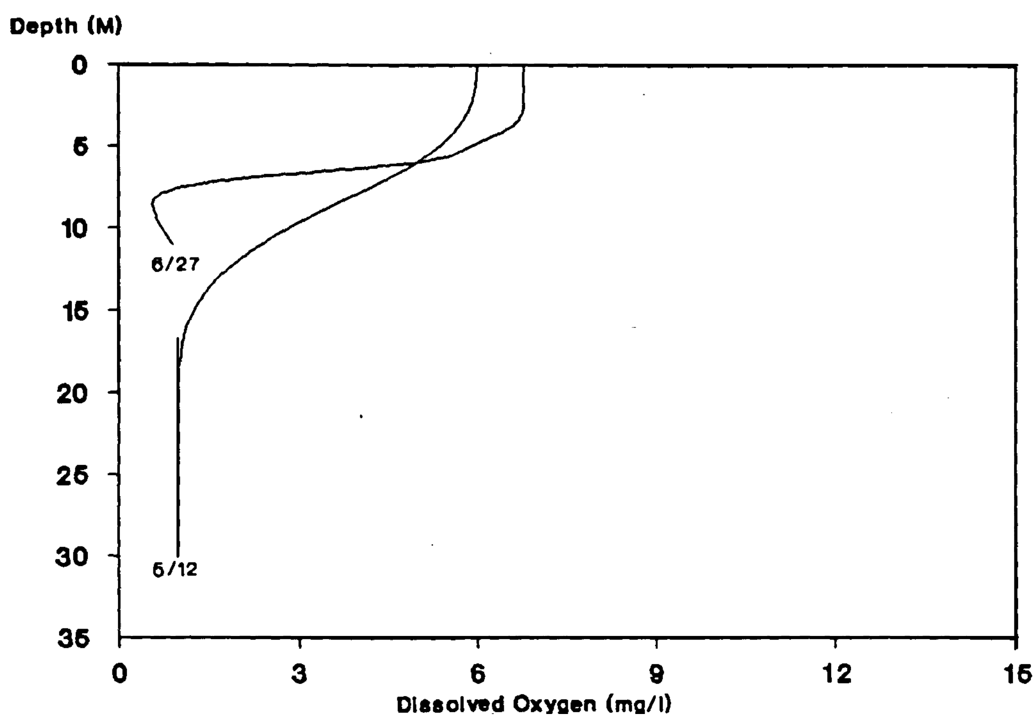
Chesterfield Reservoir



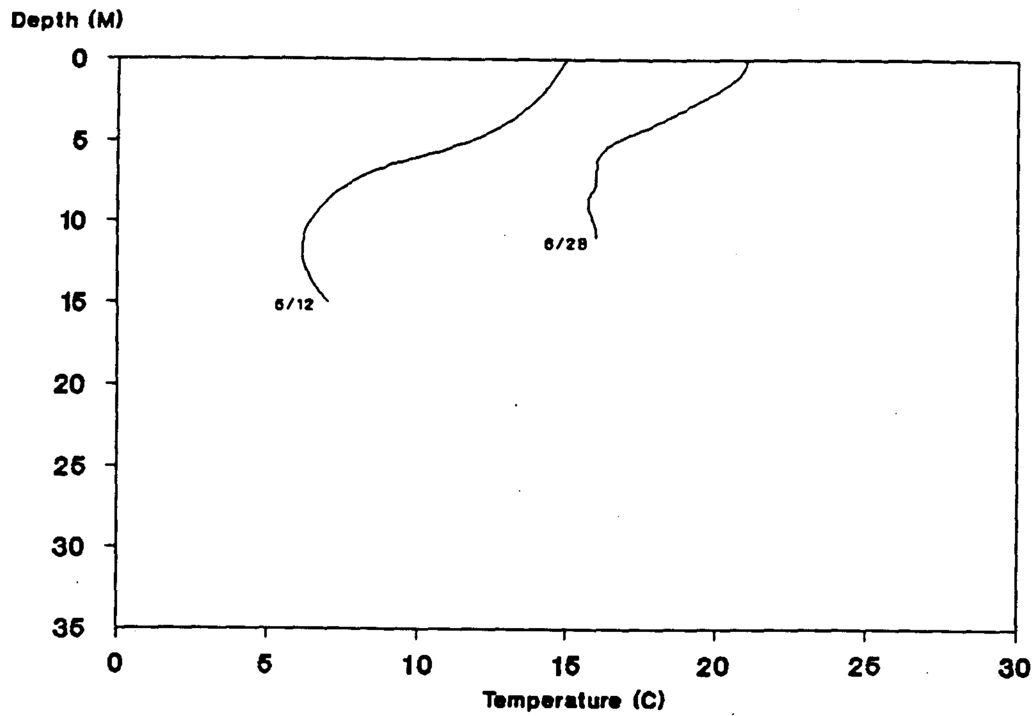
Appendix A. Figure 6. (continued)



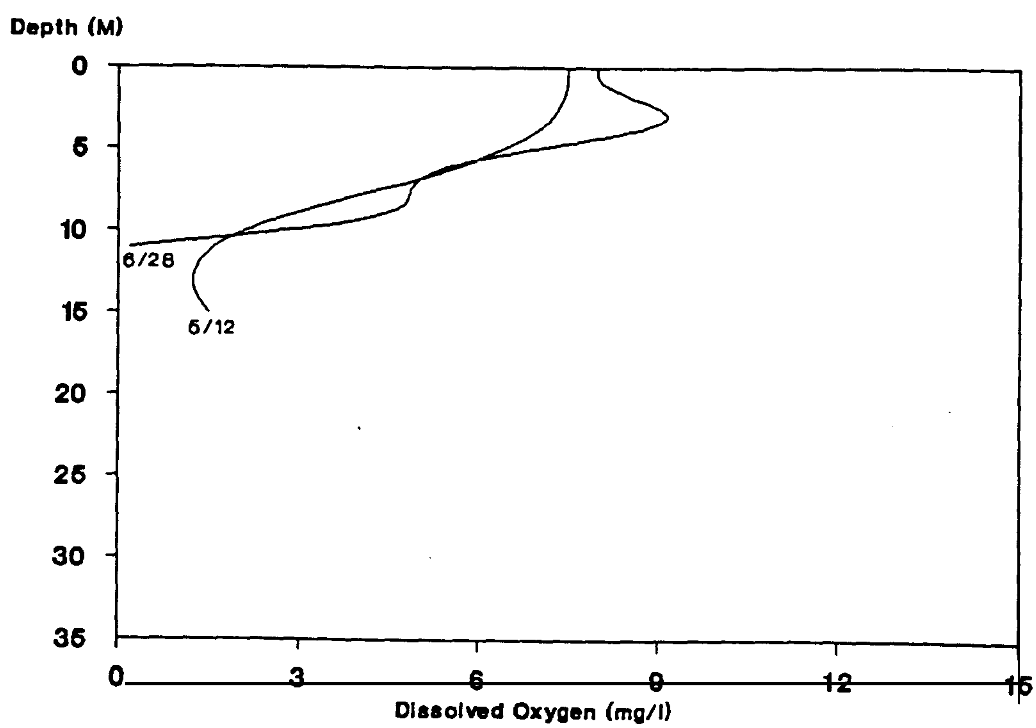
Daniels Reservoir



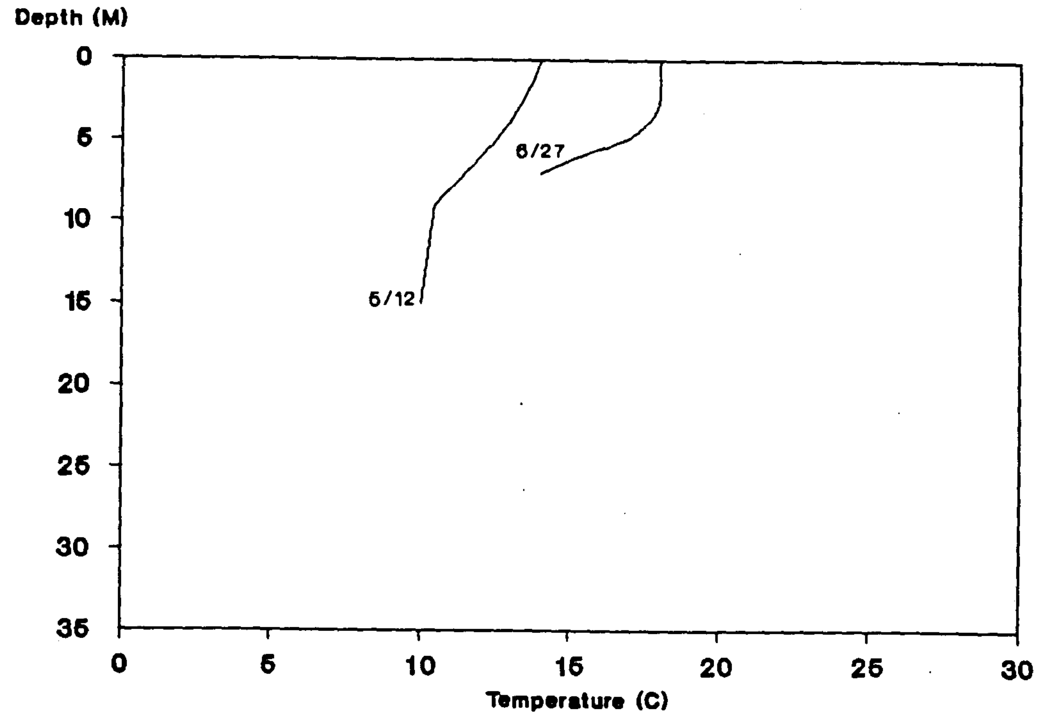
Appendix A. Figure 6. (continued)



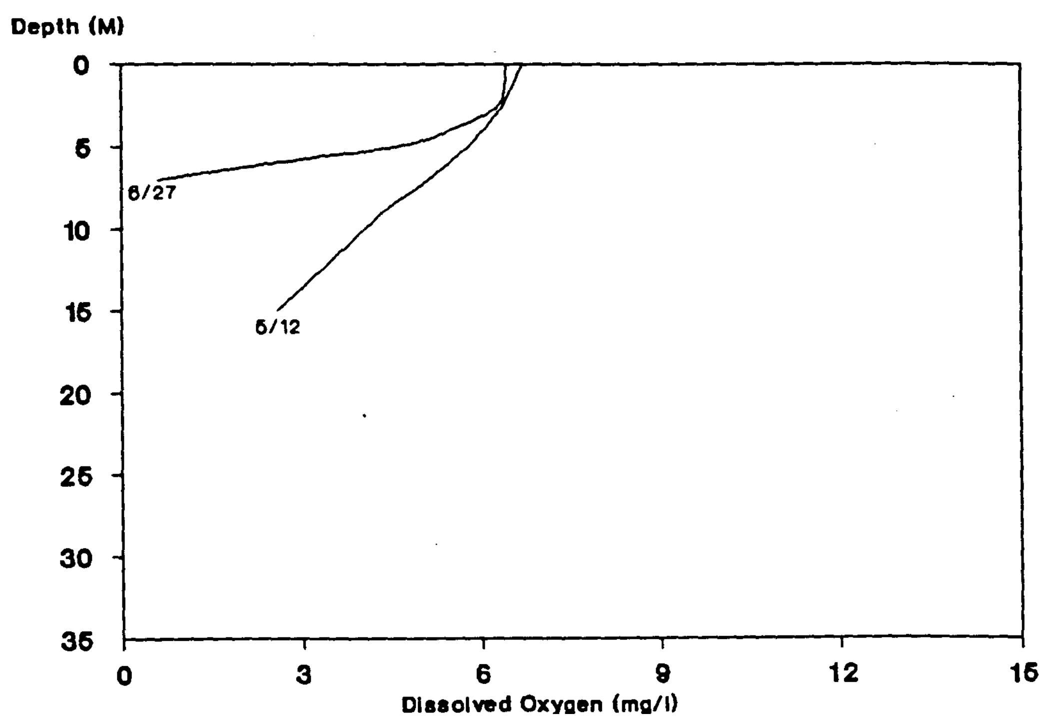
Deep Creek Reservoir



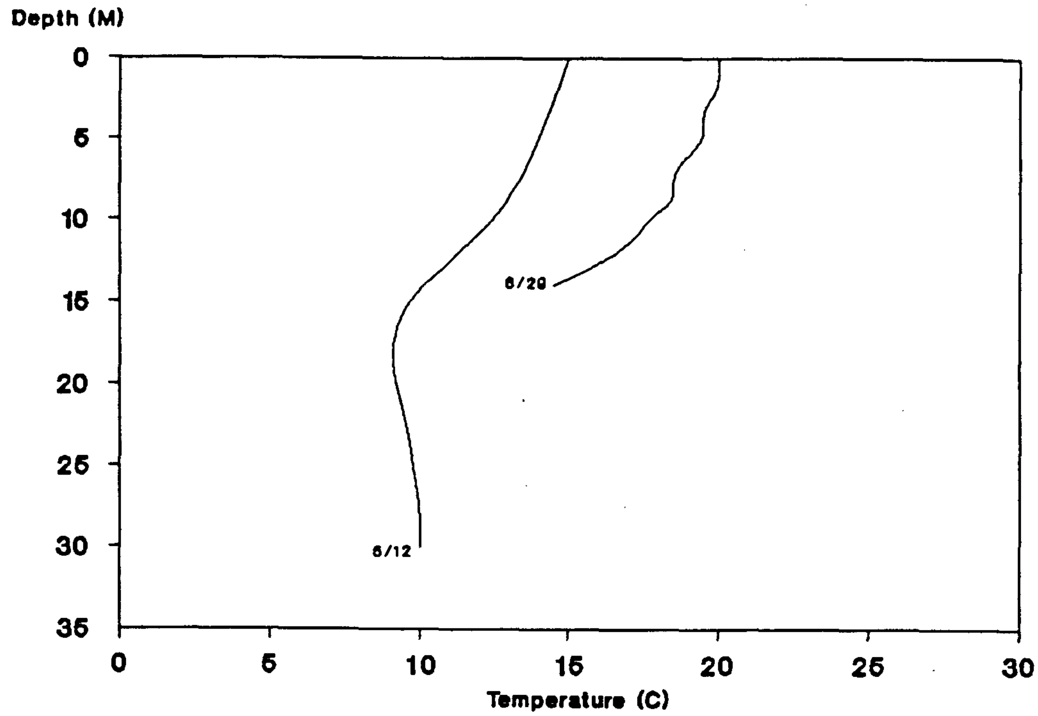
Appendix A. Figure 6. (continued)



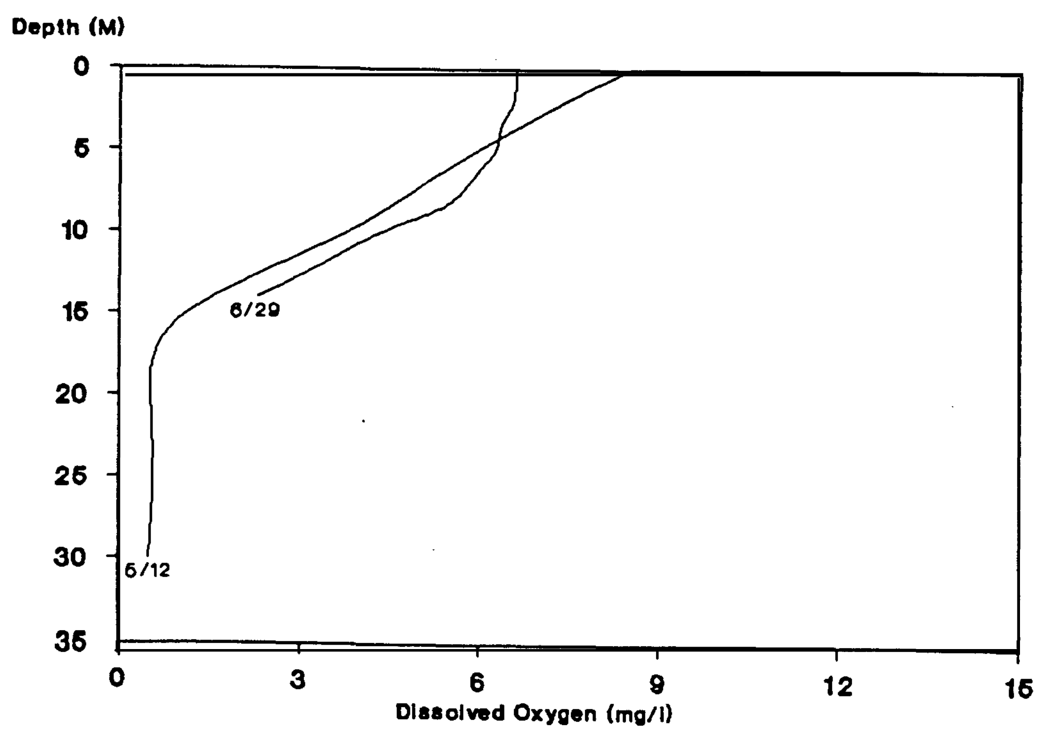
Devils Creek Reservoir



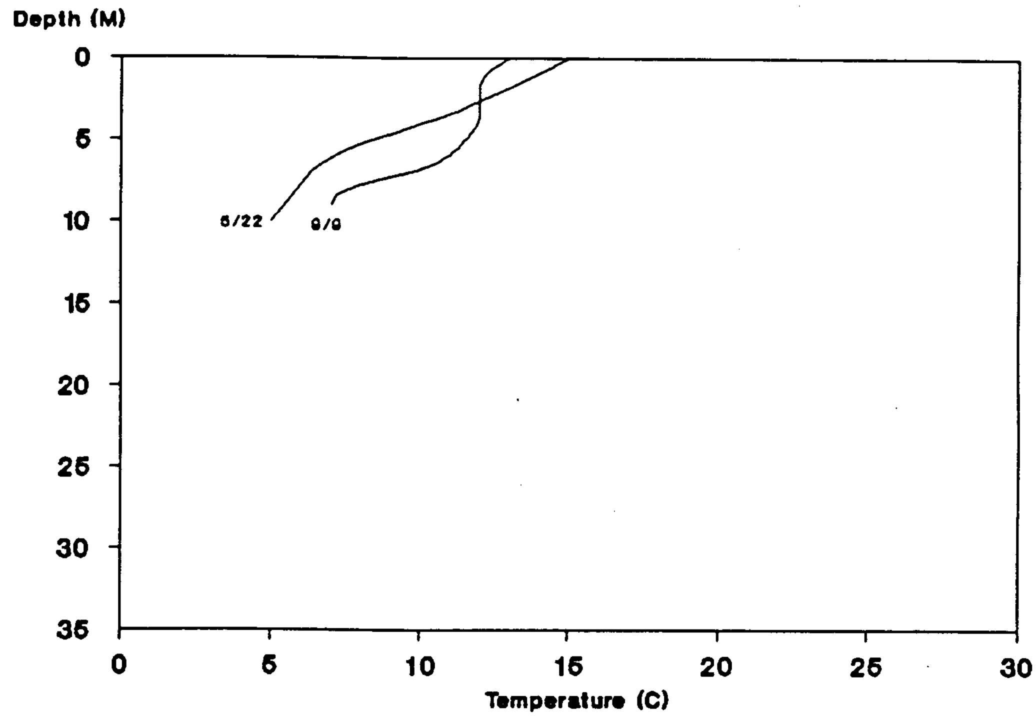
Appendix A. Figure 6. (continued)



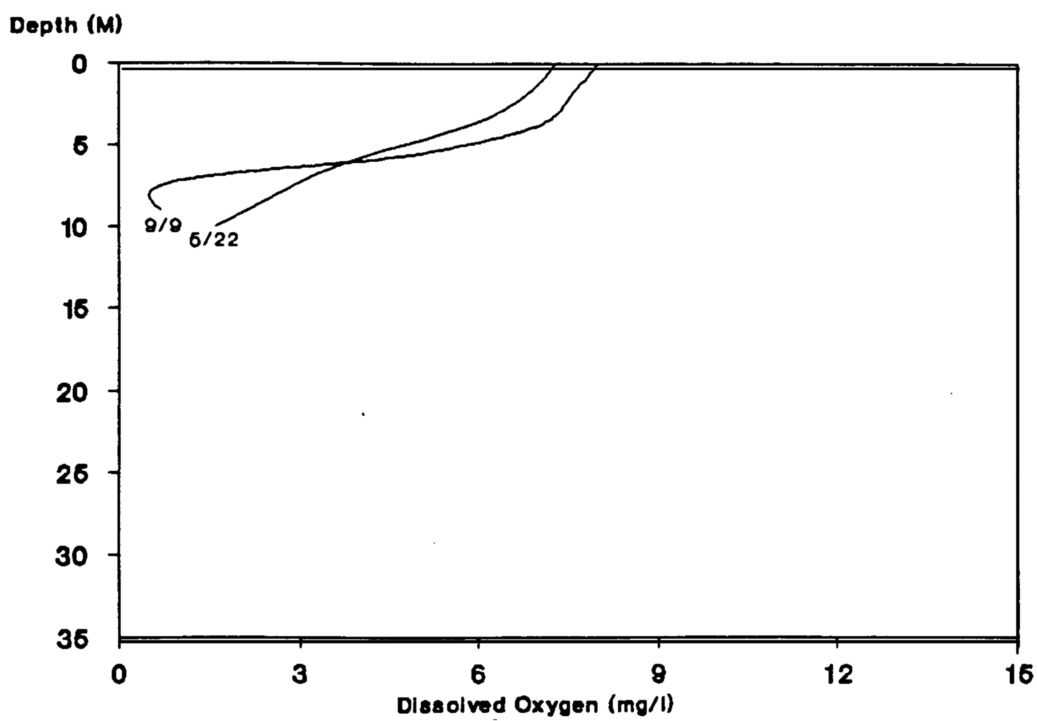
Oneida Reservoir



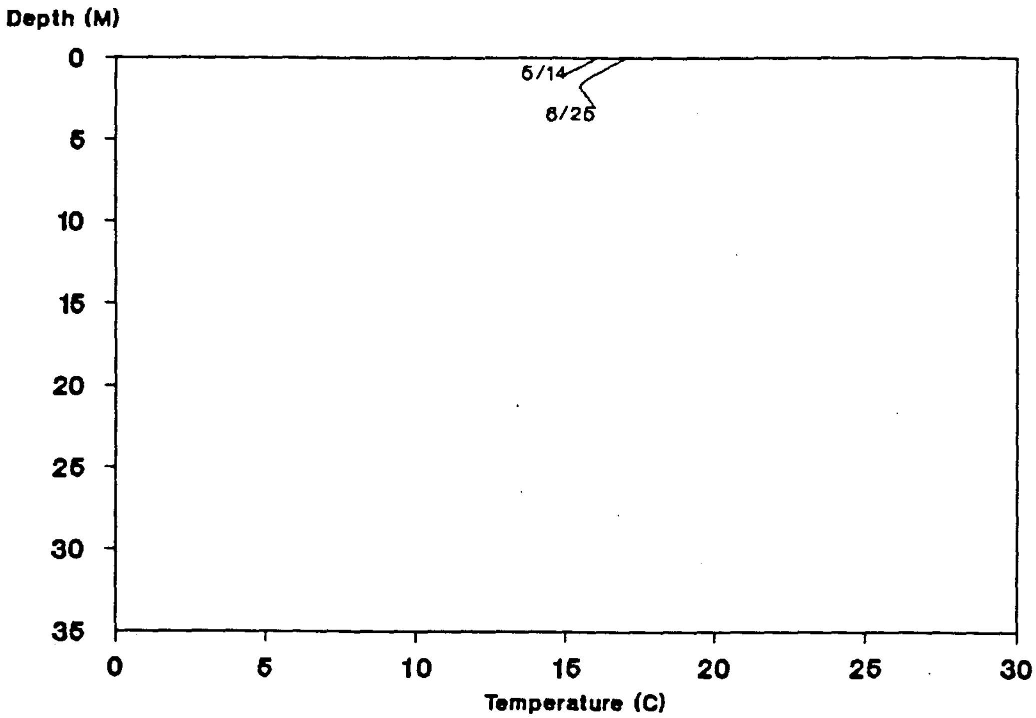
Appendix A. Figure 6. (continued)



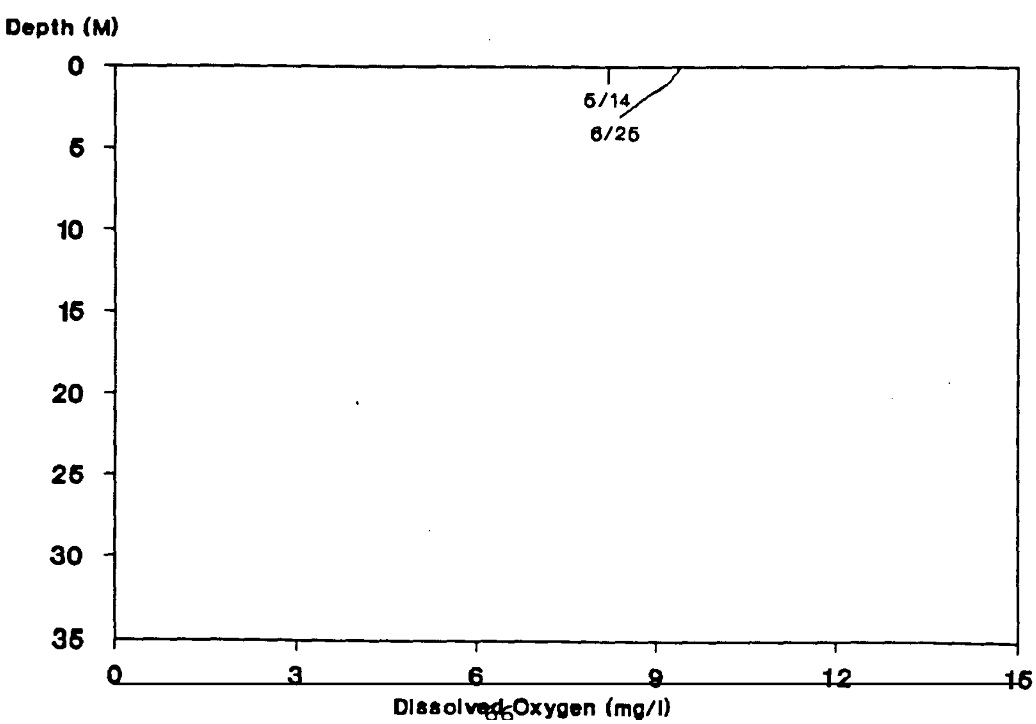
Soldiers Meadow Reservoir



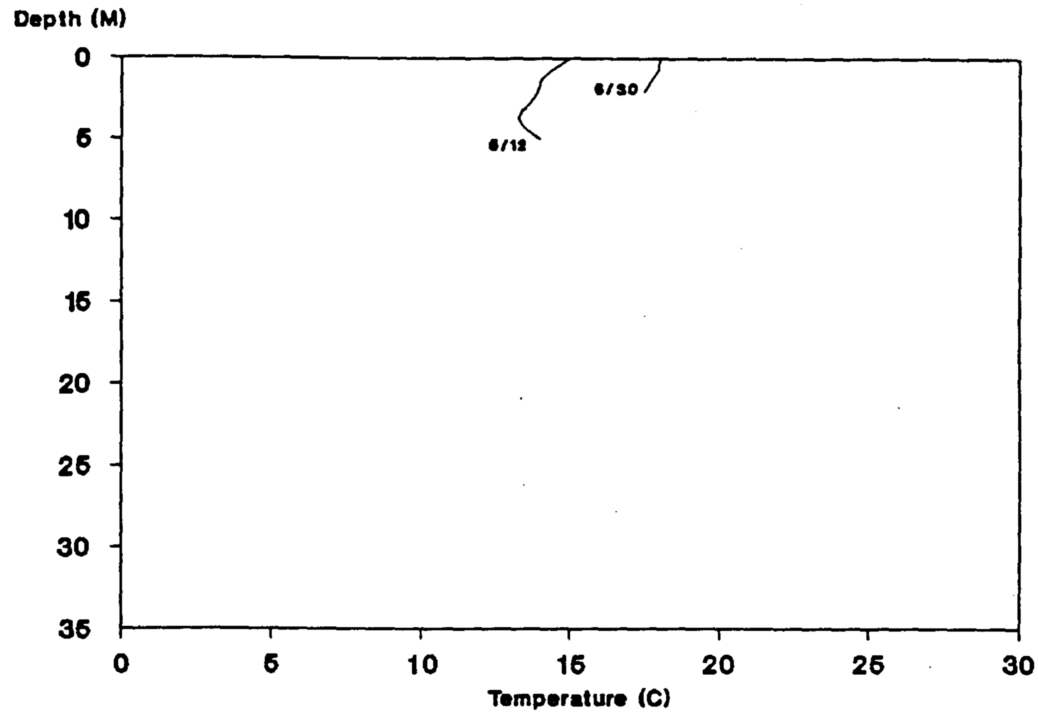
Appendix A. Figure 6. (continued)



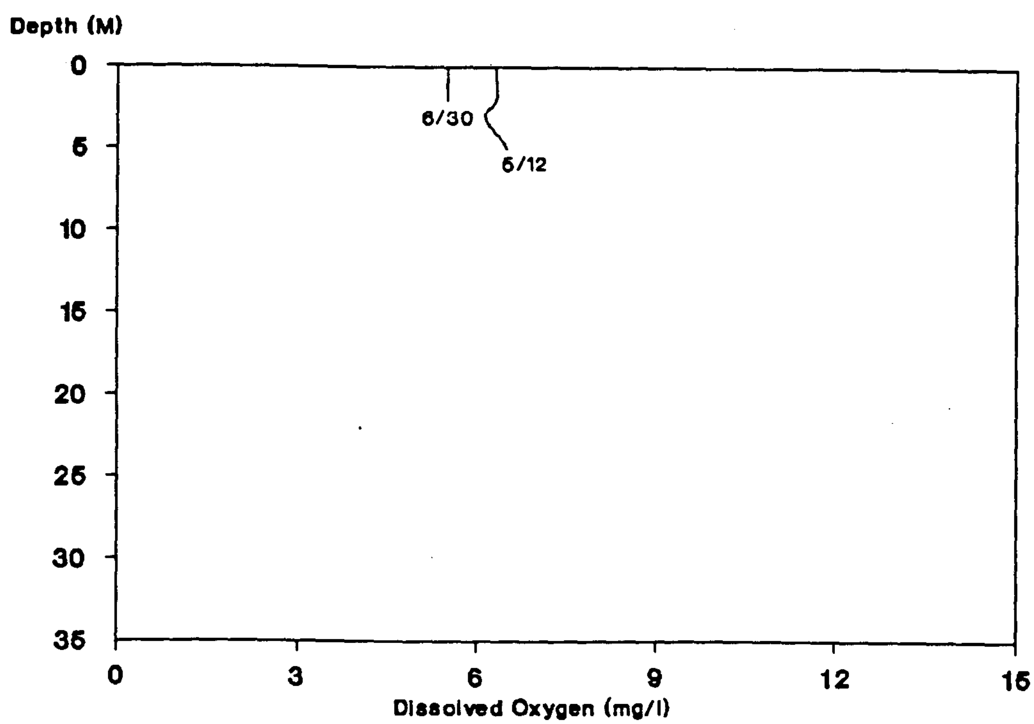
Springfield Lake



Appendix A. Figure 6. (continued)



Treasureton Reservoir



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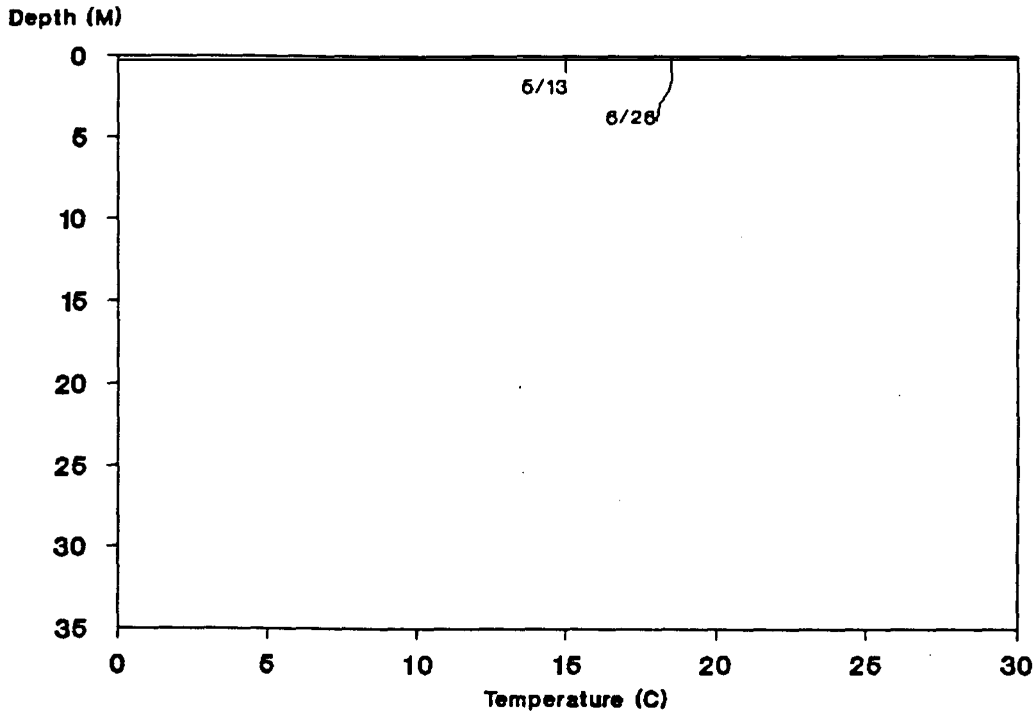
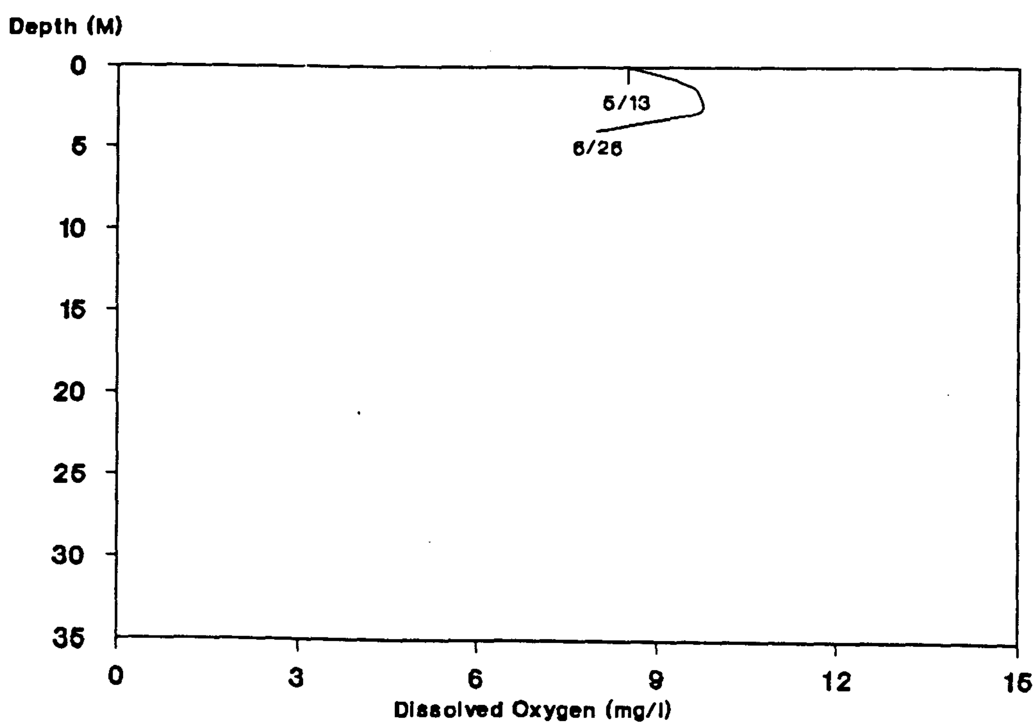
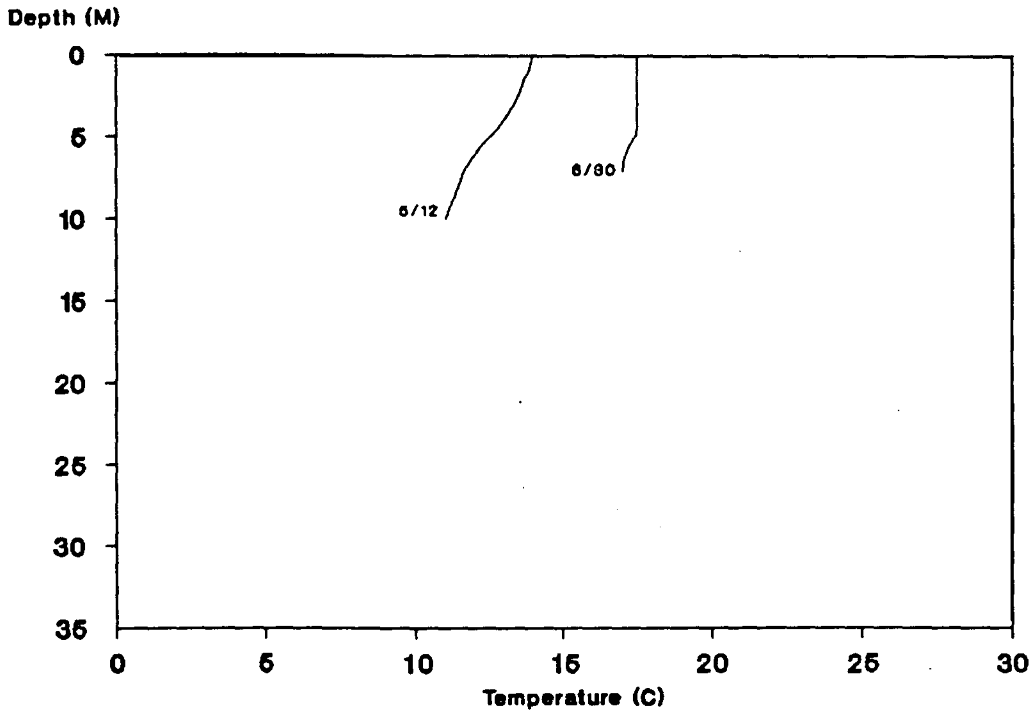


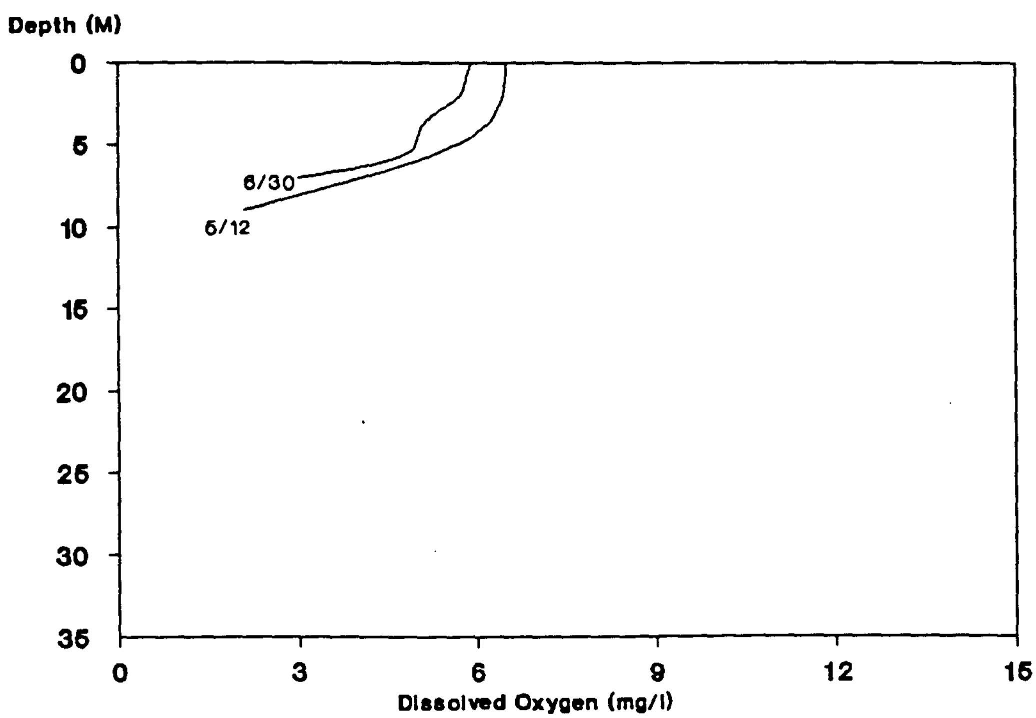
Twenty-four Mile Reservoir



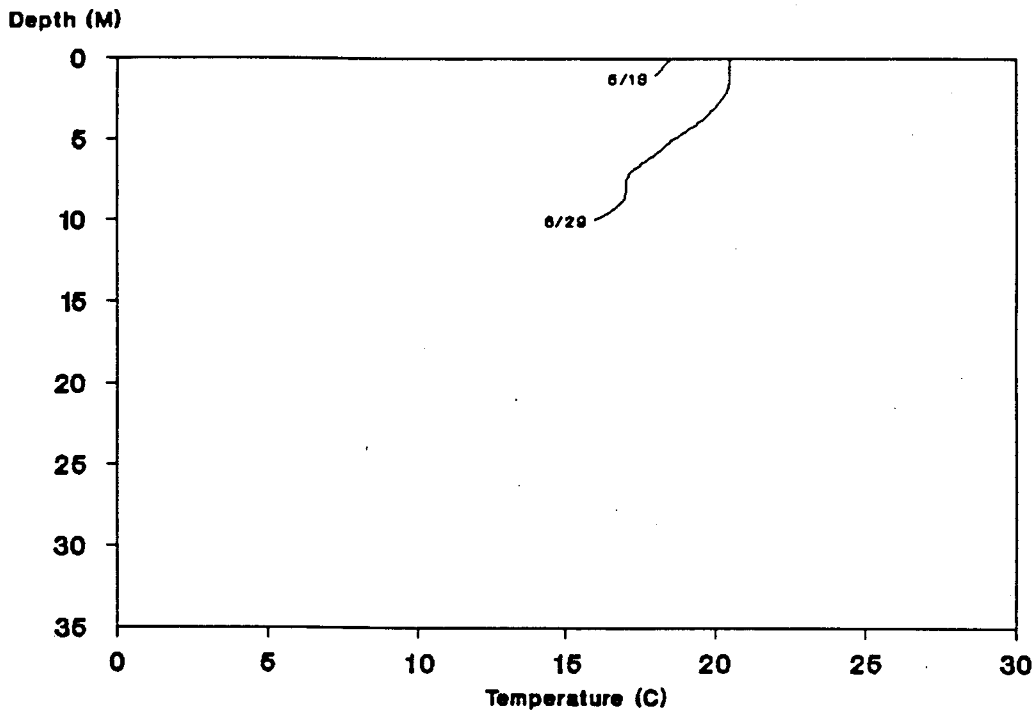
Appendix A. Figure 6. (continued)



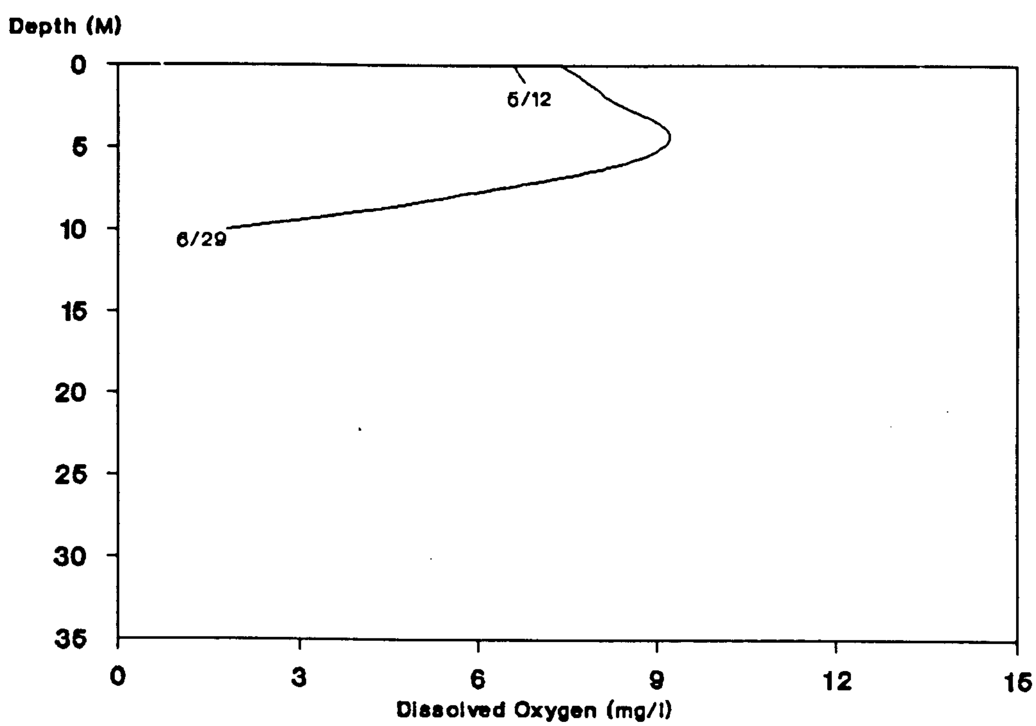
Twin Lakes



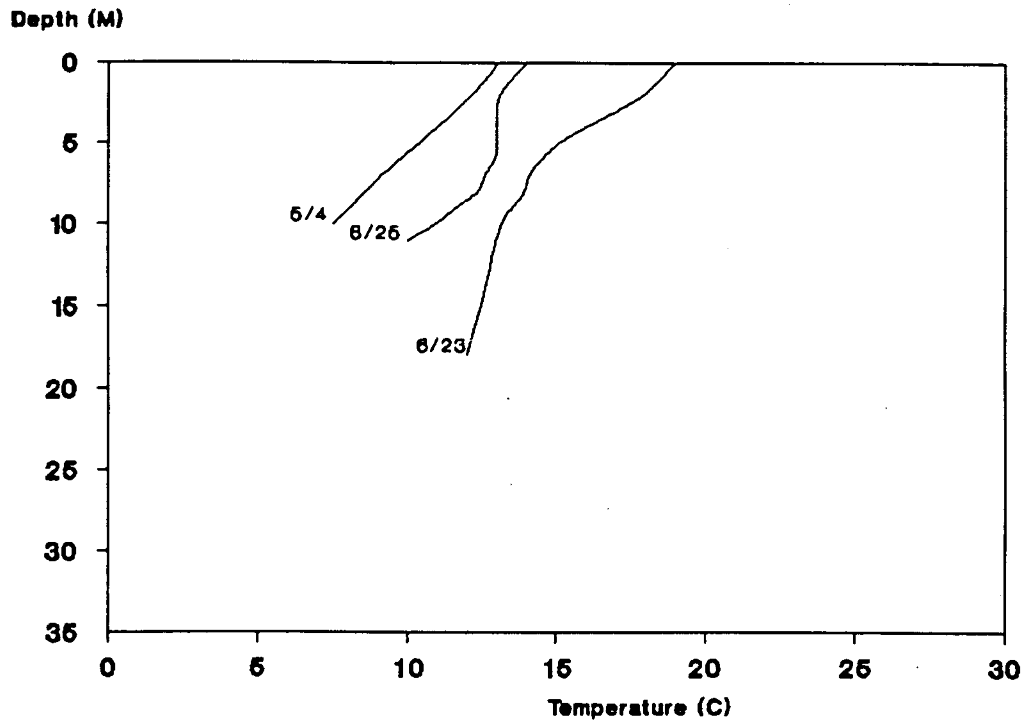
Appendix A. Figure 6. (continued)



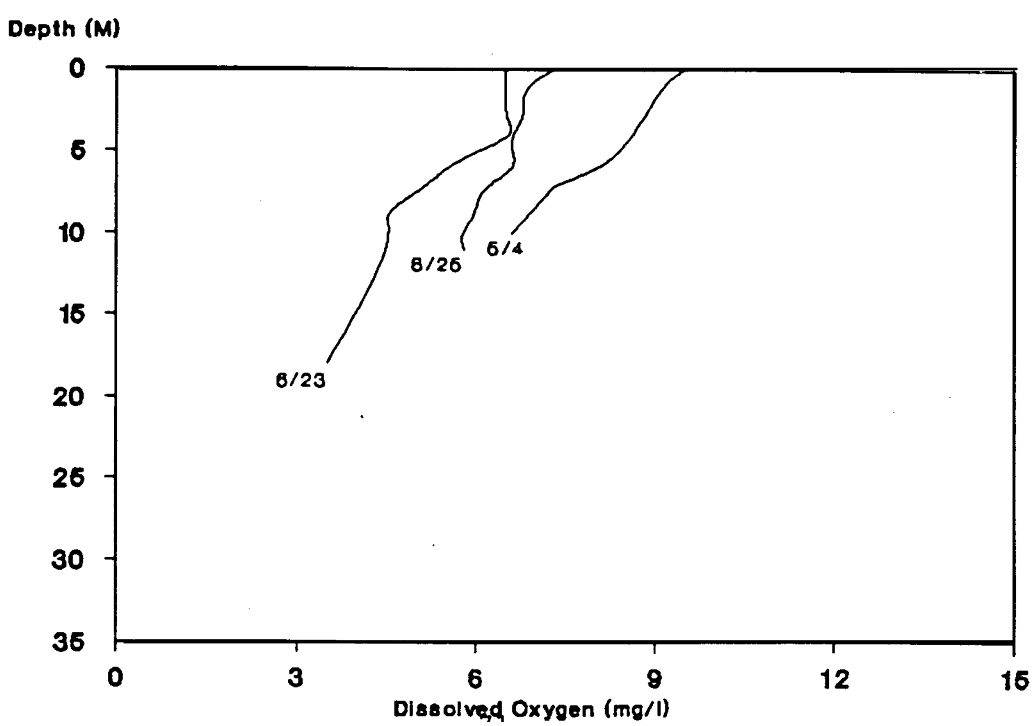
Winder Reservoir



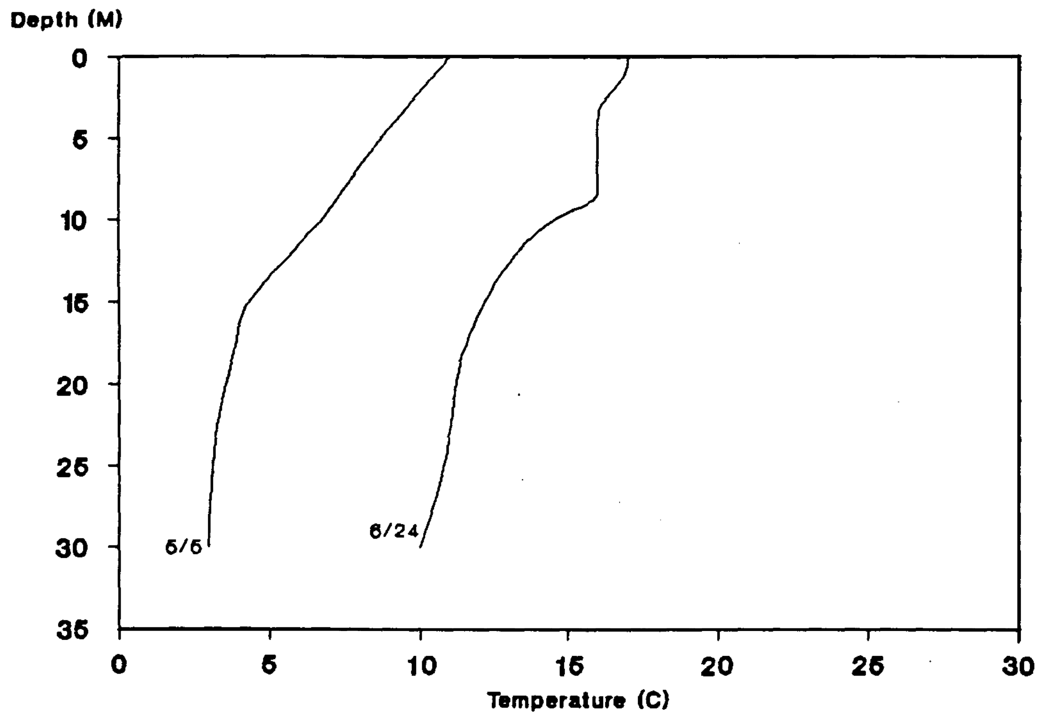
Appendix A. Figure 7. Results of temperature and dissolved oxygen sampling in Region 6 lakes and reservoirs.



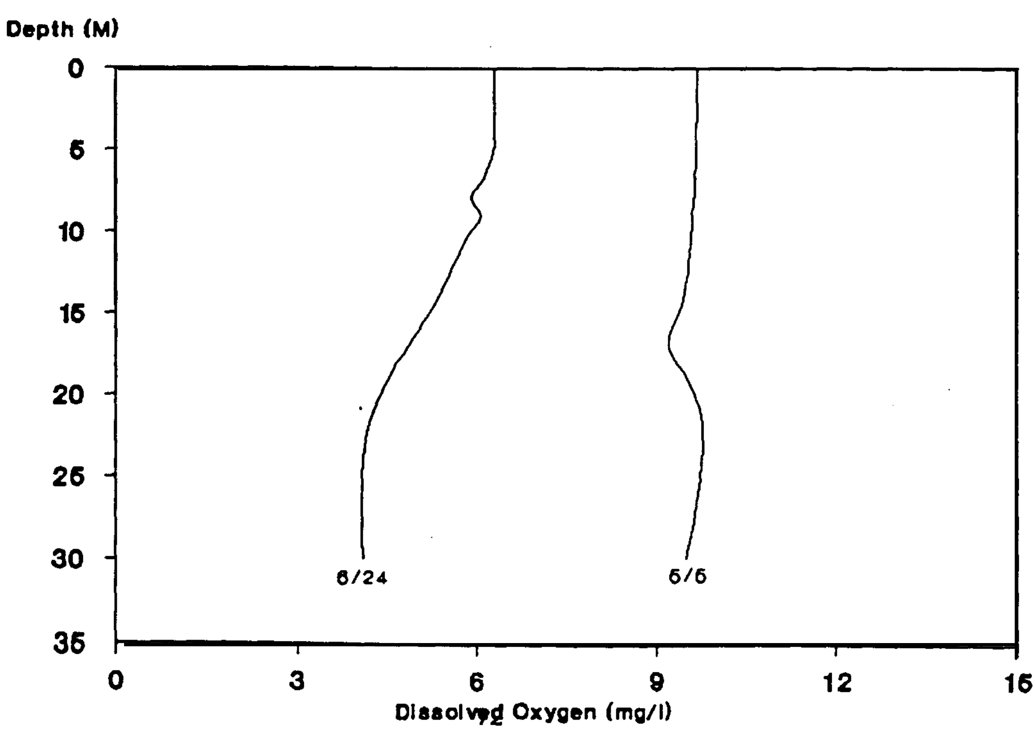
Island Park Reservoir



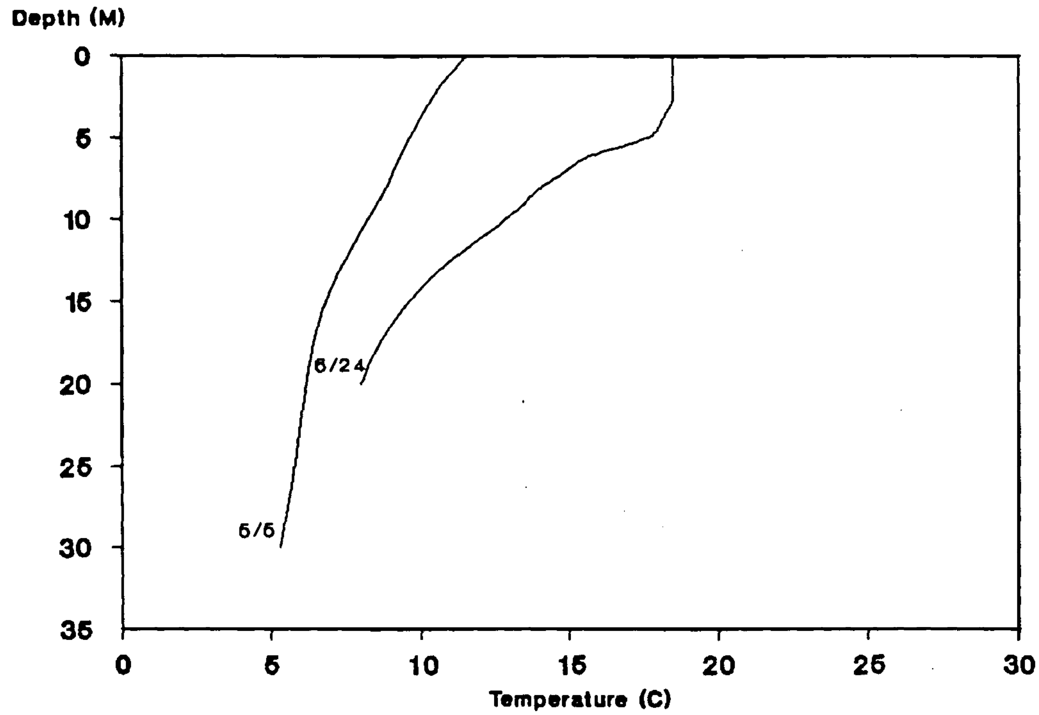
Appendix A. Figure 7. (continued)



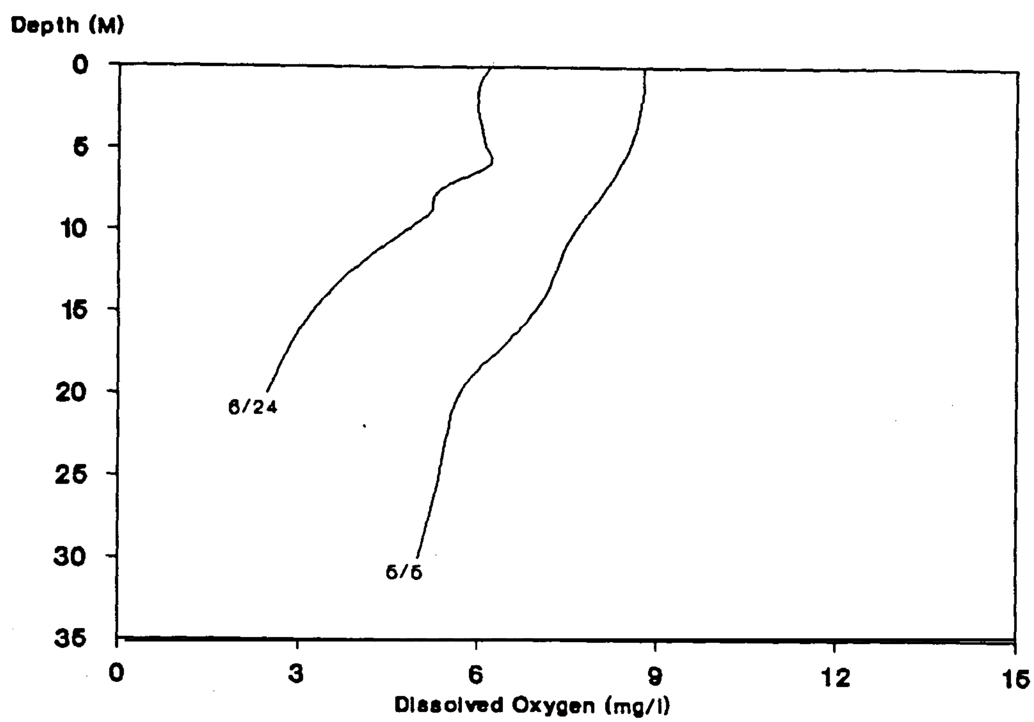
Palisades Reservoir



Appendix A. Figure 7. (continued)



Ririe Reservoir



Appendix B.

Limnological database in each region.

Appendix B. Limnological database Region 1.

Location	Date	Station	Conductivity	Tem	Depth	Diss. Oxygen	Secchi
Hauser Lake	5/24/92	Station 1	47.4	17	0	7.1	3.9
				17	lm	7.2	
				16	2m	7.4	
				15	3m	7.3	
				14.5	4m	7	
				14	5m	6.8	
				10.5	6m	5	
				8	7m	1.2	
				8	8m	.7	
				7	9m	.5	
				8	10m	.3	
		Station 2	49.6	17	0	7.1	4.2
				15	3m	7	
				13	5m	6.5	
				8	7m	.7	
				7	10m	1.1	
		Station 3	49.4	17.5	0	7	4.4
				17.5	1m	7.1	
				17.5	2m	7.1	
				15	3m	7.2	
				15	4m	7.2	
				13	5m	6.3	
Hauser Lake	9/16/92	Station 1	45.0	13	0	7.7	3.8
				13	1m	7.8	
				13	2m	7.9	
				13	3m	7.8	
				13	4m	7.8	
				13	5m	7.8	
				12.5	6m	8	
				12.5	7m	8.1	
				11.5	8m	8.2	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Spirit Lake	5/24/92	Station 1	28.0	15.5	0	7.5	3.2
				14	3m	7.8	
				12	5m	8	
				10.5	7m	7.9	
				8	10m	7	
				7	12m	6.2	
				7	15m	5.6	
Spirit Lake	9/16/92	Station 1	19.2	12	0	8.4	3.2
				12	lm	8.3	
				12	2m	8.4	
				12	3m	8.4	
				12	4m	8.4	
				11.5	5m	8.4	
				11.5	6m	8	
		Station 2	21.7	16	0	7.3	4.2
				15	lm	7.5	
				14	2m	7.7	
				14	3m	7.7	
				13	4m	8	
				11	5m	8.2	
				10	6m	8.2	
				9	7m	7.8	
				8	8m	7.5	
				7	9m	7.5	
				6.5	10m	7.4	
		Station 3	22.1	16	0	6.3	
				11.5	5m	7.9	
				7	10m	7.1	
				5	15m	5.4	
				4.5	20m	4.1	
				5	25m	3.8	
				5	30m	3.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Tem	Depth	Diss. Oxygen	Secchi
Hayden Lake	5/25/92	Station 1	58.9	14	0	7.6	8.0
				12	5m	8	
				10	10m	8.4	
				6	15m	8.1	
				4.5	20m	6.6	
				3.5	25m	7.4	
				3	30m	6.8	
		Station 2	59.5	15	0	7.3	7.9
				12	5m	8.3	
				9	10m	8.6	
				7.5	11m	8.5	
				7	12m	8.5	
				6	13m	8.4	
				6	14m	8.2	
				6	15m	8.2	
				4	20m	7.8	
				3.5	25m	7.7	
				3	30m	7.7	
		Station 3	59.2	15	0	7.4	7.7
				14.5	1m	7.4	
				14	2m	7.5	
				13.5	3m	7.7	
				13	4m	7.7	
				12	5m	7.9	
				12	6m	7.8	
				11.5	7m	8	
				11	8m	8.2	
				10	9m	8.4	
				8.5	10m	8.3	
				6	15m	7.7	
				4	20m	7.7	
				3	25m	7.7	
				3	30m	7.8	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
Hayden Lake	9/16/92	Station 1	49.2	13	0	8.4	7.2
				13	lm	8.5	
				13	2m	8.4	
				13	3m	8.7	
				13	4m	8.6	
				13	5m	8.6	
				13	6m	8.6	
				13	7m	8.7	
				14	8m	8.8	
				13	9m	8.6	
				13	10m	9	
				13	11m	9.4	
				13	12m	10.2	
				10	13m	11	
				8	14m	10.8	
				7	15m	10.6	
				6	16m	10.4	
				6	17m	10.2	
				5.5	18m	9.8	
				5	19m	9.6	
				4.5	20m	9.5	
Cocollala	5/25/92	Station 1	67.9	15	0	7.3	3.5
				12	5m	6.8	
				10	10m	3.6	
				12	15m	0.2	
				12	20m	0.2	
		Station 2	67.8	15	0	7.6	3.7
				14	3m	7.3	
				14	5m	7.2	
				13.5	7m	6.3	
				11	10m	4.4	
				13	13m	3.0	
				13	15m	3.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Station 3		16	0	7.5	3.2
				14.5	lm	7.5	
				13.5	2m	7.3	
				13	3m	7	
				12	4m	6.7	
				12	5m	6.2	
				11.5	6m	5.4	
				11	7m	4.7	
				11	8m	3.5	
				11	9m	3.2	
				10.5	10m	2.9	
				10.5	11m	2.7	
				11	12m	2.2	
				12	13m	1.5	
				12	14m	2.0	
				12.5	15m	2.7	
Cocolalla Lake	9/15/92	Station 1	64.4	14	0	7.6	1.9
				14	lm	7.5	
				14	2m	7.5	
				14	3m	7.4	
				14	4m	7.4	
				14	5m	7.4	
				14	6m	7.3	
				14	7m	7.3	
				14	8m	7.2	
				14	9m	7.2	
				13.5	10m	6.8	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Shepherd	5/25/92	Station 1	40.5	17.5	0	6.7	5.8
				15	3m	6.5	
				13	5m	5.7	
				7	7m	1.3	
				5	10m	.3	
				7	13m	.5	
				7	15m	.8	
		Station 2		18	0	5.7	7.0
				18	1m	5.3	
				17	2m	5.1	
				14.5	3m	4.5	
				14	4m	3.6	
				12.5	5m	3.1	
				9	6m	1.8	
				8	7m	1.2	
				6	10m	.5	
				7	13m	.8	
Shepherd Lake	9/15/92	Station 1	34.4	12	0	6.3	3.4
				12	lm	6.2	
				12	2m	6.2	
				12	3m	6	
				12	4m	5.9	
				12	5m	5.6	
				12	6m	5.2	
				10.5	7m	2.1	
				7	8m	1	
				6	9m	1.2	
				5	10m	1.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Dawson Lake	5/25/92	Station 1	61.5	18	0	7	2.2
				18	lm	6.7	
				14	2m	6.4	
				13	3m	5.2	
				11	4m	.3	
				9.5	5m	.6	
				11	6m	.7	
		Station 2		18	0	7	1.7
				17	1m	7	
				14	2m	6.8	
				13.5	3m	6.0	
				11.5	4m	2.5	
				10	5m	.8	
Dawson Lake	9/15/9	Station 1	56.5	11.5	0	5.1	2.2
				11	lm	5	
				11	2m	4.9	
				11	3m	4.6	
				11	4m	4.5	
				11	5m	4.4	
Jewel Lake	5/26/92	Station 1	62.5	17	0	6.8	3.3
				17	im	6.4	
				16	2m	6.1	
				13.5	3m	6.2	
				12	4m	6.8	

Appendix B. Limnological database Region 3 - McCall Subregion.

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Warm Lake	5/18/92	Station 1	58.0	14	0	6.3	4.3
				6	5m	5.5	
				6.3	7m	9	
				4.5	10m	3.5	
				4.5	12m	4	
				3	15m	2.3	
				3	19m	2.5	
		Station 2	59.7	13.5	0	6.4	4.2
				12	5m	6.5	
				6.1	10m	6.1	
				4	15m	4	
				3	20m	3	
		Station 3	60.5	12.5	0	6.5	4.0
				10	5m	6	
				5	10m	6	
				4	15m	2.5	
				3	20m	2.5	
Warm Lake	9/1/92	Station 1	46.4	17.5	0	10	4.3
				17.5	1m	10.2	
				17	2m	9.8	
				17	3m	9.8	
				17	4m	9.8	
				15.5	5m	9.6	
				15	6m	9.8	
				15	7m	10.4	
				12.5	8m	11	
				10.5	9m	11	
				9	10m	10.8	
				8	llm	8.7	
				5.5	15m	5.1	
				5	20m	6.6	
				4.5	21m	7.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Tem	Depth	Diss. Oxygen	Secchi
Jewel Lake	9/15/92	Station 1	44.2	12	0	7.8	2.6
				12	lm	7.5	
				11.5	2m	7.3	
				11.5	3m	7	
				11.5	4m	6.8	
				11.5	5m	6.3	
				11.5	6m	1.6	
				10	7m	1.3	
Granite Lake	5/26/92	Station 1	130.6	17	0	5.9	3.5
				16.5	lm	4.3	
				14.5	2m	3.2	
				11	3m	1.2	
Granite Lake	9/15/92	Station 1	103.5	13	0	7.7	4.4
				13	1m	7.5	
				13	2m	7.6	
				12.5	3m	7.4	
				12.5	4m	7.2	
				12.5	5m	6.8	
				12	6m	4	
				7	7m	1.6	
				5	8m	1.6	
				4	9m	1.8	
				3.5	10m	2	
				3	13m	2.4	
				3.5	15	2.5	
				4	20m	2.6	
				4	25m	3	
				4	30m	3.8	

Appendix B. Limnological database Region 2.

Location	Date	Station	Conductivity	Tem	Depth	Dias. Oxygen	Secchi
Winchester Lake	5/22/92	Station 1	153.0	15.5	0	7.8	
				15.5	lm	7.8	
				14	2m	7.5	
Winchester Lake	9/9/92	Station 1	106.5	15	0	10.6	.4
				12.5	1m	7.7	
				12.5	2m	7	
				12.5	3m	6.8	
				12.5	4m	6.6	
				12	5m	6	
Waha Lake	5/22/92	Station 1	67.2	18	0	6.6	1.2
				13.5	lm	7.1	
				13	2m	6.9	
				13	3m	6.5	
Lake Waha	9/9/92	Station 1	59.3	11.5	0	8.4	2.1
				11	lm	8.4	
				11	2m	8	
				11	3m	6.5	
				9	4m	3.3	
				7	5m	1.4	
				6	6m	1.5	
				4	7m	1	
				3.5	8m	.5	
				3	9m	.1	
				3	10m	.1	
				3	11m	.2	
				3	12m	.3	
Soldier's Meadow	5/22/92	Station 1	54.9	15	0	7.3	1.5
				12	3m	6.8	
				8	5m	4.6	
				6	7m	3	
				5	10m	1.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
		Station 2	66.0	15.5	0	7.4	1.2
				15	1m	7.5	
				13.5	2m	7.2	
				11	3m	6.3	
				9	4m	5.4	
		Station 3	55.5	15	0	7.6	1.5
				14	im	8	
				12	2m	7.9	
				12	3m	7.1	
				10	4m	5.1	
Soldier's Meadow	9/9/92	Station 1	41.6	13	0	8	1.2
				12	lm	7.8	
				12	2m	7.5	
				12	3m	7.4	
				12	4m	7	
				11.5	5m	5.8	
				11	6m	4.4	
				10	7m	.7	
				7	8m	.3	
				7	9m	.7	
Mann's Lake	5/23/92	Station 1	106.1	19	0	6.9	1.7
				15	3m	6.2	
				13.5	5m	5.3	
				12.5	7m	4.5	
				13	10m	2.2	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Station 2	101.5	18.5	0	4.5	1.6
				18	1m	6.4	
				15.5	2m	6.8	
				15.5	3m	6.4	
				15	4m	6	
				14	5m	5.3	
				13	6m	5.1	
				13	7m	4.8	
				12.5	8m	4.5	
Mann's Lake	9/9/92	Station 1	78.2	18	0	9.2	.9
				17.5	lm	9	
				15	2m	8	
				15	3m	7.7	
				15	4m	7.7	
				15	5m	7.7	
				15	6m	7.5	
				15	7m	7.5	
				15	8m	7.2	
				15	9m	6.8	
				15	10m	2.0	
Elk Creek	5/23/92	Station 1	27.3	20	0	7.8	
Elk Creek	9/10/92	Station 1	33.8	14	0	8.3	2.1
				12	1m	7.8	
				11	2m	7.7	
				11	3m	8	
				11	4m	7.8	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Moose Creek	9/10/9	Station 1	33.4	15	0	6.5	1.7
				12	lm	5.8	
				11.5	2m	6	
				11	3m	5.5	
Spring Valley	5/24/92	Station 1	37.5	17	0	6.6	2.4
				16.5	lm	6.7	
				15	2m	6.6	
				14	3m	6.2	
				13	4m	5.0	
				10.5	5m	1.1	
				10.2	7m	.8	
		Station 2	39.9	17	0	6.6	2.4
				15	lm	6.7	
				15	2m	6.6	
				14	3m	5.9	
				11.5	4m	3.3	
				10	5m	.4	
Spring Valley	9/10/9	Station 1	38.8	14	0	6.8	2.1
				13.5	lm	6.8	
				13.5	2m	6.5	
				13.5	3m	4.8	
				13	4m	4.5	
				13	5m	2	
				12.5	6m	.5	

Appendix B. Limnological database Region 3.

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	4/29/92	Spring Shores	91.5	9.8	0	8.8	2.65
				5.2	2M		
				9	5M	4.7	
				9	10M	6.1	
				9	15M	3	
				8	20	1.5	
				9	25M	1.4	
				9	30M	1.3	
Lucky Peak	4/29/92	Near Dam	81.3	10.8	0	10	1.9
				10	6M	10	
				9.5	15M	10	
				9.5	18M	8.5	
				9	23M	6.5	
				8	30M	4.5	
Lucky Peak	4/29/92	Mid-way	96.8	10.5	0	16	2.9
				9	5M	16	
				9	7M	9.5	
				9	9M	9.5	
				9	10M	9	
				9	11M	9.1	
				9	13M	8.4	
Lucky Peak	6/3/92	Silver Shores	8.43 (xlO)	17	0	6.8	2.9
				17	1M	7	
				17	2M	7	
				17	3M	7	
				17	4M	6.8	
				17	5M	6.8	
				16.5	6M	7.1	
				15.5	7M	6.6	
				15	8M	6.3	
				14.5	9M	4.7	
				14.5	10M	3.4	
				14	15M	1.4	
				13.5	20M	.8	
				12.5	25M	.5	
				12	30M	.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	6/3/92	Mid-way	87.3	17	0	6.6	3.1
				15	5M	6.3	
				14.5	10M	5	
				14	15M	1.5	
				13	20M	.5	
				12	25M	.4	
				12	30M	.6	
Lucky Peak	6/3/92	Near Dam	93.9	16	0	6.6	3.2
				15.5	5M	6.2	
				15	10M	5.7	
					15M	3.5	
				13.5	20M	1.8	
				12.5	25	1.3	
				12.5	30M	2.2	
Lucky Peak	6/10/92	Spring Shores	80.0	19	0	7	2.0
				19	1M	7.1	
				18	2M	7.1	
				18	3M	7	
				17	4M	6.9	
				16	5M	6.9	
				16	6M	6.6	
				16	7M	6.4	
				16	8M	6.3	
				16	9M	6.3	
				16	10M	6.3	
				15	15M	5.8	
				15	20M	3.0	
				14	25M	1.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	6/10/92	Mid-way	78.7	19	0	7.2	2.0
				16	5M	6.6	
				15.5	10M	5.4	
				15	15M	3.8	
				15	20M	1.6	
				14	25M	.7	
				13	30M	.7	
Lucky Peak	6/10/92	Near Dam	90.6	17	0	7	3.0
				17	5M	6.8	
				17	10M	5.8	
				16	13M	3.5	
				14	20M	1.3	
				14	25M	.7	
				14	30M	.7	
Lucky Peak	6/17/92	Spring Shores	84.2	17	0	4.6	3.5
				16.5	1M	4.7	
				16	2M	4.5	
				16	3M	4.8	
				16	4M	4.6	
				16	5M	3.8	
				16	6M	3.2	
				16	7M	2	
				16	8M	1.4	
				16	9M	1.1	
				16	10M	.9	
				15.5	15M	.4	
				15	20M	.3	
				15	25M	.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	6/17/92	Mid-way	83.5	16.5	0	6.2	3.0
				16.3	1M	6.2	
				16	5M	5.8	
				15.5	10M	5.4	
				15	15M	4	
				15	20M	3.3	
				15	25M	2.8	
Lucky Peak	6/17/92	Near Dam	89.4	16	0	6.3	4.8
				16	1M	5.9	
				15.5	5M	5.7	
				15.5	10M	5.4	
				15.5	15M	2.4	
				15.3	20M	.7	
				15	25M	.6	
				14	30M	1.6	
Lucky Peak	6/25/92	Spring Shores		21	0	11.4	1.7
				21	1M	11.6	
				20.8	2M	11.6	
				20.5	3M	11.6	
				20.2	4M	11.7	
				19	5M	12	
				19	6M	12	
				19	7M	11.9	
				18.5	8M	11.8	
				18.5	9M	12	
				18.5	10M	12	
				18	15M	11.7	
				17.5	20M	11	
				17	25M	11.2	
				15.5	30M	12	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	6/25/92	Mid-way		20	0	11.2	2.3
				20	1M	11.2	
				20	2M	11.2	
				20	3M	11.2	
				20	4M	11.2	
				20	5M	11.4	
				20	6M	11.2	
				19.5	7M	11.2	
				19.5	8M	7.2	
				19.5	9M	11.1	
				19.5	10M	11	
				18	15M	10.8	
				17.3	20M	10.4	
				17	25M	10.2	
				16.5	30M	10.8	
Lucky Peak	6/25/92	Near Dam		20	0	11.6	2.
				20	1M	10.8	
				20	2M	10.6	
				20	3M	10.8	
				19.5	4M	10.8	
				20	5M	10.8	
				19.5	6M	10.8	
				19.5	7M	10.8	
				19.5	8M	10.8	
				19.5	9M	10.8	
				19.5	10M	10.8	
				19.5	15M	10.8	
				17	20M	10.6	
				17	25M	10.6	
				[illegible]	[illegible]	[illegible]	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	7/1/92	Spring Shores		20.5	0	11.0	2.2
				20.1	1M	11.0	
				20	2M	10.9	
				20	3M	10.9	
				20	4M	10.8	
				19.9	5M	10.8	
				19	10M	10.7	
				18.1	15M	10	
				17.1	20M	8.9	
				17	25M	8.5	
				17	30M	7.3	
Lucky Peak	7/1/92	Mid-way		20	0	10.5	2.8
				20	1M	10.5	
				20	2M	10.4	
				20	3M	10.5	
				20	4M	10.3	
				20	5M	10.3	
				20	6M	10.3	
				20	7M	10.3	
				20	8M	10.4	
				20	9M	10.4	
				20	10M	10.4	
				19.1	15M	9.9	
				19	20M	10.1	
				18	25M	9.9	
				17	30M	9.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky **Peak**	7/1/9	Near Dam		20	0	10.6	2.9
				20	1M	10.6	
				20	2M	10.6	
				20	3M	10.6	
				20	4M	10.5	
				20	5M	10.5	
				19.9	6M	10	
				19.9	7M	10	
				19.9	8M	10.4	
				20	9M	10.4	
				19.8	10M	10.4	
				19.8	15M	10.2	
				19	20M	9.8	
				18	25M	9.6	
				17	30M	9.6	
Lucky Peak	7/8/92	Spring Shores		20.1	0	11.5	3.0
				20.1	1M	11.6	
				20.1	2M	11.6	
				20.1	3M	11.5	
				20	4M	11.2	
				20	5M	11.3	
				20	6M	11.2	
				19.9	7M	11.2	
				19.5	8M	11.1	
				19.5	9M	11.1	
				19.1	10M	10.9	
				18.5	15M	11.3	
				18.1	20M	11	
				18	22M	11.1	
Lucky **Peak**	7/8/9	Mid-way		19.5	0	11	3.8
				19.5	1M	11.2	
				19.4	2M	11	
				19.3	3M	11.1	
				19.1	5M	11.2	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dias. Oxygen	Secchi
Lucky Peak	7/8/92	Near Dam		19.6	0	10.8	3.3
				19.5	1M	10.8	
				19.5	2M	10.9	
				19.5	3M	10.9	
				19.5	4M	10.9	
				19.5	5M	10.9	
				19.5	6M	10.9	
				19.5	7M	11	
				19.3	8M	11	
				19.5	9M	11	
				19.5	10M	11	
				19	15M	11	
				19	20M	10.9	
				19	23M	10.8	
Lucky Peak	7/15/92	Spring Shores	75.2	19	0	7.8	3.3
				18.5	1M	8	
				18.5	2M	8	
				18.5	3M	8	
				18	4M	8.2	
				18	5M	8	
				18	6M	7.8	
				17.5	7M	7.7	
				17.5	8M	7.7	
				17.5	9M	7.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	7/15/92	Near Dam	71.9	18	0	7.6	4.
				18	1M	7.6	
				18	2M	7.6	
				17.5	3M	7.7	
				17.5	4M	7.6	
				18	5M	7.6	
				17.5	6M	7.6	
				17.5	7M	7.6	
				17.5	8M	7.6	
				17.5	9M	7.6	
				17.5	10M	7.6	
				17.5	13M	7.6	
				17.5	15M	7.4	
				17	20M	7.3	
				16.5	25M	6.8	
				17	30M	6.8	
Lucky Peak	7/22/92	Spring Shores	89.4	20.5	0	8.2	1.
				20.5	1M	8.2	
				20.5	2M	8.2	
				20.2	3M	8	
				20	4M	7.8	
				20	5M	7.6	
				20	6M	7.3	
				19.5	7M	7.1	
				19	8M	6.7	
				19	9M	6.6	
				18.5	10M	6.5	
				18	13M	6.8	
				18	15M	6.8	
				16.5	20M	5.2	
				16.5	25M	2.6	
				16.5	30M	2.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	7/22/92	Near Dam	73.3	19	0	7.8	2.6
				19	1M	7.7	
				19	2M	7.6	
				19	3M	7.7	
				19	4M	7.7	
				19	5M	7.7	
				19	6M	7.7	
				19	7M	7.7	
				19	8M	7.7	
				19	9M	7.7	
				18.5	10M	7.7	
				19	13M	7.7	
				19	15M	7.8	
				19	20M	7.7	
				18	25M	7.2	
				17.5	30M	6.8	
Lucky Peak	7/29/92	Station 1	84.4	20	0	8.9	2.1
				19.9	1m	8.4	
				19.8	2m	8.1	
				19.5	3m	8.2	
				19.5	4m	7.8	
				19.3	5m	7.9	
				19	6m	7	
				18.9	7m	6.8	
				18.6	8m	7.1	
				18.5	9m	6.9	
				18.5	10m	6.4	
				18.2	12m	6.7	
				18	13m	7	
				17.1	15m	4.3	
				17.1	20m	4.7	
				17.5	25m	5.1	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	7/29/92	Station 2	75.3	19.5	0	8.2	3.8
				19.1	lm	8.3	
				19	2m	8.2	
				19	3m	8.2	
				19	4m	8.1	
				19	5m	8.1	
				19	6m	8.2	
				19	7m	8.1	
				19	8m	8.1	
				19	9m	8	
				19	10m	7.9	
				18.9	15m	7.8	
				18.1	20m	7.7	
				17.8	25m	7.1	
				17.5	30m	7	
Lucky Peak	8/5/92	Station 1	88.0	20	0	7.6	.5
				20	lm	7.5	
				19.5	2m	7	
				19	3m	6.4	
				18.5	4m	5.9	
Lucky Peak	8/5/92	Station 2	81.0	19	0	7.6	2.1
				19	lm	7.6	
				19	2m	7.6	
				19	3m	7.6	
				19	4m	7.6	
				19	5m	7.6	
				19	6m	7.5	
				19	7m	7.5	
				19	8m	7.5	
				19	9m	7.3	
				19	10m	7	
				19	12m	7.6	
				19	14m	7.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lucky Peak	8/12/92	Station 2	81.5	19	0	7.5	2.3
				18.7	lm	7.7	
				18.5	2m	7.7	
				18.5	3m	7.6	
				18.5	4m	7.6	
				18.5	5m	7.6	
				18.5	6m	7.6	
				18.5	7m	7.5	
				18.5	8m	7.6	
				18.5	9m	7.6	
				18.5	10m	7.6	
				18.5	11m	7.6	
				18.5	12m	7.6	
				18.5	13m	7.3	
Lucky Peak	8/20/92	Station 2	83.2	18.7	0	7.7	1.7
				18.5	im	7.9	
				18.5	2m	7.9	
				18.5	3m	7.8	
				18.5	4m	7.8	
				18.5	5m	7.8	
				18.5	6m	7.7	
				18.5	7m	7.7	
				18.5	8m	7.6	
				18.5	9m	7.7	
				18.5	10m	7.7	
				18.5	11m	7.7	
				18.5	13m	7.7	
Arrowrock	5/8/92	Station 1	78.7	15	0	7.6	3.4
				11	5m	7.5	
				9.5	lOm	7.4	
				6.5	15m	7.4	
				5	20m	7.4	
				4	25m	8.2	
				3.8	30m	8	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
		Station 2		15	0	7.1	2.7
				10.5	5m	7.1	
				10	10m	7.2	
				10.5	15m	6.6	
		Station 3		14.5	0	7.4	3.2
				11	5m	7.2	
				10	10m	7	
				7.5	15m	7	
				5	20m	6.8	
				4	25m	6.9	
				4	30m	6.5	
Lake Lowell	5/8/92	Station 1	280.0	19	0	7.6	.7
				19	lm	7.7	
				19	2m	7.2	
				18	3m	7.5	
				17	4m	7	
				16	5m	6	
				14	6m	4.7	
				14	7m	4.2	
				13	8m	3.5	
		Station 2		20	0	7.5	.5
				20	lm	7.2	
				20	2m	7	
				20	3m	7.6	
				19	4m	7.5	
				18.5	5m	7.3	
		Station 3		17	0	7	.9
				17	lm	6.8	
				17	2m	7.3	
				16	3m	6.7	
				16	4m	6.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lake Lowell	7/15/92	Station 1	251.0	20.5	0	8.6	.3
				20.2	1m	8.1	
				20	2m	7.2	
				19.4	3m	6.3	
				19.5	4m	6.2	
				19.3	5m	5.2	
Deadwood	7/12/92	Station 1	40.6	17	0	7.3	5.0
				17	lm	7.4	
				17	2m	7.3	
				17	3m	7.2	
				16.5	4m	7	
				16	5m	7.6	
				16	6m	7.7	
				15	7m	7.4	
				14	8m	5.1	
		Station 2	39.0	17	0	7.5	5.3
				17	lm	7.5	
				17	2m	7.5	
				17	3m	7.5	
				17	4m	7.5	
				16	5m	7.7	
				16	6m	8	
				15	7m	8.2	
				14	8m	7.8	
				13	9m	7.8	
				12	10m	7.0	
				11	11m	6.2	
				11	12m	4.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
Horsethief	5/18/92	Station 1	59.4	15.5	0	6.7	2.6
				15.1	2m	6.4	
				11	4m	5.9	
				9.1	6m	3.4	
				6.1	8m	.7	
				7	10m	1.1	
		Station 2	59.5	15.5	0	6.7	2.4
				15	3m	6.5	
				12	5m	4.2	
				9	7m	3.3	
		Station 3	59.5	15.5	0	6.5	2.0
				15	3m	5.3	
				13	5m	4.5	
Horsethief	9/1/92	Station 1	46.1	18.5	0	13.2	3.2
				18.5	lm	12	
				18	2m	8.8	
				17.5	3m	8.6	
				17	4m	7.8	
				16	5m	6.4	
				15	6m	5.2	
				11	7m	5.2	
				10	8m	5.6	
				10	9m	5.8	
		Station 2		18.5	0	12	
				18.5	lm	12	
				18	2m	11.6	
				17.5	3m	12	
				17.5	4m	11.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lost Valley	5/19/92	Station 1	69.5	14	0	6.8	8.2
				14	3m	6.9	
				12.9	5m	6.6	
				12.5	7m	5.9	
				12.5	9m	6	
		Station 2	70.6	14.1	0	6.9	3.0
				14.1	lm	6.9	
				14	2m	6.9	
				14	3m	7	
		Station 3	61.9	14	0	6.9	4.8
				14	lm	6.9	
				14	2m	6.7	
				14	3m	6.8	
				13.7	4m	6.8	
Lost Valley	9/3/92	Station 1	54.5	16	0	8.7	1.8
Goose Lake	5/19/92	Station 1	15.9	8	0	8.8	
				8	1m	8	
Goose Lake	9/2/92	Station 1	10.8	16	0	9.8	
				16	lm		
				15.5	2m		
Brundage	5/19/92	Station 1	14.8	9	0	7	
				9	lm	7	
Brundage	9/2/92	Station 1	12.8	15.5	0	10.9	1.4
				15.5	lm		
				15	2m		

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dias. Oxygen	Secchi
Little Payette	5/19/92	Station 1	18.1	13	0	6.6	
				12.1	lm	6.7	
Little Payette	9/3/92	Station 1	13.5	16	0	8.2	3.2
Upper Payette	5/19/92	Station 1	11.0	9	0	6.8	
				9	lm	7	
Upper Payette	9/3/93	Station 1	18.5	17	0	12.2	4.8
				17	lm		
				17	2m		
				16	3m		
				15.5	4m		
				14	5m		
				10	6m		
				8	7m		
Granite Lake	9/2/92	Station 1	16.0	14.5	0	10.08	5.0
				14.5	1m		
				14.5	2m		
				14.5	3m		
				14	4m		
Cascade	5/20/92	b2	42.5	14	0	6.6	1.1
				13.5	3m	6.4	
				13	6m	6	
				11.5	9m	4.7	
				10.3	12m	3.7	
				9.5	15m	2.4	
				9.5	18m	2.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		d2	42.0	13	0	6.8	1.4
				13	3m	6.5	
				13.6	5m	6.4	
				12.1	10m	5.7	
				10	15m	2.8	
		3	43.8	14.5	0	7.5	.7
				13.5	4m	6.4	
				12	7m	5.4	
				11	10m	4.3	
				10.3	13m	3.7	
				10	16m	3.2	
Cascade	6/4/92	b2	45.5	19	0	6.3	
				18	lm	6.5	
				18	2m	6.5	
				18	3m	6.4	
				18	4m	5.9	
				17.5	5m	5.8	
				17.5	6m	5.3	
				17	7m	5.3	
				15	8m	3.8	
				13	9m	2.3	
				12	10m	2.1	
				11.3	llm	1.5	
				11	12m	1.4	
				11	13m	1.3	
				11	14m	1.2	
				11	15m	1.1	
				11	16m	.9	
				11	17m	.7	
				11	18m	.9	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dias. Oxygen	Secchi
		E	46.2	19	0	7.3	1.7
				17	3m	6.8	
				16.5	5m	6.5	
				14.5	10m	3.6	
				12	11m	2.2	
				11.3	12m	2	
		C	47.1	19	0	1.9	1.1
				17.5	3m	6.8	
				17	5m	6.2	
				12	10m	2	
				12	12m	1.9	
Cascade	6/11/92	A	45.0	19	0	6.5	2.7
				16	5m	2.8	
				14	10m	2.7	
		B2	45.7	19.5	0	7.	2.8 -
				19	1m	6.5	
				18.5	2m	6.2	
				18.5	3m	5.4	
				17.5	4m	4.4	
				16.5	5m	3.9	
				16	6m	3.9	
				16	7m	3.8	
				15	8m	3.5	
				15	9m	3.2	
				15	10m	3.3	
				15	13m	2	
				12	18m	1.9	
		F3	41.5	19.5	0	7	2.8
				19	1m	6.6	
				18	2m	6.7	
				18	3m	6.4	
				18	4m	6.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
		E	43.7	19.5	0	6.9	2.4
				19	lm	6.8	
				18	2m	6.6	
				18	3m	6.2	
				17.5	4m	5.9	
				17	5m	5.1	
				16.5	6m	4.9	
				15	7m	3.8	
				14	8m	3.2	
				13.5	9m	1.9	
				13	10m	2	
		D2	43.8	19.5	0	7.2	2.5
				19	lm	6.8	
				18.5	2m	6.8	
				18	3m	6.5	
				18	4m	6	
				17.5	5m	5.5	
				17	6m	5	
				16	7m	4.8	
				16	8m	4.5	
				14	9m	3.5	
				13.5	10m	2.5	
				13	11m	2	
Cascade	6/18/92	A	43.1	16.5	0	6.6	1.4
				16.2	1m	7.2	
				15.5	3m	6	
				15	5m	5.4	
				14.8	7m	4.8	
				15	9m	.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		B2	43.3	17.2	0	6.5	2.2
				15.8	lm	6.5	
				15.1	2m	6.1	
				14.9	3m	5.7	
				14.8	4m	5.2	
				14.5	5m	5	
				14.5	6m	5	
				14.5	7m	4.9	
				14.5	8m	4.9	
				14.5	9m	4.9	
				14.5	10m	4.8	
				14.5	llm	4.8	
				14.5	12m	4.9	
				14.5	13m	4.5	
				14.2	14m	4.2	
				14.2	15m	3.1	
				11.5	20m	.7	
		F3	41.8	17	0	5.9	2.2
				15	2m	5.6	
				14.4	4m	5.1	
				14.4	6m	5	
				14.1	8m	4.2	
				14.9	10m	2.8	
		E	44.1	17.2	0	5.5	2.0
				14.6	2m	5.7	
				14	4m	5.4	
				14	6m	4.9	
				14	8m	4.9	
				14	10m	4.8	
				15	12m	3.8	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		D1	43.3	18.8	0	5.5	2.1
				15.2	lm	6	
				14.5	5m	5.4	
				16.1	10m	3.8	
Cascade	6/24/92	A		26	0	11.8	.6
				25	1m	12.2	
				24	2m	11.7	
				22.5	3m	10.8	
				19.5	4m	8.4	
				18	5m	7.8	
				16	10m	7.3	
				16	17m	3.7	
				16	20m	3.3	
		B2		24	0	12.3	.9
				23	lm	12.4	
				25	2m	12	
				22	3m	11.2	
				19	4m	9.8	
				18	5m	7.6	
				17	6m	8.5	
				16.5	7m	7.8	
				16	8m	7.5	
				16	9m	7.2	
				16	10m	7.2	
				15	15m	7.4	
				15	20m	6.2	
				15	25m	5.4	
				15.5	30m	4.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secch
		F3		25	0	10.8	2.3
				20.5	lm	13.4	
				19	2m	10.4	
				18	3m	11.6	
				17	4m	10.2	
				16	5m	9.6	
				16	7m	9.8	
				15.5	10m	5.5	
				15.5	15m	4.5	
				17	20m	4.7	
		E		25	0	11.6	1.9
				21.5	lm	12.2	
				20	2m	12	
				18	3m	12	
				17	4m	10.6	
				17	5m	10.2	
				17	7m	9.8	
				16	10m	9.8	
				15.5	15m	6	
				15.5	20m	4.5	
		Dl		24	0	11.2	2.2
				22	lm	12.4	
				20.5	2m	12.3	
				19.5	3m	12.5	
				18.5	4m	12.8	
				18	5m	11.4	
				17	7m	9.8	
				16.5	10m	9.3	
				16	15m	6.6	
				16	20m	6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Cascade	7/2/92	A		19	0	9.7	1.4
				18	lm	10	
				18	3m	9.5	
				17.9	5m	9.2	
				17.7	7m	9	
				17.5	9m	8.2	
		B2		20	0	9.3	1.3
				18.1	1m	10	
				18	2m	10	
				17.9	3m	9.6	
				17.9	4m	9.4	
				18	5m	9.4	
				18	6m	9.2	
				18	7m	9	
				18	8m	8.8	
				17.5	9m	7	
				17	10m	5.5	
				16	15m	5.1	
		C		20	0	9.6	1.5
				18.2	1m	10.6	
				17.5	2m	10.2	
				17.5	3m	10	
				17.5	4m	9.8	
				17.5	5m	9.8	
				17.5	6m	9.7	
				17.5	7m	9.6	
				17.5	8m	9.8	
				17.5	9m	9	
				17.3	10m	8.2	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
		E		18.1	0	9.8	1.6
				17.5	1m	9.9	
				17.5	2m	9.6	
				17.4	3m	9.2	
				17.2	4m	9	
				17.2	5m	9.3	
				17	6m	8.2	
				17	7m	7.2	
				17	8m	7.2	
				17	9m	7.2	
				16.7	10m	6.9	
		F3		18	0	10.4	1.4
				18	1m	10.6	
				17	2m	10.2	
				17	4m	9.8	
				17	6m	9.8	
				16.5	8m	9.6	
		D2		19.5	0	9.5	1.5
				18	1m	9.8	
				17.5	3m	9.2	
				17.5	5m	9.2	
				17.5	7m	8.6	
				16.8	10m	5.4	
Cascade	7/9/92	A		19.5	0	12.2	1.2
				19.5	1m	12.5	
				19	3m	12.2	
				19	5m	11.6	
				18.5	8m	10.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		B2		19.5	0	12.7	.9
				19.5	lm	12.5	
				18.5	2m	12.2	
				18.5	3m	11	
				18.2	4m	10.8	
				18.2	5m	10.8	
				18.1	6m	10.6	
				18	7m	10.2	
				17.8	8m	7.8	
				17.3	9m	6.8	
				17	10m	6.2	
				16	15m	3.7	
				16	17m	3.7	
		D2		19.9	0	11.5	1.3
				18.9	1m	11.2	
				18	3m	10.9	
				17.6	5m	10.2	
				17.1	10m	9.5	
				16.5	12m	5.1	
		E		19.5	0	11.8	1.3
				17.8	1m	10.4	
				17.8	3m	10.2	
				17.5	5m	9.9	
				16.9	10m	6.2	
				16.8	13m	4.8	
		F3		20	0	11.8	1.4
				18.1	1m	12	
				18	3m	11.2	
				17.5	5m	10.1	
				17	8m	6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Mid-Res		20.2	0	11.2	1.4
				18.5	lm	11.8	
				18	3m	10.6	
				17.5	5m	9.6	
				17	10m	7.9	
				16	16m	3.7	
Cascade	7/16/92	A	35.5	19.8	0	8	.6
				19.5	lm	7.9	
				19	3m	8.5	
				18.8	5m	8.1	
				18	8m	5.8	
		B	38.7	18.1	0	8.8	1.1
				18	lm	8.9	
				18	2m	8.7	
				18	3m	8.5	
				18	4m	8.4	
				18	5m	8.1	
				18	6m	8	
				18	7m	7.3	
				17.2	8m	5.9	
				17	9m	4.8	
				16	10m	3.5	
				14.5	15m	.6	
		F	36.1	18	0	8.2	1.7
				17.5	lm	8.1	
				17	3m	7.2	
				16.1	5m	5.4	
				15.5	10m	1.8	
		D2	33.3	18	0	6.4	1.8
				17	lm	6.5	
				16.2	3m	5.7	
				16.1	5m	5.3	
				15.5	10m	2.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		E	36.9	18	0	8.8	1.4
				17.5	1m	8.2	
				16.7	3m	6.6	
				16.1	5m	6.1	
				15	10m	1.2	
Cascade	7/22/92	A	35.0	18.5	0	6.5	.9
				18.5	lm	6.3	
				18.5	2m	6.1	
				18.5	3m	6	
				18.5	4m	5.8	
				17.8	5m	4.9	
				17.5	6m	4.1	
				17	7m	4	
		B2	37.7	18.5	0	7.4	1.1
				18.5	lm	7.3	
				18.5	2m	7.3	
				18.5	3m	7.2	
				18.5	4m	7.2	
				18.2	5m	7	
				18.2	6m	6.8	
				18	7m	6.4	
				17.1	8m	4.1	
				16.5	9m	2.5	
				16	10m	1.5	
				16	11m	1.4	
				15.5	12m	.7	
				15.2	13m	.6	
				15.1	14m	.5	
				15	15m	.5	
				15	16m	.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		C	35.4	18	0	7.7	1.1
				17.9	1m	7.5	
				17.8	2m	7.4	
				17.5	3m	7.2	
				17	4m	7.1	
				17.5	5m	7	
				17.5	6m	6.8	
				17.5	7m	6.8	
				17.5	8m	6.6	
				17	9m	6.4	
				16.5	10m	6.1	
				15.5	11m	1.2	
				15	12m	.7	
				15	13m	.9	
		D2	36.5	17.5	0	7.1	1.2
				17	1m	6.9	
				17	2m	6.9	
				17	3m	6.8	
				17	4m	6.8	
				17	5m	6.7	
				17	6m	6.6	
				17	7m	6.7	
				17	7m	6.7	
				17	8m	6.6	
				17	9m	6.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		F	37.0	17	0	7.5	1.3
				17	lm	7.4	
				17	2m	7.5	
				17	3m	7.4	
				17	4m	7.4	
				16.8	5m	7.4	
				16.5	6m	6.7	
				16.2	7m	4.6	
				16	8m	3.5	
				16	9m	3.3	
				16	10m	2.9	
Cascade	7/30/92	A	36.8	21	0	5.3	1.4
				21	lm	5.6	
				20.5	2m	5.6	
				20.5	3m	5.4	
				20	4m	5.3	
				20	5m	4.9	
				17.2	6m	3.8	
				17	7m	3	
		B2	35.4	20	0	6.2	1.7
				19.5	1m	6	
				19	2m	6.2	
				19	3m	6.1	
				19	4m	5.9	
				19	5m	5.8	
				19	6m	5.5	
				18	7m	3.8	
				17	8m	3.3	
				17	9m	2.1	
				16.5	10m	2	
				16	11m	.4	
				15.5	12m	.4	
				15.5	13m	.4	
				15.5	14m	.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
		C	35.8	19.5	0	6.5	1.7
				19	lm	6.8	
				18.5	2m	6.6	
				18	3m	6.1	
				18	4m	5.4	
				17.5	5m	5	
				17	6m	4.6	
				17	7m	4.1	
				16.5	8m	3.7	
				16	9m	3.1	
				16	10m	2.1	
				16	11m	.7	
		D2	27.9	18.2	0	5.9	1.5
				18	lm	5.5	
				17.3	2m	5.8	
				17	3m	5.3	
				17	4m	5.3	
				17	5m	5.2	
				17	6m	4.5	
				16.8	7m	3.7	
				16.5	8m	3.3	
				16.5	9m	3.1	
		F3	37.2	19	0	7.3	2.1
				18.5	lm	7.1	
				17.5	2m	6.7	
				17.5	3m	6	
				17	4m	5.5	
				17	5m	4.4	
				16.5	6m	2.1	
				16.5	7m	7.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		E	34.3	19	0	6.5	2.0
				18	1m	6.3	
				17.5	2m	6	
				17.5	3m	5.8	
				17	4m	5.4	
				17	5m	4.8	
				17	6m	4.7	
				17	7m	3.8	
				16.5	8m	3.7	
				16	9m	1.5	
Cascade	8/6/92	A	47.3	21.5	0	10.6	1.1
				21.5	lm	10.4	
				21	2m	10.2	
				20	3m	8.6	
				19	4m	8.3	
				17.5	5m	1.3	
				17	6m	1.4	
				17	7m	1.4	
				17	8m	1.5	
				17	9m	1.5	
				17	10m	1.8	
		B2	48.8	21	0	10.4	
				20	lm	10.2	
				20	2m	9.3	
				20	3m	9.3	
				20	4m	8	
				19	5m	4.5	
				18	6m	2.5	
				17.5	7m	2.6	
				17	8m	3.3	
				17	9m	3.3	
				17	10m	2.7	
				16	18m	2.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Cascade	8/13/92	A	54.0	21.5	0	9.4	.7
				21.5	1m	9.2	
				21	2m	9.1	
				18.5	3m	6.6	
				18	4m	5.9	
				18	5m	5.5	
				17.5	6m	3.3	
				17.5	7m	2.3	
		B2	51.9	21	0	10.6	.8
				20.5	lm	9.4	
				19.5	2m	8.5	
				19.3	3m	9.2	
				19	4m	9.1	
				18.5	5m	6.8	
				18.5	6m	6.4	
				18	7m	5.9	
				16.7	8m	1.1	
				16	9m	.6	
				15.3	10m	.7	
				15	11m	.7	
				15	12m	.7	
				15	13m	.7	
				15	14m	.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		C	44.3	20	0	9.3	.8
				19	lm	9.1	
				19	2m	7.1	
				18.5	3m	7.8	
				18.5	4m	7.1	
				18.5	5m	6.7	
				18.2	6m	6.2	
				18	7m	5.7	
				17.2	8m	3.1	
				16.4	9m	.6	
				16	10m	.6	
				16	llm	.7	
				15.5	12m	.8	
		E	35.7	19.5	0	7.9	
				18.5	lm	7.6	
				18	3m	6.9	
				18	4m	6.3	
				17.6	5m	5.7	
				17.5	6m	4.7	
				17	7m	3.7	
				16.5	8m	1.2	
				16	9m	.9	
		F3	38.9	19	0	8	
				18.5	lm	7.6	
				18.2	2m	6.9	
				18	3m	6.3	
				17.8	4m	5.1	
				17	5m	2.9	
				16.5	6m	.7	
				16	7m	.6	
				16	8m	.8	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss Oxygen	Secch
Cascade	8/21/92	A	40.6	20	0	9.3	1.0
				19.5	im	8.8	
				18.5	3m	6.6	
				17.5	4m	2.8	
				17	5m	1.5	
				17	6m	1.7	
		B	54.0	19.5	0	10.8	.9
				19	lm	10.2	
				18.5	2m	9.2	
				18	3m	6.7	
				17	4m	2.8	
				16	5m	.8	
				16	6m	.8	
				15.5	7m	.8	
				15.5	8m	.7	
				15	9m	.7	
				15	10m	.8	
				14.5	11m	.8	
				14.5	12m	.8	
				14.5	13m	.8	
				14	14m	.8	
				14	15m	.8	
				14	16m	.8	
		North End	39.6	19	0	8.8	1.2
				18.5	lm	8.6	
				18.5	2m	8.4	
				18	3m	8.4	
				18	4m	7.8	
				18	5m	7.2	
				17.5	6m	6.2	
				17	7m	3.2	
				17.5	8m	1.7	

Appendix B. (continued)
Appendix B. Limnological database Region 4.

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		E	48.8	19	0	10.2	1.1
				19	1m	10.2	
				19	2m	10.2	
				19	3m	10.2	
				19	4m	9.8	
				19	5m	9.6	
				18	6m	8.3	
				15.5	7m	.6	
				15.5	8m	.7	
				15.5	9m	.8	
				15	10	.8	
		F3	47.7	19	0	10.4	1.2
				19	lm	9.9	
				19	2m	9.4	
				19	3m	9.3	
				19	4m	8.4	
				18.5	5m	6	

Appendix B. Limnological database Region 4.

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Oakley	5/6/92	Station 1	330.0	14	0	8.1	
Oakley	7/7/92	1 (dam face)	571.0	16	0	7.2	.2
				16	lm	7	
				15.5	2m	6.9	
				15.5	3m	7	
				15.5	4m	6.7	
				15	5m	6.1	
				15	6m	5.6	
				15	7m	6.1	
				15	8m	6.4	
		2 (mid-res)	510.0	16	0	7.3	.2
				16	lm	7.2	
				16	2m	6.9	
				16	3m	7	
				15.5	4m	7	
				15.5	5m	7	
				15.5	6m	6.7	
		3 (Upper end)	568.0	16.5	0	7.5	.2
				16.5	.5	7.4	
				16.5	lm	7.4	
				16.5	1.5m	7.3	
				16.5	2m	7.4	
				16.5	2.5m	6.7	
Salmon Falls Creek	5/6/92	Station 1	220.0	13	0	7.2	1.4
				9.5	5m	7.5	
				8	ilm	7.4	
				8	15m	6.6	
				7	20m	6.6	
				7	25m	6	
		Station 2		13	0	7.2	2.2
				10	5m	7.4	
				9	10m	7.2	
				7.5	17m	7	
				6.8	20m	5.4	
				6	25m	4.9	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dias. Oxygen	Secchi
		Station 3		11.2	0	7.4	
				10	3m	7.4	
				10	8m	7.3	
				8	13m	6.8	
				7	18m	6.5	
				6	23m	6	
				5	26m	6.4	
Salmon Falls Ck	7/7/92	1 (near dam)	358.0	15.5	0	8.6	2.6
				15	lm	8.5	
				15	2m	8.2	
				14.5	3m	8.3	
				14	4m	8.3	
				14	5m	8.1	
				16	6m	7.9	
				14	7m	7.4	
				14	8m	7.7	
				13.5	9m	7.1	
				12	10m	5.4	
				8.5	15m	3.7	
				7	20m	1.8	
				7	23m	1.3	
		2 (inlet)	377.0	17.5	0	9.4	.8
				17.5	.5	9.4	
				18	lm	9.4	
				18	1.5m	9.1	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		3 (mid-res)	347.0	15.5	0	9.1	1.8
				15	lm	8.9	
				15	2m	8.7	
				15	3m	8.8	
				15	4m	8.8	
				15	5m	8.7	
				15	6m	8.5	
				15	7m	8.2	
				15	8m	7.8	
				14.5	9m	7.3	
Lower Salmon Falls	5/6/92	Station 1	430.0	17.5	0	9.1	1.1
				15.5	3m	8.3	
				15.5	5m	8	
				15.5	7m	7.9	
				15	10m	7.5	
		Station 2		18	0	8.9	1.2
				15.6	3m	8	
				15.5	5m	7.8	
				15.5	7m	7.8	
				15	10m	7.8	
		Station 3		18	0	8.1	1.1
				16	3m	8.1	
				15	5m	7.1	
				15	7m	6.9	
				15	10m	7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Lower Salmon Falls	7/1/92	1 (near dam)	769.0	16.5	0	8.9	1.9
				15.5	im	8.8	
				15	2m	8.8	
				15	3m	8.8	
				15	4m	8.7	
				15	5m	8.8	
				15	6m	8.7	
				15	8m	8.5	
				15	9m	9.1	
				15.5	10m	9	
		2 (near upper dam)	772.0	16	0	11.9	
				16	.5	11.9	
				15	lm	10.8	
				15	1.5	10.4	
				15	2m	10.1	
				15	2.5	10.4	
				15.5	3m	10.6	
		3 (between dams)	779.0	16	0	8.5	2.9
				16	lm	8.5	
				15.5	2m	8.4	
				15	3m	7.9	
				15	4m	7.6	
				15	5m	7.2	
				15.5	6m	7.7	
Little Wood	5/7/92	Station 1		12	0	7.2	1.3
				11	3m	7.6	
				10.4	5m	7	
				9.5	7m	6.9	
				9	10m	6.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Station 2	172.0	11.5	0	7	4.7
				11	3m	7.4	
				11	5m	7.3	
				10	10m	7.1	
				7.5	15m	7.1	
				6.5	20m	7.1	
				6	25m	6.7	
				6	30m	5.8	
		Station 3		12	0	7.4	
				11	5m	7.4	
				10	10m	7.3	
				7.9	15m	7	
				7	20	6.7	
				6.5	25m	6.5	
Little Wood	7/4/92	1 (farthest from dam	292.0	16	0	6.4	1.6
				16	.5	6.4	
				16	im	6.6	
				16	1.5	6.3	
				15.5	2m	6.4	
				15.5	2.5	6.4	
				15	3m	6.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		2	289.0	16.5	0	6.9	2.8
				16.5	lm	6.8	
				16	2m	6.8	
				16	3m	6.8	
				16	4m	6.6	
				16	5m	6.5	
				15.5	6m	6.2	
				15	7m	6.1	
				15	8m	5.9	
				15	9m	5.8	
				15	10m	5.8	
				15	11m	5.7	
				14.5	12m	5.2	
		3 (near dam)	303.0	16.5	0	6.8	2.8
				16	lm	6.9	
				16	2m	6.9	
				16	3m	6.9	
				16	4m	6.9	
				16	5m	6.8	
				16	6m	6.8	
				16	7m	6.7	
				15	8m	5.7	
				15	9m	5.7	
				14.5	10m	5.4	
				14	15m	5.2	
				13	19m	.6	
Magic	5/7/92	Station 1	270.0	16	0	6.9	2.4
				14	3m	7	
				11.1	5m	6.5	
				11	7m	6	
				11	10m	4.9	
				13.5	13m	3.3	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secch
		Station		16	0	5.8	3.9
				14.5	lm	6.9	
				13.5	2m	6.7	
				12.5	3m	6.3	
				11.1	4m	6	
				11	5m	5.8	
		Station		17	0	6.6	2.3
				15	lm	6.7	
				14	2m	6.3	
				11.5	3m	5.6	
				11	4m	5.5	
				11	5m	5	
Anderson Ranch	5/7/92	Station	98.2	14	0	7.8	3.0
				11	5m	7.3	
				10	10m	7	
				8	15m	6.8	
				5	20m	7.2	
				4.5	25m	7.5	
				5.5	30m	7	
		Station		15	0	7.6	2.7
				12	5m	7.7	
				10	10m	6.8	
				9	15m	6.5	
				7	20m	7	
				6.5	25m	6.7	
				4	30m	7.3	
		Station		14.5	0	7.7	3.1
				12	5m	7.8	
				9.5	10m	6.7	
				8	15m	7	
				6	20m	7.2	
				4.5	25m	7.2	
				4	30m	7.2	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Anderson Ranch	7/3/92	2 (under high wires)	123.0	19	0	6.9	3.
				19	im	6.8	
				19	2m	6.7	
				18.5	3m	6.8	
				18.5	4m	6.7	
				18	5m	6.6	
				18	6m	6.5	
				17	7m	5.7	
				16.5	8m	5.6	
				16	9m	5.4	
				15.5	10m	5.6	
				14	15m	5.1	
				11.5	20m	4.8	
				6.5	25m	4.8	
				5.5	30m	5	

Appendix B. Limnological database Region 5.

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Blackfoot	5/5/92	Station 1	488.0	16	0	6	
				14.5	lm	5.8	
				12.5	2m	6.3	
				11	3.5	5.6	
		Station 2		15	0	6.2	
				15	lm	6	
				13	3m	6.1	
		Station 3		18	0	6.3	
				18	lm	6.3	
Blackfoot	6/26/92	1(dam)	611.0	19	0	5.3	.6
				19	.5	5.1	
				19	lm	4.9	
				18.5	1.5	5.1	
				18.5	2m	5.1	
				18	2.5	4.9	
				18	3m	4.8	
				17.5	3.5	4.5	
				17.5	4m	4.5	
		2(.74 miles from dam)		18	0	4.7	.6
				18	.5	4.5	
				18	lm	4.5	
				18	1.5	4.5	
				18	2m	4.4	
				18	2.5	4.4	
				17.5	3m	4.2	
				17	3.5	3.8	
		3	650.0	17	0	5.1	.4
				17	.5	5.1	
				17	lm	5.2	
				17	1.5	5	
Blackfoot	8/26/92	Station 1	474.0	13	0	6.4	.4
				12.5	lm	5.9	
				12	2m	5.5	
				12	3m	4.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Station 2	474.0	13.5	0	6.2	.3
				12.5	1m	6.1	
				12	2m	6	
		Station 3		13.5	0	6.8	
				13	lm	6.4	
				12	2.5m	5.6	
		Station 4		13.5	0	6.7	
				13.5	lm	6.7	
		Station 5		12.5	0	6.6	
				12	lm	6.3	
				11.5	2m	6.2	
Daniels	5/12/92	Station 1	520.0	13.5	0	6	4.0
				13	5m	6	
				8	15m	3	
				8	20m	1	
				8	25m	1	
				8	30m	1	
		Station 2		13	0	6	5.1
				13	3m	6	
				13	5m	6	
				12	7m	5.5	
				9	10m	3	
				9	11m	6	
		Station 3		13	0	6	4.9
				13	lm	6	
				13	2m	6	
				12	3m	6.3	
				12	4m	6	
				12	5m	7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Death	Diss. oxygen	Secch
Daniel's	6/27/92	1(near Dam)	508.0	18	0	6.8	3.0
				18	1m	6.8	
				18	2m	6.8	
				17	3m	6.8	
				17	4m	6.6	
				15.5	5m	5.8	
				14.5	6m	5.5	
				12.5	7m	1.5	
				11	8m	.5	
				10	9m	.6	
				9	10m	.7	
				10	11m	.9	
		2(mid-res)	512.0	18.5	0	6.7	2.5
				18	lm	6.5	
				17.5	2m	6.7	
				17	3m	6.3	
				16.5	4m	5.8	
				14.5	5m	3.3	
				13.5	6m	3.5	
				12.5	7m	.7	
				12	8m	.8	
		3 (upper res)	501.0	19	0	6.9	2.4
				18.5	.5	6.5	
				18.5	lm	6.9	
				18	1.5	7.3	
				17.5	2m	7.6	
				17.5	2.5	6.4	
				17.5	3m	6.8	
Devils Creek	5/12/92	Station 1	406.0	14	0	6.7	5.4
				13	5m	6.2	
				9	10m	3.6	
				1f1	15m	2.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dias. Oxygen	Secchi
		Station 2	383.0	14	0	6.6	5.1
				13	3m	6.5	
				12.5	5m	6.2	
				10.5	8m	5.6	
		Station 3		14	0	6.5	
				14	lm	6.5	
				13	2m	6.8	
				13	3m	6.6	
				13	4m	6.9	
				13	5m	6.6	
Devil's Ck	6/27/92	1(upper end)	381.0	18.5	0	6.5	1.7
				18.5	.5	6.4	
				18.5	lm	6.4	
				18.5	1.5	6.5	
				18.5	2m	6.5	
		2(mid-res)	391.0	19	0	6.5	2.0
				19	.5	6.5	
				18.5	lm	6.5	
				18.5	1.5	6.5	
				18.5	2m	6.5	
				18.5	2.5	6.3	
				18.5	3m	6.5	
				18.5	3.5	6.5	
				18	4m	6.5	
		3 (off dam)		18	0	6.4	2.0
				18	lm	6.4	
				18	2m	6.4	
				18	3m	6.2	
				17.5	4m	5.4	
				17	5m	5	
				15	6m	2.3	
				14	7m	.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Deep Creek	5/12/92	Station 1	404.0	15	0	7.5	5.1
				14	3m	7.5	
				8	7m	5	
				6	10	1.5	
				6	13m	1	
				7	15m	1.5	
		Station 2	402.0	14.5	0	7.5	5.4
				13.5	3m	7	
				13.5	5m	6.4	
				8.1	7m	3.6	
				6	10m	2.5	
		Station 3		15	0	7.4	3.3
				15	lm	7.9	
				14	2m	8.7	
				14	3m	9.5	
Deep Ck	6/28/92	1 (near dam)	316.0	21	0	8	4.3
				21	lm	7.9	
				20	2m	8.7	
				19	3m	9.4	
				18	4m	8.6	
				16.5	5m	6.9	
				16	6m	5.4	
				16	7m	4.9	
				16	8m	4.8	
				15.5	9m	4.7	
				16	10m	3	
				16	11m	.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		2 (mid-res)	316.0	21	0	8.6	3.9
				21	.5	8.6	
				21	1m	8.6	
				20	1.5	10.3	
				19.5	2m	9.3	
				19	2.5	9.2	
				18	3m	9.1	
				18	3.5	8.8	
				18	4m	8.8	
				17.5	4.5	8.5	
				17	5m	8.2	
		3 (upper end)	312.0	21	0	9.7	3.4
				20	lm	9.5	
				19	2m	8.7	
				18.5	3m	7.9	
				17.5	4m	7.2	
				17	5m	8	
Twin Lakes	5/12/92	Station 1	304.0	15	0	6.5	4.8
				14	3m	6.4	
				13	5m	4.8	
				11	8m	1.1	
		Station 2		14	0	6.5	3.8
				13.5	3m	6.6	
				12.5	5m	6.4	
				11.5	7m	4.3	
				11	10m	1.5	
		Station 3	295.0	14	0	6.5	2.9
				13.5	3m	6.6	
				12.5	5m	6.4	
				11.5	7m	4.3	
				11	10m	1.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dios. Oxygen	Secch
Twin Lakes	6/30/92	1 (Mid. S Lake)	301.0	18	0	5.5	1.5
				18	lm	5.3	
				18	1.5	5.2	
				18	2m	5.3	
				17.5	2.5	5.2	
				17.5	3m	5.3	
				17.5	3.5	5.4	
				17	4m	5.4	
		2 (S end of N lake)	429.0	17.5	0	5.9	1.8
				17.5	lm	5.8	
				17.5	2m	5.8	
				17.5	3m	5.3	
				17.5	4m	5	
				17.5	5m	5	
				17	6m	4.8	
				17	7m	3	
		3 (N lake near dam)	428.0	17	0	6	2.5
				17	im	5.8	
				17	2m	5.8	
				17	3m	5.8	
				17	4m	5.7	
				17	5m	5.7	
Winder	5/12/92	Station 1	253.0	18.5	0	6.8	
				18.5	lm	6.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Winder	6/29/92	1 (near Dam)	162.1	20.5	0	7.9	4.1
				20.5	lm	7.9	
				20.5	2m	8.1	
				20	3m	8.8	
				19.5	4m	9.3	
				18.5	5m	9.2	
				18	6m	8.5	
				17	7m	7.2	
				17	8m	5.4	
				17	9m	4	
				16	10m	1.8	
		2 (middle)	166.1	20.5	0	7.5	4.0
				20.5	lm	7.7	
				20.5	2m	7.9	
				20.5	3m	7.6	
				20.5	4m	7.8	
				20.5	5m	7.9	
				18	6m	4.8	
				17.5	7m	4.5	
		3 (farthest from dam)	162.6	20.5	0	8.4	
				20.5	lm	8.9	
				20.5	2m	9.2	
				20.5	3m	9.8	
Treasureton	5/12/92	Station 1	525.0	15	0	6.3	2.4
				14	lm	6.3	
				14	2m	6.4	
				13.5	3m	6	
				13	4m	6.3	
				14	5m	6.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Treasureton	6/30/92	1 (near dam)	785.0	18	0	5.5	
				18	.5	5.4	
				18	lm	5.5	
				18	1.5	5.5	
				17.5	2m	5.5	
				17.5	2.5	5.5	
		2 (middle)	776.0	17	0	5.5	
				17	.5	5.4	
				17	lm	5.5	
				17	1.5	5.5	
				17	2m	5.4	
		3 (past boat ramp)	752.0	17	0	6.3	
				17.5	.5	6.4	
				17	lm	6.5	
Oneida	5/12/93	Station 1	800.0	15	0	8.5	
				14	5m	5.7	
				13	10m	4.2	
				9	15m	.5	
				9	20m	.5	
				10	25m	.6	
				10	30m	.5	
		Station 2	920.0	16	0	8.2	1.6
				15	3m	6.5	
				14	5m	5.5	
				14	7m	5.5	
				13	10m	5	
		Station 3		15.5	0	7.6	
				14	5m	5.6	
				13	10m	4.3	
				9	15m	.4	
				5	20m	.5	
				5.5	25m	1	2.1

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dies. Oxygen	Secch
Oneida	6/29/92	1 (near dam)	809.0	20	0	6.6	1.3
				20	lm	6.6	
				20	2m	6.6	
				19.5	3m	6.4	
				19.5	4m	6.3	
				19.5	5m	6.3	
				19	6m	6	
				18.5	7m	5.8	
				18.5	8m	5.6	
				18.5	9m	5.1	
				17.5	10m	4.2	
				17	12m	3.4	
				14.5	14m	2.3	
		2 (upper end)	818.0	19.5	0	5.7	.4
				19.5	.5	5.7	
				19.5	lm	5.7	
				19.5	1.5	5.7	
				19.5	2m	5.7	
				19.5	2.5	5.8	
				19.5	3m	5.8	
				19.5	3.5	5.9	
				19.5	4m	6	
		3	836.0	20	0	5.7	.5
				20	lm	5.6	
				20	2m	5.3	
				20	3m	4.7	
				19	4m	4.3	
				18.5	5m	4.3	
				18.5	6m	4.3	
				18.5	7m	3.8	
				18.5	8m	3.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. oxygen	Secchi
Chesterfield	5/13/92	Station 1	480.0	14	0	8.9	4.9
				13	3m	8.5	
				13	5m	8.2	
				13	7m	7.9	
				13	10m	7.8	
		Station 2	455.0	13.5	0	9.4	4.3
				13	lm	9.8	
				13	2m	10.4	
				13	3m	10.6	
				13	4m	11	
		Station 3		14	0	9.8	4.8
				13	3m	10.2	
				13	4m	10.5	
				13	5m	11	
Twenty-four Mile	5/13/92	Station 1	725.00	15	0	8.5	
				15	lm	8.5	
Twenty-four Mile	6/26/9	1(farthest from dam)	505.0	18.5	lm	10.9	
				18.5	.5	11.5	
				18.5	1.5	10.5	
				18	2m	10.6	
				18	2.5	11.3	
				17	3m	3	
		2(middle)	518.0	18.5	0	10.4	
				18.5	.5	11.3	
				18.5	lm	10.8	
				18.5	1.5	10.7	
				18	2m	11.1	
				18	2.5	11.6	
				18	3m	11	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		3(near dam)	516.0	18.5	0	8.5	
				18.5	.5	9	
				18.5	lm	9.7	
				18.5	1.5	10.2	
				18.5	2m	9.7	
				18.5	2.5	9.5	
				18	3m	9.9	
				18	3.5	10	
				18	4m	8	
				18	4.5	3.9	
Alexander	5/13/92	Station 1	804.0	13	0	3.7	
		Station 2	836.0	13	0	6.8	.3
				13	lm	6.6	
				14	2m	6.8	
		Station 3	840.0	13	0	6.4	.3
				13	lm	6.3	
				13	2m	6.2	
				13	3m	6	
				13.5	4m	4	
Springfield Lake	5/13/92	Station 1	610.0	16	0	8.2	
				14	1.5	8.2	
Springfield Lake	6/25/92	1(SW end)	527.0	17	0	9.6	
				17	.5	9.3	
				17	lm	9.2	
				17	1.5	9.5	
				16.5	2m	8.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Dias. Oxygen	Secchi
		2(mid-lake)	538.0	17	0	9.4	2.7
				17	.5	9.5	
				16	lm	9.3	
				15	1.5	9.4	
				15	2m	8.7	
				15	2.5	9.1	
				16	3m	8.4	
		3(Midlake)	523.0	17	0	10	
				17	.5	10.3	
				17	lm	10.6	
				17	1.5	10.6	
				17	2m	10.2	
				17	2.5	10.2	
				17	3m	10.4	

Appendix B. Limnological database Region 6.

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
Island Park	5/4/92	Station 1	126.3	13	0	10	2.3
				10.5	2m	9	
				10	3m	8	
				8.4	6m	7	
		Station 2		13	0	9.5	
				12.8	1m		
				9.8	6m	8.6	
				9	7m	7	
				7.5	10m	6.6	
		Station 3		13	0	8.9	2.3
				10	5m	8.6	
Island Park	6/23/92	1(near Dam)	158.9	19	0	6.5	3.0
				18.5	lm	6.5	
				18	2m	6.5	
				17	3m	6.5	
				16	4m	6.7	
				15	5m	6	
				14.5	6m	5.5	
				14	7m	5.2	
				14	8m	4.8	
				13.5	9m	4.4	
				13	10m	4.7	
				12.5	15m	4	
				12	18m	3.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		2(W side of island)	171.4	19.5	0	7.1	2.8
				19	1m	7	
				18	2m	7.1	
				16.5	3m	6.8	
				15	4m	6.1	
				15	5m	5.7	
				14	6m	5.5	
				14	7m	5.6	
				13	8m	4.5	
				13	9m	4.4	
				13	10m	4	
				12	12m	3	
				12	14m	2.4	
		3(Upper End)	178.0	19.5	0	6.7	3.7
				17.5	lm	6.4	
				17	2m	6.3	
				15.5	3m	6.4	
				15	4m	6.3	
				15	5m	6	
Island Park	8/25/92	Station 1	145.0	13.5	0	6.7	.9
				13.3	lm	6.8	
				13	2m	7	
				13	3m	13	
				6.8	4m	13	
				6.4	5m	13	
				6.1	6m	13	
				7.9	7m	13	
				5.8	8m	12.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Station 2		14	0	7.3	
				13.5	lm	6.8	
				13	2m	6.8	
				13	3m	6.8	
				13	4m	6.6	
				13	5m	6.6	
				13	6m	6.7	
				12.5	7m	6.2	
				12.5	8m	6	
				11.5	9m	6	
				11	10m	5.7	
				10	11m	5.8	
		Station 3		13.5	0	7	
				13.5	lm	6.9	
				13.6	2m	6.6	
				13	3m	6.5	
				13	4m	6.2	
				13	5m	5.7	
				12.8	6m	5.8	
				12.8	7m	5.7	
				12.5	8m	5.7	
				12	9m	4.2	
				11	10m	2.5	
				10	11m	3.8	
Ririe	5/5/92	Station 1	455.0	11	0	8.8	1.2
				10.1	lm	9.5	
				10	2m	9	
				10	5m	8.5	
				8	7m	7.7	
				7	12m	4.8	
				8	17m	4.6	
				8	22m	4.6	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Death	Diss. Oxygen	Secch
		Station 2		11.5	0	8.8	1.7
				10	5m	8.8	
				8	10m	7.5	
				7.3	13m	7.5	
				7	15m	7	
				6.5	18m	6.2	
				6	20m	7.5	
				6.5	25m	5.4	
				7	30m	5	
		Station 3		11.5	0	8.6	2.7
				10	3m	8.6	
				9	8m	8.4	
				7.2	13m	7.2	
				6.2	18m	7	
				6	23m	6.7	
				6	28m	6.7	
				5.5	33m	6.5	
Ririe	6/24/92	1 (dam face)	51.0	18.5	0	6.2	5.5
				18.5	lm	6	
				18.5	2m	6	
				18.5	3m	6	
				18	4m	6.1	
				18	5m	6.1	
				15.5	6m	6.4	
				15	7m	5.5	
				14	8m	5.2	
				13.5	9m	5.3	
				13	10m	4.7	
				9	15m	3	
				8	20m	2.5	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		2 (mid-res)	50.4	19	0	6.3	4.0
				19	lm	5.9	
				18.5	2m	6	
				17	3m	6.3	
				16	4m	6.6	
				15	5m	6.8	
				15	6m	6.4	
				14.5	7m	6	
				13.5	8m	5.1	
				13	9m	4.4	
				13	10m	3.9	
				10	15m	1.9	
				8	20m	1.2	
		3 (near upper ramp)	50.9	19	0	6.4	2.1
				18	lm	6.6	
				17.5	2m	6.8	
				17	3m	6.9	
				15	4m	7	
				14.5	5m	6.7	
				14	6m	5.5	
				13.5	7m	4.9	
				13	8m	3.2	
				13	9m	2.1	
				13	10m	1	
Palisades	5/5/92	Station 2	340.0	11.5	0	5.8	1.5
				9.1	5m	5.8	
				7.5	8m	5.5	
				6.5	10m	4.8	
				6	12m	4.8	
				4	15m	3.5	
				3.2	20m	2.5	
				3	25m	2.2	
				3	30m	2	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		Station 1		11	0	9.7	1.9
				8.5	3m	9.7	
				7	10m	9.6	
				4	15m	9.5	
				4	17m	9	
				3.5	20m	9.9	
				3	25m	9.8	
				3	30m	9.5	
		Station 3		13	0	8.3	
				9.9	5m	8.3	
				6	10m	8.3	
				3.5	15m	8	
				3.5	20m	6.6	
				4	25m	6.8	
				4.1	30m	7.1	
Palisades	6/24/92	1(Dam Falls)	29.4	17	0	6.3	5.6
				17	lm	6.3	
				16.5	2m	6.3	
				16	3m	6.3	
				16	4m	6.3	
				16	5m	6.3	
				16	6m	6.2	
				16	7m	6.1	
				16	8m	5.8	
				16	9m	6.2	
				14	10m	5.8	
				12	15m	5.3	
				11	20m	4.2	
				11	25m	4	
				10	30m	4.1	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		2(Narrows,mid-lake)	28.2	19	0	6.6	1.6
				17	im	6.7	
				16	2m	6.8	
				15	3m	7	
				15	4m	6.9	
				14	5m	6.7	
				14	6m	6.4	
				14	7m	6.3	
				13.5	8m	6.1	
				13.5	9m	6	
				13.5	10m	6.3	
				13.5	12m	6	
		3(upper end)	26.2	17	0	5.4	.9
				16.5	1m	5.8	
				15.5	2m	6	
				15.5	3m	6	
				15	4m	6.2	
				15	5m	6.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Oxygen	Secchi
St. John's	6/28/92	1 (farthest from dam)	428.0	18.5	0	5.5	.2
				17	.5	5.5	
				16	im	4.7	
		2 (mid-res)	432.0	19	0	5.6	.2
				18.5	.5	5.3	
				18	lm	5.3	
				16	1.5	5.2	
		3 (near dam)	430.0	19	0	5.4	.2
				18.5	.5	5.3	
				18	1m	4.5	
				17	1.5	4.6	
Pleasantview	6/28/92	1 (near dam)	540.0	19.5	0	8.2	1.9
				19	.5	8	
				19	lm	7.8	
				18	1.5	6.6	
				17.5	2m	6.2	
				17	2.5	6.1	
				17	3m	6.2	
		2 (mid-res)	550.0	20.5	0	9	
				19.5	.5	8.5	
				19	1m	8.5	
				18	1.5	8.4	
				16.5	2m	8.4	
		3 (upper end)	557.0	20.5	0	9.6	
				20	.5	9.4	
				19	1m	8.6	
				17	1.5	7.1	
				17	2m	6.4	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
C.J. Strike	7/6/92	1 (Bruneau Arm, mid)	644.0	21	0	9.3	.7
				20.5	lm	8.9	
				20	2m	7.5	
				19	3m	6.2	
				18.5	4m	5.1	
				18.5	5m	4.7	
				18.5	6m	4.6	
				18.5	7m	4.7	
				18.5	8m	4.9	
				18.5	9m	4.9	
				18.5	10m	4.7	
		2 (Bruneau Arm Narrow)	610.0	20.5	0	9	1.6
				20.5	im	8.6	
				20	2m	8.2	
				19.5	3m	7.1	
				19	4m	6.2	
				18.5	5m	4.8	
				18.5	6m	4.2	
				18	7m	3.8	
				18	8m	3.3	
				18	9m	2	
				17.5	10m	1.3	
				17	12m	.6	
				16	14m	.7	

Appendix B. (continued)

Location	Date	Station	Conductivity	Temp	Depth	Diss. Oxygen	Secchi
		3 (mimd-res, 200m)	686.0	18.5	0	7.1	1.8
				18.5	1m	6.6	
				18	2m	6.1	
				18	3m	5.6	
				18	4m	5.6	
				17.5	5m	5.3	
				17.5	6m	5.2	
				17.5	7m	5.1	
				17.5	8m	5.1	
				17.5	9m	5	
				17.5	10m	4.6	
				17	12m	4	
				17	14m	3.1	
				15	16m	.4	
				14	18m	.4	
		4 (Snake Arm)	593.0	19.5	0	9.3	1.2
				19	1m	8.9	
				19	2m	8.7	
				18.5	3m	7.7	
				18	4m	7.4	
				18	5m	7	
				18	6m	6.9	
				18	7m	6.7	
				17.5	8m	6.4	
				17	9m	3.9	
				16.5	10m	3.3	
				15	15m	.3	
				14	20m	.4	
				13.5	23m	.6	

Appendix C.

Zooplankton species, composition, and size structure by region.

Appendix C. Zooplankton species, composition, and size structure in Region 1.

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25
Hayden	5/25	Bosmina	1	1	1						
		Daphnia	0	1							
		Copepods	21	62	37	5			2		
	9/16	Bosmina									
		Daphnia	0	2	1	0	1	2	1		
		Copepods	1	4	1			1			
Cocolalla	5/25	Bosmina	3	1							
		Daphnia	0	360	132	100	59	4			
		Copepods	204	142	35		2				
	9/15	Bosmina									
		Daphnia									
		Copepods	38	104	29	10	5				
Dawson Lake	5/25	Bosmina		1							
		Daphnia		6	22	8	5				
		Copepods	18	20	20	29	1				
	9/15	Bosmina									
		Daphnia		3	21	18	26	1			
		Copepods	36	20	10	1					
Shepard	5/25	Bosmina	2	2							
		Daphnia		5	46	27	24	5	3		1
		Copepods	35	140	12	9					
	9/15	Bosmina	1	1	1						
		Daphnia		6	12	6	3	2	1		
		Copepods	167	84	1	6					

APPEND-C

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Jewel	5/26	Bosmina	11	8	5						
		Daphnia		2				1			
		Copepods	8	15	1						
	9/15	Bosmina		1							
		Daphnia		2	1	10	2	1	1		
		Copepods	1								
Spirit	5/24	Bosmina	13	10							
		Daphnia		3	2						
		Copepods	47	293	42	6					
	9/16	Bosmina	52	40							
		Daphnia		2	4	5					
		Copepods	6	28	19	3					
Granite	5/26	Bosmina	3	3							
		Daphnia		8	7	2					
		Copepods	88	' 65	4						
	9/15	Bosmina	2	2							
		Daphnia					5		1	4	
		Copepods	15	32	9	1					
Hauser	5/24	Bosmina									
		Daphnia		12	16	8	26	6	6	2	
		Copepods	11	3							

Appendix C. Zooplankton species, composition, and size structure in Region 2.

Lake	Date	Organism	0.25 mm	0.50	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 m
Winchester	5/22	Bosmina	7	5							
		Daphnia		3	7	2	4	2			
		Copepods	256	116	5	3					
	9/9	Bosmina		2							
		Daphnia		100	57	71	24	2			
		Copepods	4	2							
Sp. Valley	5/24	Bosmina									
		Daphnia		8	1						
		Copepods	29	8	12	1					
	9/10	Bosmina	183	377	79						
		Daphnia		4	4	3	7				
		Copepods	39	10	2						
S. Meadow	5/23	Bosmina	4		1						
		Daphnia			3	1	1				1
		Copepods	22	77	51						
	9/9	Bosmina	12	299	45						
		Daphnia		6	48	45	3	2			
		Copepods	22	56	59	15					
Mann's L	5/25	Bosmina	1	6	5						
		Daphnia		6	16	8	6	1			
		Copepods	12	74	8	3	1				
	9/15	Bosmina									
		Daphnia									
		Copepods									
Lake Waha	9/9	Bosmina	79	438	7						
		Daphnia		2	4	1					
		Copepods	97	180	47	9					

APPEND-C

Appendix C. Zooplankton species, composition, and size structure in Region 3.

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Arrowrock	5/8	Bosmina									
		Daphnia		19	63	29	28	2			
		Copepods	78	59	5						
CJ Strike	7/6	Bosmina	99	14							
		Daphnia		3	1		3				
		Copepods	1	4	2						
Lucky Peak	4/29	Bosmina	132	72	1						
		Daphnia		11	8	9	2	1			
		Copepods	54	724	122	37	5	1			
	6/10	Bosmina	32	11							
		Daphnia		26	26	20	9	1			
		Copepods	230	382	26	3					
	6/17	Bosmina	19	6							
		Daphnia			15	21	15	9	9	1	
		Copepods	45	404	41	6					
	6/30	Bosmina	56	24							
		Daphnia		28	42	17	20				
		Copepods	51	103	15	9					
	7/15	Bosmina	1								
		Daphnia		10	17	7	9			1	
		Copepods	58	43	25	1					

APPEND-C

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Lucky Peak	7/22	Bosmina	2	17							
		Daphnia		18	13	7	41	28	13	5	
		Copepods	10	34	20	11					
	7/29	Bosmina			3	4	6		6	5	1
		Daphnia			8	22	20	18	9		
		Copepods	3	37	38	8	2				
	8/5	Bosmina									
		Daphnia		81	49	19	39	23	4		
		Copepods	9	15	20	11	1				
	8/12	Bosmina	1	9	3		1				
		Daphnia		45	39	16	18	25	33	11	1
		Copepods	20	33	29	7	1	2			
	8/20	Bosmina	1	4	6	5	1				
		Daphnia		28	25	27	16	29	6		
		Copepods	2	26	24	20	4				
Deadwood	7/12	Bosmina	16	10							
		Daphnia	2	5	1						
		Copepods	6	13	1						
L. Lowell	5/8	Bosmina	4								
		Daphnia	1	86	42	16	22	8	3		
		Copepods	97	282	192	63	27	12	9		

Appendix C. Zooplankton species, composition, and size structure in Region 3 - McCall Subregion.

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	mm	1.75 mm	2.00 mm	mm
Goose Lake	9/2	Bosmina	5	2							
		Daphnia		1		1	2				
		Copepods	3	11	6	1					
U. Payette	9/3	Bosmina	2								
		Daphnia		4	2		1				
		Copepods		1	3	17	5				
Cascade	5/20	Bosmina	408	19							
		Daphnia		3							
		Copepods	6	9	11						
	6/4	Bosmina	43	34							
		Daphnia		9	4	3	5	3	3	3	
		Copepods	1	3	12						
	6/11	Bosmina	7	8							1
		Daphnia		8	12	2	2	1	2	2	2
		Copepods	6	9	19	6	1				
	7/16	Bosmina	3	3							
		Daphnia		1		2	3	1			
		Copepods	1	7	19	7					
	7/23	Bosmina	305	1							
		Daphnia		10	8	5	8	4	2	2	
		Copepods	7	25	17	9					
	7/30	Bosmina									
		Daphnia		8	23	47	2	1	1		

Copepods	45	33	30	3

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25
Cascade	8/13	Bosmina	1	3							
		Daphnia		12	5	11	10	6	9	4	1
		Copepods	36	100	43	13					
	8/20	Bosmina			1						
		Daphnia		21	7	1	3				
		Copepods	1	11	21	2					
Brundage	9/2	Bosmina	6	11							
		Daphnia		5	3	7					
		Copepods	1	10	6						
Granite L	9/2	Bosmina	1	1	2						
		Daphnia		1							
		Copepods	1	2	7		1				
Warm L	5/18	Bosmina	12	2							
		Daphnia	2	136	93	19	2				
		Copepods		11	69	16	3				
	9/1	Bosmina									1
		Daphnia									2
		Copepods									
L Payette	9/3	Bosmina	12	12	2	1	1				
		Daphnia		8	3	6	1				1
		Copepods	5	27	16	4					
L Valley	5/19	Bosmina	83	116	9						
		Daphnia		4	4		2	1			
		Copepods	5	12	6	1					

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
L Valley	9/3	Bosmina	3	1	2						
		Daphnia		5	16	3					
		Copepods			48	56					
Horsethief	5/18	Bosmina		21							
		Daphnia	2	10	25	34	40	30	28	7	1
		Copepods	4	7		2	1	1			
	9/1	Bosmina	5	38	22						
		Daphnia		8	5	3					
		Copepods		2	2	1	2	13			

Appendix C. Zooplankton species, composition, and size structure in Region 4.

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25
L Salmon F	5/6	Bosmina	9	3							
		Daphnia									
		Copepods	7	3							
	7/2	Bosmina									1
		Daphnia			1		1				2
		Copepods		1	1						
Magic	5/7	Bosmina	76	138	43	12					
		Daphnia			21	19	2	1			1
		Copepods	47	179	37	15	1				
	7/3	Bosmina									
		Daphnia		11	32	21	18	5			
		Copepods	53	113	17						
S F Creek	5/6	Bosmina	121	93		1					
		Daphnia		4	1	3					
		Copepods	605	115	13	4					
	7/7	Bosmina	16	1							
		Daphnia		1		5	1				
		Copepods	4	30	8						
Oakley	7/7	Bosmina	1	1							
		Daphnia		8		5	3				
		Copepods	16	115	68	10					
Little Wood	5/7	Bosmina	1	8	1					1	
		Daphnia		19	398	25	43	9	1		2
		Copepods	29	16	3	4					

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Little Wood	7/4	Bosmina									
		Daphnia			2	4	1	2	3		1
		Copepods	10	99	1		1				
Anderson R	5/7	Bosmina	1	5							
		Daphnia		19	54	16	16	5			
		Copepods	83	24	6	3					
	7/3	Bosmina	2	1							
		Daphnia		2	71	45	44	20			
		Copepods	171	69	5	2					

Appendix C. Zooplankton species, composition, and size structure in Region 5.

Lake	Date	Orqanism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Oneida	5/12	Bosmina	13	9	3						
		Daphnia	59	52	15	8	4				
		Copepods	82	93	44	20					
	6/29	Bosmina	98	13							
		Daphnia	1	578	88	26	9	1			
		Copepods	58	16	8	3					
Twin Lakes	5/12	Bosmina									
		Daphnia		3	8	3	3	2			
		Copepods	6	8	3						
	6/30	Bosmina	5	1							1
		Daphnia		47	87	10	18	1			2
		Copepods	159	72	2						
Alexander	5/13	Bosmina	28	36	5	1	1				
		Daphnia	4	28	7	4	1	3	1		1
		Copepods	5	48	11	2	1				
Blackfoot	5/5	Bosmina	2	7	2						
		Daphnia		11	23	15	13	3	8		
		Copepods	26	109	37	1	1	1	1		
	6/26	Bosmina									
		Daphnia			8	21	41				
		Copepods		196		85					
Blackfoot	8/26	Bosmina	4	14							
		Daphnia		22	10	10	8	3	2		
		Copepods	17	14	10	3					

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Daniels	5/12	Bosmina		1	1						
		Daphnia		28	325	66	24	38	17	5	
		Copepods	248	160	173	88	3	1			
	6/27	Bosmina	3	4							
		Daphnia		6	37	5	5	2	1		
		Copepods	25	83	13						
Winder	6/29	Bosmina	132	84							
		Daphnia		52	115	65	7				
		Copepods	50	564	2						
Devil's Ck	5/12	Bosmina	1	6							
		Daphnia			38	80	68	17	9	13	1
		Copepods	2	77	76	33	1				
	6/27	Bosmina									1
		Daphnia		2	4	14	16	2	1		2
		Copepods	14	43	19	10					
Deep Creek	5/12	Bosmina		5							1
		Daphnia		20	33	28	58	26	3		2
		Copepods	56	179	80						
	6/28	Bosmina									
		Daphnia			5	45	5	3	1		1
		Copepods	48	7	1						
Pleasant.	6/28	Bosmina									1
		Daphnia		39	2	1	3				2
		Copepods	52	19	1	8					

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
St. John's	6/28	Bosmina									
		Daphnia									1
		Copepods									
Chester.	5/13	Bosmina	3	3							
		Daphnia		2	20	59	44	3	7	3	2
		Copepods	12	11	1		1				
Treasureton	6/30	Bosmina	3								
		Daphnia		4	24	26	13	8	1		
		Copepods	36	24	8	11					
Springfield	6/25	Bosmina	12	22	1						
		Daphnia				2	1				
		Eurycer.			3	3	4	3	1	2	1
T. Four Mi	6/26	Bosmina									
		Daphnia		17	23	1	2	1			
		Copepods	9	54	144	71	2				

Appendix C. Zooplankton species, composition, and size structure in Region 6.

Lake		Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25
Palisades		6/24	Bosmina									
			Daphnia				18	19	8	7		
			Copepods				11	6				
Ririe		5/5	Bosmina	56	48							
			Daphnia		7	7	2	7				
			Copepods	30	23	20	3					
		6/24	Holopedium			100						
			Daphnia				350	600				
			Copepods		2175	1050						
Is Park		5/4	Holopedium		64							
			Daphnia				32					
			Copepods	960	162							
		6/23	Bosmina		408							
			Daphnia						1080	144		
			Copepods	960	192							
Is Pk	1	8/25	Bosmina	1	5							
			Daphnia		64	49	65	37	6	7	3	
			Copepods	12	15	3	5	4	6	4		
	2	8/25	Bosmina	1								
			Daphnia		99	87	51	29	16	5	1	
			Copepods	24	9	8	13	2	3	1		
	3	8/25	Bosmina	2	5							
			Daphnia		77	105	70	45	8	7	2	
			Copepods	12	10	6	6	5	5	3		

Appendix C. (continued)

Lake	Date	Organism	0.25 mm	0.50 mm	0.75 mm	1.00 mm	1.25 mm	1.50 mm	1.75 mm	2.00 mm	2.25 mm
Is Pk St2 1	8/25	Bosmina	13	3							
		Daphnia	3	42	39	39	38	13	13	1	
		Copepods	5	8	1	8	3	3	1		
2	8/25	Bosmina		2	1						
		Daphnia		8	5	2	5	5	6	2	
		Copepods	6	5		3		2	2		
Is Pk St2 3	8/25	Bosmina	4	4							
		Daphnia		12	22	9	13	6	2		
		Copepods	4		5	7	1	1	1		
Is Pk St3 1	8/25	Bosmina									
		Daphnia		17	15	10	8	5			
		Copepods	5	5	2	8	5	2	1		
2	8/25	Bosmina	1								
		Daphnia		12	18	25	14	4	4		
		Copepods	13	6	8	4	6	1	3	1	
3	8/25	Bosmina									
		Daphnia		17	27	18	17	6	3		
		Copepods	3	4	12	7	5	1	3		

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