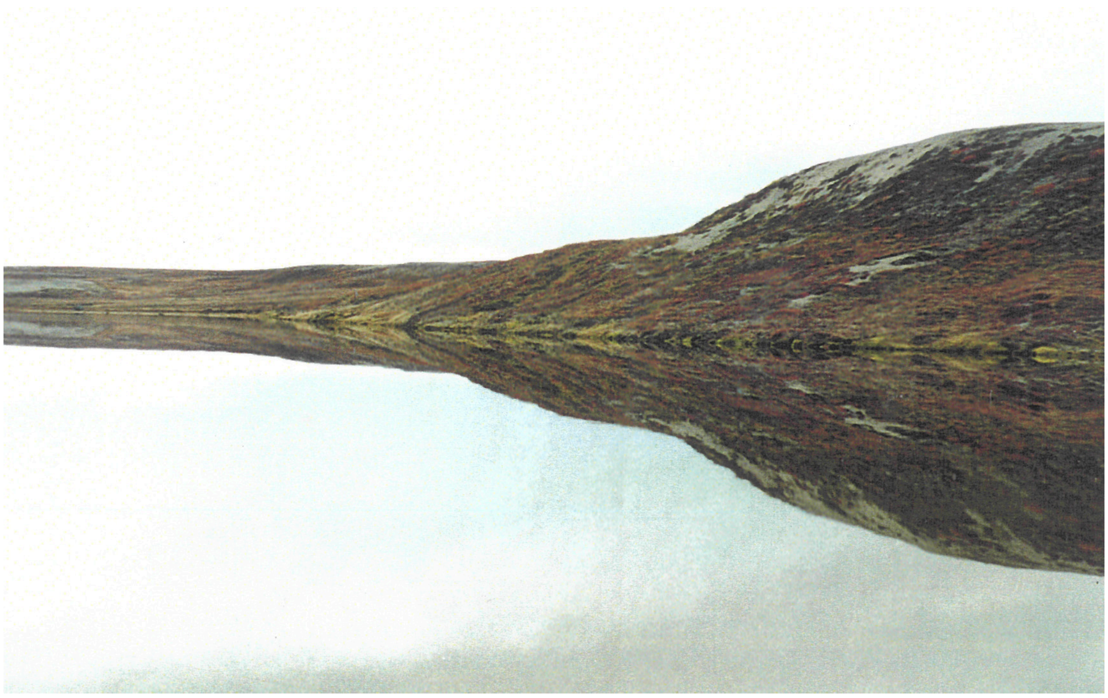
JERICHO DIAMOND PROJECT
AQUATIC STUDIES PROGRAM (1996)



RL&L Environmental Services Ltd.

JERICHO DIAMOND PROJECT
AQUATIC STUDIES PROGRAM (1996)

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Phytoplankton, chlorophyll *a*, and stream periphyton samples were identified by David Beliveau of Bio-Aquatic Consulting Ltd.; benthic macroinvertebrates were identified by Sherry Beckett (independent contractor, Calgary, AB); and, zooplankton samples were identified by Peter Aku and Mariola Jankowicz of the University of Alberta.

EXECUTIVE SUMMARY

The Jericho Diamond Project is situated 420 km northeast of Yellowknife in the Northwest Territories. In anticipation of possible development of this deposit, Canamera Geological Ltd. of Vancouver initiated a baseline environmental inventory of the area in 1995. R.L. & L. Environmental Services Ltd. was contracted to complete the aquatic biota component of this inventory. This report summarizes the findings made during the second year of the baseline aquatic studies program.

The Jericho study area encompasses lakes and streams in the immediate vicinity of the Jericho Diamond Project Site. Waterbodies were chosen for investigation based on the potential for impacts caused by the development. Four sampling zones were established. The Mine Operation Zone encompassed Carat Lake and waterbodies situated downstream of the proposed mine site. The Borrow Extraction Zone encompassed waterbodies in a small drainage within an esker complex situated immediately north of the proposed mine. The third zone (Tailings Impoundment/Docking Facility Zone), which was situated to the east, encompassed waterbodies that may be used for tailings storage and a small bay of Contwoyto Lake that is the proposed location of the docking facility. The fourth sampling zone included stream crossings along the proposed corridor for the all-weather route to the Lupin Mine Site.

During summer, several of the study lakes exhibited thermal stratification. In the Mine Operation Zone, the deeper basins (>15.5 m) of Carat Lake and Jericho Lake had thermoclines between 10.5 and 15.0 m depth. In the Borrow Extraction Zone, lakes deeper than 10 m in depth had thermoclines (Lakes O1 and O3). In the Tailings Impoundment/Docking Facility Zone, the smaller lakes (Lakes D4 and D5) exhibited thermal stratification (beginning at 8 m depth), while the bay (14 m deep at sampling site) in the much larger Contwoyto Lake exhibited isothermal conditions. These data suggest that deeper waterbodies throughout the Jericho study area stratify during the summer, and therefore, can be classified as dimictic (thoroughly mix twice a year). The shallower basins that do not stratify can be classified as monomictic (continuous mixing).

Dissolved oxygen concentrations during summer were similar among most lakes in the three zones (8.5 to 10 mg/L). Contwoyto Lake was unique in that it had the highest dissolved oxygen concentration (11.4 mg/L). This difference was due principally to lower water temperatures, which allow higher saturation levels. The water transparency levels were high in all waterbodies, which was indicative of low suspended materials and low biological productivity.

The phytoplankton communities were similar among the three zones. They were typical of communities found in subarctic lakes and were indicative of oligotrophic conditions. In general, golden-brown algae (Chrysophyta) and diatoms (Bacillariophyta) had the greatest biovolumes, while species of cyanobacteria (Cyanophyta) had the greatest densities.

The zooplankton communities in the Jericho study area lakes were also typical of subarctic systems, however, there were differences among the three zones. In general, the zooplankton communities in the Mine Operation and the Borrow Extraction Zones were dominated by water fleas (Cladocera), which accounted for the majority of the community biomass. The zooplankton community of the lakes within the Tailings Impoundment/Docking Facility Zone were dominated by copepods.

Periphyton were sampled from streams in the Mine Operation Zone and the Borrow Extraction Zone. The most abundant periphytic algae in the Mine Operation Zone streams were the cyanobacteria (Cyanophyta) *Lyngbya limnetica* and *Gomphosphaeria naegelianum*. The most abundant periphytic algae in the Borrow Extraction Zone stream were the cyanobacterium *Microcystis flos-aquae* and the diatom *Tabellaria flocculosa*. The density of periphytic algae in the Borrow Exaction Zone was lower than in the streams in the Mine Operation Zone. The reasons for these differences are unclear, however, the results from both zones are indicative of oligotrophic nutrient conditions.

Benthic macroinvertebrates were sampled from study area lakes and streams. In lakes, mean densities and mean number of taxonomic groups were greater in the littoral zones than in the profundal zones, which was a reflection of the higher productivity of shallow-water habitats. Communities within the three study area zones were similar. Dominant taxa in lakes were chironomids (midges), oligochaetes (aquatic earthworms), and nematodes (roundworms). The benthic macroinvertebrate community in streams were dominated by nematodes (roundworms), oligochaetes (aquatic earthworms), and chironomids (midges). These results were indicative of oligotrophic systems with low productivity and short growing seasons.

Fish communities in lakes differed between the three study area zones. Species recorded in lakes in the Mine Operation Zone included lake trout, Arctic char, round whitefish, burbot, and slimy sculpin, but lake trout was the numerically dominant species in all lakes. Round whitefish and Arctic char were generally the second most abundant species, although they were much less numerous. In the Borrow Extraction Zone, seven species of fish were recorded in sampled lakes. They included lake trout, Arctic char, round whitefish, burbot, Arctic grayling, ninespine stickleback, and slimy sculpin. Of these species, only lake trout, Arctic char and round whitefish were numerous. Lake trout dominated fish communities in Lakes O3 and O5. Arctic char was numerically dominant in Lake O1. In Lakes O2 and O4, round whitefish was the most numerous fish. Lakes in the Tailings Impoundment/Docking Facility Zone supported simple species communities; only lake trout and Arctic char were present. Lake trout was the dominant species in Contwoyto Lake, while Arctic char predominated in Lake D5, and both species were equally important in Lake D4.

Seven species of fish were recorded in sampled streams within the Jericho study area. Arctic grayling, Arctic char, ninespine stickleback, and slimy sculpin were the dominant species, followed by lower numbers of lake trout, round whitefish, and burbot. Most fish recorded in streams (all except ninespine stickleback and slimy sculpin) represented younger age classes that utilized the watercourses for rearing purposes. Fish numbers were generally low in streams, although notable exceptions occurred. In the Carat Lake area, Stream C1 supported a diverse assemblage of species and it contained the highest number of Arctic char recorded in the Mine Operation Zone. Likewise, Stream C6 supported the highest density of Arctic grayling in the zone. In the Jericho River area, Arctic grayling numbers were high in both the upper and lower sections of the main river, as well as in Streams O1, O24, and O25. One species, ninespine stickleback, was also numerous in the Mine Operation Zone, but its distribution was restricted to the Jericho River and its tributaries. Arctic grayling, Arctic char, and slimy sculpin tended to be the most widespread and numerous species in Borrow Extraction Zone streams. Fish numbers were highest in Stream O18 in the Lake O1 area, Stream O5 in the Lake O6 area, and Stream O5 in the Lake O5 area. The highest number of Arctic char were recorded in Stream O18, while Arctic grayling were most numerous in Streams O6 and O5. Few fish were recorded in streams in the Tailings Impoundment/Docking Facility Zone. Lake trout, Arctic char, and slimy sculpin were the only species identified.

Fish populations in the three zones of the Jericho study area exhibited similar biological characteristics. Length-frequency distributions for lake populations typically were bimodal with larger individuals dominating the sample. Fish were slow growing and exhibited large variations in length at a given age. Fish populations in the Jericho study area also matured at a late age. Arctic char and lake trout also exhibited evidence of alternate year spawning (i.e., nonfecund individuals); between 15% and 30% of mature fish that were examined would not have spawned in 1996. These biological characteristics were typical of unexploited fish populations residing in subarctic lakes that have low primary productivity.

Feeding habits of fish in all three zones of the Jericho study area were typical of the species examined and was dependant on food availability. The most prevalent food groups consumed by all fish species in each zone were zooplankton and chironomids. Other items consumed were fish, trichopterans, molluscs, and eubranchiopods. The feeding habits of fish were also dependent on species specific food preferences. Lake trout and Arctic char from the larger waterbodies (Carat, Jericho and Contwoyto Lakes) consumed fish as part of their diet. Trichopterans, which are benthic macroinvertebrates, accounted for a large proportion of food items consumed by round whitefish.

Lakes and streams were evaluated to assess their value as habitat for fish populations. This involved surveys of lake shoreline and stream channel characteristics and attempts to document fish use of these areas. Lakes in the Mine Operation Zone tended to be dominated by cobble-boulder substrates. These characteristics provided an abundance of potential spawning areas for species such as lake trout, Arctic char, and round whitefish. Several high quality spawning sites were identified and the presence of high concentrations of lake trout at one of these locations (north-east corner of Carat Lake) confirmed that it was used for this purpose. The same shoreline characteristics that provided an abundance of spawning habitat also limited the availability of rearing habitat. Shoreline areas of waterbodies in the Borrow Extraction Zone were dominated by smaller substrates consisting of sands and gravels. These characteristics also provided an abundance of potential spawning areas, however, there was a paucity of lake shore rearing habitat. The shoreline areas of lakes in the Tailings Impoundment/Docking Facility Zone were dominated by large substrates consisting of cobbles and boulders; bedrock areas were also identified in some of these lakes. Although not confirmed by concentrations of spawning fish, a shoal situated in the proposed docking facility bay exhibited characteristics of a high quality lake trout spawning site. Overall, the characteristics of lakes in the Jericho study area provided the necessary habitat to support self-sustaining fish populations. Deep-water areas were available as overwintering habitat. Spawning habitat characterized by clean gravel to boulder-sized substrates was widely distributed in areas sufficiently deep enough to avoid freezing. In contrast to the availability of potential spawning areas, rearing habitat was limited in distribution and abundance.

Streams in the Jericho study area generally were small, ephemeral watercourses dominated by ill-defined channels and large substrates. Those that maintained water flow during the entire summer period freeze to the bottom during winter. As a consequence of these characteristics, fish utilized the habitat provided by these systems on an opportunistic basis and use was generally restricted to the lower sections. Spawning, rearing, and feeding habitats were present in varying amounts and were used by fish originating from study area lakes. In the Mine Operation Zone, Stream C1 in the Carat Lake area was used extensively by Arctic char for rearing. Stream C6 provided good quality spawning and rearing habit for Arctic grayling. One larger system in the Interbasin area (Stream C15), was used for rearing and/or feeding purposes by Arctic grayling and lake trout. The Jericho River (both upper and lower sections) contained good habitat. Its large size, well-defined channel, and abundance of smaller substrates created a diverse assemblage of habitats. Deep-water areas in the upper Jericho River may also provide overwintering habitat for fish. A significant feature of the Jericho River was the presence of a cascade area approximately 15 m in height that was located near the outlet of Jericho Lake. Although not an absolute barrier, this area created a significant impediment to fish passage between the Jericho River system and lakes situated farther upstream. Tributary streams associated with the Jericho River were small, but several provided good quality spawning and rearing habitat for Arctic grayling. Tributaries exhibiting these characteristics were Streams O1, O8, O24, O25, and O27.

Streams in the Borrow Extraction Zone provided limited habitat for fish. The primary reasons were their small size and intermittent flow during the summer. Some streams did have good quality habitat. One watercourse in the Lake O1 area (Stream O18) provided high quality spawning habitat for Arctic grayling and rearing habitat for Arctic char. Stream O6, which was the drainage system for Lake O4, was one of the larger watercourses in the Borrow Extraction Zone. It contained good quality spawning and rearing habitat, as well as feeding habitat for adult Arctic grayling. Similarly, Stream O5 in the Lake O5 area provided good quality spawning and rearing habitat.

Habitat surveys of 12 streams within the Tailings Impoundment/Docking Facility Zone documented the absence of fish habitat. The primary reasons for severely limited fish habitat in these streams were their small size, intermittent flow during the summer, poorly defined channels, and steep slopes.

A preliminary survey of stream crossings along the proposed all-weather route between the Jericho Diamond Project and the Lupin Mine site identified 36 watercourses that could potentially be traversed by this road. Of these watercourses, 13 contained habitat and were utilized by fish.

TABLE OF CONTENTS

Page #

LIST OF TABLES

Page #

LIST OF FIGURES

Page #

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

The Jericho Diamond Project was initiated by Lytton Minerals Ltd. in 1995 based on the discovery of a kimberlite pipe adjacent to the southern shore of an unnamed lake (locally known as Carat Lake), which is situated 420 km northeast of Yellowknife in the Northwest Territories. Canamera Geological Ltd. of Vancouver is responsible for coordinating the environmental baseline studies for the Jericho Diamond Project.

In anticipation of possible development of this deposit, Canamera initiated a baseline inventory program in 1995. The program involved collection of data on regional meteorological conditions, water quality, hydrology, wildlife, and aquatic biota. R.L. & L. Environmental Services Ltd. was contracted to complete the aquatic biota component of the baseline inventory program. This component investigated the aquatic community within the Carat Lake drainage in the immediate vicinity of the deposit. The information from the 1995 aquatic baseline inventory was presented in a comprehensive report entitled "Jericho Diamond Project Aquatic Studies, 1995".

In early 1996, the Jericho Diamond Project progressed to the bulk sampling phase. At the same time, plans were formulated for two development options. These included a stand alone facility (extraction and on-site milling) or an extraction facility (extraction and transportation of ore off-site for milling). This second option involved two transportation scenarios. The first was the transport of ore by barge/winter road to the Lupin mine (i.e., Echo Bay Mines Ltd.) via Contwoyto Lake, while the second required a permanent road to Lupin (approximately 50 km in length).

As part of the continuing baseline inventory program for the Jericho Diamond Project, R.L. & L. Environmental Services Ltd. was contracted to complete the aquatic biota component of the study. The purpose of the 1996 program was fourfold:

- to address data gaps associated with baseline information collected in the Carat Lake drainage during 1995;
- to collect baseline information from aquatic biological communities in other drainages that may be directly or indirectly impacted by the proposed development;
- to collect preliminary baseline fisheries information at stream crossings along the proposed all-weather route to Lupin; and,
- to summarize this information in a comprehensive report to be used as the basis for an Environmental Impact Assessment.

1.2 STUDY OBJECTIVES

The specific objectives of the 1996 program were as follows:

- to describe the seasonal abundance, distribution, and biological characteristics of nonvertebrate communities (benthic macroinvertebrates, zooplankton, phytoplankton, and periphyton) found in waterbodies in the project area;
- to describe the seasonal abundance, distribution, and biological characteristics of fish species found in waterbodies in the project area, as well as the habitat used by these fish;
- to document background concentrations of metals occurring in fish tissues collected from selected waterbodies in the project area, and;
- to assess the importance of waterbodies that may be impacted by development to fish populations residing within, immediately downstream, and upstream of the development.

1.3 STUDY AREA

The Jericho Diamond Project is located adjacent to the northwest arm of Contwoyto Lake, Northwest Territories, approximately 420 km northeast of Yellowknife at 65° 59' north latitude and 111° 28' west longitude (Figure 1.1).

The study area (hereafter referred to as Jericho study area) encompassed lakes and streams in the immediate vicinity of the Jericho Diamond Project Site (Figure 1.2 and Appendix G3). Waterbodies were chosen for investigation based on the potential for impacts caused by development. Four sampling zones were established. The Mine Operation Zone encompassed Carat Lake and waterbodies situated downstream of the proposed mine site. The Borrow Extraction Zone encompassed waterbodies in a small drainage within an esker complex situated immediately north of the proposed mine. The esker material in this area may be used for construction purposes during project development. The third zone (Tailings Impoundment/Docking Facility Zone), which was situated to the east, encompassed waterbodies that may be used for tailings storage and a small bay of Contwoyto Lake that is the proposed location of the docking facility. The fourth sampling zone included stream crossings along the proposed corridor for the all-weather route to the Lupin Mine Site (Figure 1.3 and Appendix I1).

One additional lake was included in Jericho study area. Fish collections were undertaken at a control lake, located outside of the proposed development area (i.e., 6 km west). This waterbody was used for collections of fish for assessment of background metal concentrations in tissues.

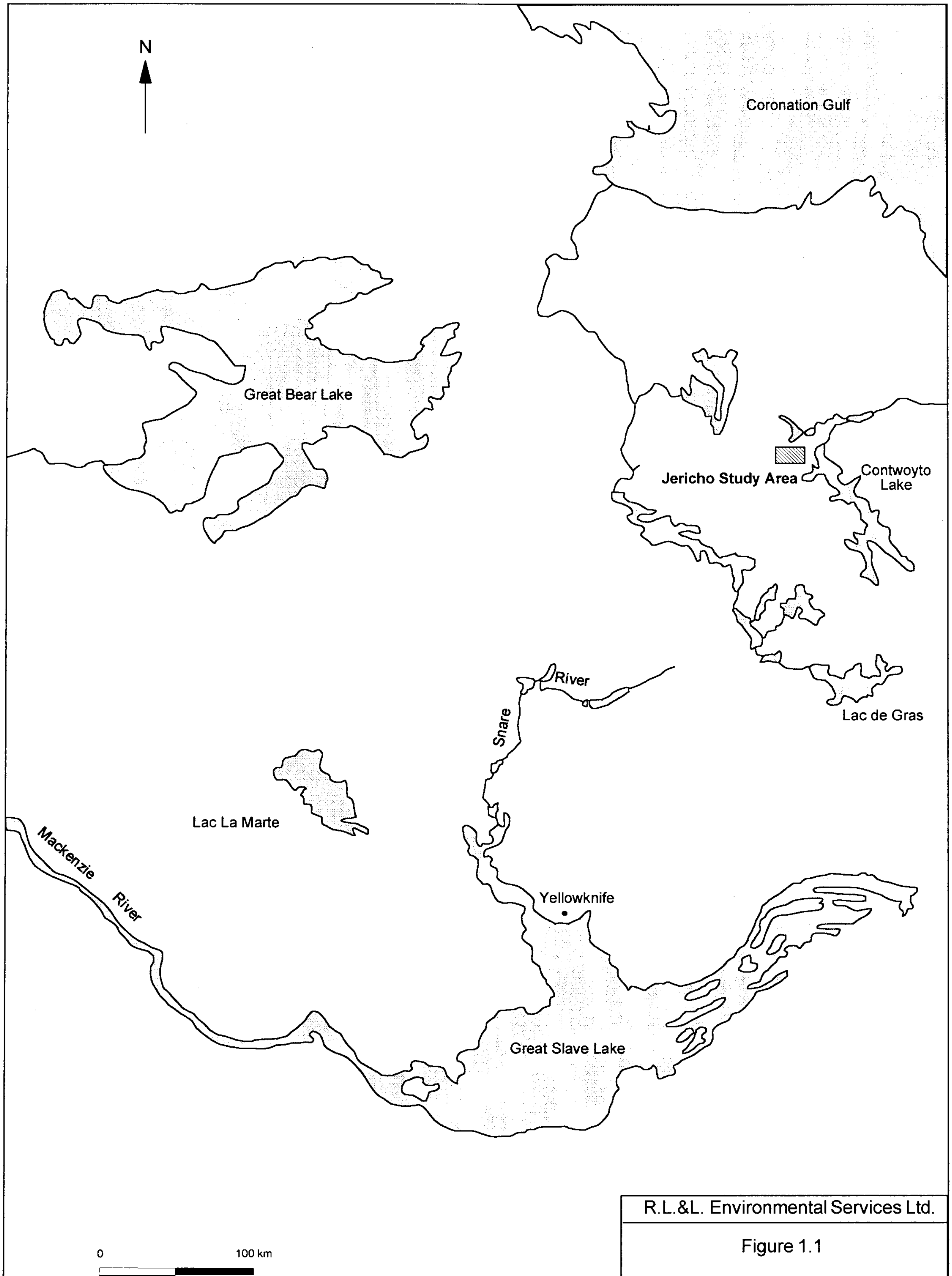

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Figure 1.1

Jericho Study Area, 1996.

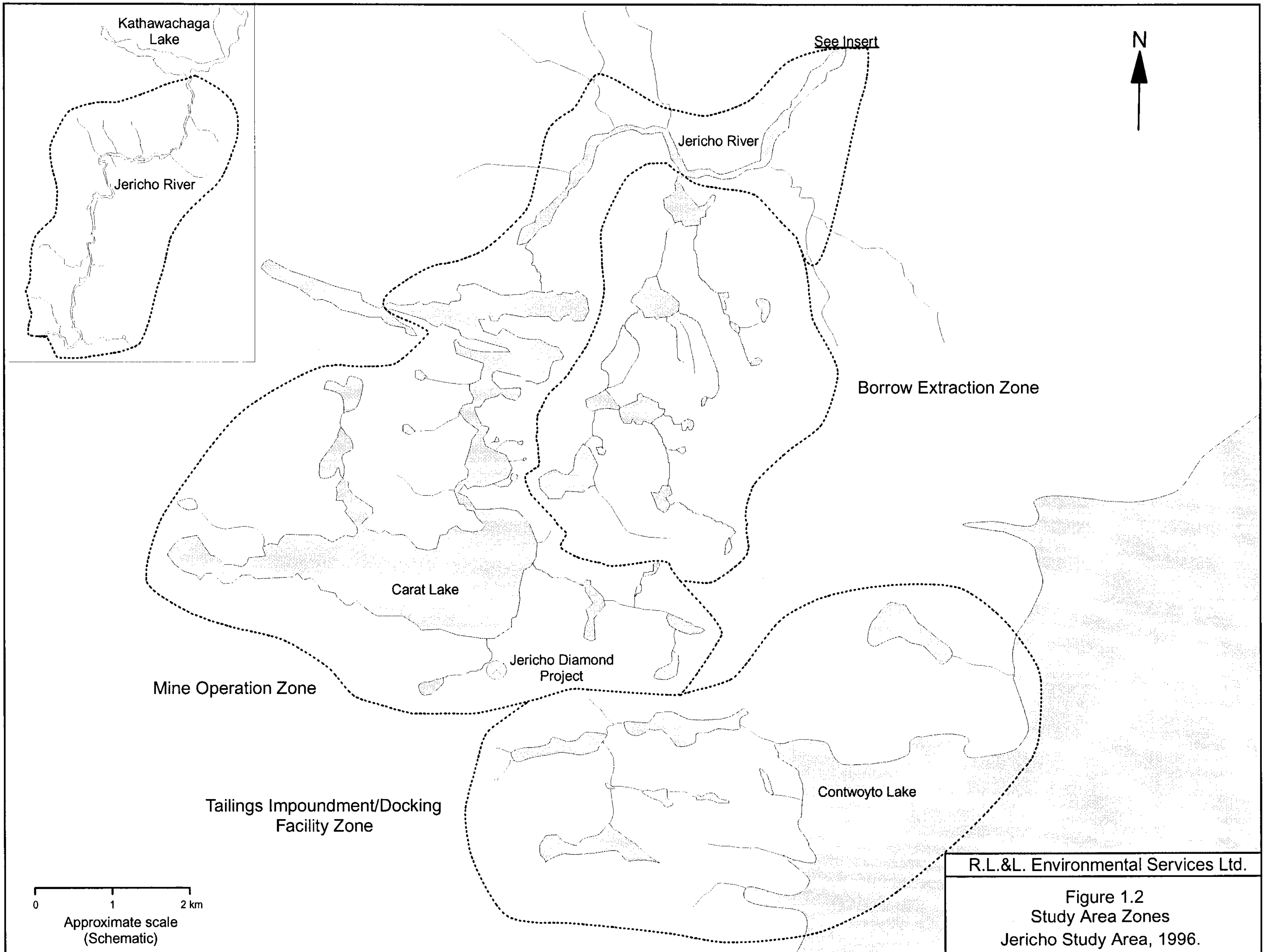

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Figure 1.2
Study Area Zones
Jericho Study Area, 1996.

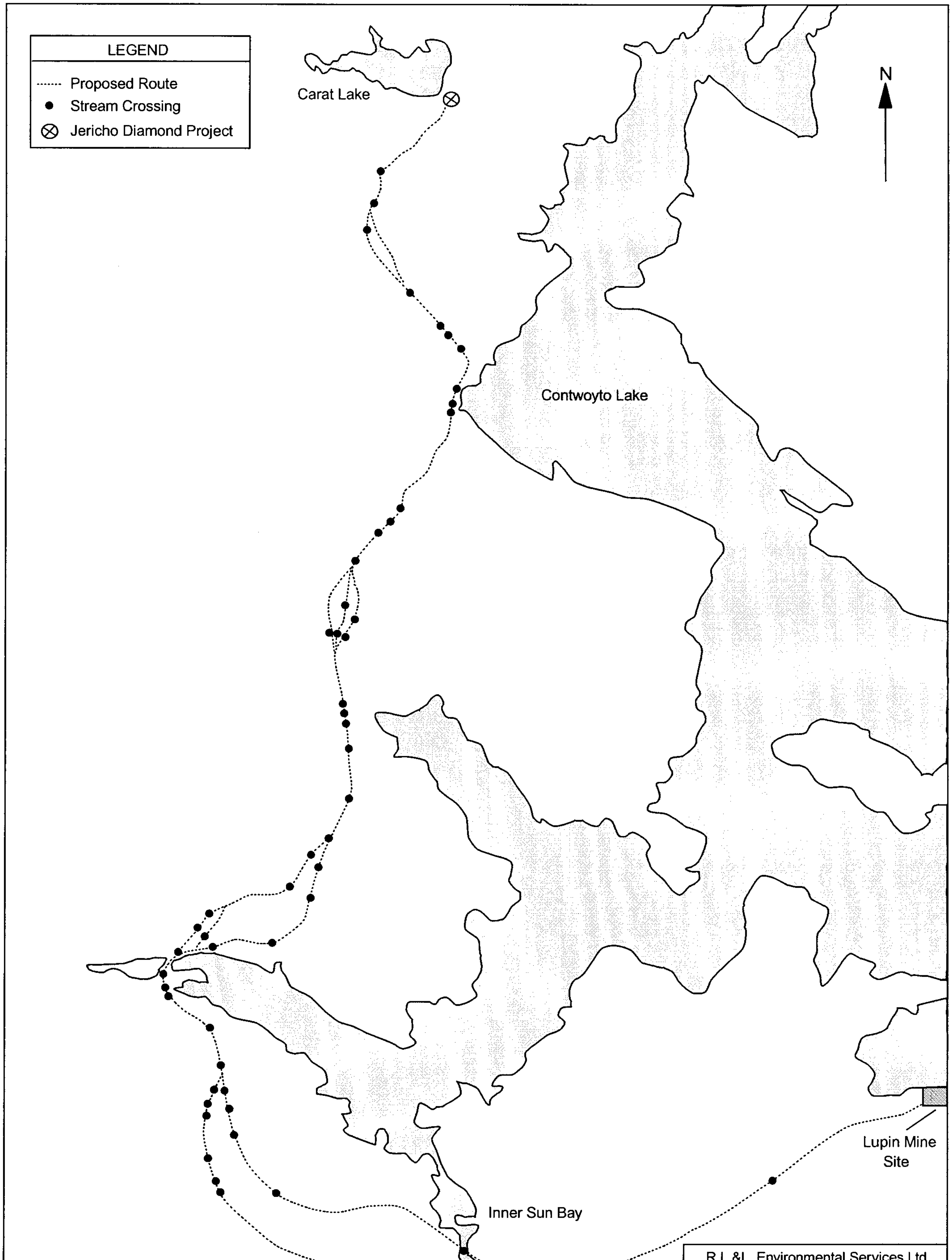


Figure 1.3
Stream Crossing Survey
All-weather Route
Jericho Study Area, 1996.

1.4 SITE SELECTION, TIMING, AND LOGISTICS

Site selection was based two criteria: the characteristics of the site should be representative of the area and where appropriate, sites previously sampled in 1995 were resampled in 1996.

The 1996 aquatic biota field sampling program was conducted during three periods. The spring session was completed between 11 and 25 June. This study component was designed to investigate fish use of streams for spawning and rearing, and to establish sampling sites for the summer and fall sessions.

The second field period commenced on 22 July and was completed on 6 August. The sampling program during this period involved several components. Tributary investigations included collection of fish and habitat data from streams previously sampled in the spring, as well as collection of periphyton and benthic macroinvertebrate samples from selected stream locations. The lake sampling program involved collection of limnological data, and samples of phytoplankton, zooplankton, and benthic macroinvertebrates. Fish species distribution and abundance were investigated and a tagging program was undertaken in an attempt to assess fish movements between waterbodies. Tagged fish were also used to develop estimates of fish population size in selected lakes. In addition to these programs, tissue samples were collected from fish in selected lakes within the study area to document background concentrations of trace metals.

The third field period (3-10 September) involved documentation of fall fish distribution and abundance in lakes, and identification of potential spawning areas. Fish tissue samples were also collected in waterbodies where adequate sample sizes were not obtained during summer. Limnological data and plankton samples were also collected during this period.

Access to the site was by fixed-wing aircraft from Yellowknife. Accommodations were at the Canamera Geological Ltd. exploration camp located on the east shore of Carat Lake. Transportation of personnel and equipment to sampling sites was provided by helicopter.

2.0 METHODOLOGY

2.1 FIELD SAMPLING

2.1.1 Limnology

Temperature and dissolved oxygen were measured using an Oxyguard Handy Mark II dissolved oxygen-temperature meter. Measurements were taken at 0.5 m intervals to within 0.5 m of the lake bottom (to avoid contamination of the probe with sediment). Water transparency was measured to the nearest 0.1 m using a standard Secchi disk (20 cm diameter).

At each site, two additional measurements were taken from the water surface. Conductivity was measured using a Hanna HI 8033 conductivity meter and pH was measured using a Fisher Accumet 1001 pH meter.

2.1.2 Plankton

2.1.2.1 Phytoplankton

Phytoplankton were collected during the summer and fall periods. Samples were taken from the euphotic zone of the lake. This zone is equal to the depth of 1% light penetration (approximately two times the Secchi depth). Vertical collections were made using a weighted plastic tube. A sample consisted of a composite of three discrete vertical collections within this zone. In lakes that were shallower than two times the Secchi depth, phytoplankton hauls encompassed the entire water column to 1 m above the lake bottom (to avoid contamination of the sample with sediment). Samples were placed in labelled 500 ml glass containers, preserved with 5% acid-Lugol's solution, and stored in the dark. Three drops of 100% formalin were added to each sample to prevent growth of bacteria and fungi during storage.

2.1.2.2 Zooplankton

Zooplankton samples were collected during summer and fall periods. A sample consisted of a composite of three vertical hauls at a particular site. The depth of each haul was equal to two times the Secchi depth. In lakes that were shallower than two times the Secchi depth, zooplankton hauls encompassed the entire water column to 1 m above the lake bottom (to avoid contamination of the sample with sediment). Zooplankton collections were made with a Wisconsin plankton net constructed with Nitex® mesh (net mouth diameter 13.34 cm). Two zooplankton nets with differing mesh sizes were used during the study; one employed a 0.064 x 0.064 mm mesh, while the other used a 0.355 x 0.355 mm mesh. To account for differences in sampling efficiency (i.e., smaller organisms escaping through the larger mesh size), correction factors were used (see Section 2.2.1.2). To prevent predation by cyclopoid copepods, each sample was immediately preserved in 5% formalin and stored in labelled 500 ml polyethylene bottles. Equipment was thoroughly rinsed after sampling at each site to prevent contamination.

2.1.3 Stream Periphyton

The periphytic community in streams was sampled during the summer period to assess the algal community composition and to measure chlorophyll *a* and ash-free dry mass (AFDM). At each site, three replicates were collected following the methods described in Charlton et al. (1981) and Hickman et al. (1982). Each replicate consisted of scrapings from the surface (5 cm^2) of three stones, selected at random, from the stream bottom. Samples used for algal identification and enumeration were placed in individually labelled 250 ml opaque containers and preserved with acid-Lugol's solution. Shortly after collection, two drops of 100% formalin were added to each of these samples to prevent growth of bacteria and fungi. Samples destined for chlorophyll *a* analysis were filtered onto Whatman GF/C filter paper, covered with anhydrous $MgCO_3$, and frozen. Samples for AFDM were subsampled in the laboratory, from the acid-Lugol's preserved samples.

2.1.4 Benthic Macroinvertebrates

2.1.4.1 Lakes

Benthic macroinvertebrates were sampled from sites located in littoral (<5.0 m depth) and profundal (>5.0 m depth) zones of selected lakes during summer. Three replicate samples were collected at each site using an Ekman grab sampler (area equal to 0.023 m^2). Samples were then sieved through a 0.243 mm mesh to remove excess sediments, placed in labelled polyethylene sample bags, and preserved in 10% formalin. Water depth and substrate type were recorded for each sample location.

2.1.4.2 Streams

Benthic macroinvertebrates were collected from stream sites during summer. Three replicate samples were collected at each site. The apparatus used for this purpose was a modified (0.243 mm mesh) Surber sampler (area equal to 0.093 m^2). The substrate within the area enclosed by the sampler was thoroughly stirred by hand to a 5 cm depth to dislodge the invertebrates (larger stones were individually cleaned and rinsed). The sample was then preserved with 10% formalin and stored in a labelled bottle. Substrate type was recorded at each site.

2.1.5 Fish

2.1.5.1 Lakes

Fish sampling in lakes focussed on determining species composition and relative abundance, as well as providing samples for analyses of background concentrations of metals in the tissues of selected fish species. In addition, captured fish of selected species not required for other aspects of the program were tagged using numbered Floy anchor tags.

Fish sampling in lakes was undertaken during summer and fall. The primary fish capture method used was standard gang gillnetting. Each gang consisted of six panels (15.2 m x 2.4 m each) of sinking monofilament nylon netting of the following mesh sizes (stretched measure): 1.9 cm, 3.8 cm, 6.4 cm, 8.9 cm, 10.2 cm, and 12.7 cm.

In summer, a variety of habitats were sampled using bottom and surface sets. During fall, sampling sites were chosen based on their potential as spawning habitat for species such as lake trout and Arctic char. This approach was taken in an attempt to identify important spawning sites. Pertinent data recorded at each gill net site included set/pull time, set location/orientation, water depth, and substrate type. Catch rates were assessed by using a net-unit approach (i.e., 100 m^2 surface area of net fished for the equivalent of a 12-hour period constitutes one net-unit of effort). Catch-per-unit-effort (CPUE) was expressed as the number of fish (by species) per net-unit.

Additional capture techniques were employed during lake sampling. For larger size-classes of fish angling with lures was used. To capture smaller size-classes of fish in habitats not effectively sampled by gillnetting, standard gee traps were used in rocky shoreline areas. Deepwater areas were sampled using jumbo gee traps. Dimensions of standard gee traps were 0.4 m length x 0.2 m diameter with an aperture of 0.02 m. Dimensions of the jumbo gee traps were 1.0 m length x 0.5 m diameter with an aperture of 0.06 m. Both types of traps were baited (i.e., cheese or meat).

Attempts were made to document population size (for the larger size-classes) of lake trout and Arctic char in selected waterbodies. This involved marking fish (using numbered Floy anchor tags) during summer and early fall and then returning in late fall to obtain a cohort of marked fish. An estimate of fish population size was estimated using standard mark-recapture methodology (Petersons Single Census Model; Ricker 1975).

2.1.5.2 Streams

During spring and summer sessions, survey level fish sampling was conducted in representative sections of streams to assess fish species composition, relative abundance, and habitat utilization (spawning, rearing, feeding, and movements). During spring, surveys were undertaken on all streams that were associated with study area lakes. During summer, surveys were limited to streams that contained flowing water and that were deemed to have fish habitat. A variety of sampling methods were used to document the presence of fish in streams; these included visual observations, snorkelling, backpack electrofishing, and angling. The specific methods utilized depended on habitat conditions and stream discharge at the time of sampling. The backpack electrofisher employed during sampling was a Smith-Root Type XII, which is specifically designed for use in low conductivity water.

Estimates of population size were generated for streams containing high densities of fish. A multi-pass removal-depletion method described by Zippin (1958) was utilized to develop these population estimates. Sampling methodology involved placement of block nets (0.5 cm stretched measure mesh) across the channel at upstream and downstream ends of the site to prevent fish movement into or out of the area. A backpack electrofisher was then used to thoroughly sample the enclosed area. The multi-pass removal-depletion method requires a minimum of three removal runs to generate an accurate population estimate. Each removal run consisted of an upstream pass through the enclosed area. Captured fish were placed in a holding tank located at the downstream end of the enclosed section. All fish were identified, enumerated and measured prior to their release downstream of the lower block net.

2.1.5.3 All-weather Route Stream Crossings

During spring and summer sessions, surveys were completed on sections of streams that were crossed by the proposed all-weather route to Lupin. During spring, visual surveys were undertaken at all potential crossings to assess their value as fish habitat. No fish sampling was undertaken during the spring session. During summer, surveys were limited to stream crossings that contained flowing water and that were deemed to have fish habitat. Sampling methods employed included those described in Section 2.1.5.2.

2.1.5.3 Biological Characteristics

All captured fish were identified to species. Data recorded for each fish included fork length (to the nearest 1 mm), weight (to the nearest 5 g), sex, and maturity. An appropriate ageing structure was also collected (Mackay et al. 1990) from a representative sample of captured fish. Data were recorded on standardized record sheets to facilitate data analyses in the laboratory.

To determine feeding habits, stomach contents of fish that succumbed during sampling were analysed in the field using the method described by Thompson (1959), which is a modification of the numerical method used by Hynes (1950). Each stomach was examined and evaluated for fullness and allotted a designated number of fullness points (i.e., 20 points for a full stomach and 0 points for an empty stomach). After points were allocated for the degree of fullness, the stomach was opened and the points allotted to individual food categories based on their volume. To account for the presence of empty stomachs, values of zero were incorporated into the analysis.

2.1.6 Habitat

2.1.6.1 Lakes

The shoreline habitat characteristics of major lakes in the study area were described using a standardized habitat classification system developed by R.L. & L. Environmental Services Ltd. (Appendix A1). The classification system categorized shoreline habitat into discrete habitat types based on two variables: slope and substrate type. Lake habitat assessments were accomplished by circumnavigating each lake by boat. In addition to categorizing lake shoreline into habitat types, important features such as high quality rearing and spawning areas were identified.

2.1.6.2 Streams

The physical habitat available to fish in study area streams was documented during spring and summer. During spring, a reconnaissance level survey was undertaken on the ground to identify streams that provided habitat for fish populations residing in study area waterbodies. Streams containing barriers to fish passage at their confluence, or those that were ephemeral (water flow only during spring snow melt or high rainfall events), were characterized as having no value to fish and were excluded from more detailed surveys.

Detailed surveys were undertaken during summer using a variety of methods. The physical habitat provided by streams was described using a classification system specifically developed for this purpose by R.L. & L. Environmental Services Ltd. (Appendix A2). The classification system categorizes stream habitat into discrete habitat types (e.g., Run, Pool, Riffle). Once the stream was described using this system, several parameters were quantified within representative sections. Cross-sectional transects across the stream channel were used to measure water depth, water velocity, substrate type, and stream width. For discharge calculations, mean column velocity and depth were measured at ¼, ½, and ¾ of the wetted channel width. Substrate characteristics were recorded according to the Modified Wentworth Classification System (Appendix A3).

2.1.6.3 All-weather Route Stream Crossings

The habitat available at each stream crossing was assessed during spring and summer. The methods employed included those described in Section 2.1.6.2.

2.1.7 Fish Tissues

To document background metal concentrations, fish tissues (i.e., muscle, liver, and kidney) were collected from lake trout and round whitefish in selected lakes in the study area. The tissue sampling procedures included safeguards to prevent contamination. They included the following:

- use of sterile stainless steel instruments;
- tissue cups rinsed in 5% nitric acid solution; and,
- covering the work area in plastic.

Dorsal musculature (50 to 100 g) was dissected from each fish and sealed in 120 ml sterile, acid-washed specimen containers. Livers and kidneys were dissected from the fish and stored individually in labelled tissue cups. All tissue samples were kept frozen until the time of analysis.

To allow comparison of metal concentrations in fish tissue from the study area waterbodies to those from lakes unaffected by future development, tissue samples also were collected from fish in a control lake located 6 km west of the study area (outside of the influence of the project development).

2.2 LABORATORY ANALYSES

2.2.1 Plankton

2.2.1.1 Phytoplankton

Prior to laboratory analysis, the phytoplankton samples were inverted gently, and 10 to 100 ml subsamples were dispensed into sedimentation chambers (Lund et al. 1958). After a 24 h sedimentation period, samples were processed. To obtain a comprehensive species list, the entire basal area of the chamber was scanned qualitatively with an inverted microscope (Wild M-40). Taxonomic keys used for identification included Prescott (1970), Taft and Taft (1971), and Webber (1971).

Once a comprehensive species list was formed, cell density was assessed. To calculate cell density (cells/ml), individual cells were enumerated within a specified area of the sedimentation chamber. This was accomplished by counting the number of cells along horizontal transects placed across the specified area. To calculate the cell density of each species in the sample, the number of cells within the specified area was extrapolated to the subsample, and then to the entire sample.

Cell biovolume ($\mu m^3/m^3$) was calculated by first measuring the physical dimensions (length, width, and depth) of between 10 and 30 cells of each species in the sample. Estimates of cell biovolume were then generated by multiplying the mean dimension of cells belonging to a particular species by the number of cells enumerated for that species. The mean cell biovolume estimate for the subsample was then extrapolated to the entire sample. Species that were enumerated during the qualitative assessment, but not enumerated (i.e., very low numbers or located outside the enumeration transects), were recorded as present.

For diatom identification and enumeration, a separate subsample was concentrated, dried onto a coverslip, ashed in a muffle furnace to remove organic matter, and mounted in Storax.

2.2.1.2 Zooplankton

Zooplankton counts were conducted using a dissecting stereo-microscope (Wild M-5); identifications were made using a compound microscope equipped with a phase-contrast condenser (Wild M-20). Taxonomic keys used for crustacean plankton were Brooks, Wilson and Yeatman (in Edmondson 1959), supplemented by the keys of Brooks (1957), Smirnov (1971), Brandlova et al. (1972), Flössner (1972), and Kiefer (1978). The taxonomic key used for identification of rotifers was the Voigt revision by Koste (1978), supplemented by keys of Ahlstrom (1943) and Ruttner-Kolisko (1974). Chaoboridae were identified using the keys of Cook (1956) and Saether (1970). Specimens were identified to the lowest taxonomic level possible.

Enumeration of zooplankton in each sample involved different techniques that were dependent on taxonomic group. Cladocerans and copepods (all stages) were enumerated either from three 15 ml subsamples or from the entire sample using a dissecting microscope at magnifications of 12-50×. Subsampling was performed on samples that were subjectively assessed to have large numbers of specimens. Rotifers were enumerated from a subsample: a modified Folsom-style splitter was used to create subsamples. Each 15 ml subsample was allowed to settle for 24 h before processing. An inverted microscope (100 or 200×) was used to enumerate rotifers by counting either 6 fields (1 field = 0.02625 cm^2) or the entire counting chamber (4.907 cm^2). Subsamples were continually removed from the original sample until approximately 200 mature or identifiable rotifer organisms were processed. Species encountered, but not enumerated due to low numbers, were recorded as present.

Once numbers of organisms within each sample were established, these values were converted to densities per cubic metre. This was accomplished by determining the total volume filtered (i.e., net mouth area x depth of haul x number of hauls) and multiplying by the number of organisms enumerated. To standardize the density data collected using zooplankton nets equipped with different mesh sizes, correction factors were employed. Samples collected with a 0.355 x 0.355 mm bucket mesh were corrected by multiplying density values for macrozooplankton (cladocerans, calanoids, and cyclopoids) by 6 and densities for microzooplankton (rotifers and copepod nauplii) by 10.

Biomass of major taxonomic groups in each sample was also calculated. To calculate biomass, lengths were measured from the first 30 individuals observed in a sample. Lengths of larger zooplankton were measured directly with a microscope equipped with a calibrated Sigma Scan digitizing tablet. Smaller zooplankton, such as rotifers, were measured using an eyepiece graticule and corrected for magnification. Lengths were measured from the first 10-30 individuals of each species observed in each sample. Using length measurements from individual organisms, weights were calculated from published length-weight regression equations (Table 2.1). For each sample, a mean individual weight was calculated by averaging the estimated weights generated from the length-weight regression equation (it is important to average weights and not lengths; Bird and Prairie (1985)). Biomass for each taxonomic group was calculated by multiplying the number enumerated for that sample by the mean individual weight.

Table 2.1 Length-weight regression equations used to calculate zooplankton weights, Jericho study area, 1996.

Organism	Equation	Reference
Copepods (N1-adults)	$\ln W(\mu g) = 1.9526 + 2.399 \cdot \ln L(mm)$	Bottrell et al. (1976)
Daphnia spp.	$\ln W(\mu g) = 1.6 + 2.84 \cdot \ln L(mm)$	Bottrell et al. (1976)
Holopedium spp.	$\ln W(\mu g) = 6.4957 + 3.052 \cdot \ln L(mm)$	Downing (1984)
Rotifers	$\ln W(\mu g) = -10.3815 + 1.574 \cdot \ln L(\mu g)$	Stemberger and Gilbert (1987)

Zooplankton hauls cannot be considered adequately quantitative for sampling rotifers because coarser mesh sizes, especially those >0.065 mm, may allow small forms to escape, or because clogging of the net may occur. Consequently, numbers derived from zooplankton hauls should be considered as a relative comparison of abundance (Green 1977).

2.2.2 Stream Periphyton

In the laboratory, the periphytic algal samples were processed as outlined in Lund et al. (1958). Samples were first mixed and then subjected to serial dilutions (generally 0 to 1000 fold dilutions depending on algal and organic debris in original sample). Subsequently 1 to 10 ml subsamples were dispensed into sedimentation chambers. After a 12-hour sedimentation period, the basal area of each chamber was scanned qualitatively with an inverted Lietz microscope to identify the best dilution for subsequent quantitative analyses and to obtain a comprehensive species list. Once the appropriate dilution was established, taxonomic groups within the sample were identified and enumerated.

Cell biovolume was not used as for phytoplankton (see Section 2.2.1) because such data were difficult to obtain and most periphyton communities were dominated by a few species of filamentous green algae (Chlorophyta), cyanobacteria (Cyanophyta), or diatoms (Bacillariophyta). Chlorophyll *a* (an estimate of the amount of live algae) and ash-free-dry-mass (AFDM) (an estimate of organic mass) provided estimates of the amount of periphytic material in lieu of biovolume.

Taxonomic keys of Smith (1950), Prescott (1970), and Webber (1971) were used for species identification. Counts were made at a magnification of approximately 450× along horizontal transects across the diameter of the chamber; a minimum of 200 algal units were examined. Species that were encountered, but not enumerated during routine transect counts, were recorded as present.

To identify and enumerate diatoms, subsamples were treated with a mixture of concentrated sulphuric acid, potassium dichromate and hydrogen peroxide followed by repeated washes in distilled water. The cleaned frustules were then dried on cover glasses and mounted in Storax.

Chlorophyll *a* analysis was conducted using the spectrophotometric acetone extraction method described by Moss (1967a, 1967b). The AFDM subsamples were removed from the acid-Lugol's preserved samples and filtered onto prewashed and preweighed Whatman GF/C filters. They were subsequently dried (at 105°C for 24 h) and weighed. The dried samples were then ashed in a muffle furnace (at 550°C for 1 h) and cooled in a desiccator. The difference between dry mass and ash mass is ash-free dry mass (APHA 1993).

2.2.3 Benthic Macroinvertebrates

2.2.3.1 Lakes

In the laboratory, samples were first processed to remove all extraneous substrate and organic matter. Individual samples were washed to remove the preservative and repeatedly elutriated to remove silt, sand, and gravel (i.e., inorganic materials). This procedure was continued until invertebrates were no longer observed in the elutriated water. The remaining organic and inorganic material was scanned (without a microscope) in an enamelled tray, and large animals (greater than 0.5 cm) were removed. The sample was then fractionated for ease of sorting (using a series of nested sieves) into: a large fraction containing filamentous algae, macrophyte pieces, and plant material (greater than 4 mm;), a coarse fraction (1 - 4 mm); a medium fraction (0.5 - 1 mm); and, a fine fraction (0.25 - 0.5 mm).

Using a dissecting microscope (6 to 42× magnification), invertebrates were then sorted by major taxonomic group and identified to the lowest practical taxonomic level (genus or species where possible). More difficult groups, such as nematodes, were identified to a higher taxonomic level. Keys used for identification included Baumann et al. (1977), Wiggins (1977), Wiederholm (1983), Merritt and Cummins (1984), Brinkhurst (1986), and Clifford (1991).

2.2.3.2 Streams

Laboratory analyses of benthic macroinvertebrate samples collected from streams were conducted in the same manner as described in Section 2.2.3.1 for the lake samples.

2.2.4 Fish Ageing

Fish ageing followed the protocol outlined in Mackay et al. (1990). Otoliths were used to age lake trout, Arctic char, and round whitefish; scales were used to age Arctic grayling. Otoliths, which had been stored dry in labelled envelopes, were first lightly ground and polished with emery cloth (400 grit) to allow sufficient light transmission. Then a binocular dissecting microscope, equipped with a transmitted light source, was used to obtain an age from each structure. Clean, nonregenerated scales were mounted on a glass slide, and a photocopy was made using a Canon PC Printer 80 microfiche reader/printer. Scales were then aged using this photocopy. Each structure was aged by two independent readers. When discrepancies in the assigned age occurred, the two readers conferred to arrive at a consensus. A third independent reader conducted a random check of selected structures to ensure quality control.

Whenever sample sizes permitted, a minimum of 20 structures were aged. When more than 20 structures were available for analysis, a subsample was aged. To obtain a subsample, structures were first ordered sequentially based on fork length and then random selections were made from each 10 mm length-class interval.

2.2.5 Fish Tissues

Analyses of fish tissue samples for background metal concentrations were conducted by Elemental Research Inc. laboratories in Vancouver (Table 2.2). The following is a description of the methods and instrumentation used.

Tissue samples were stored frozen until analyses were undertaken. Samples were prepared for analyses by first homogenizing the tissue in plastic cups using a "Virtis" shearer equipped with stainless steel blades. Prior to homogenization of each sample, the apparatus was cleaned with 18MΩ deionized water. Approximately 1 g of homogenized tissue was then weighed into a precleaned (triple nitric acid) teflon digestion vessel. High purity "Seastar" nitric acid (4 ml) was added and the vessel was capped before being heated at 150°C. The resulting solution was made up to a volume of 25 ml with 18MΩ deionized water for subsequent analyses by ICPMS at a dilution factor of five.

For each sample, a 26 element trace metal scan was performed using ICPMS (Inductively Coupled Argon Plasma/Mass Spectrometer). The instrumentation used to perform the analysis was a Finnegan MAT SOLA ICPMS. Nominal settings used were 1500 W forward power, <5 W reflected, 15 L/min coolant, 1.1 L/min auxiliary, and 0.96 L/min nebuliser flow. Optimization of the lens settings was carried out daily by maximizing the signal obtained from a 100 ppb Y solution.

QA/QC procedures used included running certified reference materials (including NBS1566A-oyster tissue, DORM-2, and DOLT-2) and sample duplicates at a minimum ratio of 1 per 20. Acceptance criteria for CRM's was within 30% of nominal at >10 times the LOD. For duplicates, acceptance criteria was that the sample and its duplicate were within ± 20% of the average value at >10 times the LOD.

Table 2.2 Detection limits for metal constituents analysed in fish tissue samples, Jericho study area, 1996.

Metal	Abbreviation	Detection Limit (μg/g on "dry weight" basis)	Metal	Abbreviation	Detection Limit (μg/g on "dry weight" basis)
Aluminum	Al	1	Magnesium	Mg	0.05
Antimony	Sb	0.1	Manganese	Mn	0.05
Arsenic	As	0.05	Mercury	Hg	0.005
Barium	Ba	0.01	Molybdenum	Mo	0.1
Beryllium	Be	0.05	Nickel	Ni	0.1
Boron	B	0.5	Phosphorus	PO4	10
Cadmium	Cd	0.05	Potassium	K	0.5
Calcium	Ca	-	Silver	Ag	0.01
Chromium	Cr	0.5	Sodium	Na	0.5
Cobalt	Co	0.05	Strontium	Sr	0.01
Copper	Cu	0.05	Tin	Sn	0.1
Iron	Fe	1	Vanadium	V	0.5
Lead	Pb	0.05	Zinc	Zn	0.05

Moisture content was measured using 1 g of homogenized tissue. The sample was weighed into a preweighed and tared 10 ml glass beaker. The beaker and sample were then dried overnight at 105°C. After cooling to room temperature, the beaker and sample were transferred to a desiccator for 2 h, after which, the beaker with the sample was re-weighed to obtain the loss in moisture.

All results were reported as micrograms per gram on a "dry weight" basis.

2.2.6 Data Processing

Data processing and summarization was completed using an IBM compatible microcomputer. Data were entered and analysed using a variety of software programs including PC-File (Ver. 5.0), Lotus for Windows (Ver. 4.0), SPSS for Windows (Ver. 6.0), and Microsoft Access for Windows (Ver. 7.0). Report figures and maps were generated using Freelance for Windows (Ver. 2.0).

Quality assurance and quality control were an integral part of all phases of data processing. This involved use of standardized formats for data record forms (used during field collections) and electronic data files (used during data processing). Data were checked visually during all stages of data processing (data entry, summarization, and presentation).

3.0 MINE OPERATION ZONE

3.1 LIMNOLOGY

This section provides summary results for lake morphology, temperature and dissolved oxygen profiles, and water transparency measurements in selected lakes of the Mine Operation Zone. Limnological data were collected from five lakes potentially influenced by the proposed development (Lake C1, Carat Lake, Interbasin Two, Interbasin One, and Jericho Lake): two sites were established in Carat Lake (one on each of the two basins in this waterbody), while one site was located on each of the remaining four lakes (Figure 3.1.1). Specific sampling locations are provided in Appendix B1.

3.1.1 Lake Morphology

The morphological characteristics of the five lakes are variable (Table 3.1.1 and Figure 3.1.1). The smallest waterbody surveyed is Lake C1 (3 ha). This lake is situated immediately west of the Jericho Diamond Project site along the south shore of Carat Lake. A preliminary assessment suggests that Lake C1 consists of a single basin with a maximum water depth of 9.0 m. The low shoreline development ratio (1.19) is an indication that there is limited potential for the presence of a littoral zone in this lake. There are no defined inlet streams to this lake, however, it receives subsurface input from a small isolated basin located to the south. There is one outlet stream to Lake C1, which flows through the Jericho Diamond Project site before entering Carat Lake.

Carat Lake is the largest waterbody in the Mine Operation Zone (269 ha); the Jericho Diamond Project is situated along its southwest shore. Carat Lake consists of three basins; the largest comprises the central portion of the lake, while two smaller basins are situated to the west (Figure 3.1.2). The mean depth of this waterbody is 10.8 m and the maximum recorded depth is 32.0 m. Carat Lake exhibits an irregular shoreline, which contributes to a relatively high shoreline development ratio (2.04). There is one major inlet tributary that enters Carat Lake at its extreme western end, as well as several small ephemeral streams along its northern and southern shores. The one outlet stream to Carat Lake exits at its northeast end before entering Interbasin Two.

Interbasin Two is a small waterbody (19 ha) that is part of the system separating Carat Lake from Jericho Lake. A preliminary investigation indicates that it consists of a single basin with a maximum depth of 11.0 m. Similar to findings for Lake C1, it has a low shoreline development ratio (1.18).

Interbasin One receives its water from Interbasin Two and is immediately south of Jericho Lake. This waterbody is separated from Jericho Lake by a narrow deep channel. This waterbody consists of two smaller basins separated by an island-shoal complex. The surface area of Interbasin One is 58 ha and a preliminary assessment indicates that the maximum depth is 11 m.

Jericho Lake is the second largest waterbody surveyed in the Mine Operation Zone; it has a surface area of 69 ha. Jericho Lake is isolated from another basin situated immediately to the west by a narrow, shallow channel. An initial survey of Jericho Lake indicates that it is comprised of a single elongated basin with a maximum depth of 15.0 m. The irregular shoreline of Jericho Lake contributes to its high shoreline development ratio (1.91).

3.1.2 Temperature and Dissolved Oxygen

Temperature and dissolved oxygen profile data from the Mine Operation Zone of the Jericho study area were collected during summer, while surface water data were collected during the fall. Water column oxygen-temperature profiles are depicted in Figure 3.1.3; all data are presented in Appendix B1.

Water depths recorded at the monitoring sites varied from 9 to 24 m. Site W1-2 of Carat Lake was the deepest and Site W4 of Lake C1 was the shallowest. The remaining sites were 10, 11, and 15 m in depth (Sites W1-1, W5 and W6, and W2, respectively) (Figure 3.1.3; Appendix B1).

In summer (3 to 4 August), the temperature profiles of most basins that were 11 m in depth or less indicated uniform mixing (i.e., they were isothermal); in contrast, dissolved oxygen concentrations at the same sites tended to have greater variation. For example, Site W1-1 had water temperatures that varied between 13.5°C at the surface and 13.9°C at the bottom, a difference of only 0.4°C (Figure 3.1.3). Dissolved oxygen concentrations at this site were 10.0 mg/L at the surface and approximately 6.0 to 8.0 mg/L at the lake bottom. Site W4 had water temperatures that ranged from 14.2°C at the surface to 7.4°C at the bottom, while dissolved oxygen varied little throughout the water column (9.3 to 9.9 mg/L). It is not known why oxygen and temperature profiles exhibited these characteristics in the shallow basins; however, the decreasing oxygen concentrations with depth may have been the result of equipment malfunction and were not representative of actual concentrations. Dissolved oxygen concentrations in the surface waters (i.e., 0-1 m) were at 100% saturation. However, under certain conditions (i.e., improper membrane seal over cathode probe) associated pressure increases with depth may affect the performance of the meter (R. Hirsch, Point Four Systems Inc., Port Moody, BC, pers. comm.). There was a general correlation of decreasing dissolved oxygen concentrations with depth, suggesting that pressure did affect the meter's performance.

At the deep basin sites of Carat Lake (Site W1-2) and Jericho Lake (Site W2) thermoclines were noted between 10 to 14 m and 10 to 12 m, respectively (Figure 3.1.3). A thermocline was also recorded at Site W4 on Lake C1 but the water depth where stratification occurred was between 6 and 8 m. At these sites, water temperatures were approximately 14.0°C above the thermocline and 6.0°C below the thermocline. Below the thermocline, dissolved oxygen concentrations tended to increase with depth at sites W1-2 and W2. This observation was likely a reflection of the effects of temperature on the solubility of oxygen (i.e., colder water can hold greater concentrations of dissolved gases). Anoxic conditions were not identified in any of the Mine Operation Zone study lakes.

The surface water temperature of each lake within the Mine Operation Zone was measured in the fall (4 to 5 September). Temperatures at all sites were above freezing (Appendix B1) and ranged from 6.0°C at Site W6 (Interbasin Two) to 8.0°C at Sites W2 (Jericho Lake) and W5 (Interbasin One). The surface waters in all basins, where recordings were collected, were well oxygenated (10.7 to 11.6 mg/L). Surface temperature and dissolved oxygen were not measured at Site W4 (Lake C1) in the fall.

3.1.3 Transparency

Water transparencies did not vary greatly in the summer (3 to 4 August) or fall (4 to 5 September). Secchi depths ranged from 5.1 m at Site W5 (Interbasin One) to 5.5 m at Site W1-1 (Carat Lake) in the summer and from 3.5 to 4.0 m among all monitoring sites in the fall. Water transparency data (Secchi depths) are presented in Figure 3.1.3 and Appendix B1. Based on Secchi depth readings, the euphotic zones (depth to 1% light penetration where algae can still subsist=2×Secchi depth) were approximately 11 m and 8 m in the summer and fall, respectively.

3.1.4 Summary

3.1.4.1 Lake Morphology

The five surveyed lakes in the Mine Operation Zone range in size from 3 ha (Lake C1) to 269 ha (Carat Lake) and exhibit maximum depths of 9 m or greater. Carat Lake is the deepest waterbody in the zone; the maximum depth is 32 m. Based on a bathymetric survey of Carat Lake, this waterbody contains three basins, with the largest basin encompassing the central portion of the lake. Preliminary surveys of each of the other waterbodies indicates that most consist of a single basin; only Interbasin One is composed of two separate basins. Carat, Interbasin One, and Jericho Lakes have shoreline development ratios greater than 1.8, which is an indication of very irregular shorelines. Lake C1 and Interbasin Two have more uniform shoreline configurations and lower ratios (<1.2).

3.1.4.2 Temperature and Dissolved Oxygen

During the 1996 aquatic studies program in the Mine Operation Zone study area, the deep basins of Carat (Site W1-2) and Jericho lakes (Site W2) exhibited thermoclines, while in general, shallower lakes and basins exhibited isothermal conditions. These data suggest that deeper lakes (i.e., greater than 12 m) in the study area stratify during the summer and can be classified as dimictic (thoroughly mix twice a year). The shallower basins can be classified as monomictic (continuous mixing) throughout the open water season.

In summer, the isothermal basins had water temperatures that ranged from 13.3 to 14°C, while those basins with thermoclines had water temperatures that decreased to 5.2°C. In fall, surface water temperatures among the study sites ranged from 6.0 to 8.0°C. The summer dissolved oxygen concentrations ranged from 4.4 to 10.0 mg/L, while fall surface water concentrations varied from 10.7 to 11.6 mg/L.

In summer, dissolved oxygen concentrations below Canadian Water Quality Guidelines for the protection of early life stages of cold-water biota (≥9.5 mg/L; Table 3.1.2) were recorded at several sites. The low dissolved oxygen concentrations recorded at this time were likely the result of equipment malfunction and were not representative of actual concentrations throughout the water column. Dissolved oxygen concentrations at the surface were at 100% saturation and above the 9.5 mg/L criteria. Because these lakes are nutrient poor (R.L. & L Environmental Services Ltd. 1995; Canamera Geological Ltd., unpublished data), dissolved oxygen concentrations should have remained constant throughout the water column, at least to the thermocline. This was not the case, at several sites the concentration was correlated with water depth, which is an indication of equipment malfunction (R. Hirsch, Technical Engineer, Point Four Systems Inc., Port Moody, BC, pers. comm.). As such, the dissolved oxygen concentrations recorded during the summer should be viewed with caution.

3.4.1.3 Transparency

The water transparency levels recorded in the Mine Operation Zone lakes indicated that the euphotic zone (the water depth to which light levels diminish to 1% and can generally sustain phytoplankton life = 2 × Secchi depth; Wetzel 1983) was about 10 to 11 m during the summer and 7 to 8 m during the fall. The amount of light penetration is dependent upon suspended materials (i.e., sediments and other allochthonous matter) and the biological productivity of a lake (i.e., density and biovolume of phytoplankton). The euphotic zone depths are indicative of oligotrophic lakes (i.e., low nutrient content; Wetzel 1983). The smaller euphotic zone depths recorded in fall are likely due to increased densities of phytoplankton compared to the summer (see Section 6.2).

3.2 PLANKTON

To provide baseline information on the plankton community, samples were collected from the Mine Operation Zone of the Jericho study area during summer and fall of 1996. Three sites were established; Sites PL1-1 and PL1-2 on Carat Lake, and Site PL2 on Jericho Lake (Figure 3.2.1). Relevant data are summarized in the following sections; all data are presented in Appendices C1 to C3.

3.2.1 Phytoplankton

Phytoplankton are microscopic free-floating algae (Smith 1950). Summary results of phytoplankton biovolume (microns cubed per metre cubed or $\mu m^3/m^3$) and density (No. cells/ml) are both presented in this section because density alone does not provide an accurate assessment of a taxon's importance. For example, taxa that are extremely numerous may have a low biovolume, due principally to the small size of individual organisms. Conversely, those taxa that have large biovolumes (due to large individual organism size), may not be numerically abundant. These large bodied groups can contribute significantly to lake productivity. As such, their numbers can influence the abundance and biomass of herbivores that feed on them (generally zooplankton) and they can modify nutrient availability for competing plants or algae.

3.2.1.1 Biovolume

In total, 135 species of algae were identified from the samples collected in the Mine Operation Zone study area (Appendix C2). Table 3.2.1 summarizes biovolumes of major taxonomic groups encountered. In the summer, golden-brown algae (Chrysophyta) had the greatest biovolumes. In Sites PL1-1 and PL1-2 (Carat Lake), golden-brown algae accounted for 51% and 55% of the total biovolume, respectively. In Jericho Lake (Site PL2) golden-brown algae contributed 65% of the total biovolume. Green algae (Chlorophyta) were the second most dominant algal taxon in Sites PL1-1 of Carat Lake and PL2 of Jericho Lake at 22% and 12%, respectively. Dinoflagellates (Pyrrophyta) were the second most dominant (14%) algal group at Site PL1-2 of Carat Lake.

In fall, golden-brown algae remained dominant at all sites; this major taxonomic group accounted from 49% to 56% of the total algal biovolume. Diatoms (Bacillariophyta) were second in importance (17 to 26% of the total) during this period (Table 3.2.1).

3.2.1.2 Density

The relative importance of the most numerous species within each of the six major taxonomic groups is depicted in Figure 3.2.2. Cyanobacteria (Cyanophyta) were the numerically dominant taxa in all the samples that were collected; *Aphanothece clathrata* densities ranged from 2648 to 6519 cells/ml. The cyanobacterium *Aphanocapsa elachista* was also abundant within the sampling sites. However, cyanobacteria typically have very small cells and do not contribute greatly to biovolume.

In summer, the most abundant golden-brown algae were *Ochromonas* sp. and *Stichogloea doederleinii*. These two taxa ranged in density from 63 to 132 cells/ml and 82 to 128 cell/ml, respectively, among the three monitoring sites (Figure 3.2.2; Appendix C2). There was a change in the dominant species of golden-brown algae in the fall; *Chrysococcus* sp. was the most abundant at Site PL1-1 (Carat Lake) and at Site PL2 (Jericho Lake) while *Chrysosphaerella rodhei* dominated Site PL1-2 (Carat Lake) (138, 443, and 198 cells/ml, respectively).

Except for *Achnanthes minutissima* at Site PL1-2 (Carat Lake) in summer, the most abundant diatoms among all monitoring sites and seasons were *Cyclotella comta, C. glomerata,* and *C. ocellata*. In general, the diatom community was more diverse and abundant in fall than in summer (Figure 3.2.2; Appendix C2).

3.2.2 Zooplankton

Zooplankton communities are composed of microscopic animals that live in the water column (Pennak 1978; Wetzel 1983). Information describing seasonal differences in zooplankton biomass is summarized in Table 3.2.2, while seasonal differences in density for the dominant taxa belonging to the three major taxonomic groups (Copepoda, Cladocera, and Rotifera) are presented in Figure 3.2.3. All raw data are presented in Appendix C3. Summary results of zooplankton biomass (micrograms per metre cubed or $\mu g/m^3$) and density (No./m^3) are both presented in this section because, as with phytoplankton, density alone does not provide an accurate assessment of a taxon's importance. Taxa that are extremely numerous may have a low biomass, due principally to the small size of individual organisms. Conversely, those taxa that have large biomass (due to large individual organism size), may not be numerically abundant. These large bodied groups can contribute a significant amount to lake productivity. As such, their numbers can influence the abundance and biomass of predators that feed on them (generally other zooplankton and fish) and they can modify the phytoplankton community.

3.2.2.1 Biomass

In summer, water fleas (Cladocera) contributed 95% (Site PL1-1) and 99% (Site PL1-2) of the biomass in Carat Lake. These percentages represent 1.12 and 1.75×10^{6} $\mu g/m^3$, respectively. Zooplankton biomass at Jericho Lake (Site PL2), was dominated by cyclopoid copepods (3530 $\mu g/m^3$) and water fleas (3311 $\mu g/m^3$), which represented 37% and 40% of the total, respectively. In fall, the two Carat Lake sites were dominated by cyclopoid copepods, while the Jericho Lake site was dominated by water fleas (73%, 55%, and 83% of the total biomass, respectively). For example, *Dicyclops bicuspidatus* accounted for 47 389 $\mu g/m^3$ of the zooplankton biomass at Site PL1-2 of Carat Lake while *Holopedium gibberum* had a biomass of 88 358 $\mu g/m^3$ at Site PL2 of Jericho Lake.

3.2.2.2 Density

In summer, two copepod species (*Dicyclops bicuspidatus* and *Leptodiaptomus sicilis*) co-dominated the zooplankton community (Figure 3.2.3). In Site PL1-1 of Carat Lake, *D. bicuspidatus* (1760/m^3) was slightly more abundant than *L. sicilis* (1456/m^3), while Site PL1-2 of Carat Lake and Site PL2 of Jericho Lake had greater densities of *L. sicilis* (609 and 221/m^3, respectively) than *D. bicuspidatus* (152 and 166/m^3, respectively). In the fall, *D. bicuspidatus* was the most abundant copepod in Carat Lake (1631 and 3832/m^3, at Sites PL1-1 and PL1-2, respectively), while *L. sicilis* was the most abundant copepod in Jericho Lake (1603/m^3 at Site PL2). Overall, copepod densities were much greater in the fall than in the summer.

Among the water fleas (Cladocera), *Holopedium gibberum* was the dominant species in Carat Lake; up to 2437/m^3 in the summer (Site PL1-2). Water fleas were not numerous in samples collected during fall (29/m^3 at Site PL1-2 and 0/m^3 at Site PL1-1). Only two water flea species were collected in Jericho Lake and these were not abundant; *Daphnia middendorffiana* (55/m^3) during summer, and *H. gibberum* during fall (123/m^3)(Figure 3.2.3).

In summer, wheel animal (Rotifera) communities in all three sampling sites were dominated by *Conochilus unicornis* (26 824, 3136, and 1336/m^3 at Sites PL1-1, PL1-2, and PL2, respectively). In the fall, *C. unicornis* was second or third most abundant in the two Carat Lake sites (PL1-1 and PL1-2); *Keratella cochlearis* was the most abundant rotifer at these sites (8745 and 7003/m^3, respectively). At Site PL2 of Jericho Lake *C. unicornis* remained the dominant wheel animal, while *Kellicottia longispina* was second in abundance (Figure 3.2.3; Appendix C3).

3.2.3 Summary

3.2.3.1 Phytoplankton

The phytoplankton assemblage in lakes within the Mine Operation Zone study area during 1996 was indicative of oligotrophic waterbodies (Wetzel 1983). Golden-brown algae (Chrysophyta) had the greatest biovolumes during summer and fall. Green algae (Chlorophyta), dinoflagellates (Pyrrophyta), and diatoms (Bacillariophyta) were second in importance during summer. In fall, diatoms were second in importance in terms of biovolume.

Due to their small size relative to other taxa, the cyanobacteria (Cyanophyta) *Aphanothece clathrata* and *Aphanocapsa elachista* were the most abundant (up to 6500 and 3000 cells/ml, respectively) algal species identified from all sites in both seasons. In summer, the most abundant golden-brown algae were *Ochromonas* sp. and *Stichogloea doederleinii*. In fall, the dominant species of golden-brown algae changed; *Chrysococcus* sp. was the most abundant taxon at two of the three monitoring sites, while *Chrysosphaerella rodhei* dominated the third site. In general, the diatom community was more diverse and abundant in fall than in summer.

3.2.3.2 Zooplankton

In general, the zooplankton community in the Mine Operation Zone study area exhibited variations in community structure among lakes and seasons. Cladocera was the dominant taxonomic group in all lakes in terms of biomass. Within this group, *Holopedium gibberum* was the most important species. Other taxonomic groups, such as cyclopoid copepods, also accounted for a considerable amount of the zooplankton biomass at some sites. For example, *Dicyclops bicuspidatus* accounted for 47 389 $\mu g/m^3$ of the zooplankton biomass at Site PL1-2 of Carat Lake during the fall. *Leptodiaptomus sicilis* and *D. bicuspidatus* accounted for the majority of the calanoid and cyclopoid copepod biomass, respectively. The wheel animals, *Conochilus unicornis* and *Keratella cochlearis* tended to be the most abundant zooplankton species at all monitoring sites during both seasons; however, due to the relatively small size of these animals, they did not have large contributions to the community biomass.

3.3 STREAM PERIPHYTON

Periphyton refers to the community of algae, bacteria, fungi, and their secretions that grow on substrates in freshwater systems (Lock et al. 1984). In addition to having an important role in aquatic trophic relationships (i.e., invertebrates and fish use it as a source of food and shelter), the periphyton community is well suited for use as a biological indicator of environmental conditions, including those imposed by anthropogenic activities. Summary results of periphyton density (No. cells/ml), chlorophyll *a* concentration ($\mu g/cm^2$), and ash-free-dry-mass (AFDM) concentration (mg/cm^2) are presented in this section.

A limited periphyton sampling program was conducted in the summer of 1996. Three replicate periphyton samples were collected from each of three streams in the Mine Operation Zone of the Jericho study area; Site B1 in Stream C1, Site B2 in Stream C15, and Site B4 in the Jericho River (Site O7) (Figure 3.3.1). Data are presented as means (n=3, ±1 standard error). Relevant information are summarized in this section; all data are presented in Appendices D1 and D2.

3.3.1 Density

In total, 130 periphytic algal species were identified in the samples collected from the three study streams. Each of the streams tended to have a unique periphytic algal community. Stream C1 (Site B1) was dominated by the cyanobacterium (Cyanophyta) *Lyngbya limnetica* (792 082±111 828 cells/cm^2) and the diatom (Bacillariophyta) *Tabellaria flocculosa* (263 649±9336 cells/cm^2). Stream C15 (Site B2) had three dominant species of cyanobacteria (*Aphanocapsa elachista*, *Gomphosphaeria naegelianum*, and *Phormidium* sp.) and one diatom (*Achnanthes minutissima*) that were between 92 000 and 118 000 cells/cm^2 (mean densities). The Jericho River (Site B4) had 428 221±217 399 cells/cm^2 of *G. naegelianum*; no other species approached this density at this site (Figure 3.3.2; Appendix D2).

3.3.2 Biomass

Mean chlorophyll *a* concentrations in the three Mine Operation Zone streams (C1, C15, and Jericho River) ranged from 0.007±0.006 µg/cm^2 at Site B2 of Stream C15 to 1.289±0.430 µg/cm^2 at Site B1 of Stream C1 (Appendix D1). AFDM concentrations did not vary as much as chlorophyll *a* estimates; means ranged from 24.1 to 34.6 mg/cm^2.

3.3.3 Summary

Each of the three study streams (C1, C15, and Jericho River) of the Mine Operation Zone tended to have a unique periphytic algal community. The most abundant periphytic algae were the cyanobacteria *L. limnetica* and *G. naegelianum*. Among the diatoms, *A. minutissima* and *T. flocculosa* tended to be the most abundant.

The chlorophyll *a* and AFDM estimates were low at all stream sites. Stream C15 had very low levels of live algae relative to the organic content of periphyton (i.e., live algae was almost non-existent). Stream C1 and the Jericho River had larger amounts of chlorophyll *a* than did Stream C15. Stream C15 was also unique in that three species of algae were co-dominant, while Stream C1 and the Jericho River had one or two algal species that dominated the periphyton community. The low levels of live algae (i.e., chlorophyll *a* concentration) and the absence of a single dominant species in Stream C15 indicated that some physical or chemical factor may have affected periphyton at this site. Some variables that could account for these data include: low light penetration, low or no flow velocities, limiting concentrations of essential nutrients, and the presence of a toxic substance.

The amount of chlorophyll *a* and AFDM found in periphytic communities is controlled primarily by light quality and quantity, water velocity, and nutrient concentrations (Horner and Welch 1981). Moderate current velocities (20 to 100 cm/s) and increasing phosphorus concentrations (to 50 µg/L total phosphorus) promote periphytic growth. The locations sampled in the present study were not shaded by riparian vegetation, exhibited current velocities within the range reported by Horner and Welch, and were not exposed to a known toxic substance. Therefore, it is likely that nutrient concentrations were low. Indeed, in 1995 and 1996 total phosphorus concentrations (the nutrient most often limiting algal growth) were below 0.010 and 0.005 mg/L in Carat Lake and the Jericho River, respectively (R.L. & L. Environmental Services Ltd. 1995). In both study years, periphytic biomass estimates (i.e., chlorophyll *a* and AFDM) in the streams of the Mine Operation Zone were also low and characteristic of oligotrophic conditions.

3.4 BENTHIC MACROINVERTEBRATES

Benthic (bottom-dwelling) macroinvertebrates are an important link in aquatic food webs. Most benthic invertebrates are herbivorous, detrivorous, or filter feeders and derive much of their energy from aquatic plants and algae or organic materials. Some benthic macroinvertebrate species are predacious, generally feeding upon other invertebrates. Many fish species, including early life history stages of piscivorus species, feed upon benthic macroinvertebrates.

3.4.1 Lakes

The lake sampling program was designed to obtain baseline information on benthic macroinvertebrate communities in selected lakes within the Mine Operation Zone of the Jericho study area. In the summer, three replicate samples were collected from the littoral and profundal zones of Carat and Jericho Lakes (Figure 3.4.1). In total, 27 taxonomic groups were identified. The number of taxa in each sample ranged from 4 to 21. Summary data are provided Table 3.4.1 and site specific sampling information is summarized in Appendices E1 and E2.

The mean ($\pm$1 standard error) total number of benthic macroinvertebrates in the littoral zone ranged from 3319$\pm$1254/m^2 at Site L1-1 of Carat Lake to 12 420$\pm$1803/m^2 at Site L2 of Jericho Lake (Table 3.4.1). Nematode (roundworms) dominated; densities ranged from 928$\pm$331/m^2 to 2725$\pm$1243/m^2 (Sites L1-1 and L1-2 of Carat Lake, respectively). Chironomidae larvae (midges) as a group (i.e., sum of five subfamilies and tribes) and harpacticoid copepods also dominated the littoral benthic community. Jericho Lake (Site L2) had the highest chironomid densities, (6782$\pm$3037/m^2) while Carat Lake (Site L1-1) had the lowest (767$\pm$725/m^2) ; there was about an eight-fold difference in the total number of midges between these sites. Oligochaetes (aquatic earthworms) had greater densities in Carat Lake (Site L1-2) than in Jericho Lake; however, Site L1-1 of Carat Lake had the lowest densities of this taxon. Ostracods (seed shrimps) were identified in samples collected from Jericho Lake but were not found in the Carat Lake samples. Sphaeriids (fingernail clams) were not identified in any of the littoral zone samples.

The mean ($\pm$1 standard error) total number of benthic macroinvertebrates in the profundal zone ranged from 275$\pm$129/m^2 at Site P1-2 of Carat Lake to 2536$\pm$318/m^2 at Site P2 of Jericho Lake (Table 3.4.1). Midge larvae of the tribe Chironomini was the most abundant taxon of the profundal benthos; Jericho Lake had a mean of 1507/m^2, while Carat Lake had 0 and 29/m^2 at Sites P1-1 and P1-2, respectively. Indeed, Jericho Lake had five-fold more chironomid larvae than did Carat Lake. Jericho Lake also had more oligochaetes in the profundal zone than did Carat Lake. Ostracods were only identified in the samples collected from Jericho Lake. Nematodes were only found at Site PL1-1 of Carat Lake.

Mean overall densities of benthic macroinvertebrates were much greater in the littoral zone than in the profundal zone (Table 3.4.1) and, the number of taxonomic groups identified in the littoral zone was greater than the number identified in the profundal zone.

3.4.2 Streams

A benthic macroinvertebrate sampling program was conducted on three streams within the Mine Operation Zone in the summer of 1996 (Figure 3.4.1). One sampling site was established on each of the three study streams; the outlet stream of Lake C1 (Stream C1, Site B1), the outlet stream of Carat Lake (Stream C15, Site B2), and the Jericho River (Site B4). In total, 36 different taxonomic groups were identified. The number of taxa in a given sample ranged from 4 to 22. Site specific sampling information is summarized in Appendix E3, while raw data are presented in Appendix E4.

The benthic macroinvertebrate community in the three study area streams was dominated by oligochaetes, nematodes, chironomids, and hydroids (Coelenterata) (Table 3.4.2). These taxonomic groups tended to have sporadic distributions within each sample site (i.e., large standard errors). The overall mean density ($\pm$1 standard error) of benthic macroinvertebrates in the three study streams ranged from 1387$\pm$526/m^2 in the Jericho River to 2104$\pm$1337/m^2 in Stream C1; these densities are low considering that stream environments can be found with densities approaching 10^7/m^2 (Hynes 1970; Resh and Rosenberg 1984; Rosenberg and Resh 1993).

The benthic macroinvertebrate community structure differed among the three study streams (Table 3.4.2). The mean number of taxonomic groups identified in each stream were 7, 20, and 24 taxa/m^2, in Streams C1, C15, and the Jericho River, respectively. Stream C1 had large numbers of nematodes and low numbers of chironomids relative to Stream C15 and the Jericho River. In addition, hydroids, ostracods, and stoneflies (Plecoptera) were not identified in samples collected from Stream C1, but were found in Stream C15 and the Jericho River. Water mites (Hydrachnidia) were not found in Stream C15, but were in Stream C1 and the Jericho River. Microturbellarians (microflatworms) and the caddisfly *Gresnia* (Trichoptera) were only found in Stream C15. Differences in the community structure among the three study streams may be attributed, in part, to natural variation and differences in the physical habitat that was sampled (i.e., water depth, flow velocity, substrate composition; Appendix E3).

3.4.3 Summary

3.4.3.1 Lakes

Overall mean densities and number of taxonomic groups of benthic macroinvertebrates were greater in the littoral zones than in the profundal zones of the Mine Operation Zone study lakes. This reflects the higher productivity of shallow-water habitats because of higher water temperatures and greater light penetration. Anoxia of the profundal zone was not recorded during the 1996 open water season (see Section 3.1) and probably was not a factor in benthic macroinvertebrate production. Taxonomic composition was indicative of a short growing season and a homogenous substrate dominated by fine sediments.

In terms of taxonomic composition, the benthic macroinvertebrate communities in the two study lakes were dominated by a few taxa: chironomids, nematodes, oligochaetes, and harpacticoid copepods. Some taxa (e.g., nematodes) were nearly exclusive to the littoral zone, while other taxa (e.g., sphaeriids) were only found in the profundal zone. Jericho Lake had much greater densities of benthic macroinvertebrates than Carat Lake, suggesting that Jericho Lake is more productive.

3.4.3.2 Streams

Three streams were sampled for benthic macroinvertebrates in the Mine Operation Zone. The benthic communities in these systems were dominated by nematodes, oligochaetes, and chironomids. The species composition and low densities were typical of nutrient poor systems. There were some notable differences in the benthic macroinvertebrate community structure among the three study streams; Stream C1 differed from the other two streams. It had the lowest number of taxonomic groups, largest number of nematodes, and the lowest numbers of chironomids relative to Stream C15 and the Jericho River. In addition, hydroids (Coelenterata), ostracods (seed shrimps), and stoneflies (Plecoptera) were not identified in samples collected from Stream C1, but were found in the other two streams. Differences in physical characteristics among the sampling sites and natural variation may account for some of these differences.

3.5 FISH

3.5.1 Species Composition and Abundance

The 1996 aquatic studies fish sampling program was designed to provide information on species composition and abundance in the Mine Operation Zone. Sampling was conducted during spring, summer, and fall in a variety of habitats using several inventory techniques. In lakes, these techniques included gillnetting, angling, and the use of gee traps. In streams, fish were inventoried using backpack electrofishing and snorkelling. The following section provides summary information for fish communities in selected lakes and streams; all raw data are presented in Appendices F1 to F5.

3.5.1.1 Lakes

During the 1996 fisheries program, five lakes were sampled (Figure 3.5.1). These included Lake C1, Carat Lake, Interbasin Two, Interbasin One, and Jericho Lake. Carat Lake and Jericho Lake were previously sampled during the 1995 program; but, one waterbody (Lake C3), was not included in the present study. This lake was located upstream of the potential impact area and was not used extensively by fish populations residing in Carat Lake (R.L. & L. Environmental Services Ltd. 1995).

In total, 348 fish representing five species were recorded from sampled lakes in the Mine Operation Zone (Table 3.5.1). In order of numerical importance, they were lake trout (235), Arctic char (67), round whitefish (42), slimy sculpin (3), and burbot (1). The relative importance of a particular species within each lake was not constant (Table 3.5.2). In the small headwater lake adjacent to the proposed mine site (Lake C1), lake trout was the only species encountered. In Carat Lake, lake trout dominated the sample (71%), but species such as round whitefish (18%) and Arctic char (11%) were also present. The species composition and relative importance of fish sampled in Interbasin One were very similar to that of Carat Lake. Lake trout dominated the sample (53%), followed by lower numbers of round whitefish (20%) and Arctic char (23%). In Interbasin Two, lake trout was again the most abundant species (89%) followed by round whitefish (9%), however, no Arctic char were captured. In contrast to these waterbodies, the Jericho Lake sample was equally represented by lake trout (55%) and Arctic char (44%); no round whitefish were encountered.

To assess the relative abundance of fish in each of the sampled lakes, gill net catch data were summarized. These data were used for comparison purposes because they were based on a standardized sampling effort and the majority of fish were captured using this technique (341 of 348 fish).

The relative abundance (catch-per-unit-effort or CPUE) values generated for fish captured in each lake (Figure 3.5.2) were generally consistent with the percent composition information. However, the relative abundance of fish varied between seasons and between lakes. Catch rates for most species tended to be higher in fall than in summer (a notable exception was the absence of fish in Interbasin Two during fall).

A number of reasons may explain the higher catch rates recorded during fall. Seasonal differences existed in the sampling strategy employed. In summer, a variety of habitats and locations were sampled to assess fish distribution patterns. In an effort to identify spawning areas, fall sampling was restricted to sites thought to contain suitable spawning habitat. Some of these locations contained high concentrations of fish (e.g., 35 fish/100 $m^2 \cdot 12$ h at Site 1 in Carat Lake; Appendix F2). Higher catch rates during fall may also have reflected greater movement by fish, which would have increased their vulnerability to capture by gill nets (i.e., cooler water temperatures in fall may have induced feeding and/or spawning activity). Given these factors, CPUE values recorded during fall may not be indicative of real changes in fish abundance. As such, the following discussion will concentrate on findings made during the summer period.

The data suggested that overall fish numbers differed among groups of lakes; combined CPUE values during summer were 10 fish/100 $m^2 \cdot$ 12 h in Carat, Interbasin Two and Jericho Lakes, compared to 5 fish/100 $m^2 \cdot$ 12 h. in Lake C1 and Interbasin One. It is unclear why catch rates differed among these groups of lakes. It is possible that they were related to differences in lake size and productivity.

Catch rates for specific species also varied among lakes. Lake trout was the dominant species in each waterbody during summer, however, CPUE values were highest in Interbasin Two (9 fish/100 $m^2 \cdot$ 12 h), moderately high in Lake C1, Carat Lake, and Jericho Lake (approximately 6 fish/100 $m^2 \cdot$ 12 h), and lowest in Interbasin One (4 fish/100 $m^2 \cdot$ 12 h). Arctic char exhibited a similar catch rate to lake trout in Jericho Lake (6 fish/100 $m^2 \cdot$ 12 h), but were much less abundant in other sampled waterbodies. In contrast, round whitefish exhibited relatively low CPUE values in all lakes where they were encountered (0.1 to 3 fish/100 $m^2 \cdot$ 12 h).

3.5.1.2 Streams

Fish were encountered in 21 of the 27 sampled streams within the Mine Operation Zone (Figure 3.5.1). These streams were located in four general areas: Carat Lake (5), Interbasin (4), upper Jericho River (5 tributaries and mainstem Jericho River), and lower Jericho River (5 tributaries and mainstem Jericho River). Most of these watercourses were investigated during the 1995 fisheries program. Exceptions included the lower section of the Jericho River and five of its tributaries. This area of the Jericho River was included in the current fisheries program to ascertain its importance to fish populations that may also utilize upstream areas of the Jericho River.

In total, 693 fish representing seven species were enumerated (Table 3.5.3). Arctic grayling dominated the sample (329), followed in decreasing order of abundance by, ninespine stickleback (126), Arctic char (75), slimy sculpin (74), burbot (47), lake trout (25), and round whitefish (17). The number of fish recorded varied depending on sampling area (Table 3.5.4). Most fish were recorded from streams in the Carat Lake area (275). In the Jericho River area, 213 fish were encountered in the upper section, while 188 fish were recorded in the lower section. Only seventeen fish were encountered within the Interbasin streams.

The number of species encountered varied depending on sampling area (Table 3.5.4). Highest diversity occurred in the upper Jericho River area where seven species were recorded; four species occurred in the lower Jericho River area. Six species were identified in the Carat Lake area streams (all except ninespine stickleback), while five species were found within the Interbasin area (all except ninespine stickleback and round whitefish). It should be noted that ninespine stickleback were not encountered in any waterbody upstream of the cascade on the Jericho River (situated immediately downstream of Jericho Lake).

The relative importance of each species in the Mine Operation Zone differed among areas. In Carat Lake area streams, Arctic grayling dominated the sample (38%), followed by Arctic char (25%) and slimy sculpin (24%). Species such as burbot, lake trout, and round whitefish were also present, but were much less important (<7%).

Although the number of fish in the Interbasin area streams was low (<15 fish), the relative importance of each species was generally similar to that of the Carat Lake area; Arctic grayling (59%) and slimy sculpin (24%) accounted for most of the sample. In the upper Jericho River area, ninespine stickleback was the most numerous fish (41%), although Arctic grayling also accounted for a large percentage of the sample (32%). In the lower section of the Jericho River area, Arctic grayling was much more important relative to ninespine stickleback (77% compared to 20%, respectively).

The number of fish and species composition varied between individual streams within each area (Figure 3.5.3). Of the five streams inventoried in the Carat Lake area, species diversity was highest in Stream C1 (4). The majority of fish recorded in this stream were Arctic char (48). Stream C6 contained the highest number of fish of any stream in the area and these were dominated by Arctic grayling (105). It should be noted that this high number was related to the large amount of sampling effort expended on this particular stream (Appendix F3). Fish numbers were lower in all other systems in the Carat Lake area. Arctic char was the dominant species in Streams C2 and C2A (10 and 9 fish, respectively), while slimy sculpin was the dominant species in Stream C4 (23 fish).

There were a paucity of fish in most streams within the Interbasin area. Very few fish were encountered in Streams C10, C12, and C13. The species encountered in these tributaries were Arctic char, burbot, and slimy sculpin. Stream C15, which represented the main channel connecting Carat Lake to Interbasin Two, contained the highest number of fish (11). Ten Arctic grayling and one lake trout were recorded in this system.

In total, 11 systems were inventoried in the Jericho River area. These included 5 tributaries situated in the upper reach of Jericho River (Streams O1 to O4 and O8), 5 tributaries in the lower reach of Jericho River (Streams O23 to O27), and the mainstem Jericho River (Sections O7A [upper] and O7B [lower]).

In the upper reach of Jericho River the highest species diversity (5) and fish number (114) occurred in Stream O1. Ninespine stickleback was the dominant species in this system (74 fish). Stream O7A contained the same number of species (5) and the next highest number of fish (57); Arctic grayling dominated in this stream (40 fish). Lower numbers of fish were recorded in all other tributaries of the upper Jericho River (<25 fish).

In the lower Jericho River, diversity was lower (between one and three species). In this area, Arctic grayling was the numerically dominant species in most sampled tributaries. Numbers were highest in Streams O7B (54), O24 (33), O25 (40), and O26 (15). Ninespine stickleback were also relatively abundant in Stream O25 (13) and O26 (24).

3.5.2 Biological Characteristics

An important component of the 1996 fisheries program was to describe the biological characteristics of fish species encountered in the Mine Operation Zone. Characteristics described in this section include: length-frequency distributions, length-weight relationships, mean condition factors, age-at-maturity, mean length-at-age, and mean weight-at-age. Because much of this information was collected from fish that succumbed during sampling, and mortality rates were generally low, sample sizes were small. Unless otherwise stated, data from all sampling sessions and sampling methods have been combined for the analyses. Raw data used for these analyses are presented in Appendix F5.

3.5.2.1 Lake trout

Lake trout captured in the Mine Operation Zone ranged in fork length from 85 to 960 mm, however, few individuals were less than 160 mm or greater than 660 mm in length (Figure 3.5.4). Length-frequency distributions of fish sampled from the Carat Lake, Interbasin (data for Interbasin One and Interbasin Two combined), and Jericho Lake systems were similar and tended to exhibit bimodal distributions. These groupings occurred between 160 and 260 mm and between 400 and 600 mm. Length data were also collected from lake trout captured in Lake C1, however, the sample was too small to establish an accurate assessment of the length-frequency distribution (n=12). Lengths of lake trout in this small waterbody ranged from 176 to 429 mm fork length (Appendix F5).

Length-weight regression equations and mean condition factors for lake trout sampled from lakes within the Mine Operation Zone during summer are presented in Table 3.5.5.

Age-at-length and age-at-weight information for a sample of lake trout captured in Carat Lake during summer are provided in Table 3.5.6. Fish in this sample ranged in age from 1 to 29 years. Caution should be used when interpreting this information. The sample used for ageing was small (n=21) and there was variation inherent to this type of data (subarctic fish populations typically exhibit a great range in age for fish of a given length [Johnson 1972]). As such, this information provides only a representative cross-section of the population and should not be interpreted as an accurate description of growth rate. As such, it should not be used for comparison of growth curves among different fish populations.

Limited data were available to assess age-at-maturity for lake trout in the Mine Operation Zone. Information for lake trout in Carat Lake suggested that these fish became sexually mature at approximately 15 years of age. The smallest sexually mature lake trout encountered was 421 mm fork length. This fish was a ripe male captured from Carat Lake. Nonfecund lake trout were identified during the present study (i.e., mature fish that did not spawn that year). The percentage of nonfecund individuals in the sample that could be assessed for sexual maturity was 23% (n=98).

3.5.2.2 Arctic Char

The fork length of Arctic char sampled from waterbodies in the Mine Operation Zone ranged from 34 to 639 mm (Figure 3.5.5). However, the length-frequency distributions of fish sampled from each system differed. In the Carat Lake system, fish less than 120 mm in length dominated the sample. These individuals represented young-of-the-year and yearling fish captured from tributary streams. In the other two systems (Interbasin and Jericho Lake), distributions were dominated by fish greater than 160 mm fork length; these larger individuals were encountered in lakes. The Jericho Lake sample exhibited a bimodal length-frequency distribution that was typical of lake dwelling fish populations in the study area. Groupings occurred between 160 and 280 mm and between 480 and 660 mm.

Length-weight regression equations and mean condition factors for Arctic char sampled from lakes within the Mine Operation Zone during summer are presented in Table 3.5.7.

Age-at-length and age-at-weight information for a sample of Arctic char captured from the Carat Lake system during summer are presented in Table 3.5.6. Fish in this sample ranged in age from 0 to 12 years. As for lake trout, caution should be used when interpreting these data. The sample used for ageing was small (n=21) and there was variation inherent to this type of data (subarctic fish populations typically exhibit a great range in age for fish of a given length [Johnson 1972]). As such, this information provides only a representative cross-section of the population and should not be interpreted as an accurate description of growth rate. As such, it should not be used for comparison of growth curves among different fish populations.

Limited age-at-maturity data for Arctic char captured in the Mine Operation Zone suggests that fish became sexually mature at 10 years of age. The smallest sexually mature Arctic char was 407 mm fork length. This fish was a ripe female captured from Jericho Lake. Nonfecund Arctic char were also recorded during the study. The percentage of nonfecund individuals in the sample of mature fish that could be assessed for sexual maturity was 27% (n=22).

3.5.2.3 Round Whitefish

The fork length of round whitefish sampled from waterbodies in the Mine Operation Zone ranged from 53 to 532 mm (Figure 3.5.6); the majority of fish were greater than 300 mm fork length. The limited number of fish less than 100 mm in fork length were captured from study area streams. The median length of sampled fish was 424 mm.

The length-weight regression equation and mean condition for round whitefish sampled from the Mine Operation Zone waterbodies during summer was:

$$\text{Weight (g)} = 1.432 * 10^{-5} * \text{Fork Length (mm)}^{2.968}$$
where: n=27 and r^2=0.998; and,

Mean Condition Factor=1.195 ± 0.033 (SE).

Age-at-length and age-at-weight information for a sample of round whitefish captured from the Carat Lake system during summer and fall are presented in Table 3.5.6. Fish in this sample ranged in age from 1 to 29 years. Past investigations of subarctic round whitefish populations have not documented the existence of fish 15 years of age and older (Kennedy 1949 and Mackay 1989). However, several individuals in the Carat Lake sample did exceed this age. This discrepancy can be explained by use of different ageing structures; past studies have employed scales, whereas the present study utilized otoliths. It is now commonly accepted that otoliths allow a more accurate assessment of fish age than scales, particularly for older fish (Jessop 1972 and Mackay et al. 1990).

Limited data were available to assess the age-at-maturity data for round whitefish captured in the Mine Operation Zone. These data suggest that fish became sexually mature at 7 years of age. The smallest sexually mature round whitefish encountered during the study was 316 mm in fork length. This fish was a ripe female captured from Carat Lake. Nonfecund round whitefish were not recorded during the study.

3.5.2.4 Arctic grayling

The fork length of Arctic grayling sampled from waterbodies within the Mine Operation Zone ranged from 29 to 258 mm (Figure 3.5.6). The majority of these fish were less than 70 mm fork length (median length=49 mm). All sampled fish were captured from study area streams and represented either young-of-the-year (modal peak of 40 mm), juvenile (modal peak of 120 mm), or adult fish (258 mm fork length).

The length-weight regression equation and mean condition factor for Arctic grayling sampled from the Mine Operation Zone (all seasons combined) was:

$$\text{Weight (g)} = 1.713 * 10^{-6} * \text{Fork Length (mm)}^{3.347}$$
where: n=34 and r^2=0.869; and,

Mean Condition Factor=0.996 ± 0.039 (SE).

Ages were assessed for Arctic grayling sampled from the Mine Operation Zone waterbodies using summer and fall data combined (Table 3.5.6). Fish in this sample ranged in age from 0 to 4 years. No age-at-maturity data were available for this species.

3.5.3 Feeding Habits

Stomach contents of three species (lake trout, Arctic char, and round whitefish) were analysed to assess feeding habits (all seasons combined). Data were collected from fish that succumbed during capture or that were sacrificed for collection of tissue samples. The information is presented as frequency of occurrence and percent composition of food items by volume. The raw data used for these analyses can be found in Appendix F5.

3.5.3.1 Lake trout

The diet of lake trout consisted principally of zooplankton (Figure 3.5.7). This was the dominant food item in fish stomachs from Carat, Interbasin, and Jericho Lakes, where it exceeded 50% occurrence and 60% composition by volume. Other food items consumed were fish, chironomids (midges), trichopterans (caddis flies), pelecypods (clams), and gastropods (snails). Only in the Jericho Lake sample did one of these food items (fish) exceed 15% occurrence and 20% composition by volume.

3.5.3.2 Arctic char

The diet of Arctic char was very similar to that of lake trout; it consisted primarily of zooplankton (Figure 3.5.8). This was the dominant food item in all three lakes; it exceeded 60% occurrence and 70% composition by volume. Other food items consumed were fish, chironomids, and pelecypods, however, none of these categories exceeded 10% occurrence or 20% composition by volume.

3.5.3.3 Round whitefish

Food habits were assessed for round whitefish sampled from Carat and Interbasin Lakes. In Carat Lake, this species consumed a variety of food items, which included zooplankton, fish, trichopterans, chironomids, and pelecypods (Figure 3.5.9). The dominant food consumed was trichopterans (67% occurrence and 55% composition by volume). Other food items did not exceed 21% occurrence or 17% composition by volume. Similarly, trichopterans were also an important component in the diet of round whitefish in the Interbasin Lakes sample (50% occurrence and 57% composition by volume). In this area, zooplankton was the only other food item consumed and was of equal importance to trichopterans (50% occurrence and 43% composition by volume).

3.5.4 Fish Movements

The Mine Operation Zone of the Jericho study area contains several lakes that are interconnected by large streams. As such, the potential exists for fish to undertake movements between waterbodies. To assess movement patterns of fish, a tagging program was initiated in 1995 and continued during the present study. Lake trout, Arctic char, and Arctic grayling in good physical condition were tagged and released. Round whitefish were not included in this study component because captured individuals of this species generally were in poor physical condition.

During the present study, 59 lake trout and 19 Arctic char were tagged and released in four lakes (Table 3.5.8). These marked fish were in addition to the 57 lake trout, 15 Arctic char, and 1 Arctic grayling originally tagged in 1995 (R.L. & L. Environmental Services Ltd. (1995). Of these tagged fish, only seven individuals were recaptured (two lake trout and five Arctic char); three of these fish had been tagged and released in 1995. These results suggest that the tag return rate was low for both species (2% for lake trout and 15% for Arctic char). Probable reasons for low recapture rates were the small number of marked fish released into the population, loss of tags from marked fish, and removal of marked fish from the population. There is evidence that mortality caused by predation may be a significant factor in removal of marked fish from the population. Three tags were recovered from the stomachs of fish during assessments of feeding habits; if these tags are included in the recapture data set, they represent 30% of all recaptures. The size of tagged fish was apparently not a deterrent to predation. Two of these tags were placed fish greater than 320 mm in fork length; a 342 mm lake trout and a 440 mm Arctic char.

The limited recapture results suggest that there is little movement of fish between waterbodies. Only two of the seven marked fish were recaptured outside of their waterbody of origin. The two fish that did move were Arctic char that were originally tagged in Jericho Lake. Both fish were subsequently recaptured in Interbasin One during the fall sampling period; a waterbody that is connected to Jericho Lake via a narrow, deep channel. These results indicate that Arctic char do move between these two waterbodies. One possible reason for movement of Arctic char between Jericho Lake and Interbasin One could be spawning related activity; both fish were sexually mature and ready to spawn at the time of recapture.

These limited results make it difficult to assess movement patterns of fish in the Mine Operation Zone. However, characteristics of the major watercourses in the area and fish enumeration data can also be used to predict whether movements of large numbers of fish occur between waterbodies.

Two main watercourses exist in the Mine Operation Zone. Stream C15 connects Carat Lake to the Interbasin Lakes. This watercourse is a narrowing of the basin between these two waterbodies. It is shallow and is dominated by sand substrates. These characteristics would hamper, but not prevent, movement of large adult fish between these waterbodies.

The second main watercourse is the outlet system to Jericho Lake (Jericho River). This stream flows from Jericho Lake in a northward direction to connect with the Burnside River drainage system (Kathawachaga Lake). Because Jericho River is relatively large (see Section 3.6) and is connected to the larger Burnside River system, there is the potential for annual movements of fish into and through the study area. However, the presence of a cascade area at the outlet of Jericho Lake, (caused by a decrease in elevation of 15 m) creates a major, but not impassable, barrier to fish passage. The presence of this barrier severely limits movements of fish into study area lakes.

To establish whether fish attempted to move into the study area via the outlet system, snorkel surveys were undertaken in Jericho River during spring, summer, and fall. The surveys were used to count any large fish that may have been staging immediately downstream of the cascade area. The three surveys identified no fish concentrations at the base of the cascade; results that are similar to findings made in 1995. As such, large numbers of fish do not undertake annual upstream migrations from the Burnside system into the Jericho Lake area.

3.5.5 Resource and Potential Harvest

Based on available information, waterbodies in the Mine Operation Zone were not used extensively for commercial or domestic fisheries. However, recreational use by personnel associated with exploration activity did occur. Personnel housed in the Canamera Geological Ltd. exploration camp actively fished Carat Lake during the 1996 study period. No anglers were observed using other lakes or any streams in the Mine Operation Zone.

The relatively small size of study area lakes and their low productivity make their sport fish populations susceptible to over harvest. To estimate the annual sport fish harvest a waterbody can support, an equation that employs a lake's surface area, was developed by Evans et al. (1990) for Northern Ontario. This equation has been recommended to calculate potential annual harvest of lake trout in inland lakes (Oliver et al. 1991) and is as follows:

$$\log_{10} H \quad 0.60 \quad 0.72 \log_{10} A$$

Where: H = potential annual harvest of lake trout (kg).
A = surface area (ha) of lake (lake surface areas based on 1:50 000 scale N.T.S. maps).

Using this formula, the potential annual harvest of lake trout ranged from 8 kg in Lake C1 to 224 kg in Carat Lake, with the larger lakes having the highest values (Table 3.5.9). This information indicates that lake trout are susceptible to over harvest. It should also be noted that these values may be biassed upward due to a number of environmental differences between subarctic lakes and waterbodies in northern Ontario. Lower nutrient levels, a colder water temperature regime, and a shorter open water period in the subarctic region would significantly lower the potential harvest available in these lakes compared to those in northern Ontario.

3.5.6 Summary

Sampled lakes in the Mine Operation Zone supported populations of lake trout, round whitefish, and Arctic char. Lake trout was the predominant species with Arctic char and round whitefish being less numerous in most lakes. Notable exceptions were the absence of round whitefish in Jericho Lake and the presence of only lake trout in Lake C1. Based on abundance indices (catch rates using standardized gill net sets), overall fish densities in summer were similar among Carat Lake, Interbasin Two and Jericho Lake (10 fish/100 $m^2 \cdot 12$ h) and among Lake C1 and Interbasin Two (5 fish/100 $m^2 \cdot 12$ h). It is unclear why catch rates differed between lakes. It is possible that they were related to differences in lake size and productivity.

Several fish species were encountered in sampled streams. Arctic grayling, Arctic char, and slimy sculpin tended to be the most numerous species, followed by lower numbers of lake trout, round whitefish, and burbot. One species, ninespine stickleback, was also relatively abundant, but was present only in the Jericho River system below the cascade. With the possible exception of the Jericho River, sampled streams provided habitat to fish only during the open water period (most likely froze to the channel bottom in winter). Therefore, the presence of species such as Arctic grayling and burbot in sampled streams indicated that adults of these species were present in the lakes, even though they were not encountered during lake sampling.

Overall, low numbers of fish were recorded in sampled streams. However, in the Carat Lake area, Stream C1 supported a diverse assemblage of species and it contained the highest number of Arctic char recorded in the Mine Operation Zone. Likewise, Stream C6 supported the highest number of Arctic grayling. With the exception of Stream C15, which is the connecting watercourse between two lakes, streams in the Interbasin area contained very few fish. In the Jericho River area, high fish numbers were recorded in the Sections O7A and OB, as well as in several tributary streams. These were Streams O1, O24, and O25, which all contained high numbers of Arctic grayling.

The biological characteristics of fish populations in the Mine Operation Zone indicated that they were slow growing, late maturing, and dominated by older age-classes. Lake dwelling species (lake trout, Arctic char, and round whitefish) tended to exhibit bimodal length-frequency distributions and were dominated by larger older fish. To some extent, this reflected the sampling methodology employed (smaller size-classes were not effectively sampled using gill nets), however, these data are typical of subarctic fish populations residing in cold, oligotrophic waterbodies. It has been suggested that these characteristics are indicative of unexploited fish populations in a state of equilibrium with their environment (Johnson 1976).

The feeding habits of fish in the Mine Operation Zone were related to a species feeding habits and the most abundant food item available. Zooplankton was the dominant food group identified in lake trout and Arctic char stomachs, although fish was also consumed. In contrast, aquatic insects (predominantly trichopterans) were present in round whitefish stomachs. Other food items consumed by this species were pelecypods and zooplankton.

Limited recapture data for tagged fish made it difficult to assess movement patterns of fish in the Mine Operation Zone. However, characteristics of the major watercourses in the area and fish enumeration data indicated that large numbers of fish did not undertake movements between waterbodies. Survey data also indicated that, annual movements of fish into and through the study area lakes from downstream areas of the Burnside River system does not occur. This is likely due to the presence of a cascade immediately downstream of Jericho Lake on the Jericho River, which is a significant barrier to fish passage.

Based on available information, waterbodies in the Mine Operation Zone were not used extensively for commercial or domestic fisheries. However, recreational use by personnel associated with exploration activity did occur. The biological characteristics of fish populations in these waterbodies (i.e., slow growing and late maturing), the relatively small size of these lakes, and their low productivity make their sport fish populations susceptible to over harvest.

3.6 HABITAT AND HABITAT USE

This study component was designed to describe aquatic habitat in lakes and streams in the Mine Operation Zone and to assess its value to fish communities. The 1996 program was a continuation of work undertaken in 1995 (R.L. & L. Environmental Services Ltd. 1995). This section provides information for waterbodies not previously investigated, as well as additional data for waterbodies that were surveyed in 1995. Raw data collected during the present study are provided in Appendices G1 and G2.

3.6.1 Lakes

The shoreline habitat characteristics of five waterbodies in the Mine Operation Zone were surveyed: Carat Lake, Jericho Lake, Interbasin One, Interbasin Two, and Lake C1 (Figure 3.6.1). Surveys were designed to provide a general assessment of the shoreline characteristics of each lake and to identify potential high quality spawning and rearing habitats.

Surveys indicated that the shorelines of Carat Lake, Lake C1, and Jericho Lake were dominated by cobble-boulder substrates (Table 3.6.1). The Carat Lake shoreline was dominated by cobble-boulder substrates of low (56%) or moderate slopes (31%). These characteristics were also recorded for Lake C1; 100% of the shoreline was composed of cobble-boulder substrates. Although cobble-boulder substrates were important in Jericho Lake, bedrock substrates were equally important (50%). In Carat and Jericho Lakes, substrates consisting of fine substrates (sand and gravels) accounted for less than 15% of the shoreline and were limited in distribution to the eastern basins of both waterbodies.

In contrast to the aforementioned lakes, shoreline areas of Interbasin One and Interbasin Two contained extensive areas dominated by fine substrates consisting of sands and gravels. In Interbasin One, these areas accounted for 35% (low slope) and 12% (moderate slope) of the shoreline. In Interbasin Two fine substrates and low slopes dominated the shoreline (64%).

Potential spawning habitats were also identified during the shoreline habitat surveys. Spawning habitat required by lake dwelling species such as lake trout, Arctic char, and round whitefish is characterized by the presence of clean gravel to boulder-sized substrate in areas sufficiently deep to avoid freezing (Scott and Crossman 1973). Areas with these characteristics were widely distributed in all surveyed waterbodies, which suggests that spawning habitat was not limited in any of the lakes surveyed.

A number of sites exhibiting characteristics of high quality spawning habitat were located (i.e., contained an abundance of clean substrates, exhibited moderate shoreline slope into deep water, and were positioned in areas that promote water movement) (Figure 3.6.1). Concentrations of spawning lake trout recorded at one of these sites (i.e., northeast shore of Carat Lake) confirmed these findings.

Shoreline habitat surveys did not identify extensive areas containing potential rearing habitat. Rearing habitat suitable for lake dwelling fish species is characterized by shallow-water zones exhibiting low slopes and fine substrates that support the growth of aquatic macrophytes (Randall et al. 1996). These features provide shelter (i.e., protection from predators and source of food) to younger age-classes of fish. In addition, they provide habitat for forage fish species such as slimy sculpin and ninespine stickleback. Shallow water areas with fine substrates were present (see preceding paragraphs), however, aquatic macrophytes were sparsely distributed. Emergent species included sedges (*Carex* spp.) and aquatic grasses (*Glyceria* spp.). Only one area contained an extensive zone of these plants (southwest corner of Carat Lake). Submergent vegetation that could be observed from the water's surface was also limited in abundance. The only species encountered was coontail (*Ceratophyllum demersum*), and it was restricted to the channel connecting Carat Lake to Interbasin Two.

Areas exhibiting high quality rearing habitat were sparsely distributed in surveyed lakes within the Mine Operation Zone. Two small areas were identified in each of the western basin of Carat Lake, the Interbasins area, and the north shore of Jericho Lake.

3.6.2 Streams

Similar to methodologies used in 1995, investigations of streams in the study area were undertaken during spring and summer. During spring, a reconnaissance level survey was conducted to identify streams that provided some habitat for fish communities and to assess their potential as spawning habitat (i.e., use by spring spawning Arctic grayling). Surveys during summer were used to provide a more detailed description of stream characteristics and to assess their overall potential as fish habitat.

Streams chosen for investigation during the present study included most systems examined in 1995; Streams C3, C7, C8, and C9 (R.L. & L. Environmental Services Ltd. 1995) were not sampled because they either had little value for fish or they were outside the present study area. Several new streams were surveyed in 1996; they included tributaries in the Interbasin area and tributaries to the lower Jericho River area.

In total, 27 watercourses were examined during the 1996 sampling program (Figure 3.6.2). Of these, six contained no fish during spring sampling and were ephemeral (contained water only during the snow melt period or during rainfall events). These streams were deemed to have no value to fish communities, and therefore, did not receive more extensive investigation. The 21 streams (including two river sections) that had some potential as fish habitat were located in four general areas: Carat Lake (5), Interbasin area (4), the upper Jericho River (5 tributaries and mainstem river), the lower Jericho River (5 tributaries and mainstem river). The majority of these systems were small (18) and exhibited intermittent flow during the summer sampling period. The three remaining streams were part of the main drainage system. They were Stream C15, which was the connecting channel between Carat Lake and Interbasin Two, and Jericho River (Sections O7A and O7B); the outlet system for the study area lakes.

3.6.2.1 Carat Lake Streams

Stream C1

Stream C1 is a small watercourse within the Jericho Diamond Project area that drains a headwater lake situated to the south of Carat Lake. The habitat survey during 1995 indicates that the lowermost 200 m of this stream consists of a series of small channels, which amalgamate into a single channel further upstream. A small cascade occurs immediately below the headwater lake; this cascade is likely a barrier to fish passage during low flow periods. Although small, this stream maintains water flow throughout the open water period. The stream contains varying amounts of gravel, cobble, and boulder substrates, and the channel is dominated by RIFFLE and RUN habitat (Table 3.6.2).

A diverse assemblage of fish was recorded in Stream C1 during the 1996 sampling program (Table 3.6.3). Species recorded were Arctic char, lake trout, round whitefish, and slimy sculpin. All of these fish were encountered in the lowermost 200 m of the stream. The presence of young-of-the-year and juvenile age-classes suggested that this system provided good rearing habitat (Table 3.6.4), particularly for Arctic char.

Streams C2 and C2A

Streams C2 and C2A are very small, ephemeral watercourses that have extremely limited value to fish; however, because they are located within the Jericho Diamond Project Area they are discussed in this section. Stream C2 drains a shallow headwater lake situated immediately east of Carat Lake, while Stream C2A drains a small pond adjacent to Carat Lake. Both streams exhibit minimal flow during dry periods.

Fish were present in both streams during 1996 sampling, but were restricted to the lowermost 20 m. Arctic char was the dominant species, although lake trout and slimy sculpin were also present. The small size of both streams severely limits their value as fish habitat.

Stream C4

Stream C4 is a small well-defined tributary that drains a headwater lake at the northwest corner of Carat Lake. The stream channel exhibits a low slope for much of its surveyed length; however, the gradient increases dramatically and the flow becomes subsurface approximately 600 m upstream from its confluence. This area is a barrier to fish passage. The stream contains multiple POOL-RUN habitat complexes and an abundance of sand substrate. Small pockets of gravel substrates are also present in the numerous small pools.

One Arctic char and five lake trout were recorded in this stream as well as numerous sculpin. This information suggested that Stream C4 was used for rearing purposes by these species, although habitat quality was low.

Stream C6

This tributary is a short watercourse that connects the north basin of Carat Lake to several headwater lakes. In its lower section, the stream is dominated by boulder substrates and RUN habitat. As the channel approaches the headwater lake, it becomes less well-defined and contains small patches of gravel substrate.

Three fish species were recorded in this stream during 1996 sampling; Arctic grayling, burbot, and slimy sculpin. Of these three species young-of-the-year Arctic grayling were particularly abundant. In fact, this stream contained the highest number of Arctic grayling in the study area. Using a density estimate sampling technique (see Section 2.1.7) the density of young-of-the-year Arctic grayling in Stream C6 was calculated to be 135 fish per 100 m $\pm$3.3 fish (based on 95% Confidence Intervals). In addition to a high density of fish, egg sweeps during spring located Arctic grayling eggs in the stream. These data confirmed that Arctic grayling used Stream C6 for spawning and rearing purposes. However, it is unclear whether these fish originated from Carat Lake or the headwater system.

3.8.2.2 Interbasin Streams

Streams C10, C12, C13

Due to the similarity in habitat characteristics, these streams will be discussed as a group. These tributaries are very small watercourses that drain the terrain adjacent to the Interbasin lakes. They are dominated by dispersed channels and silt/sand substrates. Zero flows were recorded during periods of low rainfall.

Small numbers of fish (Arctic char, burbot, and slimy sculpin) were present in these systems during spring when water flows were sufficient to support fish. However, their value as rearing habitat was severely limited by the lack of water during the summer period.

Stream C15

Stream C15 is a short outlet system that connects Carat Lake to Interbasin Two. It is a large stream that has water flow during the entire open water period. Its channel is well-defined and is dominated by RUN and FLAT habitats. The substrate consists primarily of sand interspersed by small amounts of gravels, cobbles, and boulders.

Although very short in length, Stream C15 provides good quality fish habitat. Snorkel surveys during summer documented the presence of a single adult lake trout and Arctic grayling indicating that it was used for feeding purposes. Juvenile Arctic grayling also used the stream for rearing. Although Arctic grayling eggs and young-of-the-year fish were not recorded in this system, its characteristics (i.e., gravel substrates) suggests that it could provide spawning habitat for this species.

3.6.2.3 Jericho River Streams

The Jericho River serves as the outlet system to waterbodies in the Jericho study area. It is unique in that it is the largest stream in the study area and several small tributaries drain into the sections investigated. A major barrier to fish passage exists on the Jericho River immediately downstream of Jericho Lake (Figure 3.6.2). Within this 120 m section, the stream drops approximately 15 m. The channel disperses over bedrock and boulders as it falls through a series of cascades. Although this section is a major barrier to fish passage, it is not a complete barrier, particularly during high flow periods.

After the Jericho River completes its descent from Jericho Lake, its channel becomes well-defined. Habitat surveys were completed in two areas. Section O7A encompassed the upper Jericho River and included five tributaries; Section O7B encompassed the lower Jericho River, which also included five tributaries.

Section O7A (Upper Jericho River)

Section O7A of the Jericho River is dominated by deep long FLAT habitats interspersed by short RAPID sections. Water depth varied within this portion of the Jericho River, but observations during snorkelling suggested that depths greater than 3.0 m are not uncommon. The substrate varies between sand in FLAT habitats, to boulder and cobble in RAPID habitats.

Due to its large size and habitat diversity, Section O7A of the Jericho River provides good quality fish habitat. Because of its depth, it provides feeding areas for adult fish and possibly overwintering areas. Surveys documented the presence of adult Arctic char, Arctic grayling, and lake trout. The presence of numerous juvenile Arctic grayling also suggested that this species reared within the Jericho River. The absence of gravel substrates in the section investigated indicated that the watercourse was not used for spawning by Arctic grayling, however, conditions (RAPID habitats) were suitable for spawning by species such as lake trout.

Streams O1, O2, O3, O4 (Upper Jericho River)

Due to the similarity in habitat characteristics, these streams will be discussed as a group. These tributaries to the upper Jericho River are small and are dominated by small substrates (sand, gravel, and cobble), and have very low water flows during periods of low rainfall. All contain an abundance of RUN habitat. The presence of smaller substrates in these streams, in combination with moderate to low gradients, creates rearing and spawning habitat for species such as Arctic grayling.

The streams' value as rearing habitat was confirmed by the presence of Arctic char and Arctic grayling in all four streams. Although adult Arctic grayling were not encountered during spring sampling, habitat conditions suggest that these streams were also used for spawning purposes by this species. Other species encountered were burbot, ninespine stickleback, and slimy sculpin.

Stream O8 (Upper Jericho River)

Habitat characteristics of the surveyed section of Stream O8 are similar to characteristics in Streams O1, O2, O3 and O4. Unlike the smaller watercourses, however, it had stable flows during the summer sampling period. Extensive areas of this stream provide fish habitat. The well-defined channel is characterized by a series of POOL, RUN, and RIFFLE habitats and an abundance of gravel substrates.

During spring sampling, Arctic grayling eggs were collected from Stream O8 and young-of-the-year fish were recorded in this system during summer. The presence of Arctic grayling eggs and fish, combined with an abundance of spawning and rearing habitat strongly suggested that Stream O8 was used for spawning and rearing purposes by this species.

Section O7B (Lower Jericho River)

The habitat characteristics of Section O7B of the lower Jericho River differed from those of the upper Jericho River. The watercourse in this area is shallow and dominated by RUN habitat interspersed by RAPID/POOL complexes. Although FLAT habitat is present, these areas generally exhibit shallow water depths. The substrates in Section O7B are dominated by sand and boulders interspersed with patches of gravels. Due to the lack of deep water areas, this section has limited value as feeding habitat for adult fish. However, these characteristics provide good quality spawning and rearing habitat for species such as Arctic grayling. Not surprisingly, large numbers of young-of-the-year and juvenile Arctic grayling were documented in Section O7B.

Stream O23 (Lower Jericho River)

This tributary to the lower Jericho River is small, exhibits a low slope, and is dominated by sand substrate. Zero flow during the summer period severely limits its value as fish habitat. A small number of young-of-the-year Arctic grayling were recorded in this stream ($n=2$). The absence of suitable spawning substrate suggests that these fish originated from the Jericho River and not from Stream O23.

Streams O24, O25, O26, and O27 (Lower Jericho River)

Due to the similarity in habitat characteristics, these streams will be discussed as a group. These tributaries to the lower Jericho River varied in size, with Stream O24 exhibiting the lowest discharge and Stream O27 the highest. They are small, exhibit low slopes, and are dominated by sand substrates interspersed with small pockets of gravel (Stream O27 is the exception; gravel was the dominant substrate type). All these streams contain an abundance of RUN habitat. The presence of smaller substrates in these streams, in combination with low gradients, create good quality spawning and rearing habitat for species such as Arctic grayling.

Their value as spawning and rearing habitat was confirmed by the presence of young-of-the-year and juvenile Arctic grayling in all four streams. Other species encountered in these streams were ninespine stickleback (Streams O25, O26, and O27), and slimy sculpin (Stream O27).

3.6.3 Summary

The shoreline areas of lakes in the Mine Operation Zone tended to be dominated by cobble-boulder substrates; this was particularly true for Lake C1, Carat Lake, and Jericho Lake. The two Interbasin lakes also contained rocky shorelines, however, fine substrates (principally sands and gravels) were also present. These shoreline characteristics provided an abundance of potential spawning areas for species such as lake trout, Arctic char, and round whitefish. Therefore, spawning areas were not limited in any of the surveyed lakes. Several high quality spawning sites were identified during the study and the presence of high concentrations of lake trout at one (north-east corner of Carat Lake) confirmed that it was used for this purpose. The same shoreline characteristics that provided an abundance of spawning habitat also severely limited the available rearing habitat for fish. The absence of fine substrates along much of the shoreline areas precluded the development of aquatic macrophytes, features that facilitate development of lake shore rearing habitat.

In total, 27 streams were surveyed in the Mine Operation Zone. In general, these systems provided limited habitat for fish populations originating from study area lakes. This was true for most streams in the Carat Lake and Interbasin areas. The primary reasons for low quality fish habitat in most streams were small size, a preponderance of boulder substrates, and poorly defined channels. Some streams did provide better quality habitat. These included two tributaries in the Carat Lake area (Streams C1 and C6) and one larger system in the Interbasin area (Stream C15). These systems contained spawning and/or rearing habitat that could be used by species such as Arctic grayling.

The upper and lower sections of the Jericho River and several of their tributary streams also contained good quality habitat. The Jericho River, the largest stream in the study area, exhibited a well-defined channel and contained a mixture of slow, deep-water areas and fast shallow water areas. As such, rearing habitat was available for juveniles and feeding habitat was present for use by adult fish. Deep-water areas in the upper Jericho River also suggested that it may provide overwintering habitat for fish. Tributary streams associated with the Jericho River were small, but several had well-defined channels and smaller substrates. As such, these systems provided good quality spawning and rearing habitat for species such as Arctic grayling. Tributaries exhibiting these characteristics were Streams O1, O8, O24, O25, and O27.

A significant feature of the Jericho River was the presence of a cascade area approximately 15 m in height that was located near the outlet of Jericho Lake. Although not an absolute barrier, this area created a significant impediment to fish passage between the Jericho River system and lakes situated farther upstream. This may explain why ninespine stickleback were recorded downstream of the cascade area, but were absent from waterbodies situated upstream.

3.7 BACKGROUND METAL CONCENTRATIONS IN FISH TISSUE

During 1995, a monitoring program was initiated in the Mine Operation Zone to document background metal concentrations in kidney, liver, and muscle tissues of fish (lake trout and round whitefish). Samples were collected from two lakes. These were Jericho Lake, which is situated downstream of the Jericho Diamond Project and Control Lake, which was outside the influence of any potential development (i.e., 6 km west of the Jericho Diamond Project). Results of this program are presented in R.L. & L. Environmental Services Ltd. (1995).

The 1995 study design for the monitoring program included Jericho Lake and not Carat Lake as the monitoring site, because initial development plans of the Jericho Diamond Project required removal of Carat Lake from the aquatic biological system (i.e., drainage of the basin to gain access to the deposit). As such, the waterbody would not have been available for future monitoring. These plans were subsequently modified; it was no longer required to drain Carat Lake for development of the deposit. To account for the changes in the development plan, the monitoring program was modified to include Carat Lake as the monitoring site.

In 1996, fish tissues were collected from lake trout and round whitefish in Carat Lake to document background metal concentrations in kidney, liver, and muscle tissues of fish. To ensure quality control (i.e., remove biases associated with between year sampling) samples were again collected from the Control Lake.

In total, 21 lake trout and 20 round whitefish were sampled for tissue analysis from each of Carat Lake and Control Lake (Table 3.7.1). The size range of fish collected for tissue samples is also provided in Table 3 7.1. The concentrations of 26 metal elements were analysed. Liver and muscle tissue samples were analysed; kidney tissue samples have been stored (frozen at -17°C) pending future analyses. Results of the analyses for all elements are presented in Appendices H1 and H2. For analytical purposes, values below the detection limits were coded as one half the detection limit.

The average concentrations of some of the potentially toxic metals (aluminum, arsenic, cadmium, mercury, lead, nickel, copper, and zinc) in the tissues of study area fish are presented in Tables 3.7.2 to 3.7.3. The results are discussed separately for each of the metals.

3.7.1 Aluminum

The availability of aluminum to aquatic organisms has been correlated with the pH of the aquatic environment (Holtze and Hutchinson 1989); however, it is unclear at what pH threshold, or at what concentration, aluminum becomes toxic to fish. Aluminum can be acutely toxic at high exposure levels, but it does not bioaccumulate in aquatic organisms (Neville 1985).

Detectable concentrations of aluminum (>1 µg/g) were recorded in 100% of the lake trout liver samples from both lakes (Table 3.7.2). For muscle tissue, however, aluminum concentrations did not exceed the detection limit in either lake. Mean aluminum levels in liver tissue samples were similar in both lakes (21 µg/g and 20 µg/g from each of Carat and Control Lakes, respectively). The maximum recorded aluminum concentration was 72 µg/g (Carat Lake).

Aluminum concentrations in round whitefish tissues were lower than those recorded for lake trout tissues. Detectable concentrations of aluminum were detected in 95% of round whitefish liver samples (Table 3.7.3), but concentrations in muscle tissue did not exceed the detection limit. The mean aluminum level in liver tissue samples from Carat Lake was 9 µg/g; in Control Lake it was 8 µg/g. The maximum recorded aluminum concentration in round whitefish from the Mine Operation Zone was 31 µg/g (Carat Lake).

3.7.2 Arsenic

Arsenic is more common in the earth's crust than mercury or cadmium, and it is more toxic to plants than to animals (Demayo et al. 1979). It does not appear to biomagnify through different trophic levels, and demersal species are more likely to accumulate arsenic than pelagic fish (Demayo et al. 1979). Arsenic concentrates mainly in the liver and is a cumulative toxin (Falk et al. 1973).

Detectable concentrations of arsenic (>0.05 µg/g) were recorded in 91% of lake trout liver samples, but only 43% of lake trout muscle samples. Mean concentrations of arsenic in liver tissue samples were higher in the Control Lake (0.38 µg/g and 1.76 µg/g in Carat Lake and Control Lake, respectively). Arsenic levels in muscle tissue samples were lower than those in livers; mean concentrations were 0.09 µg/g in the Carat Lake sample and 0.07 µg/g in the Control Lake sample. The maximum arsenic concentration was recorded from a liver tissue sample collected in Control Lake (7.50 µg/g).

Arsenic concentrations recorded in round whitefish tissues were also low. Detectable concentrations of arsenic were recorded in 88% of round whitefish liver samples, and in muscle tissues, 31% of samples exceeded the detection limit. Mean arsenic levels in liver tissue samples were highest in Control Lake (2.46 µg/g versus 0.28 µg/g). Mean values in muscle tissues were 0.09 µg/g and 0.03 µg/g in Carat and Control Lake samples, respectively. The maximum arsenic concentration was recorded in a round whitefish liver tissue sample from Control Lake (8.25 µg/g).

3.7.3 Cadmium

Cadmium does not bioaccumulate in the food web (Reeder et al. 1979a). The rate of cadmium uptake is generally faster in hard waters, although cadmium toxicity decreases in hard water (Reeder et al. 1979a).

Detectable concentrations of cadmium (greater than 0.05 μg/g) were recorded in all lake trout liver samples, but were detected in only 6% of lake trout muscle samples. Mean cadmium levels in liver samples were similar among lakes (2.61 μg/g and 2.65 μg/g from Carat and Control Lakes, respectively). In muscle samples mean concentrations did not exceed 0.03 μg/g. The maximum recorded cadmium concentration in lake trout liver samples was 5.99 μg/g (Carat Lake).

Cadmium concentrations in round whitefish were low. Detectable concentrations of cadmium were recorded in all round whitefish liver samples; detectable levels were not recorded in muscle tissue samples. The mean cadmium level in liver tissue samples were similar in Carat and Control Lakes (0.66 μg/g and 0.69 μg/g, respectively). The maximum recorded concentration in round whitefish liver tissue was 2.06 μg/g (Carat Lake).

3.7.4 Copper

In contrast to the nonessential trace metals (e.g., arsenic, cadmium, mercury, lead), copper is important for biochemical functions; however, excess amounts of copper are toxic to freshwater fish (Förstner and Wittman 1979). The toxicity of copper varies with the species of fish and with ambient water characteristics (e.g., pH and alkalinity). Copper is not considered to be a cumulative systematic poison as most of it is excreted from the body (Falk et al. 1973). The main areas of the body where it concentrates are the liver, muscle, and brain tissues (Demayo and Taylor 1981).

Detectable concentrations of copper (>0.05 μg/g) were recorded in all of lake trout liver and muscle samples. Mean copper levels in liver tissue samples were highest from Control Lake (89.76 μg/g versus 81.50 μg/g), whereas mean copper levels in lake trout muscle tissues were highest in Carat Lake (0.93 μg/g versus 0.78 μg/g). The maximum recorded copper concentrations in lake trout tissue were 232.00 μg/g (liver sample from Control Lake) and 3.78 μg/g (muscle sample from Control Lake).

Detectable concentrations of copper were recorded in all round whitefish samples. Mean copper levels in liver samples were 7.97 μg/g (Carat Lake) and 9.89 μg/g (Control Lake). For muscle tissues, levels were 1.06 μg/g in the Carat Lake sample and 0.99 μg/g in the Control Lake sample. Maximum recorded copper concentrations in round whitefish were 25.40 μg/g (liver sample from Control Lake) and 1.56 μg/g (muscle sample from Carat Lake).

3.7.5 Lead

Lead tends to deposit in bone as a cumulative toxin (Falk et al. 1973). It is more toxic in soft water than in hard water (Demayo et al. 1980).

Lead concentrations in the lake trout tissue samples were low. Detectable concentrations of lead (>0.05 µg/g) were recorded in only 31% of lake trout liver samples, and in 24% of the muscle samples. Mean lead levels in liver samples were 0.04 µg/g in Carat Lake and 0.07 µg/g in Control Lake. The mean lead level in the Control Lake muscle sample was 0.10 µg/g; detectable concentrations of lead were not recorded from the Carat Lake muscle tissue sample. The maximum recorded lead concentration in lake trout tissue was 0.41 µg/g (liver sample from Control Lake).

Detectable concentrations of lead were recorded in 23% of round whitefish liver samples and in 33% of the muscle tissue samples. Highest mean lead levels in liver tissue samples occurred in fish from Control Lake (0.12 µg/g versus 0.04 µg/g). Detectable concentrations of lead were not recorded in round whitefish muscle tissues collected from Carat Lake. The mean concentration recorded in Control Lake was 0.14 µg/g. The maximum recorded lead concentrations in round whitefish tissues were 0.71 µg/g (liver sample from Control Lake) and 0.26 µg/g (muscle sample from Control Lake).

3.7.6 Mercury

Mercury in fish tissue is most commonly present in the form of methyl mercury. Because there are several types of mercury potentially present in the environment, total mercury is the form recommended for setting guidelines (Reeder et al. 1979b). The maximum allowable level of mercury in muscle tissue of fish sold in Canada for human consumption is 0.5 µg/g (wet weight), which is comparable to approximately 2.5 µg/g when expressed on a "dry weight" basis (assuming 80% moisture content).

Mercury concentrations were above the detection limit (>0.005 µg/g) in all lake trout tissue samples. The mean mercury levels in lake trout liver tissues were 2.803 µg/g in Carat Lake and 0.501 µg/g in Control Lake. Mean mercury values in muscle tissue samples were similar (1.074 µg/g in Carat Lake and 0.925 µg/g in Control Lake). None of the 42 lake trout muscle samples had mercury levels equal to or higher than allowed for human consumption (2.5 µg/g). The maximum mercury concentrations documented in individual fish were 4.760 µg/g in a Carat Lake liver sample and 2.140 µg/g in a Control Lake muscle sample.

In round whitefish, most tissues contained detectable levels of mercury (95% of liver and 92% of muscle samples), however, concentrations were considerably lower. In liver tissue, mean values were (0.843 µg/g in Carat Lake and 0.248 µg/g in Control Lake). Concentrations in muscle tissue were similar (0.501 µg/g in Carat Lake and 0.278 µg/g in Control Lake). The highest mercury levels recorded in round whitefish tissues were 1.720 µg/g (liver sample from Carat Lake) and 0.891 µg/g (muscle sample from Carat Lake).

3.7.7 Nickel

The toxicity of nickel rises with decreasing water hardness and increasing acidity (CCREM 1987); it also increases when nickel is present with copper, which is likely a result of synergism (Taylor et al. 1979). Nickel has the greatest effect on the early life stages of fish, including fertilized eggs, but it does not biomagnify in the food web (Taylor et al. 1979). Hutchinson et al. (1975) reported that nickel concentrations were highest in plants and lowest in predators situated in the upper levels of the food chain.

The level of nickel in lake trout tissues generally was low. Detectable concentrations of nickel (>0.1 μg/g) were recorded in 38% of liver samples and 12% of the muscle samples; however, levels were at or near detection limits in both Carat Lake and Control Lake samples. Maximum nickel concentrations in lake trout tissues were 3.2 μg/g (liver sample from Carat Lake), and 0.6 μg/g (muscle sample from Carat Lake).

Detectable concentrations of nickel were recorded in 45% of round whitefish liver samples and 3% of muscle tissue samples. Similar to findings for lake trout, mean levels for both lakes and were at detection limits (0.1 μg/g for liver and muscle tissues). Maximum nickel concentrations in round whitefish tissues were 0.4 μg/g (liver sample from Carat Lake), and 0.2 μg/g (muscle sample from Carat Lake).

3.7.8 Zinc

Zinc primarily affects gill epithelial tissues. In excessive amounts, it can cause immediate mortality or it can induce delayed mortality by stressing the animal (Falk et al. 1973). However, zinc is essential for plant and animal health. The toxicity of zinc rises with increasing pH and decreasing water hardness. Zinc concentrations are usually greater in omnivorous than in piscivorus species, and greater in benthic invertebrates than in fish (CCREM 1987).

Zinc concentrations in lake trout tissues were similar among the study lakes. Mean levels in the liver tissues were 152.62 μg/g in Carat Lake and 151.57 μg/g in Control Lake samples; mean levels in the muscle tissues were 14.47 μg/g and 12.15 μg/g, respectively. Maximum recorded zinc concentrations in lake trout tissues were 226.00 μg/g (liver sample from Carat Lake), and 19.60 μg/g (muscle sample from Carat Lake).

Zinc concentrations in round whitefish tissues were lower than levels recorded in lake trout samples. Mean levels in the liver tissues were 82.36 μg/g in Carat Lake and 95.34 μg/g in Control Lake; mean levels in muscle tissues were 14.31 μg/g and 13.17 μg/g. Maximum recorded zinc concentrations in round whitefish from the Mine Operation Zone were 162.00 μg/g (liver sample from Control Lake), and 17.50 μg/g (muscle sample from Carat Lake).

SECTION 3 - TABLES

Table 3.1.1 Morphometric characteristics[a] of surveyed lakes within the Mine Operation Zone, Jericho study area, 1996.

Lake	Surface Area (ha)	Lake Volume (m)	Mean Depth (m)	Maximum Depth (m)	Shoreline Length (m)	Shoreline Development Ratio
Lake C1	2.77	-	-	9.0	700	1.19
Carat Lake[b]	268.99	2.894×10^7	10.8	32.0	11850	2.04
Interbasin Two	19.44	-	-	11.0	1850	1.18
Interbasin One	58.33	-	-	11.0	4900	1.81
Jericho Lake	69.44	-	-	15.0	5650	1.91

[a] Unless otherwise stated, morphometric characteristics are based on measurements from a 1:50 000 NTS map and field observations.
[b] Morphometric characteristics (with the exception of shoreline length) provided by Canamera Geological Ltd.

Table 3.1.2 Canadian Water Quality dissolved oxygen guidelines for the protection of freshwater fish.

Fish Type[a]	Life Stage[b]	Criteria (mg/ml)
Cold Water	early life stage all other life stages	9.5 6.5
Warm Water	early life stage all other life stages	6.0 5.0

[a] Cold-water fish are defined as those species that prefer summer water temperatures ranging from 10 to 18°C and Warm-water fish are those species that prefer summer water temperatures of 18 to 26°C (Nelson and Paetz 1992).
[b] Early life stage encompasses the period from spawning to 30 days after hatching.
Source: CCME (1996).

Table 3.2.1 Phytoplankton biovolume in sampled lakes during summer and fall within the Mine Operation Zone, Jericho study area, 1996.

Taxonomic Group	Carat Lake (Site PL1-1)				Carat Lake (Site PL1-2)				Jericho Lake (Site PL2)			
	Summer		Fall		Summer		Fall		Summer		Fall	
	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%
Bacillariophyta (diatoms)	19 890	6.9	117 420	26.4	14 395	5.5	105 650	17.7	22 220	10.2	127 329	17.4
Cryptophyta (cryptomonads)	17 989	6.2	24 488	5.5	32 362	12.5	33 761	5.7	233	0.1	27 605	3.8
Chrysophyta (golden-brown algae)	147 820	51.2	225 758	50.8	142 723	55.0	291 937	49.0	140 136	64.6	405 499	55.5
Pyrrophyta (dinoflagellates)	20 247	7.0	4197	0.9	37 363	14.4	92 247	15.5	3684	1.7	29 015	4.0
Euglenophyta (euglenoid)							5262	0.9				
Chlorophyta (green algae)	64 627	22.4	51 908	11.7	22 023	8.5	51 403	8.6	25 307	11.7	114 375	15.7
Cyanophyta (cyanobacteria)	18 346	6.3	20 477	4.6	10 753	4.1	15 533	2.6	25 257	11.6	26 975	3.7
Total Biovolume	**288 919**	**100**	**444 248**	**100**	**259 619**	**100**	**595 793**	**100**	**216 837**	**100**	**730 798**	**100**

Table 3.2.2 Zooplankton biomass in sampled lakes during summer and fall within the Mine Operation Zone, Jericho study area, 1996.

Taxonomic Group	Carat Lake (Site PL1-1)				Carat Lake (Site PL1-2)				Jericho Lake (Site PL2)			
	Summer		Fall		Summer		Fall		Summer		Fall	
	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%
Copepoda Calanoida	33 912	2.9	6436	22.3	15 715	0.9	17 911	19.7	1995	20.8	17 348	16.2
Cyclopoida	20 788	1.8	21 179	73.3	1800	0.1	50 309	55.3	3530	36.9	1017	1.0
Cladocera	1 116 251	95.0			1 751 438	99.0	21 430	23.6	3311	34.6	88 358	82.7
Rotifera	3480	0.3	1278	4.4	697	<0.1	1317	1.4	734	7.7	147	0.1
Total Biomass	**1 174 432**	**100**	**28 892**	**100**	**1 769 649**	**100**	**90 966**	**100**	**9570**	**100**	**106 869**	**100**

Table 3.4.1 Mean density[a] (±1 standard error) of benthic macroinvertebrates in the littoral and profundal zones[b] of selected lakes within the Mine Operation Zone, Jericho study area, 1996.

Taxonomic Group	Carat Lake				Jericho Lake	
	Littoral (Site L1-1)	Profundal (Site P1-1)	Littoral (Site L1-2)	Profundal (Site P1-2)	Littoral (Site L2)	Profundal (Site P2)
ANNELIDA						
OLIGOCHAETA	478 (419)	29 (29)	1232 (653)		638 (583)	348 (326)
ARTHROPODA						
HYDRACHNIDIA	14 (14)	14 (14)	14 (14)		130 (25)	14 (14)
CRUSTACEA						
COPEPODA						
Harpacticoida	1058 (906)	29 (29)	188 (72)	14 (14)	522 (219)	29 (29)
OSTRACODA					377 (210)	130 (109)
INSECTA						
DIPTERA						
Chironomidae[c]	767 (725)	391 (262)	855 (698)	216 (196)	6782 (3037)	1912 (605)
Chironomini			14 (14)	29 (29)	1058 (1036)	1507 (348)
Diamesinae				14 (14)		
Orthocladiinae	565 (523)	348 (219)	319 (304)	145 (125)	3072 (1448)	217 (110)
Tanypodinae	14 (14)	14 (14)		14 (14)		
Tanytarsini	188 (188)	29 (29)	522 (380)	14 (14)	2652 (553)	188 (147)
TRICHOPTERA						
Limnephilidae						
Gresnia			14 (14)			
MICROTURBELLARIA	29 (29)					
MOLLUSCA						
PELECYPODA						
Sphaeriidae		174 (115)		29 (29)		58 (58)
NEMATODA	928 (331)	43 (25)	2725 (1243)		2391 (489)	
Total No. Benthic Taxa/m²	**9 (2)**	**7 (1)**	**9 (2)**	**5 (1)**	**19 (1)**	**9 (2)**
Total No. of Benthic Invertebrates/m²	**3319 (1254)**	**710 (258)**	**5101 (2080)**	**275 (129)**	**12 420 (1803)**	**2536 (318)**

[a]Mean density (No./m^2) value and standard error generated using three replicate samples.
[b]For definition of littoral and profundal zones see Section 2.2.5.
[c]Sum of all subfamilies and tribes.

Table 3.4.2 Mean density[a] (±1 standard error) of dominant benthic macroinvertebrates in selected streams within the Mine Operation Zone, Jericho study area, 1996.

Taxonomic Group	Stream C1 (Site B1)	Stream C15 (Site B2)	Jericho River (Site B4)
COELENTERATA		487 (138)	14 (7)
Hydridae			
Hydra			
ANNELIDA			
OLIGOCHAETA	573 (377)	602 (173)	222 (127)
ARTHROPODA			
HYDRACHNIDIA	32 (32)		75 (39)
CRUSTACEA			
COPEPODA			
Harpacticoida	36 (26)	29 (7)	29 (29)
OSTRACODA		61 (29)	197 (74)
INSECTA			
DIPTERA			
Chironomidae[b]	54 (39)	215 (126)	490 (289)
Chironomini			104 (68)
Diamesinae		18 (18)	32 (32)
Orthocladiinae	54 (39)	179 (93)	125 (94)
Tanypodinae		7 (4)	118 (53)
Tanytarsini		11 (11)	111 (42)
Empididae	7 (7)	7 (7)	
Simulidae	68 (19)		4 (4)
Tipulidae		151 (44)	29 (4)
PLECOPTERA			
Perlodidae		14 (4)	
Nemouridae			18 (13)
TRICHOPTERA			
Limnephilidae			
Gresnia		4 (4)	
MICROTURBELLARIA		7 (7)	
NEMATODA	1330 (863)	219 (56)	111 (9)
Total No. Benthic Taxa/m^2	**7 (2)**	**20 (2)**	**24 (3)**
Total No. of Benthic Invertebrates/m^2	**2104 (1337)**	**1821 (473)**	**1387 (526)**

[a]Mean density (No./m^2) value and standard error generated using three replicate samples.
[b]Sum of all subfamilies and tribes.

Table 3.5.1 Overall species composition of fish sampled from lakes within the Mine Operation Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species		Total	
Common Name	**Scientific Name**	**Number**	**Percent**
Arctic char	*Salvelinus alpinus* (Linnaeus)	67	19.3
Burbot	*Lota lota* (Linnaeus)	1	0.3
Lake trout	*Salvelinus namaycush* (Walbaum)	235	67.5
Round whitefish	*Prosopium cylindraceum* (Pallas)	42	12.1
Slimy sculpin[a]	*Cottus cognatus* Richardson	3	0.9
All Species Combined		**348**	**100.0**

[a]Species designation based on identification of a subsample of preserved individuals (n=2).

Table 3.5.2 Species composition of fish sampled from individual lakes within the Mine Operation Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species	Lake C1		Carat Lake		Interbasin One		Interbasin Two		Jericho Lake	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Arctic char			20	11.4	9	22.5			38	44.2
Burbot									1	1.2
Lake trout	12	100.0	124	70.9	21	52.5	31	88.6	47	54.7
Round whitefish			31	17.7	8	20.0	3	8.6		
Slimy sculpin					2	5.0	1	2.9		
Total	**12**	**100.0**	**175**	**100.0**	**40**	**100.0**	**35**	**100.0**	**86**	**100.0**

Table 3.5.3 Overall species composition of fish sampled from streams within the Mine Operation Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species		Total	
Common Name	**Scientific Name**	**Number**	**Percent**
Arctic char	*Salvelinus alpinus* (Linnaeus)	75	10.8
Arctic grayling	*Thymallus arcticus* (Pallas)	329	47.5
Burbot	*Lota lota* (Linnaeus)	47	6.8
Lake trout	*Salvelinus namaycush* (Walbaum)	25	3.6
Ninespine stickleback	*Pungitius pungitius* (Linnaeus)	126	18.2
Round whitefish	*Prosopium cylindraceum* (Pallas)	17	2.5
Slimy sculpin[a]	*Cottus cognatus* Richardson	74	10.7
All Species Combined		**693**	**100**

[a]Species designation based on identification of a subsample of preserved individuals (n=5).

Table 3.5.4 Species composition of fish sampled from streams in four areas within the Mine Operation Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species	Carat Lake Streams		Interbasin Streams		Jericho River Streams			
					Upper		Lower	
	No.	%	No.	%	No.	%	No.	%
Arctic char	68	24.7	1	5.9	6	2.8		
Arctic grayling	105	38.2	10	58.8	68	31.9	146	77.7
Burbot	13	4.7	1	5.9	33	15.5		
Lake trout	16	5.8	1	5.9	8	3.8		
Ninespine stickleback					88	41.3	38	20.2
Round whitefish	8	2.9			7	3.3	2	1.1
Slimy sculpin	65	23.6	4	23.5	3	1.4	2	1.1
Total	**275**	**100.0**	**17**	**100.0**	**213**	**100.0**	**188**	**100.0**

Table 3.5.5 Length-weight regression equations and mean condition factors for lake trout sampled during summer from lakes within the Mine Operation Zone, Jericho study area, 1996.

Lake	Length-weight Relationship		Condition Factor (±SE)	Sample Size
	Regression Equation[a]	r^2 Value		
Carat Lake	Weight = $4.375 * 10^{-6} *$ Fork Length$^{3.145}$	0.968	1.049 ± 0.026	68
Interbasin Lakes	Weight = $7.277 * 10^{-6} *$ Fork Length$^{3.068}$	0.982	1.093 ± 0.043	42
Jericho Lake	Weight = $8.336 * 10^{-6} *$ Fork Length$^{3.034}$	0.992	1.026 ± 0.031	21

[a]Weight in g; fork length in mm.

Table 3.5.6 Age-length relationships for Arctic char, Arctic grayling, lake trout, and round whitefish sampled from selected waterbodies within the Mine Operation Zone, Jericho study area, 1996.

Age	Lake trout[a]					Arctic char[a]					Round whitefish[c]					Arctic grayling[b]				
	Fork Length (mm)		Weight (g)		n	Fork Length (mm)		Weight (g)		n	Fork Length (mm)		Weight (g)		n	Fork Length (mm)		Weight (g)		n
	Mean	Range	Mean	Range		Mean	Range	Mean	Range		Mean	Range	Mean	Range		Mean	Range	Mean	Range	
0						44	37 - 52			6						41	29-48			4
1	85		5		1	91	70 - 113	10	5-14	4	81	74-88	5	4-6	2	110	95-123	14	6-20	7
2											108		10		1	136	114-172	26	8-60	23
3						184	142 - 225	115		2						176	171-181	56	54-58	2
4																258		202		1
5																				
6						334	314 - 360	412	335-495	3	340		490		1					
7											316		400		1					
8											358		600		1					
9						547		1650		1										
10						491	466 - 515	1208	1175-1240	2	424		940		1					
11	428		940		1	594	565 - 623	2275	2000-2550	2										
12						460		1120		1	396		690		1					
13	439		900		1						464		1150		1					
14	415	410-420	865	780-950	2															
15	421		950		1						450	445-455	1268	1160-1375	2					
16	485		1480		1						459	455-462	1175	1050-1300	2					
17											461		1375		1					
18																				
19																				
20	465		1160		1															
21	464	439-488	1465	1350-1580	2						480	475-484	1255	1200-1310	2					
22	496	481-520	1399	1280-1500	5						485		1500		1					
23											466	455-477	1127	1100-1150	3					
24	546		1960		1						473		1380		1					
25	527	475-619	1700	1200-2250	3						469		1200		1					
26	580		2300		1						532		1495		1					
27																				
28																				
29	488		1200		1						407		1260		1					

[a]Ages generated using fish sampled during summer from Carat Lake and associated streams.
[b]Ages generated using fish sampled during summer and fall from all lakes and streams within zone.
[c]Ages generated using fish sampled during summer and fall from Carat Lake.

Table 3.5.7 Length-weight regression equations and mean condition factors for Arctic char sampled during summer from lakes within the Mine Operation Zone, Jericho study area, 1996.

Lake	Length-weight Relationship		Condition Factor (±SE)	Sample Size
	Regression Equation[a]	r^2 Value		
Carat Lake	Weight = 5.309 * 10^{-5} * Fork Length$^{2.725}$	0.946	1.009 ± 0.047	15
Jericho Lake	Weight = 1.300 * 10^{-4} * Fork Length$^{2.586}$	0.934	1.212 ± 0.091	21

[a]Weight in g; fork length in mm.

Table 3.5.8 Number of lake trout and Arctic char marked (and recaptured in 1996) in lakes within the Mine Operation Zone, Jericho study area during 1995 and 1996.

Waterbody	1995		1996		Total	
	Lake trout	Arctic char	Lake trout	Arctic char	Lake trout	Arctic char
Carat Lake	27	7	39 (2)	6 (0)	66 (2)	13 (0)
Jericho Lake	30	8	12 (0)	9 (3)	42 (0)	17 (3)
Interbasin One	-	-	7 (0)	4 (2)	7 (0)	4 (2)
Interbasin Two	-	-	1 (0)	0 (0)	1 (0)	0 (0)
Total	**57**	**15**	**59 (2)**	**19 (5)**	**116 (2)**	**34 (5)**

Table 3.5.9 Surface areas and potential annual harvests of lake trout populations in lakes within the Mine Operation Zone, Jericho study area, 1996.

Lake	Surface Area (ha)[a]	Potential Harvest of Lake Trout (kg/yr)[b]
Carat Lake	269.0	223.6
Jericho Lake	69.4	84.3
Interbasin One	58.3	74.4
Interbasin Two	19.4	33.7
Lake C1	2.8	8.4

[a]Lake surface area provided by Canamera Geological Ltd. (Carat Lake) or measured from 1:50 000 scale N.T.S. maps.
[b]Based on Evan's formula for harvest.

Table 3.6.1 Summary of lakeshore habitat characteristics recorded for sampled waterbodies within the Mine Operation Zone, Jericho study area, 1996.

Habitat Zone[a]		Carat Lake		Interbasin One		Interbasin Two		Jericho Lake		Lake C1	
Slope	**Substrate**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**
Low	Fines	914	10.7	992	35.2	2005	64.4	430	10.9		
	Cobble-Boulder	4737	55.5	645	22.9	942	30.3	1184	30.1	137	35.7
	Bedrock										
Moderate	Fines			325	11.6	165	5.3	110	2.8		
	Cobble-Boulder	2652	31	485	17.2					247	64.3
	Bedrock										
High	Fines										
	Cobble-Boulder	238	2.8	370	13.1			265	6.7		
	Bedrock							1948	49.5		
Total		**8540**	**100**	**2817**	**100**	**3112**	**100**	**3936**	**100**	**384**	**100**

[a]For definition of habitat zones see Appendix A1.

Table 3.6.2 Summary of habitat characteristics[a] of inventoried streams within the Mine Operation Zone, Jericho study area, 1996.

Area	Stream	Surveyed Length (m)	Average Width (m)	Discharge[b] (m^3/s)	Slope (%)	Channel Type (%)		Bank Type (%)		Habitat Type (%)						Substrate Type (%)				
						Single	Multiple	Distinct	Indistinct	Pool	Run	Flat	Cascade	Riffle/ Rapid	Dispersed	Si/Sa	Gr	Co	Bo	Bed
Carat L.	C1[c]	454	1.6	0.004	2.0	22	78	22	78		24			76		7	17	50	27	
	C2[c]	300	0.5	0.001	5.0		100		100					100			40	50	10	
	C2A	100	0.5	0.001	2.5	80	20	60	40	30	70					69	10	14	7	
	C4[c]	800	0.6	N/D[d]	1.5	28	72	73	27	5	95					72	5	3	20	
	C6[c]	150	0.4	0.012	4.0	100		100			77	23					3	15	82	
Interbasin	C10	50	0.3	0.000	0.5		100		100						100	100				
	C12	50	0.4	0.000	0.5		100		100						100	100				
	C13	50	0.3	0.000	0.5		100		100						100	100				
	C15	150	35.0	N/D	0.5	100		100			65	20		10		70	5	10	15	
Jericho R. (Upper)	O1[c]	369	0.4	0.005	1.0	37	63	32	68	2	98					83	4	8	5	
	O2[c]	529	0.9	0.001	2.0	100		6	94	6	94					90	2	2	6	
	O3[c]	150	0.4	0.000	1.5	100		100			100					50	10	30	10	
	O4[c]	347	1.0	0.005	4.0	4	96	4	96	4	71			25		53	1	13	33	
	O7A[c]	1715	37.9	N/D	1.5	93	7	100			7	79	7	7		26		41	27	6
	O8[c]	224	1.7	N/D	1.5	100		15	85	2	75			23		17	42	33	9	
Jericho R. (lower)	O7B	2500	35.0	N/D	1.5	95	5	100		5	45	30		20		30	10	15	35	10
	O23	50	0.6	0.000	1.0	100		100				100				85		5	10	
	O24	350	0.6	0.016	1.5	100		100			55	35		10		65	10	5	20	
	O25	680	0.8	0.025	1.5	75	25	75	25	10	60	5			25	20	5	5	70	
	O26	200	2.0	0.043	1.5	100		100		50	50					85	5	5	5	
	O27	100	1.5	0.054	1.0	95	5	100		25	55		20			15	70	10	5	

[a]For classification system see Appendix A.
[b]Discharge measured during summer
[c]Habitat data collected during 1995 study; discharge measured during 1996.
[d]N/D=no data.

Table 3.6.3 Number of fish recorded in sampled streams according to age-class within the Mine Operation Zone, Jericho study area 1996 (all sampling methods and periods combined).

Area	Tributary	Species	Age-Class[a]			
			Young-of-the-year	Juvenile	Adult	Combined
Carat Lake	C1	Arctic char	41	7		48
		Lake trout		9		9
		Round whitefish		8		8
		Slimy sculpin				9
	C2	Arctic char	3	7		10
		Lake trout		2		2
		Slimy sculpin				4
	C2A	Arctic char	8	1		9
		Slimy sculpin				2
	C4	Arctic char		1		1
		Lake trout		5		5
		Slimy sculpin				23
	C6	Arctic grayling	67	38		105
		Burbot	12	1		13
		Slimy sculpin				27
Interbasin	C10	Arctic char	1			1
	C12	Burbot		1		1
		Slimy sculpin				3
	C13	Slimy sculpin				1
	C15	Arctic grayling		9	1	10
		Lake trout			1	1
Jericho River (Upper)	O1	Arctic char	1			1
		Arctic grayling	2	7		9
		Burbot	27	2		29
		Ninespine stickleback				74
		Slimy sculpin				1
	O2	Arctic grayling		3		3
		Burbot	4			4
		Ninespine stickleback				14
	O3	Arctic char		2		2
		Arctic grayling		1		1
	O4	Arctic char		2		2
		Arctic grayling	1	6	1	8
	O7A	Arctic char			1	1
		Arctic grayling	9	26	5	40
		Lake trout		2	6	8
		Round whitefish		7		7
		Slimy sculpin				1
	O8	Arctic grayling	5	2		7
		Slimy sculpin				1
Jericho River (Lower)	O7B	Arctic grayling	23	30	1	54
		Round whitefish		2		2
	O23	Arctic grayling	2			2
	O24	Arctic grayling	32		1	33
	O25	Arctic grayling	39	1		40
		Ninespine stickleback				13
	O26	Arctic grayling	14	1		15
		Ninespine stickleback				24
	O27	Arctic grayling	2			2
		Ninespine stickleback				1
		Slimy sculpin				2

[a]Age-class designations based on size differences of fish for each species.

Table 3.6.4 Fish habitat quality ratings for sampled streams within the Mine Operation Zone, Jericho study area, 1996.

Area	Stream	Rating of Habitat Quality[a]		
		Spawning	Rearing	Feeding
Carat Lake	C1	Low	Moderate	Nil
	C2	Nil	Low	Nil
	C2A	Nil	Low	Nil
	C4	Low	Low	Nil
	C6	Moderate	Moderate	Nil
Interbasin	C10	Nil	Low	Nil
	C12	Nil	Low	Nil
	C13	Nil	Low	Nil
	C15	Moderate	Low	Moderate
Jericho River (Upper)	O1	Moderate	Moderate	Nil
	O2	Low	Moderate	Low
	O3	Low	Low	Nil
	O4	Low	Moderate	Nil
	O7A	Low	Moderate	High
	O8	Moderate	Moderate	Low
Jericho River (Lower)	O7B	Moderate	Moderate	Low
	O23	Nil	Low	Nil
	O24	High	Moderate	Low
	O25	Moderate	Moderate	Low
	O26	Low	Moderate	Low
	O27	High	Moderate	Low

[a]Rating of habitat quality based on qualitative assessment of stream habitat and fish numbers recorded during survey.

Table 3.7.1 Number, mean length, and size range of fish collected for kidney, liver, and muscle tissue analyses within the Mine Operation Zone, Jericho study area, 1996.

Lake	Species	Sample Size	Fork Length (mm)			
			Mean	Standard Deviation	Minimum	Maximum
Carat Lake	Lake trout	21	485	52.3	410	619
	Round whitefish	20	449	44.8	340	532
Control Lake	Lake trout	21	427	25.7	400	486
	Round whitefish	20	395	43.9	321	441

Table 3.7.2 Mean concentrations of metals in lake trout tissue samples within the Mine Operation Zone, Jericho study area, 1996.

Lake	Tissue	Parameter	Metal Concentrations (μg/g of dry weight)							
			Al (1)[c]	**As (0.05)**	**Cd (0.05)**	**Cu (0.05)**	**Pb (0.05)**	**Hg (0.005)**	**Ni (0.1)**	**Zn (0.05)**
Carat	Liver	n < D.L.[a]	0	4	0	0	16	0	14	0
	n=21	**Mean (μg/g)**	**21**	**0.38**	**2.61**	**81.50**	**0.04**	**2.803**	**0.4**	**152.62**
		Sd[b] (μg/g)	17	0.27	1.63	52.15	0.04	1.155	0.7	32.66
		Min. (μg/g)	2	0.03	0.63	11.40	0.03	0.240	0.1	102.00
		Max. (μg/g)	72	0.95	5.99	213.00	0.19	4.760	3.2	226.00
	Muscle	n < D.L.[a]	21	9	19	0	21	0	17	0
	n=21	**Mean (μg/g)**	**1**	**0.09**	**0.03**	**0.93**	**0.03**	**1.074**	**0.1**	**14.47**
		Sd[b] (μg/g)	0	0.09	0.02	0.20	0.00	0.486	0.1	1.64
		Min. (μg/g)	1	0.03	0.03	0.62	0.03	0.400	0.1	12.60
		Max. (μg/g)	1	0.40	0.13	1.53	0.03	2.100	0.6	19.60
Control	Liver	n < D.L.[a]	0	0	0	0	13	0	12	0
	n=21	**Mean (μg/g)**	**20**	**1.76**	**2.65**	**89.76**	**0.07**	**0.501**	**0.1**	**151.57**
		Sd[b] (μg/g)	12	1.68	1.24	56.72	0.10	0.572	0.1	28.99
		Min. (μg/g)	5	0.31	1.26	4.34	0.03	0.070	0.1	99.00
		Max. (μg/g)	47	7.50	6.16	232.00	0.41	2.120	0.6	211.00
	Muscle	n < D.L.[a]	21	15	21	0	11	0	20	0
	n=21	**Mean (μg/g)**	**1**	**0.07**	**0.03**	**0.78**	**0.10**	**0.925**	**0.1**	**12.15**
		Sd[b] (μg/g)	0	0.10	0	1.78	0.08	0.341	0.1	1.66
		Min. (μg/g)	1	0.03	0.03	2.78	0.03	0.528	0.1	8.45
		Max. (μg/g)	1	0.48	0.03	3.78	0.24	2.140	0.4	15.00

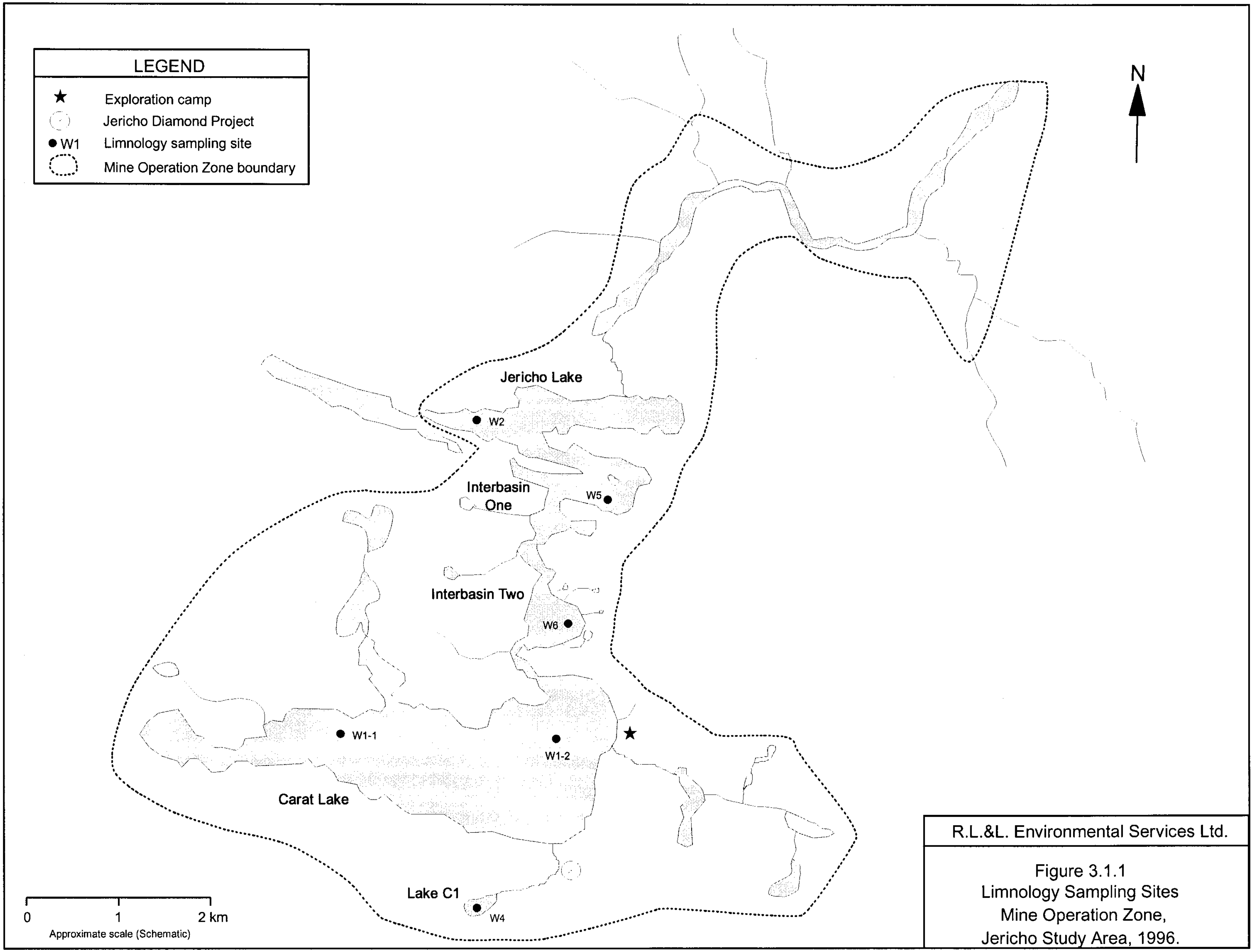
[a]Number of samples below detection limit.
[b]Standard deviation.
[c]Detection limit.

Table 3.7.3 Mean concentrations of metals in round whitefish tissue samples within the Mine Operation Zone, Jericho study area, 1996.

Lake	Tissue	Parameter	Metal Concentrations (μg/g of dry weight)							
			Al (1)[c]	**As (0.05)**	**Cd (0.05)**	**Cu (0.05)**	**Pb (0.05)**	**Hg (0.005)**	**Ni (0.1)**	**Zn (0.05)**
Carat	Liver	n < D.L.[a]	2	5	0	0	18	1	13	0
	n=20	**Mean (μg/g)**	**9**	**0.28**	**0.66**	**7.97**	**0.04**	**0.843**	**0.1**	**82.36**
		Sd[b] (μg/g)	9	0.19	0.48	1.64	0.04	0.427	0.1	15.10
		Min. (μg/g)	1	0.03	0.09	4.85	0.03	0.003	0.1	57.40
		Max. (μg/g)	31	0.62	2.06	10.50	0.19	1.720	0.4	112.00
	Muscle	n < D.L.[a]	15	6	16	0	16	2	15	0
	n=16	**Mean (μg/g)**	**1**	**0.09**	**0.03**	**1.06**	**0.03**	**0.501**	**0.1**	**14.31**
		Sd[b] (μg/g)	0	0.06	0	0.17	0	0.266	0	1.44
		Min. (μg/g)	1	0.03	0.03	0.87	0.03	0.003	0.1	12.20
		Max. (μg/g)	2	0.23	0.03	1.56	0.03	0.891	0.2	17.50
Control	Liver	n < D.L.[a]	0	0	0	0	13	1	9	0
	n=20	**Mean (μg/g)**	**8**	**2.46**	**0.69**	**9.89**	**0.12**	**0.248**	**0.1**	**95.34**
		Sd[b] (μg/g)	7	2.75	0.44	4.92	0.20	0.241	0.1	24.91
		Min. (μg/g)	3	0.23	0.13	6.00	0.03	0.003	0.1	68.70
		Max. (μg/g)	29	8.25	1.64	25.40	0.71	0.800	0.3	162.00
	Muscle	n < D.L.[a]	20	19	20	0	8	1	20	0
	n=20	**Mean (μg/g)**	**1**	**0.03**	**0.03**	**0.99**	**0.14**	**0.278**	**0.1**	**13.17**
		Sd[b] (μg/g)	0	0.01	0	0.21	0.10	0.124	0	1.38
		Min. (μg/g)	1	0.03	0.03	0.68	0.03	0.003	0.1	10.60
		Max. (μg/g)	1	0.07	0.03	1.30	0.26	0.462	0.1	16.60

[a]Number of samples below detection limit.
[b]Standard deviation.
[c]Detection limit.

SECTION 3 - FIGURES



R.L.&L. Environmental Services Ltd.

Figure 3.1.1
Limnology Sampling Sites
Mine Operation Zone,
Jericho Study Area, 1996.

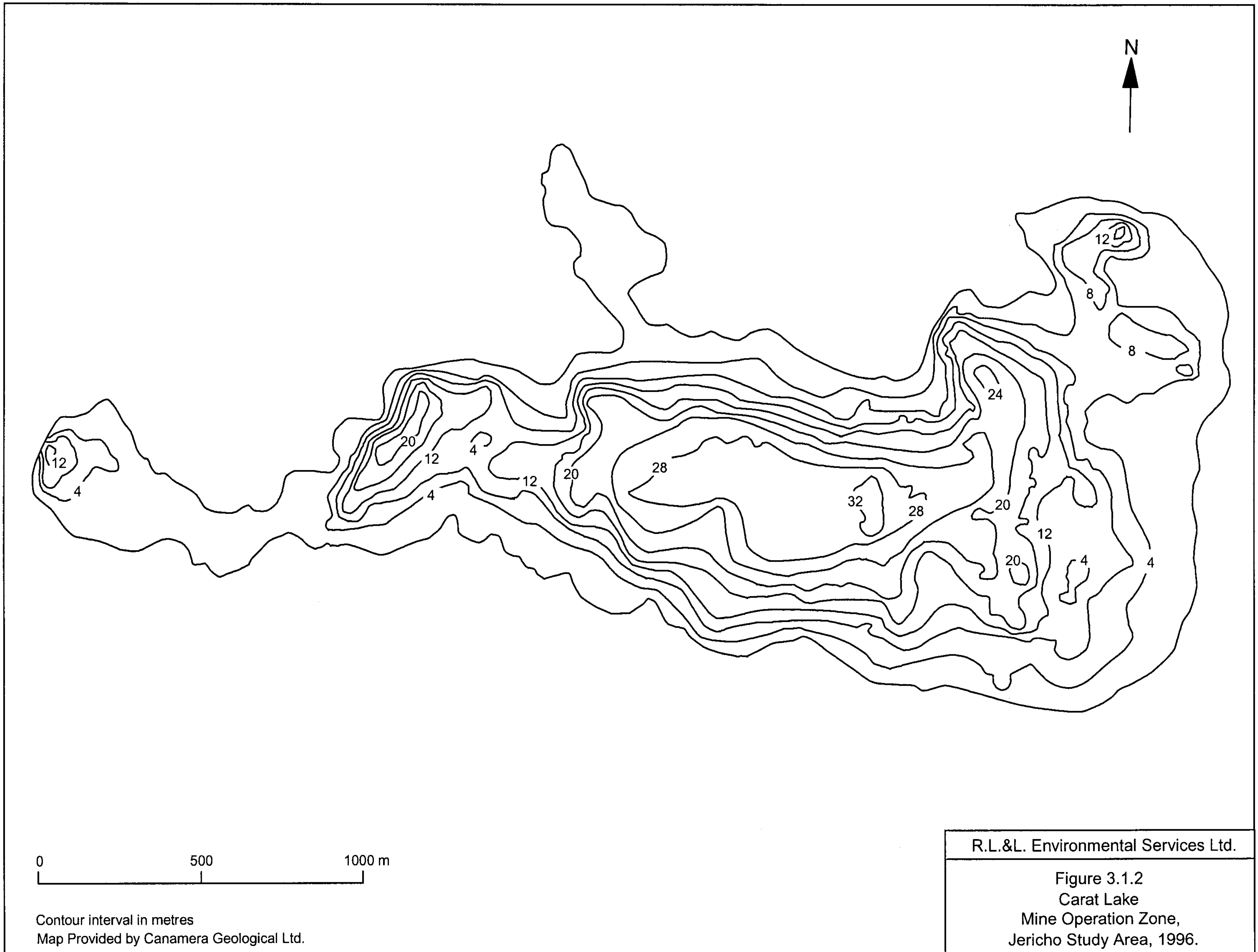


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Figure 3.1.2
Carat Lake
Mine Operation Zone,
Jericho Study Area, 1996.

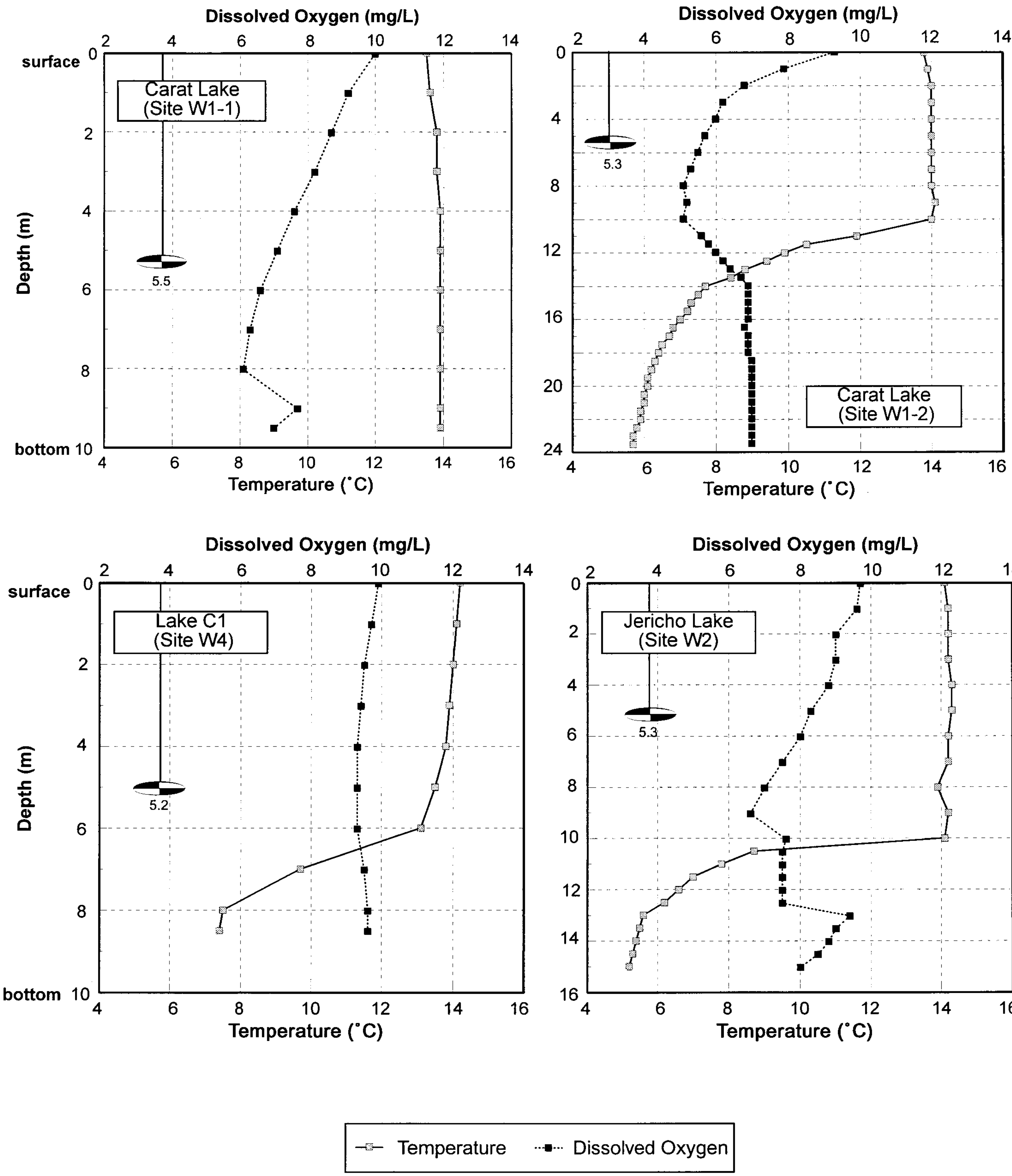

Figure 3.1.3 Dissolved oxygen and temperature profiles, and Secchi depths in lakes within the Mine Operation Zone, Jericho study area, 3 to 4 August 1996.

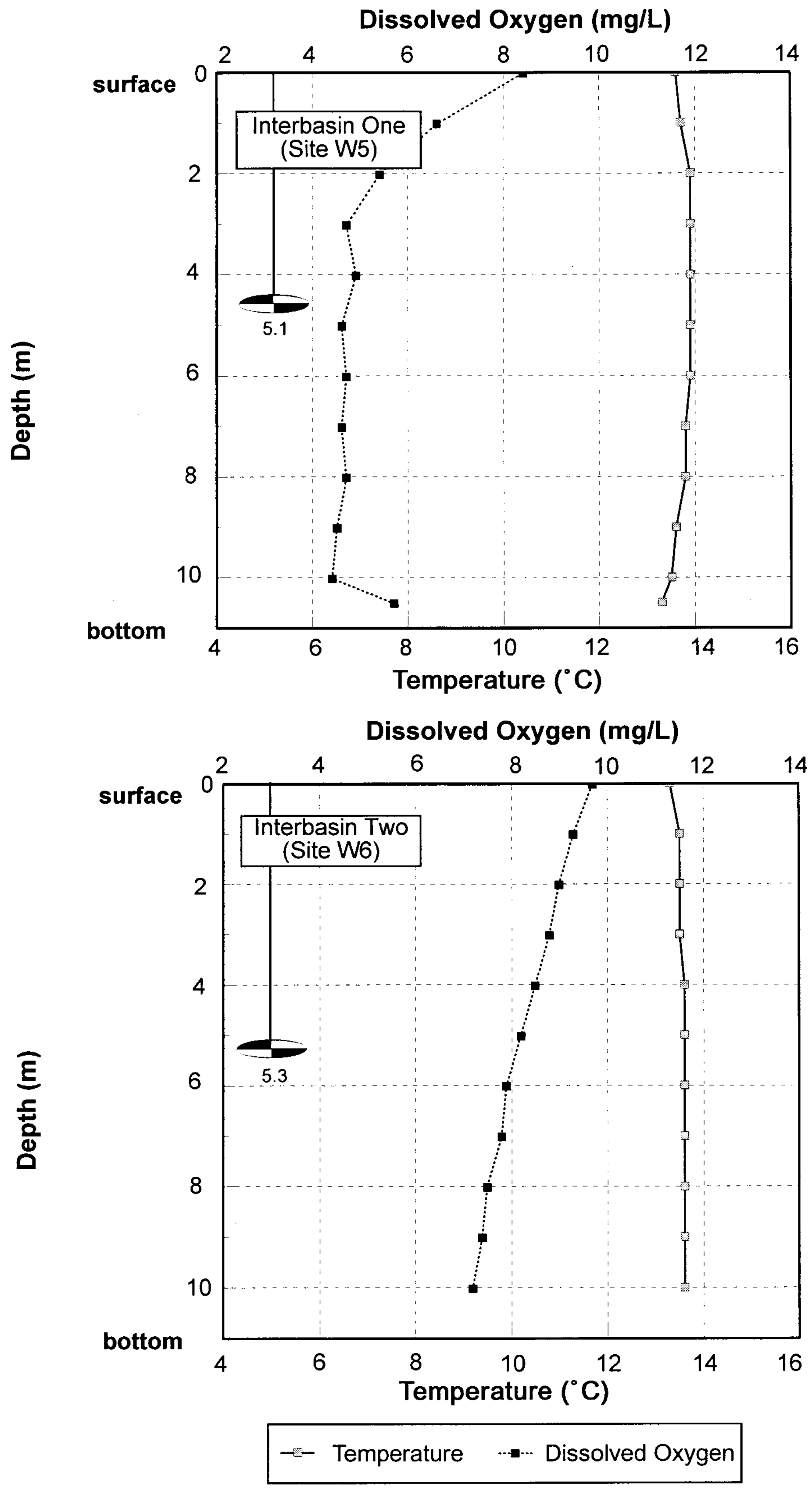

Figure 3.1.3 Concluded.

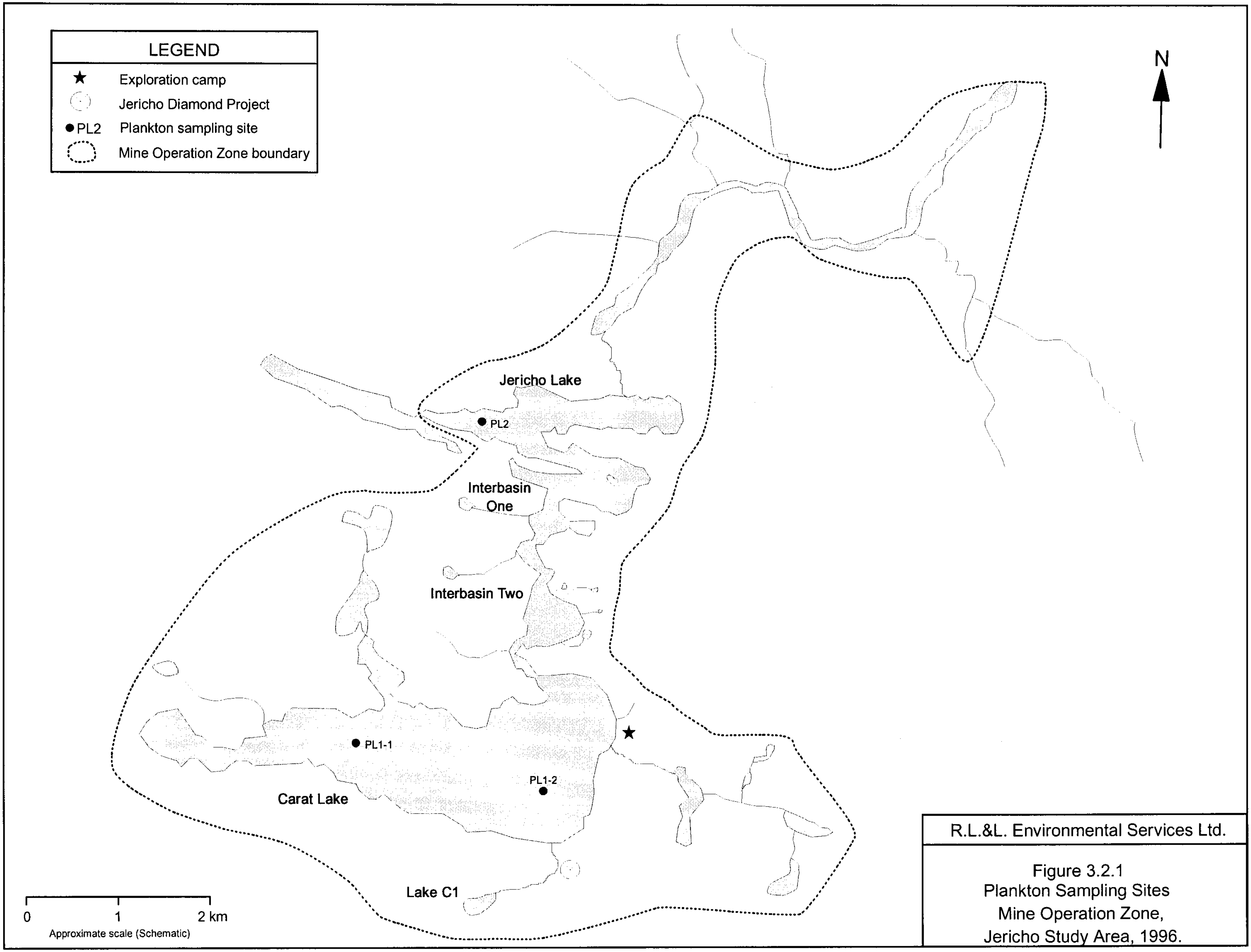

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Figure 3.2.1
Plankton Sampling Sites
Mine Operation Zone,
Jericho Study Area, 1996.

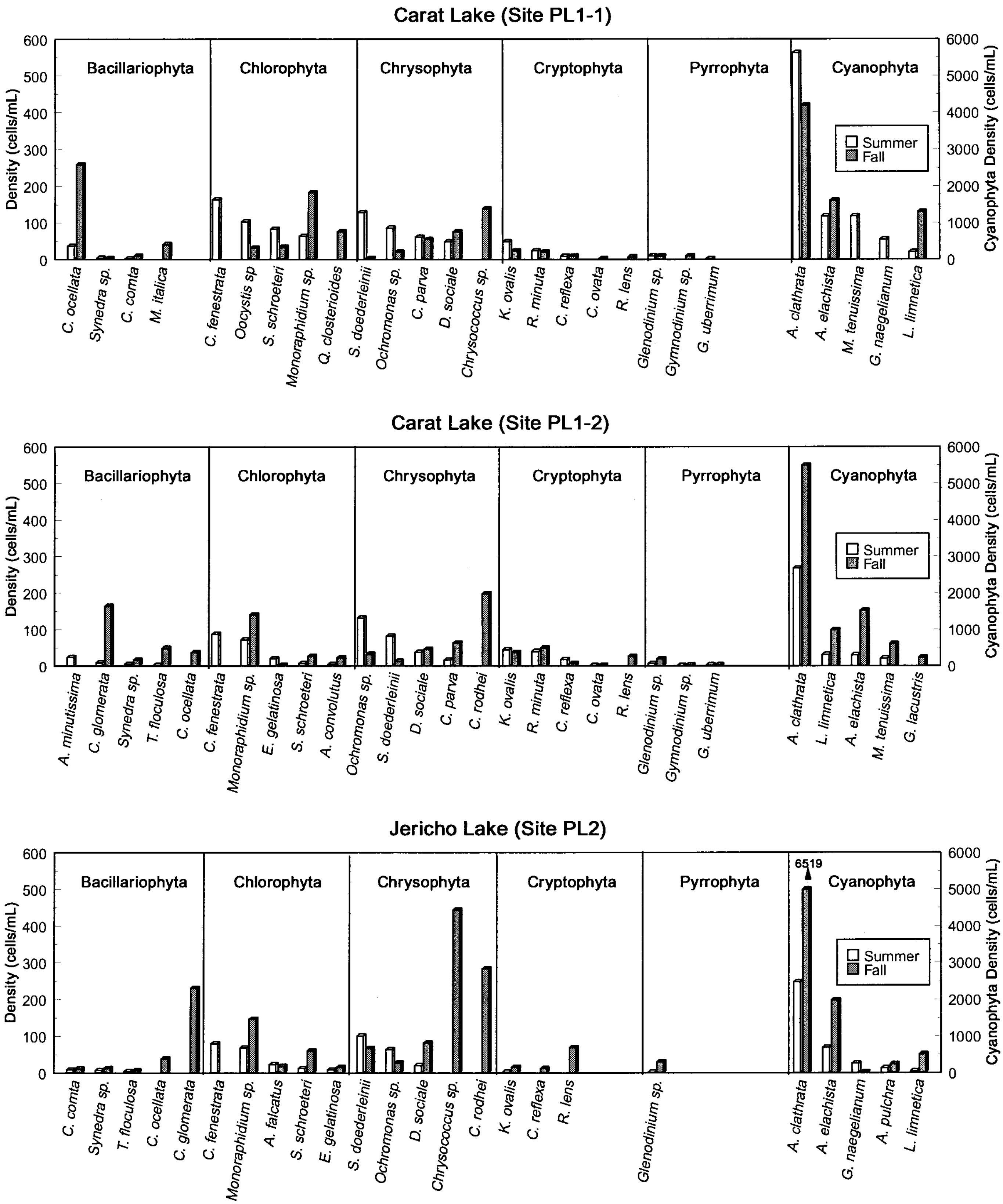

Figure 3.2.2 Density of dominant phytoplankton species in each of six taxonomic groups during summer and fall in lakes within the Mine Operation Zone, Jericho study area, 1996 (note difference in scale for Cyanophyta).

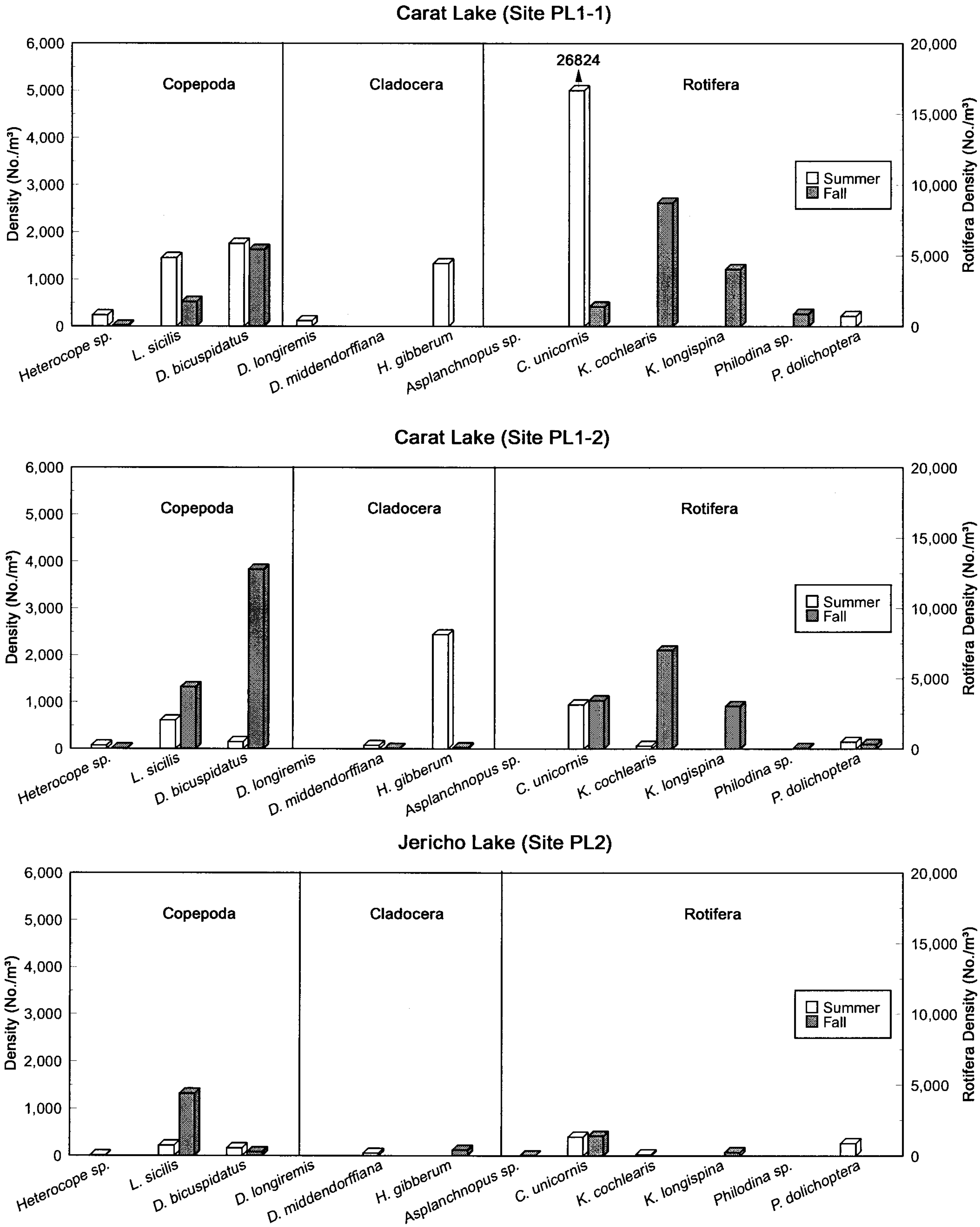

Figure 3.2.3 Density of major zooplankton species in each of three taxonomic groups during summer and fall in lakes within the Mine Operation Zone, Jericho study area, 1996 (note difference in scale for Rotifera).

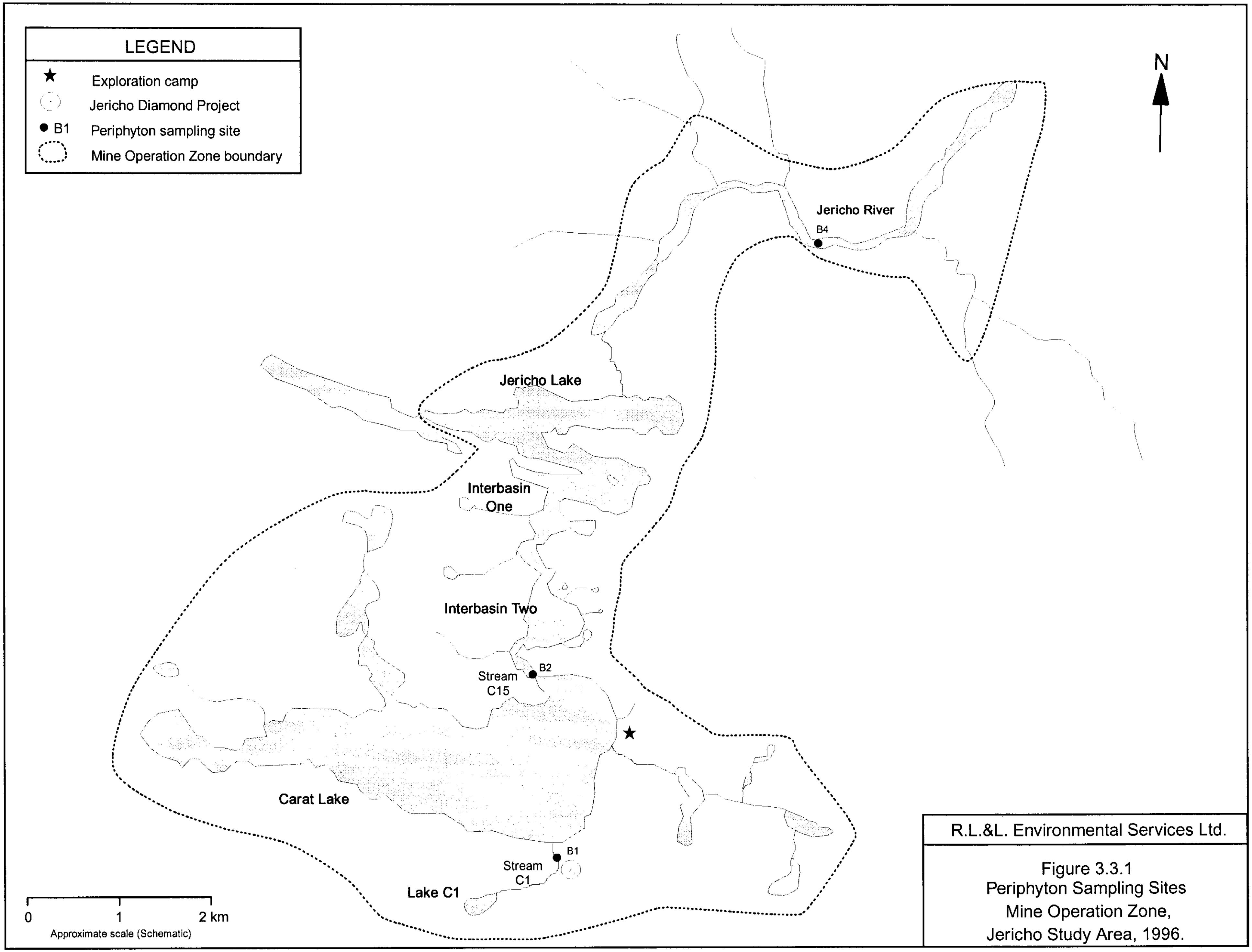

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Figure 3.3.1
Periphyton Sampling Sites
Mine Operation Zone,
Jericho Study Area, 1996.

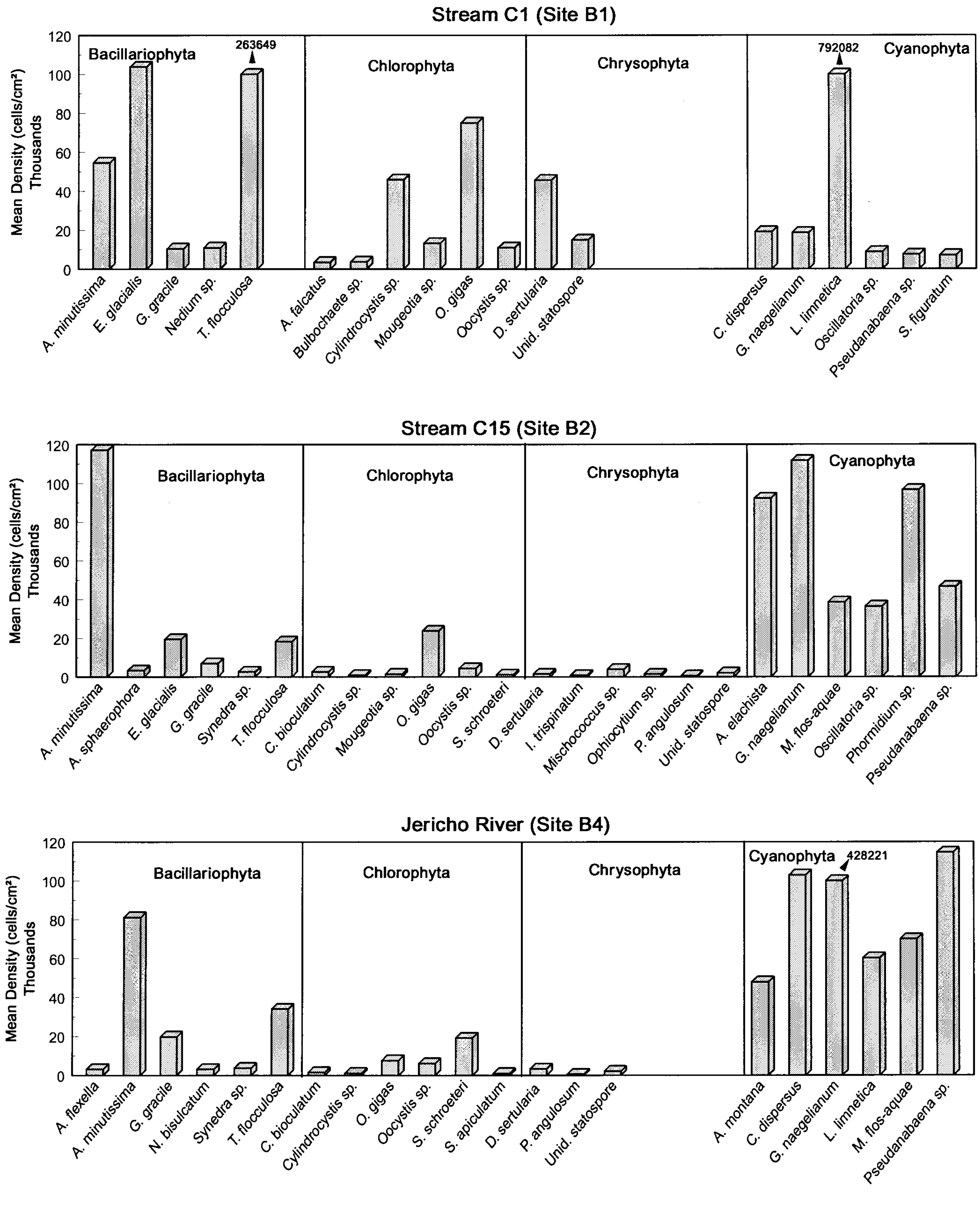

Figure 3.3.2 Mean density (n=3) of the most numerous periphytic algal species among the four major taxonomic groups in streams within the Mine Operation Zone, Jericho study area, summer 1996.

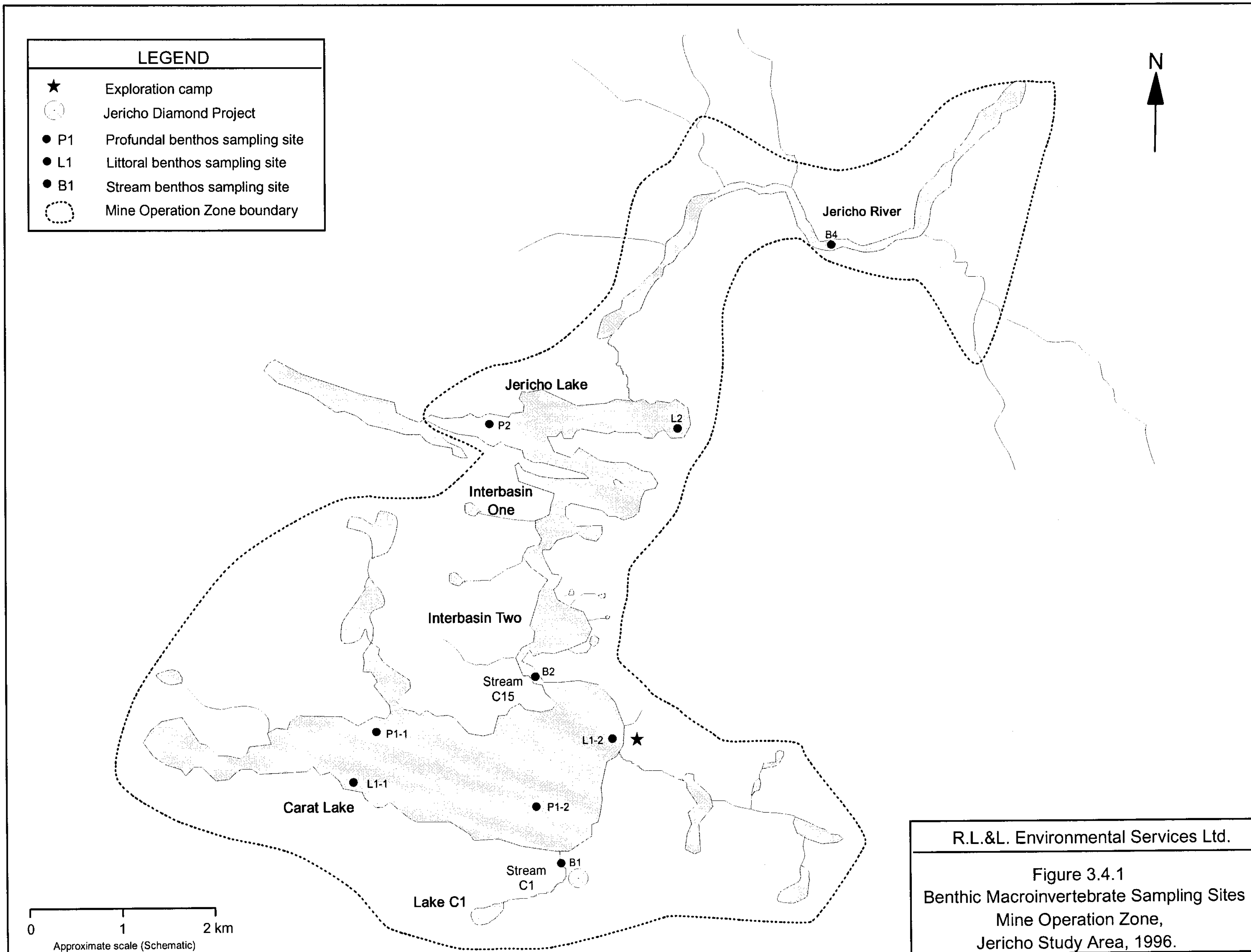

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Figure 3.4.1
Benthic Macroinvertebrate Sampling Sites
Mine Operation Zone,
Jericho Study Area, 1996.

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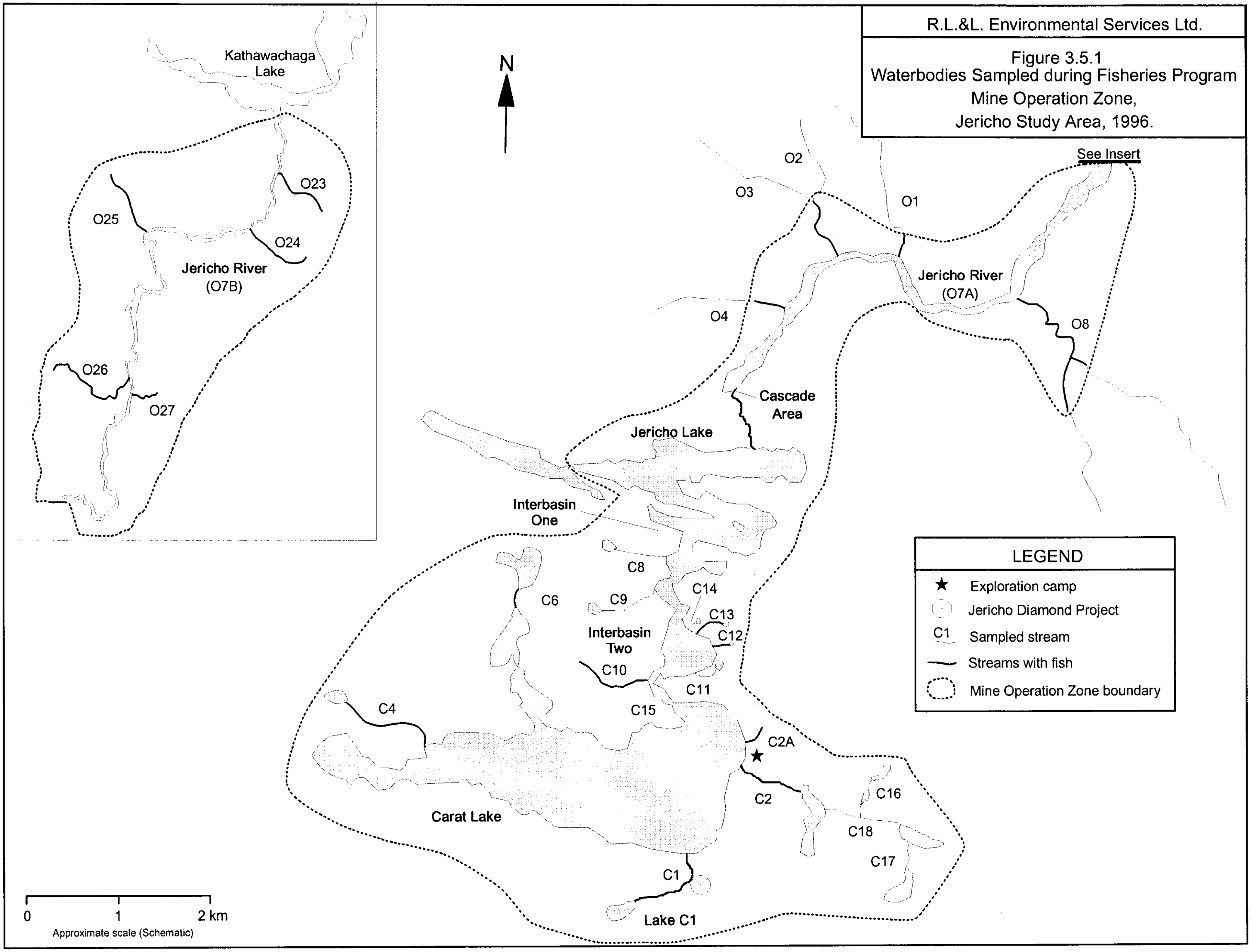
Figure 3.5.1
Waterbodies Sampled during Fisheries Program
Mine Operation Zone,
Jericho Study Area, 1996.



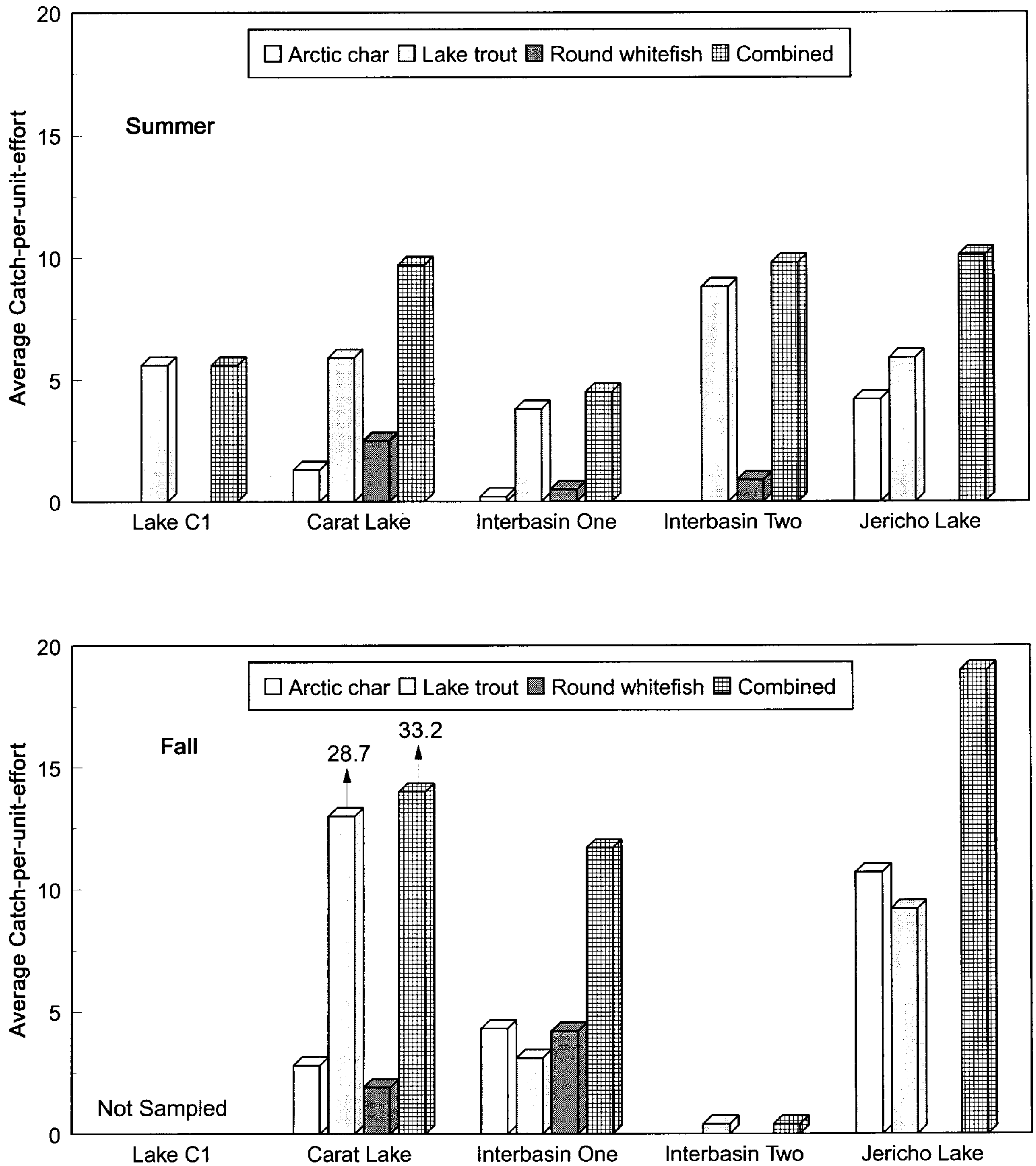


Figure 3.5.2 Average catch-per-unit-effort values (fish/100 m² ·12h) for fish captured during gill net sampling in lakes during summer and fall within the Mine Operation Zone, Jericho study area, 1996.

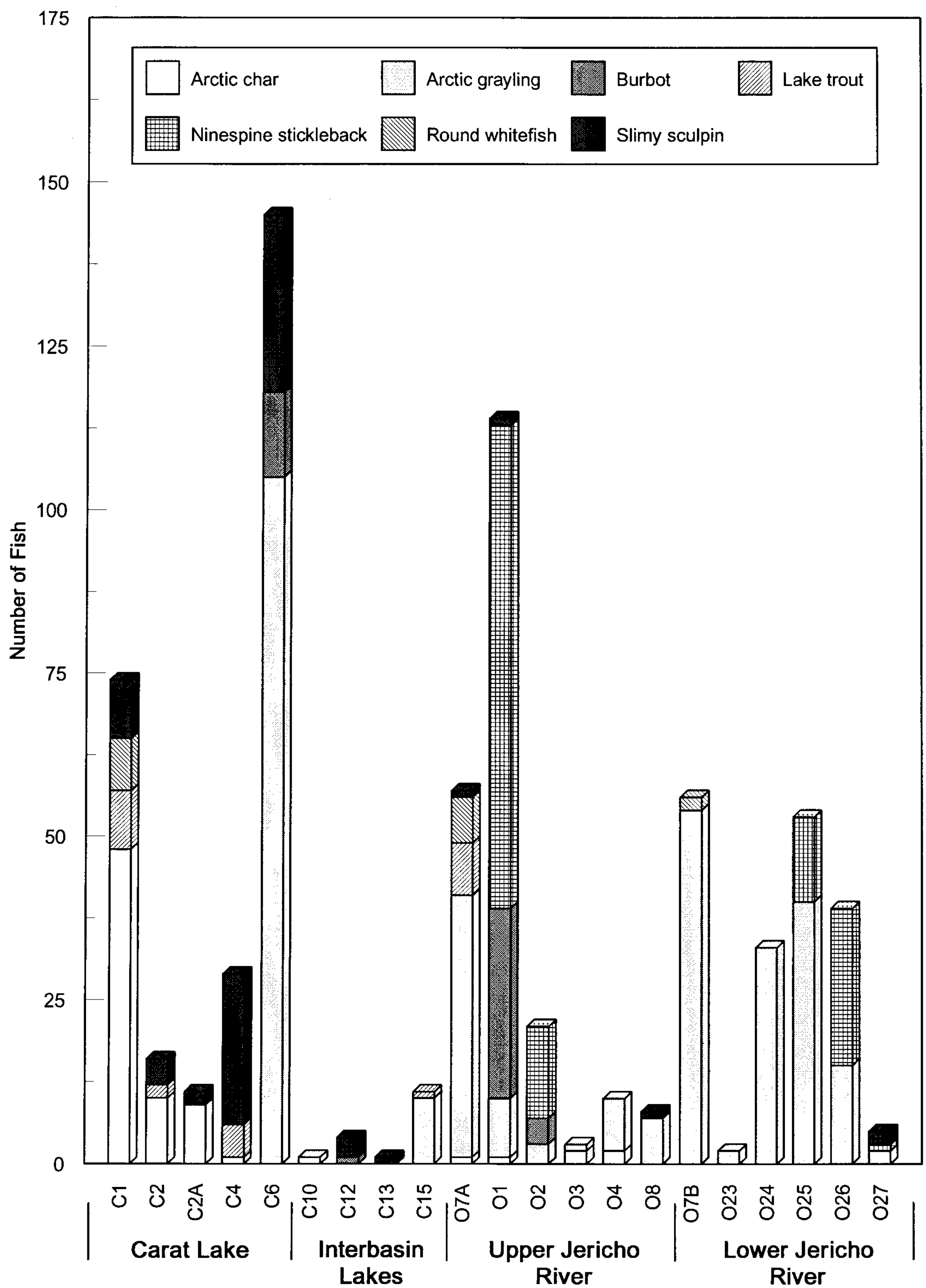


Figure 3.5.3 Comparison of fish numbers recorded in streams within four areas of the Mine Operation Zone, Jericho study area, 1996 (all methods and sampling periods combined).

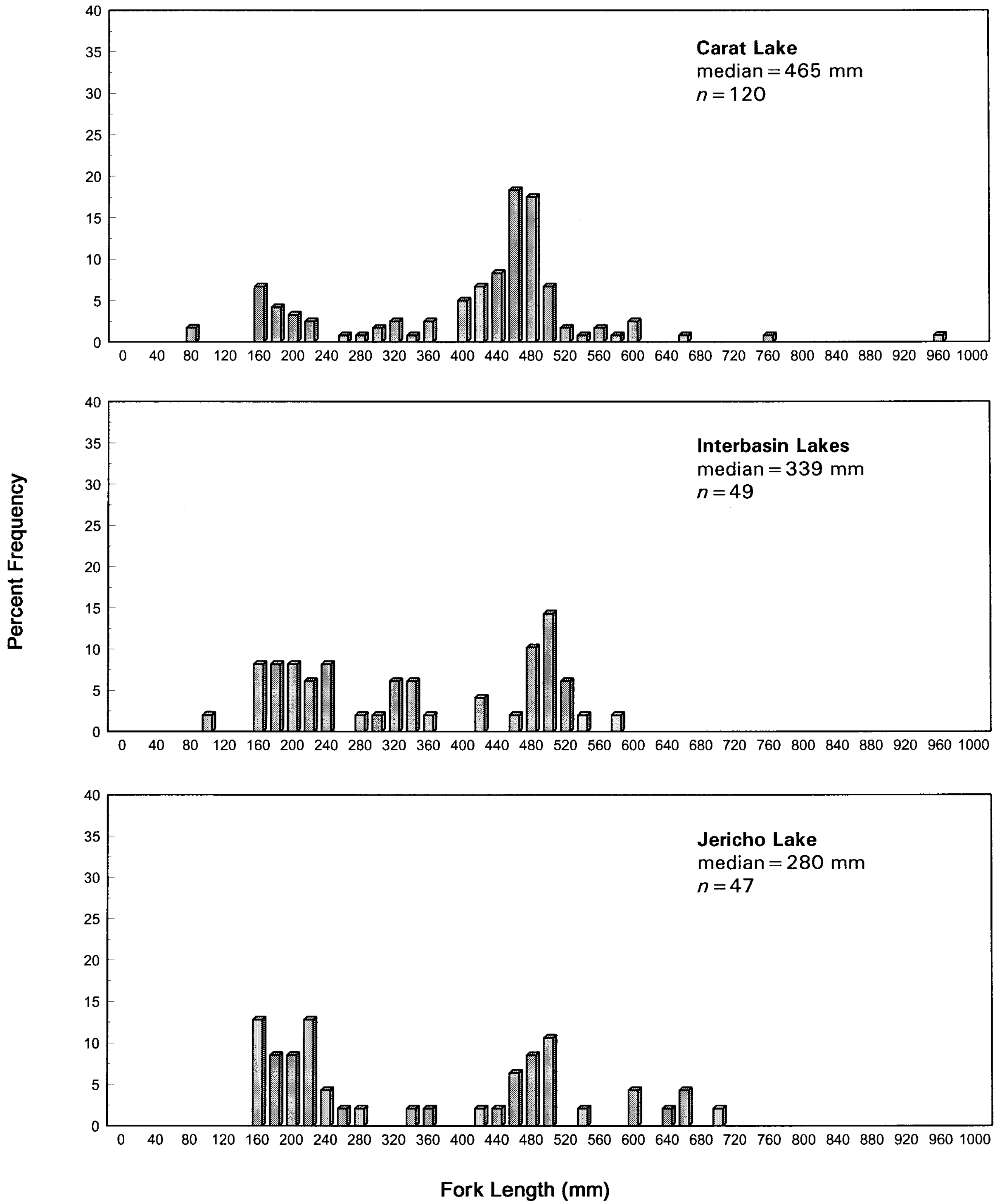


Figure 3.5.4 Length-frequency distribution of lake trout in waterbodies within the Mine Operation Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined).

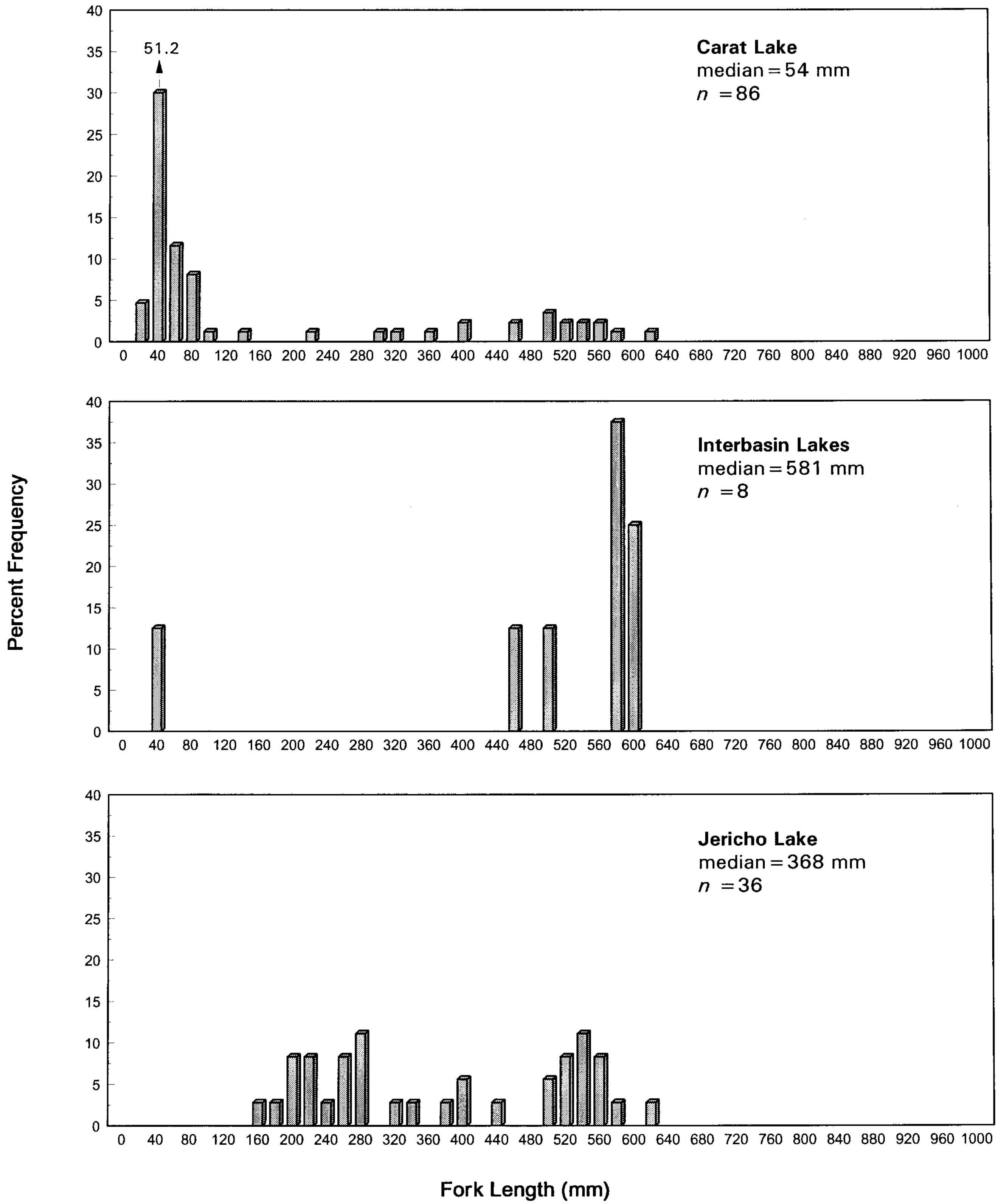


Figure 3.5.5 Length-frequency distribution of Arctic char in waterbodies within the Mine Operation Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined).

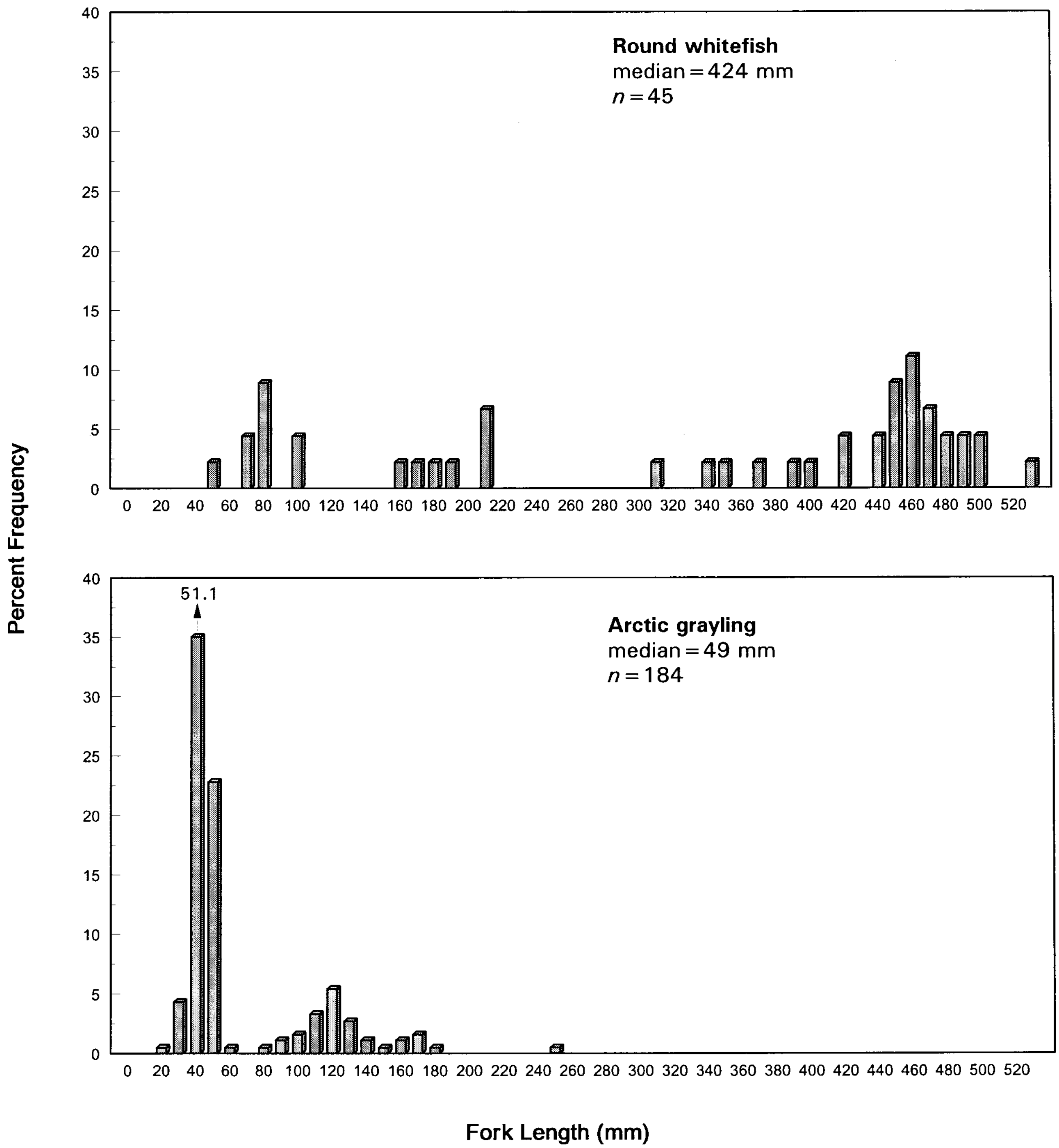


Figure 3.5.6 Length-frequency distribution of Arctic grayling and round whitefish within the Mine Operation Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined).

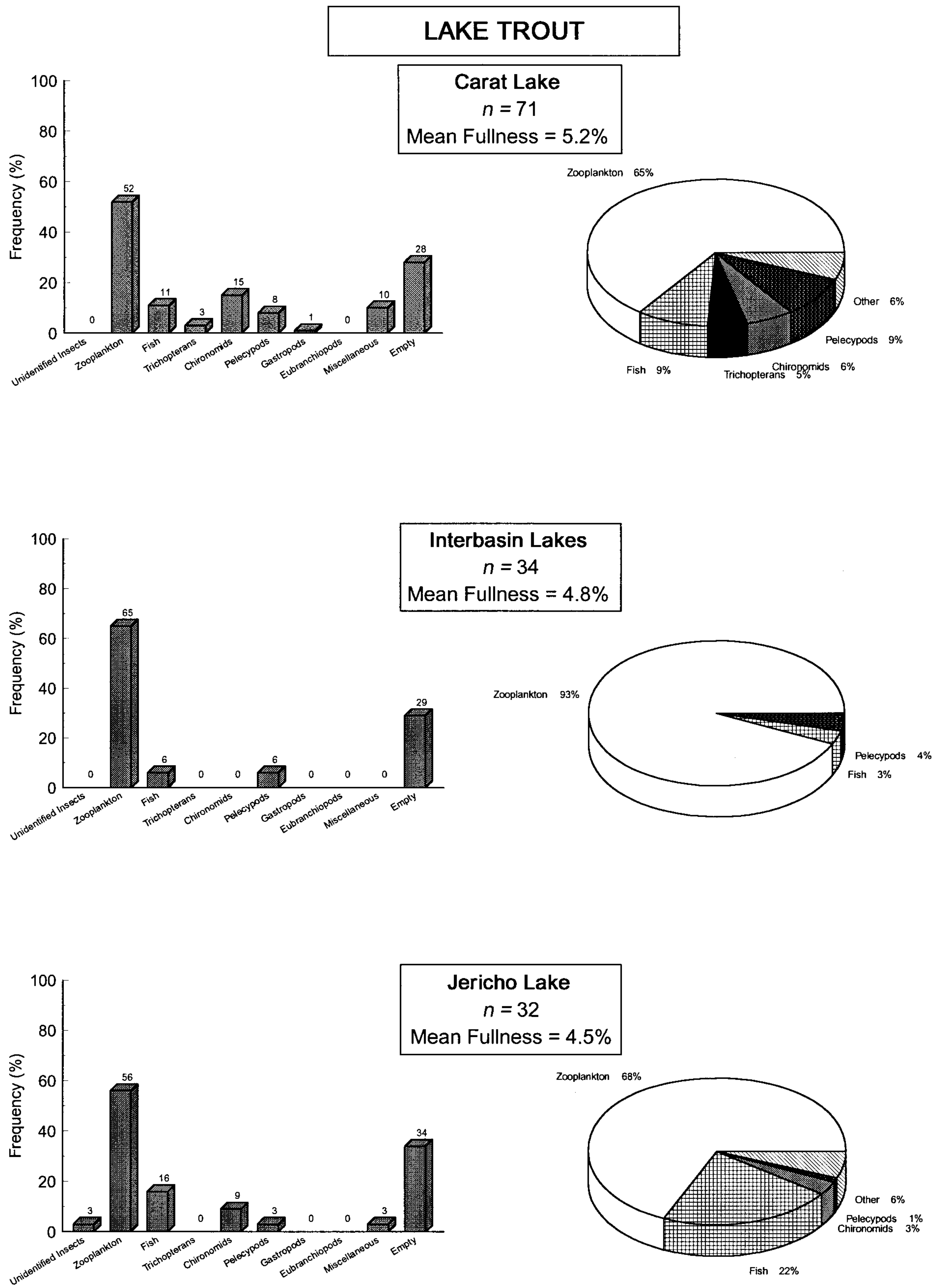


Figure 3.5.7 Frequency of occurrence (bars) and percent composition (pies) of food items encountered in stomachs of lake trout captured from lakes in the Mine Operation Zone, Jericho study area, 1996 (all seasons combined).

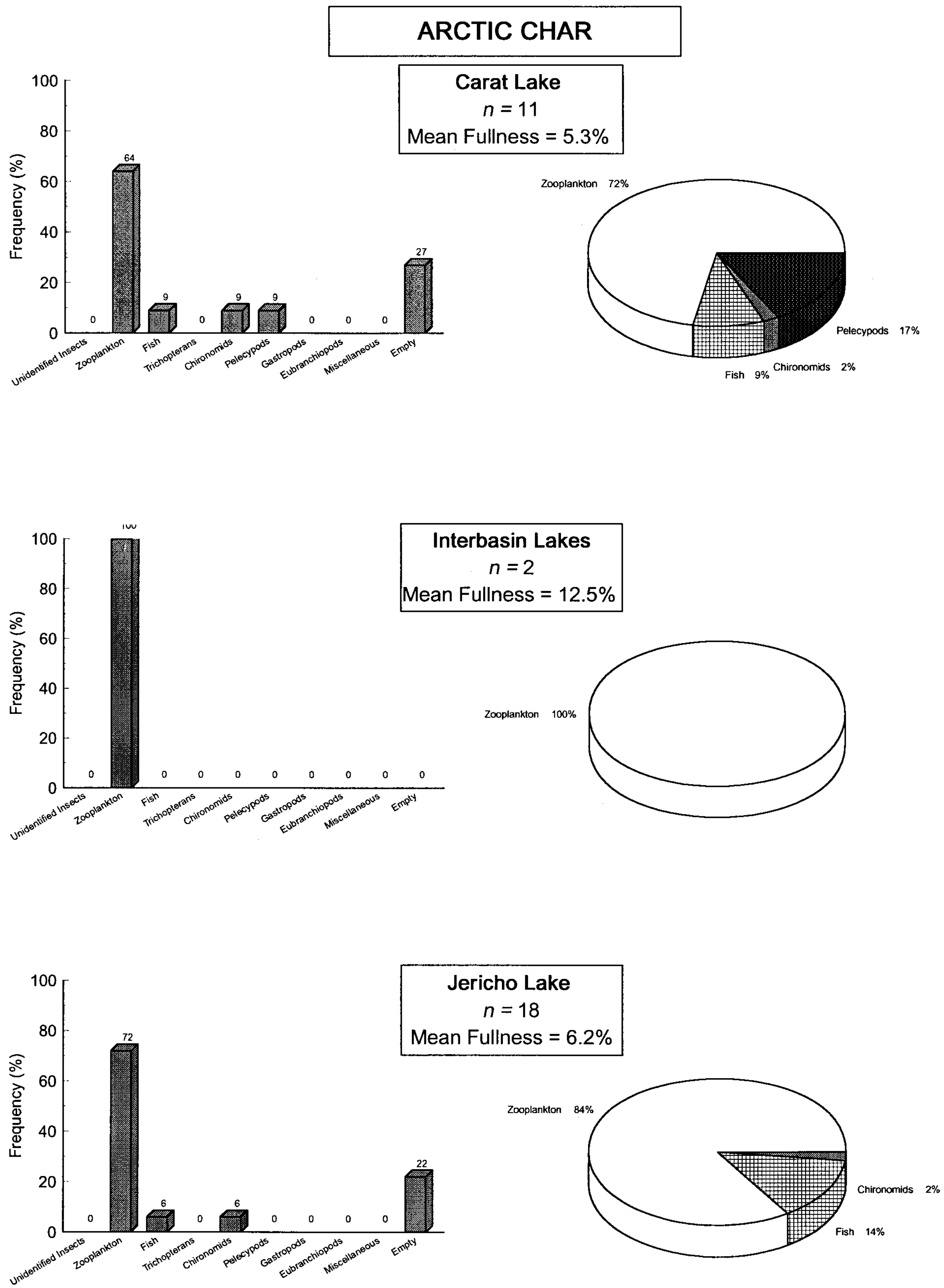


Figure 3.5.8 Frequency of occurrence (bars) and percent composition (pies) of food items encountered in stomachs of Arctic char captured from lakes in the Mine Operation Zone, Jericho study area, 1996 (all seasons combined).

ROUND WHITEFISH

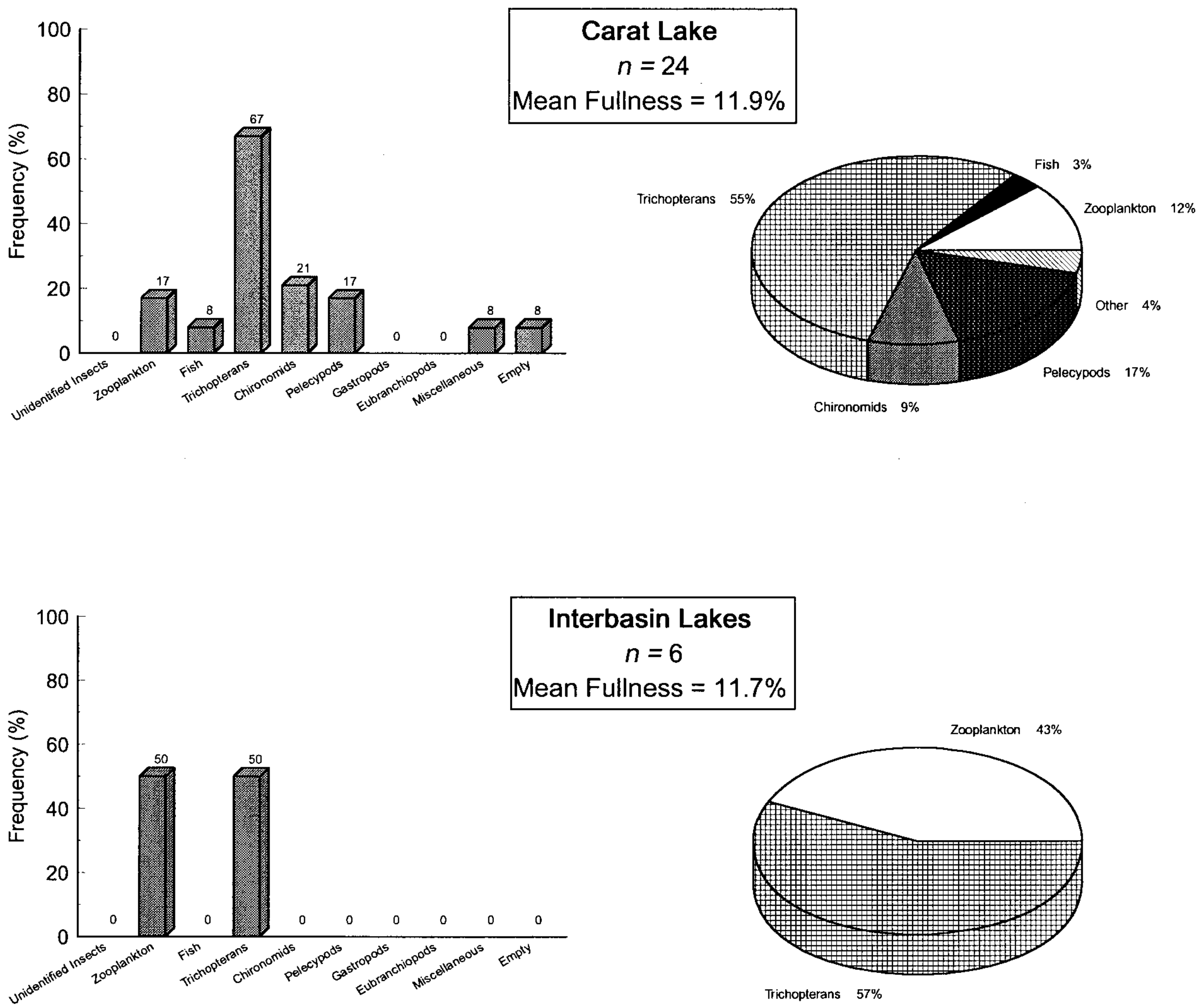
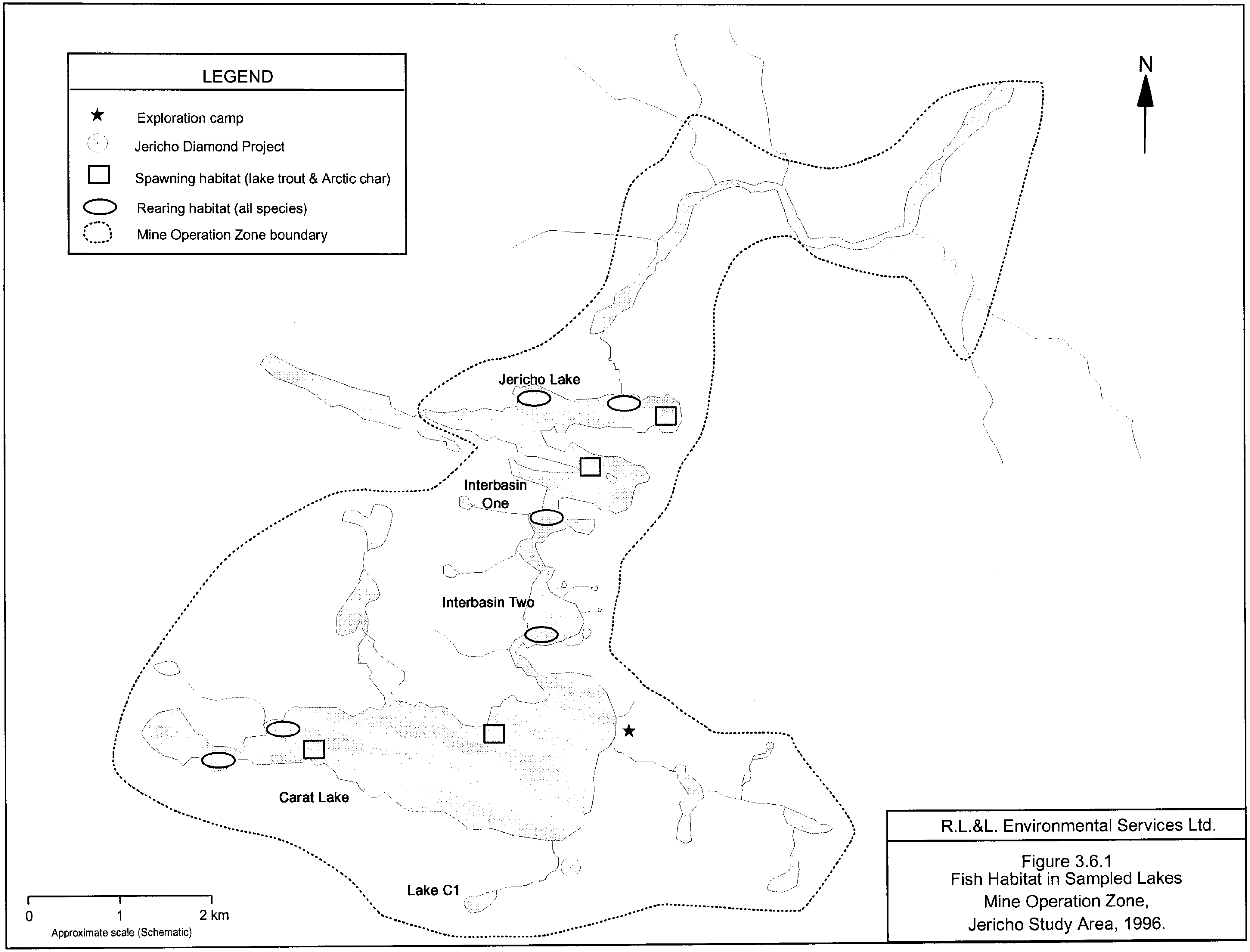


Figure 3.5.9 Frequency of occurrence (bars) and percent composition (pies) of food items encountered in stomachs of round whitefish captured from lakes in the Mine Operation Zone, Jericho study area, 1996 (all seasons combined).

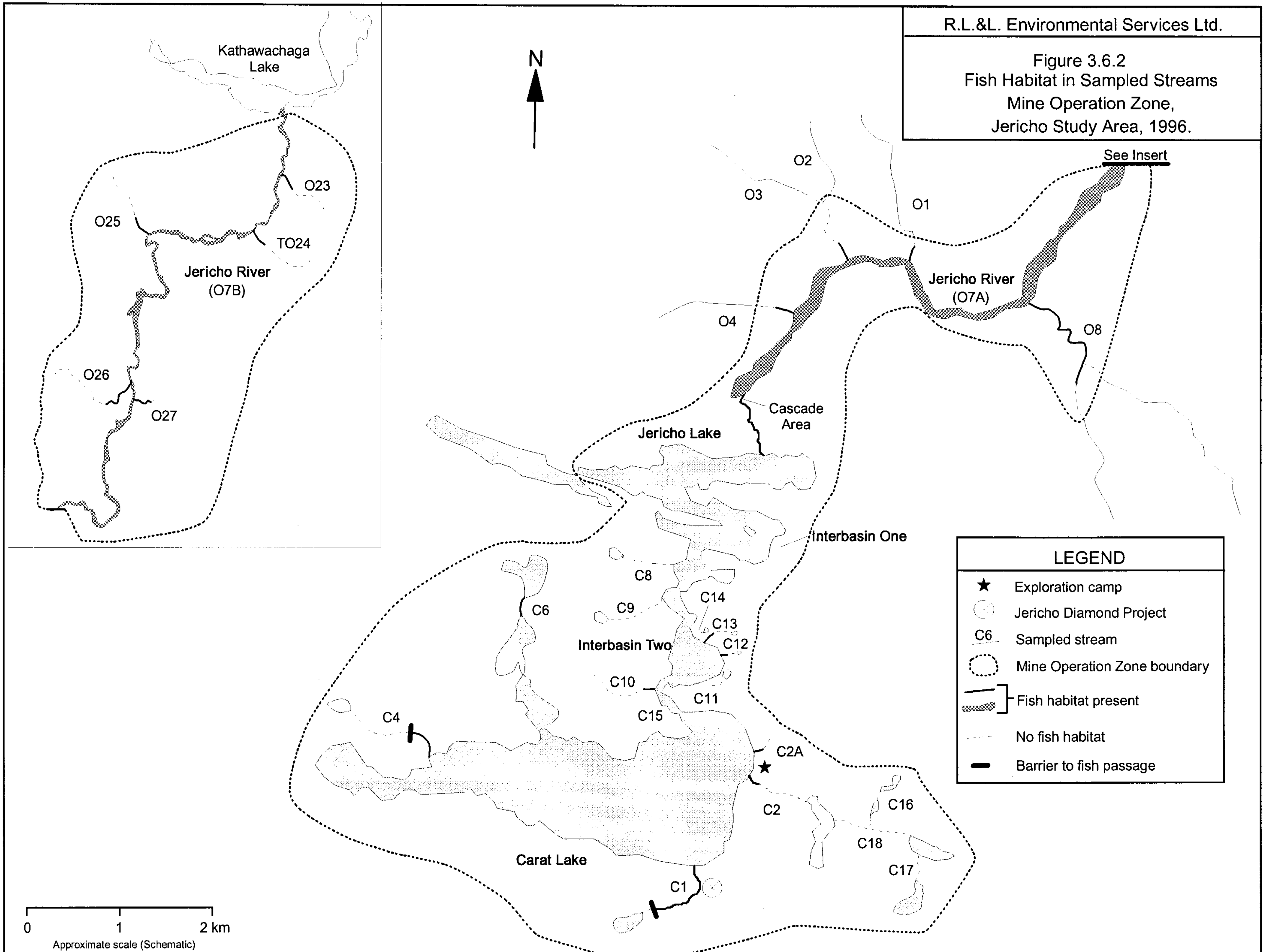


R.L.&L. Environmental Services Ltd.

Figure 3.6.1
Fish Habitat in Sampled Lakes
Mine Operation Zone,
Jericho Study Area, 1996.

R.L.&L. Environmental Services Ltd.

Figure 3.6.2
Fish Habitat in Sampled Streams
Mine Operation Zone,
Jericho Study Area, 1996.



4.0 BORROW EXTRACTION ZONE

4.1 LIMNOLOGY

This section provides summary results for lake morphology, temperature and dissolved oxygen profiles, and water transparency measurements in selected lakes of the Borrow Extraction Zone. Limnological data were collected from five lakes potentially influenced by proposed developments (Lakes O1 to O5). One sampling site was established on each of the lakes (Figure 4.1.1). Specific sampling locations are provided in Appendix B1.

4.1.1 Lake Morphology

The largest waterbody surveyed in the Borrow Extraction Zone was Lake O1 (18.1 ha) (Table 4.1.1 and Figure 4.1.1). This lake is situated immediately north of the Jericho Diamond Project site and is adjacent to the air strip and fuel storage depot. A bathymetric survey of Lake O1 indicates that the waterbody is composed of two basins; a larger, shallower, northern basin and a smaller, deeper, southwestern basin (Figure 4.1.2). This lake is relatively shallow (mean depth=4.1 m) and it exhibits a low shoreline development ratio (1.26). Lake O1 is the headwater lake in the Borrow Extraction Zone drainage; several small intermittent tributaries enter along its southern shore. However, given the nature of the geological material surrounding the lake (i.e., sands and gravels), it is possible that some of its water input originates from subsurface flow. There is one outlet stream to Lake O1, which flows north into Lake O2.

Lake O2 is the smallest waterbody surveyed in the Borrow Extraction Zone (5.3 ha). A bathymetric survey of Lake O2 indicates that it is a simple waterbody composed of one conical shaped basin with a maximum depth of 7.0 m (Figure 4.1.3); its shoreline development ratio is low (1.11). The only outlet stream to this waterbody flows north to Lake O4. Lake O2 receives its surface water input from Lake O1 and Lake O3.

Lake O3 is slightly larger than Lake O2 (8.3 ha) and differs from this waterbody by being deeper (maximum depth=11.0 m) and by exhibiting a more irregular shoreline (shoreline development ratio =1.22).

Lake O4 is larger than Lake O3 (16.7 ha), but is not as deep (maximum depth of 8.0 m). This waterbody has a low shoreline development ratio (1.07). Lake O4 receives surface water flow from several small intermittent streams along its south shore and from the outlet stream of Lake O2. Its only outlet stream flows north to Lake O5.

Lake O5 is situated immediately adjacent to the Jericho River and is connected to this watercourse by a short well-defined channel. It is similar in size to Lake O4 (17 ha), but exhibits a more irregular shoreline (shoreline development ratio=1.31). Initial surveys indicate that the lake contains a single basin and is shallow (maximum depth=5.0 m). Two major inlet tributaries enter this lake, one from Lake O4 and another, which drains a series of headwater systems to the northeast. Each inlet stream exhibits continuous water flow during the open water period.

4.1.2 Temperature and Dissolved Oxygen

Temperature and dissolved oxygen profile data were collected during summer, while only surface water data were collected during the fall. Water column oxygen-temperature profiles are depicted in Figure 4.1.3; all data are presented in Appendix B1.

Water depths recorded at the Borrow Extraction Zone sites varied from 5 to 12.5 m; Site W11 (Lake O5) was the shallowest and Site W7 (Lake O1) was the deepest. Water depth at the remaining sites ranged between 8 and 11.3 m in depth (Figure 4.1.4; Appendix B1).

Surface temperatures at sampling sites during summer (3 to 4 August) were approximately 14°C (Figure 4.1.3). Lakes O1 and O3 were thermally stratified; the thermoclines were located between 10 m and the bottom (13 m) and 6 m and the bottom (11 m), respectively. The remaining lakes (Lakes O2, O4, and O5) were isothermal (i.e., uniform temperatures throughout the water column).

Dissolved oxygen concentrations within the Borrow Extraction Zone lakes were variable (Figure 4.1.4; Appendix B1). Site W7 on Lake O1 had the greatest change in dissolved oxygen concentration; it changed from 9.7 mg/L to 6.6 mg/L between the surface and lake bottom. Lake O5 (Site W11) had the lowest change in oxygen concentration with depth (9.7 mg/L at surface to 9.2 mg/L at the bottom); this was likely due to the shallow depth of the lake at this site (5.0 m). Overall, dissolved oxygen concentrations in the five study lakes varied from 6.6 to 10.0 mg/L.

The surface water temperature in the fall for each Borrow Extraction Zone study lake (6 to 8 September) was above freezing (Appendix B1); temperatures ranged from 4.0°C at Site W11 (Lake O5) to 6.0°C (Site W9) of Lake O3. The surface waters in all study lakes in this zone were well oxygenated (10.1 to 10.7 mg/L) and complied with Canadian Water Quality Guidelines (CCME 1996).

4.1.3 Transparency

In summer (3 and 4 August), water transparency (Secchi depths) did not vary greatly; it ranged from 5.2 m at Sites W10 and W11 to 5.7 m at Site W7 (Figure 4.1.4; Appendix B1). In the fall (6 to 8 September), Secchi depths were lower than in summer, but had a greater range (3.5 m to 5.0 m in Lakes O1 and O4, respectively). The euphotic zone depths (depth to about 1% light penetration and where algae can still subsist = 2 × Secchi depth) were under 12 m in the summer and 10 m or less in the fall.

4.1.4 Summary

4.1.4.1 Lake Morphology

The five surveyed lakes in the Borrow Extraction Zone are small; they range in size from 5 ha (Lake O2) to 18 ha (Lake O1). These waterbodies have maximum depths greater than 5 m. Lake O1 is the deepest waterbody identified in the zone (maximum depth was 14 m). Based on a bathymetric survey of Lake O1, this waterbody contains two basins, with the larger, shallower basin encompassing the northern portion of the lake. A bathymetric survey of Lake O2 indicates that this small waterbody is composed of a single basin. Preliminary surveys of other waterbodies suggest that they also consist of single basins. All surveyed lakes in the Borrow Extraction Zone have shoreline development ratios less than 1.4, which is an indication of uniform shoreline configurations.

4.1.4.2 Temperature and Dissolved Oxygen

During the 1996 aquatic studies program in the Borrow Extraction Zone study area, lakes deeper than 10 m in depth (Lakes O1 and O3) exhibited thermal stratification, while shallower waterbodies (Lakes O2, O4, and O5) exhibited isothermal conditions. Therefore the deeper lakes can be classified as dimictic (thoroughly mix twice a year), while the shallower lakes can be classified as monomictic (continuous mixing).

The lakes within the Borrow Extraction Zone have shallower (approximately 2 m) thermoclines than the lakes of the Mine Operation Zone. This was likely attributed to location (i.e., on the leeward side of an esker and protected from wind exposure) and the smaller size of the lakes in the Borrow Extraction Zone. Lakes with small surface areas generally have a shorter distance for wind exposure (i.e., reduced fetch distance). The amount of wind exposure a lake receives affects the formation and depth of the thermocline; and in general, the lower the wind exposure the shallower the thermocline (Wetzel 1983).

In summer, the isothermal lakes had water temperatures that ranged from 13.3 to 14.1°C, while those lakes that stratified had water temperatures below the thermocline as low as 5.6°C. In fall, water temperatures among the study sites at the surface to a 1 m depth, ranged from 4.0 to 6.0°C. The summer dissolved oxygen concentrations varied from 6.6 to 10.0 mg/L, while fall surface water concentrations ranged from 10.1 to 10.7 mg/L.

During summer, all lakes studied within the Borrow Extraction Zone had dissolved oxygen concentrations that were below the Canadian Water Quality Guideline for the protection of cold-water biota early life stages (9.5 mg/L, Table 3.1.2). The low dissolved oxygen concentrations recorded at this time were likely the result of equipment malfunction and were not representative of actual concentrations throughout the water column. Dissolved oxygen concentrations at the surface were 100% saturation and above the 9.5 mg/L criteria. Because these lakes are nutrient poor (R.L. & L. Environmental Services Ltd. 1995; Canamera Geological Ltd., unpublished data), dissolved oxygen concentrations should have remained constant throughout the water column, at least to the thermocline. This was not the case, at several sites the concentration was correlated with water depth, which is an indication of equipment malfunction (R. Hirsch, Technical Engineer, Point Four Systems Inc., Post Moody, BC, pers. comm.). As such, the dissolved oxygen concentrations recorded during the summer should be viewed with caution.

4.1.4.3 Transparency

The water transparency levels recorded in the Borrow Extraction Zone lakes indicated that the euphotic zone was between 10 and 12 m during the summer and between 7 and 10 m during the fall. The amount of light penetration is dependent upon suspended materials (i.e., sediments and other allochthonous matter) and the biological productivity of a lake (i.e., density and biovolume of phytoplankton). Transparency levels in these lakes were similar to those measured in the Mine Operation Zone lakes; they are indicative of oligotrophic systems.

4.2 PLANKTON

To provide baseline information on the plankton community, samples were collected from the Borrow Extraction Zone of the Jericho study area during summer and fall of 1996. One site (PL4) was established on Lake O1 (Figure 4.2.1). This site was closest to the region that is projected to have the most activity associated with borrow extraction materials. Relevant data are summarized in the following sections; all data are presented in Appendices C1 to C3.

4.2.1 Phytoplankton

Phytoplankton are microscopic free-floating algae (Smith 1950). Summary results of phytoplankton biovolume (microns cubed per metre cubed [$\mu m^3/m^3$]) and density (No. cells/ml) are both presented in this section because density alone does not provide an accurate assessment of importance. For example, taxa that are extremely numerous may have a low biovolume, due to the small size of individual organisms. Conversely, those taxa that have large biovolumes (due to large individual organism size), may not be numerically abundant. These large bodied groups can contribute significantly to lake productivity. As such, their numbers can influence the abundance and biomass of herbivores that feed on them (generally zooplankton) and they can modify nutrient availability for competing plants or algae.

4.2.1.1 Biovolume

In total, 101 species of algae were identified from the samples collected in the Borrow Extraction Zone study area (Appendix C2). Table 4.2.1 summarizes biovolumes of major taxonomic groups encountered. In the summer, golden-brown algae (Chrysophyta) contributed 56% of total algal biovolumes, while dinoflagellates (Pyrrophyta) accounted for 24%. In fall, golden-brown algae and diatoms (Bacillariophyta) accounted for over 85% of the biovolume (75 and 10%, respectively).

4.2.1.2 Density

The relative importance of the most numerous species within each of the six major taxonomic groups are depicted in Figure 4.2.2. Cyanobacteria (Cyanophyta) were the numerically dominant taxa in all samples; *Aphanothece clathrata* densities ranged from 10 334 cells/ml in summer to 12 183 cells/ml in fall. *Aphanocapsa elachista* had the second highest densities (4456 and 3017 cells/ml in the summer and fall, respectively). Cyanobacteria, however, typically have very small cells and do not contribute greatly to biovolume. Golden-brown algae contributed the most toward total phytoplankton biovolume in each season (refer to Section 4.2.1.1); *Ochromonas* sp. was the most abundant golden-brown algae during summer (572 cells/ml) and *Chrysosphaerella rodhei* dominated during fall (396 cells/ml).

4.2.2 Zooplankton

Zooplankton communities are composed of microscopic animals that live in the water column. The seasonal changes in zooplankton biomass are summarized in Table 4.2.2, while seasonal changes in density for dominant taxa are presented in Figure 4.2.3. All raw data are presented in Appendix C3. Summary results of zooplankton biomass (micrograms per metre cubed [$\mu g/m^3$]) and density (No./m^3) are presented in this section because density alone does not provide an accurate assessment of importance. Taxa that are extremely numerous may have a low biomass, due to the small size of individual organisms. Conversely, those taxa that have large biomass (due to large individual organism size), may not be numerically abundant. These large bodied groups can contribute a significant amount to lake productivity. As such, their numbers can influence the abundance and biomass of predators that feed on them (generally other zooplankton and fish) and they can modify the phytoplankton community.

4.2.2.1 Biomass

In summer, water fleas (Cladocera) and calanoid copepods (Calanoida) contributed 99% of total zooplankton biomass in Lake O1 (87 and 12%, respectively). These percentages represented 235 and 31.9×10^3 $\mu g/m^3$, respectively. In fall, calanoid copepods accounted for the majority of zooplankton biomass (83%) while cyclopoid copepods were second in abundance (8%) and water fleas were third (7%) (Table 4.2.2; Appendix C3).

4.2.2.2 Density

In summer, Lake O1 was dominated by the wheel animal (Rotifera) *Conochilus unicornis* (16 444 individuals/m^3) and the calanoid copepod *Leptodiaptomus sicilis* (1337 individuals/m^3). In fall, *C. unicornus* was replaced by *Kellicottia longispina* (29 617 individuals/m^3) and *L. sicilis* increased in abundance (6698 individuals/m^3). Overall, zooplankton densities were greater in the fall than in the summer (Figure 4.2.3; Appendix C3).

4.2.3 Summary

4.2.3.1 Phytoplankton

The phytoplankton assemblage in Lake O1 was indicative of oligotrophic waterbodies (Wetzel 1983). Golden-brown algae (Chrysophyta) had the greatest biovolumes in the summer and fall. Cyanobacteria (Cyanophyta) algae had the greatest densities in both seasons, due to their small cell sizes relative to other taxa.

There was a seasonal shift in the relative importance of the major taxonomic groups. Golden-brown algae contributed 56% to total algal biovolume, while dinoflagellates (Pyrrophyta) accounted for 24% in the summer. During fall, golden-brown algae increased in importance; this group accounted for over 75% of the biovolume. Also the most abundant golden-brown algae species changed from summer to fall (*Ochromonas* spp. versus *Chrysosphaerella rodhei* respectively), while cyanobacteria were dominated by *Aphanothece clathrata* and *Aphanocapsa elachista* in both seasons.

4.2.3.2 Zooplankton

The zooplankton community in Lake O1 exhibited a change in community structure between summer and fall. In general, zooplankton biomass was dominated by the water fleas (primarily *Holopedium gibberum*) in summer and calanoid copepods (primarily *Leptodiaptomus sicilis*) in fall. The most abundant zooplankton were the wheel animals (*Conochilus unicornis* and *Kellicottia longispina* in summer and fall, respectively).

4.3 STREAM PERIPHYTON

Periphyton refers to the community of algae, bacteria, fungi, and their secretions that grow on substrates in freshwater systems (Lock et al. 1984). In addition to having an important role in aquatic trophic relationships (i.e., used by invertebrates and fish as a source of food and shelter), they are well suited for use as a biological indicator of environmental conditions, including those imposed by anthropogenic activities. Summary results of periphyton density (No. cells/ml), chlorophyll *a* concentration ($\mu g/cm^2$), and ash-free-dry-weight (AFDM) concentration (mg/cm^2) are presented in this section.

A limited periphyton sampling program was conducted in the summer of 1996. Three replicate samples were collected from one stream (Stream O18, Site B3) in the Borrow Extraction Zone (Figure 4.3.1). This stream is situated adjacent to the proposed development. Data are presented as means ($n=3$, ± 1 standard error). Relevant information are summarized in this section; all data are presented in Appendices D1 and D2.

4.3.1 Density

In total, 84 periphytic algal species were identified in the samples from Stream O18 (Appendix D2). The algal community at this site was dominated by the cyanobacterium *Microcystis flos-aquae* (161 402 ± 161 402 cells/cm^2) and the diatom *Tabellaria flocculosa* (140 323 ± 47 836 cells/cm^2). Other abundant periphytic algal species included the cyanobacteria *Lyngbya limnetica* and *Phormidium* sp.(Figure 4.3.2).

4.3.2 Biomass

Stream O18 had low estimates of mean periphytic chlorophyll *a* and mean AFDM (0.512 ± 0.351 μg/cm^2 and 23.6 ± 6.65 μg/cm^2, respectively; Appendix D1). These estimates are indicative of oligotrophic conditions (Horner and Welch 1981; Wetzel 1983).

4.3.3 Summary

The most abundant periphytic algae in Stream O18 of the Borrow Extraction Zone were the cyanobacterium *Microcystis flos-aquae* and the diatom *Tabellaria flocculosa*. The overall mean density of algae in Stream O18 (623 886 ± 206 406 cells/cm^2) was low.

The amount of chlorophyll *a* and AFDM (indicators of live algae and periphyton biomass, respectively) is controlled primarily by light quality and quantity, water velocity, and nutrient concentrations (Horner and Welch 1981). Moderate current velocities (20 to 100 cm/s) and increasing phosphorus concentrations (to 50 μg/L total phosphorus) promote periphytic growth. The sampling location on Stream O18 exhibited light and current velocities within the range reported by Horner and Welch (1981). Therefore, it is likely that phosphorous concentrations were low, which limited periphytic growth.

4.4 BENTHIC MACROINVERTEBRATES

Benthic (bottom-dwelling) macroinvertebrates are an important link in aquatic food webs. Most benthic invertebrates are herbivorous, detrivorous, or filter feeders and derive much of their energy from aquatic plants and algae or organic materials. Some benthic macroinvertebrate species are predacious, generally feeding upon other invertebrates. Many fish species, including early life history stages of piscivorus species, feed upon benthic macroinvertebrates.

4.4.1 Lakes

The lake sampling program was designed to obtain baseline information from benthic macroinvertebrate communities in selected lakes within the Borrow Extraction Zone. In summer, three replicate samples were collected from each of the littoral and profundal zones of Lake O1 (Figure 4.4.1). In total, 12 taxonomic groups were identified. The number of taxa in each sample ranged from 3 to 15 (Appendix E2). Summary data are provided in Table 4.4.1; site specific sampling information is summarized in Appendix E1 and raw data are presented in Appendix E2.

The total mean density ($\pm$1 standard error) of benthic macroinvertebrates in the littoral zone of Lake O1 was 5696$\pm$2119/m^2 (Table 4.4.1). The mean number of taxonomic groups was fourteen. The three most abundant taxa were Chironomidae (midges) (2797/$m^2$$\pm$964), Sphaeriidae (fingernail clams) (1275$\pm$394/m^2), and Nematoda (roundworms) (1203$\pm$988/m^2). Ostracods (seed shrimps), and oligochaetes (aquatic earthworms) were also present in the littoral benthic community.

The total mean density ($\pm$1 standard error) of benthic macroinvertebrates in the profundal zone of Lake O1 was 2478$\pm$199/m^2 (Table 4.4.1). The mean number of taxonomic groups identified was eight. The three most abundant taxa were midges (1897$\pm$283/m^2), fingernail clams (406$\pm$169/m^2), and seed shrimps (116$\pm$96/m^2). There also were considerable numbers of nematodes, water mites (Hydrachnidia), and oligochaetes.

Mean overall densities of benthic macroinvertebrates were much greater in the littoral zone than in the profundal zone of Lake O1; there was at least a two-fold difference in density (Table 4.4.1). Furthermore, the number of taxonomic groups identified in the littoral zone was greater than the number identified in the profundal zone. Taxon specific differences were also apparent; water mites were only found in profundal zone samples, while microturbellarians (microflatworms) were only found in littoral zone samples. In addition, large differences in densities were observed for nematodes (means of 1203 and 14/m^2 respectively), fingernail clams (means of 1275 and 406/m^2 respectively), and midges of the tribe Chironomini (means of 1522 and 130/m^2 respectively). In contrast, midges of the tribe Tanypodinae were more abundant in the profundal zone (1420$\pm$151/m^2) than in the littoral zone (478$\pm$100/m^2).

4.4.2 Streams

A benthic macroinvertebrate sampling program was conducted in Stream O18 (Site B3) of the Borrow Extraction Zone in the summer of 1996 (Figure 4.4.1). Site specific sampling information is summarized in Appendix E3, while raw data are presented in Appendix E4. In total, 25 different taxonomic groups were identified; the number of taxa in each sample ranged from 20 to 28.

The benthic macroinvertebrate community in Stream O18 was dominated by oligochaetes (1301$\pm$491/m^2), ostracods (1240$\pm$399/m^2), and midges (mean of 1050$\pm$355/m^2). Other taxa with high densities included nematodes, nemourid stoneflies (Plecoptera), and hydroids (Coelenterata). The total mean density of benthic macroinvertebrates and the mean number of taxa in Stream O18 were low (5470$\pm$993/m^2 and 25$\pm$2/m^2, respectively) (Table 4.4.2).

4.4.3 Summary

4.4.3.1 Lakes

Overall, mean densities and number of taxonomic groups of benthic macroinvertebrates were greater in the littoral zone than the profundal zone of Lake O1. This reflects the higher productivity of shallow-water habitats due to higher water temperatures and greater light penetration. Anoxia of the profundal zone was not recorded during the 1996 open water season (see Section 4.1) and probably was not a factor in benthic macroinvertebrate production. Taxonomic composition was indicative of a short growing season and a homogenous substrate dominated by fine sediments.

The mean number of taxonomic groups identified in the littoral zone (14) was greater than the number identified in the profundal zone (8) of Lake O1. Taxon specific differences were also apparent; water mites were only identified in samples collected from the profundal zone, while microturbellarians (microflatworms) were only found in littoral zone samples. In addition, there were large differences in densities. Differences were observed for nematodes, fingernail clams, and midges of the tribe Chironomini (littoral zone densities were much greater). Midges of the tribe Tanypodinae exhibited the opposite trend; densities of this taxon were more abundant in the profundal zone than in the littoral zone.

4.4.3.2 Streams

One stream site was sampled for benthic macroinvertebrates within the Borrow Extraction Zone. The benthic macroinvertebrate community in Stream O18, was dominated by oligochaetes (aquatic earthworms), ostracods (seed shrimps), and chironomids (midges). Other taxa with considerable densities included nematodes (roundworms), nemourid stoneflies (Plecoptera), and hydroids (Coelenterata). The species composition and low densities were typical of nutrient poor systems (Hynes 1970; Resh and Rosenberg 1984; Rosenberg and Resh 1993).

4.5 FISH

4.5.1 Species Composition and Abundance

The 1996 aquatic studies fish sampling program was designed to provide information on species composition and abundance in the Borrow Extraction Zone. Sampling was conducted during spring, summer, and fall in a variety of habitats using several inventory techniques. In lakes, these techniques included gillnetting, angling, and the use of gee traps. In streams, fish were inventoried using backpack electrofishing and snorkelling. The following section provides summary information for fish communities in selected lakes and streams; all raw data are presented in Appendices F1 to F5.

4.5.1.1 Lakes

Five lakes were sampled during the 1996 fisheries program (Figure 4.5.1); Lakes O1 to O5. None of these waterbodies were examined during the 1995 investigation.

In total, 214 fish representing seven species were sampled from lakes in the Borrow Extraction Zone (Table 4.5.1). In order of numerical importance, they were Arctic char (85), lake trout (70), round whitefish (28), ninespine stickleback (18), Arctic grayling (10), slimy sculpin (2), and burbot (1). The relative importance of a particular fish species within each lake was not constant (Table 4.5.2). In Lake O1, situated the farthest upstream within the Borrow Extraction Zone drainage, Arctic char dominated the sample (75%). Lake trout was second in importance (23%), followed by low numbers of round whitefish and slimy sculpin (each species accounted for 1% of the sample). In Lakes O2, O3, and O4, Arctic char was also important, but this species did not dominate the sample (<27% in each of the lakes). The dominant species in these lakes were as follows: round whitefish in Lakes O2 and O4 (39% and 45%, respectively) and lake trout in Lake O3 (58%). In Lake O5, lake trout dominated the sample (47%), followed by ninespine stickleback (23%) and Arctic grayling (17%). Other species, such as round whitefish and Arctic char, were not as important as in other waterbodies (9% and 4% of sample, respectively).

To assess the relative abundance of fish in each of the sampled lakes, gill net catch data for each lake were summarized. These data were used for comparison purposes because they were based on a standardized sampling effort and the majority of fish were captured using this technique (193 of 214 fish).

The relative abundance (catch-per-unit-effort or CPUE) values generated for fish captured in each lake (Figure 4.5.2) were consistent with the percent composition information. However, the relative abundance of fish varied between seasons and between lakes. Catch rates for most species tended to be higher during fall than during summer.

A number of reasons may explain the higher catch rates recorded during fall. Seasonal differences existed in the sampling strategy employed. In summer, a variety of habitats and locations were sampled to assess fish distribution patterns. In an effort to identify spawning areas, fall sampling was restricted to sites thought to contain suitable spawning habitat; areas where higher numbers of fish were usually present. Higher catch rates during fall may also have reflected greater movement by fish, which would have increased their vulnerability to capture by gill nets (i.e., cooler water temperatures in fall may have induced feeding and/or spawning activity). Given these factors, CPUE values recorded during fall may not be indicative of real changes in fish abundance. As such, the following discussion will concentrate on findings made during the summer period.

The data suggested that overall fish abundance indices in summer differed among lakes. CPUE values were highest in Lake O1 (11 fish/100 $m^2 \cdot 12$ h, respectively), followed by Lake O5 which exhibited the next highest overall catch rates (7 fish/100 m^2 · 12 h, respectively). Combined CPUE values for fish in each of the three remaining waterbodies were lower (between 3 and 7 fish/100 m^2 · 12 h). Variation in catch rates among lakes likely was related to differences in lake size and productivity.

Catch rates for specific species also varied among lakes during summer. In general, Arctic char and lake trout exhibited the highest abundance indices. CPUE values for Arctic char were highest in Lake O1 (9 fish/100 m^2 · 12 h), while, CPUE values for lake trout were highest in Lakes O5 and O3 (5 and 4 fish/100 m^2 · 12 h, respectively). For other species, catch rates were much lower. Although round whitefish was the most abundant fish in Lake O2 during summer, CPUE values did not exceed 3 fish/100 m^2 · 12 h. Similarly, catch-per-unit-effort values for Arctic grayling did not exceed 2 fish/100 m^2 · 12 h in Lake O5, the only waterbody where this species was found.

4.5.1.2 Streams

Of the 17 streams investigated within the Borrow Extraction Zone, 14 contained fish (Figure 4.5.1). These streams were situated within five general areas: Lake O1 (2 tributaries), Lake O2 (2 tributaries), Lake O3 (3 tributaries), Lake O4 (4 tributaries), and Lake O5 (3 tributaries). Two of these watercourses (Streams O5 and O6) were investigated during the 1995 fisheries program.

In total, 687 fish representing seven species were enumerated in the Borrow Extraction Zone (Table 4.5.3). Slimy sculpin dominated the sample (215) followed by Arctic grayling and Arctic char (155 and 151, respectively). Other species encountered were ninespine stickleback (116), burbot (38), round whitefish (10), and lake trout (2). The number of fish recorded varied depending on sampling area (Table 4.5.4). Most fish were recorded from streams in the Lake O4 and Lake O1 areas (199 and 179, respectively), followed by streams located in the Lake O5 area (135 fish). In contrast, fewer than 100 fish were encountered in each of the two remaining areas (Lakes O2 and O3).

The number of species encountered was relatively constant among sampling areas (Table 4.5.4). Seven species were identified in Lake O1 and O2 area streams, while six species were found in the Lake O4 area (all except lake trout), and five species were encountered in Lakes O3 and O5 areas (all except lake trout and round whitefish).

The relative importance of each species in the Borrow Extraction Zone differed among areas. Arctic char was the dominant species in the Lake O1 area (56%) followed by slimy sculpin (24%). In Lake O2 area streams, slimy sculpin dominated the sample (60%), and Arctic grayling was the second most important species (34%). Similarly, slimy sculpin dominated in the Lake O3 area (54%), however, Arctic char replaced Arctic grayling as the second most important species (27%). Ninespine stickleback dominated the sample in the Lake O4 area (35%), while Arctic grayling and slimy sculpin were equal in importance (20%). In the Lake O5 area, Arctic grayling was the dominant species (47%); ninespine stickleback and slimy sculpin were also important (24%).

The species composition and numerical abundance of fish varied between individual streams within each area (Figure 4.5.3). Of the two streams inventoried in the Lake O1 area, Stream O18 exhibited the highest species diversity (7) and fish number (169). The majority of fish recorded in this stream were Arctic char (95). It should be noted that this high number was related to the increased sampling effort expended in this particular system. Stream O19 contained fewer species (3) and much lower numbers of fish (10).

Two streams (O9 and O22) were associated with Lake O2. Both systems were dominated by Arctic grayling and slimy sculpin, however, their numbers were highest in Stream O22 (23 Arctic grayling and 47 slimy sculpin).

The three streams within the Lake O3 area differed in the fish numbers recorded. Stream O21 contained the greatest number of fish (48) and these were dominated almost entirely by slimy sculpin. In total, 29 fish were recorded in Stream 21, of which Arctic char were most important (23). In contrast, few fish were recorded in Stream O16 (4).

Streams in the Lake O4 area also varied in the fish numbers recorded. Most fish were encountered in Stream O6 (119) and these were dominated by ninespine stickleback (49) and Arctic grayling (40). Stream O12 exhibited the second highest number of fish (62), but in this system, slimy sculpin, Arctic char and ninespine stickleback were equal in importance (21, 17, and 14 fish, respectively). The two remaining streams contained few fish (< 12).

In the fifth area of the Borrow Extraction Zone (Lake O5), individual stream species assemblages were similar. Streams O5 and O6A contained the highest numbers of fish (72 and 60, respectively). Arctic grayling, ninespine stickleback, and slimy sculpin were also present in these watercourses. Arctic grayling dominated the sample in Stream O5 (47). In Stream O6A, ninespine stickleback were most numerous (25), while only one Arctic char and two Arctic grayling were recorded in Stream O14.

4.5.2 Biological Characteristics

An important component of the 1996 fisheries program was to describe the biological characteristics of fish species encountered in the Borrow Extraction Zone of the Jericho study area. Characteristics described in this section include: length-frequency distributions, length-weight regressions, mean condition factors, age-at-maturity, mean length-at-age, and mean weight-at-age. Because much of this information was collected from fish that succumbed during sampling, and mortality rates were generally low, sample sizes are small. Unless otherwise stated, data from all sampling sessions and sampling methods have been combined for the analyses. Raw data used for these analyses are presented in Appendix F5.

4.5.2.1 Lake trout

The majority of lake trout captured in the Borrow Extraction Zone ranged in fork length from 104 to 620 mm, however, few individuals were less than 160 mm or greater than 620 mm in length (Figure 4.5.4). Samples sizes were sufficiently large enough to generate length-frequency distributions for fish sampled from Lake O1 only; data for other waterbodies were grouped (Lakes O2, O3, O4, and O5 combined). The length-frequency distributions were similar; the majority of fish were between 400 and 600 mm in fork length.

Length-weight regression equations and mean condition factors for lake trout sampled from selected lakes in the Borrow Extraction Zone during summer are presented in Table 4.5.5.

Age-at-length and age-at-weight information for a sample of lake trout collected from all waterbodies during summer and fall combined are provided in Table 4.5.6 (data from individual waterbodies were combined due to insufficient sample sizes). Fish in this sample ranged in age from 1 to 36 years. Caution should be used when interpreting this information. The sample used for ageing was small (n=20) and there was variation inherent to this type of data (subarctic fish populations typically exhibit a great range in age for fish of a given length [Johnson 1972]). As such, this information provides only a representative cross-section of the population and should not be interpreted as an accurate description of growth rate. As such, it should not be used for comparison of growth curves among different fish populations.

Limited data were available to assess age-at-maturity for lake trout. Information collected from all sampled waterbodies suggested that these fish became sexually mature at 10 years of age. The smallest sexually mature lake trout encountered was 447 mm in fork length. This fish was a ripe male captured from Lake O1. Nonfecund lake trout were also identified during the present study (i.e., mature fish that did not spawn that year). The percentage of nonfecund individuals in the combined sample of mature fish that could be assessed for sexual maturity was 17% (n=29).

4.5.2.2 Arctic Char

The fork length of sampled Arctic char ranged from 34 to 620 mm (Figure 4.5.5). Length-frequency distributions of fish sampled from Lake O1 and other waterbodies (data for Lakes O2, O3, O4, and O5 combined due to insufficient sample sizes) were similar; fish less than 100 mm in length dominated the sample. These individuals represented young-of-the-year and yearling fish captured from tributary streams. The other major grouping consisted of fish between 280 and 640 mm fork length.

Length-weight regression equations and mean condition factors for Arctic char sampled from selected lakes within the Borrow Extraction Zone during summer are presented in Table 4.5.7.

Age-at-length and age-at-weight information for the sample of Arctic char captured from Lake O1 during summer and fall combined are provided in Table 4.5.6 (insufficient data were available from other waterbodies). Fish in this sample ranged in age from 0 to 12 years. As for lake trout, caution should be used when interpreting this information. The sample used for ageing was small (n=32) and there was variation inherent to this type of data (subarctic fish populations typically exhibit a great range in age for fish of a given length [Johnson 1972]). As such, this information provides only a representative cross-section of the population and should not be interpreted as an accurate description of growth rate. As such, it should not be used for comparison of growth curves among different fish populations.

Limited age-at-maturity data for Arctic char suggests that fish became sexually mature at 8 years of age. The smallest sexually mature Arctic char was a gravid male 465 mm in fork length captured from Lake O1. Nonfecund Arctic char were also recorded during the study. The percentage of nonfecund individuals in the sample of mature fish that could be assessed for sexual maturity was 31% (n=26).

4.5.2.3 Round Whitefish

The fork length of round whitefish sampled from waterbodies in the Borrow Extraction Zone ranged from 97 to 513 mm (Figure 4.5.6); the median length of sampled fish was 280 mm.

The length-weight regression equation and mean condition factor for round whitefish during summer was:

$$\text{Weight (g)} = 3.365 * 10^{-6} * \text{Fork Length (mm)}^{3.208}$$

where: $n=11$ and $r^2=0.998$; and,

Mean Condition Factor = 1.079 ± 0.056.

Age-at-length and age-at-weight information for a sample of round whitefish from all sampled lakes and all seasons combined are presented in Table 4.5.6. Fish in this sample ranged in age from 1 to 23 years. Past investigations of subarctic round whitefish populations have not documented the existence of fish 15 years of age and older (Kennedy 1949 and Mackay 1989). However, several individuals in the sample did exceed this age. This discrepancy can be explained by use of different ageing structures; past studies have employed scales, whereas the present study utilized otoliths. It is now commonly accepted that otoliths allow a more accurate assessment of fish age than scales, particularly for older aged fish (Jessop 1972 and Mackay et al. 1990).

Limited data were available to assess age-at-maturity of round whitefish. These data suggested that fish became sexually mature at 8 years of age. The smallest sexually mature round whitefish encountered during the study was 388 mm fork length. This fish was a ripe male captured from Lake O2. Nonfecund round whitefish were not recorded during the study.

4.5.2.4 Arctic Grayling

The fork length of Arctic grayling sampled from waterbodies within the Borrow Extraction Zone ranged from 36 to 426 mm (Figure 4.5.6); the majority of fish were less than 180 mm fork length. The median length of sampled fish was 119 mm. Most sampled fish were captured from study area streams and represented either young-of-the-year (modal peak of 60 mm) or juvenile fish (modal peak of 110 mm). The small number of adult fish (n=7), all of which were captured in study area lakes, ranged in fork length from 247 mm to 426 mm.

The length-weight regression equation and mean condition factor for Arctic grayling (all seasons combined) was:

$$\text{Weight (g)} = 2.371 * 10^{-6} * \text{Fork Length (mm)}^{3.295}$$

where: n=61 and r^2=0.974; and,

$$\text{Mean Condition Factor} = 1.054 \pm 0.028.$$

Ages were assessed for Arctic grayling using data for all lakes and seasons combined (Table 4.5.6). Fish in this sample ranged in age from 0 (52 mm fork length) to 7 years (393 mm fork length). No age-at-maturity data were available for this species.

4.5.3 Feeding Habits

Stomach contents of four species (lake trout, Arctic char, round whitefish, and Arctic grayling) were analysed to assess feeding habits (all seasons and lakes combined). Data were collected from fish that succumbed during capture or that were sacrificed for tissue samples. The information is presented as frequency of occurrence and percent composition of food items by volume. The raw data used for these analyses can be found in Appendix F5.

4.5.3.1 Lake trout

The diet of lake trout was diverse (Figure 4.5.7). Items consumed included zooplankton, fish, trichopterans, chironomids, pelecypods, and eubranchiopods. The most important food groups in the lake trout diet were fish (33% occurrence and 41% composition by volume) and eubranchiopods (tadpole shrimp) (37% occurrence and 37% composition by volume). Zooplankton, which was an important food item for other fish species in the Borrow Extraction Zone, was not a major component of the lake trout diet (22% occurrence and 18% composition by volume).

4.5.3.2 Arctic char

The diet of Arctic char consisted principally of zooplankton. This food item exceeded 23% occurrence and 61% composition by volume. The only other food item of importance was eubranchiopods (7% occurrence and 12% composition by volume). A large percentage of Arctic char stomachs in the sample were empty (70%).

4.5.3.3 Round whitefish

This species consumed a limited variety of food items; these were zooplankton, trichopterans, and pelecypods. The dominant food item consumed was trichopterans (62% occurrence and 52% composition by volume). The only other food item of importance was zooplankton (46% occurrence and 36% composition by volume).

4.5.3.4 Arctic grayling

Similar to findings for other species, the diet of Arctic grayling consisted primarily of zooplankton (83% occurrence and 62% composition by volume). Other food items consumed were chironomids, and eubranchiopods, but these occurred in less than 18% of the stomachs and accounted for less than 28% of the food consumed by volume.

4.5.4 Fish Movements

The Borrow Extraction Zone of the Jericho study area contains several lakes that are interconnected by small streams. Although these streams are small, the potential exists for fish to undertake movements between waterbodies. To assess movement patterns of fish in this area, a tagging program was initiated in 1996. Lake trout, Arctic char, and Arctic grayling in good physical condition were tagged and released. Round whitefish were not included in this study component because captured individuals of this species generally were in poor physical condition.

During the present study, 35 lake trout, 39 Arctic char and 3 Arctic grayling were tagged and released in five lakes (Table 4.5.8). Of these tagged fish, only one individual was recaptured (lake trout in Lake O4). This fish was marked and released on 2 August and subsequently recaptured in the same waterbody on 8 September. These limited results make it difficult to assess movement patterns of fish in the Borrow Extraction Zone. However, characteristics of watercourses in the area can be used to indicate whether movements of fish occur between waterbodies.

Four watercourses provided potential movement corridors for fish in the study area (Streams O6A, O6, O9, and O18). Stream O6A is a small system that allows free movement between Lake O5 and the Jericho River during the open water period. Fish that utilize the shallow Jericho River during summer may move into the deeper Lake O5 to overwinter. Also, species such as Arctic grayling may move from the Jericho River into Lake O5 area streams for spawning purposes.

Stream O6 connects Lake O5 to Lake O4. This small stream has a well-defined channel that would allow unrestricted fish movements during the open water period. Similar to Stream O6A, spawning Arctic grayling may also move from the Jericho River into the Borrow Extraction Zone drainage via Stream O6.

The two remaining watercourses (Stream O9 and O18) are both small, shallow, and at times, poorly-defined channels dominated by boulder substrates. These characteristics would hamper, but not prevent, movement of fish farther upstream into the Borrow Extraction Zone drainage. As such, it is unlikely that large numbers of fish undertake annual movements through these two streams.

4.5.5 Resource and Potential Harvest

Based on available information, waterbodies in the Borrow Extraction Zone were not used extensively for commercial or domestic fisheries. However, recreational use by personnel associated with exploration activity did occur. Personnel housed in the Canamera Geological Ltd. exploration camp fished Lake O1 during the 1996 study period. No anglers were observed using other lakes or any streams in the Borrow Extraction Zone.

The small size of study area lakes and their low productivity make their sport fish populations susceptible to over harvest. To estimate the annual sport fish harvest a waterbody can support, an equation that employs a lake's surface area, was developed by Evans et al. (1990) for Northern Ontario. This equation has been recommended to calculate potential annual harvest of lake trout in inland lakes (Oliver et al. 1991) and is as follows:

$$\log_{10}H \quad 0.60 \quad 0.72\ \log_{10} A$$

Where: H = potential annual harvest of lake trout (kg).
A = surface area (ha) of lake (lake surface areas based on 1:50 000 scale N.T.S. maps).

Using this formula, the potential annual harvest of lake trout from lakes in the Borrow Extraction Zone ranged between 13 kg in Lake O2 and 32 kg in Lake O1, with the larger lakes having the highest values (Table 4.5.9). This information indicates that trout species residing in the Borrow Extraction Zone waterbodies are susceptible to over harvest. Also, these values may be biassed upward due to a number of environmental differences between subarctic lakes and waterbodies in northern Ontario. Lower nutrient levels, a colder water temperature regime, and a shorter open water period in the subarctic region would significantly lower the potential harvest available in these subarctic lakes compared to those in northern Ontario.

4.5.6 Summary

Sampled lakes in the Borrow Extraction Zone supported populations of lake trout, Arctic char, round whitefish, and Arctic grayling. Arctic char was the dominant species numerically, followed closely by lake trout. All other species were not as numerous. Based on abundance indices (catch rates using standardized gill net sets), overall fish densities were highest in Lake O1 (11 fish/100 $m^2 \cdot$ 12 h in summer) followed by Lake O5 (7 fish/100 $m^2 \cdot$ 12 h in summer). CPUE values recorded in the three remaining lakes did not exceed 7 fish/100 $m^2 \cdot$ 12 h. It is unclear why catch rates differed among lakes. It is possible that they were related to differences in lake size and productivity.

In terms of the species captured, Arctic char was the dominant fish in Lake O1. Lake trout dominated in Lakes O3 and O5. Although, round whitefish were not numerous, it was the most important species in Lakes O2 and O4. Arctic grayling, was captured only in Lake O5.

Several fish species were encountered in sampled streams. Arctic grayling, ninespine stickleback, and slimy sculpin tended to be the most widespread and numerous species; although high numbers of Arctic char were recorded in some streams. Other species, such as lake trout, round whitefish, and burbot were not numerous in any of the Borrow Extraction Zone streams.

Overall, low numbers of fish were recorded in sampled streams. However, Stream O18 in the Lake O1 area supported a diverse assemblage of species and it contained the highest number of Arctic char recorded in the Borrow Extraction Zone. This stream is likely the principal rearing area for the Arctic char population in Lake O1. Likewise, Streams O5 and O6 supported high numbers of Arctic grayling. Both systems are probably spawning and rearing areas for the Arctic grayling population that resides in Lake O5.

The biological characteristics of fish populations indicated that they were slow growing, late maturing, and dominated by older age-classes. Lake dwelling species (lake trout and Arctic char) tended to exhibit bimodal length-frequency distributions and lake samples were dominated by larger, older individuals. To some extent, this reflected the sampling methodology employed (smaller size-classes were not effectively sampled using gill nets), however, these data are typical of subarctic fish populations residing in cold, oligotrophic waterbodies. It has been suggested that these characteristics are indicative of unexploited fish populations in a state of equilibrium with their environment (Johnson 1976).

The feeding habits of fish were related to a species feeding habits and the most abundant food item available. Fish was the dominant food item identified in lake trout stomachs, although nonvertebrates, such as zooplankton and eubranchiopods, were also important. Zooplankton was an important food group identified in Arctic char, round whitefish, and Arctic grayling stomachs. It was the dominant food of Arctic char and Arctic grayling. In contrast, trichopterans (an aquatic insect) was most important in round whitefish stomachs. One other food item consumed by all species were pelecypods.

Limited recapture data from tagged fish made it difficult to assess movement patterns of fish in the Borrow Extraction Zone. However, some watercourses could be used as movement corridors between waterbodies. Two watercourses provided potential movement corridors for fish in the study area (Streams O6A and O6). Stream O6A allows free movement of fish between Lake O5 and the Jericho River, while Stream O6 connects Lake O5 to Lake O4.

Based on available information, waterbodies in the Borrow Extraction Zone were not used extensively for commercial or domestic fisheries. However, recreational use by personnel associated with exploration activity did occur. The biological characteristics of fish populations in these waterbodies (i.e., slow growing and late maturing), the small size of these lakes, and their low productivity make their sport fish populations susceptible to over harvest.

4.6 HABITAT AND HABITAT USE

This study component was designed to describe aquatic habitat in lakes and streams in the Borrow Extraction Zone and to assess its value to fish communities. This section provides information for waterbodies not previously investigated, as well as new data for waterbodies that were surveyed in 1995. All raw data collected during the present study are provided in Appendices G1 and G2.

4.6.1 Lakes

The shoreline habitat characteristics of five waterbodies in the Borrow Extraction Zone were surveyed: Lakes O1 to O5 (Figure 4.6.1). Surveys were designed to provide a general assessment of the shoreline characteristics of each lake and to identify high quality habitats. These high quality habitats were: sheltered shallow-water areas containing aquatic macrophytes (submergent and emergent vegetation) suitable for fish rearing and submerged cobble, gravel, and boulder areas suitable for spawning by lake trout, Arctic char, and round whitefish.

Shoreline characteristics in each of the five lakes were uniform; all contained large amounts of fine substrates, which consisted primarily of sands and gravels (Table 4.6.1). In fact, Lake O3 was the only waterbody with areas consisting of larger substrates; cobble-boulder substrates (47%) and bedrock substrates (7%). Low shoreline slopes also predominated in most of the lakes. One exception included Lake O2 where 51% of the shoreline exhibited a high slope. As well, large sections of the Lake O4 shoreline exhibited moderate or high slopes (38% and 33%, respectively).

Potential spawning and rearing habitats were also identified during the lake surveys. Spawning habitat required by lake dwelling species such as lake trout, Arctic char, and round whitefish is characterized by the presence of clean gravel to boulder-sized substrate in areas sufficiently deep to avoid freezing (Scott and Crossman 1973). Areas with these characteristics were widely distributed in all surveyed waterbodies, therefore, spawning habitat does not appear to be limited in any of these lakes. Two potential high quality spawning sites were identified; one in Lake O3 and one in Lake O1 (Figure 4.6.1).

Rearing habitat suitable for lake dwelling fish species is characterized by shallow-water zones exhibiting low slopes and fine substrates that support the growth of aquatic macrophytes (Randall et al. 1996). These features provide shelter (i.e., protection from predators and source of food) to younger age-classes of lake trout, Arctic char, and round whitefish. In addition, they provide habitat for forage fish species, such as slimy sculpin and ninespine stickleback. Shoreline areas exhibiting these characteristics were limited in the surveyed waterbodies. Shallow water areas with fine substrates were present, however, aquatic macrophytes were restricted to protected shoreline margins. Aquatic macrophytes in these zones consisted of emergent species (*Carex* spp.) and aquatic grasses (*Glyceria* spp.); no submergent species were recorded during the habitat surveys. Few high quality rearing areas were present in any of these lakes (Figure 4.6.1).

4.6.2 Streams

Investigations of streams in the study area were undertaken during spring and summer. During spring, a reconnaissance level survey was conducted to identify streams that provided some habitat for fish communities and to assess their potential as spawning habitat (i.e., use by spring spawning Arctic grayling). Surveys during summer were used to provide a more detailed description of stream characteristics and to assess their overall potential as fish habitat.

Streams chosen for investigation during the present study included two watercourses examined in 1995; these were Streams O5 and O6 (R.L. & L. Environmental Services Ltd. 1995).

In total, 17 watercourses were examined during the 1996 sampling program (Figure 4.6.2). Of these, three contained no fish during spring sampling and were ephemeral (contained water only during the snow melt period or during rainfall events). These streams were deemed to have no value to fish communities, and therefore, did not receive more extensive investigation. The 14 streams that had some potential as fish habitat were associated with each of the five sampled lakes: Lake O1 (2), Lake O2 (2), Lake O3 (3), Lake O4 (4), and Lake O5 (3). Most of these streams were small and exhibited intermittent flow during the summer sampling period.

4.6.2.1 Lake O1 Streams

Stream O18

Stream O18 is a small watercourse that connects Lake O1 to Lake O2. This stream provides good quality fish habitat. It exhibits a well-defined channel with an abundance of RUN habitat interspersed with POOL, RIFFLE, and FLAT complexes (Table 4.6.2). The substrate in this watercourse is equally represented by sand, gravel, cobble, and boulder substrates.

A diverse assemblage of fish were recorded in Stream O18 and included Arctic char, Arctic grayling, burbot, lake trout, ninespine stickleback, round whitefish, and slimy sculpin (Table 4.6.3). Based on the presence of young-of-the-year fish and its habitat characteristics, Stream O18 provided high quality spawning habitat for Arctic grayling (Table 4.6.4). This stream also provided an abundance of rearing habitat for fish, particularly for Arctic char and Arctic grayling. In fact, this watercourse contained the highest number of Arctic char encountered during the 1996 program. Using a density estimate sampling technique (see Section 2.1.5) the density of Arctic char in Stream O18 during summer was 40 fish per 100 m$\pm$3.3 (young-of-the-year) and 9 fish per 100 m$\pm$0.6 (juveniles).

Stream O19

Stream O19 is an ephemeral watercourse that drains into Lake O1 along its southeast shore. This stream provides limited fish habitat due to the absence of water flow during summer. It exhibits an ill-defined channel that is dominated by RUN habitat and sand substrates. The few fish recorded in this stream (Arctic char, Arctic grayling, and slimy sculpin) were restricted to the lower reach.

4.6.2.2 Lake O2 Streams

Streams O9 and O22

Streams O9 and O22 form the outlet system to Lake O2. During the spring high water period, each stream drains directly in Lake O4, however, during low flow, Stream O22 connects with Stream O9 before entering the lake. These watercourses exhibit similar characteristics. They are both relatively small streams that have well-defined channels over much of their lengths. Stream O9 is dominated by RUN and FLAT habitats, whereas Stream O22 contains principally RUN habitat. Substrates in both systems consist mostly of sand, with smaller amounts of gravels and cobbles. Stream O9 also contains large amounts of boulder substrates (45%).

Species recorded in these streams were Arctic char, Arctic grayling, burbot, lake trout, ninespine stickleback, round whitefish, and slimy sculpin. Of these species, only juvenile Arctic grayling and slimy sculpin were numerous. Both streams contained good quality spawning and rearing habitat. During spring, Arctic grayling eggs were recorded in Stream O22, which suggests that it may be an important spawning area for this species. However, the absence of young-of-the-year Arctic grayling, indicates that factors other than habitat may limit its value as spawning habitat.

4.6.2.3 Lake O3 Streams

Stream O16

Streams O16 is a small, ephemeral stream that drains into Lake O3 along its southeast shore. This stream provides limited fish habitat due to minimal water flow during summer. It exhibits a well-defined channel that is dominated by FLAT habitat and sand substrates. Few fish were recorded in this stream; Arctic char, Arctic grayling, and slimy sculpins were restricted to the lower reach.

Stream O17

Stream O17 is a small watercourse that drains a small headwater lake situated to the southeast of Lake O3. Unlike Stream O16, this watercourse provides good quality fish habitat. It exhibits a well-defined channel with an abundance of RUN habitat interspersed with POOL, RIFFLE, and FLAT complexes. The substrate in this watercourse is dominated by sand, which is interspersed by pockets of gravel and cobble substrates.

Species recorded in this stream were Arctic char, ninespine stickleback, and slimy sculpin. The characteristics of this stream suggested that it provided good quality spawning habitat, however, spring spawning species such as Arctic grayling were not recorded. Stream O17 provided an abundance of good quality rearing habitat for fish, particularly for Arctic char.

Stream O21

Stream O21 is a very short, shallow watercourse that connects Lake O3 to Lake O2. It exhibits an ill-defined channel that contains an abundance of emergent vegetation. Given the abundance of cover provided by the vegetation, this stream contains good quality rearing habitat, however, its short length limits its value to fish. Species recorded in this stream were Arctic grayling, burbot, ninespine stickleback, and slimy sculpin.

4.6.2.4 Lake O4 Streams

Stream O6

Stream O6 is the drainage system for Lake O4 and connects that waterbody to Lake O5. This stream is one of the larger watercourses in the Borrow Extraction Zone. It exhibits a well-defined channel over its entire length, and its substrates are composed of sands, gravels, cobbles, and boulders. The principle habitat types are RUN and RIFFLE. These characteristics create high quality spawning and rearing habitat. Stream O6 also has sufficient depth to be used as feeding habitat by adult fish.

Six species of fish were recorded in Stream O6: Arctic char, Arctic grayling, burbot, ninespine stickleback, round whitefish, and slimy sculpin; Arctic grayling and ninespine sticklebacks were the most numerous. Both young-of-the-year and juvenile Arctic grayling were present in this stream, which suggests that it is used for spawning and rearing purposes by this species.

Streams O10, O11, O12

Due to the similarity in habitat characteristics, these streams will be discussed as a group. These tributaries are very small watercourses that drain the terrain adjacent to Lake O4. They exhibit low slopes in their lower reaches and are dominated by well-defined channels and sand substrates. The habitat in each stream consists mainly of RUN, although in Stream O11, FLAT habitat type is also important. All exhibited low flows during the summer sampling period. Of the three watercourses, Stream O12 is the largest.

Few fish were encountered in Streams O10 and O11. Small numbers of Arctic char, burbot, ninespine stickleback, and slimy sculpin were present in these systems only during spring, the only time when water flows were sufficient to support fish. As such, their value as rearing habitat was severely limited.

Stream O12 contained more species and higher numbers of fish than the other two streams; Arctic char, Arctic grayling, burbot, ninespine stickleback, and slimy sculpin were present. Due to the lack of suitable substrates, this watercourse provided only limited amounts of spawning habitat, however, good quality rearing habitat was present.

4.6.2.5 Lake O5 Streams

Stream O5

Stream O5 drains several headwater lakes located south of Lake O5. This stream is relatively large and maintains water flows during the entire open water period. This watercourse exhibits a well-defined channel over much of its length, and its substrates are composed of sands, gravels, cobbles, and boulders. The principle habitat types are RUN and RIFFLE. These characteristics provide good quality spawning and rearing habitat and makes this system one of the better streams in the Borrow Extraction Zone for species such as Arctic grayling.

Five species of fish were recorded in Stream O5: Arctic char, Arctic grayling, burbot, ninespine stickleback, and slimy sculpin. Arctic grayling were the most numerous fish and were represented by young-of-the-year and juvenile Arctic grayling. As such, this stream is likely used for both spawning and rearing purposes by this species.

Stream O6A

Stream O6A is a short outlet system that connects Lake O5 to the Jericho River. It is a relatively large stream that has water flow during the entire open water period. Its channel is well-defined and is dominated by RUN and FLAT habitats. The substrate consists primarily of sand interspersed by small amounts of cobbles and boulders.

The absence of suitable substrates limits the potential of Stream O6A as spawning habitat. It is likely that the young-of-the-year Arctic grayling recorded in this stream originated from the Jericho River and not Stream O6A. Although very short in length, Stream O6A provided good quality rearing habitat. Surveys documented the presence of Arctic grayling, burbot, ninespine stickleback, and slimy sculpin. Deep-water areas near its confluence with the Jericho River also created good quality feeding habitat for adult fish.

Streams O14

This watercourse is a small outlet stream in the headwater area of the Stream O5 drainage system. Stream O14 is ephemeral and contained flowing water only during spring. It is characterized by a well-defined channel and cobble substrates. The habitat in this stream consisted mainly of RIFFLE.

Very few fish were encountered in Stream O14 (1 Arctic char and 2 Arctic grayling). Given its small size, its value to fish is severely limited. It should be noted, however, that the presence of fish in a small headwater system such as Stream O14, strongly indicates that the headwater lakes in this area are capable of supporting fish.

4.6.3 Summary

The shoreline areas of lakes in the Borrow Extraction Zone were dominated by fine substrates consisting of sands and gravels. These shoreline characteristics provided an abundance of potential spawning areas for species such as lake trout, Arctic char, and round whitefish. Therefore, spawning areas were not limited in any of the surveyed lakes. In contrast, a paucity of aquatic macrophytes in these lakes severely limited the availability of rearing habitat.

Habitat surveys were undertaken in 17 streams within the Borrow Extraction Zone. In general they provided limited habitat for fish populations originating from study area lakes. The primary reasons for low quality fish habitat in these streams were their small size and intermittent flow during the summer. Some streams did provide better quality habitat.

One watercourse in the Lake O1 area (Stream O18) provided high quality spawning habitat for Arctic grayling and an abundance of rearing habitat for Arctic char. Stream O6 is the drainage system for Lake O4. This stream is one of the larger watercourses in the Borrow Extraction Zone and exhibits a well-defined channel over its entire length. These characteristics created good quality spawning and rearing habitat for Arctic grayling, as well as feeding habitat for adult fish. Similarly, Stream O5 in the Lake O5 area provided good quality spawning and rearing habitat and makes this system one of the better streams in the Borrow Extraction Zone.

SECTION 4 - TABLES

Table 4.1.1 Morphometric characteristics[a] of surveyed lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Lake	Surface Area (ha)	Lake Volume (m)	Mean Depth (m)	Maximum Depth (m)	Shoreline Length (m)	Shoreline Development Ratio
Lake O1[b]	18.1	7.345×10^5	4.1	14	1900	1.26
Lake O2[b]	5.3	1.130×10^5	2.5	7	900	1.11
Lake O3	8.3	-	-	11	1250	1.22
Lake O4	16.7	-	-	8	1550	1.07
Lake O5	16.7	-	-	5	1900	1.31

[a]Unless otherwise stated, morphometric characteristics are based on measurements from a 1:50 000 NTS map and field observations.
[b]Morphometric characteristics (with the exception of shoreline length) provided by Canamera Geological Ltd.

Table 4.2.1 Phytoplankton biovolume in sampled lakes during summer and fall within the Borrow Extraction Zone, Jericho study area, 1996.

Taxonomic Group	Lake O1 (Site PL4)			
	Summer		Fall	
	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%
Bacillariophyta (diatoms)	26 914	4.1	91 525	10.2
Cryptophyta (cryptomonads)	17 576	2.7	28 391	3.2
Chrysophyta (golden-brown algae)	368 138	56.0	677 155	75.2
Pyrrophyta (dinoflagellates)	154 248	23.5	20 145	2.2
Euglenophyta (euglenoid)				
Chlorophyta (green algae)	64 931	9.9	64 959	7.2
Cyanophyta (cyanobacteria)	25 429	3.9	18 080	2.0
Total Biovolume	**657 236**	**100**	**900 255**	**100**

Table 4.2.2 Zooplankton biomass in sampled lakes during summer and fall within the Borrow Extraction Zone, Jericho study area, 1996.

Taxonomic Group	Lake O1 (Site PL4)			
	Summer		Fall	
	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%
Copepoda Calanoida	31 970	11.9	88 901	83.0
Cyclopoida			8132	7.6
Cladocera	234 919	87.2	7386	6.9
Rotifera	2477	0.9	2751	2.6
Total Biomass	**269 366**	**100**	**107 170**	**100**

Table 4.4.1 Mean density[a] (±1 standard error) of benthic macroinvertebrates in the littoral and profundal zones[b] of Lake O1 within the Borrow Extraction Zone, Jericho study area, 1996.

Taxonomic Group	Lake O1	
	Littoral (Site L4)	**Profundal (Site P4)**
ANNELIDA		
OLIGOCHAETA	101 (38)	29 (29)
ARTHROPODA		
HYDRACHNIDIA		14 (14)
CRUSTACEA		
COPEPODA		
Harpacticoida	43 (43)	
OSTRACODA	159 (58)	116 (96)
INSECTA		
DIPTERA		
Chironomidae[c]	2797 (965)	1897(283)
Chironomini	1522 (634)	130 (66)
Diamesinae	217 (116)	14 (14)
Orthocladiinae	580 (115)	333 (52)
Tanypodinae	478 (100)	1420 (151)
Tanytarsini		
TRICHOPTERA		
Limnephilidae		
Gresnia	14 (14)	
MICROTURBELLARIA	14 (14)	
MOLLUSCA		
PELECYPODA		
Sphaeriidae	1275 (394)	406 (169)
NEMATODA	1203 (988)	14 (14)
Total No. Benthic Taxa/m²	**14 (1)**	**8 (2)**
Total No. of Benthic Invertebrates/m²	**5696 (2119)**	**2478 (199)**

[a]Mean density (No./m^2) value and standard error generated using three replicate samples.
[b]For definition of littoral and profundal zones see Section 2.2.5.
[c]Sum of all subfamilies and tribes.

Table 4.4.2 Mean density[a] (±1 standard error) of benthic macroinvertebrates in Stream O18 within the Borrow Extraction Zone, Jericho study area, 1996.

Taxonomic Group	Stream O18 (Site B3)
COELENTERATA	
Hydridae	
Hydra	179 (64)
ANNELIDA	
OLIGOCHAETA	1301 (491)
ARTHROPODA	
HYDRACHNIDIA	54 (25)
CRUSTACEA	
COPEPODA	
Harpacticoida	43 (0)
OSTRACODA	1240 (399)
INSECTA	
DIPTERA	
Chironomidae[b]	1050 (355)
Chironomini	72 (36)
Diamesinae	
Orthocladiinae	480 (169)
Tanypodinae	276 (106)
Tanytarsini	222 (44)
Empididae	25 (25)
Simulidae	22 (6)
Tipulidae	394 (79)
PLECOPTERA	
Perlodidae	
Nemouridae	366 (188)
TRICHOPTERA	
Limnephilidae	
Gresnia	129 (22)
MICROTURBELLARIA	72 (38)
NEMATODA	566 (332)
Total No. Aquatic Taxa/m^2	**25 (2)**
Total No. of Aquatic Invertebrates/m^2	**5470 (993)**

[a]Mean density (No./m^2) value and standard error generated using three replicate samples.
[b]Sum of all subfamilies and tribes.

Table 4.5.1 Overall species composition of fish sampled from lakes within the Borrow Extraction Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species		Total	
Common Name	**Scientific Name**	**Number**	**Percent**
Arctic char	*Salvelinus alpinus* (Linnaeus)	85	39.7
Arctic grayling	*Thymallus arcticus* (Pallas)	10	4.7
Burbot	*Lota lota* (Linnaeus)	1	0.5
Lake trout	*Salvelinus namaycush* (Walbaum)	70	32.7
Ninespine stickleback	*Pungitius pungitius* (Linnaeus)	18	8.4
Round whitefish	*Prosopium cylindraceum* (Pallas)	28	13.1
Slimy sculpin[a]	*Cottus cognatus* Richardson	2	0.9
All Species Combined		**214**	**100.0**

[a]Species designation based on identification of a subsample of preserved individuals ($n=1$).

Table 4.5.2 Species composition of fish sampled from lakes within the Borrow Extraction Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species	Lake O1		Lake O2		Lake O3		Lake O4		Lake O5	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Arctic char	66	75.0	4	22.2	5	20.8	8	25.8	2	3.8
Arctic grayling					1	4.2			9	17.0
Burbot					1	4.2				
Lake trout	20	22.7	3	16.7	14	58.3	8	25.8	25	47.2
Ninespine stickleback			3	16.7	2	8.3	1	3.2	12	22.6
Round whitefish	1	1.1	7	38.9	1	4.2	14	45.2	5	9.4
Slimy sculpin	1	1.1	1	5.6						
Total	**88**	**100.0**	**18**	**100.0**	**24**	**100.0**	**31**	**100.0**	**53**	**100.0**

Table 4.5.3 Overall species composition of fish sampled from streams within the Borrow Extraction Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species		Total	
Common Name	**Scientific Name**	**Number**	**Percent**
Arctic char	*Salvelinus alpinus* (Linnaeus)	151	22.0
Arctic grayling	*Thymallus arcticus* (Pallas)	155	22.6
Burbot	*Lota lota* (Linnaeus)	38	5.5
Lake trout	*Salvelinus namaycush* (Walbaum)	2	0.3
Ninespine stickleback	*Pungitius pungitius* (Linnaeus)	116	16.9
Round whitefish	*Prosopium cylindraceum* (Pallas)	10	1.5
Slimy sculpin[a]	*Cottus cognatus* Richardson	215	31.3
All Species Combined		**687**	**100**

[a]Species designation based on identification of a subsample of preserved individuals ($n=5$).

Table 4.5.4 Species composition of fish sampled from streams in five areas within the Borrow Extraction Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species	Lake O1		Lake O2		Lake O3		Lake O4		Lake O5	
	No.	%	No.	%	No.	%	No.	%	No.	%
Arctic char	101	56.4	1	1.1	22	27.2	25	12.6	2	1.5
Arctic grayling	13	7.3	32	34.4	6	7.4	41	20.6	63	46.7
Burbot	9	5.0	1	1.1	1	1.2	21	10.6	6	4.4
Lake trout	1	0.6	1	1.1						
Ninespine stickleback	5	2.8	1	1.1	8	9.9	70	35.2	32	23.7
Round whitefish	7	3.9	1	1.1			2	1.0		
Slimy sculpin	43	24.0	56	60.2	44	54.3	40	20.1	32	23.7
Total	**179**	**100.0**	**93**	**100.0**	**81**	**100.0**	**199**	**100.0**	**135**	**100.0**

Table 4.5.5 Length-weight regression equations and mean condition factors for lake trout sampled during summer from selected lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Lake	Length-weight Relationship		Condition Factor (±SE)	Sample Size
	Regression Equation[a]	r^2 Value		
Lake O1	Weight = $5.080 * 10^{-7}$ * Fork Length$^{3.497}$	0.998	1.105 ± 0.169	6
Lakes O2, O3, O4, and O5[b]	Weight = $9.705 * 10^{-6}$ * Fork Length$^{3.042}$	0.984	1.264 ± 0.038	25

[a]Weight in g; fork length in mm.
[b]Data are combined due to insufficient samples sizes from individual lakes.

Table 4.5.6 Age-length relationships for Arctic char, Arctic grayling, lake trout, and round whitefish sampled within the Borrow Extraction Zone, Jericho study area, 1996.

Age	Arctic char[a]					Arctic grayling[b]					Lake trout[b]					Round whitefish[b]				
	Fork Length (mm)		Weight (g)		*n*	Fork Length (mm)		Weight (g)		*n*	Fork Length (mm)		Weight (g)		*n*	Fork Length (mm)		Weight (g)		*n*
	Mean	Range	Mean	Range		Mean	Range	Mean	Range		Mean	Range	Mean	Range		Mean	Range	Mean	Range	
0	52	45 - 66			7	52	45 - 56			9										
1	94	84 - 106	8	5 - 10	4	104	87 - 114	12	8 - 18	6	104		6		1	105	100 - 111	11	10 - 12	4
2	151	129 - 173	33	20 - 46	2	162	116 - 188	51	18 - 72	11						127	111 - 168	10		8
3	329		378		1	247		195		1						188	187 - 188	62	52 - 72	2
4	257	197 - 318	193	78 - 322	3	327		395		1						271		224		1
5	273		190		1						189	160 - 217	85	45 - 125	2					
6	229		126		1	404		900		1	247		190		1					
7	410	376 - 457	654	424 - 982	3	393	385 - 400	863	820 - 905	2										
8	417	342 - 465	817	400 - 1140	3						372	332 - 408	648	465 - 805	3	388		784		1
9	505	485 - 528	1205	1130 - 1250	3						399	283 - 478	888	280 - 1410	3					
10											456	426 - 490	1243	890 - 1650	3	471		1330		1
11	541	522 - 560	1454	1262 - 1646	2						447		950		1	476		1240		1
12	588	563 - 613	1653	1322 - 1984	2						436	430 - 442	905	850 - 960	2					
13																				
14																				
15																513		1580		1
16																				
17																				
18																				
19																				
20																				
21																				
22																505		1650		1
23																486		1340		1
24																				
25																				
26											598		2610		1					
27																				
28																				
29																				
30																				
31																				
32																				
33											530		1430		1					
34																				
35																				
36											608	594 - 622	2743	2326 - 3160	2					

[a]Ages generated using fish sampled during summer and fall from Lake O1 and associated streams.
[b]Ages generated using fish sampled during summer and fall from all lakes and streams within zone.

Table 4.5.7 Length-weight regression equations and mean condition factors for Arctic char sampled during summer from selected lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Lake	Length-weight Relationship		Condition Factor (±SE)	Sample Size
	Regression Equation[a]	r^2 Value		
Lake O1	Weight = $2.495 * 10^{-5}$ * Fork Length$^{2.839}$	0.981	0.963 ± 0.021	37
Lakes O2, O3, O4, and O5[b]	Weight = $3.614 * 10^{-5}$ * Fork Length$^{2.801}$	0.953	1.048 ± 0.038	10

[a]Weight in g; fork length in mm.
[b]Data are combined due to insufficient sample sizes from individual lakes.

Table 4.5.8 Number of lake trout, Arctic char, and Arctic grayling marked (and recaptured) in lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Waterbody	Lake Trout	Arctic char	Arctic grayling	Total
Lake O1	15	30	-	45 (0)
Lake O2	1	4	-	5 (0)
Lake O3	7	3	-	10 (0)
Lake O4	4 (1)	2	-	6 (1)
Lake O5	8	-	3	11 (0)
Total	**35 (1)**	**39 (0)**	**3 (0)**	**77 (1)**

Table 4.5.9 Surface areas and potential annual harvests of lake trout populations in lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Lake	Surface Area (ha)[a]	Potential Harvest of Lake Trout (kg/yr)[b]
Lake O1	18.1	32.0
Lake O2	5.3	13.2
Lake O3	8.3	18.3
Lake O4	16.7	30.2
Lake O5	16.7	30.2

[a]Lake surface area provided by Canamera Geological Ltd. (Lakes O1 and O2) or measured from 1:50 000 scale N.T.S. maps.
[b]Based on Evan's formula for harvest.

Table 4.6.1 Summary of lakeshore habitat characteristics recorded for sampled waterbodies within the Borrow Extraction Zone, Jericho study area, 1996.

Habitat Zone[a]		Lake O1		Lake O2		Lake O3		Lake O4		Lake O5	
Slope	**Substrate**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**
Low	Fines	1426	100	229	49	279	45.2	260	29.2	1079	78.4
	Cobble-Boulder										
	Bedrock										
Moderate	Fines							340	38.2		
	Cobble-Boulder					293	47.4			297	21.6
	Bedrock										
High	Fines			238	51			290	32.6		
	Cobble-Boulder										
	Bedrock					46	7.4				
Total		**1426**	**100**	**466**	**100**	**617**	**100**	**890**	**100**	**1376**	**100**

[a]For definition of habitat zones see Appendix A1.

Table 4.6.2 Summary of habitat characteristics[a] of inventoried streams within the Borrow Extraction Zone, Jericho study area, 1996.

Area	Stream	Surveyed Length (m)	Average Wetted Width (m)	Discharge[b] (m^3/s)	Slope (%)	Channel Type (%)		Bank Type (%)		Habitat Type (%)						Substrate Type (%)				
						Single	Multiple	Distinct	Indistinct	Pool	Run	Flat	Cascade	Riffle/ Rapid	Dispersed	Si/Sa	Gr	Co	Bo	Bed
O1	O18	450	0.6	0.004	2.0	90	10	100		13	65	13		10		33	22	20	24	
	O19	150	0.5	0.000	1.0	50	50	50	50	10	70	10		10		70	10	20		
O2	O9	1690	2.5	0.075	1.0	100		98	2	4	40	39		17		29	20	16	45	
	O22	325	0.5	0.075	1.0	100		100			95			5		60	30	10		
O3	O16	30	0.5	0.000	1.0	100		100				100				100				
	O17	220	0.5	0.002	2.0	100		100		15	55	10		20		65	20	15		
	O21	90	5.0	0.038	1.0	100		40	60		40	60				60	25	15		
O4	O6[c]	800	2.8	0.079	1.0	100		100			88			12		24	14	27	35	
	O10	100	0.4	0.002	2.0	100		90	10	15	85					95		5		
	O11	100	0.9	0.000	1.0	100		100			50	50				100				
	O12	300	0.4	0.006	1.0	100		100		10	70		10	10		90		5	5	
O5	O5[c]	900	1.7	0.045	2.0	56	44	56	44		56			44		19	10	63	8	
	O6A	300	2.0	0.113	1.0	100		80	20		55	40		5		90		5	5	
	O14	40	0.8	0.000	2.0	100		100		10				90		5	10	80	5	

[a]For classification system see Appendix A.
[b]Discharge measured during summer base flow period.
[c]Habitat data collected during 1995 study; discharge measured during 1996.

Table 4.6.3 Number of fish recorded in sampled streams according to age-class within the Borrow Extraction Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Area	Tributary	Species	Age-Class[a]			
			Young-of-the-year	Juvenile	Adult	Combined
Lake O1	O18	Arctic char	61	33	1	95
		Arctic grayling	12			12
		Burbot	8	1		9
		Lake trout		1		1
		Ninespine stickleback				5
		Round whitefish		7		7
		Slimy sculpin				40
	O19	Arctic char	2	4		6
		Arctic grayling		1		1
		Slimy sculpin				3
Lake O2	O9	Arctic char	1			1
		Arctic grayling		9		9
		Lake trout		1		1
		Slimy sculpin				9
	O22	Arctic grayling		23		23
		Burbot		1		1
		Ninespine stickleback				1
		Round whitefish		1		1
		Slimy sculpin				47
Lake O3	O16	Arctic char	2			2
		Arctic grayling		1		1
		Slimy sculpin				1
	O17	Arctic char	13	7		20
		Ninespine stickleback				2
		Slimy sculpin				7
	O21	Arctic grayling		5		5
		Burbot	1			1
		Ninespine stickleback				6
		Slimy sculpin				36
Lake O4	O6	Arctic char	1	3		4
		Arctic grayling	27	13		40
		Burbot	8			8
		Ninespine stickleback				49
		Round whitefish		2		2
		Slimy sculpin				16
	O10	Arctic char	2	2		4
		Burbot	4			4
		Slimy sculpin				3
	O11	Ninespine stickleback				7
	O12	Arctic char	15	2		17
		Arctic grayling		1		1
		Burbot		9		9
		Ninespine stickleback				14
		Slimy sculpin				21
Lake O5	O5	Arctic char	1			1
		Arctic grayling	12	34	1	47
		Burbot	4		1	5
		Ninespine stickleback				9
		Slimy sculpin				10
	O6A	Arctic grayling	3	11		14
		Burbot	1			1
		Ninespine stickleback				23
		Slimy sculpin				22
	O14	Arctic char		1		1
		Arctic grayling		2		2

[a]Age-class designations based on size differences of fish for each species.

Table 4.6.4 Fish habitat quality ratings for sampled streams within the Borrow Extraction Zone, Jericho study area, 1996.

Area	Stream	Rating of Habitat Quality[a]		
		Spawning	Rearing	Feeding
Lake O1	O18	High	High	Low
	O19	Low	Low	Nil
Lake O2	O9	Moderate	High	Low
	O22	High	High	Low
Lake O3	O16	Nil	Low	Nil
	O17	Moderate	High	Low
	O21	Moderate	Moderate	Nil
Lake O4	O6	High	High	Moderate
	O10	Low	Low	Nil
	O11	Nil	Low	Nil
	O12	Nil	Moderate	Nil
Lake O5	O5	Moderate	High	Moderate
	O6A	Low	High	High
	O14	Low	Low	Nil

[a]Rating of habitat quality based on qualitative assessment of habitat and fish numbers recorded during survey.

SECTION 4 - FIGURES

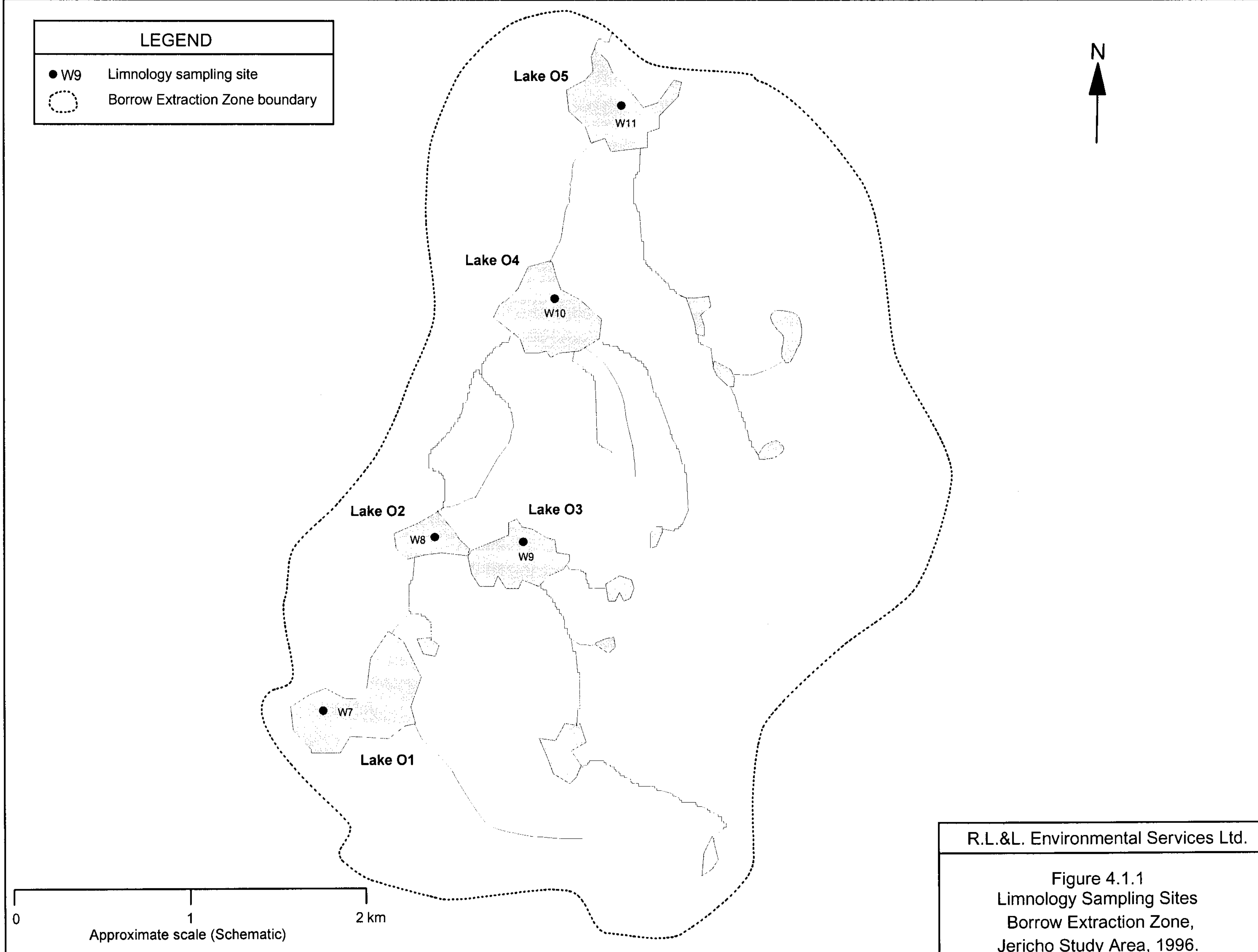


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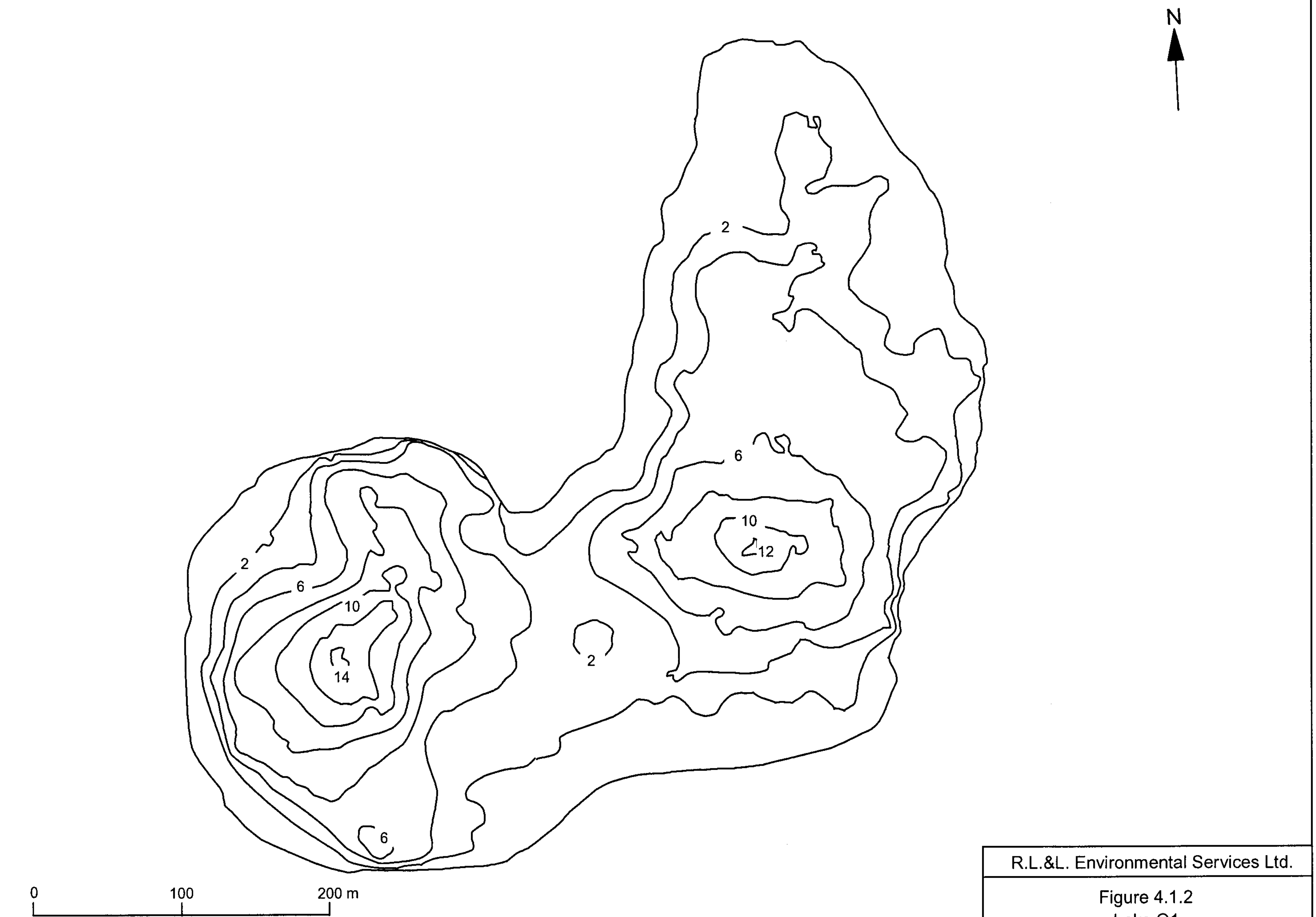
Figure 4.1.1
Limnology Sampling Sites
Borrow Extraction Zone,
Jericho Study Area, 1996.



Contour interval in metres
Map Provided by Canamera Geological Ltd.

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Figure 4.1.2
Lake O1
Borrow Extraction Zone,
Jericho Study Area, 1996.

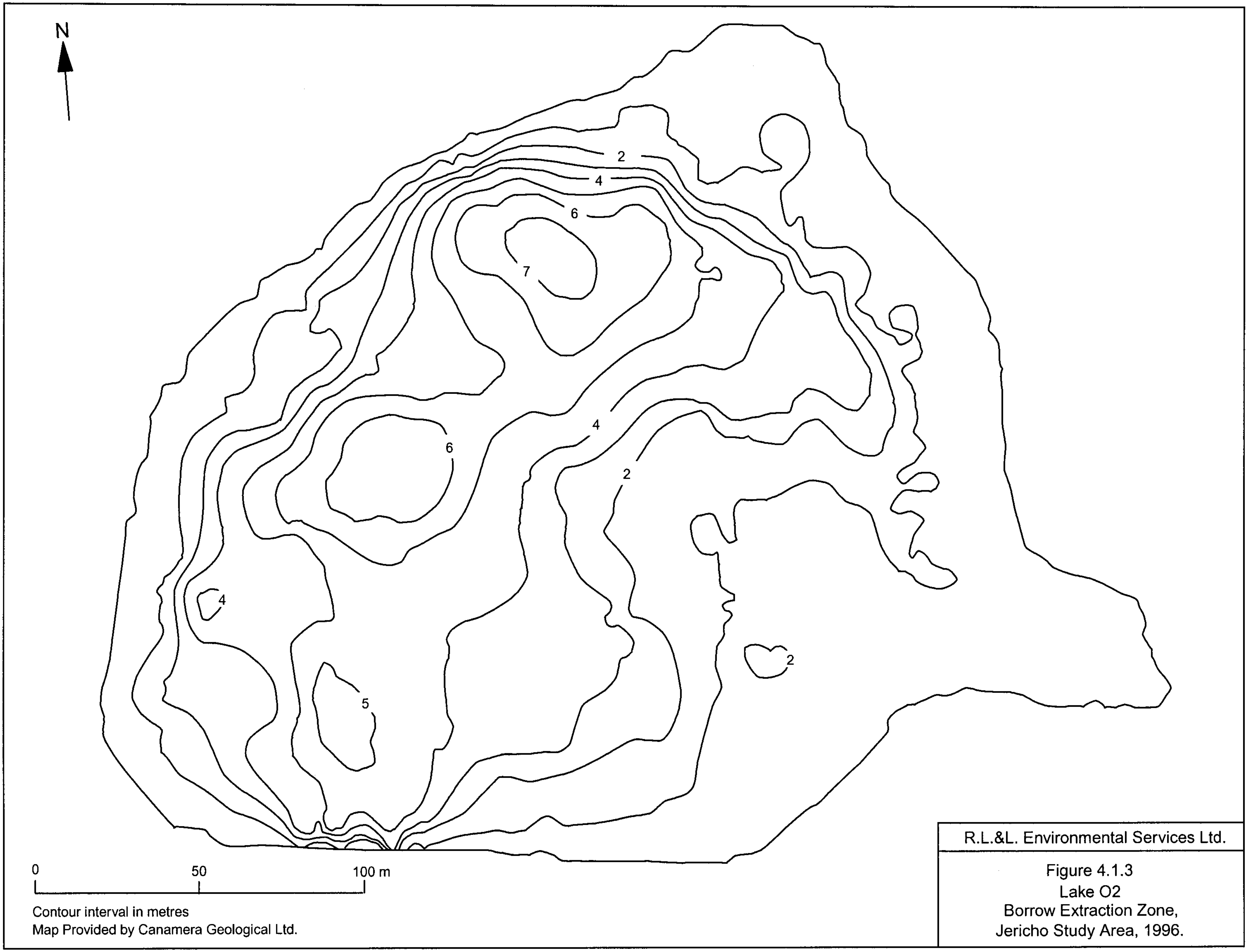

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Figure 4.1.3
Lake O2
Borrow Extraction Zone,
Jericho Study Area, 1996.

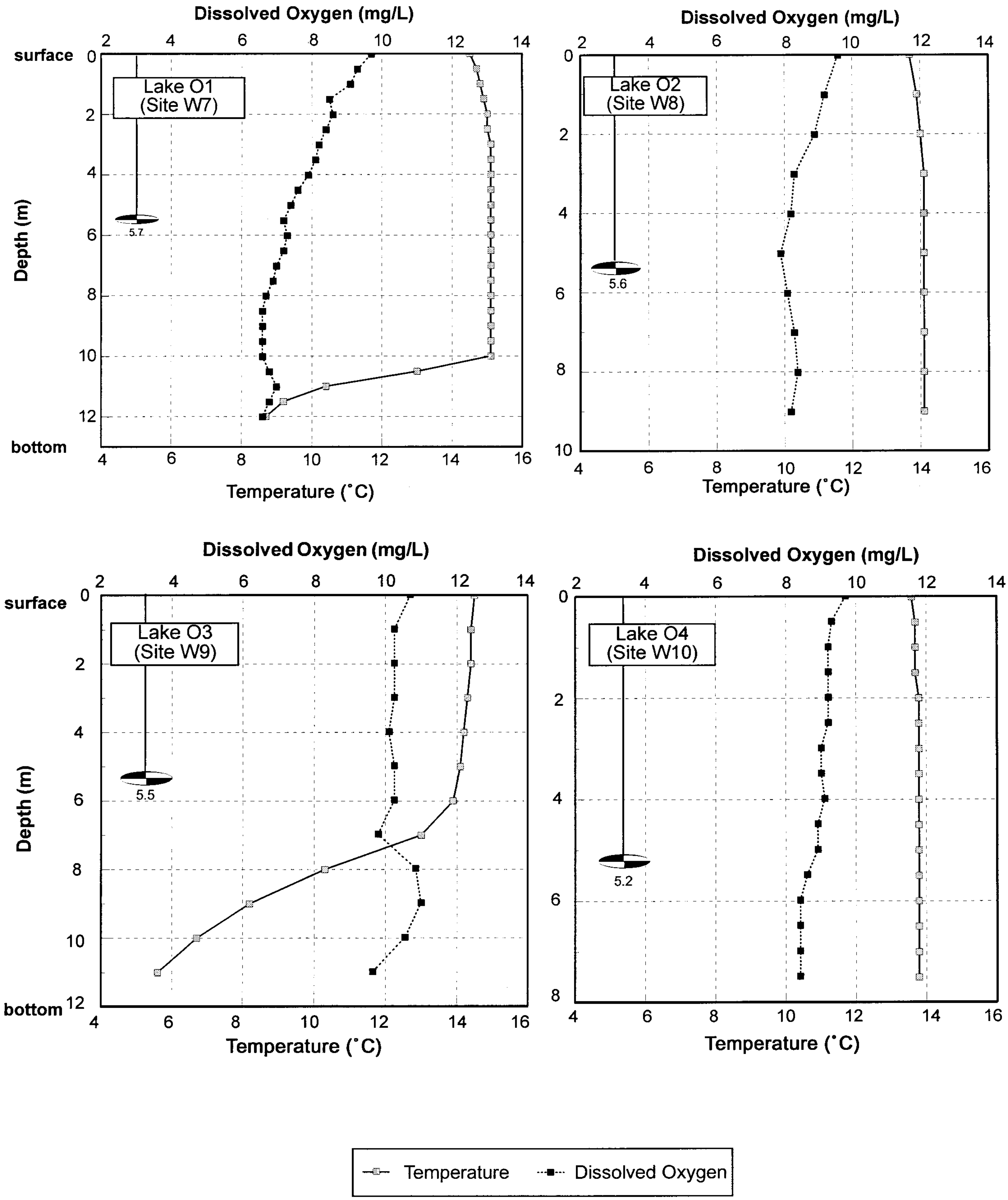

Figure 4.1.4 Dissolved oxygen and temperature profiles, and Secchi depths in lakes within the Borrow Extraction Zone, Jericho study area, 3 to 4 August 1996.

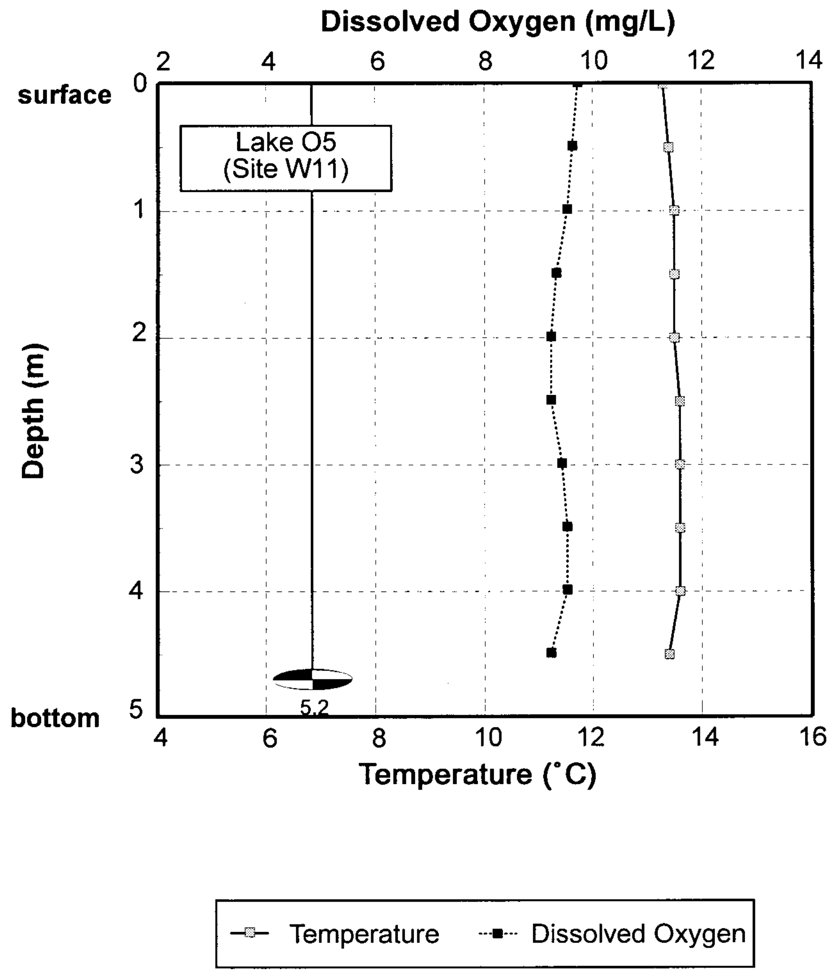

Figure 4.1.4 Concluded.

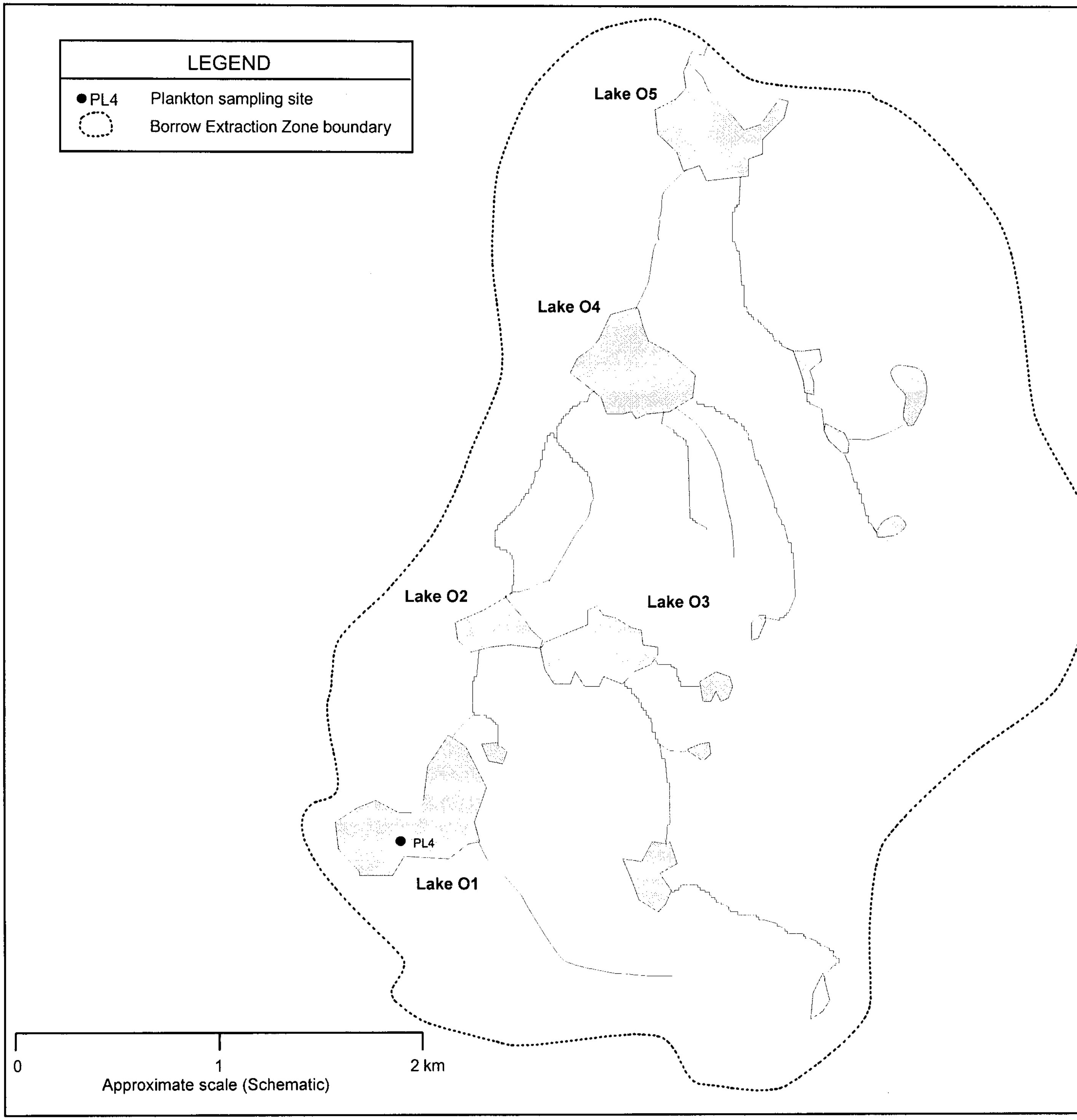

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Figure 4.2.1
Plankton Sampling Sites
Borrow Extraction Zone,
Jericho Study Area, 1996.

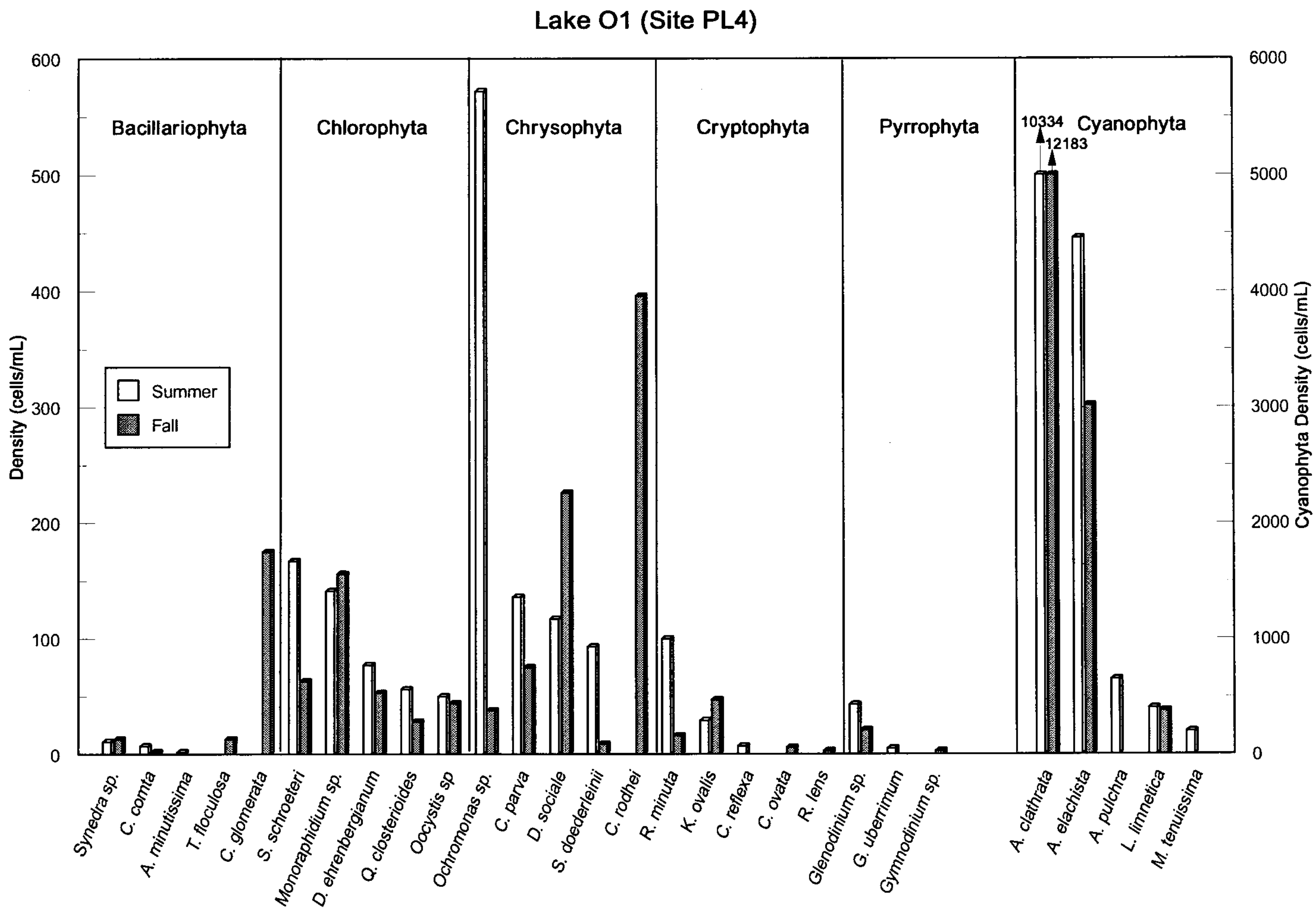


Figure 4.2.2 Density of major phytoplankton species in each of six taxonomic groups during summer and fall in Lake O1 within the Borrow Extraction Zone, Jericho study area, 1996 (note difference in scale for Cyanophyta).

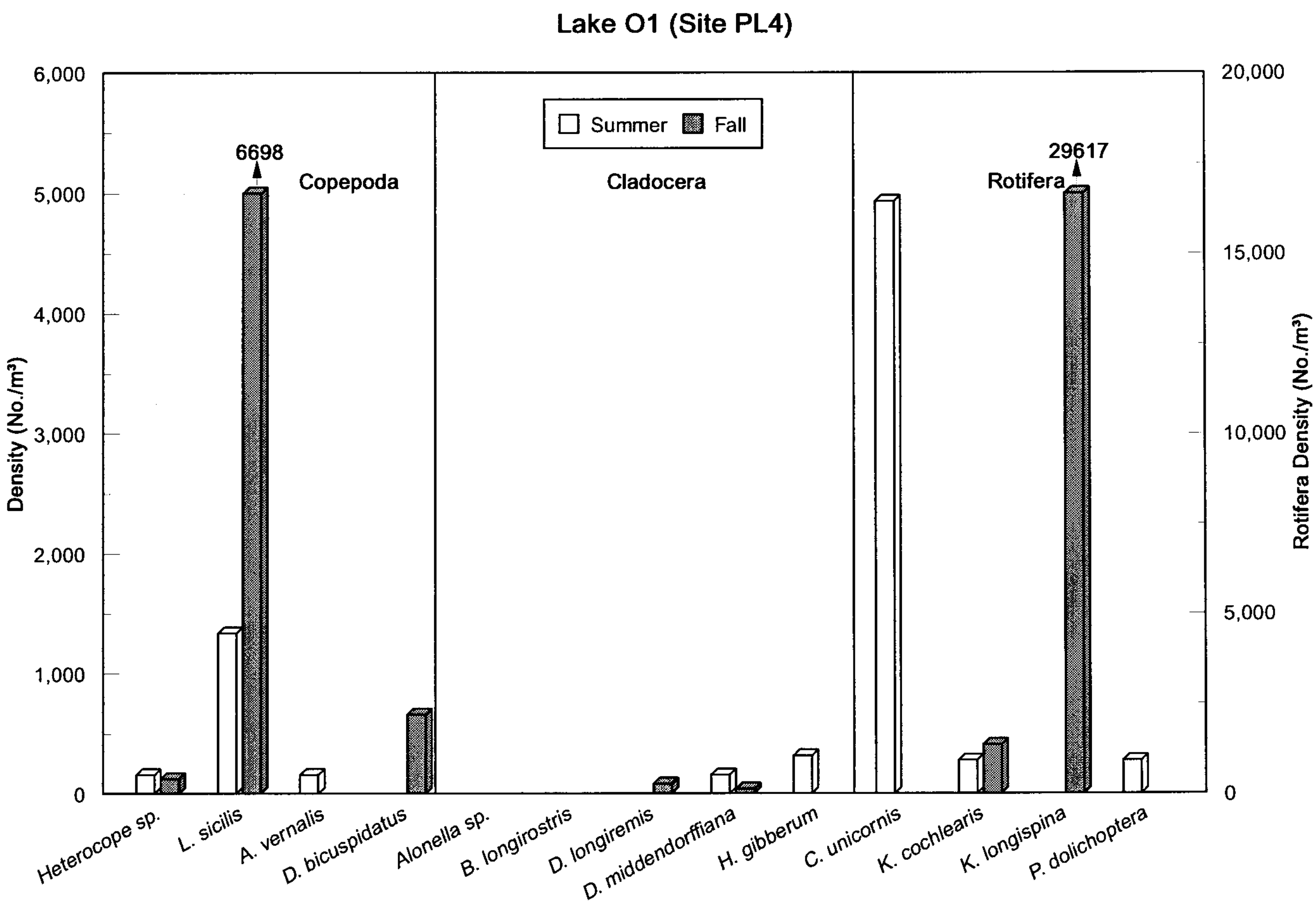


Figure 4.2.3 Density of major zooplankton species in each of three taxonomic groups during summer and fall in Lake O1 within the Borrow Extraction Zone, Jericho study area, 1996 (note difference in scale for Rotifera).

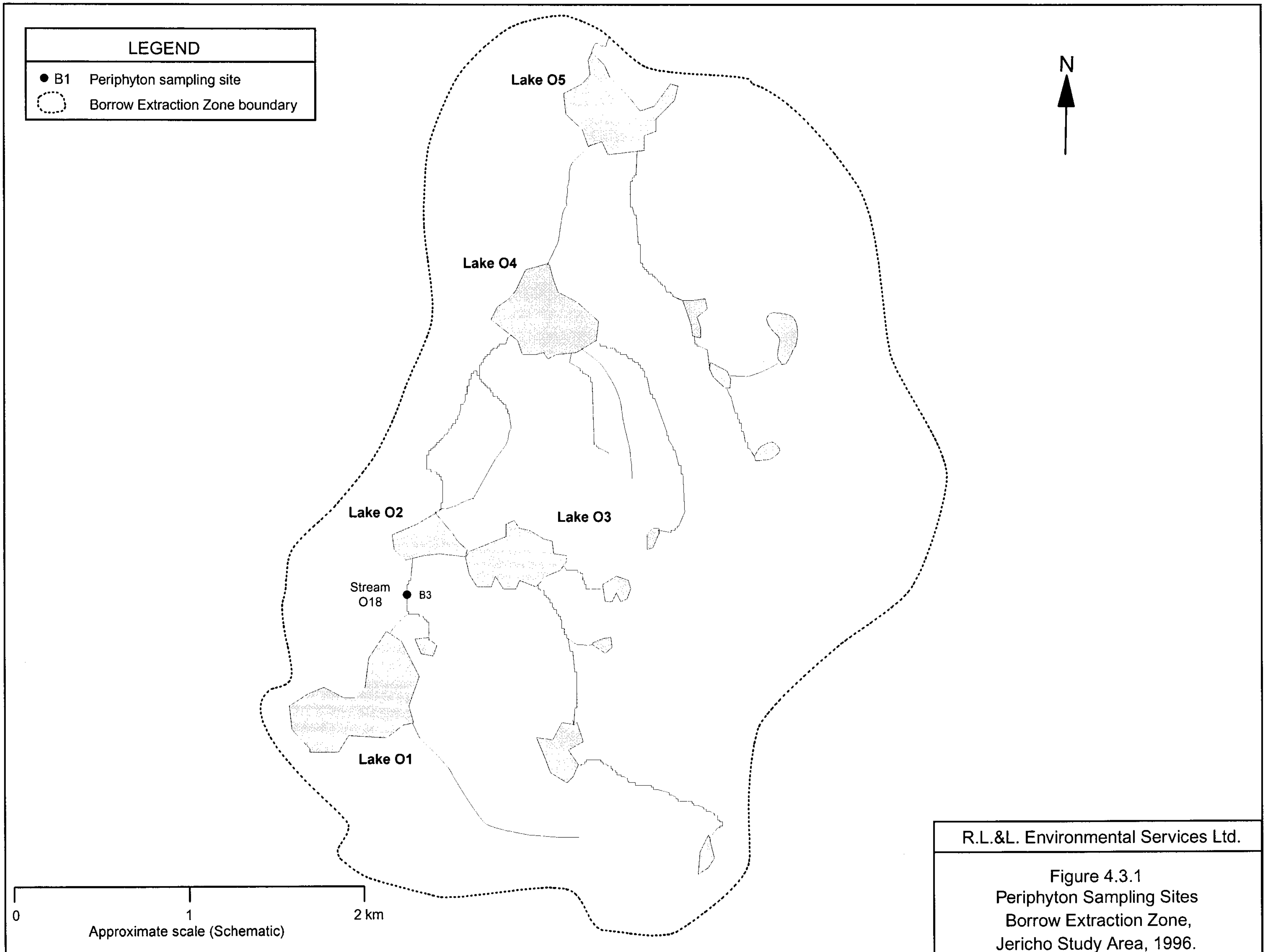


Figure 4.3.1
Periphyton Sampling Sites
Borrow Extraction Zone,
Jericho Study Area, 1996.

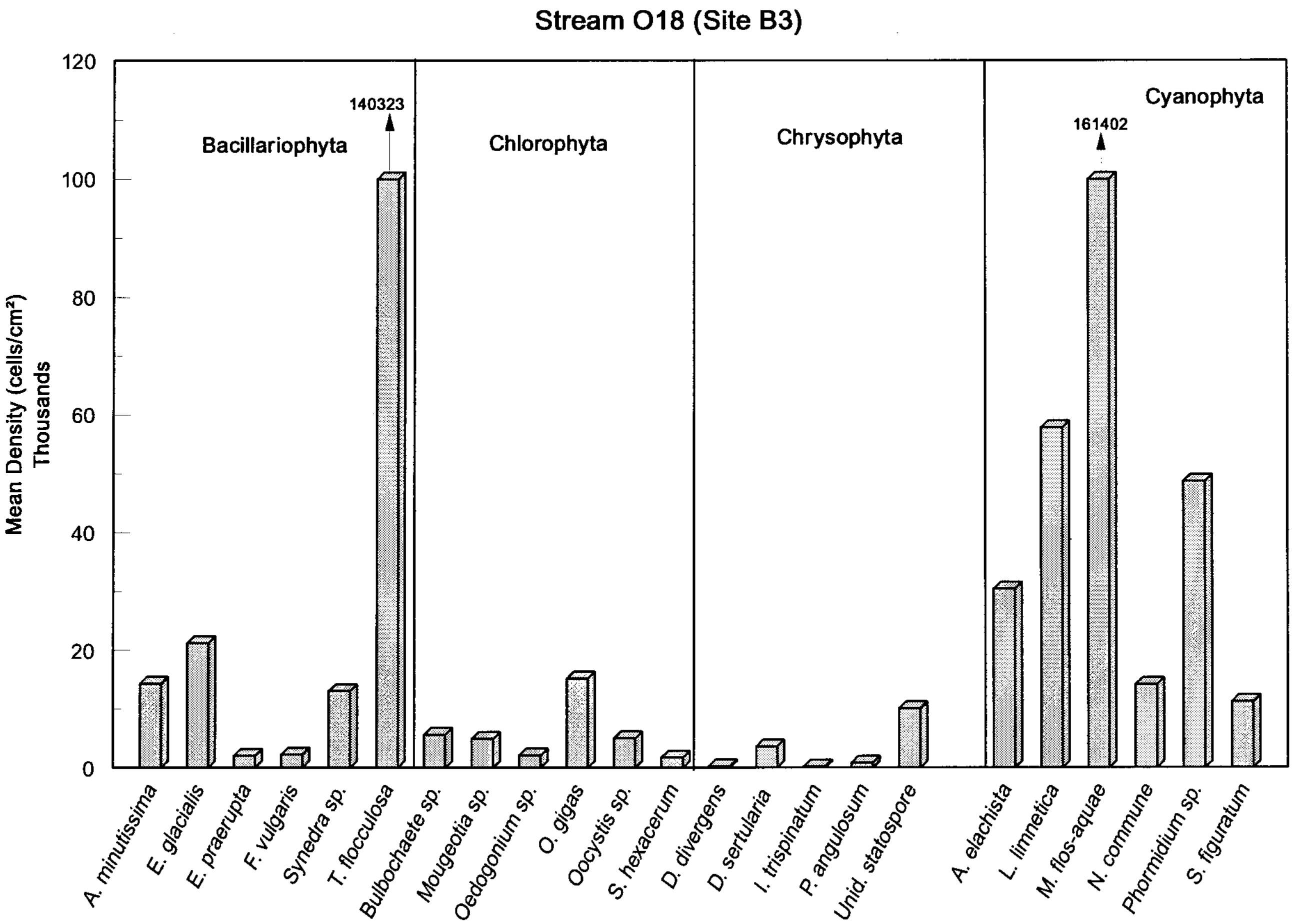
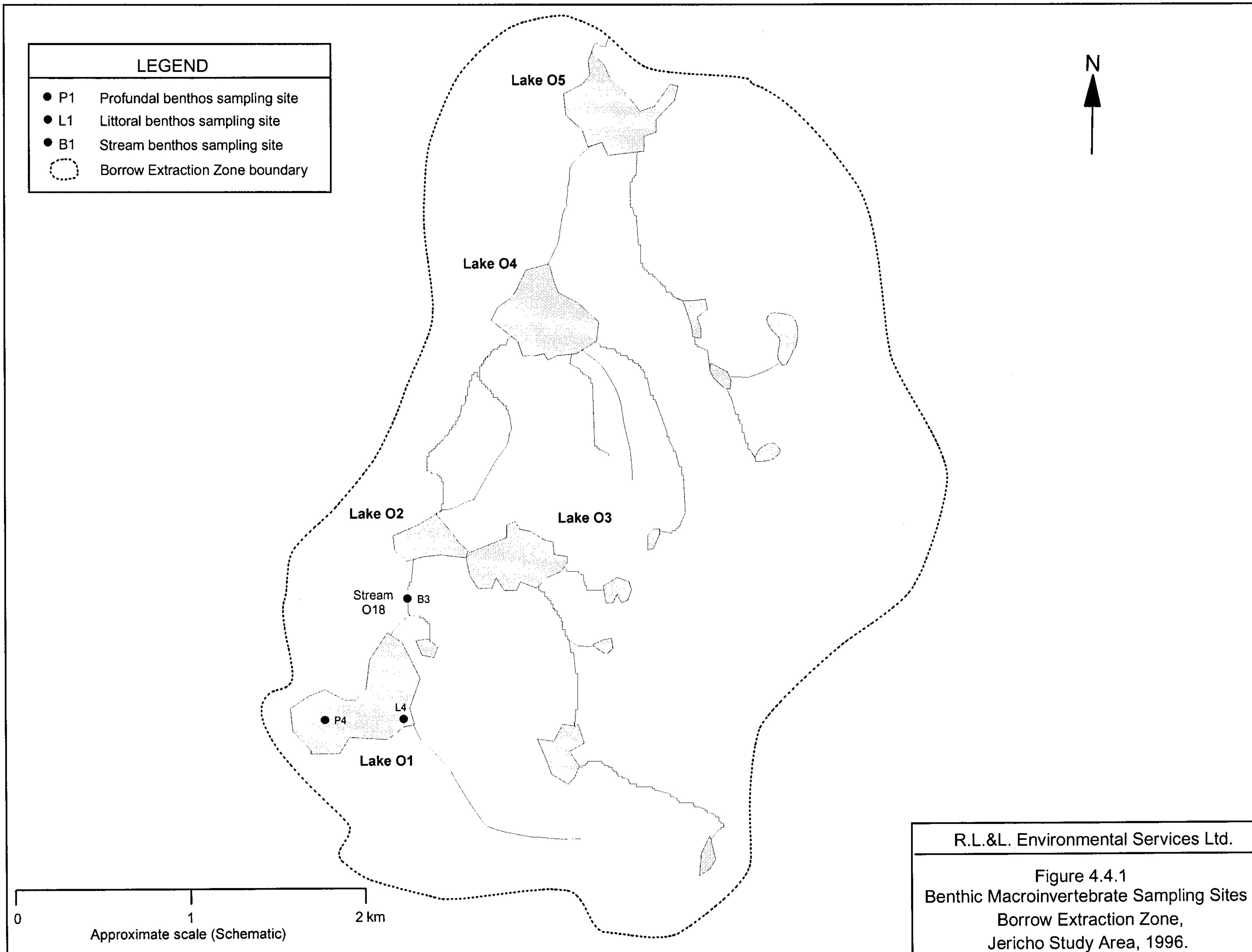
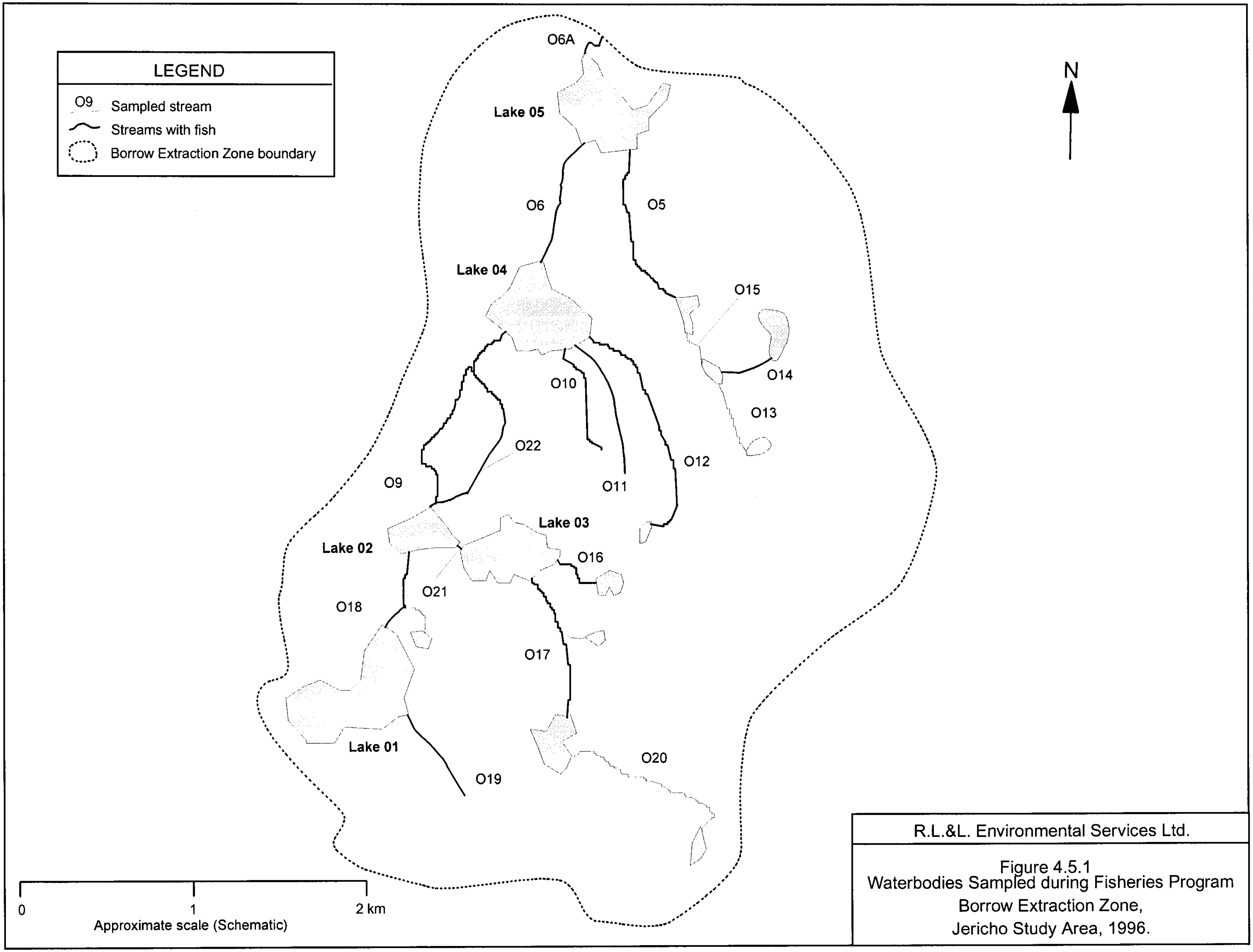


Figure 4.3.2 Mean density (*n*=3) of the most numerous periphytic algal species among the four major taxonomic groups in Stream O18 within the Borrow Extraction Zone, Jericho study area, summer 1996.



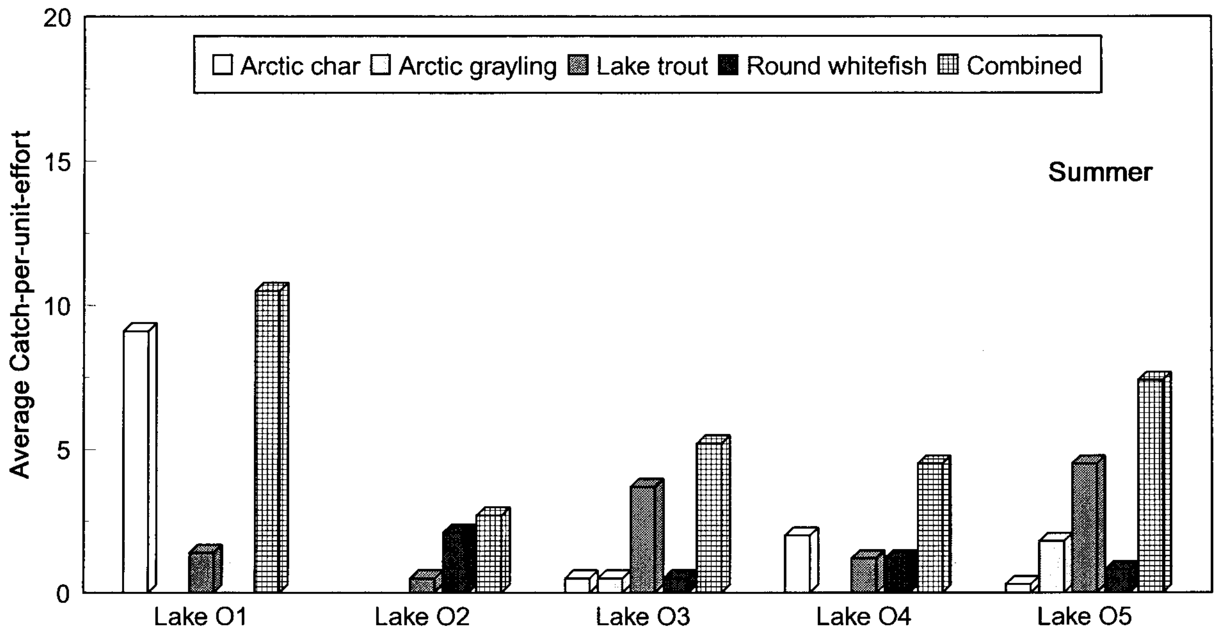
R.L.&L. Environmental Services Ltd.

Figure 4.4.1
Benthic Macroinvertebrate Sampling Sites
Borrow Extraction Zone,
Jericho Study Area, 1996.



R.L.&L. Environmental Services Ltd.

Figure 4.5.1
Waterbodies Sampled during Fisheries Program
Borrow Extraction Zone,
Jericho Study Area, 1996.



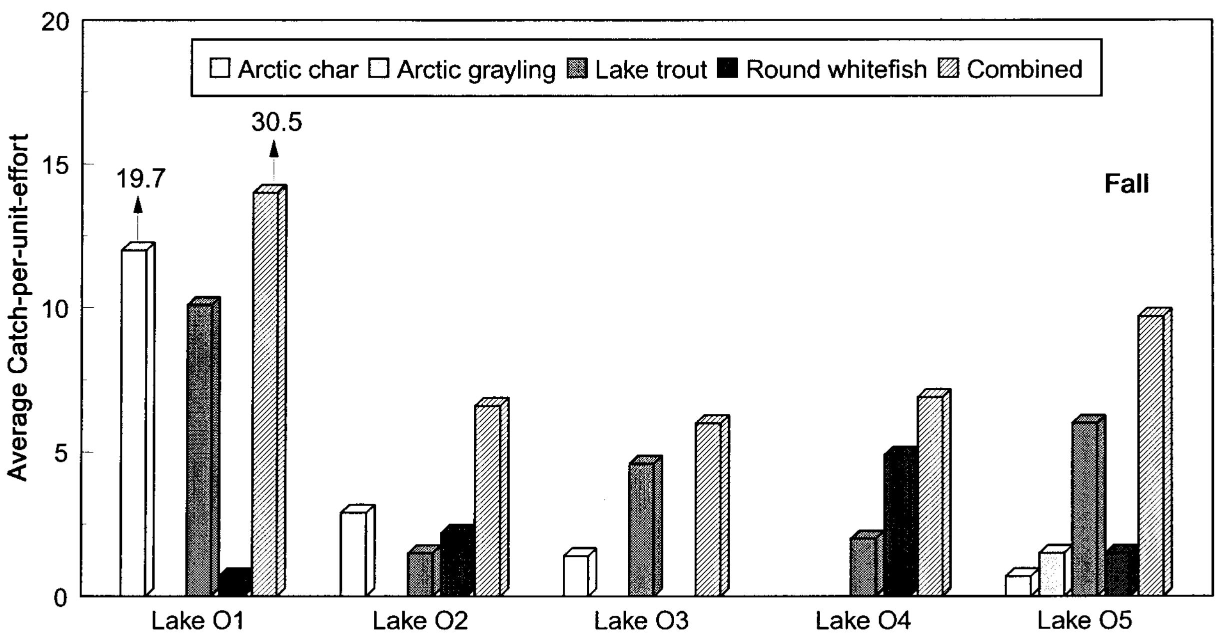


Figure 4.5.2 Average catch-per-unit-effort values (fish/100 m^2 ·12h) for fish captured during gill net sampling in lakes during summer and fall within the Borrow Extraction Zone, Jericho study area, 1996.

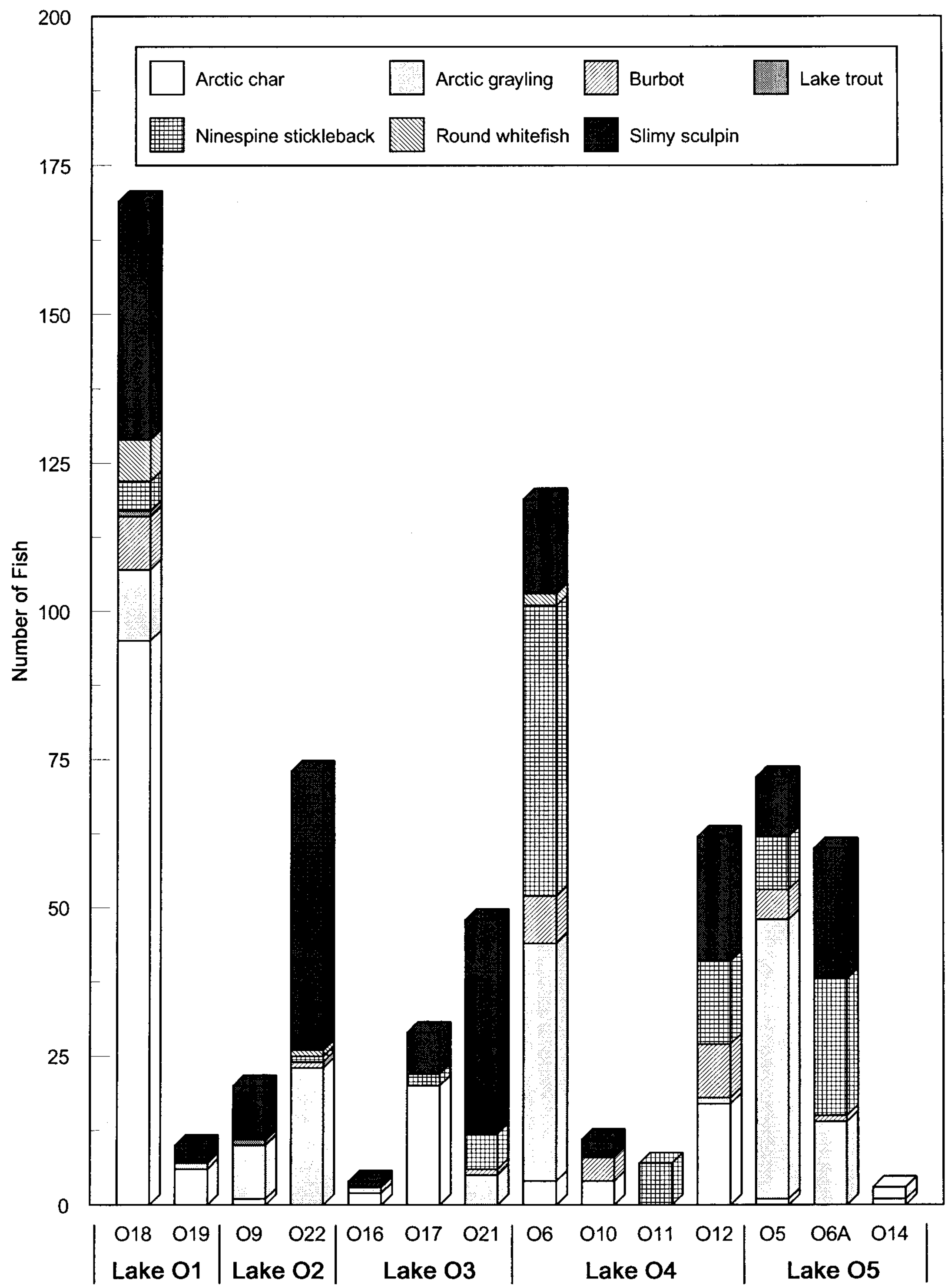


Figure 4.5.3 Comparison of fish numbers recorded in streams within five areas of the Borrow Extraction Zone, Jericho study area, 1996 (all methods and sampling periods combined).

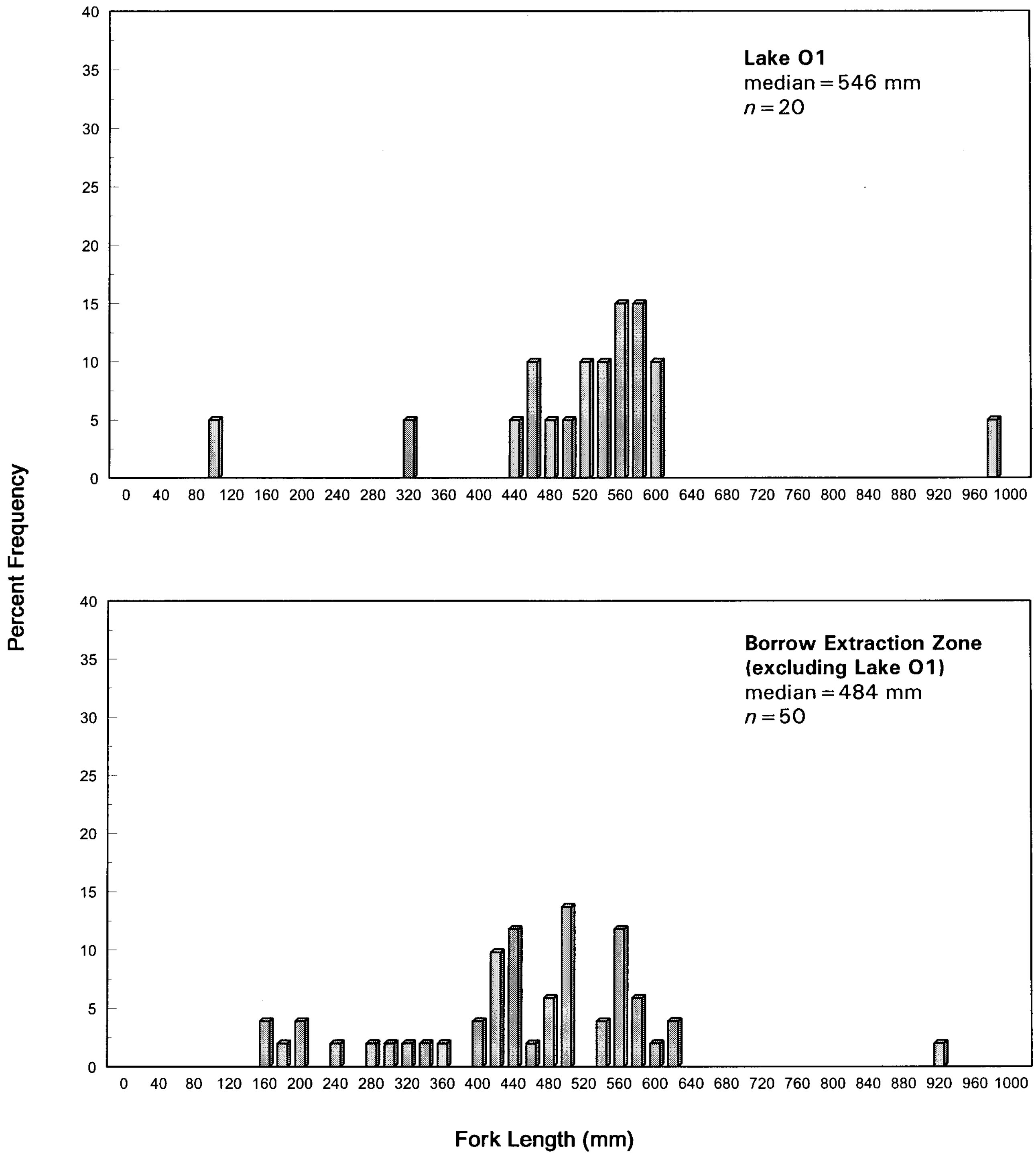


Figure 4.5.4 Length-frequency distribution of lake trout in waterbodies within the Borrow Extraction Zone, Jericho study area, 1996 (data for all seasons, and sampling methods, lakes and streams combined).

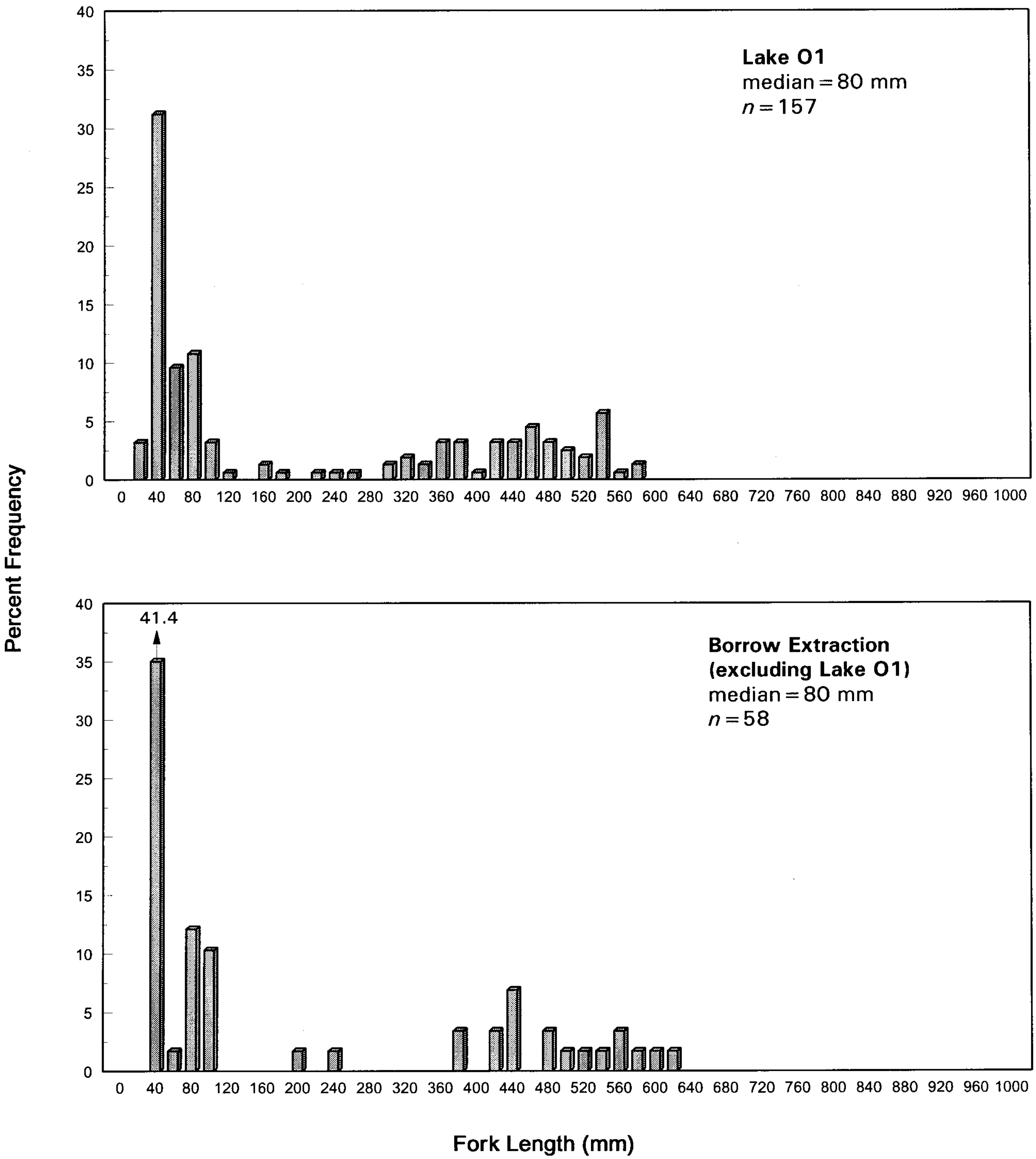


Figure 4.5.5 Length-frequency distribution of Arctic char in waterbodies within the Borrow Extraction Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined).

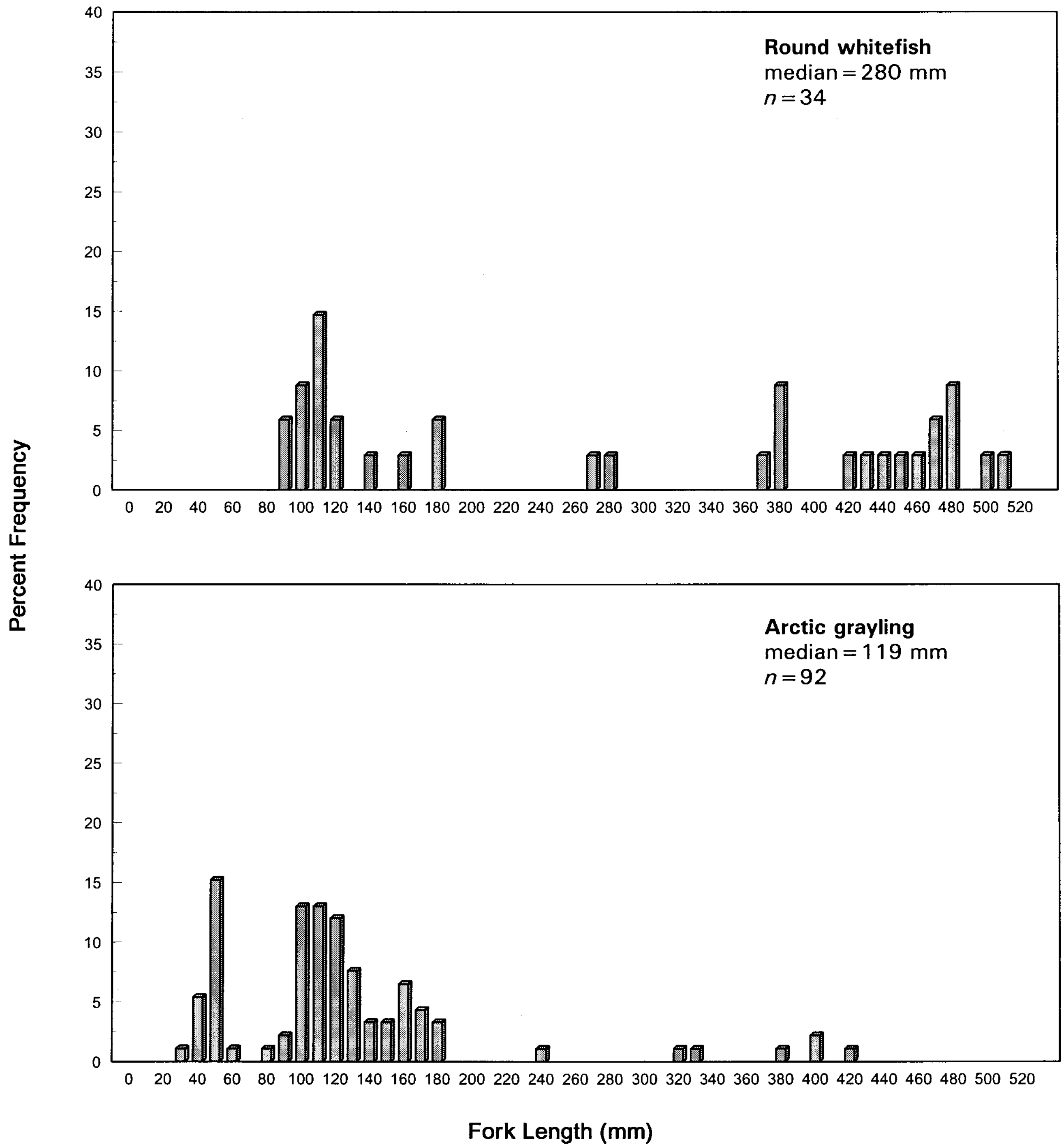


Figure 4.5.6 Length-frequency distribution of Arctic grayling and round whitefish within the Borrow Extraction Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined).

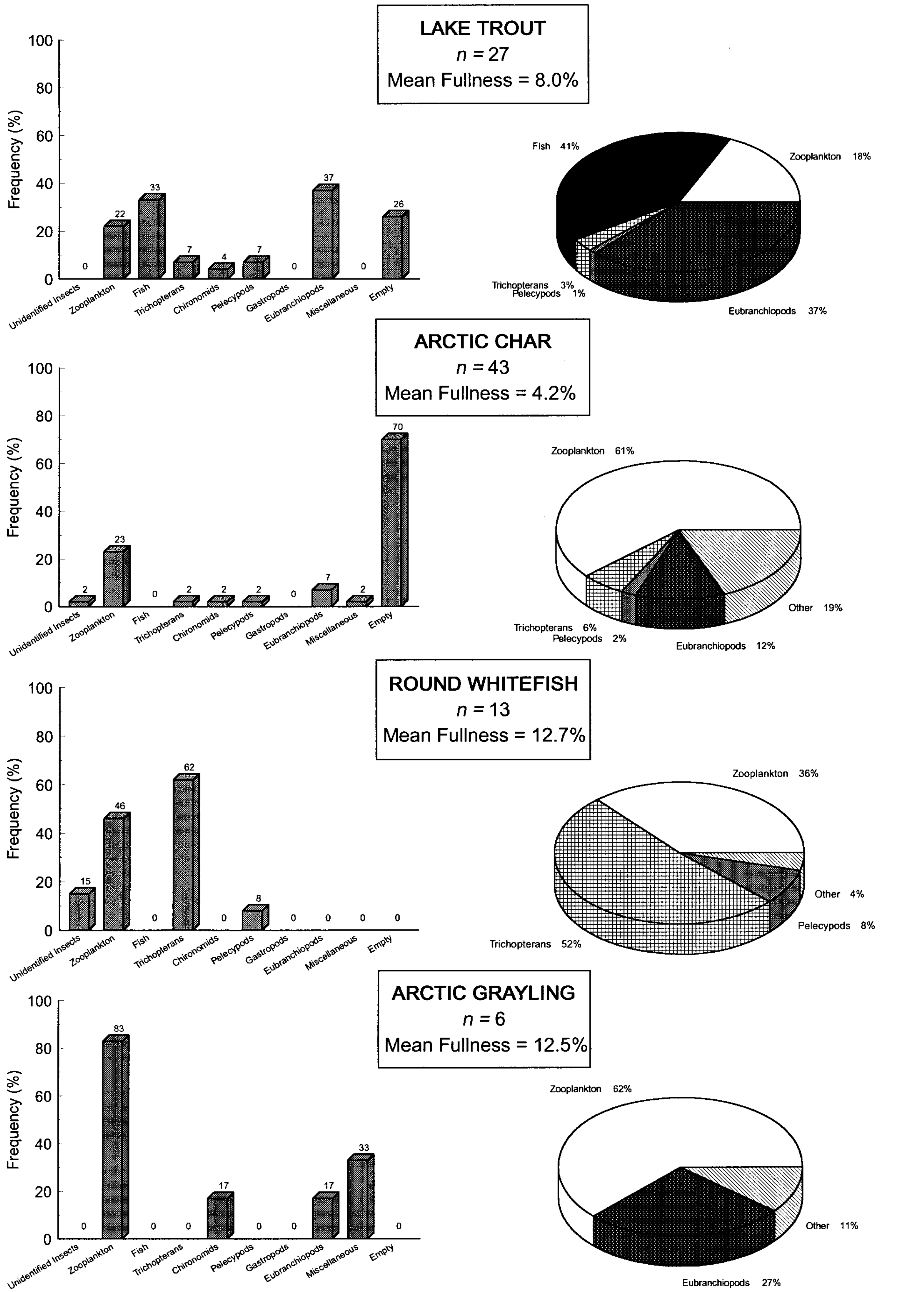
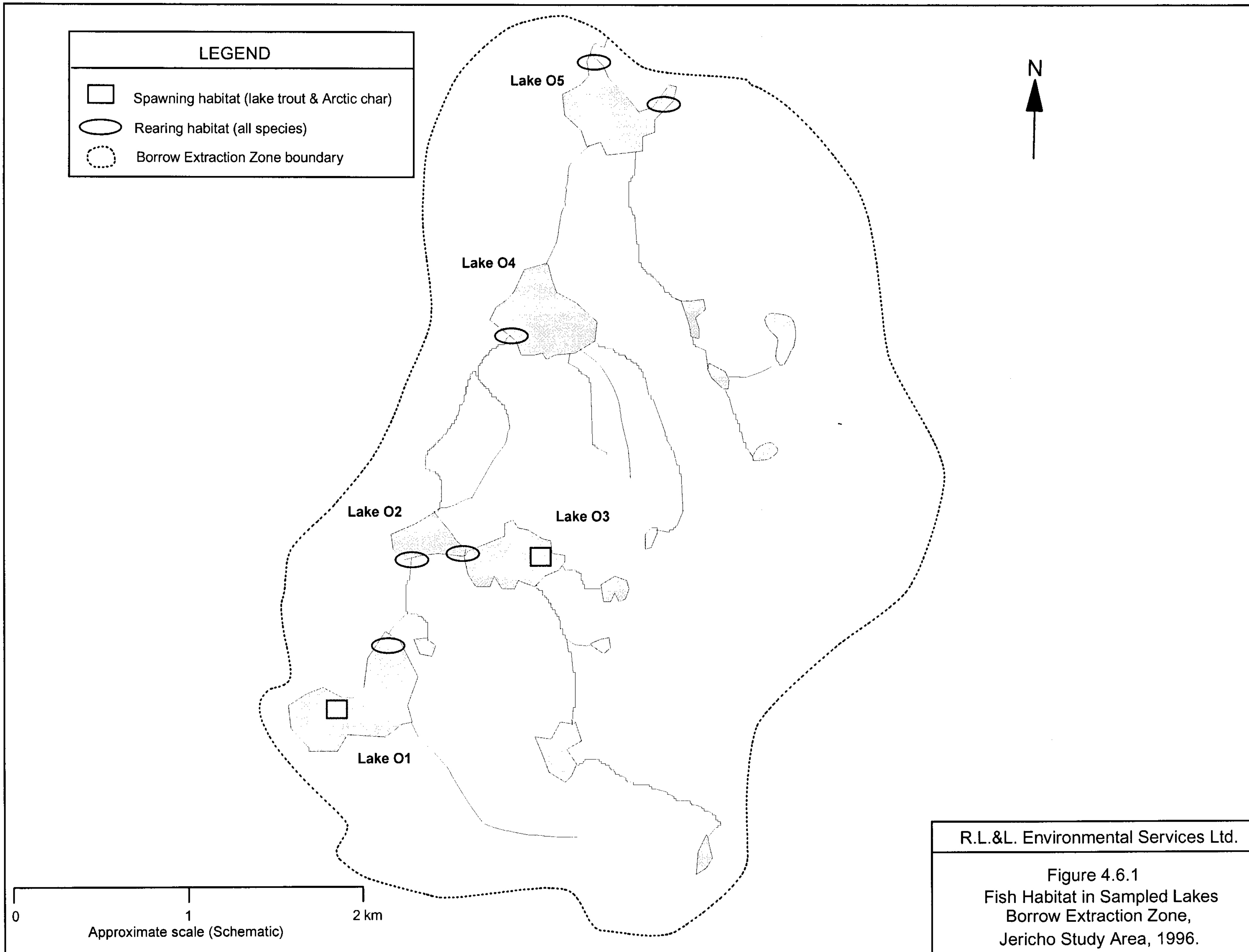
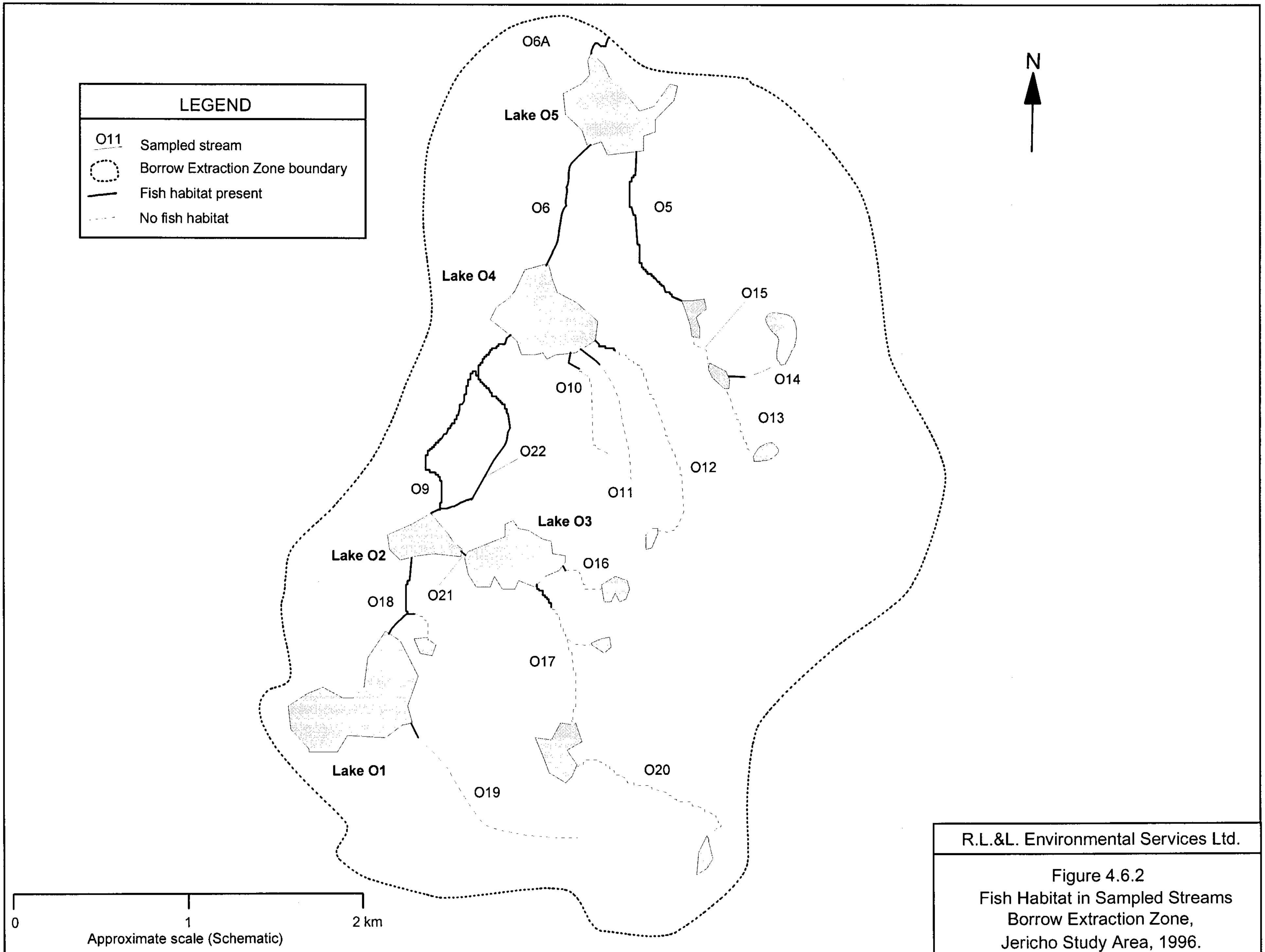


Figure 4.5.7 Frequency of occurrence (bars) and percent composition (pies) of food items encountered in stomachs of lake trout, Arctic char, round whitefish and Arctic grayling sampled within the Borrow Extraction Zone, Jericho study area, 1996 (all seasons and waterbodies combined).



R.L.&L. Environmental Services Ltd.

Figure 4.6.1
Fish Habitat in Sampled Lakes
Borrow Extraction Zone,
Jericho Study Area, 1996.



R.L.&L. Environmental Services Ltd.

Figure 4.6.2
Fish Habitat in Sampled Streams
Borrow Extraction Zone,
Jericho Study Area, 1996.

5.0 TAILINGS IMPOUNDMENT/DOCKING FACILITY

5.1 LIMNOLOGY

This section provides summary results for lake morphology, temperature and dissolved oxygen profiles, and water transparency measurements of selected lakes within the Tailings Impoundment/Docking Facility Zone. Limnological data were collected from three lakes potentially influenced by the proposed development (Lake D4, Lake D5, and Contwoyto Lake). One sampling site was established on each of the lakes (Figure 5.1.1). The monitoring site on Contwoyto Lake was located in a small bay where the proposed docking facility is to be established. Specific locations of each sampling site are provided in Appendix B1.

5.1.1 Lake Morphology

In general, the morphological characteristics of Lakes D4 and D5 and the bay of Contwoyto Lake are similar (Table 5.1.1). Lake D5, which is the smaller of the two lakes (8.6 ha) is situated the farthest upstream in the drainage (Figure 5.1.2). A bathymetric survey of Lake D5 indicates that the waterbody is composed of two basins; the larger, deeper, western basin and the smaller, shallower, eastern basin. This lake is relatively shallow (maximum depth=12 m and mean depth=2.7 m) and it exhibits a high shoreline development ratio (1.67). A small number of intermittent tributaries enter this waterbody along its southern and eastern shores. There is one outlet stream that flows into Lake D4.

Lake D4 (16 ha) is entrenched between two steep rock outcrops and is oriented in an east-west direction. The lake is relatively deep (maximum depth=20 m and mean depth=6.9 m) and it exhibits a high shoreline development ratio (1.93). A bathymetric survey of Lake D4 shows that has a single basin with three deep-water depressions (maximum depth=20.0 m) (Figure 5.1.3). There are no defined outlet streams associated with Lake D4. Excess water exists at the eastern end of the lake and connects with Contwoyto Lake via a boulder strewn channel.

Contwoyto Lake is a large waterbody (95752 ha) associated with the Burnside drainage system (Environment Canada 1973). The bay in which the proposed docking facility will be located is situated along the western shore of the northern arm of Contwoyto Lake and is small (67 ha). The area surveyed is deep (maximum depth=20 m) and the shoreline exhibited steep slopes (Figure 5.1.4). The survey also identified a rock shoal situated immediately west of the proposed docking facility.

5.1.2 Temperature and Dissolved Oxygen

Temperature and dissolved oxygen profile data were collected during summer while surface water data were collected during the fall. Water column oxygen-temperature profiles are depicted in Figure 5.1.5; all data are presented in Appendix B1.

Water depths recorded at the sampling sites varied from 10.5 (Site W13 on Lake D5) to 14.5 m (Site W12 on Lake D4). The Contwoyto Lake monitoring site (W14) was 14.2 m in depth.

With the exception of Contwoyto Lake, surface temperatures during summer (3 August) ranged from 14.5 to 14.8°C (Figure 5.1.5). Contwoyto Lake had surface temperatures of about 9.0°C, which were considerably cooler than those recorded in the other lakes. Thermal stratification was evident in Lakes D4 and D5, but not in Contwoyto Lake; the thermoclines were located at 7 m in Lake D4 and 8 m in Lake D5. Contwoyto Lake at Site W14 was isothermal. Contwoyto Lake's large size relative to Lakes D4 and D5 likely accounted for the cooler temperatures and isothermal conditions.

Dissolved oxygen profiles indicated that lakes with lower temperatures had higher oxygen concentrations (Figure 5.1.5). For example, Site W12 on Lake D4 had a dissolved oxygen concentration of 9.0 mg/L at the water surface, which was 14.8°C. In contrast, Contwoyto Lake had a dissolved oxygen concentration of 11.3 mg/L and a surface water temperature of 9.1°C. An increase in dissolved oxygen concentration with lowered water temperature likely reflects the effects of temperature dependent solubility (i.e., colder water can hold greater concentrations of dissolved gases; Wetzel 1983).

Above the thermoclines, Lakes D4 and D5 exhibited decreased dissolved oxygen concentrations with depth. For example, both lakes had a dissolved oxygen concentration of 9.7 mg/L at the surface (0 m). At a depth of 7.0 m oxygen concentrations were 8.9 and 7.8 mg/L, respectively. This correlation with depth, suggested that pressure affected the meter's performance. Under certain conditions, pressure may affect the performance of the meter (R. Hirsch, pers. comm.) and was likely the main reason for these observations (see also Sections 3.1 and 4.1).

In fall (3 to 9 September), surface water temperatures in the lakes ranged from 6.0°C in Lake D5 (Site W13) and Contwoyto Lake (Site W14) to 8.0°C in Lake D4 (Site W12) (Appendix B1). The surface waters within these study lakes were well oxygenated (10.3 to 11.3 mg/L).

5.1.3 Transparency

In summer, water transparencies (Secchi depths) in the smaller waterbodies (Lakes D4 and D5) were low (5.1 and 5.3 m, respectively) relative to the larger Contwoyto Lake (9.3 m). Secchi depths were lower in fall than in summer; 3.8, 3.0, and 4.0 m in Lakes D4, D5, and Contwoyto Lake, respectively. Based on these data, the summer euphotic zone depths (depth to 1% light penetration where phytoplankton can generally subsist = 2 × Secchi depth) were less than 12 m in Lakes D4 and D5 and approximately 18 m in Contwoyto Lake; the fall euphotic zones were less than 8 m in all lakes.

5.1.4 Summary

5.1.4.1 Lake Morphology

The three waterbodies in the Tailings Impoundment/Docking Facility Zone range in size from 67 ha (bay of Contwoyto Lake) to 16 ha (Lake D4) and exhibit maximum depths between 12 and 20 m . Lake D4 is the deepest waterbody identified in the zone; the maximum depth is 20 m. However, basins of Contwoyto Lake that are outside the surveyed area likely are deeper. Based on a bathymetric survey of Lake D5, this waterbody contains two basins, the largest basin encompassing the western portion of the lake. Bathymetric surveys of the other two waterbodies indicate that each is composed of a single basin. The shoreline development ratios of Lakes D4 and D5 are greater than 1.6, which is an indication of very irregular shorelines. No ratio was calculated for Contwoyto Lake, however, the shoreline in the bay area is relatively uniform.

5.1.4.2 Temperature and Dissolved Oxygen

During the 1996 aquatic studies program, the smaller lakes (i.e., Lakes D4 and D5) exhibited thermal stratification, while the much larger Contwoyto Lake exhibited isothermal conditions. These data indicate that small lakes in this study area can stratify during the summer (beginning at about 8 m in depth), and therefore, are dimictic (thoroughly mix twice a year). Contwoyto Lake also stratifies (Moore 1978b), but at depths greater than the 14 m recorded at the site in the present study. Lake size, location, exposure to wind, and depth are all factors that affect the presence and depth of thermoclines (Wetzel 1983).

In the summer, Contwoyto Lake exhibited water temperatures of 8.1 to 9.1°C, while Lakes D4 and D5 had water temperatures that ranged from 6.1 to 14.8°C. In the fall, surface (i.e., 0 - 1 m) water temperatures in the study lakes ranged from 6.0 to 8.0°C. The summer dissolved oxygen concentrations in the lakes ranged from 7.6 to 11.4 mg/L, while fall concentrations varied from 10.3 to 11.3 mg/L.

During summer, Lakes D4 and D5 had dissolved oxygen concentrations that were below the Canadian Water Quality Guideline for the protection of cold-water biota early life stages (9.5 mg/L; Table 3.1.2).The low dissolved oxygen concentrations recorded at this time were likely the result of equipment malfunction and were not representative of actual concentrations throughout the water column. Dissolved oxygen concentrations at the surface were at 100% saturation and above the 9.5 mg/L criteria. Because these lakes are nutrient poor (R.L. & L Environmental Services Ltd. 1995; Canamera Geological Ltd., unpublished data), dissolved oxygen concentrations should have remained constant throughout the water column, at least to the thermocline. This was not the case, at several sites the concentration was correlated with water depth, which is an indication of equipment malfunction (R. Hirsch, Technical Engineer, Point Four Systems Inc., Port Moody, BC, pers. comm.). As such, the dissolved oxygen concentrations recorded during the summer should be viewed with caution.

5.1.4.3 Transparency

The water transparency levels recorded in Lakes D4 and D5 indicated that the euphotic zone depths ranged between 10 to 11 m in the summer and 6 to 8 m in the fall. In Contwoyto Lake the euphotic zone was 19 m in summer and 8 m in fall.

5.2 PLANKTON

To provide baseline information on the plankton community, samples were collected from lakes during summer and fall of 1996. Three sites were established and monitored; Site PL5 (Lake D4), PL6 (Lake D5), and PL7 (Contwoyto Lake) (Figure 5.2.1). Relevant data are summarized in the following sections; site specific sampling data are presented in Appendices C1 to C3.

5.2.1 Phytoplankton

Phytoplankton are microscopic free-floating algae (Smith 1950). Summary results of phytoplankton biovolume (microns cubed per metre cubed or [$\mu m^3/m^3$]) and density (No. cells/ml) are both presented in this section because density alone does not provide an accurate assessment of importance. For example, taxa that are extremely numerous may have a low biovolume, due to the small size of individual organisms. Conversely, those taxa that have large biovolumes (due to large individual organism size), may not be numerically abundant. These large bodied groups can contribute significantly to lake productivity. As such, their numbers can influence the abundance and biomass of herbivores that feed on them (generally zooplankton) and they can modify nutrient availability for competing plants or algae. Raw phytoplankton data are summarized in Appendix C2.

5.2.1.1 Biovolume

In total, 136 species of algae were identified from the samples collected in the Tailings Impoundment/Docking Facility Zone study area (Appendix C2). Table 5.2.1 summarizes biovolumes of major taxonomic groups encountered. In summer, diatoms (Bacillariophyta) and golden-brown algae (Chrysophyta) dominated total algal biovolume (27 and 25%, respectively) in Lake D4. Golden-brown algae accounted for the majority of algal biovolume in Lake D5 (62%) and green algae (Chlorophyta) dominated in Contwoyto Lake (48%).

In fall, golden-brown algae and diatoms continued to account for the majority of algal biovolumes (46 and 31%, respectively) in Lake D4. In Lake D5, the fall phytoplankton community shifted to diatoms as the major taxonomic group (46%); golden-brown algae were second (32%). The fall phytoplankton community of Contwoyto Lake was dominated by golden-brown algae (41%), while green algae accounted for only 11%.

5.2.1.2 Density

The relative importance of the most numerous species within each of the six major taxonomic groups are depicted in Figure 5.2.2. In summer, cyanobacteria (Cyanophyta) were the numerically dominant taxa in Lakes D4 and D5;

Aphanothece clathrata accounted for most of the cyanobacteria at each site (7554 and 5200 cells/ml, respectively). *Aphanocapsa elachista* was the second most abundant cyanobacterium (2238 and 1823 cells/ml, respectively). The fall phytoplankton community of Lake D4 continued to be dominated by the cyanobacterium *A. clathrata* (2430 cells/ml), while at Lake D5 the diatom *Cyclotella ocellata* (924 cells/ml) replaced *A. clathrata* as the numerically dominant species.

The summer phytoplankton community of Contwoyto Lake was dominated by the diatom *Rhizosolenia longiseta* (6778 cells/ml), while the fall community was dominated by the cyanobacterium *A. clathrata* (609 cells/ml). In fall, the density of *R. longiseta* fell to 5 cells/ml. Among the green algae, *Sphaerocystis schroeteri* was the dominant species during summer and fall (354 and 94 cells/ml, respectively).

Chrysosphaerella rodhei and *Chrysococcus* sp. were the dominant golden-brown algae species during the two sampling seasons (Figure 5.2.2; Appendix C2).

5.2.2 Zooplankton

Zooplankton communities are composed of microscopic animals that live in the water column. Information describing seasonal differences in zooplankton biomass and density are presented in Table 5.2.2 and Figure 5.2.3, respectively. All raw data are presented in Appendix C3. Results of zooplankton biomass ($\mu g/m^3$) and density (No./m^3) are both presented in this section because, density alone does not provide an accurate assessment of importance. Taxa that are extremely numerous may have a low biomass, due to the small size of individual organisms. Conversely, those taxa that have large biomass (due to large individual organism size), may not be numerically abundant. These large bodied groups can contribute a significant amount to lake productivity. As such, their numbers can influence the abundance and biomass of predators that feed on them (generally other zooplankton and fish) and they can modify the phytoplankton community.

5.2.2.1 Biomass

In summer and fall, calanoid copepods accounted for most of the biomass in Lakes D4 and D5; summer estimates were 74 and 81%, respectively, while fall estimates were 75 and 49%, respectively (Table 5.2.2; Appendix C3). Zooplankton biomass at Contwoyto Lake, was dominated by cyclopoid copepods in both summer (51%) and fall (55%).

5.2.2.2 Density

Two species (*Dicyclops bicuspidatus* and *Leptodiaptomus sicilis*) co-dominated the copepod community in all three study lakes (Figure 5.2.3; Appendix C3). In the summer, densities of *D. bicuspidatus* ranged from 295 (Lake D4) to 2031/m^3 (Contwoyto Lake). In fall, this species had a much greater range in density, 90/m^3 in Lake D4 and 9553/m^3 in Contwoyto Lake. In summer, *L. sicilis* densities ranged from 1625/m^3 in Contwoyto Lake to 4003/m^3

in Lake D4. In fall *L. sicilis* densities ranged from 2125 to 4021/m^3. Overall, copepod densities were greater in fall than in summer although some exceptions occurred in Lake D4.

Among the water fleas (Cladocera), *Bosmina longirostris* was the most abundant species (Figure 5.2.3; Appendix C3). This species dominated in Contwoyto Lake in summer and fall (1066 and 2997/m^3 respectively). Water flea densities in Lakes D4 and D5 were one order of magnitude lower than in Contwoyto Lake.

The wheel animal (Rotifera) communities tended to be dominated by four species (*Conochilus unicornis*, *Kellicottia longispina*, *Keratella cochlearis*, and *Polyantha dolichoptera*). In the summer, Lakes D4 and D5 were dominated by *C. unicornis* (16 391 and 40 296/m^3, respectively) while in Contwoyto Lake *C. unicornis*, *K. longispina*, and *P. dolichoptera* were equal in abundance (169/m^3). In fall, *C. unicornis*, *K. longispina*, and *K. cochlearis* were the most abundant wheel animals in all three lakes (Figure 5.2.3; Appendix C3).

5.2.3 Summary

5.2.3.1 Phytoplankton

The phytoplankton assemblages were indicative of oligotrophic waterbodies (Wetzel 1983). In general, golden-brown algae (Chrysophyta) and diatoms (Bacillariophyta) had the greatest biovolumes. Certain species of cyanobacteria (Cyanophyta; *Aphanothece clathrata* and *Aphanocapsa elachista*) and diatoms (*Cyclotella ocellata* and *Rhizosolenia longiseta*) had the greatest densities. Biovolumes and density estimates varied between summer and fall. For example, Contwoyto Lake's phytoplankton biovolume was dominated by green algae (Chlorophyta) in the summer and by golden-brown algae in the fall. The diatom *R. longiseta* was the most abundant species in the summer, while the cyanobacterium *A. clathrata* was the most abundant species in the fall. The other study lakes followed a similar pattern. This was likely due to physical-chemical differences between lakes as well as seasonal differences in community composition.

5.2.3.2 Zooplankton

The zooplankton community in the Tailings Impoundment/Docking Facility Zone varied between lakes and between seasons. In general, copepods dominated zooplankton biomass in all three lakes during summer and fall. Within this taxonomic group, *Leptodiaptomus sicilis* was the predominant copepod in Lakes D4 and D5, while *Dicyclops bicuspidatus* was the most abundant copepod in Contwoyto Lake. Copepod densities in Lake D5 and Contwoyto Lake were much greater in the fall than in the summer; the reverse was true for Lake D4. Contwoyto Lake had the highest densities of water fleas (Cladocera). In both summer and fall, *Bosmina longirostris* densities were one or two orders of magnitude greater in Contwoyto Lake than in Lakes D4 and D5. Overall, the wheel animals *Conochilus unicornis*, *Kellicottia longispina*, *Keratella cochlearis*, and *Polyantha dolichoptera* tended to be the most abundant zooplankton species in study area lakes.

5.3 STREAM PERIPHYTON

Due to a preponderance of large boulder substrates and subsurface water flow suitable sampling sites were not available to sample periphyton in the Tailings Impoundment/Docking Facility Zone.

5.4 BENTHIC MACROINVERTEBRATES

Benthic (bottom-dwelling) macroinvertebrates are an important link in aquatic food webs. Most benthic invertebrates are herbivorous, detrivorous, or filter feeders and derive much of their energy from aquatic plants and algae or organic materials. Some benthic macroinvertebrate species are predacious, generally feeding upon other invertebrates. Many fish species, including early life history stages of piscivorus species, feed upon benthic macroinvertebrates.

5.4.1 Lakes

The lake sampling program was designed to obtain baseline information from benthic macroinvertebrates communities on selected lakes within the Tailings Impoundment/Docking Facility Zone. During summer, three replicate samples were collected from the littoral and profundal zones of Lakes D4 and D5, and Contwoyto Lake (Figure 5.4.1). Summary data are provided Table 5.4.1. Site specific sampling information is summarized in Appendix E1 and raw data presented in Appendix E2.

In total, 34 taxonomic groups were identified; the number of taxa identified in each sample ranged from 7 to 25.

The mean ($\pm$1 standard error) total number of benthic macroinvertebrates in the littoral zone ranged from 9957$\pm$3246/m^2 in Lake D5 to 15 435$\pm$8276/m^2 in Contwoyto Lake; mean number of taxa ranged from 11$\pm$2 to 21$\pm$3/m^2 (Table 5.4.1). Overall, chironomid larvae (midges) were the most abundant taxon in the littoral zone; mean densities were 3405$\pm$1218/m^2, 8275$\pm$3675/m^2, and 4985$\pm$3797/m^2 in Lakes D5, D4, and Contwoyto Lake, respectively. Oligochaetes (aquatic earthworms), nematodes (roundworms), and ostracods (seed shrimps) were also present in the littoral benthic community. Contwoyto Lake had higher densities of oligochaetes and nematodes than did Lakes D4 and D5. Ostracods were more abundant in Lake D5 than in Lake D4 and Contwoyto Lake.

The mean ($\pm$1 standard error) total number of benthic macroinvertebrates in the profundal zone ranged from 2000$\pm$617/m^2 in Lake D5 to 4391$\pm$1931/m^2 in Contwoyto Lake; mean number of taxa ranged from 10$\pm$1 to 14$\pm$3/m^2 (Table 5.4.1). Midge larvae as a whole were the most abundant taxonomic group in the profundal benthos, Contwoyto Lake had a mean of 2811$\pm$2006/m^2, while Lakes D5 and D4 had 1131$\pm$656 and 1594$\pm$658/m^2, respectively. Lake D4 had more ostracods in the profundal zone than did Lake D5 and Contwoyto Lake.

Mean overall densities of benthic macroinvertebrates were much greater in the littoral zone than in the profundal zone; there was at least a three-fold difference in total density (Table 5.4.1). For Lakes D4 and D5, the number of taxonomic groups were greater in the littoral zone than in the profundal zone. The opposite trend was true in Contwoyto Lake; the littoral zone had a mean of 11 ± 2 taxa/m^2, while the profundal zone had a mean of 14 ± 3 taxa/m^2. In general, nematodes were more numerous in the littoral zones of each lake. In Contwoyto Lake, sphaeriids were only found in the profundal zone.

5.4.2 Streams

Due to a preponderance of large boulder substrates and subsurface water flow, suitable sites were not available to sample benthic macroinvertebrates in the Tailings Impoundment/Docking Facility Zone.

5.4.3 Summary

In general, total mean densities and mean number of taxonomic groups of benthic macroinvertebrates were greater in the littoral zone than in the profundal zone of lakes in the Tailing Impoundment/Docking Facility Zone. Contwoyto Lake was the only exception, the profundal zone had more taxa than the littoral zone. These results reflect the higher productivity of shallow-water habitats (e.g., higher water temperatures and greater light penetration). Taxonomic composition and abundance was indicative of a short growing season and a homogenous substrate mainly composed of fine sediments.

In terms of taxonomic composition, the benthic macroinvertebrate communities in the three study lakes were dominated by a few taxa: chironomids, oligochaetes, nematodes, and ostracods. The majority of nematodes were found in the littoral zone. The sphaeriids (fingernail clams) of Contwoyto Lake were only identified in samples collected from the profundal zone, while sphaeriids were common to both the littoral and profundal zones of Lakes D4 and D5. Contwoyto Lake had greater densities of benthic macroinvertebrates, in both the littoral and profundal zones, than did Lakes D4 and D5, suggesting that Contwoyto Lake was more productive.

5.5 FISH

5.5.1 Species Composition and Abundance

The 1996 aquatic studies fish sampling program was designed to provide information on species composition and abundance in the Tailings Impoundment/Docking Facility Zone. As for the other zones in the study area, sampling was conducted during spring, summer, and fall in a variety of habitats using several inventory techniques. In lakes, these techniques included gillnetting, angling, and the use of gee traps. In streams, fish were inventoried using backpack electrofishing. The following section provides summary information for fish communities in selected lakes and streams in the Tailings Impoundment/Docking Facility Zone of the Jericho study area. All raw data are presented in Appendices F1 to F5.

5.5.1.1 Lakes

During the 1996 fisheries program, three lakes were sampled in the Tailings Impoundment/Docking Facility Zone (Figure 5.5.1). These were Lake D4, Lake D5, and a small bay of Contwoyto Lake.

In total, 204 fish representing two species were recorded from sampled lakes in the Tailings Impoundment/Docking Facility Zone (Table 5.5.1); these were lake trout (114) and Arctic char (90).

Lake trout and Arctic char were recorded in each of the three sampled lakes, but the relative importance of these species was not constant (Table 5.5.2). In Lake D4, Arctic char and lake trout were equally represented (53% and 47%, respectively). In Lake D5, Arctic char was the predominant species in the sample (69%). In contrast, lake trout clearly dominated the sample in Contwoyto Lake (93%).

The gill net catch data were used to assess the relative abundance of fish species in the sampled lakes. These data were used for comparison purposes because they were based on a standardized sampling effort and the majority of fish were captured using this technique (194 of 204 fish).

The relative abundance (catch-per-unit-effort or CPUE) values generated for fish captured in each lake (Figure 5.5.2) were consistent with the percent composition information. Highest CPUE values were recorded in Lakes D4 and D5 during summer (11 fish/100 $m^2 \cdot$ 12 h). Catch rates were much lower in Contwoyto Lake (5 fish/100 $m^2 \cdot$ 12 h during summer). The relative abundance of fish species also varied among seasons; catch rates during summer were higher. CPUE values recorded for lake trout were greater than 3 fish/100 $m^2 \cdot$ 12 h in summer compared to less than 2 fish/100 $m^2 \cdot$ 12 h during fall. The same pattern was evident for Arctic char. Catch rates during summer were greater than 7 fish/100 $m^2 \cdot$ 12 h in Lakes D4 and D5, but they did not exceed 5 fish/100 $m^2 \cdot$ 12 h in either lake during fall.

Abundance indices for each species also differed among lakes. For Arctic char, catch rates were highest in Lakes D4 and D5 (9 and 8 fish/100 $m^2 \cdot$ 12 h in summer, respectively). CPUE values for lake trout did not exceed 5 fish/100 $m^2 \cdot$ 12 h in any of the sampled waterbodies.

5.5.1.2 Streams

Of the 12 streams inventoried within the Tailings Impoundment/Docking Facility Zone, 7 contained fish (Figure 5.5.1). These streams were situated in three areas: Lake D4 (2), Lake D5 (2), Contwoyto Lake (3).

In general, limited numbers of fish were encountered in streams within the Tailings Impoundment/Docking Facility Zone. In total, 52 fish representing three species were enumerated (Table 5.5.3). These were slimy sculpin, which dominated the sample (35), lake trout (8), and Arctic char (9). The number of fish recorded varied depending on sampling area (Table 5.5.4). Most fish were recorded from streams in the Lake D4 and Lake D5 areas (21 and 20, respectively). Fewer fish were encountered in Contwoyto Lake streams (11).

The importance of each species varied between areas (Table 5.5.4). Slimy sculpin dominated numerically in all areas (ranged from 60% to 76% of the sample). However, Arctic char was the only other species recorded in Lake D4 area streams, and lake trout was the only other species encountered in Contwoyto Lake area streams. In Lake D5 area streams, lake trout and Arctic char were equally represented.

The number of fish recorded in individual streams also differed (Figure 5.5.3). In the Lake D4 area, Stream D2 contained many more fish than Stream D1 (20 versus 1). Streams D4 and D6 in the Lake D5 area exhibited a similar pattern; more fish were recorded in Stream D6 than D4 (18 versus 2). Streams in the Contwoyto Lake area also contained few fish. Most were recorded in Stream E1 (7); fewer than three fish were encountered in each of Streams B1 and F1.

5.5.2 Biological Characteristics

An important component of the 1996 fisheries program was to describe the biological characteristics of fish species recorded in the Tailings Impoundment/Docking Facility Zone. Characteristics described in this section include: length-frequency distributions, length-weight regressions, mean condition factors, age-at-maturity, mean length-at-age, and mean weight-at-age. Because much of this information was collected from fish that succumbed during sampling, and mortality rates were generally low, sample sizes are small. Unless otherwise stated, data from all sampling sessions and sampling methods have been combined for the analyses. Raw data used for these analyses are presented in Appendix F5.

5.5.2.1 Lake trout

Lake trout ranged in fork length from 96 to 684 mm (Figure 5.5.4). Lake trout captured from Contwoyto Lake exhibited a bimodal distribution with modal peaks occurring at 160 and 480 mm. Lake trout in the other two sampled waterbodies (Lakes D4 and D5) exhibited a similar range in size, although the majority of fish were smaller (<380 mm fork length). The length-frequency distribution for the Lake D4 sample also was bimodal; peaks occurred at 240 and 320 mm.

Length-weight regression equations and mean condition factors for lake trout sampled from each lake during summer are presented in Table 5.5.5.

Age-at-length and age-at-weight information for samples of lake trout captured from each lake during summer is provided in Table 5.5.6. Fish in this sample ranged in age from 1 to 36 years. Caution should be used when interpreting this information. The samples used for ageing were small ($n \leq 31$) and there was variation inherent to this type of data (subarctic fish populations typically exhibit a great range in age for fish of a given length [Johnson 1972]). As such, this information provides only a representative cross-section of these populations and should not be interpreted as an accurate description of growth rates. As such, it should not be used for comparison of growth curves among different fish populations.

Limited data were available to assess age-at-maturity for lake trout. Information collected from Lake D4 suggested that these fish became sexually mature at 12 years of age. The smallest sexually mature lake trout encountered in Lake D4 was a ripe male 352 mm in fork length. In Lake D5, the smallest sexually mature lake trout was a ripe female with a fork length of 333 mm. The minimum fork length of sexually mature lake trout appeared to be greater in Contwoyto Lake. A gravid male 495 mm in length was recorded from this waterbody. Nonfecund lake trout were also recorded in each of the sampled lakes (i.e., mature fish that did not spawn that year). The percentage of nonfecund individuals in samples that could be assessed for sexual maturity were 78% (Contwoyto Lake; $n=18$) and 38% (Lake D4; $n=18$). Sample sizes were insufficient to assess the percentage of nonfecund mature lake trout in Lake D5.

5.5.2.2 Arctic char

The fork length of Arctic char sampled from waterbodies ranged from 54 to 416 mm (Figure 5.5.5). Length-frequency distributions of fish sampled from Lakes D4 and D5 were similar; fish between 280 and 420 mm in length dominated both samples. Few Arctic char less than 280 mm fork length were encountered in either waterbody.

Length-weight regression equations and mean condition factors for Arctic char sampled from lakes during summer are presented in Table 5.5.7.

Age-at-length and age-at-weight information for samples of Arctic Char captured from Lakes D4 and D5 during summer and fall are provided in Table 5.5.8. Fish in these samples ranged in age from 5 to 12 years. Caution should be used when interpreting this information. The samples used for ageing were small ($n \leq 8$) and there was variation inherent to this type of data (subarctic fish populations typically exhibit a great range in age for fish of a given length [Johnson 1972]). As such, this information provides only a representative cross-section of these populations and should not be interpreted as an accurate description of growth rates. As such, it should not be used for comparison of growth curves among different fish populations.

Limited age-at-maturity data were available for sampled Arctic char. Data from Lake D4 suggested that fish became sexually mature at 10 years of age (ripe male 380 mm fork length), while in Lake D5, Arctic char became sexually mature by age 8 (ripe male 332 mm fork length). Nonfecund Arctic char were not recorded in sampled lakes during the study. This finding was not typical when compared to other Arctic char populations in the study area (see Sections 3.5.2 and 4.5.2). Small sample sizes may explain this discrepancy.

5.5.3 Feeding Habits

Stomach contents of Arctic char and lake trout were analysed to assess feeding habits (all seasons combined). Data were collected from fish that succumbed during capture or that were sacrificed for tissue samples. The information is presented as frequency of occurrence and percent composition of food items by volume. The raw data used for these analyses can be found in Appendix F5.

5.5.3.1 Lake trout

The diet of lake trout in all three lakes was dominated by zooplankton (Figure 5.5.6). In Lakes D4 and D5, the diet consisted almost exclusively of zooplankton. In Contwoyto Lake, the diet was more varied; foods consumed were zooplankton, fish, trichopterans, and chironomids. Zooplankton was the most important foot item (46% occurrence and 48% composition by volume); chironomids and fish were next in importance (12 to 17% occurrence and 16 to 19% composition by volume, respectively).

5.5.3.2 Arctic char

Similar to findings for lake trout, the diet of Arctic char consisted primarily of zooplankton (Figure 5.5.7). This food item exceeded 75% occurrence and 50% composition by volume in samples from each of the three sampled lakes. In Contwoyto Lake, chironomids were equal in importance to zooplankton (based on a sample of 1 stomach). Chironomids were also an important food item in Lake D5 (38% occurrence and 43% composition by volume). In Lake D4, trichopterans and pelecypods were most important (10 to 20% occurrence and 9 to 17% composition by volume).

5.5.4 Fish Movements

Streams in the Tailings Impoundment/Docking Facility Zone are small and have dispersed channels, therefore there is no potential for fish to undertake movements between waterbodies.

5.5.5 Population Estimates

During the 1996 field program, attempts were made to estimate the size of fish populations inhabiting Lakes D4 and D5, two waterbodies that could potentially be affected by development of a tailings impoundment. Because lake trout and Arctic char were the most numerous fish encountered and they were easily captured by the sampling techniques employed, these species were targeted for population estimates. Fish in good physical condition were marked with a numbered Floy tag during summer and fall sampling. It was hoped that a sufficient number of the fish would be subsequently recaptured to generate useful population estimates.

Effort was expended to capture and mark as many fish as possible during the summer session (27 July to 4 August), as well as the early part of the fall session (3 September). During the marking sessions, 18 lake trout and 17 Arctic char were marked and released in Lake D4, while 7 lake trout and 23 Arctic char were marked and released in Lake D5 (Table 5.5.9). On 9 September, crews returned to both lakes to obtain the recapture cohort required to generate the population estimates.

Given the small size of the two lakes (surface areas of Lake D4 and D5 are 16 ha and 9 ha, respectively), the number of marked fish released into these systems was sufficient to ensure an adequate recapture rate of tagged fish (one exception was lake trout in Lake D5 where only seven fish were marked). Recapture rates for marked Arctic char were 23% in Lake D4 and 22% in Lake D5. However, no marked lake trout were recaptured in either lake; this was likely due to the low number of fish encountered during the recapture session.

Population estimates for Arctic char in each lake were 51 fish ±36 fish (Lake D4) and 32 fish ±13 fish (Lake D5). These values correspond to the relative sizes of these lakes; Lake D4 has twice the surface area of Lake D5. Both estimates have wide 95% confidence intervals, which is an indication of low precision (Seber 1982). This problem is an artifact of two factors: a limited number of marked fish were recaptured and the total number of fish collected during the recapture session was low (12 Arctic char in Lake D4 and 7 Arctic char in Lake D5). If attempts are made to generate estimates for fish populations in the future, more sampling effort should be expended to allow development of more precise population estimates.

5.5.6 Resource and Potential Harvest

Based on available information, waterbodies in the Tailings Impoundment/Docking Facility Zone were not used extensively for commercial or domestic fisheries. Nor was there recreational use of Lakes D4 and D5. Contwoyto Lake is used extensively for recreational angling during the open water period. Personnel from the Echo Bay Mines Ltd. Lupin Mine routinely harvest fish from Contwoyto Lake and are known to angle in the north arm of the lake (David Hohnstein, Echo Bay Mines Ltd. pers. comm.). In fact, a lake trout tagged during the present study was harvested by an angler from the Lupin mine in the vicinity of the proposed docking facility.

The small sizes of Lakes D4 and D5 and their low productivity, make sport fish populations susceptible to over harvest. To estimate the annual sport fish harvest a waterbody can support, an equation that employs a lake's surface area, was developed by Evans et al. (1990) for Northern Ontario. This equation has been recommended to calculate potential annual harvest of lake trout in inland lakes (Oliver et al. 1991) and is as follows:

$$\log_{10} H \quad 0.60 \quad 0.72 \log_{10} A$$

Where: H = potential annual harvest of lake trout (kg).
A = surface area (ha) of lake (lake surface areas based on 1:50 000 scale N.T.S. maps).

Using this formula, the potential annual harvest of lake trout from each of the small lakes was calculated. The potential harvest for Lakes D4 and D5 were 29 kg and 18 kg, respectively (Table 5.5.10). This information indicates that trout species are susceptible to over harvest. Also, these values may be biassed upward due to a number of environmental differences between subarctic lakes and waterbodies in northern Ontario. Lower nutrient levels, a colder water temperature regime, and a shorter open water period in the subarctic region would significantly lower the potential harvest available in these subarctic lakes compared to those in northern Ontario. The potential harvest of lake trout in the small bay of Contwoyto Lake could not be estimated, but given the size of this waterbody, the potential annual harvest is large.

5.5.7 Summary

Sampled lakes in the Tailings Impoundment/Docking Facility Zone supported populations of lake trout and Arctic char. Two separate systems were represented in this zone: a small bay of Contwoyto Lake and two small headwater lakes that drain into Contwoyto Lake (Lakes D4 and D5). Based on abundance indices (catch rates using standardized gill net sets), overall fish densities during summer were highest in Lakes D4 and D5 (11 fish/100 m^2 · 12 h in summer). CPUE values recorded in Contwoyto Lake did not exceed 5 fish/100 m^2 · 12 h. Arctic char was the numerically dominant fish in Lake D5; lake trout dominated in Contwoyto Lake. In Lake D4, lake trout and Arctic char were equally represented.

Few fish were encountered in sampled streams. Lake trout, Arctic char, and slimy sculpin were the only species recorded. The low numbers of fish was due to the very poor habitat available in these streams.

The biological characteristics of fish populations indicated that they were slow growing, late maturing, and dominated by older age-classes. Lake dwelling species (lake trout and Arctic char) tended to exhibit bimodal length-frequency distributions and were dominated by larger older fish. To some extent, this reflected the sampling methodology employed (smaller size-classes were not effectively sampled using gill nets), however, these data are typical of subarctic fish populations residing in cold, oligotrophic waterbodies. It has been suggested that these characteristics are indicative of unexploited fish populations in a state of equilibrium with their environment (Johnson 1976).

The feeding habits of fish were related to the most abundant food item available. Zooplankton was the dominant food item identified in lake trout and Arctic char stomachs in all sampled waterbodies. Fish and chironomids were also important food groups consumed by lake trout in Contwoyto Lake. Chironomids were the predominant food of Arctic char in Lake D5 and Contwoyto Lake.

The physical characteristics of streams in the Tailings Impoundment/Docking Facility Zone, such as insufficient water depth, intermittent water flow, and ill-defined channels prevented any movements of fish between waterbodies.

Based on available information, waterbodies in the Tailings Impoundment/Docking Facility Zone were not used extensively for commercial and domestic fisheries. Recreational angling was observed on Contwoyto Lake near the proposed docking facility. The biological characteristics of fish populations in these waterbodies (i.e., slow growing and late maturing), the small size of some of these lakes (Lakes D4 and D5), and their low productivity, make their sport fish populations susceptible to over harvest.

5.6 HABITAT AND HABITAT USE

This study component was designed to describe aquatic habitat in lakes and streams in the Tailings Impoundment/Docking Facility Zone and to assess its value to fish communities. This section provides information; raw data are presented in Appendices G1 and G2.

5.6.1 Lakes

The shoreline habitat characteristics of three waterbodies were surveyed. These included complete assessments of Lake D4 and Lake D5, and a survey of the small bay of Contwoyto Lake (Figure 5.6.1). Surveys were designed to provide a general assessment of the shoreline characteristics of each lake and to identify high quality habitats. These high quality habitats included: sheltered shallow-water areas containing aquatic macrophytes (submergent and emergent vegetation) suitable for fish rearing and submerged cobble-boulder areas suitable for spawning by lake trout, Arctic char, and round whitefish.

Shorelines in all three lakes were dominated by cobble-boulder substrates (range from 64% to 100%) (Table 5.6.1). The only other shoreline type recorded during the surveys was bedrock; this accounted for 36% of the Lake D4 shoreline. No fine substrates were encountered in any of the lakes. In Contwoyto Lake and Lake D4, a large percentage of the shorelines (>56%) exhibited moderate to high slopes. The shoreline of Lake D5 was characterized as having a low slope (70%).

Potential spawning and rearing habitats were identified during the shoreline habitat surveys. Spawning habitat required by lake dwelling species such as lake trout, Arctic char, and round whitefish is characterized by the presence of clean gravel to boulder-sized substrate in areas sufficiently deep to avoid freezing (Scott and Crossman 1973). Areas with these characteristics were widely distributed in all surveyed waterbodies. A number of sites that provided high quality spawning habitat (i.e., contained an abundance of clean substrates, exhibited moderate slopes to deep water, and were positioned on the windward side of the lake which promotes water movement) are illustrated in Figure 5.6.1. Fisheries surveys during fall did not locate concentrations of spawning fish at any of these sites, therefore, their use as spawning areas was not confirmed.

High quality rearing habitat suitable for lake dwelling fish species is characterized by shallow-water zones exhibiting low slopes and fine substrates that support the growth of aquatic macrophytes (Randall et al. 1996). These features provide shelter (i.e., protection from predators and source of food) to younger age-classes of lake trout, Arctic char, and round whitefish. In addition, they provide habitat for forage fish species such as slimy sculpin.

Shoreline areas exhibiting these characteristics were severely limited in all surveyed waterbodies. Shallow-water areas with low slopes and fine substrates were not present and aquatic macrophytes were restricted to a few protected shoreline margins. Aquatic macrophytes consisted of emergent species (*Carex* spp.) and aquatic grasses (*Glyceria* spp.); no submergent species were recorded during the habitat surveys. Only one high quality rearing area was identified; this area was located in Lake D4 (Figure 5.6.1).

5.6.2 Streams

Investigations of streams in the Tailings Impoundment/Docking Facility Zone were undertaken during spring and summer. During spring, a reconnaissance level survey was conducted to identify streams that provided some habitat for fish communities and to assess their potential as spawning habitat (i.e., use by spring spawning Arctic grayling). Surveys during summer were used to provide a more detailed description of stream characteristics and to assess their overall potential as fish habitat.

In total, 12 watercourses were examined during the 1996 sampling program (Figure 5.6.2). Of these, five contained no fish during spring sampling and were ephemeral (contained water only during the snow melt period or during rainfall events). These streams were deemed to have no value to fish communities, and therefore, did not receive more extensive investigation. The seven streams that had some potential as fish habitat were located in three general areas: Contwoyto Lake (3), Lake D4 (2), and Lake D5 (2). All of these systems were small and the majority exhibited intermittent flow during the summer sampling period.

5.6.2.1 Contwoyto Lake Streams

Stream B1

Stream B1 is a small watercourse that drains a headwater lake situated immediately north of the Docking Facility bay. This stream exhibits a very high slope (7%) and is dominated by cobble substrates (Table 5.6.2). Due to these characteristics, much of the channel is a barrier to fish passage; all fish were encountered in the lowermost 20 m of the stream. The low numbers of lake trout and slimy sculpin encountered in this system (Table 5.6.3) indicates that its value as fish habitat is severely limited (Table 5.6.4).

Streams E1 and F1

Streams E1 and F1 are very small, ephemeral watercourses located along the southern shore of the Docking Facility bay of Contwoyto Lake. The high slopes (>6%) and dispersed channels of these streams severely limit their value to fish. The few fish that were present were restricted to the lowermost 20 m.

5.6.2.2 Lake D4 Streams

Stream D1

Stream D1 is the outlet system to Lake D4 that drains into Contwoyto Lake. This watercourse contains no defined stream channel. Substrates are dominated by boulders and much of the water flow is subsurface. As such, this stream contains no useful fish habitat. The single Arctic char encountered during the fisheries survey was captured at the confluence of Stream D1 and Contwoyto Lake.

Stream D2

Stream D2 is the connecting watercourse between Lakes D4 and D5. It has an ill-defined channel over much of its length; RUN habitat and boulder substrates dominated (77%). Although small, water flow was maintained in this stream during the summer period. It did provide habitat to fish originating from Lake D4 or Lake D5. However, these characteristics severely limits movement of fish between these two waterbodies.

Slimy sculpin and Arctic char were recorded in this stream. These fish were confined to the outlet area of Lake D4 and the inlet area of Lake D5.

5.6.2.3 Lake D5 Streams

Stream D4

This tributary is a small watercourse that drains the terrain at the west end Lake D5. It exhibits a well-defined channel dominated by RUN habitat and sand substrates. A prominent feature of this stream is a cascade at its confluence with Lake D5. This feature is a barrier to fish passage during low flow and severely limits its value as fish habitat. Two juvenile Arctic char were encountered in this stream during the spring survey.

Stream D6

Stream D6 drains a series of small headwater lakes situated to the southeast of Lake D5. Although this stream maintained water flow during the summer period, much of its channel is ill-defined and is dispersed through boulder fields. Approximately 300 m upstream of its confluence with Lake D5, its flow is subsurface. A such, all fish habitat is restricted to the lowermost section of stream. Three species of fish were encountered in this stream (Arctic char, lake trout, and slimy sculpin); none were abundant.

5.6.3 Summary

The shoreline areas of lakes in the Tailings Impoundment/Docking Facility Zone were uniformly dominated by large substrates consisting of cobbles and boulders. These shoreline characteristics provide an abundance of potential spawning areas for species such as lake trout. Although not confirmed as a spawning area, a shoal situated in the proposed docking facility bay exhibited characteristics of a high quality lake trout spawning area.

In contrast to the abundance of potential spawning sites, a paucity of aquatic macrophytes in these lakes severely limited the availability of lake shore rearing habitat.

Habitat surveys were undertaken in 12 streams. In general they provided little habitat for fish populations originating from study area lakes. The primary reasons for low quality fish habitat in these streams were their small size, intermittent flow during the summer, and poorly defined channels. Good quality fish habitat was not identified in any of the surveyed streams.

5.7 BACKGROUND METAL CONCENTRATIONS IN FISH TISSUE

In 1996, a monitoring program was initiated in the Tailings Impoundment/Docking Facility Zone to document background metal concentrations in kidney, liver, and muscle tissues of fish (lake trout and round whitefish). Samples were collected from two lakes: Contwoyto Lake, which is situated downstream of the proposed tailings area and a Control Lake, which was outside the influence of any potential development (i.e., 6 km west of the Jericho Diamond Project).

In total, 21 lake trout were sampled for tissue analysis from each of Contwoyto Lake and Control Lake (Table 5.7.1); no round whitefish were collected from Contwoyto Lake. The size range of fish collected for tissue samples is also provided in Table 5.7.1. The concentrations of 26 metal elements were analysed. Liver and muscle, but not kidney tissue samples were analysed; kidney tissue samples have been stored (frozen at -17°C) pending future analyses. Results of the analyses for all elements are presented in Appendices H2 and H3. For analytical purposes, values below the detection limits were coded as one half the detection limit.

The average concentrations of some of the potentially toxic metals (aluminum, arsenic, cadmium, mercury, lead, nickel, copper, and zinc) in the tissues of study area fish are presented in Table 5.7.2. The results are discussed separately for each of the metals.

5.7.1 Aluminum

The availability of aluminum to aquatic organisms has been correlated with the pH of the aquatic environment (Holtze and Hutchinson 1989); however, it is unclear at what pH threshold, or at what concentration, aluminum becomes toxic to fish. Aluminum can be acutely toxic at high exposure levels, but it does not bioaccumulate in aquatic organisms (Neville 1985).

Detectable concentrations of aluminum (>1 μg/g) were recorded in 100% of the lake trout liver samples from both lakes (Table 5.7.2). For muscle tissue, however, aluminum concentrations exceeded the detection limit only once (3 μg/g in Contwoyto Lake). Mean aluminum levels in liver tissue samples were similar (16 μg/g and 20 μg/g from each of Contwoyto and Control Lakes, respectively). The maximum recorded aluminum concentration was 47 μg/g (Control Lake).

5.7.2 Arsenic

Arsenic is more common in the earth's crust than mercury or cadmium, and it is more toxic to plants than to animals (Demayo et al. 1979). It does not appear to biomagnify through different trophic levels, and demersal species are more likely to accumulate arsenic than pelagic fish (Demayo et al. 1979). Arsenic concentrates mainly in the liver and is a cumulative toxin (Falk et al. 1973).

Detectable concentrations of arsenic (>0.05 μg/g) were recorded in all lake trout liver samples, but only 64% of lake trout muscle samples. Mean concentrations of arsenic in liver tissue samples were higher in Contwoyto Lake (4.89 μg/g and 1.76 μg/g in Contwoyto Lake and Control Lake, respectively). Arsenic levels in muscle tissue samples were lower than those in livers; mean concentrations were 0.14 μg/g in the Contwoyto Lake sample and 0.07 μg/g in the Control Lake sample. The maximum arsenic concentration was recorded from a liver tissue sample collected in Contwoyto Lake (11.80 μg/g).

The high mean arsenic concentration recorded in Contwoyto Lake was representative of the sample and was not caused by a single extreme value that could have biassed the mean of the sample. The reason for the high value relative to the Control Lake sample is unclear. There was a significant difference between lakes in the size of lake trout collected for tissue analyses ($P=0.001$, one-tailed *t*-test [Sokal and Rohlf 1981]). Contwoyto Lake fish were larger than Control Lake fish (490 mm versus 427 mm), therefore, the effects of bioaccumulation may explain the difference. The larger, and presumably older, fish may contain higher concentrations of arsenic. Regardless of the reason for the high mean arsenic value for lake trout collected from Contwoyto Lake, future monitoring programs should take this into account.

5.7.3 Cadmium

Cadmium does not bioaccumulate in the food web (Reeder et al. 1979a). The rate of cadmium uptake is generally faster in hard waters, although cadmium toxicity decreases in hard water (Reeder et al. 1979a).

Detectable concentrations of cadmium (greater than 0.05 μg/g) were recorded in all lake trout liver samples, but were not detected in any of lake trout muscle samples. Mean cadmium levels in liver samples were similar among lakes (2.03 μg/g and 2.65 μg/g from Contwoyto and Control Lakes, respectively). The maximum recorded cadmium concentration in lake trout liver samples was 6.17 μg/g (Contwoyto Lake).

5.7.4 Copper

In contrast to the nonessential trace metals (e.g., arsenic, cadmium, mercury, lead), copper is important for biochemical functions; however, excess amounts of copper are toxic to freshwater fish (Förstner and Wittman 1979). The toxicity of copper varies with the species of fish and with ambient water characteristics (e.g., pH and alkalinity). Copper is not considered to be a cumulative systematic poison as most of it is excreted from the body (Falk et al. 1973). The main areas of the body where it concentrates are the liver, muscle, and brain tissues (Demayo and Taylor 1981).

Detectable concentrations of copper (>0.05 μg/g) were recorded in all of lake trout liver and muscle samples. Mean copper levels in liver tissue samples were highest from Control Lake (89.76 μg/g versus 42.36 μg/g), and mean copper levels in lake trout muscle tissues were also highest in Control Lake (0.78 μg/g versus 0.68 μg/g). The maximum recorded copper concentrations in lake trout tissue were 232.00 μg/g (liver sample from Control Lake) and 3.78 μg/g (muscle sample from Control Lake).

5.7.5 Lead

Lead tends to deposit in bone as a cumulative toxin (Falk et al. 1973). It is more toxic in soft water than in hard water (Demayo et al. 1980).

Lead concentrations in the lake trout tissue samples were low. Detectable concentrations of lead (>0.05 μg/g) were recorded in 69% of lake trout liver samples and in 24% of the muscle samples. Mean lead levels in liver samples were 0.37 μg/g in Contwoyto Lake and 0.07 μg/g in Control Lake. The mean lead level in the Control Lake muscle sample was 0.10 μg/g; detectable concentrations of lead were not recorded in the Contwoyto Lake muscle tissue sample. The maximum recorded lead concentration in lake trout tissue was 0.86 μg/g (liver sample from Contwoyto Lake).

5.7.6 Mercury

Mercury in fish tissue is most commonly present in the form of methyl mercury. Because there are several types of mercury potentially present in the environment, total mercury is the form recommended for setting guidelines (Reeder et al. 1979b). The maximum allowable level of mercury in muscle tissue of fish sold in Canada for human consumption is 0.5 μg/g (wet weight), which is comparable to approximately 2.5 μg/g when expressed on a "dry weight" basis (assuming 80% moisture content).

Mercury concentrations were above the detection limit (>0.005 μg/g) in all lake trout tissue samples. The mean mercury levels in lake trout liver tissues were 1.610 μg/g in Contwoyto Lake and 0.501 μg/g in Control Lake. Mean mercury values in muscle tissue samples were similar (0.909 μg/g in Contwoyto Lake and 0.925 μg/g in Control Lake). None of the 42 lake trout muscle samples had mercury levels equal to or higher than allowed for human consumption (2.5 μg/g). The maximum mercury concentrations documented in individual fish were 4.750 μg/g in a Contwoyto Lake liver sample and 2.140 μg/g in a Control Lake muscle sample.

5.7.7 Nickel

The toxicity of nickel rises with decreasing water hardness and increasing acidity (CCREM 1987); it also increases when nickel is present with copper, which is likely a result of synergism (Taylor et al. 1979). Nickel has the greatest effect on the early life stages of fish, including fertilized eggs, but it does not biomagnify in the food web (Taylor et al. 1979). Hutchinson et al. (1975) reported that nickel concentrations were highest in plants and lowest in predators situated in the upper levels of the food chain.

The level of nickel in lake trout tissues generally was low. Detectable concentrations of nickel (>0.1 μg/g) were recorded in only 29% of liver samples and 12% of the muscle samples, and levels were at or near detection limits in both Contwoyto Lake and Control Lake samples. Maximum nickel concentrations in lake trout tissues were 8.6 μg/g (liver sample from Contwoyto Lake), and 0.4 μg/g (muscle sample from Control Lake).

5.7.8 Zinc

Zinc primarily affects gill epithelial tissues. In excessive amounts, it can cause immediate mortality or it can induce delayed mortality by stressing the animal (Falk et al. 1973). However, zinc is essential for plant and animal health. The toxicity of zinc rises with increasing pH and decreasing water hardness. Zinc concentrations are usually greater in omnivorous than in piscivorus species, and greater in benthic invertebrates than in fish (CCREM 1987).

Zinc concentrations in lake trout tissues were similar among the study lakes. Mean levels in the liver tissues were 155.43 μg/g in Contwoyto Lake and 151.57 μg/g in Control Lake samples; mean levels in the muscle tissues were 11.89 μg/g and 12.15 μg/g, respectively. Maximum recorded zinc concentrations in lake trout tissues were 232.00 μg/g (liver sample from Contwoyto Lake), and 15.30 μg/g (muscle sample from Contwoyto Lake).

SECTION 5 - TABLES

Table 5.1.1 Morphometric characteristics[a] of surveyed lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Lake	Surface Area (ha)	Lake Volume (m)	Mean Depth (m)	Maximum Depth (m)	Shoreline Length (m)	Shoreline Development Ratio
Lake D4	15.58	1.070×10^6	6.9	20	2700	1.93
Lake D5	8.55	2.250×10^5	2.7	12	1700	1.67
Contwoyto Lake	67.45	n/a	n/a	20	n/a	n/a

[a]Morphometric characteristics (with the exception of shoreline length) provided by Canamera Geological Ltd.
n/a Not applicable.

Table 5.2.1 Phytoplankton biovolume in sampled lakes during summer and fall within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Taxonomic Group	Lake D4 (Site PL5)				Lake D5 (Site PL6)				Contwoyto Lake (Site PL7)			
	Summer		Fall		Summer		Fall		Summer		Fall	
	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%	Biovolume ($\mu m^3/m^3$)	%
Bacillariophyta (diatoms)	105 794	27.1	104 512	31.3	5263	2.7	111 931	46.4	48 188	7.6	45 017	14.4
Cryptophyta (cryptomonads)	31 354	8.0	30 466	9.1	13 226	6.8	35 552	14.7	23 375	3.7	13 234	4.2
Chrysophyta (golden-brown algae)	98 208	25.2	151 950	45.5	119 295	61.6	76 241	31.6	189 393	29.9	126 824	40.6
Pyrrophyta (dinoflagellates)	68 890	17.7	3799	1.1	24 514	12.6	5359	2.2	56 781	9.0	62 365	20.0
Euglenophyta (euglenoid)									9949	1.6		
Chlorophyta (green algae)	48 203	12.4	32 047	9.6	25 293	13.1	11 523	4.8	303 252	47.8	34 239	11.0
Cyanophyta (cyanobacteria)	37 273	9.6	11 116	3.3	6199	3.2	740	0.3	2929	0.5	30 558	9.8
Total Biovolume	**389 722**	**100**	**333 890**	**100**	**193 790**	**100**	**241 346**	**100**	**633 867**	**100**	**312 237**	**100**

Table 5.2.2 Zooplankton biomass in sampled lakes during summer and fall within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Taxonomic Group	Lake D4 (Site PL5)				Lake D5 (Site PL6)				Contwoyto Lake (Site PL7)			
	Summer		Fall		Summer		Fall		Summer		Fall	
	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%	Biomass ($\mu g/m^3$)	%
Copepoda Calanoida	47 980	74.2	28 851	74.7	42 105	80.5	85 802	49.3	18 805	35.1	34 602	15.7
Cyclopoida	8501	13.2	1077	2.8	3503	6.7	63 434	36.4	27 552	51.4	120 754	54.7
Cladocera	5699	8.8	8124	21.0	1810	3.5	24 665	14.2	7094	13.2	64 824	29.4
Rotifera	2450	3.8	548	1.4	4863	9.3	179	0.1	145	0.3	616	0.3
Total Biomass	**64 630**	**100**	**38 600**	**100**	**52 281**	**100**	**174 080**	**100**	**53 595**	**100**	**220 796**	**100**

Table 5.4.1 Mean density[a] (±1 standard error) of benthic macroinvertebrates in the littoral and profundal zones[b] of selected lakes within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Taxonomic Group	Lake D5		Lake D4		Contwoyto Lake	
	Littoral (Site L6)	Profundal (Site P6)	Littoral (Site L5)	Profundal (Site P5)	Littoral (Site L7)	Profundal (Site P7)
ANNELIDA						
OLIGOCHAETA	739 (396)	130 (91)	928 (705)	29 (29)	4290 (3895)	188 (110)
ARTHROPODA						
HYDRACHNIDIA	101 (63)	43 (25)	406 (147)	29 (29)	72 (72)	130 (75)
CRUSTACEA						
COPEPODA						
Harpacticoida	87 (66)		43 (25)	275 (195)		
OSTRACODA	5217 (2091)	203 (102)	2058 (1238)	1739 (1449)	464 (464)	145 (92)
INSECTA						
DIPTERA						
Chironomidae[c]	3405 (1218)	1131 (656)	8275 (3675)	1594 (658)	4985 (3797)	2811 (2006)
Chironomini	362 (198)	899 (584)	768 (750)	667 (282)		14 (14)
Diamesinae	159 (119)					
Orthocladiinae	2290 (635)	58 (43)	5609 (2139)	174 (87)	4362 (3387)	2609 (1909)
Tanypodinae	275 (124)	174 (29)	1014 (590)	72 (14)	43 (43)	58 (40)
Tanytarsini	319 (142)		884 (196)	681 (275)	580 (367)	130 (43)
TRICHOPTERA						
Limnephilidae						
Gresnia	43 (43)		58 (38)	14 (14)	58 (58)	
MICROTURBELLARIA			188 (95)	72 (72)		
MOLLUSCA						
PELECYPODA						
Sphaeriidae	130 (53)	449 (354)	435 (348)	391 (165)		232 (124)
NEMATODA	159 (52)	14 (14)	1145 (722)	87 (66)	5000 (1501)	667 (153)
Total No. Benthic Taxa/m^2	**21 (3)**	**10 (1)**	**16 (4)**	**13 (1)**	**11 (2)**	**14 (3)**
Total No. of Benthic Invertebrates/m^2	**9957 (3246)**	**2000 (617)**	**13 638 (1309)**	**4333 (1230)**	**15 435 (8276)**	**4391 (1931)**

[a]Mean density (No./m^2) value and standard error generated using three replicate samples.
[b]For definition of littoral and profundal zones see Section 2.2.5.
[c]Sum of all subfamilies and tribes.

Table 5.5.1 Overall species composition of fish sampled from lakes within the Tailings Impoundment/DockingFacility Zone lakes, Jericho study area, 1996 (all sampling methods and periods combined).

Species		Total	
Common Name	Scientific Name	Number	Percent
Arctic char	*Salvelinus alpinus* (Linnaeus)	90	44.1
Lake trout	*Salvelinus namaycush* (Walbaum)	114	55.9
All Species Combined		**204**	**100.0**

Table 5.5.2 Species composition of fish sampled from lakes within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species	Lake D4		Lake D5		Contwoyto Lake	
	No.	%	No.	%	No.	%
Arctic char	42	53.2	44	68.8	4	6.6
Lake trout	37	46.8	20	31.2	57	93.4
Total	**79**	**100.0**	**64**	**100.0**	**61**	**100.0**

Table 5.5.3 Overall species composition of fish sampled from streams within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species		Total	
Common Name	Scientific Name	Number	Percent
Arctic char	*Salvelinus alpinus* (Linnaeus)	9	17.3
Lake trout	*Salvelinus namaycush* (Walbaum)	8	15.4
Slimy sculpin	*Cottus cognatus* Richardson	35	67.3
All Species Combined		**52**	**100**

Table 5.5.4 Species composition of fish sampled from streams in three areas within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Species	Lake D4		Lake D5		Contwoyto Lake	
	No.	%	No.	%	No.	%
Arctic char	5	23.8	4	20.0		
Lake trout			4	20.0	4	36.4
Slimy sculpin	16	76.2	12	60.0	7	63.6
Total	**21**	**100.0**	**20**	**100.0**	**11**	**100.0**

Table 5.5.5 Length-weight regression equations for lake trout sampled during summer from lakes within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Lake	Length-weight Relationship		Condition Factor (±SE)	Sample Size
	Regression Equation[a]	r^2 Value		
Lake D4	Weight = 7.161 * 10^{-6} * Fork Length$^{3.064}$	0.922	1.062 ± 0.052	30
Lake D5	Weight = 2.056 * 10^{-5} * Fork Length$^{2.863}$	0.989	0.945 ± 0.020	13
Contwoyto Lake	Weight = 4.864 * 10^{-6} * Fork Length$^{3.132}$	0.99	1.051 ± 0.026	50

[a]Weight in g; fork length in mm.

Table 5.5.6 Age-length relationships for lake trout within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Age	Lake D4[a]					Lake D5[b]					Contwoyto Lake[b]				
	Fork Length (mm)		Weight (g)		*n*	Fork Length (mm)		Weight (g)		*n*	Fork Length (mm)		Weight (g)		*n*
	Mean	Range	Mean	Range		Mean	Range	Mean	Range		Mean	Range	Mean	Range	
0															
1											96				1
2						121	116 - 129	19	16 - 22	3	108		10		1
3						265		185		1					
4											168		40		1
5											162		45		1
6	232		125		1						184	175 - 193	60	55 - 70	3
7	218		95		1	235		110		1					
8	243		135		1	249		135		1	236		120		1
9	274		185		1	288		220		1					
10						187				1	219		115		1
11						314		300		1					
12	331		360		1	229				1					
13	346	320 - 372	413		2										
14	365		465		1						405	374 - 436	810	560 - 1060	2
15	375		470		1						366	337 - 395	618	435 - 800	2
16	357		495		1						456	427 - 484	1030	850 - 1210	2
17	420		745		1						475	454 - 495	1225	1040 - 1500	4
18											436		770		1
19											461		1100		1
20						446		725	725 - 725	1	568	461 - 684	1998	960 - 3150	4
21											495		1350		1
22															
23															
24	450		845		1						519	510 - 528	1475	1400 - 1550	2
25															
26															
27															
28															
29															
30															
31															
32											490		1400		1
33											569	525 - 612	2130	1900 - 2360	2
34															
35															
36	522		1560		1										

[a]Ages generated using fish sampled during summer and fall.
[b]Ages generated using fish sampled during summer.

Table 5.5.7 Length-weight regression equations for Arctic char sampled during summer from two lakes within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Lake	**Length-weight Relationship**		**Condition Factor (±SE)**	**Sample Size**
	Regression Equation[a]	**r^2 Value**		
Lake D4	Weight = 5.081 * 10^{-6} * Fork Length$^{3.101}$	0.926	0.925 ± 0.017	25
Lake D5	Weight = 2.999 * 10^{-4} * Fork Length$^{2.409}$	0.901	0.962 ± 0.023	24

[a]Weight in g; fork length in mm.

Table 5.5.8 Age-length relationships for Arctic char within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Age	**Lake D4**[a]					**Lake D5**[a]				
	Fork Length (mm)		**Weight (g)**		***n***	**Fork Length (mm)**		**Weight (g)**		***n***
	Mean	**Range**	**Mean**	**Range**		**Mean**	**Range**	**Mean**	**Range**	
0										
1										
2										
3										
4										
5	283		225		1	288		255		1
6						266		240		1
7										
8	305	300 - 310	267	253 - 280	2	341	332 - 350			2
9	393	386 - 400	545	500 - 590	2					
10	355	315 - 385	486	280 - 672	3	328		385		1
11										
12						388	368 - 407	550	380 - 720	2
13										
14										

[a]Ages generated using fish sampled during summer and fall.

Table 5.5.9 Number of lake trout and Arctic char marked and recaptured in Lake D4 and Lake D5 within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Parameter	**Lake D4**		**Lake D5**	
	Lake trout	**Arctic char**	**Lake trout**	**Arctic char**
Number of Fish Marked	18	17	7	23
Number of Recaptured Fish with Marks	0	4	0	5
Total Number of Fish Recaptured	2	12	0	7
Population Estimate[a] **(± 95% C.I.)**	-	**51±36**	-	**32±13**

[a]Population estimate based on Peterson's Single Census Model (see Section 2.2.8); 95% Confidence Intervals = 2 x standard error.

Table 5.5.10 Surface areas and potential annual harvests of lake trout populations in lakes within the Borrow Extraction Zone, Jericho study area, 1996.

Lake	Surface Area (ha)[a]	Potential Harvest of Lake Trout (kg/yr)[b]
Lake D4	15.6	28.8
Lake D5	8.2	18.1

[a]Lake surface area provided by Canamera Geological Ltd.
[b]Based on Evan's formula for harvest.

Table 5.6.1 Summary of lakeshore habitat characteristics recorded for sampled waterbodies within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Habitat Zone[a]		Contwoyto Lake[b]		Lake D4		Lake D5	
Slope	**Substrate**	**Length (m)**	**%**	**Length (m)**	**%**	**Length (m)**	**%**
Low	Fines						
	Cobble-Boulder	219	16.8	366	44.4	1253	69.7
	Bedrock						
Moderate	Fines						
	Cobble-Boulder	704	53.8	165	20	544	30.3
	Bedrock						
High	Fines						
	Cobble-Boulder	384	29.4				
	Bedrock			293	35.6		
Total		**1308**	**100**	**823**	**100**	**1797**	**100**

[a]For definition of habitat zones see Appendix A1.
[b]Survey restricted to proposed Docking Facility bay.

Table 5.6.2 Summary of habitat characteristics[a] of inventoried streams within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Area	Stream	Surveyed Length (m)	Average Wetted Width (m)	Discharge[b] (m^3/s)	Slope (%)	Channel Type (%)		Bank Type (%)		Habitat Type (%)						Substrate Type (%)				
						Single	Multiple	Distinct	Indistinct	Pool	Run	Flat	Cascade	Riffle/ Rapid	Dispersed	Si/Sa	Gr	Co	Bo	Bed
Contwoyto L.	B1	50	1.0	0.146[c]	7.0	100		100		20				80			10	80	10	
	E1	50	1.0	0.001[c]	6.0		100		100						100		5	15	80	
	F1	50	1.0	0.001[c]	12.0		100		100						100	30			70	
Lake D4	D1	500	15.0	N/D[d]	3.0		100		100						100				100	
	D2	70	1.5	0.042	4.0	93	7	20	80		73		14	8	7	4	4	15	77	
Lake D5	D4	60	0.1	0.011	4.0	100		100		7	79		7	7		80	7	1	12	
	D6	280	1.2	0.011	2.5	30	70	50	50		35		10		55	30	5	5	60	

[a]For classification system see Appendix A.
[b]Discharge measured during summer.
[c]Discharge measured during late spring immediately after snow melt.
[d]N/D=no data.

Table 5.6.3 Number of fish recorded in sampled streams according to age-class within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all sampling methods and periods combined).

Area	Tributary	Species	Age-Class[a]			
			Young-of-the-year	Juvenile	Adult	Combined
Contwoyto Lake	B1	Lake trout		2		21
		Slimy sculpin				
	E1	Slimy sculpin				6
	F1	Lake trout		2		2
Lake D4	D1	Arctic char		1		1
	D2	Arctic char	1	3		4
		Slimy sculpin				16
Lake D5	D4	Arctic char		2		2
	D6	Arctic char		2		2
		Lake trout		4		4
		Slimy sculpin				12

[a]Age-class designations based on size differences of fish for each species.

Table 5.6.4 Fish habitat quality ratings for sampled streams within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Area	Stream	Rating of Habitat Quality[a]		
		Spawning	Rearing	Feeding
Contwoyto Lake	B1	Nil	Low	Nil
	E1	Nil	Low	Nil
	F1	Nil	Low	Nil
Lake D4	D1	Nil	Nil	Nil
	D2	Low	Low	Nil
Lake D5	D4	Nil	Low	Nil
	D6	Nil	Low	Nil

[a]Rating of habitat quality based on qualitative assessment of stream habitat and fish numbers recorded during survey.

Table 5.7.1 Number, mean length, and size range of fish collected for kidney, liver, and muscle tissue analyses within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Lake	Sample Size	Fork Length (mm)			
		Mean	Standard Deviation	Minimum	Maximum
Contwoyto Lake	21	490	76.9	330	684
Control Lake	21	427	25.7	400	486

Table 5.7.2 Mean concentrations of metals in lake trout tissue samples within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

Lake	Tissue	Parameter	Metal Concentrations (μg/g of dry weight)							
			Al (1)[c]	As (0.05)	Cd (0.05)	Cu (0.05)	Pb (0.05)	Hg (0.005)	Ni (0.1)	Zn (0.05)
Contwoyto	Liver	n < D.L.[a]	0	0	0	0	0	0	18	0
	n=21	**Mean (μg/g)**	**16**	**4.89**	**2.03**	**42.36**	**0.37**	**1.610**	**0.6**	**155.43**
		Sd[b] (μg/g)	13	2.72	1.09	17.83	0.20	1.132	1.9	29.27
		Min. (μg/g)	5	1.72	1.11	20.20	0.12	0.483	0.1	118.00
		Max. (μg/g)	45	11.80	6.17	78.00	0.86	4.750	8.6	232.00
	Muscle	n < D.L.[a]	20	0	21	0	21	0	17	0
	n=21	**Mean (μg/g)**	**1**	**0.14**	**0.03**	**0.68**	**0.03**	**0.909**	**0.1**	**11.89**
		Sd[b] (μg/g)	1	0.08	0	0.38	0	0.498	0.1	1.67
		Min. (μg/g)	1	0.07	0.03	0.38	0.03	0.299	0.1	8.93
		Max. (μg/g)	3	0.41	0.03	2.18	0.03	2.070	0.3	15.30
Control	Liver	n < D.L.[a]	0	0	0	0	13	0	12	0
	n=21	**Mean (μg/g)**	**20**	**1.76**	**2.65**	**89.76**	**0.07**	**0.501**	**0.1**	**151.57**
		Sd[b] (μg/g)	12	1.68	1.24	56.72	0.10	0.572	0.1	28.99
		Min. (μg/g)	5	0.31	1.26	4.34	0.03	0.070	0.1	99.00
		Max. (μg/g)	47	7.50	6.16	232.00	0.41	2.120	0.6	211.00
	Muscle	n < D.L.[a]	21	15	21	0	11	0	20	0
	n=21	**Mean (μg/g)**	**1**	**0.07**	**0.03**	**0.78**	**0.10**	**0.925**	**0.1**	**12.15**
		Sd[b] (μg/g)	0	0.10	0	1.78	0.08	0.341	0.1	1.66
		Min. (μg/g)	1	0.03	0.03	2.78	0.03	0.528	0.1	8.45
		Max. (μg/g)	1	0.48	0.03	3.78	0.24	2.140	0.4	15.00

[a]Number of samples below detection limit.
[b]Standard deviation.
[c]Detection limit.

SECTION 5 - FIGURES

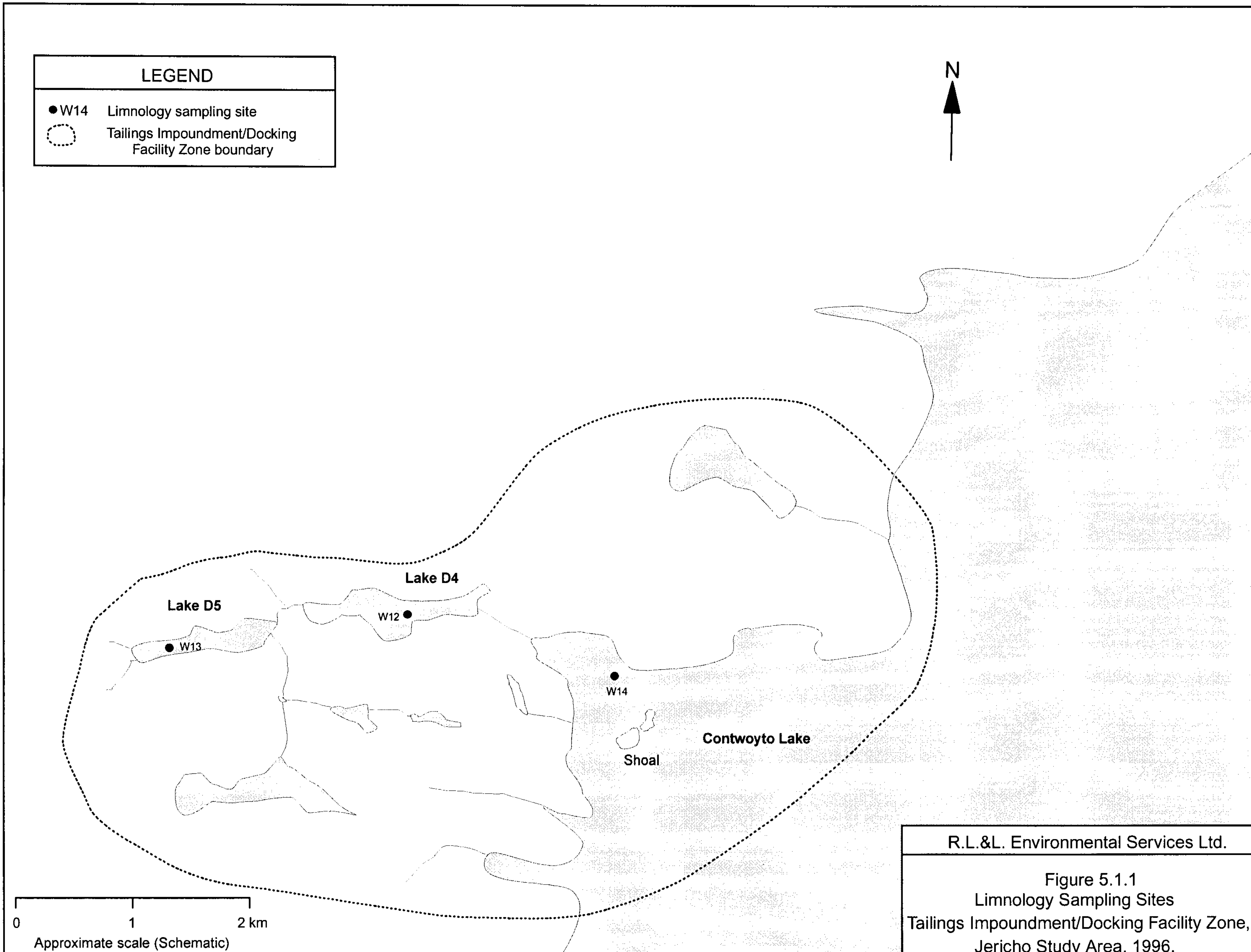


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Figure 5.1.1
Limnology Sampling Sites
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.

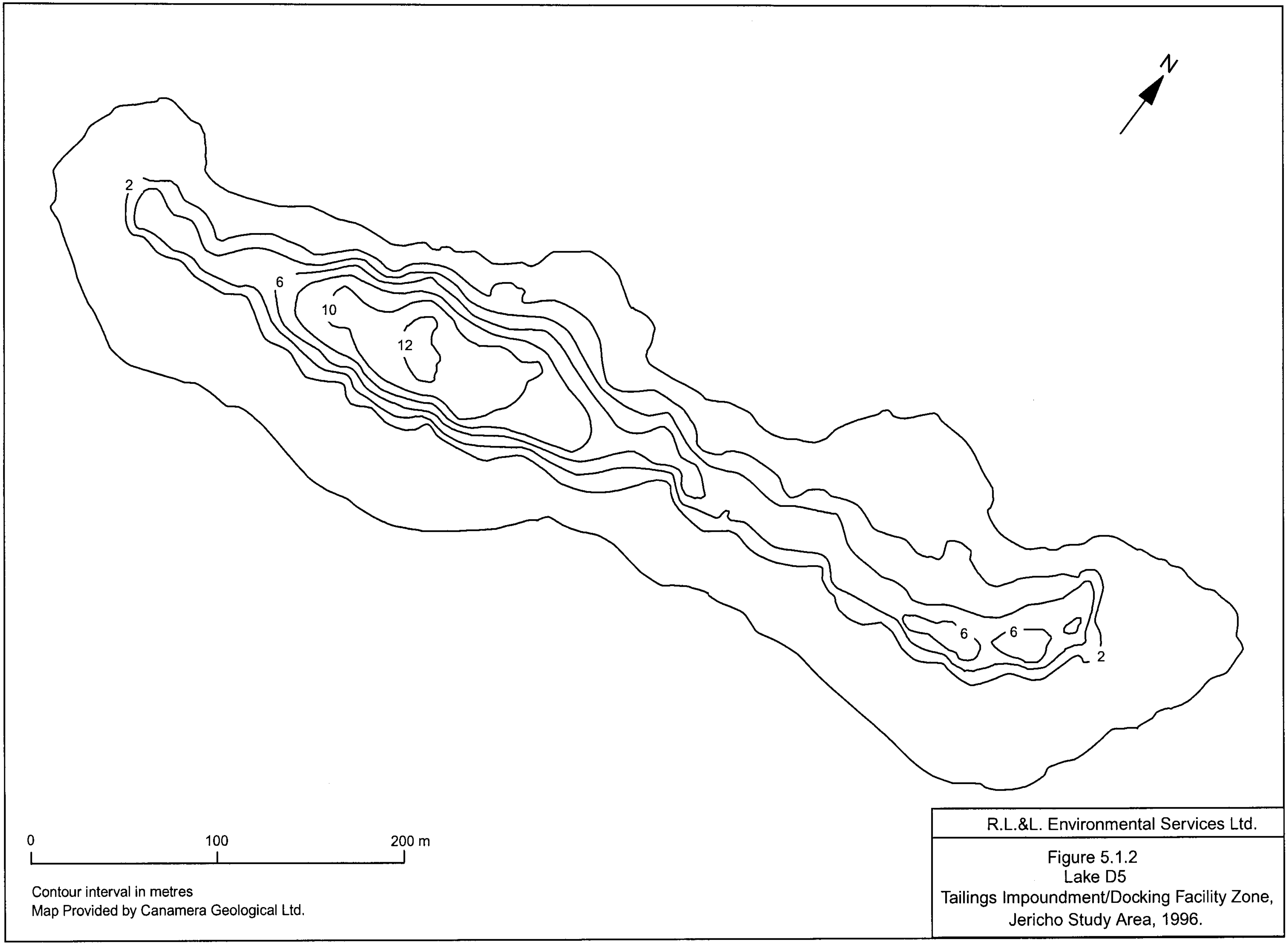

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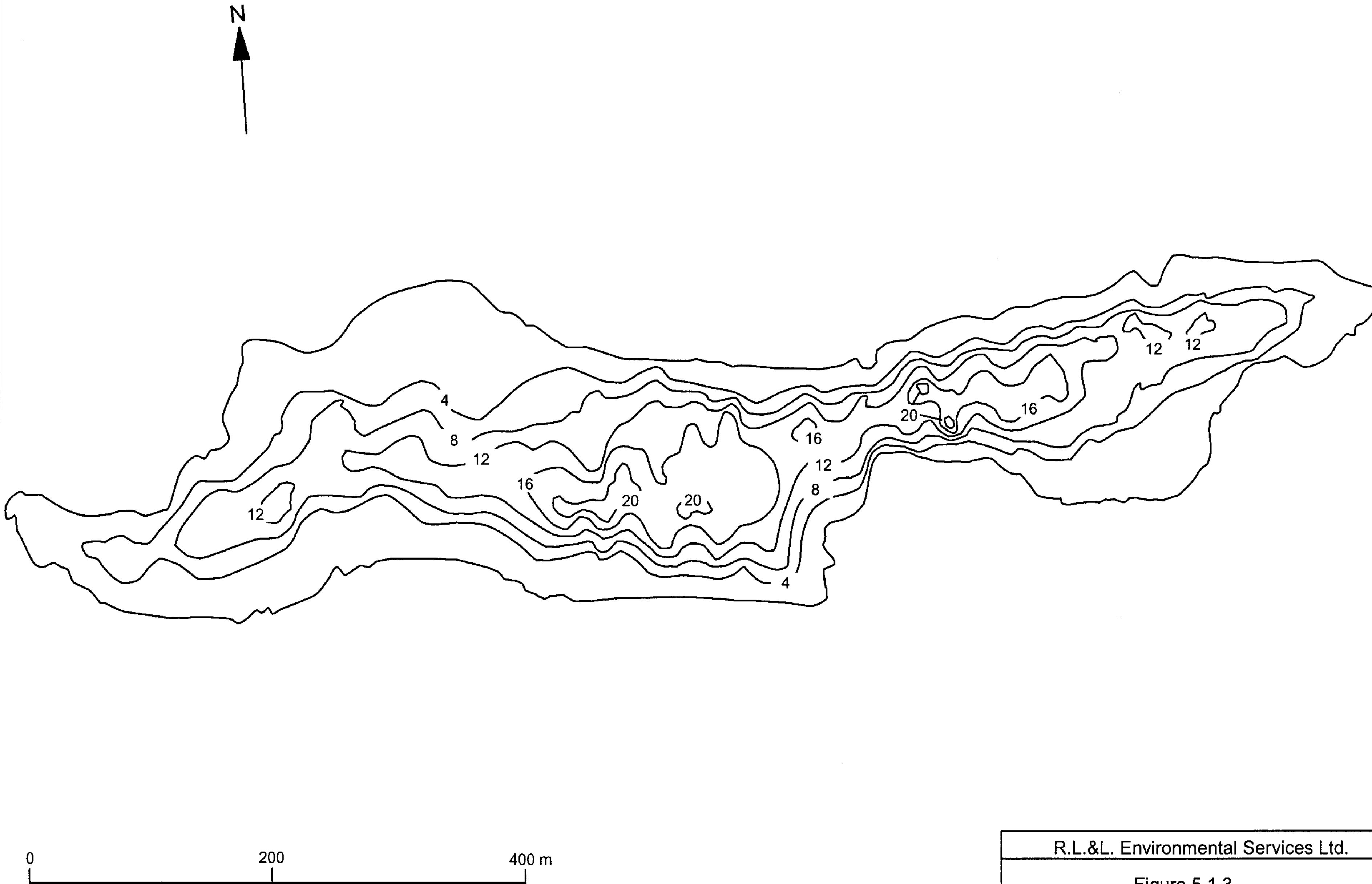
Figure 5.1.2
Lake D5
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.



Contour interval in metres
Map Provided by Canamera Geological Ltd.

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Figure 5.1.3
Lake D4
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.

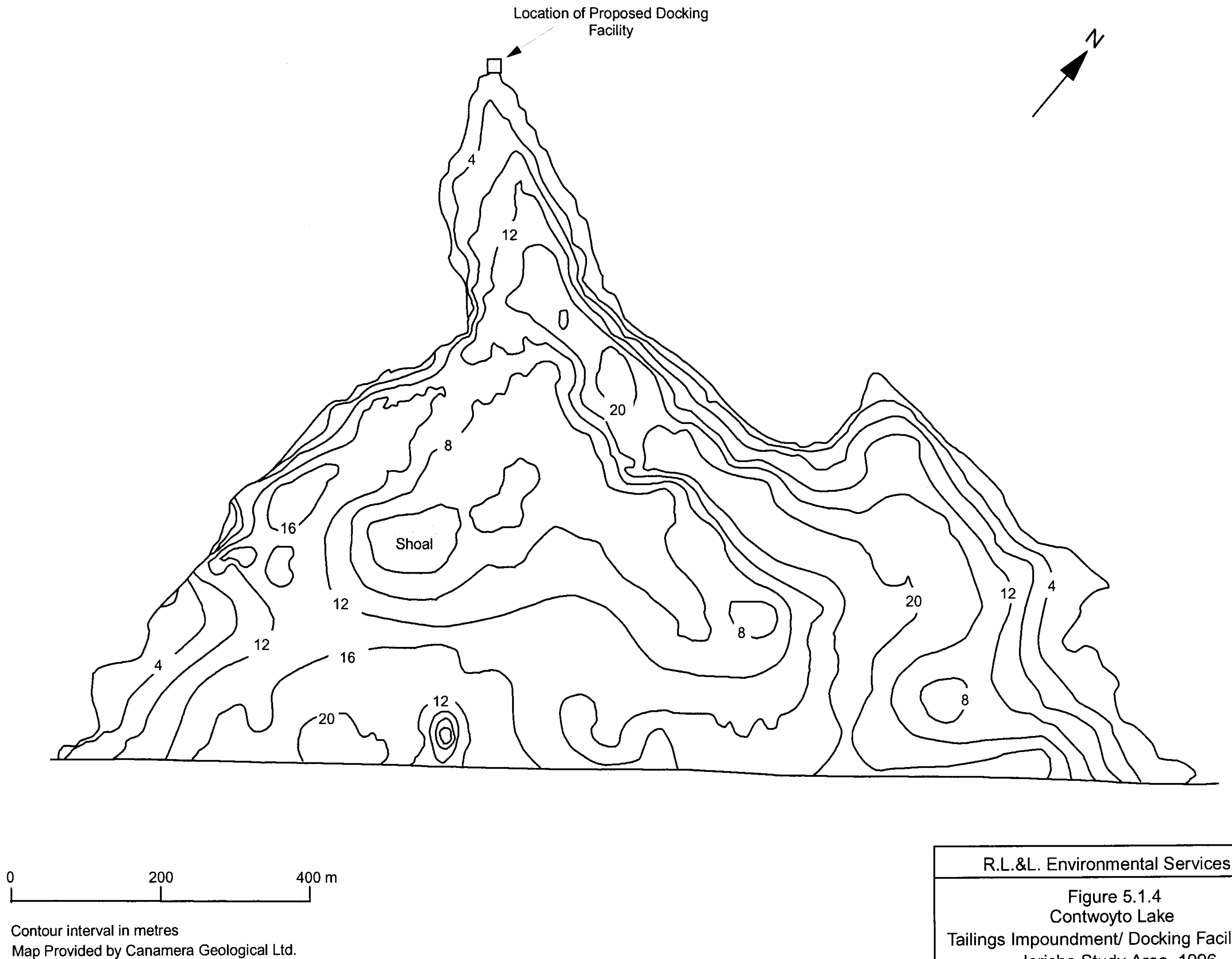

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Figure 5.1.4
Contwoyto Lake
Tailings Impoundment/ Docking Facility Zone,
Jericho Study Area, 1996.

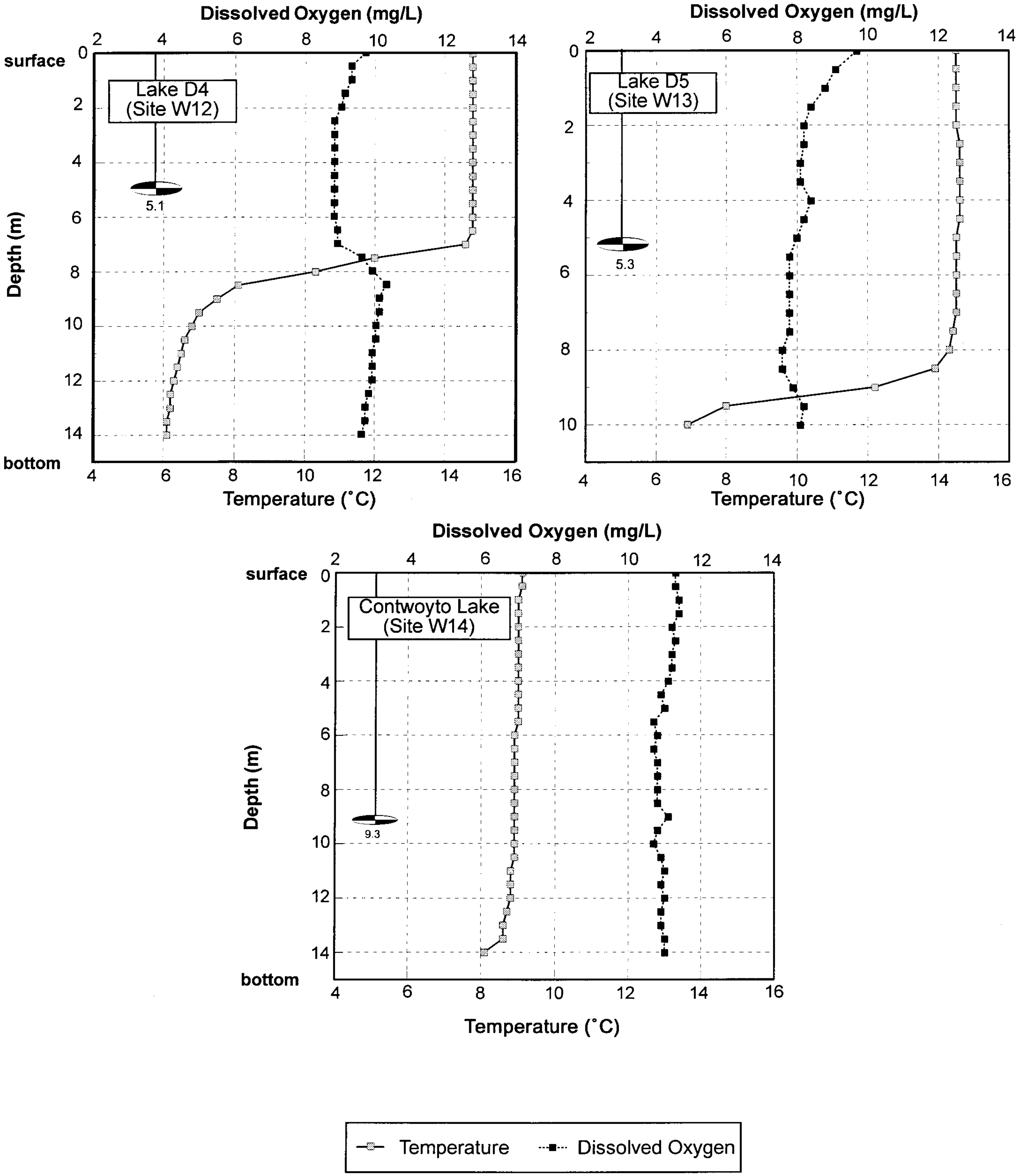

Figure 5.1.5 Dissolved oxygen and temperature profiles, and Secchi depths in lakes within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 3 August 1996.

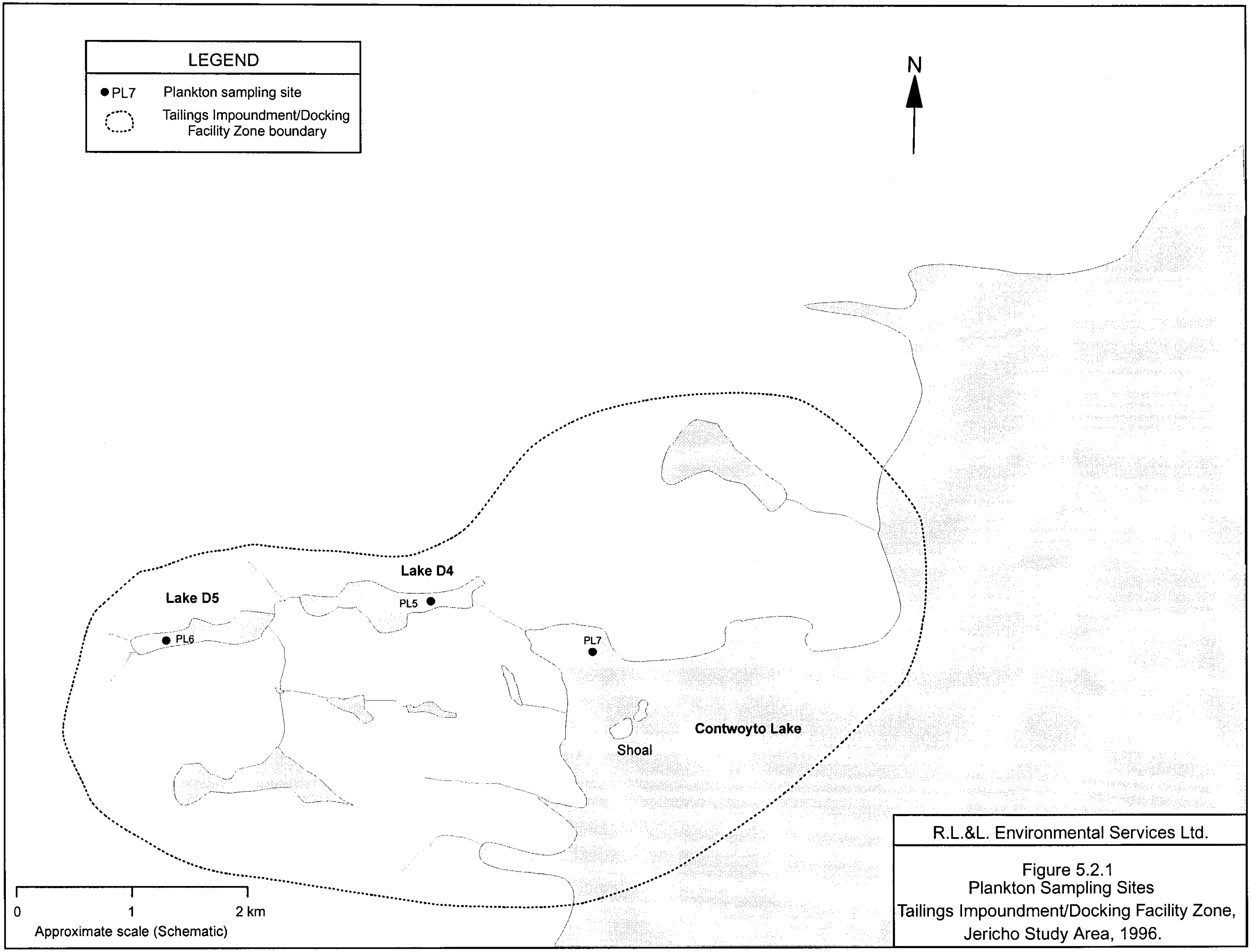

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Figure 5.2.1
Plankton Sampling Sites
Tailings Impoundment/Docking Facility Zone, Jericho Study Area, 1996.

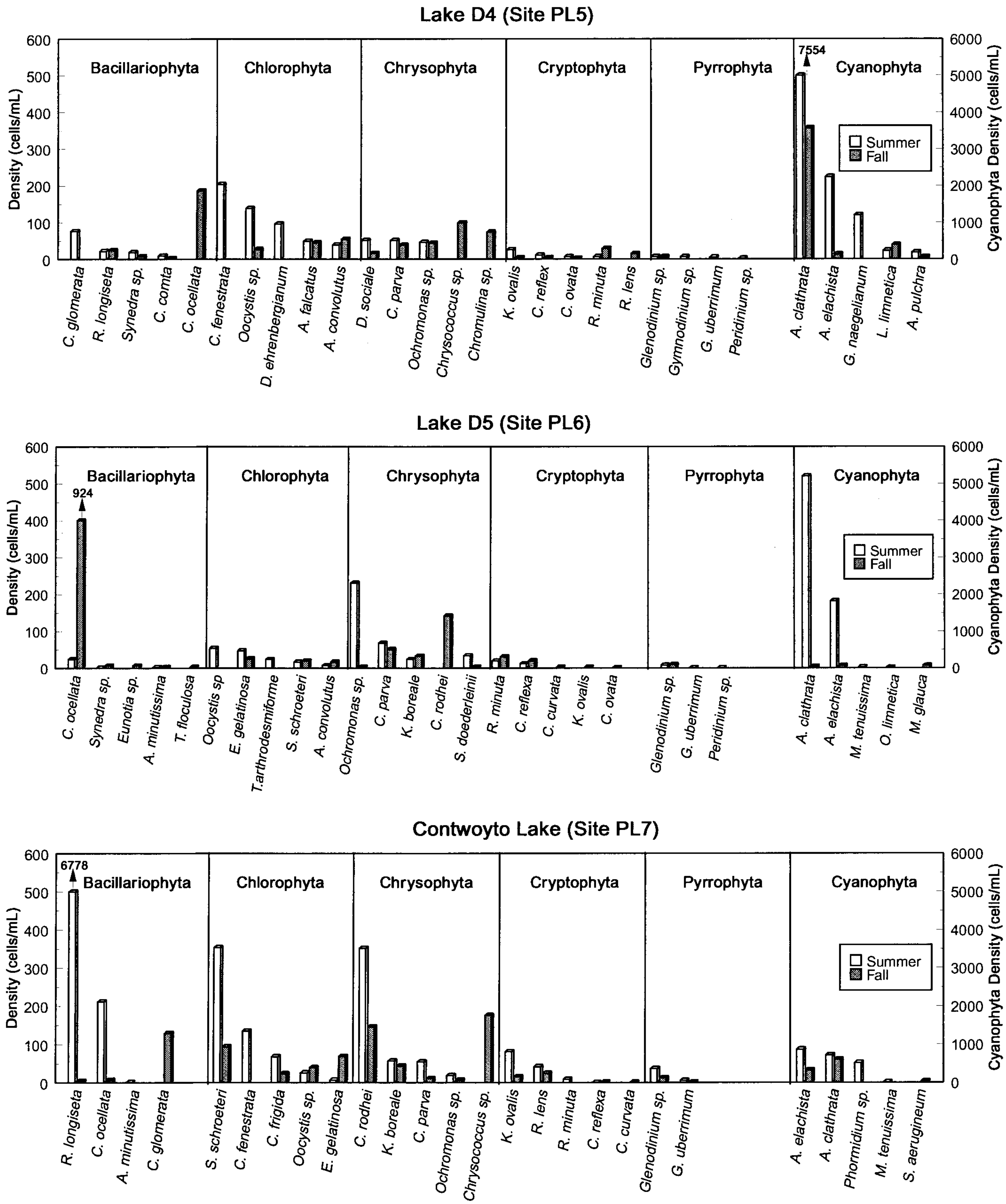

Figure 5.2.2 Density of major phytoplankton species in each of six taxonomic groups during summer and fall in lakes within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (note difference in scale for Cyanophyta).

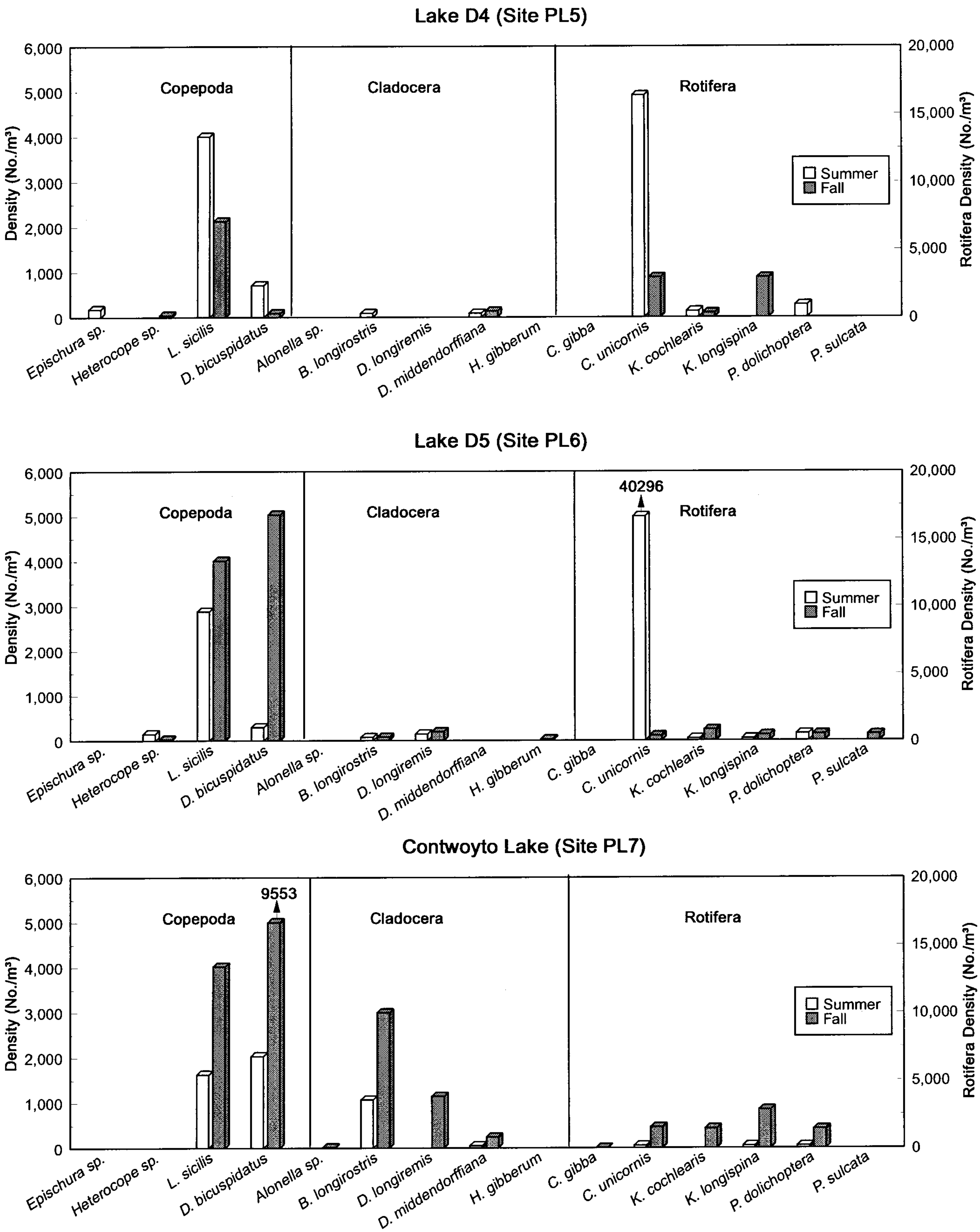

Figure 5.2.3 Density of major zooplankton species in each of three taxonomic groups during summer and fall in lakes within theTailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (note difference in scale for Rotifera).

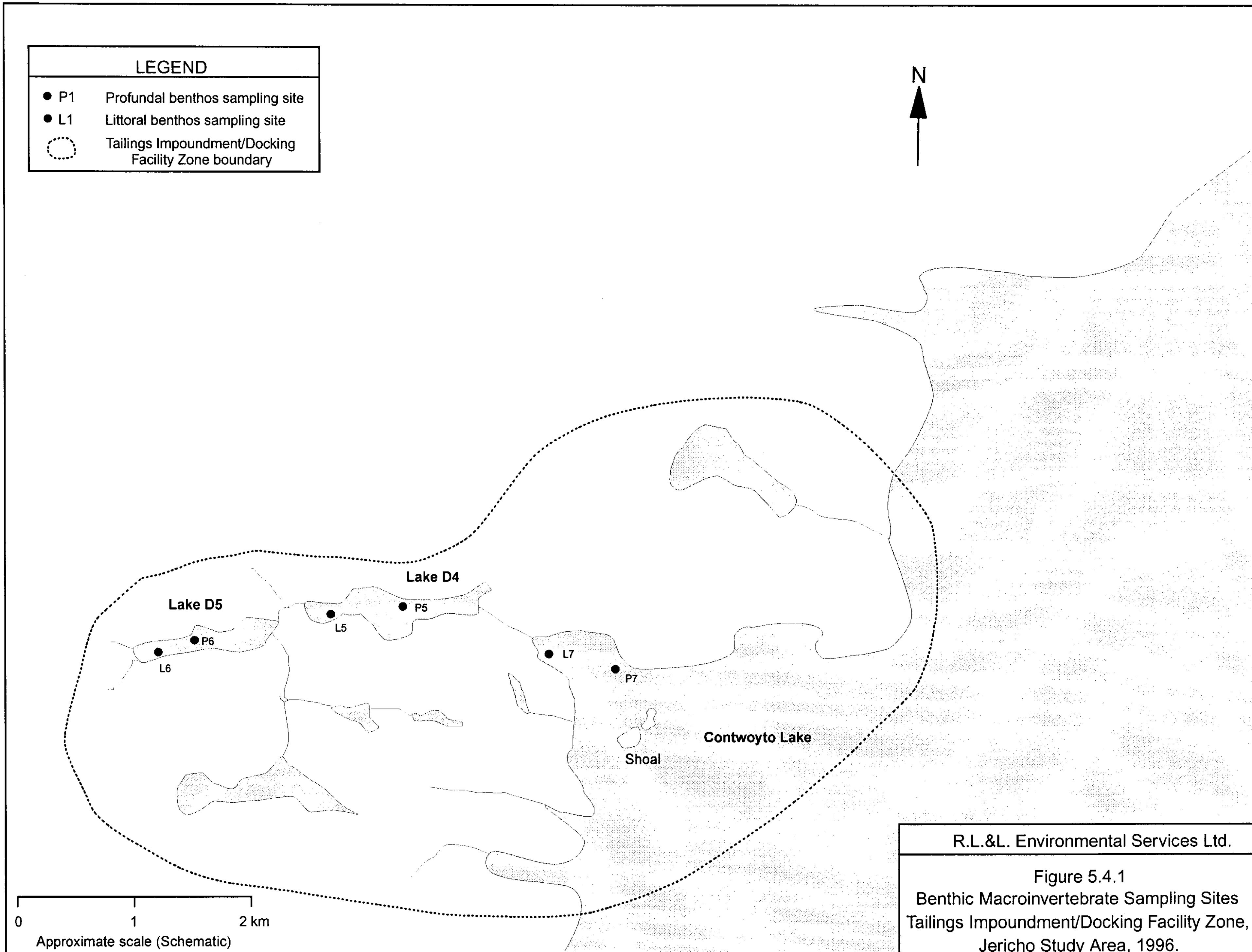

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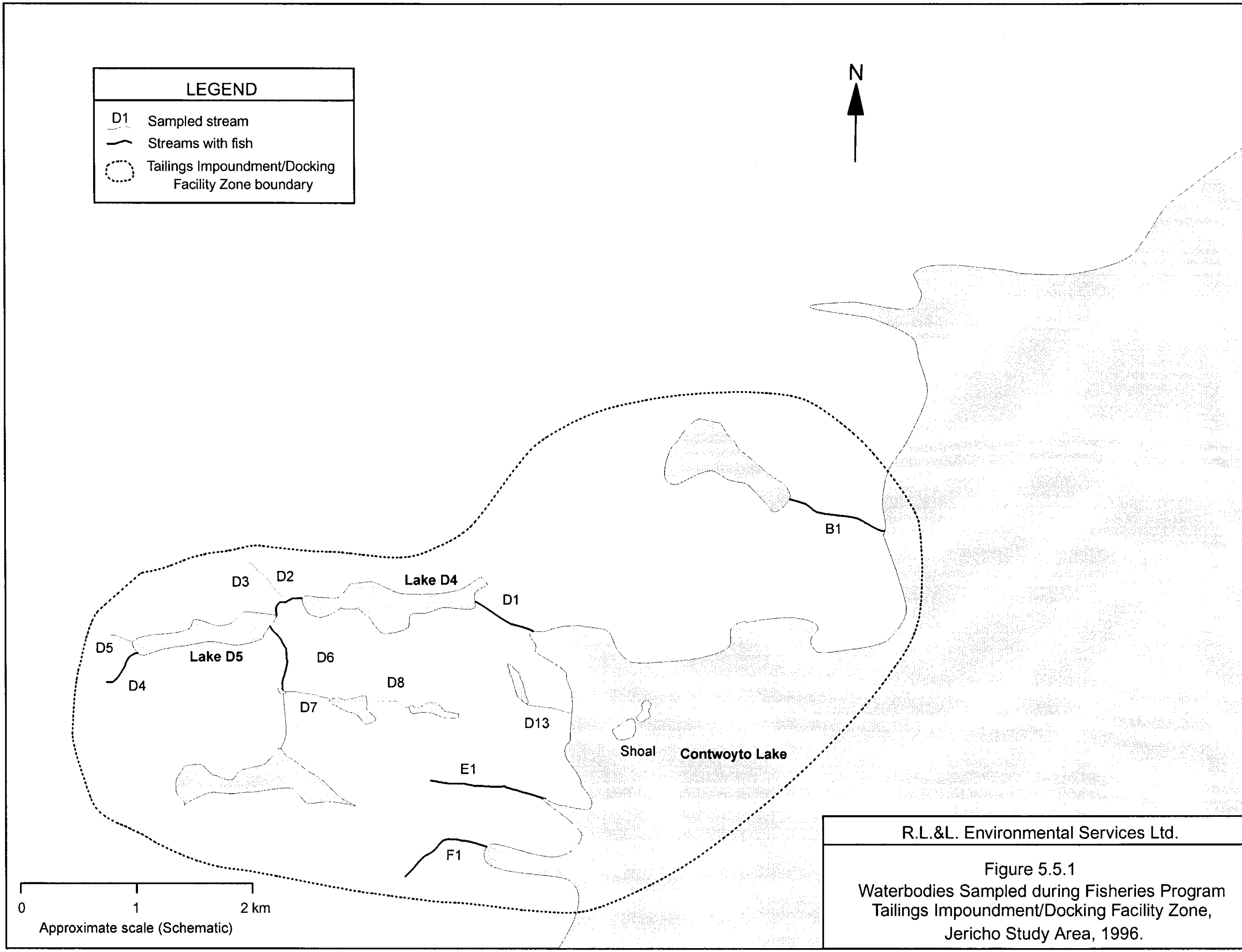
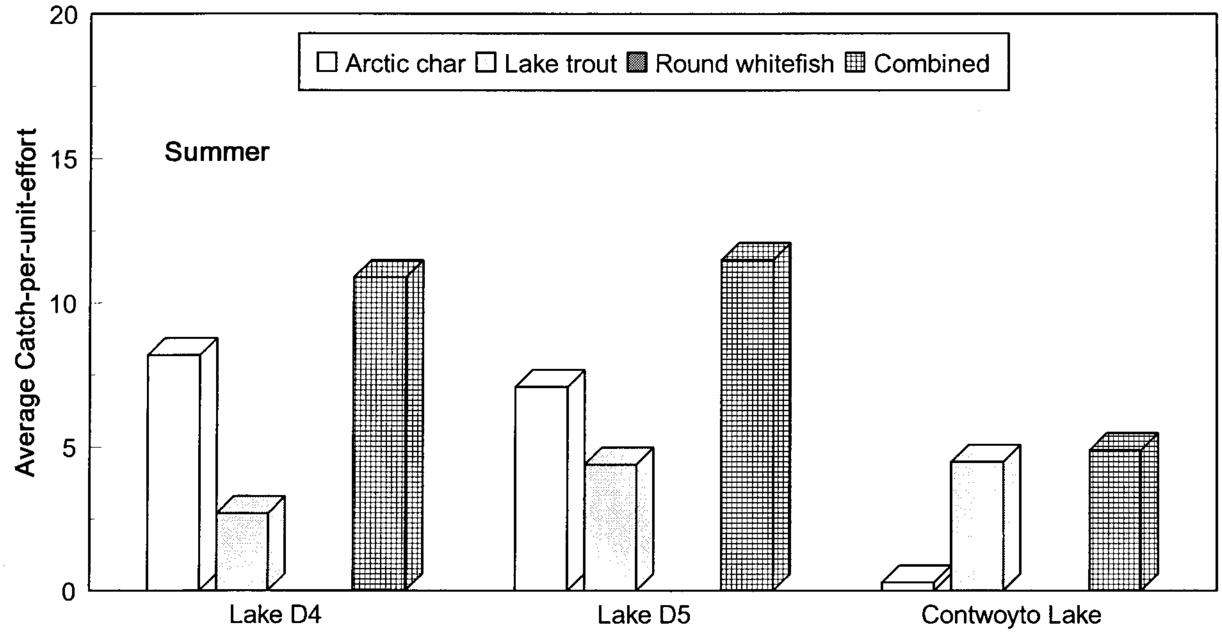
Figure 5.4.1
Benthic Macroinvertebrate Sampling Sites
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.



R.L.&L. Environmental Services Ltd.

Figure 5.5.1
Waterbodies Sampled during Fisheries Program
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.



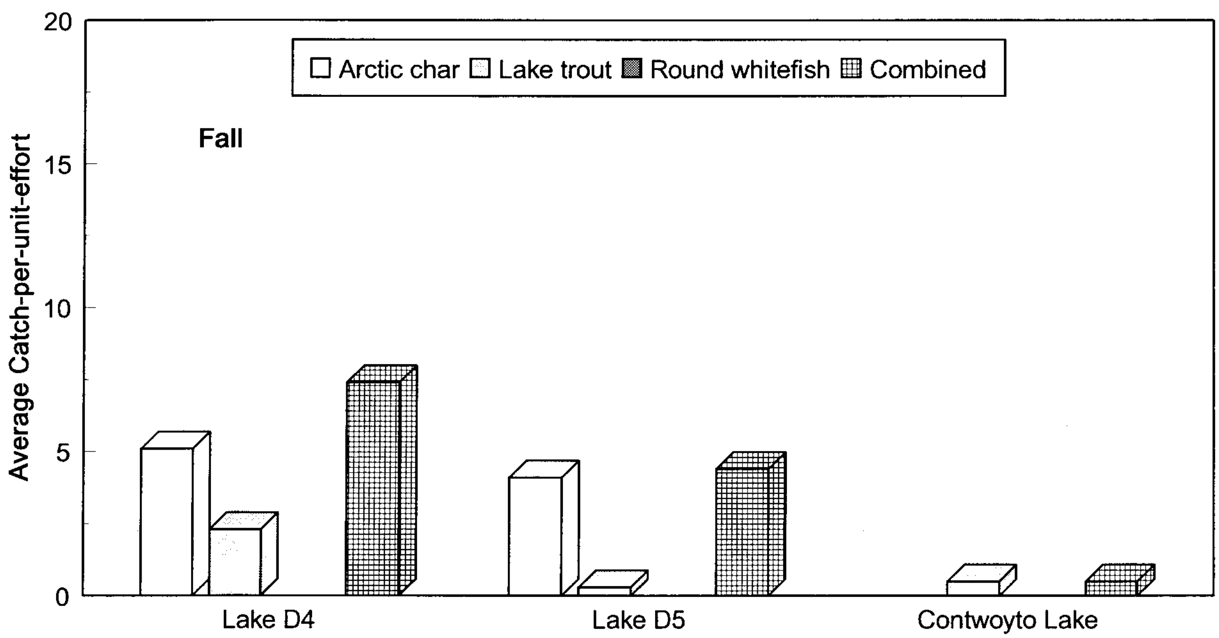


Figure 5.5.2 Average catch-per-unit-effort values (fish/100 $m^2 \cdot 12h$) for fish captured during gill net sampling in lakes during summer and fall within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996.

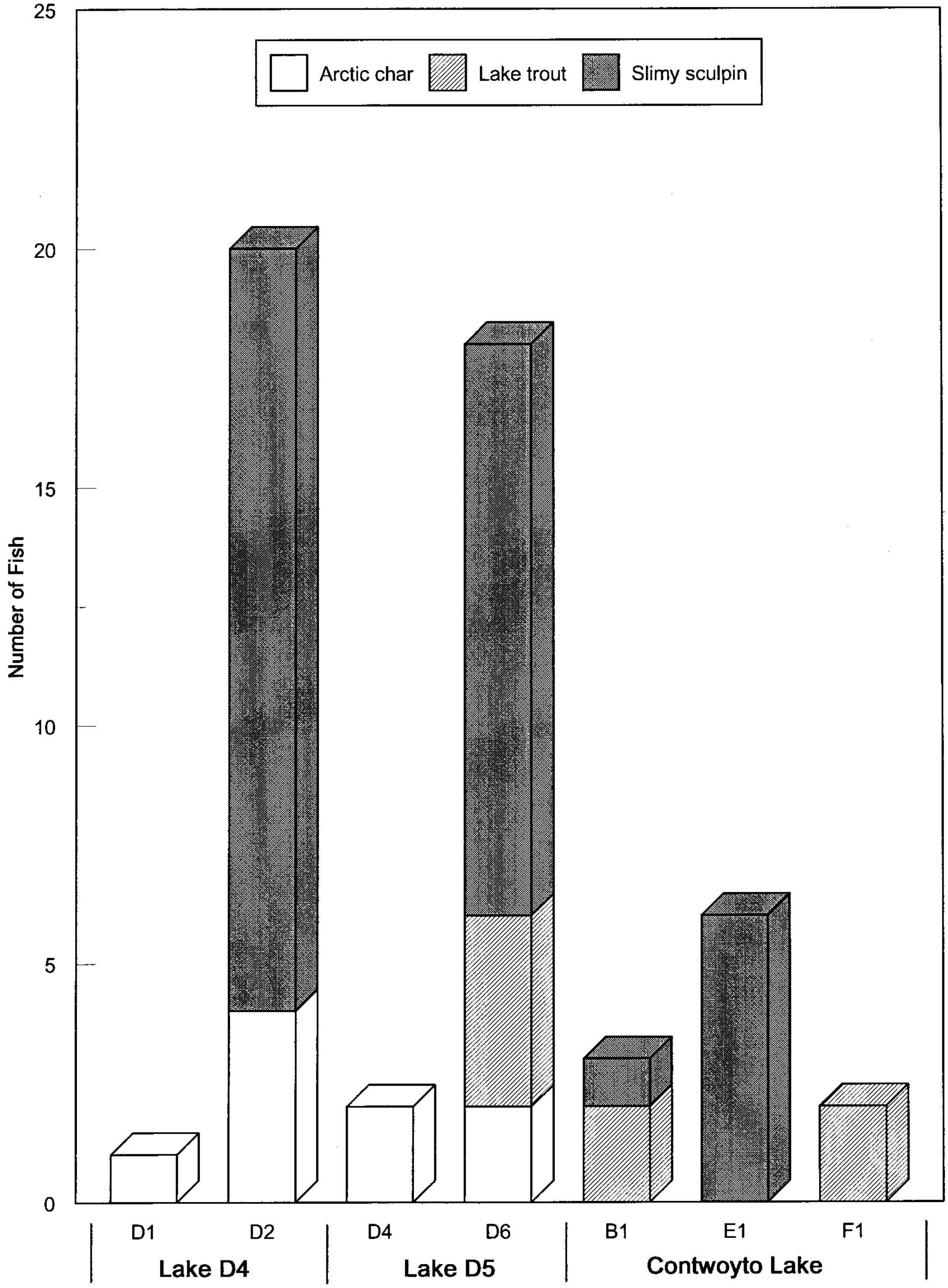


Figure 5.5.3 Comparison of fish numbers recorded in streams within three areas of the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all methods and sampling periods combined).

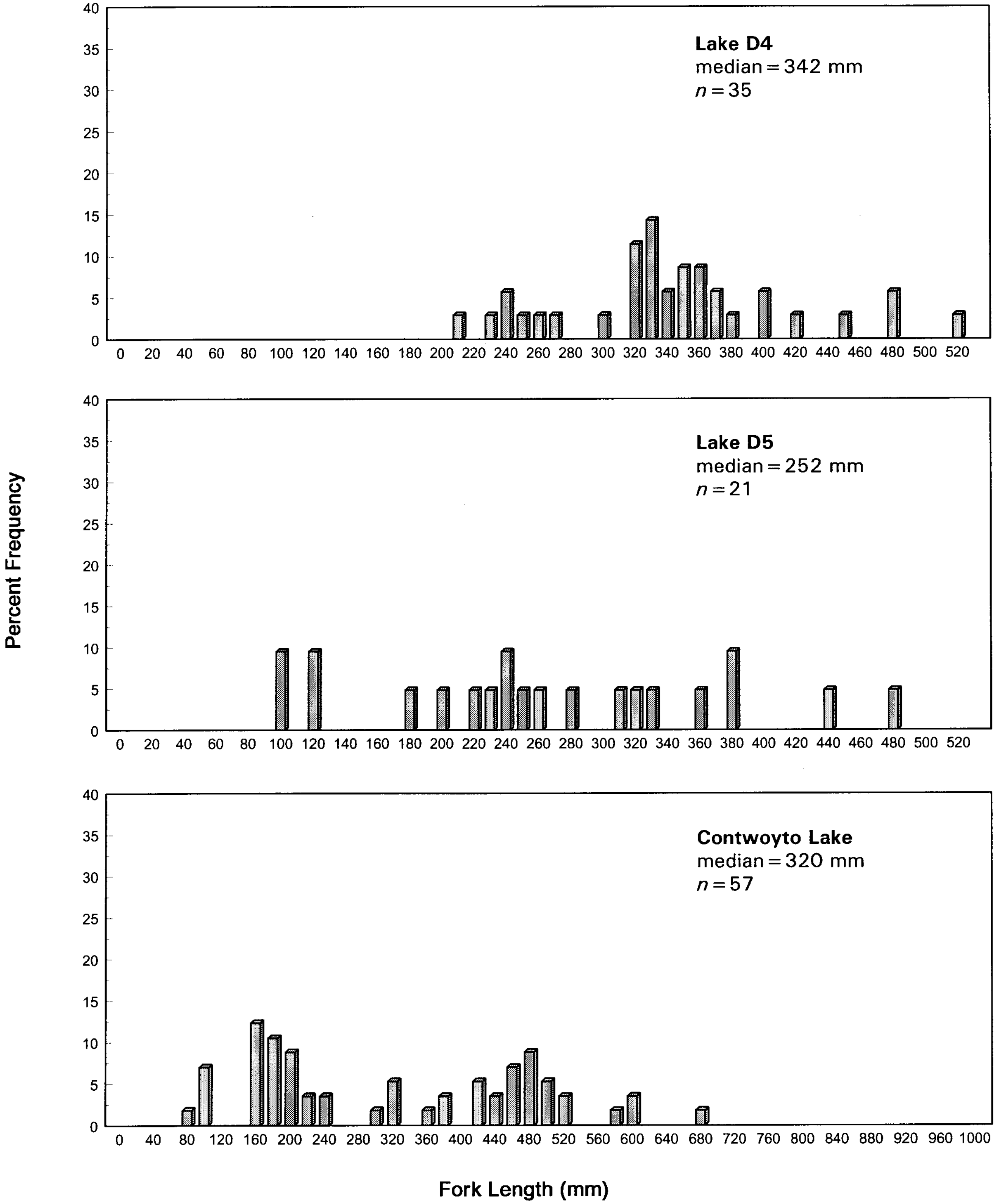


Figure 5.5.4 Length-frequency distribution of lake trout in areas within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined)(note difference in scales between Lakes D4, D5, and Contwoyto Lake).

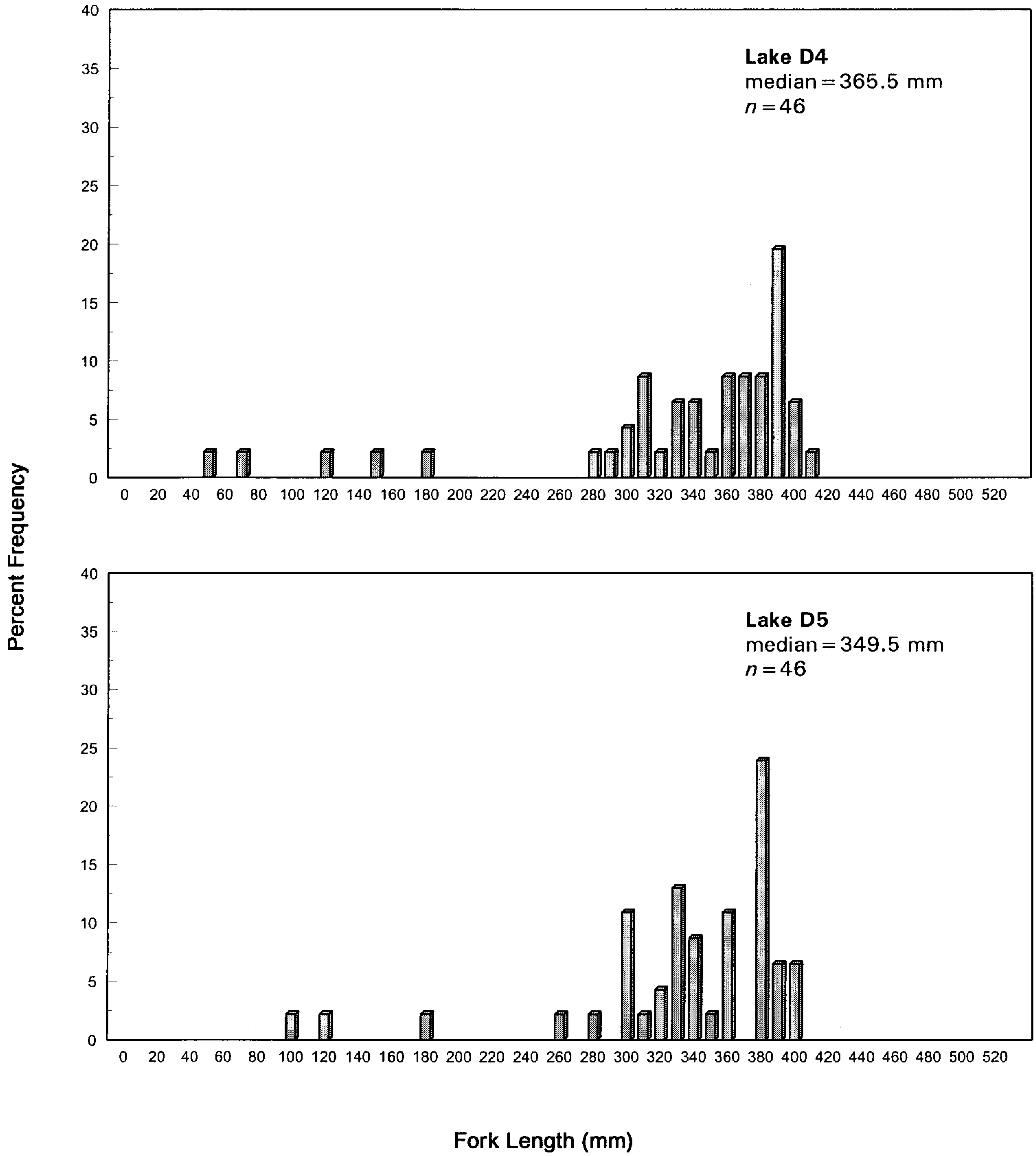


Figure 5.5.5 Length-frequency distribution of Arctic char in areas within the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (data for all seasons, sampling methods, lakes and streams combined).

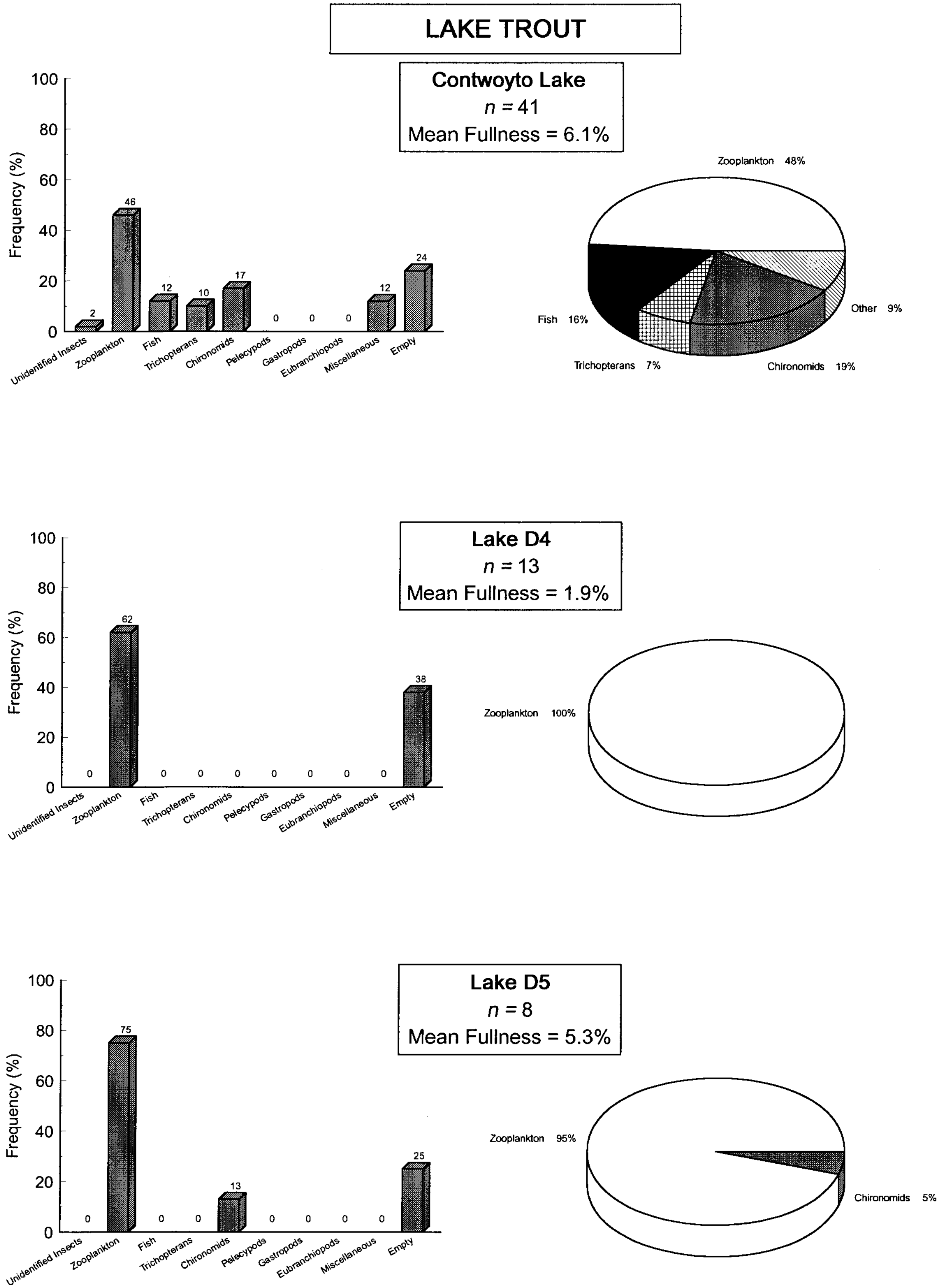


Figure 5.5.6 Frequency of occurrence (bars) and percent composition (pies) of food items encountered in stomachs of lake trout captured from lakes in the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all seasons combined).

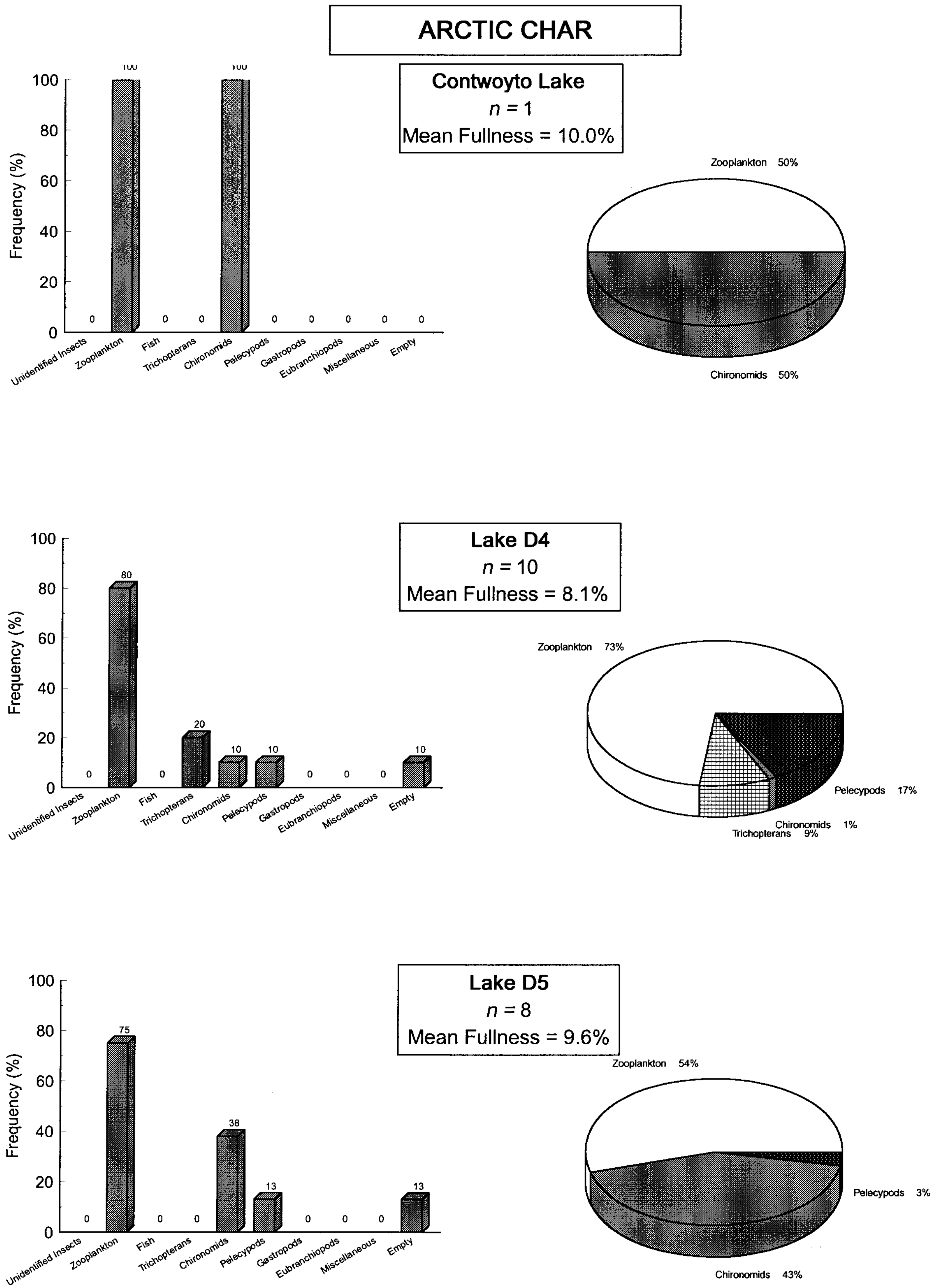
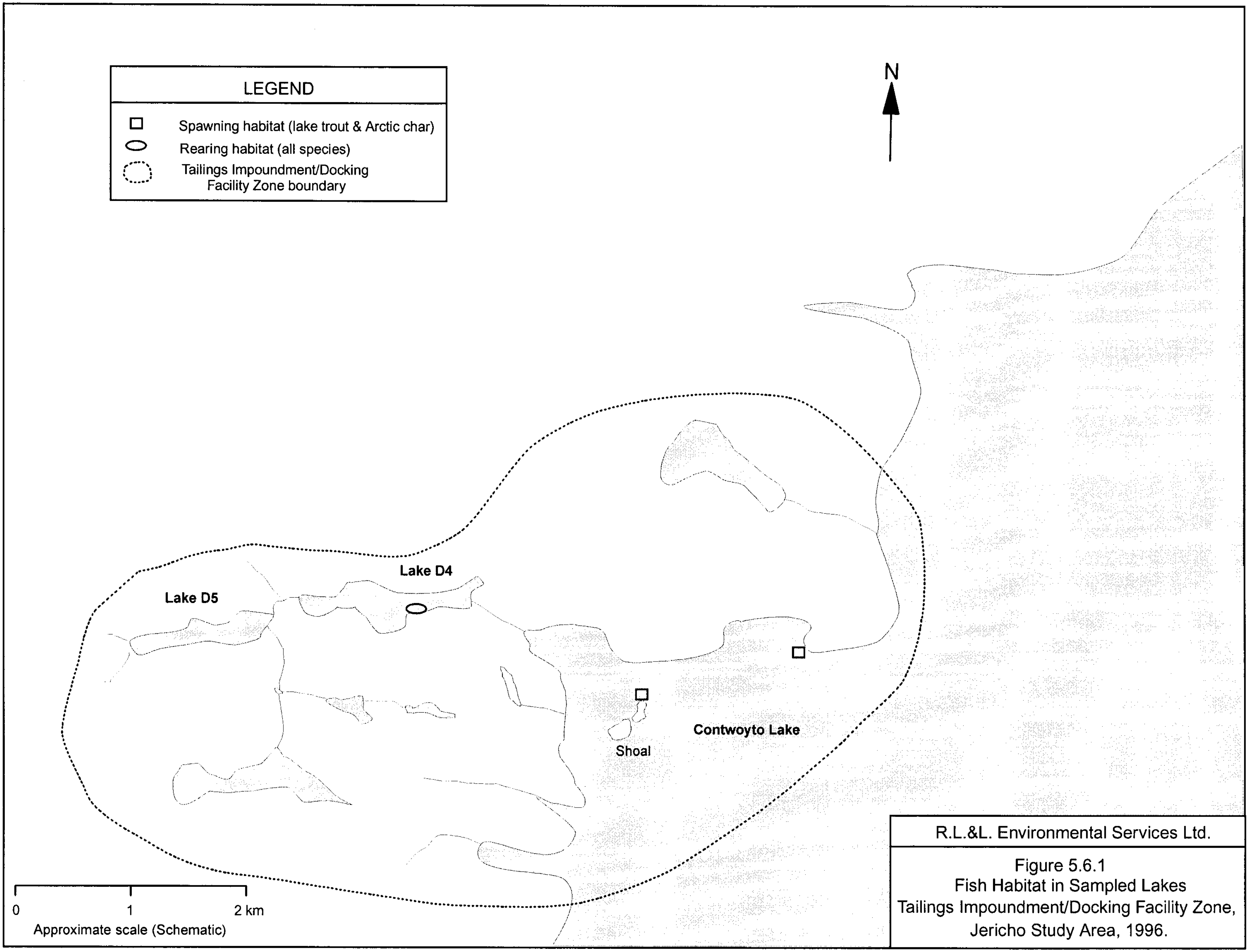
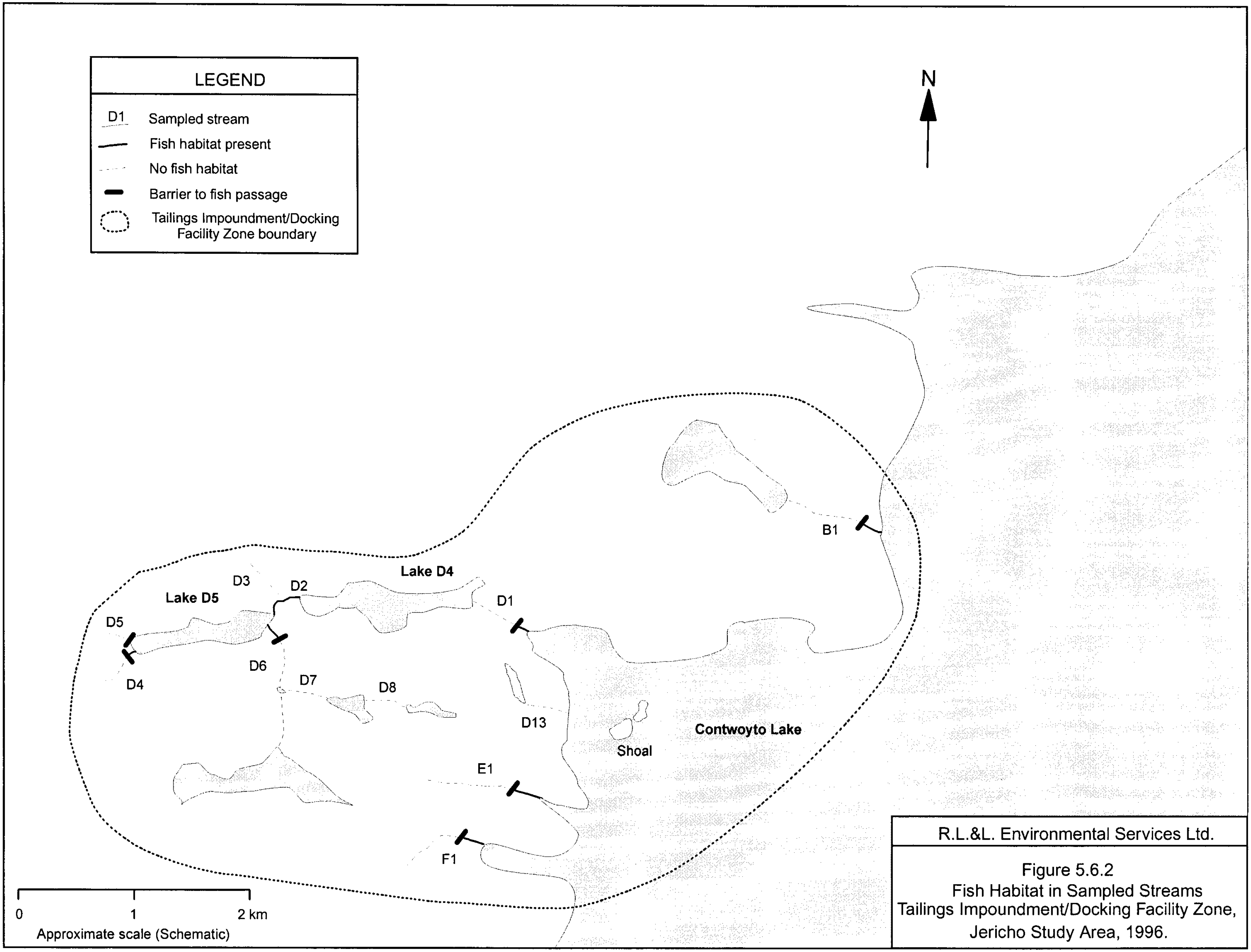


Figure 5.5.7 Frequency of occurrence (bars) and percent composition (pies) of food items encountered in stomachs of Arctic char captured from lakes in the Tailings Impoundment/Docking Facility Zone, Jericho study area, 1996 (all seasons combined).



R.L.&L. Environmental Services Ltd.

Figure 5.6.1
Fish Habitat in Sampled Lakes
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.



R.L.&L. Environmental Services Ltd.

Figure 5.6.2
Fish Habitat in Sampled Streams
Tailings Impoundment/Docking Facility Zone,
Jericho Study Area, 1996.

6.0 PRELIMINARY STREAM CROSSING SURVEY

Option Two of the Jericho Diamond Project Development Plan includes a transportation scenario that would require an all-weather road. Once established, the road would be used for year-round transportation of ore extracted at Carat Lake to the Lupin Mine processing facility, which is situated approximately 50 km south of the extraction site. The proposed route is located immediately west of Contwoyto Lake and traverses several watersheds, all of which drain into this large waterbody. Development of the all-weather road would require numerous stream crossings, each of which has the potential to impact fish habitat.

To address this concern, a preliminary stream crossing survey was undertaken to collect baseline information on fish populations and fish habitat in streams along the proposed route. These data would be used to assist in finalizing the road alignment and to determine which stream crossings required further investigation. This section provides a summary of this assessment. All raw data are presented in Appendix I1.

6.1 STREAM CROSSINGS SURVEYED

A reconnaissance of all streams along the proposed route was undertaken in spring (17 and 21 June); this entailed a visual assessment of fish habitat at all stream crossings. Activities included an evaluation of stream characteristics and identification of potential spawning areas used by species such as Arctic grayling. Streams were also surveyed in late summer (5 to 6 August) during the base water flow period. Investigations at this time included synoptic level sampling of fish populations and measurement of habitat characteristics at stream crossings identified as having the potential to support fish.

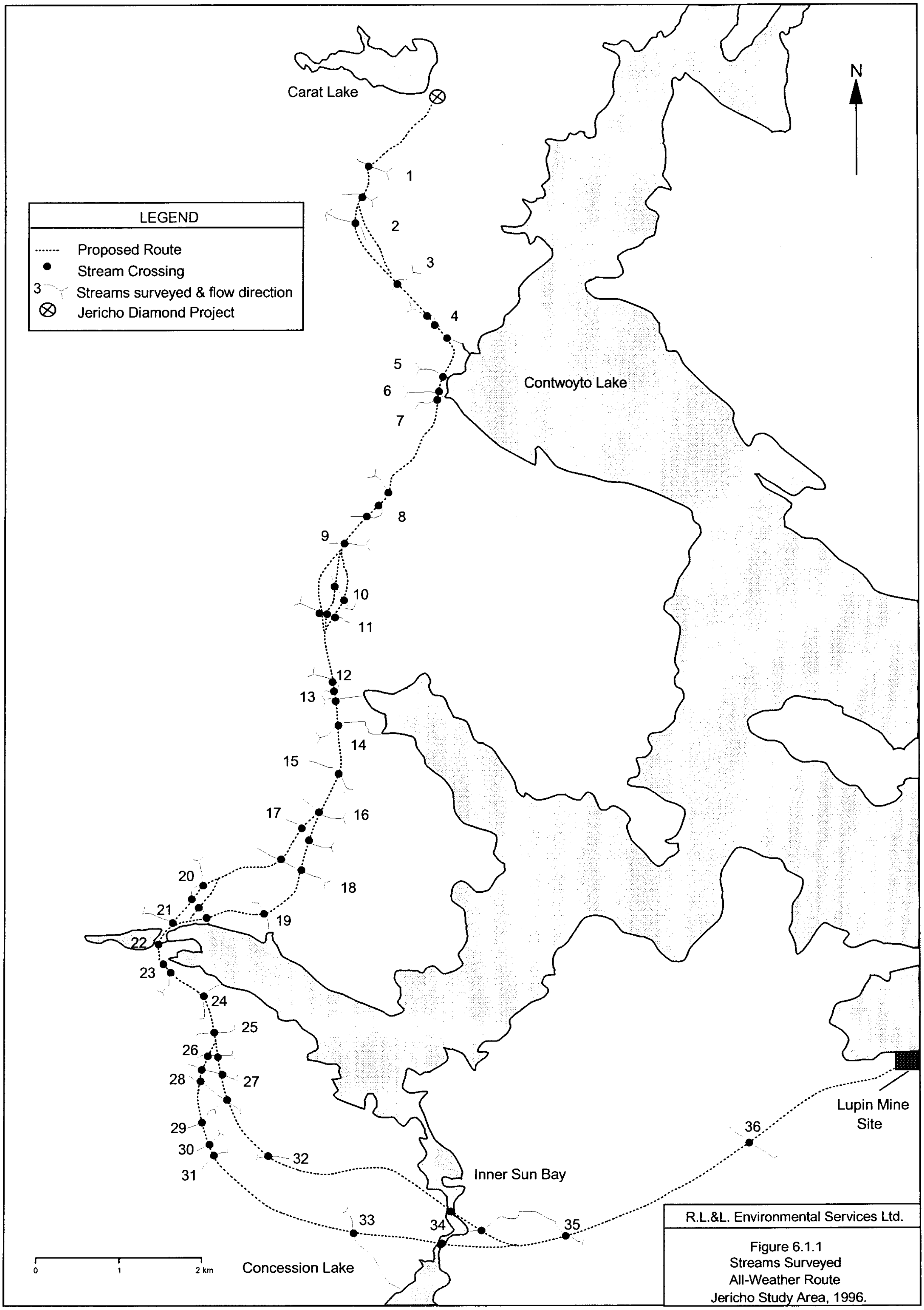
During the survey, 36 watercourses were identified along the proposed route (Table 6.1.1 and Figure 6.1.1). These systems were distributed along the entire route, but the majority were situated north of Concession Lake (91% of sample). Only a portion of these watercourses drained directly into Contwoyto Lake. Of the 36 watercourses identified, 15 (41%) were tributaries to Contwoyto Lake. These particular tributaries were situated in three general areas located along sections of the proposed route that approached the western shoreline of Contwoyto Lake.

In total, 56 crossings were assessed during the survey. Multiple crossings of the same channel were common; this occurred at 13 locations along the route and represented 61% of the total (34 of 56 crossings). It should be noted that these multiple crossings were related to alternate route selections and not the actual number of required crossings. It is assumed that once the final route selection has been made, the number of required crossings will be 36 (number of watercourses) or fewer.

Table 6.1.1 Summary information for surveyed streams along the proposed all-weather route between the Jericho Diamond Project and the Lupin Mine Site, Jericho study area, 1996.

Stream	UTM Coordinates	Number of Crossings	Crossing	Defined Channel[a]
1	12W 0477200 7318150	1	1A	√
2	12W 0476850 7317425	1	1	
3	12W 0476650 7316850	1	2	
4	12W 0479300 7313500	4	3, 4*, 5, and 6	√
5	12W 0479038 7312595	1	7*	√
6	12W 0478986 7312223	1	8*	√
7	12W 0479000 7312150	1	9	
8	12W 0478250 7308850	3	10, 11, 12	
9	12W 0476600 7307950	1	13	
10	12W 0476550 7306425	2	14, 15	
11	12W 0476248 7306075	3	16, 17, 18*	√
12	12W 0476356 7304157	2	19, 20*	√
13	12W 0476521 7303988	1	21*	√
14	12W 0476519 7303191	1	22*	√
15	12W 0476750 7301875	1	23	√
16	12W 0476163 7300746	1	24*	√
17	12W 0475825 7300500	2	25, 26	
18	12W 0475275 7299700	2	27, 28	
19	12W 0474875 7298225	1	29	
20	12W 0472925 7298100	4	30, 31, 32, 33	
21	12W 0472400 7298000	1	34	
22	12W 0472000 7297525	1	35*	√
23	12W 0472249 7296722	2	36, 37*	√
24	12W 0473300 7296075	1	38	
25	12W 0473525 7295075	1	39	
26	12W 0473733 7294625	2	40, 41*	√
27	12W 0473375 7294275	2	42, 43	
28	12W 0473375 7294175	2	44, 45	
29	12W 0473150 7293025	1	46	
30	12W 0473450 7292400	1	47	
31	12W 0473600 7292150	1	48	
32	12W 0474900 7292025	1	49	
33	12W 0477350 7290000	1	51	√
34	12W 0479747 7290617	2	50*, 52	√
35	12W 0480417 7289943	2	53*, 54*	√
36	12W 0487500 7292500	1	55	

[a]Watercourse exhibiting surface water flow within a confined channel.
*Denotes presence of fish habitat.



R.L.&L. Environmental Services Ltd.

Figure 6.1.1
Streams Surveyed
All-Weather Route
Jericho Study Area, 1996.

6.2 STREAM CROSSINGS CONTAINING FISH HABITAT

Of the 36 watercourses identified, 20 or 56% of the sample, had no potential to support fish (Figure 6.2.1). These watercourses were ephemeral systems with dispersed channels that contained water only the during spring snow-melt period or during high rainfall events. The remaining streams (16) contained a defined channel and surface water flow at the time of sampling, and therefore, had the potential to support fish.

The 16 streams that had the potential to support fish were crossed by the proposed route at 25 locations. However, not all of these crossings contained fish habitat. Of the 25 crossings surveyed 11, or 44% of the sample were deemed unsuitable for fish. Reasons for this were varied, but included the presence of barriers to fish passage and/or poor habitat characteristics. As such, 14 crossings associated with 13 streams traversed fish habitat, and therefore, warranted further investigation.

Crossings 4, 7 and 8

Crossings 4, 7, and 8 each traversed separate tributaries that entered directly into the northwestern bay of Contwoyto Lake. Habitat characteristics measured at these crossings indicated that all were small systems (discharge <0.5 m^3/s) with well-defined channels, moderate slopes ($\geq 2.5\%$), and a preponderance of RUN or FLAT habitats (Table 6.2.1). Stream substrates at Crossing 4 were dominated by cobbles (51%) and boulders (27%). At crossings 7 and 8, sands and gravels were more abundant ($>75\%$). Fish were encountered at these crossings (Table 6.2.2). Arctic char and slimy sculpin were recorded at each site, while Arctic grayling occurred only at Crossing 4 and ninespine stickleback were observed only at Crossing 7. The habitat characteristics at these crossings suggested that the streams provided good to high quality spawning and/or rearing habitat for the species encountered (Table 6.2.3).

Crossing 18

Crossing 18 traversed a stream that entered a small lake situated approximately 100 m downstream of the proposed crossing. The habitat characteristics at this crossing indicated that this watercourse was small (width=2.2 m and discharge=0.01 m^3/s). It exhibited a well-defined channel, a low slope (1%), a preponderance of RUN habitat (70%), and sand substrate (42%). Slimy sculpin was the only species encountered at this crossing. The stream at this crossing exhibited good potential as spawning habitat and provided high quality rearing habitat; however, the absence of fish in this stream suggests that other factors were limiting fish abundance.

Crossings 20 and 21

Crossings 20 and 21 traversed two separate streams within 200 m of a small, deep lake. Crossing 20 was associated with the inlet stream, while Crossing 21 traversed the outlet stream which then flowed directly into Contwoyto Lake. Habitat characteristics measured at these crossings indicated that they were small (discharge <0.05 m^3/s) with well-defined channels, low to moderate slopes ($\leq 3\%$), and a preponderance of RUN habitats ($\geq 90\%$). Stream substrates at both crossings were dominated by cobbles and boulders ($>70\%$), although gravel substrates were also present.

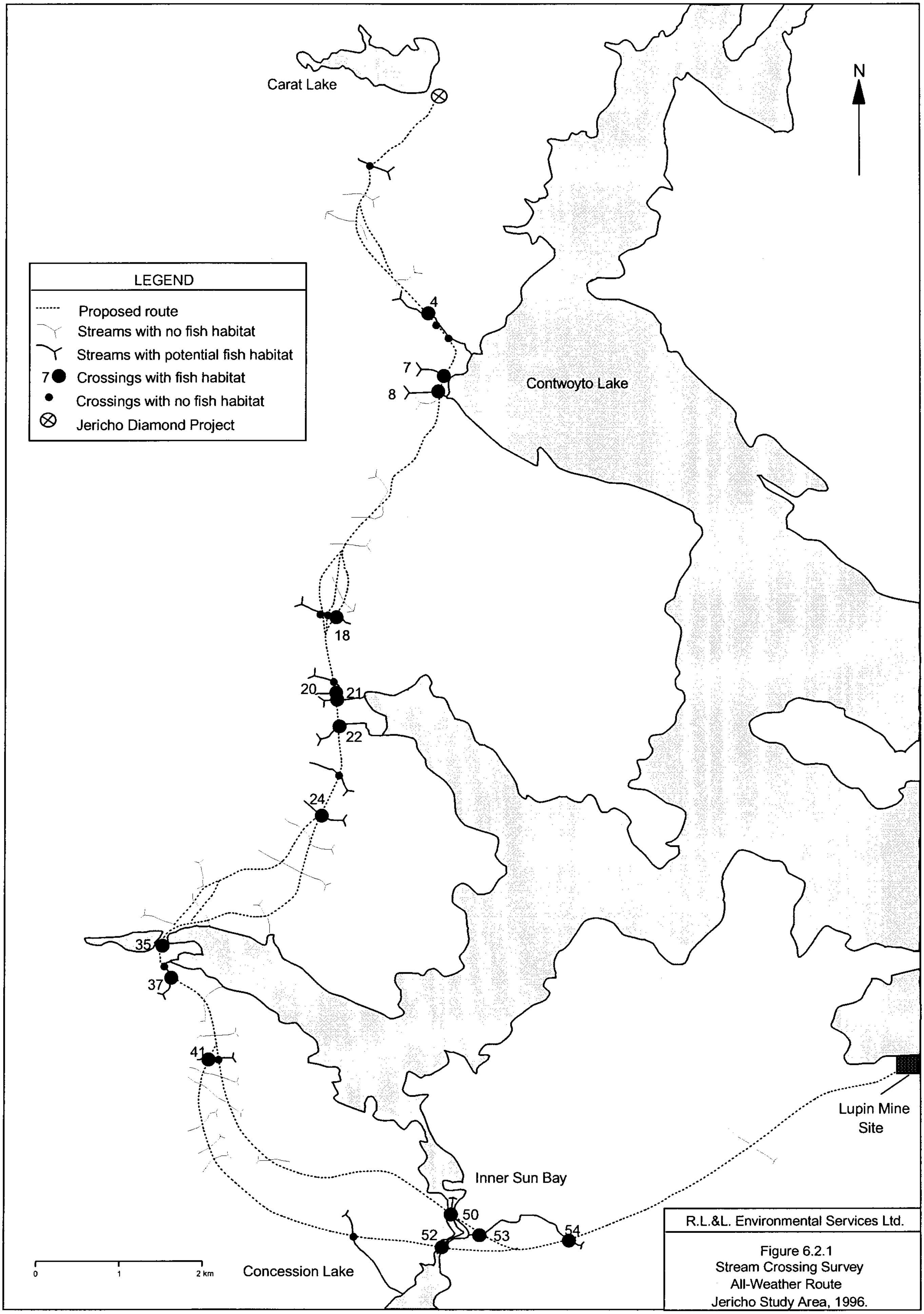


Figure 6.2.1
Stream Crossing Survey
All-Weather Route
Jericho Study Area, 1996.

Table 6.2.1 Summary of habitat characteristics[a] of stream crossings containing fish habitat along the proposed all-weather route between the Jericho Diamond Project and the Lupin Mine Site, Jericho study area, 1996.

Stream	Crossing	Average Wetted Width (m)	Average Depth (m)	Discharge[b] (m^3/s)	Slope (%)	Channel Type (%)		Bank Type (%)		Habitat Type (%)[a]					Substrate Type (%)			
						Single	Multiple	Distinct	Indistinct	Pool	Run	Flat	Cascade	Riffle/ Rapid	Si/Sa	Gr	Co	Bo
4	4	1.4	0.13	0.030	3.0	100		80	20		70		20	10	9	13	51	27
5	7	5.0	0.40	0.011	3.0	100		100		7	27	67			64	36		
6	8	1.5	0.19	0.023	2.5	100		90	10		90	10			55	23	6	16
11	18	2.2	0.15	0.014	1.0	60	40	90	10		70	30			42	27	6	26
12	20	1.2	0.18	0.044	2.0	100		100			90			10	12	6	46	36
13	21	2.1	0.17	0.039	3.0	100		90	10		100				8	21	41	30
14	22	31.4	0.14	N/D[c]	1.0	100		100			100				27	18	13	42
16	24	1.0	0.15	0.008	1.0	100		80	20		60	40			56	15		29
22	35	N/D																
23	37	2.1	0.23	0.035	2.0	100		100			70	20		10	18	46	26	10
26	41	0.9	0.11	0.001	1.0	90	10	100			40	60			49	14	22	14
34	50	61.4	0.31	N/D	1.5	100		100			100					8	16	76
	52	N/D																
35	53	3.2	0.33	0.315	1.5	100		30	70		100				26	10	15	49
	54	2.1	0.44	0.450	2.0	100		50	50		90			10		24	39	36

[a]For classification system see Appendix A.
[b]Discharge measured during summer base flow period.
[c]N/D=no data

Table 6.2.2 Number of fish recorded at surveyed stream crossings according to age-class along the proposed all-weather route between the Jericho Diamond Project and the Lupin Mine Site, Jericho study area, 1996.

Stream	Crossing	Species	Age-Class[a]			
			Young-of-the-year	Juvenile	Adult	Combined
4	4	Arctic char		7		7
		Arctic grayling		1		1
		Slimy sculpin				1
5	7	Arctic char	2	2		4
		Ninespine stickleback				2
		Slimy sculpin				3
6	8	Arctic char	5	11		16
		Slimy sculpin				1
11	18	Slimy sculpin				16
12	20	Arctic char		10		10
		Lake trout		1		1
		Ninespine stickleback				2
		Slimy sculpin				6
13	21	Slimy sculpin				24
14	22	Lake trout		4		4
		Slimy sculpin				3
16	24	Arctic grayling	10			10
		Slimy sculpin				17
22	35	N/D[b]				
23	37	Arctic grayling		9		9
		Lake trout		1		1
		Slimy sculpin				5
26	41	Burbot	1	1		2
		Slimy sculpin				1
34	50	Arctic grayling		1		1
		Ninespine stickleback				1
		Round whitefish		1		1
	52	N/D				
35	53	Arctic grayling	9	9		18
		Ninespine stickleback				1
	54	No fish recorded				0

[a]Age-class designations based on size differences of fish for each species.
[b]No data.

Table 6.2.3 Fish habitat quality ratings for sampled streams along the proposed all-weather route between the Jericho Diamond Project and the Lupin Mine Site, Jericho study area, 1996.

Stream	Crossing	Rating of Habitat Quality[a]			
		Spawning	Rearing	Feeding	Movement
4	4	Moderate	High	Nil	Nil
5	7	Moderate	Moderate	Low	Nil
6	8	High	High	Low	Low
11	18	Moderate	High	Low	Nil
12	20	Moderate	High	Low	Low
13	21	Moderate	High	Low	Low
14	22	Low	Moderate	Low	Low
16	24	Moderate	Moderate	Nil	Nil
22	35	Nil	Nil	Nil	Low
23	37	High	High	Moderate	Low
26	41	High	High	Nil	Nil
34	50	Low	Moderate	Low	Moderate
	52	Low	Moderate	Low	Moderate
35	53	High	High	High	High
	54	High	High	Moderate	Low

[a] Rating of habitat quality based on qualitative assessment of fish habitat.

Arctic char, lake trout, ninespine stickleback, and slimy sculpin were recorded at Crossing 20. In contrast, slimy sculpin was the only species recorded at Crossing 21, even though the channel at this site exhibited good habitat characteristics. The proximity of these sites to a lake suggests that viable fish populations exist in this waterbody. The habitat characteristics at both crossings indicate that the streams provided good quality spawning and high quality rearing habitat for the species encountered.

Crossing 22

Crossing 22 traversed a wide channel that was the principal connection between a series of lakes and Contwoyto Lake. The physical characteristics of this channel suggested that large volumes of water occur during freshet conditions (width=31.4 m), however discharge at the time of sampling was too low to measure. The channel at the crossing exhibited a low slope (1%) and a preponderance of boulder substrates (42%). RUN habitat dominated at the time of sampling, although it is likely that this system would be characterized by RAPID habitat during higher water flows. Given the size of this watercourse, few fish were encountered at the crossing (4 lake trout and 3 slimy sculpin). The habitat characteristics at Crossing 22 suggests that the stream provides some habitat. It is most likely used as a movement corridor for fish originating from Contwoyto Lake.

Crossing 24

Crossing 24 traversed a stream that entered a small deep lake approximately 50 m downstream. The habitat characteristics at this crossing indicated that this watercourse was small (width=1.0 m and discharge=0.01 m^3/s). It exhibited a well-defined channel, a low slope (1%), a preponderance of RUN habitat (60%), and sand substrate (56%). Arctic grayling and slimy sculpin were encountered at this crossing. Arctic grayling eggs were also located in this stream during the spring survey. The presence of Arctic grayling young-of-the-year fish and eggs, and the habitat characteristics of the stream indicates that it provides spawning and rearing habitat for this species.

Crossing 35

Crossing 35 traversed a short (200 m), wide stream channel that connected Contwoyto Lake to a waterbody situated immediately to the west. The habitat characteristics of this channel suggested that a large volume of water occurs during freshet conditions, however it was dry at the time of sampling. As such, it provided no fish habitat. Given the size of this channel, and the fact that it was the only connection between the two lakes indicated that it was likely an important movement corridor for fish during high flow periods. However, it contained no useful fish habitat during low flows.

Crossing 37

Crossing 37 traversed a stream that drained directly into Contwoyto Lake. Habitat characteristics measured at this crossing indicated that the stream was small (width=2.1 m and discharge=0.04 m^3/s), had a well-defined channel, a low slope (2%), and a preponderance of RUN habitat (70%). Stream substrates at the crossings were dominated by gravels (46%) and cobbles (26%). Arctic grayling, lake trout, and slimy sculpin were recorded at Crossing 37. The proximity of this site to Contwoyto Lake suggested that it may provide habitat for fish originating from this waterbody. The habitat characteristics of this stream indicated that it provided high quality spawning and rearing habitat for Arctic grayling.

Crossing 41

Crossing 41 traversed a tributary that drained into a lake situated approximately 100 m downstream. At the crossing, this watercourse was very small (width=0.9 m and discharge <0.01 m^3/s). It exhibited a well-defined channel, a low slope (1%), a preponderance of FLAT habitat (60%), and sand substrate (49%). Burbot and slimy sculpin were the only species encountered at this crossing. There was good potential as spawning and rearing habitat; however, the absence of numerous fish in this stream suggested that other factors were limiting fish abundance.

Crossings 50 and 52

Crossings 50 and 52 both traversed the wide channel that connects Concession Lake to Inner Sun Bay of Contwoyto Lake. The channel at both crossings exhibited similar habitat characteristics, therefore, only Crossing 50 was sampled. The habitat characteristics of this channel indicated that a large volume of water occurs during freshet conditions (width=61.4 m), however, discharge at the time of sampling was not measured. The channel exhibited a low slope (1.5%) and a preponderance of boulder substrates (76%). RUN habitat dominated (100%), although it is likely that this system would be characterized by RAPID habitat during higher water flows. Low numbers of Arctic grayling, ninespine stickleback, and round whitefish were encountered at the crossing. The habitat characteristics at Crossings 50 and 52 suggested that the channel provided some fish habitat. It may be used for spawning and rearing by some species, however, it is most likely a corridor for fish moving between Concession and Contwoyto Lakes.

Crossings 53 and 54

Crossings 53 and 54 traversed a stream that entered the channel connecting Concession Lake to Contwoyto Lake. At the time of sampling, this system received discharge from the tailings facility at the Lupin Mine Site, therefore, discharges were higher than expected for a stream of this size (width=2.1 m and discharge=0.45 m^3/s at Crossing 54). Habitat characteristics measured at both crossings indicated that the stream had a well-defined channel, exhibited a low slope (≤2%), and a preponderance of RUN habitats (≥90%). Stream substrates were dominated by sands (26%) and boulders (49%) at Crossing 53 and gravels (24%), cobbles (39%), and boulders (36%) at Crossing 54. Despite having similar habitat characteristics, fish were encountered only at Crossing 53; Arctic grayling and ninespine stickle were recorded at this site. The habitat characteristics of this stream at both crossings, suggested that it provided high quality spawning and rearing habitat for species such as Arctic grayling. It is likely that the stream at Crossing 53 was also used for feeding purposes by adult fish and as a movement corridor by all age classes.

7.0 SUMMARY DISCUSSION

This section summaries the findings of the 1996 aquatic studies program in the Jericho study area. When appropriate these results are compared to data recorded in 1995 and to information from other aquatic baseline studies in the vicinity of the Jericho Diamond Project.

7.1 LIMNOLOGY

7.1.1 Temperature

During summer 1996 several of the study lakes exhibited thermal stratification (i.e., had a thermocline, which is a region of vertical depth where there is a rapid change in temperature; Wetzel 1983). The presence and location of the thermoclines was not constant.

In the Mine Operation Zone, the deeper basins (>15.5 m) of Carat Lake and Jericho Lake had thermoclines between 10.5 and 15.0 m depth, while lakes and basins that were 11 m or less in depth exhibited isothermal conditions. In the Borrow Extraction Zone, lakes deeper than 10 m in depth had thermoclines (Lakes O1 and O3). In the Tailings Impoundment/Docking Facility Zone, the smaller lakes (Lakes D4 and D5) exhibited thermal stratification (beginning at 8 m depth), while the bay (14 m deep at sampling site) in the much larger Contwoyto Lake exhibited isothermal conditions.

These data suggest that deeper waterbodies throughout the Jericho study area stratify during the summer, and therefore, can be classified as dimictic (thoroughly mix twice a year). The shallower basins that do not stratify can be classified as monomictic (continuous mixing). Lake size, location, exposure to wind, and depth are all factors that affect the presence and depth of thermoclines (Wetzel 1983).

Surface water temperatures (i.e., 0 to 10 m depth) recorded for most lakes in the summer were between 13 and 15°C. Contwoyto Lake had surface water temperatures of only 9°C. The large size of Contwoyto Lake relative to the other study lakes is likely the reason for this lower temperature; the large volume of water required more time and thermal energy to warm. In the fall, surface water temperatures in all of the study lakes ranged from 4 to 8°C.

Carat and Jericho Lakes were the only waterbodies in the Jericho study area that were monitored in 1995 (R.L. & L. Environmental Services Ltd. 1995). In summer 1995, deep water sites of Carat Lake (Site W1-2) and Jericho Lake (Site W2) had thermoclines; however, they were located at greater depths. In addition, water temperatures above the thermoclines were 4 to 5°C warmer in 1996 than in 1995. Differences in the depth of the thermoclines and water temperatures were probably related to differences in general weather conditions (i.e., the summer of 1996 was hotter and dryer).

Water temperature profiles were similar to those of other subarctic lakes in the vicinity of the Jericho study area. This includes profiles measured in four lakes located in the Izok Project area, which is located 75 km southwest of the Jericho study area (R.L. & L. Environmental Services Ltd. 1993) and profiles from five lakes located 50 km south of the Jericho study area (Ranch Lake Project area) (R.L. & L. Environmental Services Ltd. 1996). Moore (1978b) recorded water temperatures of Contwoyto Lake in July and August 1975 and found that surface water temperatures were 10 to 11 °C at near shore locations and 7 °C at distances greater than 0.5 km from shore. Moore also stated that Contwoyto Lake had a well-defined stratification. In the present study, the monitoring site on Contwoyto Lake (Tailings Impoundment/Docking Facility Zone) was isothermal at approximately 11 °C, which was consistent with the near shore surface water temperatures recorded by Moore (1978b).

7.1.2 Dissolved Oxygen

Maximum dissolved oxygen concentrations during summer 1996 were similar among most lakes in the three zones (8.5 to 10.0 mg/L). The only exception was Contwoyto Lake which had the highest dissolved oxygen concentration (11.4 mg/L). This difference was due principally to lower water temperatures, which allow higher saturation levels.

It should be noted that in summer, dissolved oxygen concentrations below the water surface of most lakes (all except Contwoyto Lake) failed to meet the dissolved oxygen criteria established by the Canadian Water Quality Guidelines for the protection of aquatic life (CCME 1996). Dissolved oxygen concentrations were below the Canadian Water Quality Guidelines for the protection of cold-water biota early life stages (9.5 mg/L). These low levels were atypical given the characteristics of study area lakes (i.e., nutrient poor systems with low biological oxygen demand). The most viable explanation for the lower than expected oxygen levels was equipment malfunction, a source of error that was identified following the field sampling period. Such as, the oxygen levels documented in the study area lakes during summer should be viewed with caution.

Carat and Jericho Lakes were monitored for dissolved oxygen in 1995. In summer, both lakes were well oxygenated; the lowest concentration was 10.6 mg/L. Anoxic conditions (zero oxygen levels) were not recorded. These findings indicated that these lakes had a low biological oxygen demand in 1995.

In fall, dissolved oxygen concentrations in the surface waters of all the Jericho study area lakes were above all Canadian Water Quality Guidelines for the protection of aquatic life (10.1 to 11.6 mg/L).

Dissolved oxygen profiles were similar to those of other subarctic lakes in the vicinity of the Jericho study area. These include profiles measured in four lakes located in the Izok Project area, which is located 75 km southwest of the Jericho study area and profiles from five lakes located 50 km south of the Jericho study area (Ranch Lake Project area). Summer dissolved oxygen concentrations were above or near the Canadian Water Quality Guideline criteria of 9.5 mg/L for the protection of cold-water biota early life stages (CCME 1996) (9.0 to 9.5 mg/L). In fall, dissolved oxygen concentrations were greater than 10.0 mg/L in all of the above lakes. Monitoring of deep-water basins (i.e., up to 30 m) did not identify anoxic conditions in either study.

7.1.3 Transparency

The water transparency levels recorded in all waterbodies except Contwoyto Lake, indicated that euphotic zone depths were 10.0 to 11.5 m in summer and 6 to 8 m in fall. Contwoyto Lake transparency was unique among the study area lakes; euphotic zone depths were 18.6 m and 8.0 m in summer and fall, respectively. The amount of light penetration is dependent upon suspended materials (e.g., sediments) and biological productivity (e.g., density phytoplankton). In summer, phytoplankton densities in Contwoyto Lake were much lower than in the other lakes, suggesting that the presence of phytoplankton in the water column accounted for difference in transparency.

In summer 1995, euphotic zone depths in Carat and Jericho Lakes ranged from 10 to 14.2 m; in fall, the euphotic zone was approximately 13.0 m. Although higher water transparency was observed during the summer of 1995 than in 1996, differences were not extreme. The transparencies in both years were indicative of low suspended materials (i.e., sediments and other allochthonous materials) and low biological productivity (i.e., low density and biovolumes of phytoplankton in the water column).

Transparency readings were obtained in summer and fall from lakes in the Izok Project area and the Ranch Lake Project area. The euphotic zone depths of these studies ranged from 12 to 18 m in both summer and fall. The lower transparency levels in the Jericho study area lakes may be due to natural variability among years and locations. Phytoplankton densities in the present study were comparable to other nearby studies, suggesting that factors other than phytoplankton density (i.e., sediments and other allochthonous materials) may account for reduced light penetration among the Jericho study lakes in 1996.

7.2 PLANKTON

7.2.1 Phytoplankton

The phytoplankton community was similar in lakes among the three zones. They were indicative of oligotrophic conditions (Wetzel 1983). In general, golden-brown algae (Chrysophyta) and diatoms (Bacillariophyta) had the greatest biovolumes. Certain species of cyanobacteria (Cyanophyta) and diatoms had the greatest densities. However, there was some variation in this pattern between summer and fall. The variations in the phytoplankton communities were likely due to site specific differences in the morphology and physical-chemical properties of the lakes, as well as timing of natural changes in the community structure.

Contwoyto Lake samples contained low cyanobacteria densities in summer and fall, as did Lake D5 in the fall. Cyanobacteria were replaced by diatom and/or green algae species in these study lakes. These observations suggest that within the Jericho study area, Contwoyto Lake and Lake D5 may have different water quality and physical characteristics that influence the phytoplankton community. For example, Contwoyto Lake is a much larger lake and tends to have cooler water temperatures.

In 1995, R.L. & L. Environmental Services Ltd. (1995) sampled Carat and Jericho Lakes within the Mine Operation Zone. Similar results were observed between 1995 and the present investigation. The phytoplankton assemblage was indicative of oligotrophic waterbodies (Wetzel 1983), with golden-brown algae contributing most to the biovolume and cyanobacteria having the greatest densities. The 1995 data also showed similar patterns in seasonal changes; total phytoplankton densities were much greater in the fall and the same taxa accounted for the difference.

The cyanobacteria *Aphanothece clathrata* and *Aphanocapsa elachista* were reported to be the most abundant phytoplankton species among other subarctic lakes in the Izok Project area (R.L. & L. Environmental Services Ltd. 1993) and the Project 5034 area (R.L. & L. Environmental Services Ltd. 1996a). *A. clathrata* and *A. elachista* were identified as the most abundant phytoplankton species. Similar results were obtained for golden-brown algae; this taxonomic group accounted for most of the phytoplankton biovolume in the majority of lakes. Both studies recorded densities of golden-brown algae below 1000 cells/ml, far less than the tens to hundreds of thousands reported for cyanobacteria.

Phytoplankton densities ranged from 1539 to 15 800 cells/ml in lakes in the Izok Project area. In the Project 5034 area total phytoplankton densities ranged between 9275 and 23 983 cells/ml among four study lakes. Total phytoplankton densities in the present study ranged from 1711 to 18 103 cells/ml, well within the range reported by the other investigations. These observations suggest that lakes of the Jericho study area had similar phytoplankton communities and nutrient characteristics as other, subarctic lakes.

Beak (1977) sampled phytoplankton from lakes in the Izok Project area in late June 1976 and found the phytoplankton communities were also dominated by golden-brown algae and cryptomonads (Cryptophyta). Beak (1977) noted that the species composition and biomass of phytoplankton were typical of ultra-oligotrophic lakes (very low nutrient levels and low biological productivity), and were similar to other lakes at or near the tree line in nonpermafrost areas of Canada.

7.2.2 Zooplankton

The zooplankton community in lakes in the Mine Operation and the Borrow Extraction Zones were similar. In general, water fleas (Cladocera) accounted for the majority of the community biomass. Within this group, *Holopedium gibberum* was the most important species. Other taxonomic groups (calanoid or cyclopoid copepods; *Leptodiaptomus sicilis* and *Dicyclops bicuspidatus*, respectively) also accounted for a considerable amount of the zooplankton biomass in some lakes. The wheel animals (Rotifera) *Conochilus unicornis*, *Keratella cochlearis*, and

Kellicottia longispina tended to be the most numerous zooplankton species, but accounted for a low proportion of the community biomass.

The zooplankton community of the lakes within the Tailings Impoundment/Docking Facility Zone differed from those in the other two zones. In general, copepods (i.e., *L. sicilis* and *D. bicuspidatus*) dominated zooplankton biomass. The wheel animals *C. unicornis*, *K. cochlearis*, and *K. longispina*, tended to be the most numerous species, which is consistent with lakes in the Mine Operation and Borrow Extraction Zones.

Species abundance varied between summer and fall, which suggested a successional change in the zooplankton community; however, the same species tended to dominate the community in each season. These changes and differences in the zooplankton community between some lakes is likely due to natural variation, as well as different water quality and morphology of the lakes.

The zooplankton communities of Carat and Jericho Lakes within the Mine Operation Zone were sampled in 1995 (R.L. & L. Environmental Services Ltd. 1995). Changes in zooplankton biomass during 1995 were similar to those in the present investigation. In summer, water fleas dominated the community biomass in Carat Lake, while zooplankton biomass at Jericho Lake was co-dominated by cyclopoid copepods and water fleas. In fall, Carat Lake samples were dominated by cyclopoid copepods, while the Jericho Lake sample was dominated by water fleas.

Zooplankton densities in Carat and Jericho Lakes varied considerably between 1995 and 1996. For example, fall copepod densities were much lower than summer densities; a trend that was opposite to what was recorded in 1996. Except for the water flea *H. gibberum*, different species dominated the 1995 and 1996 samples. The wheel animal community also varied considerably between the two study years. It is not known why zooplankton densities varied. It is possible that warmer water temperatures in 1996 enhanced zooplankton production or altered the successional processes.

Water fleas accounted for the majority of the zooplankton biomass in other subarctic lakes. The most important rotifers were *K. cochlearis* and *K. longispina*, while the copepods *L. sicilis* and *Cyclops scutifer* were numerically dominant in lakes in the Izok Project area (R.L. & L. Environmental Services Ltd. 1993). With the exception of *C. scutifer*, these species were among the most abundant taxa in the Project 5034 area lakes examined by R.L. & L. Environmental Services Ltd. (1996a). Other studies have described the zooplankton communities of the subarctic as having low densities of water fleas and copepods, while wheel animals are the most abundant (e.g., Moore 1978a, 1978b).

7.3 PERIPHYTON

Periphyton was sampled from streams within the Mine Operation Zone and the Borrow Extraction Zone of the Jericho study area. The periphytic algal community in each stream was unique. The most abundant periphytic algae in the Mine Operation Zone (Streams C1 and C15, and Jericho River) were the cyanobacteria (Cyanophyta) *Lyngbya limnetica* and *Gomphosphaeria naegelianum*. Among the diatoms (Bacillariophyta), *Tabellaria flocculosa*, *Gomphonema gracile*, and *Achnanthes minutissima* had moderate to high densities. The most abundant periphytic algae in the Borrow Extraction Zone (Stream O18) were the cyanobacterium *Microcystis flos-aquae* and the diatom *T. flocculosa*. *M. flos-aquae* was not identified as a dominant species in any of the other sites. Differences in micro-habitat (e.g., depth, flow velocity, substrate composition) may account for the variability in the periphyton communities among the sampled streams.

The overall mean density of periphytic algae in the Borrow Extraction Zone stream (623 886$\pm$206 406 cells/cm^2) was low compared to the streams in the Mine Operation Zone (lowest overall density was 702 689 cells/cm^2). Differences in cell densities can be attributed to differences in species composition (i.e., the number of cells per unit mass or volume of a species will depend on its cell size).

Chlorophyll *a* and ash-free-dry-mass (AFDM) estimates collected from streams of the Mine Operation Zone and the Borrow Extraction Zone were comparable; they were low and indicative of oligotrophic nutrient conditions. The amount of chlorophyll *a* and AFDM (indicators of live algae and periphyton biomass, respectively) is controlled primarily by light quality and quantity, water velocity, and nutrient concentrations (Horner and Welch 1981).

The most abundant periphytic algae identified in streams within the Mine Operation Zone during the current study were also present in samples collected in 1995 (R.L. & L. Environmental Services Ltd. 1995). The overall mean densities of periphytic algae recorded for streams within the Mine Operation Zone in 1996 ranged from 702 689 to 1 553 862 cells/cm^2. These values were higher than those reported in 1995 (693 895 to 867 573 cells/cm^2). Chlorophyll *a* concentrations were similar between the two study years and ranged from 0.007 to 1.44 μg/cm^2. AFDM was not measured in 1995. These results could reflect natural temporal variations and/or variations in the micro-habitats at a given site.

Periphytic algal communities in other subarctic systems were also dominated by diatoms (Roeder et al. 1975; Moore 1978a, 1978b). These studies found that *T. flocculosa* and *A. minutissima* were the dominant periphytic algal species. Moore (1978b) also described the filamentous green algae (Chlorophyta) *Zygnema* and *Mougeotia* spp. as occasionally occurring in large numbers. These taxa were identified in samples collected from the Jericho study area, but they were not abundant. In the Project 5034 area, R.L. & L. Environmental Services Ltd. (1996a) identified the cyanobacteria *Lyngbya nordgaardii* and *Anacystis montana,* as well as the green algae *Zygnema* sp.

as the most abundant algae within the periphytic community; the most abundant diatoms were *T. flocculosa* and *A. minutissima*. The present study had various species of cyanobacteria that dominated the periphytic algal communities, while *T. flocculosa* and *A. minutissima* were the predominant diatom species.

Moore (1978a) reported total densities of periphytic algae of approximately 700 000 to 2 100 000 cells/cm^2 in two streams located in the Izok Project area. Total periphytic algal densities found during the present study were lower (623 000 to 1 554 000 cells/cm^2). Possible reasons for this difference could be variation in the timing of sample collections, selection of different stream habitats, the amount of nutrient availability, and laboratory processing (e.g., Moore 1978a identified and counted colonies of cyanobacteria and not individual cells; J.W. Moore, pers. comm.).

Periphytic chlorophyll *a* concentration of 0.265 $\mu g/cm^2$ measured by R.L. & L. Environmental Services Ltd (1996a) at a single stream located in the Project 5034 area was similar to those recorded during the present study; chlorophyll *a* concentrations were (0.007 to 1.29 $\mu g/cm^2$).

7.4 BENTHIC MACROINVERTEBRATES

7.4.1 Lakes

Overall, mean densities and mean number of taxonomic groups of benthic macroinvertebrates were greater in the littoral zones than in the profundal zones among sampled lakes in the Jericho study area. This reflects the higher productivity of shallow-water habitats because of higher water temperatures and greater light penetration. Anoxia of the profundal zone was not recorded during the 1996 open water season (Section 7.1) and probably was not a factor in benthic macroinvertebrate production. The benthic macroinvertebrate community structure was indicative of a short growing season and a homogenous substrate dominated by fine sediments.

The benthic macroinvertebrate communities of lakes within the three study area zones generally were similar. Dominant taxa exhibiting the highest densities were chironomids (midges), oligochaetes (aquatic earthworms), and nematodes (roundworms). Although the number of benthic macroinvertebrates tended to be much greater in the littoral zone than in the profundal zone in most lakes, there were some exceptions. For example, sphaeriids (fingernail clams) in the lakes of the Mine Operation Zone and Contwoyto Lake of the Tailings Impoundment/Docking Facility Zone were more abundant in the profundal zone than in the littoral zone. Some taxa were not evenly distributed among the study lakes. Ostracods (seed shrimps) were absent from Carat Lake samples, as were sphaeriids in the littoral zones of Carat and Contwoyto Lakes. Variations in physical characteristics among the sites, as well as natural variability, may account for these differences.

Carat and Jericho Lakes were sampled for benthic macroinvertebrates in 1995 (R.L. & L. Environmental Services Ltd. 1995). Similar to this investigation, chironomids, oligochaetes, and nematodes accounted for the majority of the invertebrate community and the littoral zone supported higher densities of invertebrates than the profundal zone. Some differences did occur between the two years. Ostracods were present in Carat Lake in 1995 as were sphaeriids. Differences in sampling locations may explain these changes. For example, the littoral zone samples collected in 1995 were from depths that varied from 1.5 to 4.0 m and the 1996 littoral zone samples were collected from depths that ranged from 1.0 to 1.6 m. Water depth is a factor that affects the distribution of benthic macroinvertebrates (Hynes 1970; Wetzel 1983).

Densities of benthic macroinvertebrates were comparable between the two study years. Mean total number of macroinvertebrates in the littoral zones ranged from 1452 to 22 387/m^2 in 1995 and from 3319 to 15 435/m^2 in 1996. In the profundal zones, 1995 mean total densities ranged from 178 to 2002/m^2, while 1996 densities ranged from 275 to 5696/m^2.

Beak (1977) sampled the benthic macroinvertebrate communities in the littoral and profundal habitats of a lake located approximately 75 km southwest of the Jericho study area (Izok Lake) in the Izok Project area. The benthic macroinvertebrate community in the littoral zone was dominated by oligochaetes, chironomids, and nematodes; whereas, in the profundal zone it was dominated by chironomids and sphaeriids. Moore (1978a) also sampled this waterbody, as well as two other lakes in the immediate vicinity (Itchen and Iznogoudh Lakes), and found that chironomids, sphaeriids, and oligochaetes dominated the benthic macroinvertebrate community. Moore (1978b) examined the littoral benthos of several lakes, including Contwoyto Lake, in the vicinity of the Lupin Gold Mine and found that the macroinvertebrate community was dominated by chironomids and sphaeriids. Moore (1978b) found the total abundance ranged from 140 to 4900/m^2.

7.4.2 Streams

The benthic macroinvertebrate community within streams of the Jericho study area were dominated by nematodes, oligochaetes, and chironomids. There were some notable differences among zones in the stream benthic macroinvertebrate community structure. Stream O18 of the Borrow Extraction Zone had a mean total number of invertebrates that was much greater (over 5000/m^2) than the three streams of the Mine Extraction Zone (maximum of just over 2000/m^2). Densities of stoneflies and seed shrimps were also greater in Stream O18 of the Borrow Extraction Zone than in the streams of the Mine Operation Zone. Variations in physical characteristics among the sampling sites and natural variability may account for these differences.

In 1995, R.L. & L. Environmental Services (1995) sampled two streams in the Mine Operation Zone of the Jericho study area. One of the two streams (Stream C1) was sampled in the present study. In 1995, the streams were dominated by oligochaetes, water mites, chironomids, tipulids (crane flies), and stoneflies. Although water mites and tipulids were not identified as numerically dominant taxa in 1996, these taxa were abundant in the 1995 samples. Stoneflies were also found in two of the three study streams in 1996, but at much lower densities than in 1995. Finally, the number of taxa identified and mean total densities were much greater in 1996 than in 1995.

Natural variability in the data, as well as differences in physical characteristics of each site (e.g., flow velocities and substrate) may account for differences observed between the two study years.

The results of the benthic macroinvertebrate sampling program in streams within the Jericho study area were comparable to other investigations. Beak (1977) sampled the benthic macroinvertebrate community in a stream located approximately 75 km southwest of the Jericho study area. Chironomids and stoneflies dominated this community, which is similar to the findings of 1995 (R.L. & L. Environmental Services Ltd. 1995). R.L. & L. Environmental Services Ltd.(1996a) sampled one stream located about 150 km south of the present study area and found that this stream was dominated by chironomids, nematodes, oligochaetes, and sphaeriids. Except for sphaeriids, the benthic communities were similar to those of the present study. However, R.L. & L. Environmental Services Ltd. (1996a) recorded a mean total density of over 16 000/m^2, which was much greater than the maximum density in the present study (approximately 5000/m^2).

The benthic macroinvertebrate communities in the streams within the Jericho study area were representative of subarctic systems. The species composition and low densities reported by the present study and by other investigations are indicative of oligotrophic systems (i.e., low productivity and short growing seasons: Hynes 1970; Resh and Rosenberg 1984; Rosenberg and Resh 1993).

7.5 FISH

7.5.1 Species Composition and Abundance

Fish communities were investigated in lakes and streams within three zones of the Jericho study area: the Mine Operation Zone, the Borrow Extraction Zone, and the Tailings Impoundment/Docking Facility Zone. These fish communities varied depending on the zone and the waterbody sampled within a particular zone. These differences were documented by assessing changes in species composition and relative abundance.

Five species of fish were recorded in five lakes in the Mine Operation Zone. They included lake trout, Arctic char, round whitefish, burbot, and slimy sculpin. Lake trout was the numerically dominant species in all lakes (Table 7.5.1). Round whitefish and Arctic char were also present, although they were much less numerous than lake trout. Round whitefish was the second most abundant species recorded in Carat Lake and Interbasins One and Two, while Arctic char was the subdominant species in Jericho Lake. In contrast, only lake trout were encountered in Lake C1. All other species recorded in lakes within the Mine Operation Zone (burbot and slimy sculpin) were present in very low numbers. Based on abundance indices generated using standardized gill net sets, overall fish densities were highest in Carat Lake, Interbasin Two and Jericho Lake (10 fish/100 $m^2 \cdot$ 12 h), and lowest in Lake C1 and Interbasin Two (5 fish/100 $m^2 \cdot$ 12 h).

Seven species of fish were recorded in five lakes within the Borrow Extraction Zone. They included lake trout, Arctic char, round whitefish, burbot, Arctic grayling, ninespine stickleback, and slimy sculpin. Of these species, only lake trout, Arctic char and round whitefish were numerous, however, the abundance of a particular species varied depending on the waterbody. Lake trout dominated fish communities in Lakes O3 and O5. Arctic char was numerically dominant in Lake O1. In Lakes O2 and O4, round whitefish was the most numerous fish. All other species (Arctic grayling, burbot and slimy sculpin) were sparsely distributed. Overall fish densities were highest in Lake O1(11 fish/100 m^2 · 12 h), followed by lower densities in Lake O5 (7 fish/100 m^2 · 12 h), and other waterbodies (<7 fish/100 m^2 · 12 h).

Table 7.5.1 Occurrence (○) of fish species in sampled lakes in the Jericho study area (includes data for 1995 and 1996 where applicable).

Species	Mine Operation Zone					Borrow Extraction Zone					Tailings/Docking Zone		
	Lake C1	Carat Lake	Interbasin One	Interbasin Two	Jericho Lake	Lake O1	Lake O2	Lake O3	Lake O4	Lake O5	Lake D4	Lake D5	Contwoyto Lake[a]
Arctic char	○	○	○		●	●	●	○	●	○	●	●	○
Arctic grayling								○		○			
Burbot					○			○					
Lake trout	●[b]	●	●	●	●	●	●	●	●	●	●	○	●
Ninespine stickleback							○	○	○	○			
Round whitefish		○	○	○	●	○	●	○	●	○			
Slimy sculpin			○	○		○	○						

[a]Represents species recorded in sampled area and not within main body of the lake.
[b]Dark circle represents numerically dominant species.

The three sampled lakes in the Tailings Impoundment/Docking Facility Zone supported simpler species assemblages than lakes in the other zones; only lake trout and Arctic char were present. Lake trout was the dominant species in Contwoyto Lake, while Arctic char predominated in Lake D5, and both species were equally important in Lake D4. Overall fish densities were highest in Lake D4 (11 fish/100 m^2 · 12 h), followed by Lake D5 (7 fish/100 m^2 · 12 h) and Contwoyto Lake (5 fish/100 m^2 · 12 h).

Seven species of fish were recorded in sampled streams in the Jericho study area (Table 7.5.2). Arctic grayling, Arctic char, ninespine stickleback, and slimy sculpin were the dominant species, followed by lower numbers of lake trout, round whitefish, and burbot. Most fish recorded in streams (all except ninespine stickleback and slimy sculpin) represented younger age classes that utilized the watercourses for rearing purposes. Fish numbers were generally low in streams, although notable exceptions occurred.

In the Carat Lake area of the Mine Operation Zone, Stream C1 supported a diverse assemblage of species and it contained the highest number of Arctic char recorded in the Mine Operation Zone. Likewise, Stream C6 supported the highest density of Arctic grayling in the zone. In the Jericho River area, Arctic grayling numbers were high in both the upper and lower sections of the main river, as well as in Streams O1, O24, and O25. One species, ninespine stickleback, was also numerous in the Mine Operation Zone, but its distribution was restricted to the Jericho River and its tributaries.

Table 7.5.2 Occurrence (○) of fish species in sampled streams in the Jericho study area.

Species	Mine Operation Zone			Borrow Extraction Zone					Tailings/Docking Zone		
	Carat Lake	Interbasin One	Jericho River	Lake O1	Lake O2	Lake O3	Lake O4	Lake O5	Lake D4	Lake D5	Contwoyto Lake
Arctic char	● [a]	○	○	●	○	●	○	○	○	○	
Arctic grayling	●	●	●	○	●	○	●	●			
Burbot	○	○	○	○	○	○	○	○			
Lake trout	○	○	○	○	○					○	○
Ninespine stickleback			●	○	○	○	●	●			
Round whitefish	○		○	○	○		○				
Slimy sculpin	●	●	○	●	●	●	●	●	●	●	●

[a]Dark circle represents numerically dominant species.

Arctic grayling, Arctic char, and slimy sculpin tended to be the most widespread and numerous species in Borrow Extraction Zone streams. Fish numbers were highest in Stream O18 in the Lake O1 area, Stream O5 in the Lake O6 area, and Stream O5 in the Lake O5 area. The highest number of Arctic char were recorded in Stream O18, while Arctic grayling were most numerous in Streams O6 and O5.

Few fish were recorded in streams in the Tailings Impoundment/Docking Facility Zone. Lake trout, Arctic char, and slimy sculpin were the only species recorded.

The fish communities documented in lakes and streams in each of the study area zones varied in their species composition and relative abundance, but some general patterns were apparent from the data. Firstly, the fish community in each lake consisted of only a few species. Secondly, these simple fish communities were dominated by one species; usually lake trout or Arctic char. Thirdly, the number of species encountered in a waterbody was related to lake size; smaller lakes contained fewer species (one notable exception was the results for the very large Contwoyto Lake where only two species were recorded). And fourthly, some fish species were present in low numbers or were entirely absent from study area lakes, but were abundant in streams associated with these lakes. These included Arctic grayling, burbot, ninespine stickleback, and slimy sculpin. Because most study area streams freeze to the bottom, fish utilized these watercourses only during the open water period. Therefore, the presence of these species in sampled streams indicated that viable populations existed in study area lakes, even though fish were not encountered during lake sampling.

The fish community that develops in a particular waterbody is dependant on historical opportunities to migrate (McPhail and Lindsey 1970). For example, Arctic char and lake trout populations are present in Lakes D4 and D5, despite the absence of a movement corridor between these waterbodies and Contwoyto Lake. Historically a corridor was present which enabled fish to move into these lakes. Habitat conditions were favourable and viable fish populations developed. The distribution of ninespine stickleback provides another example for opportunities for migration into waterbodies. This species is abundant in the Jericho study area, but its distribution is restricted to that part of the drainage situated downstream of a 15 m high cascade on the Jericho River. These data suggest that this cascade is a barrier to ninespine stickleback and the species has been excluded from habitat that is available upstream of the cascade.

The fish community that develops in a particular waterbody is also dependant on environmental conditions (Johnson 1975). In most sampled waterbodies in the Jericho study area, lake trout was numerically dominant. This is not surprising because this species is well adapted to cold oligotrophic systems (Scott and Crossman 1973). However, in some waterbodies (e.g., Lake O1 of the Borrow Extraction Zone) Arctic char is the dominant species. The reason for this may be related to the existence of high quality rearing habitat in the main tributary to Lake O1 (Stream O18). Younger age-classes of Arctic char can rear in this system without being subjected to high rates of predation from lake trout in the lake environment. The presence of this habitat may have enabled Arctic char to maintain relatively high fish numbers, despite the presence of lake trout.

This rational also applies to Arctic grayling, which not only rears in streams, but also requires protected areas such as stream channels to spawn. A paucity of this habitat type may limit or prevent Arctic grayling from becoming established in a particular drainage. This may explain the paucity of Arctic grayling in the Carat Lake area of the Mine Operation Zone, and its abundance farther downstream in the Jericho River area.

The fish communities documented in the Jericho study area were similar to fish communities recorded in other subarctic locations (Table 7.5.3). The species assemblage identified in waterbodies within the Ranch Lake Project area and in the Contwoyto Lake drainage of the Lupin Project area (both situated approximately 50 km south) were identical to the species assemblage in the Jericho Diamond Project area. The only exception was the presence of cisco (*Coregonus artedii*) in the Lupin Project area. A similar species assemblage was also identified in several lakes within the Izok Project area (located approximately 75 km southwest) and the NWT Diamond Project area (located 300 km southeast). Five of the species recorded in the Jericho study area were also present in the Izok Project and NWT Diamond Project areas. Arctic char was absent from waterbodies at these sites and one species, the longnose sucker (*Catostomus catostomus*), was not recorded during the current study. These findings suggest that the fish communities identified in the Jericho study area were typical of subarctic systems.

Table 7.5.3 Comparison of fish species assemblages identified in subarctic watersheds in the immediate vicinity of the Jericho Diamond Project.

Species	Jericho Diamond Project[a]	Ranch Lake Project[b]	Izok Project[c]	Lupin Project[d]	NWT Diamonds Project[e]
Arctic char	o	o		o	
Arctic grayling	o	o	o	o	o
Burbot	o	o	o	o	o
Longnose sucker			o		o
Lake cisco				o	
Lake trout	o	o	o	o	o
Ninespine stickleback	o	o		o	
Round whitefish	o	o	o	o	o
Slimy sculpin	o	o	o	o	o

[a]Results from the current study and 1995 (R.L. & L. Environmental Services Ltd. (1995).
[b]R.L. & L. Environmental Services Ltd. (1996).
[c]R.L. & L. Environmental Services Ltd. (1993).
[d]Reid Crowther & Partners Ltd. and R.L. & L. Environmental Services Ltd. (1984).
[e]BHP Diamonds Inc.(1995).

7.5.2 Biological Characteristics

Fish populations in the three zones of the Jericho study area exhibited similar biological characteristics. Length-frequency distributions for lake populations typically were bimodal with larger individuals dominating the sample. Lake trout and Arctic char captured in most lakes regularly exceeded 420 mm in fork length and round whitefish were usually greater than 320 mm in fork length. Sampled fish were slow growing and exhibited large variations in length at a given age. Fish populations in the Jericho study area also matured at a late age. Lake trout and Arctic char did not usually mature until they reached 12 years of age, while round whitefish matured at age 8. Arctic char and lake trout also exhibited evidence of alternate year spawning (i.e., nonfecund individuals); between 15% and 30% of mature fish that were examined would not have spawned in 1996.

These biological characteristics are typical of unexploited fish populations residing in subarctic oligotrophic lakes that have low primary productivity (Johnson 1976). The bimodal length-frequency distribution observed for fish populations in this study area are representative of state of equilibrium between the biomass of the population and lake productivity (Johnson 1976). In unexploited fish populations, fish lengths cluster around the modal points regardless of age. This characteristic explains the wide variation in length at a given age that was observed in the data. Slow growth, late sexual maturity, and alternate year spawning are also characteristics of fish populations that are limited by low primary productivity. Energy is required by a fish for growth, sexual maturation, and gonad development (Roff 1983). If lake productivity is low, as it is in waterbodies in the Jericho study area, fish growth and development will also be low.

The biological characteristics of fish populations residing in the Jericho study area were similar to those in other subarctic waterbodies. For example, bimodal length-frequency distributions were a prevalent characteristic of fish populations in the Ranch Lake Project area, and the Izok Lake Project area (Figure 7.5.1). Fish in these areas also exhibited a large variation in length-at-age, were late maturing, and slow growing; all characteristics that were comparable to the fish populations in the Jericho study area.

7.5.3 Feeding Habits

Feeding habits of fish in all three zones of the Jericho study area were dependant on food availability. The most prevalent food groups consumed by all fish species in each zone were zooplankton and chironomids. Other items consumed were fish, trichopterans, molluscs, and eubranchiopods. The feeding habits of fish were also dependant on a species specific food preference. Lake trout and Arctic char from the larger waterbodies (Carat, Jericho and Contwoyto Lakes) consumed fish as part of their diet. Trichopterans, which are benthic macroinvertebrates, accounted for a large proportion of food items consumed by round whitefish.

The feeding habits described are typical for the species examined (Scott and Crossman, 1973). Fish in the Jericho study area were opportunistic feeders and took advantage of whatever food items were readily available. Zooplankton, which consist of small crustaceans that reside in the water column, were sufficiently abundant to be an important food. This was true even for species that were not specialized to feed on zooplankton; large-bodied lake trout that are piscivorus (fish eaters) and round whitefish, which is a species that normally feeds on benthic macroinvertebrates.

These results are comparable to findings for fish populations residing in other subarctic lakes. In the Ranch Lake Project area benthic invertebrates (chironomids) and zooplankton were the predominant food items consumed by many species. In the Izok Project area, zooplankton was also important in the diet of fish. Other food items consumed by fish in the Izok Project area included molluscs (round whitefish) and fish (lake trout).

7.6 HABITAT AND HABITAT USE

7.6.1 Lakes

Waterbodies within the three sampling zones were evaluated to assess their value as habitat for fish populations. This involved surveys of lake shoreline and stream channel characteristics and attempts to document fish use of these areas.

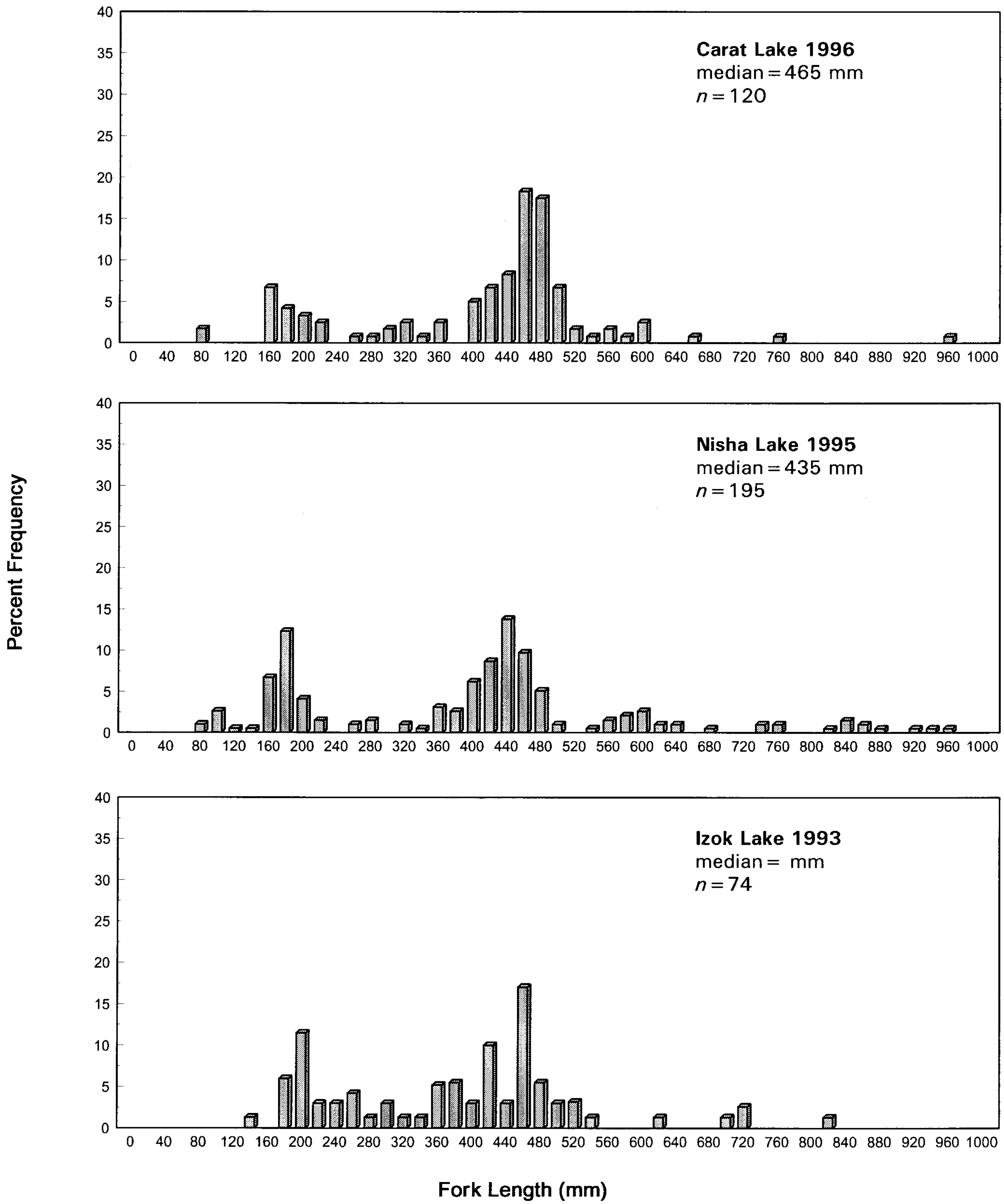


Figure 7.5.1 Comparison of length-frequency distributions of lake trout in waterbodies from several locations in the Arctic.

Shoreline habitat characteristics of lakes in each zone were different. Lakes in the Mine Operation Zone tended to be dominated by cobble-boulder substrates; an exception to this were shorelines of the two Interbasin lakes, which contained an abundance of fine substrates (principally sand). These lake characteristics provided an abundance of potential spawning areas for species such as lake trout, Arctic char, and round whitefish. Several high quality spawning sites were identified and the presence of high concentrations of lake trout at one of these sites (north-east corner of Carat Lake) confirmed that it was used for this purpose. The same shoreline characteristics that provided an abundance of spawning habitat also limited the availability of rearing habitat. The absence of fine substrates along much of the shorelines precluded the development of aquatic macrophytes, features that provide rearing habitat for smaller fish.

In contrast to the Mine Operation Zone lakes, shoreline areas of waterbodies in the Borrow Extraction Zone were dominated by fine substrates consisting of sands and gravels. These shoreline characteristics also provided an abundance of potential spawning areas. A paucity of aquatic macrophytes in these lakes severely limited the availability of lake shore rearing habitat.

The shoreline areas of lakes in the Tailings Impoundment/Docking Facility Zone were dominated by large substrates consisting of cobbles and boulders; bedrock areas were also identified in some of these lakes (Lake D4 and Contwoyto Lake). Although not confirmed by concentrations of spawning fish, a shoal situated in the proposed docking facility bay exhibited characteristics of a high quality lake trout spawning site. In contrast to the abundance of potential spawning sites in these lakes, the availability of rearing habitat was severely limited.

The characteristics of surveyed lakes in the Jericho study area provided the necessary habitat to support self-sustaining fish populations. Deep-water areas were available as overwintering habitat. Spawning habitat characterized by clean gravel to boulder-sized substrates was widely distributed in areas sufficiently deep enough to avoid freezing. These features are required by lake spawning species such as lake trout (DeRoche 1969), Arctic char (Johnson 1980), and round whitefish (Scott and Crossman 1973). In contrast to the availability of potential spawning areas, rearing habitat was limited in distribution and abundance. Despite the paucity of rearing habitat in subarctic lakes, there is a sufficient amount to maintain fish populations.

To enhance growth and reduce mortality, young-of-the year and juvenile fish require rearing areas that provide an abundance of food and protection from predation. In many lake environments, zones containing dense stands of submerged aquatic macrophytes meet these requirements (Randall et al. 1996). Food resources, such as benthic invertebrates, are more abundant (Cyr and Downing 1988) and the risk of predation is reduced (Barnett and Schneider 1974). Low nutrient levels, exposure to wind, and rock substrates are factors that limit macrophyte growth; all are common characteristics of cold oligotrophic subarctic lakes.

The absence of aquatic macrophytes forces smaller fish to forage in unprotected areas (e.g., open water zones containing zooplankton), which increases predation risk. Conversely, smaller fish are restricted to near shore areas containing larger substrates that provide protection from predation, but that contain a paucity of food. Some species (Arctic grayling and Arctic char) reduce this problem by utilizing streams as rearing habitat.

The habitat characteristics of lakes in the Jericho study area were similar to those in other drainages. In the Ranch Lake Project area, lakes provided an abundance of spawning habitat, but rearing areas were severely limited (R.L. & L. Environmental Services Ltd. 1996). Similar findings were documented in the Izok Project area (R.L. & L. Environmental Services Ltd. 1993) and the Lupin Project area (Reid Crowther & Partner and R.L. & L. Environmental Services Ltd. 1984).

7.6.2 Streams

Streams in the Jericho study area generally are small, ephemeral watercourses dominated by ill-defined channels and large substrates. Those that maintain water flow during the entire summer period freeze to the bottom during winter. As a consequence of these characteristics, fish utilized the habitat provided by these systems on an opportunistic basis and use was generally restricted to the lower sections. Spawning, rearing, and feeding habitats were present in varying amounts and were used by fish originating from study area lakes. Fish species that were frequently recorded in surveyed streams (and the habitat used) included Arctic grayling (spawning and rearing), Arctic char (rearing), ninespine stickleback (feeding), and slimy sculpin (feeding). Other species, such as lake trout and round whitefish, were not abundant in streams because these lake dwelling fish do not typically use small stream habitats (Scott and Crossman 1973).

In total, 27 streams were surveyed in the Mine Operation Zone, however, few contained good quality habitat. During the current study, Stream C1 in the Carat Lake area was used extensively by Arctic char for rearing, as did Arctic grayling in 1995. Stream C6, also in the Carat Lake area, provided good quality spawning and rearing habit for Arctic grayling. One larger system in the Interbasin area (Stream C15), was used for rearing and/or feeding purposes by Arctic grayling and lake trout.

The Jericho River (both upper and lower sections) contained good habitat. The Jericho River is the largest stream in the Mine Operation Zone. Its large size, well-defined channel, and abundance of smaller substrates creates a diverse assemblage of habitats (spawning, rearing, feeding) for Arctic grayling. Deep-water areas in the upper Jericho River may also provide overwintering habitat for fish. A significant feature of the Jericho River was the presence of a cascade area approximately 15 m in height that was located near the outlet of Jericho Lake. Although not an absolute barrier, this area created a significant impediment to fish passage between the Jericho River system and lakes situated farther upstream. Tributary streams associated with the Jericho River were small, but several provided good quality spawning and rearing habitat for Arctic grayling. Tributaries exhibiting these characteristics were Streams O1, O8, O24, O25, and O27.

Habitat surveys were undertaken in 17 streams within the Borrow Extraction Zone; in general they provided limited habitat for fish. The primary reasons were their small size and intermittent flow during the summer. Some streams did provide good quality habitat. One watercourse in the Lake O1 area (Stream O18) provided high quality spawning habitat for Arctic grayling and rearing habitat for Arctic char. Stream O6, which was the drainage system for Lake O4, was one of the larger watercourses in the Borrow Extraction Zone. It contained good quality spawning and rearing habitat, as well as feeding habitat for adult Arctic grayling. Similarly, Stream O5 in the Lake O5 area provided good quality spawning and rearing habitat.

Habitat surveys of 12 streams within the Tailings Impoundment/Docking Facility Zone documented the absence of fish habitat. The primary reasons for severely limited fish habitat in these streams were their small size, intermittent flow during the summer, poorly defined channels, and steep slopes.

The characteristics of surveyed streams in the Jericho study area are typical of inland watercourses above the tree line. Craig and McCart (1974) in their investigation of watercourses in the Beaufort Sea drainages categorize these systems as Tundra Streams. They are characterized as small meandering systems that freeze completely during winter. Discharge peaks during the snow melt period and then fluctuates depending on the magnitude and frequency of rainfall events. Water levels can recede during dry periods to the point where water flow ceases.

Fish utilize these streams during the open water period, but originate from deep-water lakes or rivers that provide overwintering habitat. The most common fish species in their study area were Arctic grayling, Arctic char, round whitefish, ninespine stickleback, and slimy sculpin. Of these species, only round whitefish was not abundant in Jericho study area streams.

Arctic grayling was the most widely distributed species in the study area of Craig and McCart (1974). Adult Arctic grayling enter the Tundra Streams to spawn shortly after flooding. Fish prefer smaller gravel substrates for egg deposition, however, a variety of substrates can be used (Scott and Crossman 1973). Once spawning has been completed, the majority of the adult fish leave the streams. Movement of adult fish into the streams is frequently accompanied by an upstream movement of juvenile fish. These individuals, along with young-of-the-year fish, remain in the stream to rear throughout the summer. Arctic char were not as abundant as Arctic grayling in Tundra Streams. Use by this species was restricted to early summer upstream movements of juvenile fish for rearing purposes.

The habitat characteristics of streams in the Jericho study area were similar to those in other drainages. In the Ranch Lake Project area, most streams were small and were utilized on an opportunistic basis by fish originating in study area lakes (R.L. & L. Environmental Services Ltd. 1996). Similar findings were documented in the Izok Project area (R.L. & L. Environmental Services Ltd. 1993) and the Lupin Project area (Reid Crowther & Partner and R.L. & L. Environmental Services Ltd. 1984).

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APPENDIX A
METHODOLOGY

APPENDIX A

STREAM HABITAT CLASSIFICATION SYSTEM

Provides a qualitative assessment of the physical characteristics of a stream and its potential as fish habitat.

Riffle - Portion of channel with increased velocity relative to Run and Pool habitat types; broken water surface due to effects of submerged or exposed bed materials; shallow (less than 25 cm). Limited value as habitat for larger juveniles and adults (i.e., feeding), but may be used extensively by young-of-the-year and small juveniles.

> RF - Typical riffle habitat type; provides limited cover for all life stages.
>
> RF/BG - Riffle habitat type with abundance of large cobble and boulder substrates. Limited cover for juveniles and adults; but, may be used extensively by young-of-the-year fish.

Rapids (RA) - Portion of channel with highest velocity relative to other habitat types. Deep (>25 cm); often formed by channel constriction. Substrate extremely coarse; dominated by large cobble and boulder substrates. Habitat provided for juveniles and adults in pocket eddies associated with substrate.

Run - Portion of channel characterized by moderate to high current velocity relative to Pool and Flat habitats; water surface largely unbroken. Potentially high habitat value for all life stages. Can be differentiated into five types based on depth and cover.

> R1 - Maximum depth exceeding 1.5 m; average depth 1.0 m. High cover at all flow conditions. Highest quality habitat for larger juveniles and adults; limited value for young-of-the-year-fish.
>
> R2/BG - Maximum depth reaching 1.0 m and generally exceeding 0.75 m; presence of large cobble or boulder substrates in channel. High cover at all flows. Moderate to high quality habitat for larger juveniles and adults.
>
> R2 - Maximum depth reaching 1.0 m and generally exceeding 0.75 m. High cover during most flows, but not during base flows. Moderate quality habitat for juveniles and adults; limited value for young-of-the-year-fish.
>
> R3/BG - Maximum depth of 0.75 m, but averaging <0.50 m; presence of large cobble or boulder substrates in channel. Moderate cover at all flows. Moderate quality habitat for juveniles and adults; but, the value to young-of-the-year-fish is potentially high.
>
> R3 - Maximum depth of 0.75 m, but averaging <0.50 m. Low cover at all flows. Lowest quality habitat for juveniles and adults; but, the value to young-of-the-year-fish is potentially high.

Flat (FL) - Area of channel characterized by low current velocities (relative to RF and Run cover types); near-laminar (i.e., non-turbulent) flow. Depositional area dominated sand/silt substrates. Differentiated from Pool habitat type by high channel uniformity and lack of direct association with riffle/run complex. Potential habitat value for all life stages is moderate to high. Can be differentiated into five types based on depth and cover.

> F1 - Maximum depth exceeding 1.5 m; average depth 1.0 m or greater. High cover at all flows. Highest quality habitat for larger juveniles and adults; limited value for young-of-the-year-fish.

F2/BG - Maximum depth reaching 1.0 m and generally exceeding 0.75 m; presence of large cobble or boulder substrates in channel. High cover at all flows. Moderate to high quality habitat for larger juveniles and adults.

F2 - Maximum depth exceeding 1.0 m; generally exceeding 0.75 m. High cover during most flows, but not during base flows. Moderate quality habitat for juveniles and adults; limited value for young-of-the-year-fish.

F3/BG - Maximum depth of 0.75 m, but averaging <0.50 m; presence of large cobble or boulder substrates in channel. Moderate cover at all flows. Moderate quality habitat for juveniles and adults; but, the value to young-of-the-year-fish is potentially high.

F3 - Maximum depth of 0.75 m, averaging less than 0.50 m. Low cover at all flows. Lowest quality habitat for juveniles and adults; but, the value to young-of-the-year-fish is potentially high.

Pool - Discrete portion of channel featuring increased depth and reduced velocity (downstream oriented) relative to Riffle and Run habitat types. Normally featuring Riffle/Run associations. Principal habitat value for all life stages is cover. When in close association with Riffle/Run habitats, value can be very high. Can be differentiated into three types based on depth.

P1 - Maximum depth exceeding 1.5 m; average depth 1.0 m or greater; high cover at all flow conditions. Often intergrades with deep-slow type of R1. Highest quality habitat for larger juveniles and adults; limited value for young-of-the-year-fish.

P2 - Maximum depth reaching or exceeding 1.0 m, generally exceeding 0.75 m. High cover at all but base flows. Moderate quality habitat for juveniles and adults; limited value for young-of-the-year-fish.

P3 - Maximum depth of 0.75 m, averaging <0.50 m. Low instream cover; includes small pocket eddies. Lowest quality habitat for all life stages.

Dispersed (DIS) - Portion of stream exhibiting no defined channel. Water depth rarely exceeding 0.25 m and often dispersed over boulder fields. Very limited value as fish habitat.

Habitat Features - Includes the following instream features:

Chutes (CH) - Area of channel constriction; generally resulting in channel deepening and increased velocity. Associated habitat types are Pool, Run, and Rapid.

Ledges (LG) - Areas of bedrock intrusion into the channel; often creates Chutes and Pool habitat.

Falls (FAL) - Area of channel exhibiting rapid vertical decent over boulder and bedrock. Often a barrier to fish passage.

Cascade (CAS) - Area of channel exhibiting rapid decent over boulder and bedrock, but, with no well defined vertical decent (i.e., falls). Often a barrier to fish passage.

Outlet/Inlet (Out) - Confluence of stream and lake; can be the outlet or inlet.

Channel Type - Includes the following categories:

Single (C1) - Entire water flow of stream through one active channel.
Multiple (C2) - Water flow of stream through more than one active channel.
Dispersed (C3) - No defined channel.

Bank Type - Includes the following categories:

Well-defined (D1) - Well-defined boundary at water-bank interface of active stream channel.
Ill-defined (D2) - Poorly defined boundary at water-bank interface of active stream channel.

LAKE SHORELINE HABITAT CLASSIFICATION SYSTEM

Provides a qualitative assessment of the physical characteristics of the littoral zone (zone of visible light penetration to bottom) and its potential as critical fish habitat (spawning and rearing).

Slope - The slope of the visible portion of the lake bottom adjacent to the shoreline. The lower the slope, the greater the amount of shallow water (littoral zone) available for use by smaller juveniles and young-of-the-year fish. Visual estimation of slope using three categories.

Low - 0 to 10%
Moderate - 11 to 30%
High - >30%

Substrate - The dominant substrate in the visible portion of the lake bottom adjacent to the shoreline. The presence of rock (cobbles, boulders) indicates potential as a spawning habitat; presence of fines (organics, clay, silt, sand, gravel) indicates the potential as rearing habitat (enhances growth of macrophytes); presence of bedrock indicates limited value as fish habitat. Visual estimation of the percent cover by each substrate size and then grouping into three categories based on the following criteria:

Fines - >40% of bottom consists of organics, clays, silts, or gravel substrates.
Rock - >60% of bottom consists of cobbles or boulders.
Bedrock - > 40% of bottom consists of bedrock.

SUBSTRATE CLASSIFICATION SYSTEM

Modified Wentworth classification for substrate particle sizes

CLASSIFICATION	PARTICLE SIZE RANGE (mm)
Bedrock	-
Boulder	>256
Cobble	32 - 256
Gravel	1 - 32
Sand	0.0625 - 0.2-1
Silt	0.0039-0.0625
Clay	<0.0039
Organics	-

APPENDIX B

LIMNOLOGY

Appendix B1 Temperature and dissolved oxygen profile data from sampled lakes, Jericho study area, 1996.

Carat Lake — Site W1-1 — 04-Aug-96

Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.0	13.5
1.0	9.2	13.6
2.0	8.7	13.8
3.0	8.2	13.8
4.0	7.6	13.9
5.0	7.1	13.9
6.0	6.6	13.9
7.0	6.3	13.9
8.0	6.1	13.9
9.0	7.7	13.9
9.5	7.0	13.9
10.0	bottom	

Secchi Disk Reading (m) = 5.5
UTM Coordinates = 12W 0476300 7320852
pH = 6.69
Conductivity (µS) = 13.1

Carat Lake — Site W1-2 — 04-Aug-96

Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.3	13.8
1.0	7.9	13.9
2.0	6.8	14.0
3.0	6.2	14.0
4.0	6.0	14.0
5.0	5.7	14.0
6.0	5.5	14.0
7.0	5.3	14.0
8.0	5.1	14.0
9.0	5.2	14.1
10.0	5.1	14.0
11.0	5.6	11.9
11.5	5.8	10.5
12.0	6.0	9.9
12.5	6.2	9.4
13.0	6.4	8.8
13.5	6.7	8.4
14.0	6.9	7.7
14.5	6.9	7.5
15.0	6.9	7.3
15.5	6.9	7.2
16.0	6.9	7.0
16.5	6.8	6.8
17.0	6.9	6.7
17.5	6.9	6.5
18.0	6.9	6.4
18.5	7.0	6.3
19.0	7.0	6.2
19.5	7.0	6.1
20.0	7.0	6.1
20.5	7.0	6.0
21.0	7.0	6.0
21.5	7.0	5.9
22.0	7.0	5.9
22.5	7.0	5.8
23.0	7.0	5.7
23.5	7.0	5.7
24.0	bottom	

Secchi Disk Reading (m) = 5.3
UTM Coordinates = 12W 0477900 7320598
pH = 6.45
Conductivity (µS) = 10.2

Jericho Lake — Site W2 — 04-Aug-96

Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	14.1
1.0	9.6	14.2
2.0	9.0	14.2
3.0	9.0	14.2
4.0	8.8	14.3
5.0	8.3	14.3
6.0	8.0	14.2
7.0	7.5	14.2
8.0	7.0	13.9
9.0	6.6	14.2
10.0	7.6	14.1
10.5	7.5	8.7
11.0	7.5	7.8
11.5	7.5	7.0
12.0	7.5	6.6
12.5	7.5	6.2
13.0	9.4	5.6
13.5	9.0	5.5
14.0	8.8	5.4
14.5	8.5	5.3
15.0	8.0	5.2
15.5	bottom	

Secchi Disk Reading (m) = 5.3
UTM Coordinates = 12W 0477343 7323673
pH = 6.95
Conductivity (µS) = 10

Interbasin One — Site W5 — 04-Aug-96

Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	8.4	13.6
1.0	6.6	13.7
2.0	5.4	13.9
3.0	4.7	13.9
4.0	4.9	13.9
5.0	4.6	13.9
6.0	4.7	13.9
7.0	4.6	13.8
8.0	4.7	13.8
9.0	4.5	13.6
10.0	4.4	13.5
10.5	5.7	13.3
11.0	bottom	

Secchi Disk Reading (m) = 5.1
UTM Coordinates = 12W 0478742 7323185
pH = 6.91
Conductivity (µS) = 15

Interbasin Two — Site W6 — 04-Aug-96

Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	13.3
1.0	9.3	13.5
2.0	9.0	13.5
3.0	8.8	13.5
4.0	8.5	13.6
5.0	8.2	13.6
6.0	7.9	13.6
7.0	7.8	13.6
8.0	7.5	13.6
9.0	7.4	13.6
10.0	7.2	13.6
11.0	bottom	

Secchi Disk Reading (m) = 5.3
UTM Coordinates = 12W 0478138 7321869
pH = nd[1]
Conductivity (µS) = nd

[1] nd = no data.

Appendix B1 Continued.

Lake C1		
Site W4		
03-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.9	14.2
1.0	9.7	14.1
2.0	9.5	14.0
3.0	9.4	13.9
4.0	9.3	13.8
5.0	9.3	13.5
6.0	9.3	13.1
7.0	9.5	9.7
8.0	9.6	7.5
8.5	9.6	7.4
9.0	bottom	

Secchi Disk Reading (m) = 5.2
UTM Coordinates = 12W 0477524 7319381
pH = 7.57
Conductivity (μS) = 16.4

Lake O1		
Site W7		
03-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	14.5
0.5	9.3	14.7
1.0	9.1	14.8
1.5	8.5	14.9
2.0	8.6	15.0
2.5	8.4	15.0
3.0	8.2	15.1
3.5	8.1	15.1
4.0	7.9	15.1
4.5	7.6	15.1
5.0	7.4	15.1
5.5	7.2	15.1
6.0	7.3	15.1
6.5	7.2	15.1
7.0	7.0	15.1
7.5	6.9	15.1
8.0	6.7	15.1
8.5	6.6	15.1
9.0	6.6	15.1
9.5	6.6	15.1
10.0	6.6	15.1
10.5	6.8	13.0
11.0	7.0	10.4
11.5	6.8	9.2
12.0	6.6	8.7
12.5	bottom	

Secchi Disk Reading (m) = 5.7
UTM Coordinates = 12W 0480048 7318619
pH = 7.18
Conductivity (μS) = 13.7

Lake O2		
Site W8		
04-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.6	13.7
1.0	9.2	13.9
2.0	8.9	14.0
3.0	8.3	14.1
4.0	8.2	14.1
5.0	7.9	14.1
6.0	8.1	14.1
7.0	8.3	14.1
8.0	8.4	14.1
9.0	8.2	14.1
9.5	bottom	

Secchi Disk Reading (m) = 5.6
UTM Coordinates = 12W 0479216 7322841
pH = 7.38
Conductivity (μS) = 13.5

Lake O3		
Site W9		
03-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.8	14.5
1.0	9.5	14.4
2.0	9.5	14.4
3.0	9.5	14.3
4.0	9.4	14.2
5.0	9.5	14.1
6.0	9.5	13.9
7.0	9.2	13.0
8.0	9.9	10.3
9.0	10.0	8.2
10.0	9.7	6.7
11.0	9.1	5.6
11.3	bottom	

Secchi Disk Reading (m) = 5.5
UTM Coordinates = 12W 0479762 7322571
pH = 7.30
Conductivity (μS) = 16.4

Appendix B1 Continued.

Lake O4		
Site W10		
04-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	13.6
0.5	9.3	13.7
1.0	9.2	13.7
1.5	9.2	13.7
2.0	9.2	13.8
2.5	9.2	13.8
3.0	9.0	13.8
3.5	9.0	13.8
4.0	9.1	13.8
4.5	8.9	13.8
5.0	8.9	13.8
5.5	8.6	13.8
6.0	8.4	13.8
6.5	8.4	13.8
7.0	8.4	13.8
7.5	8.4	13.8
8.0	bottom	
Secchi Disk Reading (m) = 5.2		
UTM Coordinates = 12W 0479806 7324051		
pH = 7.32		
Conductivity (µS) = 12.5		

Lake O5		
Site W11		
04-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	13.3
0.5	9.6	13.4
1.0	9.5	13.5
1.5	9.3	13.5
2.0	9.2	13.5
2.5	9.2	13.6
3.0	9.4	13.6
3.5	9.5	13.6
4.0	9.5	13.6
4.5	9.2	13.4
5.0	bottom	
Secchi Disk Reading (m) = 5.2		
UTM Coordinates = 12W 0479806 7324051		
pH = 7.32		
Conductivity (µS) = 12.5		

Lake D4		
Site W12		
03-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	14.8
0.5	9.3	14.8
1.0	9.3	14.8
1.5	9.1	14.8
2.0	9.0	14.8
2.5	8.8	14.8
3.0	8.8	14.8
3.5	8.8	14.8
4.0	8.8	14.8
4.5	8.8	14.8
5.0	8.8	14.8
5.5	8.8	14.8
6.0	8.8	14.8
6.5	8.9	14.8
7.0	8.9	14.6
7.5	9.6	12.0
8.0	9.9	10.3
8.5	10.3	8.1
9.0	10.1	7.5
9.5	10.1	7.0
10.0	10.0	6.8
10.5	10.0	6.6
11.0	9.9	6.5
11.5	9.9	6.4
12.0	9.9	6.3
12.5	9.8	6.2
13.0	9.7	6.2
13.5	9.7	6.1
14.0	9.6	6.1
14.5	bottom	
Secchi Disk Reading (m) = 5.1		
UTM Coordinates = 12W 0478714 7319095		
pH = 5.56		
Conductivity (µS) = 10		

Lake D5		
Site W13		
03-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	9.7	14.5
0.5	9.1	14.5
1.0	8.8	14.5
1.5	8.4	14.5
2.0	8.2	14.5
2.5	8.2	14.6
3.0	8.1	14.6
3.5	8.1	14.6
4.0	8.4	14.6
4.5	8.2	14.6
5.0	8.0	14.5
5.5	7.8	14.5
6.0	7.8	14.5
6.5	7.8	14.5
7.0	7.8	14.5
7.5	7.8	14.4
8.0	7.6	14.3
8.5	7.6	13.9
9.0	7.9	12.2
9.5	8.2	8.0
10.0	8.1	6.9
10.5	bottom	
Secchi Disk Reading (m) = 5.7		
UTM Coordinates = 12W 0480048 7318619		
pH = 7.18		
Conductivity (µS) = 13.7		

Contwoyto Lake		
Site W14		
03-Aug-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	11.3	9.1
0.5	11.3	9.1
1.0	11.4	9.0
1.5	11.4	9.0
2.0	11.2	9.0
2.5	11.3	9.0
3.0	11.2	9.0
3.5	11.2	9.0
4.0	11.1	9.0
4.5	10.9	9.0
5.0	11.0	9.0
5.5	10.7	9.0
6.0	10.8	8.9
6.5	10.7	8.9
7.0	10.8	8.9
7.5	10.8	8.9
8.0	10.8	8.9
8.5	10.8	8.9
9.0	11.1	8.9
9.5	10.8	8.9
10.0	10.7	8.9
10.5	10.9	8.9
11.0	11.0	8.8
11.5	10.9	8.8
12.0	11.0	8.8
12.5	10.9	8.7
13.0	10.9	8.6
13.5	11.0	8.6
14.0	11.0	8.1
14.2	bottom	
Secchi Disk Reading (m) = 9.3		
UTM Coordinates = 12W 0481757 7318682		
pH = 5.53		
Conductivity (µS) = 15.2		

Appendix B1 Concluded.

Carat Lake		
Site W1-1		
04-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	11.4	7.0

Secchi Disk Reading (m) = 3.5
UTM Coordinates = 12W 0476775 7320780
pH = 6.44
Conductivity (µS) = 20

Carat Lake		
Site W1-2		
04-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.7	7.0

Secchi Disk Reading (m) = 3.5
UTM Coordinates = 12W 0478017 7320765
pH = 6.47
Conductivity (µS) = 13

Jericho Lake		
Site W2		
04-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.7	8.0

Secchi Disk Reading (m) = 4.0
UTM Coordinates = 12W 0477539 7323695
pH = 6.41
Conductivity (µS) = 15

Interbasin One		
Site W5		
04-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	11.6	8.0

Secchi Disk Reading (m) = 4.0
UTM Coordinates = 12W 0478742 7323185
pH = 6.38
Conductivity (µS) = 13

Interbasin Two		
Site W6		
05-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	11.2	6.0

Secchi Disk Reading (m) = nd
UTM Coordinates = 12W 0478250 7321946
pH = 6.94
Conductivity (µS) = 20

Lake O1		
Site W7		
06-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.7	5.0

Secchi Disk Reading (m) = 3.5
UTM Coordinates = 12W 0478773 732117
pH =7.04
Conductivity (µS) = 13

Lake O2		
Site W8		
07-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.1	5.0

Secchi Disk Reading (m) = 4.0
UTM Coordinates = 12W 0479218 7322662
pH = 6.57
Conductivity (µS) = 33

Lake O3		
Site W9		
07-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.3	6.0

Secchi Disk Reading (m) = 4.8
UTM Coordinates = 12W 0479762 7322571
pH = 6.89
Conductivity (µS) = 23

Lake O4		
Site W10		
08-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.2	5.0

Secchi Disk Reading (m) = 5.0
UTM Coordinates = 12W 0479918 7323571
pH = 6.79
Conductivity (µS) = 22

Lake O5		
Site W11		
08-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.3	4.0

Secchi Disk Reading (m) = 4.5
UTM Coordinates = 12W 0480131 7324808
pH = 6.25
Conductivity (µS) = 25

Lake D4		
Site W12		
03-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.3	8.0

Secchi Disk Reading (m) = 3.8
UTM Coordinates = 12W 0480171 7319102
pH = 7.94
Conductivity (µS) = 21

Lake D5		
Site W13		
09-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	10.9	6.0

Secchi Disk Reading (m) = 3.0
UTM Coordinates = 12W 0478713 731868
pH = 6.86
Conductivity (µS) = 15

Contwoyto Lake		
Site W14		
06-Sep-96		
Depth (m)	Dissolved Oxygen (mg/L)	Temp. (°C)
0.0	11.3	6.0

Secchi Disk Reading (m) = 4.0
UTM Coordinates = 12W 0481757 7318682
pH = 6.23
Conductivity (µS) = 13

APPENDIX C
PLANKTON

Appendix C1 Summary of phytoplankton and zooplankton collection data from sampled lakes during summer and fall, Jericho study area, 1996.

Lake	Site	Zooplankton								Phytoplankton				
		Date	UTM Coordinates	No. of Replicates	Area Sampled (m^2)	Secchi Disk Depth (m)	Haul Depth (m)	Aperture Area (m^2)	Volume Filtered (m^3)	Date	UTM Coordinates	Secchi Disk Depth (m)	No. Hauls	Haul Depth (m)
Carat Lake	PL1-1	30-Jul-96	12W 0477900 7320598	3	0.014	5.6	9.0[1]	0.13	0.378	24-Jul-96	12W 0478105 7320814	7	5	14.0
		04-Sep-96	12W 0476775 7320780	3	0.014	3.5	10.5	0.13	0.441	04-Sep-96	12W 0476775 7320780	3.5	5	7.0
Carat Lake	PL1-2	30-Jul-96	12W 0476300 7320852	3	0.014	5.5	7.0[1]	0.13	0.294	24-Jul-96	12W 0476636 7320804	7	5	14.0
		04-Sep-96	12W 0478017 7320765	3	0.014	3.5	10.5	0.13	0.441	04-Sep-96	12W 0478017 7320765	3.5	5	7.0
Jericho Lake	PL2	30-Jul-96	12W 0477614 7323497	3	0.014	5.4	11.0	0.13	0.462	22-Jul-96	12W 0477614 7323497	4.5	5	9.0
		04-Sep-96	12W 0477539 7323695	3	0.014	4.0	12.0	0.13	0.504	04-Sep-96	12W 0477539 7323695	4	5	8.0
Lake O1	PL4	31-Jul-96	12W 0478773 7311793	3	0.014	6.0	8.0[1]	0.13	0.336	31-Jul-96	12W 0478773 7321179	6	5	8.5[1]
		06-Sep-96	12W 0478773 7321179	3	0.014	3.5	10.5	0.13	0.441	06-Sep-96	12W 0478773 7321179	3.5	5	7.0
Lake D4	PL5	03-Aug-96	12W 0478714 7319095	3	0.014	5.1	10.0	0.13	0.420	27-Jul-96	12W 0480051 7319032	6	5	12.0
		03-Sep-96	12W 0480171 7319102	3	0.014	3.8	16.0	0.13	0.672	03-Sep-96	12W 0480171 7319102	3.8	5	8.0
Lake D5	PL6	31-Jul-96	12W 0480048 7318619	3	0.014	5.7	9.5[1]	0.13	0.399	26-Jul-96	12W 0478758 7318735	5.8	5	11.0[1]
		09-Sep-96	12W 0478713 7318683	3	0.014	3.0	9.0	0.13	0.378	09-Sep-96	12W 0478713 7318683	3	5	6.0
Contwoyto Lake	PL7	03-Aug-96	12W 0481757 7318682	3	0.014	9.3	13.0[1]	0.13	0.546	28-Jul-96	12W 0481757 7318682	10	5	15.0[1]
		06-Sep-96	12W 0481757 7318682	3	0.014	9.0	13.0[1]	0.13	0.546	06-Sep-96	12W 0481757 7318682	9	5	13.0[1]

[1] Haul depths 1.0 m off bottom.
[2] nd = no data.

Appendix C2 Density and biovolume of phytoplankton collected from sampled during summer and fall, Jericho study area, 1996.

Density (No. /mL)

Taxonomic Group	Carat Lake Site PL1-1 Summer	Carat Lake Site PL1-1 Fall	Carat Lake Site PL1-2 Summer	Carat Lake Site PL1-2 Fall	Jericho Lake Site PL2 Summer	Jericho Lake Site PL2 Fall	Lake LO1 Site PL4 Summer	Lake LO1 Site PL4 Fall	Lake LD4 Site PL5 Summer	Lake LD4 Site PL5 Fall	Lake LD5 Site PL6 Summer	Lake LD5 Site PL6 Fall	Contwoyto Lake Site PL7 Summer	Contwoyto Lake Site PL7 Fall
BACILLARIOPHYTA (Diatoms)														
Achnanthes detha						P		P						P
Achnanthes flexella				P		P		P						P
Achnanthes lanceolata							P					P		
Achnanthes minutissima		P	24	P	2	P	2	P	5	P	3	3	2	
Achnanthes minutissima v.cryptocepala	P	P			P	P	P	P		P	P	P	P	P
Amphora ovalis	P								P		P			
Amphora sp.														P
Anomoeoneis sphaerophora v.guntherii		P		P				3		2				
Asterionella formosa		P												
Cocconeis pediculus	P						P							
Cocconeis placentula v.euglypta						P								P
Cocconeis sp.	P									P				
Coscinodiscus denarius										P				
Cyclotella comta	2	10	P	P	8	11	7	2	9	2	P	P	P	2
Cyclotella glomerata	P	P	9	164	P	230	P	175	76			P		129
Cyclotella meneghiniana							P						P	
Cyclotella ocellata	37	258	P	37	P	38		9	P	186	24	924	212	7
Cymbella lunata					P									
Cymbella minuta		P		P	P	P	P	P	P			P	P	P
Cymbella sp.	P									P	P			
Diploneis marginestriata							P							
Diploneis sp.												P		
Eunotia arcus		P					P					P		
Eunotia arcus v.bidens										P				
Eunotia glacialis		P										P		P
Eunotia naegelii				P				P						P
Eunotia perpusilla														P
Eunotia serra v.diadema		P								P				
Eunotia sp.			P	P		P		12	P	P		7		
Fragilaria arcus									P					
Fragilaria brevistriata														P
Fragilaria pinnata									P					P
Fragilaria sp.	P				P		P		P					
Frustulia rhomboides v.amphipleuroides									P					
Frustulia vulgaris		P		P				P		P		P		
Gomphonema angustatum					P									
Gomphonema gracile		P	P	P	P		P	P	P		P	P	P	
Gomphonema olivaceum					P				P			P		
Gomphonema parvulum		P						P				P	P	
Gomphonema sp.	P													
Gyrosigma sp.												P		
Melosira islandica			P	P	P				P	P		P	P	P
Melosira italica	P	41	P	P	P			P	P	P			P	
Melosira sp.						P	P							
Melosira varians					P									
Navicula cryptocephala				P		P		P		P				
Navicula pupula							P		P					
Navicula radiosa						P								
Navicula tripunctata	P					P		P	P	P		P		2
Navicula viridula					P									
Nedium sp.												P		
Nitzschia amphibia												P		P
Nitzschia angustata												P	P	P
Nitzschia filiformis						P						P		
Nitzschia fonticola		P				P								P
Nitzschia obtusa		P		6			P							
Nitzschia palea								P		P	P	P		
Nitzschia sigmoidea												P		
Nitzschia sp.	P		P		P		P		P		P		P	
Pinnularia brauniiv. amphicephala				P				P						
Pinnularia microstauron								P						
Pinnularia sp.						P	P		P			P	P	
Rhizosolenia longiseta				P		16			22	24			6,778	5
Stauroneis anceps	P							P				P		
Stauroneis phoenicenteron							P							
Stauroneis sp.													P	
Surirella sp.						P		P						
Synedra acus					P									
Synedra sp.	4	3	5	17	7	12	11	13	19	8	1	7	P	
Synedra ulna					P									
Tabellaria fenestrata				P		P		P						P
Tabellaria floculosa	P	P	2	49	4	6	P	13	P	4	P	3	P	P
Total Bacillariophyta	43	313	40	273	21	312	20	227	151	227	28	945	6,992	145

Biovolume (µm³/m³)

Taxonomic Group	Carat Lake Site PL1-1 Summer	Carat Lake Site PL1-1 Fall	Carat Lake Site PL1-2 Summer	Carat Lake Site PL1-2 Fall	Jericho Lake Site PL2 Summer	Jericho Lake Site PL2 Fall	Lake LO1 Site PL4 Summer	Lake LO1 Site PL4 Fall	Lake LD4 Site PL5 Summer	Lake LD4 Site PL5 Fall	Lake LD5 Site PL6 Summer	Lake LD5 Site PL6 Fall	Contwoyto Lake Site PL7 Summer	Contwoyto Lake Site PL7 Fall
BACILLARIOPHYTA (Diatoms)														
Achnanthes detha						P		P						P
Achnanthes flexella				P		P		P						P
Achnanthes lanceolata							P					P		
Achnanthes minutissima		P	5,222	P	461	P	496	P	977	P	724	2,026	563	
Achnanthes minutissima v.cryptocepala	P	P			P	P	P	P		P	P	P	P	P
Amphora ovalis	P								P		P			
Amphora sp.														P
Anomoeoneis sphaerophora v.guntherii		P		P				1,204		860				
Asterionella formosa		P												
Cocconeis pediculus	P						P							
Cocconeis placentula v.euglypta						P								P
Cocconeis sp.	P									P				
Coscinodiscus denarius										P				
Cyclotella comta	6,819	40,051	P	P	11,149	34,097	24,290	13,621	36,800	8,980	P	P	P	14,412
Cyclotella glomerata	P	P	3,349	14,359	P	53,700	P	38,230	22,882			P		14,261
Cyclotella meneghiniana							P						P	
Cyclotella ocellata	11,292	44,206	P	15,389	P	15,398		3,841	P	28,741	4,162	100,532	40,847	2,724
Cymbella lunata					P									
Cymbella minuta		P		P	P	P	P	P	P			P	P	P
Cymbella sp.	P									P	P			
Diploneis marginestriata							P							
Diploneis sp.												P		
Eunotia arcus		P					P					P		
Eunotia arcus v.bidens										P				
Eunotia glacialis		P										P		P
Eunotia naegelii				P				P						P
Eunotia perpusilla														P
Eunotia serra v.diadema		P								P				
Eunotia sp.			P	P		P		10,657	P	P		1,590		
Fragilaria arcus									P					
Fragilaria brevistriata														P
Fragilaria pinnata									P					P
Fragilaria sp.	P				P		P		P					
Frustulia rhomboides v.amphipleuroides									P					
Frustulia vulgaris		P		P				P		P		P		
Gomphonema angustatum					P									
Gomphonema gracile		P	P	P	P		P	P	P		P	P	P	
Gomphonema olivaceum					P				P			P		
Gomphonema parvulum		P						P				P	P	
Gomphonema sp.	P													
Gyrosigma sp.												P		
Melosira islandica			P	P	P				P	P		P	P	P
Melosira italica	P	31,701	P	P	P			P	P	P			P	
Melosira sp.						P	P							
Melosira varians					P									
Navicula cryptocephala				P		P		P		P				
Navicula pupula							P		P					
Navicula radiosa						P								
Navicula tripunctata	P					P		P	P	P		P		2,331
Navicula viridula					P									
Nedium sp.												P		
Nitzschia amphibia												P		P
Nitzschia angustata												P	P	P
Nitzschia filiformis						P						P		
Nitzschia fonticola		P				P								P
Nitzschia obtusa		P		13,881			P							
Nitzschia palea								P		P	P	P		
Nitzschia sigmoidea												P		
Nitzschia sp.	P		P		P		P		P		P		P	
Pinnularia brauniiv. amphicephala				P				P						
Pinnularia microstauron								P						
Pinnularia sp.						P	P		P			P	P	
Rhizosolenia longiseta				P		13,268			33,028	57,021			6,778	11,289
Stauroneis anceps	P							P				P		
Stauroneis phoenicenteron							P							
Stauroneis sp.													P	
Surirella sp.						P		P						
Synedra acus					P									
Synedra sp.	1,779	1,462	2,448	7,592	4,553	4,879	2,128	4,386	12,107	3,142	377	3,345	P	
Synedra ulna					P									
Tabellaria fenestrata				P		P		P						P
Tabellaria floculosa	P	P	3,376	54,429	6,057	5,987	P	19,586	P	5,768	P	4,438	P	P
Total Bacillariophyta	19,890	117,420	14,395	106,660	22,220	127,329	26,914	91,525	105,794	104,512	5,263	111,931	48,188	45,017

Appendix C2 Continued.

Density (No. /mL)

Taxonomic Group	Carat Lake				Jericho Lake		Lake LO1		Lake LD4		Lake LD5		Contwoyto Lake	
	Site PL1-1		Site PL1-2		Site PL2		Site PL4		Site PL5		Site PL6		Site PL7	
	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
CRYPTOPHYTA (Cryptomonads)														
Cryptomonas curvata	P	P		P		P	P		P	4		3	P	2
Cryptomonas erosa		P		P		P	P	P			P			
Cryptomonas ovata	P	3	1	2		P	P	6	7	2	P	2	P	
Cryptomonas reflexa	9	10	18	7	P	12	7	P	11	4	12	20	1	2
Cyanomonas sp.		P		3		P								P
Katablepharis ovalis	48	24	45	37	2	15	29	47	26	4	P	3	81	16
Rhodomonas lens		7		26		69		3		15		10	42	25
Rhodomonas minuta	24	21	40	50			100	16	7	29	20	31	9	
Sennia sp.									P					
Total Cryptophyta	81	66	104	125	2	98	136	72	51	59	32	69	133	45
CHRYSOPHYTA (Golden-Brown Algae)														
Bitrichia longispina	12	3	6	10	2	6	7	9	11	9	24	7	2	7
Botrycoccus protuberans						48								
Chromulina sp.		7		20		3		7		74		23		4
Chrysochromulina parva	61	55	17	63		15	136	75	51	38	68	51	55	11
Chrysococcus sp.		138		174		443		291		99		23		176
Chrysoikos skujai	3		1	3	P	3					1	7	7	
Chrysosphaerella rodhei		133		198		283		396		47		142	352	146
Chrysostephanosphaera globulifera	P	10		13		14	5	63	P	P	1	13	5	4
Dinobryon divergens					33			P				P		
Dinobryon sertularia						18								9
Dinobryon sertularia v.protuberans	15	17	4	42	8	16	14	6		12	P	P		4
Dinobryon sociale	48	76	38	46	20	81	117	226	51	16	24	6	14	9
Ishtmochloron trispinatum	2	3	P		1	3		P	P				P	P
Kephyrion boreale	14	34	10	67	8	57	7	31	13	40	24	33	57	44
Mallomonas sp.	5	P	5		1	P	9	P	7	7	1	P	P	P
Ochromonas spa	86	21	132	33	63	27	572	38	46	44	231	3	7	13
Ochromonas spb.	9	7	11	17		6	5	3		4		3	19	7
Ochromonas stellaris		P						P					P	
Ophiocytium sp.			P										P	
Pseudokephyrion sp.		P		3		24				4			5	2
Stichogloea doederleinii	128	3	82	13	100	66	93	9	16	25	34	3		67
Unidentified statospore	2	P		10	2	15	7	16	2	4	3	P	7	2
Total Chrysophyta	385	508	306	713	238	1,130	972	1,172	197	423	411	314	530	506
PYRROPHYTA (Dinoflagellates)														
Glenodinium sp.	10	10	7	20	2	30	43	21	7	7	8	10	37	13
Gymnodinium sp.		10	1	3		P		3	7	P				
Gymnodinium uberrimum	2		3	3		P	5	P	5	P	1		6	2
Peridinium sp.					P	P	P	P	2		1		P	
Unidentified cyst						3			P				P	2
Total Pyrrophyta	12	21	11	27	2	33	48	24	21	7	10	10	43	18
EUGELNOPHYTA														
Phacus sp.				2										
Trachelomonas sp.						P		P		P			5	P
Total Euglenophyta	0	0	0	2	0	0	0	0	0	0	0	0	5	0
CHLOROPHYTA (Green Algae)														
Ankistrodesmus convolutus	5	P	5	23	3	27		P	39	54	7	17	P	4
Ankistrodesmus falcatus	2	29	7	3	23	18	2	8	49	45	P		11	2
Arthrodesmustri angularis	P	P	2	3	3	P	P	5		P	P		5	P
Carteria sp.							P			P				
Chlamydomonas sp	5	P	P	P	P		21			16				
Chlamydomonas frigida		14	5	10	2	12	29	31	11		1	33	68	24
Closterium sp.										P				
Coelastrum cambricum		P												
Coelastrum microporum				P									P	
Cosmarium sp.	2	17		13	7	18	7	16	5	P	1	3	P	
Cosmarium sp.		P	4	3		P				P	1			
Cosmarium sp.				P		3								
Crucigenia fenestrata	163		87	P	79	P			204		P		135	
Crucigenia rectangularis						P								
Crucigenia tetrapedia		62		13		12								P
Dictyosphaerium ehrenbergianum		21		13	4	21	77	53	96					9
Elakatothrix gelatinosa	22	31	20	2	8	15	29	43	21	27	48	26	7	69
Euastrum binale						P								
Euastrum sp.	P		P	3										P
Monoraphidium sp.	64	182	72	140	68	146	141	156	11	23	3	7	P	4
Mougeotia sp.	P	P	P	3	2		8	P	2	P				P
Nephrocytium limneticum	3	7	4		P	12	44	3		9	7			9
Oocystis sp	103	31	14	21	7	87	50	44	138	27	54	P	26	40
Quadrigula closterioides		76			P		56	28	P	P	5			
Scenedesmus bijuga			6						5					
Scenedesmus ecornis														
Schroederia setigera												3		
Selenastrum minutum	3		4	10		9			7		14			
Sphaerocystis schroeteri	83	34	7	27	12	60	167	63	28	18	17	20	354	94
Staurastrum paradoxum													P	P
Staurastrum sp.								P		P				
Tetraedron minimum											1		P	
Tetraedron muticum					1						P			2
Tetrastrum arthrodesmiforme	12	17	7	17	7	30	14	6	18	11	24	P	2	22
Unidentified filament												17		
Total Chlorophyta	467	521	244	305	226	472	645	456	634	230	183	125	608	280

Biovolume (µm³/m³)

Taxonomic Group	Carat Lake				Jericho Lake		Lake LO1		Lake LD4		Lake LD5		Contwoyto Lake	
	Site PL1-1		Site PL1-2		Site PL2		Site PL4		Site PL5		Site PL6		Site PL7	
	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
CRYPTOPHYTA (Cryptomonads)														
Cryptomonas curvata	P	P		P		P	P		P	13,845		8,005	P	7
Cryptomonas erosa		P		P		P	P	P			P			
Cryptomonas ovata	P	5,073	2,092	5,296		P	P	17,947	18,152	3,578	P	2,431	P	
Cryptomonas reflexa	7,675	11,218	16,047	6,576	P	10,430	3,545	P	9,284	3,622	10,031	16,827	720	3,848
Cyanomonas sp.		P		659		P								P
Katablepharis ovalis	5,269	2,723	4,923	3,761	233	1,959	3,221	7,198	2,839	634	P	359	10,768	1,898
Rhodomonas lens		1,440		5,518		15,216		593		3,228		2,264	10,401	7,481
Rhodomonas minuta	5,045	4,034	9,300	11,951			10,810	2,653	1,079	5,559	3,195	5,666	1,486	
Sennia sp.									P					
Total Cryptophyta	17,989	24,488	32,362	33,761	233	27,605	17,576	28,391	31,354	30,488	13,226	35,552	23,375	13,234
CHRYSOPHYTA (Golden-Brown Algae)														
Bitrichia longispina	1,137	348	556	1,013	193	651	689	1,229	1,347	1,475	2,477	778	376	869
Botrycoccus protuberans						8,008								
Chromulina sp.		1,990		4,653		879		2,293		24,272		7,054		584
Chrysochromulina parva	2,743	3,490	757	4,025		1,124	6,087	3,369	2,262	1,221	3,047	2,426	5,686	837
Chrysococcus sp.		8,998		9,747		21,589		37,704		7,296		1,208		8,642
Chrysoikos skujai	1,129		401	1,108	P	1,000					387	2,817	2,363	
Chrysosphaerella rodhei		38,634		66,511		111,724		116,033		16,857		30,764	107,083	31,956
Chrysostephanosphaera globulifera	P	3,151		2,632		2,974	1,128	13,730	P	P	1,242	3,358	1,153	1,016
Dinobryon divergens					46,387			P				P		
Dinobryon sertularia						15,113								9,553
Dinobryon sertularia v.protuberans	30,415	32,099	5,589	47,250	13,514	23,309	20,241	12,914		13,225	P	P		9,492
Dinobryon sociale	48,016	101,016	45,960	55,608	21,823	102,843	146,031	369,834	44,080	22,971	21,179	8,139	14,966	13,107
Ishtmochloron trispinatum	461	1,647	P		294	700		P	P				P	P
Kephyrion boreale	5,255	23,253	4,897	43,018	3,490	42,240	2,693	17,640	7,304	30,920	10,930	16,445	23,181	17,936
Mallomonas sp.	4,943		7,989		2,181		12,048		13,874		2,034		P	
Ochromonas spa	22,001	9,045	50,058	40,579	20,086	33,030	150,662	45,126	22,964	13,650	66,579	1,445	9,276	14,626
Ochromonas spb.	2,124	1,250	2,727	3,736		1,260	1,161	38,312		1,159		868	20,292	1,230
Ochromonas stellaris		P						P					P	
Ophiocytium sp.		P	P			P		P		8,127		P	P	P
Pseudokephyrion sp.		P		951		8,032				1,200			1,276	599
Stichogloea doederleinii	28,424	837	23,789	4,105	30,784	14,734	23,641	2,173	5,169	4,939	9,634	939		14,764
Unidentified statospore	1,172	P		7,001	1,384	16,289	3,757	16,798	1,208	4,638	1,786	P	3,741	1,613
Total Chrysophyta	147,820	225,758	142,723	291,837	140,136	405,499	368,138	677,156	98,208	151,950	119,295	76,241	189,393	126,824
PYRROPHYTA (Dinoflagellates)														
Glenodinium sp.	5,843	4,159	4,040	11,082	3,684	17,145	32,562	8,548	2,314	3,799	5,729	5,359	28,308	7,815
Gymnodinium sp.		38	2,857	12,359		P		11,597	14,376	P				
Gymnodinium uberrimum	14,404		30,466	68,806		P	121,686	P	44,475	P	15,255		28,473	11,340
Peridinium sp.					P	P	P	P	7,725		3,530		P	
Unidentified cyst						11,870			P				P	43,210
Total Pyrrophyta	20,247	4,197	37,363	92,247	3,684	29,015	154,248	20,145	68,890	3,799	24,514	5,359	56,781	62,365
EUGELNOPHYTA														
Phacus sp.				5,262										
Trachelomonas sp.						P		P		P			9,949	P
Total Euglenophyta	0	0	0	5,262	0	0	0	0	0	0	0	0	9,949	0
CHLOROPHYTA (Green Algae)														
Ankistrodesmus convolutus	64	P	33	269	49	290		P	504	633	69	166	P	72
Ankistrodesmus falcatus	43	1,059	175	151	1,100	651	82	392	1,967	1,216	P		775	111
Arthrodesmustri angularis	P	P	1,092	3,783	2,047	P	P	7,487		P	P		18,704	P
Carteria sp.							P			P				
Chlamydomonas sp	2,404	P	P	P	P		5,313			5,023				
Chlamydomonas frigida		1,840	1,342	826	230	690	1,056	5,316	2,804		126	2,398	16,715	4,147
Closterium sp.										P				
Coelastrum cambricum		P												
Coelastrum microporum				P									P	
Cosmarium sp.	737	9,953		2,992	3,306	6,569	3,507	5,675	4,561	P	318	1,908	P	
Cosmarium sp.		P	1,417	4,222		P				P	12,061			
Cosmarium sp.				P		48,668								
Crucigenia fenestrata	2,748		1,430	P	2,084	P			3,326		P		3,029	
Crucigenia rectangularis						P								
Crucigenia tetrapedia		1,863		140		434								P
Dictyosphaerium ehrenbergianum		714		462	227	1,537	3,998	2,128	5,052					160
Elakatothrix gelatinosa	515	838	334	55	260	561	403	1,386	328	920	839	702	333	1,365
Euastrum binale						P								
Euastrum sp.	P		P	14,392										P
Monoraphidium sp.	1,214	4,740	2,216	12,883	928	4,172	2,170	5,107	156	753	40	114	P	130
Mougeotia sp.	P	P	P	189	882		7,755	P	1,310	P				P
Nephrocytium limneticum	66	221	70		P	387	5,920	101		1,970	132			286
Oocystis sp	30,866	13,568	7,473	532	3,277	33,046	7,811	19,722	21,490	14,694	7,816	P	8,565	15,606
Quadrigula closterioides		4,030			P		1,877	2,093	P	P	366			
Scenedesmus bijuga			62						47					
Scenedesmus ecornis														
Schroederia setigera												189		
Selenastrum minutum	12		12	439		396			23		46			
Sphaerocystis schroeteri	25,552	12,600	6,202	9,679	10,435	16,584	21,984	15,347	6,251	6,623	2,881	1,823	255,081	11,344
Staurastrum paradoxum													P	P
Staurastrum sp.								P		P				
Tetraedron minimum											69		P	
Tetraedron muticum					318						P			291
Tetrastrum arthrodesmiforme	406	482	165	389	164	390	3,055	205	384	215	530	P	50	727
Unidentified filament												4,223		
Total Chlorophyta	64,627	51,908	22,023	51,403	25,307	114,375	64,931	64,959	48,203	32,047	25,293	11,523	303,252	34,239

Appendix C2 Concluded.

Taxonomic Group	Density (No. /mL)													
	Carat Lake				Jericho Lake		Lake LO1		Lake LD4		Lake LD5		Contwoyto Lake	
	Site PL1-1		Site PL1-2		Site PL2		Site PL4		Site PL5		Site PL6		Site PL7	
	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
CYANOPHYTA (Cyanobacteria)														
Anabaena sp.			22	P		113	16			P	6	P		
Aphanizomenon flos-aquae			21		112				P		P			
Aphanocapsa elachista	1,177	1,608	301	1,523	689	1,981	4,455	3,017	2,238	127	1,823	73	866	329
Aphanocapsa pulchra		115	P	P	128	235	646	P	179	58		P		
Aphanothece clathrata	5,623	4,187	2,684	5,488	2,469	6,519	10,334	12,183	7,554	3,566	5,200	40	719	609
Chroococcus limneticus		P	P	200		181		P	P				P	
Chroococcus turgidus		P		P				6						
Dactylococcopsis linearis		P	P		P	P	42	9	18	9			2	
Gomphosphaeria aponina								P						
Gomphosphaeria lacustris		138		227		190		P		161				
Gomphosphaeria naegelianum	548	P	68		257	24	65		1,203	P				P
Lyngbya limnetica	209	1,298	307	985	49	507	395	379	232	385	P	63		
Merismopedia glauca	41	331	29		143		129	88	P	166		73		
Merismopedia tenuissima	1,177		214	615	P	353	200				34		24	P
Microcystis flos-aquae		P		P				P						
Oscillatoria limnetica	48	P				24				34	23			
Oscillatoria sp.						P								
Phormidium sp.									P		P		515	
Pseudanabaena sp.								22		11				
Radiocystis geminuta	37		P				P			P			P	
Stigonema aerugineum				P		P		P						40
Total Cyanophyta	8,860	7,676	3,646	9,038	3,847	10,126	16,262	15,705	11,424	4,518	7,066	248	2,126	978
Total Algal Density per Sample (No./mL)	9,848	9,105	4,351	10,483	4,336	12,170	18,103	17,655	12,458	5,463	7,750	1,711	10,437	1,971
Total Algal Biovolum per Sample ($\mu m^3/m^3$)														
Total Number of Taxa per Sample (no./mL)	58	75	59	77	60	84	64	80	66	73	54	65	62	67

Taxonomic Group	Biovolume ($\mu m^3/m^3$)													
	Carat Lake				Jericho Lake		Lake LO1		Lake LD4		Lake LD5		Contwoyto Lake	
	Site PL1-1		Site PL1-2		Site PL2		Site PL4		Site PL5		Site PL6		Site PL7	
	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
CYANOPHYTA (Cyanobacteria)														
Anabaena sp.			1,351	P		6,193	1,011			P	362	P		
Aphanizomenon flos-aquae			3,477		15,061				P		P			
Aphanocapsa elachista	4,037	1,986	484	2,802	1,254	3,546	4,322	5,159	5,998	2,430	2,789	111	519	812
Aphanocapsa pulchra		1,884	P	P	2,638	1,794	5,964	P	2,245	759		P		
Aphanothece clathrata	3,430	5,031	1,557	3,402	3,186	4,368	6,407	9,015	4,155	2,340	2,756	34	1,733	335
Chroococcus limneticus		P	P	1,645		3,157		P	P				P	
Chroococcus turgidus		P		P				431						
Dactylococcopsis linearis		P	P		P	P	1,471	375	2,163	180			126	
Gomphosphaeria aponina								P						
Gomphosphaeria lacustris		1,453		2,589		2,437		P		1,379				
Gomphosphaeria naegelianum	8,073	P	1,623		2,519	289	392		20,929	P				P
Lyngbya limnetica	1,609	9,045	1,865	2,987	178	3,263	5,085	1,950	1,783	2,283	P	372		
Merismopedia glauca	138	1,078	69		421		409	362	P	847		223		
Merismopedia tenuissima	31		327	2,108	P	1,475	368				150		36	P
Microcystis flos-aquae		P		P				P						
Oscillatoria limnetica	645	P				453				631	142			
Oscillatoria sp.						P								
Phormidium sp.									P		P		515	
Pseudanabaena sp.								788		267				
Radiocystis geminuta	383		P				P			P			P	
Stigonema aerugineum				P		P		P						29,411
Total Cyanophyta	18,346	20,477	10,753	15,533	25,257	26,975	26,429	18,080	37,273	11,116	6,189	740	2,929	30,558
Total Algal Density per Sample (No./mL)														
Total Algal Biovolum per Sample ($\mu m^3/m^3$)	288,919	444,248	259,619	595,793	216,837	730,798	657,236	900,255	389,722	333,890	193,790	241,346	633,867	312,237
Total Number of Taxa per Sample (no./mL)														

Appendix C3 Density and biomass of zooplankton collected from sampled lakes during summer and fall, Jericho study area, 1996.

Taxonomic Group	Density (No./m³)													
	Carat Lake				Jericho Lake		Lake LO1		Lake LD4		Lake LD5		Contwoyto Lake	
	Site PL1-1		Site PL1-2		Site PL2		Site PL4		Site PL5		Site PL6		Site PL7	
	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
CALANOIDA														
Epischura sp.									178					
Heterocope sp.	243	25	76	14		41	157	123		45	148	31		
Leptodiaptomus sicilis	1,456	527	609	1,320	221	1,603	1,337	6,698	4,003	2,125	2,878	4,011	1,625	4,021
Calanoid copepodid	61				55							171	102	560
Calanoid nauplii		61		3								342		
Total Calanoida	1,760	613	685	1,337	276	1,644	1,494	6,821	4,181	2,170	3,026	4,555	1,727	4,581
CYCLOPOIDA														
Acanthocyclops vernalis							157							
Dicyclops bicuspidatus	1,760	1,631	152	3,832	166	82		658	712	90	295	5,037	2,031	9,553
Cyclopoid copepodid		184		258	166							3,793	102	3,826
Cyclopoid nauplii		13,595		14,064					306		172	5,255		11,478
Total Cyclopoida	1,760	15,410	152	18,154	332	82	157	658	1,018	90	467	14,085	2,133	24,857
CLADOCERA														
Alonella sp.														17
Bosmina longirostris									89		74	78	1,066	2,997
Daphnia longiremis	121							82			148	202		1,145
Daphnia middendorffiana			76	14	55		157	41	89	136			51	244
Holopedium gibberum	1,335		2,437	29		123	315					31		
Total Cladocera	1,456		2,513	43	55	123	472	123	178	136	222	311	1,117	4,403
ROTIFERA														
Asplanchnopus sp.					89									
Cephalobdella gibba														24
Conochilus unicornis	26,824	1,396	3,136	3,443	1,336	1,393	16,444		16,391	2,938	40,296	373	169	1,535
Kellicottia longispina		4,042		3,035		267		29,617		2,938	172	435	169	2,827
Keratella cochlearis		8,745	660	7,003	89		926	1,362	460	326	172	808		1,438
Keratella quadrata														49
Lecane luna				58								62		
Philodina sp.		882										31		
Polyarthra dolichoptera	735		495	350	890		926		919		517	497	169	1,413
Pompholyx sulcata					178							466		
Total Rotifera	27,559	15,065	4,291	13,889	2,582	1,660	18,296	30,979	17,770	6,202	41,157	2,672	507	7,286
Total Density and Biomass	32,535	31,088	7,641	33,423	3,245	3,509	20,419	38,581	23,147	8,598	44,872	21,623	5,484	41,127

Taxonomic Group	Biomass (µg/m³)													
	Carat Lake				Jericho Lake		Lake LO1		Lake LD4		Lake LD5		Contwoyto Lake	
	Site PL1-1		Site PL1-2		Site PL2		Site PL4		Site PL5		Site PL6		Site PL7	
	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall	Summer	Fall
CALANOIDA														
Epischura sp.									2,752					
Heterocope sp.	22,122	2,236	8,164	1,538		4,405	16,861	13,214		4,845	15,821	3,333		
Leptodiaptomus sicilis	11,560	4,187	7,551	16,360	1,785	12,943	15,109	75,687	45,228	24,006	26,284	81,746	18,149	32,473
Calanoid copepodid	231				210							650	386	2,129
Calanoid nauplii		13		13								74		
Total Calanoida	33,913	6,436	15,715	17,911	1,995	17,348	31,970	88,901	47,980	28,851	42,105	85,803	18,535	34,602
CYCLOPOIDA														
Acanthocyclops vernalis														
Dicyclops bicuspidatus	20,788	19,272	1,800	47,389	2,051	1,017		8,132	8,473	1,077	3,487	62,298	27,423	118,149
Cyclopoid copepodid		233		327	210							489	128	489
Cyclopoid nauplii		1,674		2,593								647		2,116
Total Cyclopoida	20,788	21,179	1,800	50,309	2,261	1,017		8,132	8,473	1,077	3,487	63,434	27,551	120,754
CLADOCERA														
Alonella sp.														97
Bosmina longirostris									371		307	324	4,052	37,881
Daphnia longiremis	1,235							4,924			1,502	2,057		12,247
Daphnia middendorffiana			4,563	860	3,311		9,424	2,462	5,329	8,124			3,042	14,599
Holopedium gibberum	1,107,736		1,746,875	20,570		88,358	225,495					22,284		
Total Cladocera	1,108,971		1,751,438	21,430	3,311	88,358	234,919	7,386	5,700	8,124	1,809	24,665	7,094	64,824
ROTIFERA														
Asplanchnopus sp.														
Cephalobdella gibba														4
Conochilus unicornis	3,001	123	351	304	149	123	1,840		1,834	260	4,508	33	19	136
Kellicottia longispina		360	23	270		24		2,639		262	12	39	11	252
Keratella cochlearis		722		578	3		33	112	16	27	6	67		119
Keratella quadrata														
Lecane luna				138										
Philodina sp.		73										2		
Polyarthra dolichoptera	480		323	26	581		605		600		337	37	110	105
Pompholyx sulcata												1		
Total Rotifera	3,481	1,278	697	1,316	733	147	2,478	2,751	2,450	549	4,863	179	140	616
Total Density and Biomass	1,167,153	28,893	1,769,650	90,966	8,300	106,870	269,367	107,170	64,603	38,601	52,264	174,081	53,320	220,796

APPENDIX D
PERIPHYTON

Appendix D1 Summary of periphyton data collected from sampled streams, Jericho study area, 1996.

Stream	Site	Location	Date	Replicate No.	Area Sampled (cm^2)	Volume Sample Diluted to (mL)	Volume Filtered For Chlorophyll a Analysis (mL)	Volume Preserved For Periphyton Algal ID (mL)	Chlorophyll a Concentration ($\mu g/cm^2$)	Mean Chlorophyll a Concentration	AFDM mg/cm^2	Mean AFDM
C1	B1	12W 0478109 7319979	1 Aug 96	1	5	100	10	15	0.786	1.289±0.432	61.79	34.56±13.68
				2	5	100	10	15	0.933		20.32	
				3	5	100	8	15	2.150		21.58	
C15	B2	12W 0478057 7321511	4 Aug 96	1	5	100	7	15	0.000	0.007±0.006	9.37	28.29±15.983
				2	5	100	8	15	0.019		15.43	
				3	5	100	9	15	0.003		60.06	
O18	B3	12W 0479225 7322407	1 Aug 96	1	5	100	10	15	0.201	0.512±0.351	33.43	23.59±6.650
				2	5	100	10	15	1.213		26.42	
				3	5	100	6	15	0.122		10.92	
Jericho River	B4	12W 0480404 7325194	1 Aug 96	1	5	100	10	15	0.596	0.739±0.355	10.83	24.09±9.970
				2	5	100	10	15	0.209		43.62	
				3	5	100	6	15	1.414		17.83	

Appendix D2 Density of periphyton in streams in summer, Jericho study area, 1996.

Taxonomic Group	Stream TC1					Stream TC15					Stream TO18					Jericho River				
	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE
BACILLARIOPHYTA (Diatoms)																				
Achnanthes detha	P	P	P			P		P			P	P	P			P	P	P		
Achnanthes flexella	1752	864		872	506		3646		1215	1215	P	P	P			P	471	9216	3229	2997
Achnanthes lanceolata						P														
Achnanthes lanceolata v. dubia												P					P	P		
Achnanthes minutissima	95347	20734	47463	54515	21826	20399	178955	152264	117206	49013	10123	20248	12562	14311	3051	24943	123939	94900	81261	29380
Anomoeoneis sphaerophora v.guntherii			1554	518	518		8021	1961	3327	2414	P	5416	P	1805	1805			P		
A. minutissima v.cryptocephala			1554	518	518	P					P		914	305	305	P	P	P		
Caloneis sp.	P	P	P			P							P							
Cocconeis pediculus												P				164	P		55	55
Cocconeis placentula											P	P	P							
Cocconeis sp.						P														
Coscinodiscus denarius								P								P				
Cyclotella comta		3456	1554	1670	999	P	P	980	327	327	P	P	P			1556	P	P	519	519
Cyclotella glomerata						P												P		
Cyclotella keutzingiana																P				
Cyclotella meneghiniana											P									
Cyclotella ocellata			4667	1556	1556	223	2917	1961	1700	789	P	P	2741	914	914	P	2824	1993	1606	838
Cymbella cistula	P					P						P				P	P	P		
Cymbella gracilis	P					P	P	1961	654	654	P					1147	941	3238	1775	734
Cymbella hebridica																P				
Cymbella lunata	P		P			669	P		223	223	P	P	P			P	P			
Cymbella minuta		P	P			112	3646	P	1253	1197		P	P			P	1883	P	628	628
Diatoma vulgare												P					P			
Eunotia glacialis	143687	43195	124575	103819	30810	4443	35911	18139	19498	9109	29454	23281	10963	21233	5435	P				
Eunotia praerupta	2628	10937	5050	6205	2467	390	1458	5883	2577	1682	460	5803	P	2088	1862	328	1459	498	762	352
Eunotia praerupta v.bidens			P			P					P	P	914	305	305	627	P	P	209	209
Eunotia triodon	P	P	P				P	P			3221	P	P	1074	1074	P	P			
Eunotia vanheurckiiv. intermedia	P		P			P					P	P	P			328			109	109
Fragilaria brevistriata	P	P				P											P	P		
Fragilaria construens v.binodis							P	P												
Fragilaria crotonensis	P																			
Fragilaria intermedia							P	P												
Fragilaria pinnata						P	P	P								P				
Frustulia vulgaris	3504	P	12431	5312	3701	P	P	980	327	327	3221	1803	1827	2284	469	P	P	P		
Gomphonema angustatum		P				P		P			P	P	P							
Gomphonema gracile	29785	P	1554	10446	9680	5426	4557	10785	6923	1947	690	2576	1827	1698	548	655	34046	24873	19858	9960
Gomphonema parvulum							P	P								P				
Melosira ambigua	P	5183	6215	3799	1923	223	P	P	74	74						P	6589	P	2196	2196
Melosira islandica						P	P	P									P	P		
Melosira varians													P							
Meridion circulare												774		258	258	P		P		
Navicula cryptocephala			P													P				
Navicula tuscula			P			P						P				P	P	P		
Navicula zanoni	P	P																		
Nedium bisulcatum																328	941	8220	3163	2535
Nedium iridis v.amphigomphus						P	P	P					P				P	P		
Nedium sp.	3504	12095	17093	10897	3968	P	P	P												
Nitzschia amphibia							P	P			P	P				P		P		
Nitzschia angustata						P	P	P								P	P	P		
Nitzschia filiformis	P		P			P	P	P			P		P				P	4733	1578	1578
Nitzschia fonticola							P						P							
Nitzschia obtusa							P													
Nitzschia palea			P			P	P				P	P	2627	876	876		P	498	166	166
Nitzschia sigmoidea												P	P							
Pinnularia biceps			P																	
Pinnularia brauniiv. amphicephala						P														
Pinnularia dactylus																P				
Pinnularia microstauron																	P	P		
Pinnularia sp.	P	P	P			112	P	P	37	37						P	P			
Stauroneis acuta							P													
Stauroneis anceps						P	P				P	P				P		P		
Stauroneis sp.																P				
Surirella brightwellii						P		P												
Surirella sp.	P											P						P		
Synedra sp.	7005		3108	3371	2026	2050	4922	980	2651	1177	6520	17865	14773	13053	3386	1065	7530	2825	3807	1930
Tabellaria fenestrata	P	P					P					P	P			P				
Tabellaria flocculosa	278280	266378	246288	263649	9336	10319	27708	16668	18232	5080	63071	227826	130073	140323	47836	28302	42358	31758	34139	4229
Total Bacillariophyta	**565492**	**362842**	**473106**	**467147**	**58576**	**44366**	**271741**	**212562**	**176223**	**68106**	**116760**	**305592**	**179221**	**200524**	**55542**	**59443**	**222981**	**182752**	**155059**	**49198**

Appendix D2 Continued.

Taxonomic Group	Stream TC1					Stream TC15					Stream TO18					Jericho River				
	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE
CHLOROPHYTA (Green Algae)																				
Ankistrodesmus falcatus	8760	P	1554	3438	2699	P	729	P	243	243			913	304	304	P	P	P		
Bulbochaete sp.	P	3456	7769	3742	2247	2666	P		889	889	2991	10832	3198	5674	2580	P		P		
Closterium sp.	P											P	P					P		
Coeloastrum printzii		P					1458	P	486	486							P	P		
Cosmarium bioculatum	1752	1728	1554	1678	62	446	6562	980	2663	1956	2301	774	P	1025	676	1311	941	2491	1581	467
Cosmarium capitulum		1728		576	576	P						P								
Cosmarium holmiense	2628	P	P	876	876															
Cosmarium sp.	P	P				112	P	P	37	37	P	P	P			819	941	P	587	295
Cosmarium undulatum		1728	3108	1612	899	112	729		280	227	460	774	P	411	225	328	941	498	589	183
Cylindrocystis sp.	62216	43273	32243	45911	8752	809	1094	980	961	83	920	2224	914	1353	436	164	1883	1494	1180	520
Elakatothrix gelatinosa								980	327	327			457	152	152		941		314	314
Euastrum bidentatum	P	1728	388	705	523	P	P				P	P	P			164	941	1494	866	386
Euastrum dubium												774		258	258					
Euastrum gemmatum											P		P							
Golenkinka radiata						P	P	P												
Gonatozygon monotaenium	P	P	P													P				
Mougeotia sp.	26281	11231	2331	13281	6989	1962	2428	P	1463	744	4601	1161	9136	4966	2309		P	832	277	277
Oedogonium sp.											P	6577		2192	2192	1024			341	341
Oocystis gigas	150677	50971	23308	74985	38679	4128	25156	42136	23807	10993	5522	25533	14618	15224	5785		12237	10960	7732	3884
Oocystis solitaria							P	P												
Oocystis sp.	8760	10367	13985	11037	1545	1004	10208	1961	4391	2922	2301	10058	2741	5033	2516	2130	9413	6974	6172	2140
Scenedesmus acuminatus																		P		
Scenedesmus ecornis	7008			2336	2336	P						P	P			P	P	1993	664	664
Scenedesmus quadricauda							P													
Schroedaria sp.							1458		486	486										
Sphaerocystis schroeteri							3646		1215	1215	3869			1290	1290		57419	P	19140	19140
Staruastrum borgeanum	P	P																		
Staruastrum sp.											P	P	457	152	152		P	P		
Staurastrum apiculatum																328	2353	498	1060	649
Staurastrum brebissonii	P					112	P		37	37		P						498	166	166
Staurastrum hexacerum	7884	1728	P	3204	2393							774	4568	1781	1411	164	941		368	290
Staurastrum obliculare		P											P					P		
Staurastrum paradoxum						P												P		
Staurastrum paradoxum v. parvum							P	P			460	P	P	153	153		1883	498	794	563
Staurodesmus triangularis						P	P	P			115	P	P	38	38	328	P	P	109	109
Zygonema sp.	P	P	9323	3108	3108	335	P	324	220	110		P	P							
Total Chlorophyta	**275966**	**127938**	**95563**	**166489**	**55531**	**11686**	**53468**	**47361**	**37505**	**13029**	**23540**	**59481**	**37002**	**40008**	**10484**	**6760**	**90834**	**28230**	**41941**	**25220**
CHRYSOPHYTA (Golden-Brown Algae)																				
Dinobryon sociale		P																		
Dinobryon divergens													914	305	305					
Dinobryon sertularia v.protuberans	31537	62201	43384	45707	8928	1729	2917	P	1549	847	8398	774	1827	3666	2385	2416	5648	2389	3484	1082
Dinobryon sociale							P									P				
Isthmochloron trispinatum						P	1458	980	813	429		774		258	258	P	P			
Mischococcus sp.								11766	3922	3922										
Ophiocytium sp.						112	4193	P	1435	1379								P		
Pseudokephyrion angulosum			P				729	980	570	294	1841	774		872	534	491	941	498	643	149
Stichogloea doederleinii						223			74	74										
Unidentified statospore	33289	6911	4662	14954	9190	1897	4375	P	2091	1267	11043	18314	914	10090	5045	1147	2353	3238	2246	606
Total Chrysophyta	**64826**	**69112**	**48046**	**60661**	**6428**	**3961**	**13672**	**13726**	**10453**	**3246**	**21282**	**20636**	**3655**	**15191**	**5771**	**4054**	**8942**	**6125**	**6374**	**1417**

Appendix D2 Concluded.

Taxonomic Group	Stream TC1					Stream TC15					Stream TO18					Jericho River				
	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE	Rep. 1	Rep. 2	Rep. 3	Mean	SE
CRYPTOPHYTA (Cryptomonads)																				
Cryptomonas ovata								980	327	327								P		
Cryptomonas reflexa			P																	
Total Cryptophyta								**980**	**327**	**327**										
CYANOPHYTA (Cyanobacteria)																				
Agmenellum thermale		P	P			892	2911	3922	2575	891		P	7309	2436	2436					
Anabaena sp.																				
Anacystis montana																37517	106365		47961	31146
Anacystis thermalis																27687	52712	30886	37095	7863
Aphanizomenon flos-aquae											4141			1380	1380					
Aphanocapsa elachista			P			9817	266869		92229	87366		91299	P	30433	30433		P	P		
Aphanothece clathrata							26979		8993	8993		30949		10316	10316	5406		8967	4791	2607
Chroococcus dispersus	29785	12095	15539	19140	5415	3681	11666	27453	14267	6984	P	6190	14618	6936	4236		263562	45333	102965	81358
Chroococcus turgidus	3504	P	P	1168	1168	P	2917		972	972		17796	10964	9587	5183	819	6589	P	2469	2073
Dactylococcopsis sp.												4642		1547	1547	P	P	5978	1993	1993
Gomphosphaeria lacustris		13823		4608	4608		P					11606		3869	3869					
Gomphosphaeria naegelianum	56066	P		18689	18689	P	29166	305910	111692	97473						125821	849982	308860	428221	217399
Lyngbya limnetica	967139	584003	825105	792082	111828		65623	10785	25469	20317	43253	123022	7309	57861	34193	16711	81892	82197	60267	21778
Microcystis flos-aquae						P	115935		38645	38645			484207	161402	161402		190140	19926	70022	60334
Nostoc commune		P										42555	P	14185	14185			P		
Oscillatoria sp.		P	26416	8805	8805	P	97706	11766	36491	30796	P					P	P	P		
Phormidium sp.						10140	90415	189233	96596	51792		56482	89792	48758	26207					
Pseudanabaena sp.		22462	P	7487	7487	10264	78748	50915	46642	19885	2301	17796	4568	8222	4832	63074	182610	98138	114607	35476
Scytonema figuratum	21205		P	7068	7068	2009		6863	2957	2037		30949	2741	11230	9891	P		26403	8801	8801
Stigonema mamillosum	P		P			P														
Total Cyanophyta	**1077699**	**632383**	**867060**	**859047**	**128614**	**36803**	**788935**	**606847**	**477528**	**226545**	**49695**	**433286**	**621508**	**368163**	**168249**	**277035**	**1733852**	**626688**	**879192**	**439089**
EUGLENOPHYTA (Green Flagellates)																				
Trachelomonas sp.							P	980	327	327										
Total Euglenophyta								**980**	**327**	**327**										
PYRROPHYTA (Dinoflagellates)																				
Gymnodinium uberrimum												P	P							
Peridinium sp.							P	P				P	P					P		
Unidentified cyst			1554	518	518			980	327	327										
Total Pyrrophyta			**1554**	**518**	**518**			**980**	**327**	**327**										
Algal Density per Sample (No. cells/cm²)	**1983983**	**1192275**	**1485329**	**1553862**	**231101**	**96816**	**1127816**	**883436**	**702689**	**311042**	**211277**	**818995**	**841386**	**623886**	**206406**	**347292**	**2056609**	**843795**	**1082565**	**507674**
Total Number of Taxa per Sample	**49**	**49**	**53**	**50**	**1**	**69**	**73**	**60**	**67**	**4**	**48**	**69**	**63**	**60**	**6**	**66**	**64**	**73**	**68**	**3**

APPENDIX E
BENTHIC MACROINVERTEBRATES

Appendix E1 Summary of lake benthic macroinvertebrate data collected from sampled lakes during summer, Jericho study area, 1996.

Lake	Date	Site	UTM Coordinates	Sample Depth (m)	Substrate Composition
Carat	24 July 96	P1-1	12W 0478105 7320814	16.0	silt
	23 July 96	L1-1	12W 0478662 7320899	1.0	sand
Carat	24 July 96	P1-2	12W 0476636 7320804	19.5	silt
	24 July 96	L1-2	12W 0476494 7320546	1.3	silt/gravel
Jericho	22 July 96	P2	12W 0477519 7323600	15.5	silt
	22 July 96	L2	12W 0479087 7323575	1.6	sand/silt
LO1	31 July 96	P4	12W 0478773 73211793	9.5	silt
	31 July 96	L4	nd[1]	4.5	sand/silt
LD4	27 July 96	P5	12W 0480051 7319032	16.0	silt
	27 July 96	L5	12W 0479594 7318962	0.5	silt/gravel
LD5	26 July 96	P6	12W 0478758 7318735	12.0	silt
	26 July 96	L6	12W 0478809 7318684	1.5	silt
Contwoyto	28 July 96	P7	12W 0481757 7318682	16.0	silt
	28 July 96	L7	12W 0481676 7318549	0.4	silt/sand/organic matter

[1] nd = no data

Appendix E2. Macroinvertebrates collected from littoral and profundal zones of lakes during summer, Jericho study area, 1996.

Taxonomic Group	Carat Lake						Carat Lake						Jericho Lake						Lake O1					
	Site L1-1			Site P1-1			Site L1-2			Site P1-2			Site L2			Site P2			Site L4			Site P4		
	Replicate			Replicate			Replicate			Replicate			Replicate			Replicate			Replicate			Replicate		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
COELENTERATA																								
Hydridae																								
Hydra																								
ANNELIDA																								
OLIGOCHAETA															2									
Enchytraeidae	3		9			1	5		2					3	2		1							
Lumbriculidae								1	2				4		1		5		4	1	2		1	
Naididae		19						33	40															
Tubificidae			2			1			2					32		1	17							1
ARTHROPODA																								
HYDRACARINA		1		1					1				4	2	3	1							1	
CRUSTACEA																								
AMPHIPODA																								
Gammaridae																								
Gammarus																				5				
CLADOCERA																								
Chydoridae					1	2							4	5	5									
Daphnidae																								
Daphnia	43				1		2							3	4									
Holodedidae																								
Holopedium																								
Sididae																								
Diaphanosoma																		2						
COPEPODA																								
Calanoida	16	5	4		5	5	5		1		4	35	2	8			1	2	1				2	3
Cyclopoida	8		1	2	2		6		1			8		11	7	2	1	1		16	6			
Harpacticoida	4	3	66			2	6	1	6			1	8	22	6	2				3				
OSTRACODA																								
Species a													4	14		8	1			1	1		1	3
Species b													4	2	2				2	5	2			4
INSECTA																								
COLLEMBOLA																								
Isotomidae																								
Isotomurus																								
DIPTERA																								
Chironomidae			2																	1				
Chironomini									1			1												
Chironomus													5											
Corynocera														3										
Cryptochironomus																								
Dicrotendipes													4				4	2						
Microtendipes																								
Phaenospectra											1			60	1	40	19	39	31	62	12		5	4
Polypedilum																								
Diamesinae																								
Pseudodiamesa											1													
Orthocladiinae		1								2						1	4							
Abiskomyia																								
Corynoneura			1				1	1					10	7	4									
Eukiefferiella					3					2											1			
Heterotrissocladius		3		7		14			5	4	1		14	16	68	5	2	2	1	2	1			
Orthocladius/Cricotopus	16		2										1		4						1			
Paracladius																					1		1	
Parakiefferiella			16				9								4									
Psectrocladius									6	1			46	31	7	1			4	4				
Zalutschia																								
Tanypodinae																								
Ablabesmyia													2							1				
Procladius			1	1						1			6	36	24				9	13	17	7	6	10
Tanytarsini																								
Paratanytarsus		13				2		7	29		1		73	69	37	2	11		7	15	11	39	32	27
Rheotanytarsus														4										
Chironomidae Pupae		1		1		1		1	3				9	12	12	1		1						
Ceratopogonidae											1													
Simuliidae													1			1								
TRICHOPTERA																								
Limnephilidae																								
Grensia									1					1					1					
Brachycentridae																								
Brachycentrus																								
MICROTURBELLARIA			1						1				1	1						1				
Tricladida			1												4									
MOLLUSCA																								
PELECYPODA																								
Sphaeriidae																								
Sphaerium				9		3				2							4		23	41	17		9	7
Pisidium																			1		6	2	4	6
NEMATODA	24	7	33		2	1	61	14	113				77	48	40				8	73	2			1
Total Number of Animals	**114**	**53**	**139**	**21**	**14**	**32**	**95**	**68**	**214**	**12**	**9**	**45**	**279**	**390**	**237**	**65**	**70**	**49**	**92**	**244**	**80**	**48**	**62**	**66**
Total Number of Taxa	**7**	**7**	**12**	**5**	**6**	**9**	**8**	**6**	**14**	**5**	**6**	**4**	**19**	**21**	**18**	**10**	**11**	**6**	**12**	**15**	**14**	**3**	**10**	**10**

Appendix E2. Concluded.

Taxonomic Group	Lake D4						Lake D5						Contwoyto Lake					
	Site L5			Site P5			Site L6			Site P6			Site L7			Site P7		
	Replicate			Replicate			Replicate			Replicate			Replicate			Replicate		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
COELENTERATA																		
Hydridae																		
Hydra																	5	
ANNELIDA																		
OLIGOCHAETA																		
Enchytraeidae	8							1					48	8	4	6	5	
Lumbriculidae							3		3				8					
Naididae		7	29				5						208					1
Tubificidae		4	16	2			25	5	9	7		2	8		12	1		
ARTHROPODA																		
HYDRACARINA	16	7	5	2			5		2	2		1			5	6	3	
CRUSTACEA																		
AMPHIPODA																		
Gammaridae																		
Gammarus																		
CLADOCERA																		
Chydoridae		1	17				9		1					1			2	
Daphnidae																		
Daphnia				1												2	1	
Holodedidae																		
Holopedium					8													
Sididae																		
Diaphanosoma																		
COPEPODA				124	32													
Calanoida			4	2	72	7	21	55	7	10	68	3			8	3	3	
Cyclopoida	64		2	1	12		137	19	24	6	29			1	4	27	8	
Harpacticoida		2	1	4		15	5		1									
OSTRACODA																		
Species a	72	1	33	12	105	1	93	27	33	1	6	3	32			2		
Species b		9	27	1		1	120	28	59	3	1					5	3	
INSECTA																		
COLLEMBOLA																		
Isotomidae																		
Isotomurus					2													
DIPTERA																		
Chironomidae				1				1						1			1	
Chironomini		11				2												
Chironomus			2			2	9		3									
Corynocera																		
Cryptochironomus		2	1				3	4	2									
Dicrotendipes																		
Microtendipes					2													
Phaenospectra			37	11	7	21			4	12	3	47						1
Polypedilum						1												
Diamesinae							9	2										
Pseudodiamesa																		
Orthocladiinae																		
Abiskomyia																2		
Corynoneura							1		11				91		5	2		
Eukiefferiella		35					11		1				32	4	19	7	4	
Heterotrissocladius	72	131	89	6		6	29	30	38			2			27	8	21	10
Orthocladius/Cricotopus			18				6						35	1	6	8		
Paracladius							1		1	1		1				16		
Parakiefferiella			28										19		19	91	6	5
Psectrocladius			14				13	5	11				43					
Zalutschia																		
Tanypodinae																		
Ablabesmyia	16	3						1			1							1
Procladius	32	2	17	2	2	1	9	1	8	4	4	3			3	2	1	
Tanytarsini																		
Paratanytarsus	24	23	12	12	28	7	11	2	7				11		29	2	5	2
Rheotanytarsus		2					2											
Chironomidae Pupae		4	3	2	1	1		3	1	1		1	8	1	28	3	5	1
Ceratopogonidae																		
Simuliidae																		
TRICHOPTERA																		
Limnephilidae																		
Grensia		1	3		1				3						4			
Brachycentridae																		
Brachycentrus														1				
MICROTURBELLARIA		6	7			2												
Tricladida				3														
MOLLUSCA																		
PELECYPODA																		
Sphaeriidae											13							
Sphaerium	24	2	2	8	3	16	1		3	5		12				2	11	3
Pisidium			2				2	2	1			1						
NEMATODA		57	22	1	5		6	2	3			1	184	83	78	22	14	10
Total Number of Animals	**328**	**310**	**391**	**195**	**280**	**83**	**536**	**188**	**236**	**52**	**125**	**77**	**727**	**101**	**251**	**217**	**98**	**34**
Total Number of Taxa	**9**	**18**	**23**	**15**	**12**	**12**	**25**	**15**	**23**	**10**	**8**	**11**	**12**	**7**	**14**	**19**	**15**	**8**

Appendix E3 Summary of benthic macroinvertebrate data collected from streams, Jericho study area, 1996.

Stream	Site	UTM Coordinates	Date	Replicate No.	Water Depth (cm)	Water Velocity (m/sec)	Substrate Composition
C1	B1	12W 0478109 7319979	1 Aug 96	1	4	0.15	gravel/silt
				2	4	0.04	gravel/silt
				3	6	0.08	gravel/silt
C15	B2	12W 0478057 7321511	4 Aug 96	1	11	0	gravel/sand
				2	15	0	gravel/sand
				3	13	0	gravel/sand
O18	B3	12W 0479225 7322407	1 Aug 96	1	5	0.03	gravel/sand
				2	7	0.06	gravel/sand
				3	5	0.08	gravel/sand
Jericho River	B4	12W 0480404 7325194	1 Aug 96	1	18	0.02	gravel/silt
				2	23	0.06	gravel/silt
				3	19	0.03	gravel/silt

Appendix E4. Macroinvertebrates collected from streams during summer, Jericho study area, 1996.

Taxonomic Group	Stream C1, Site B1			Stream C15, Site B2			Stream O18, Site B3			Jericho River, Site B4		
	Replicate			Replicate			Replicate			Replicate		
	1	2	3	1	2	3	1	2	3	1	2	3
COELENTERATA												
Hydridae												
Hydra				33	32	71	28	8	14	2		2
ANNELIDA												
OLIGOCHAETA												
Enchytraeidae	1		1	2	3	2	96	18	4	5	1	1
Lumbriculidae				2	2	1	10	9	5	7		2
Naididae	20	16	122	54	23	75	73	41	81	25	8	5
Tubificidae				2	1	1	12	2	12	7	1	
ARTHROPODA												
HYDRACARINA			9				5	9	1	14	5	2
CRUSTACEA												
CLADOCERA												
Bosminidae										48		
Chydoridae				4	1		22	20	18	98	3	4
Daphnidae												
Daphnia						1	4	16		2		1
Holodedidae												
Holopedium										40		
CONCHOSTRACA										40		
COPEPODA												
Calanoida	1				2	2				162	1	3
Cyclopoida			16	4	3	4	2	8	6	16	4	3
Harpacticoida	2		8	2	2	4	4	4	4	8		
OSTRACODA												
Species a				3	3	11	92	188	66	30	13	10
Species b										2		
INSECTA												
COLEOPTERA												
Dytiscidae												
Oreodytes										3	2	1
DIPTERA			1									
Chironomidae						1						
Chironomini										2		
Chironomus										4	2	2
Dicrotendipes										11		3
Phaenospectra							10	10		5		
Diamesinae				5							9	
Orthocladiinae										2		
Abiskomyia		3	8							3		
Corynoneura				9	6	16	23	16	30	2	1	1
Eukiefferiella			1	2		2	4	12			9	2
Heterotrissocladius					5		9	5	20			
Orthocladius/Cricotopus							6	1		5		1
Psectrocladius	3					9	2		4		8	1
Zalutschia						1	2					
Tanypodinae												
Ablabesmyia				1	1		8	42	27	20	10	3
Tanytarsini												
Paratanytarsus				3			28	20	14	5	8	18
Empididae												
Clinocera			2					5				
Hemerodromia				2			2					
Simuliidae	7	3	9				3	2	1			1
Tipulidae						2						
Dicranota				4	4	6	1	4				
Tipula				7	5	14	39	43	23	3	2	3
Chironomidae Pupae				1		1	2		2			
PLECOPTERA								4		8		
Perlodidae												
Cultus				1	2	1						
Nemouridae							52	32	5			2
Nemoura							12	1			2	1
TRICHOPTERA						1						
Limnephilidae												
Grensia				1			9	16	11			
MICROTURBELLARIA						1	12	8				
Tricladida				1								
MOLLUSCA												
GASTROPODA												
Valvatidae												
Valvata										1		
NEMATODA	27	61	283	21	11	29	114	28	16	12	10	9
TARDIGRADA				1		2						
Total Number of Animals	**61**	**83**	**460**	**165**	**106**	**258**	**686**	**572**	**364**	**592**	**99**	**81**
Total Number of Taxa	**7**	**4**	**10**	**22**	**17**	**21**	**28**	**26**	**20**	**29**	**19**	**23**

APPENDIX F
FISH

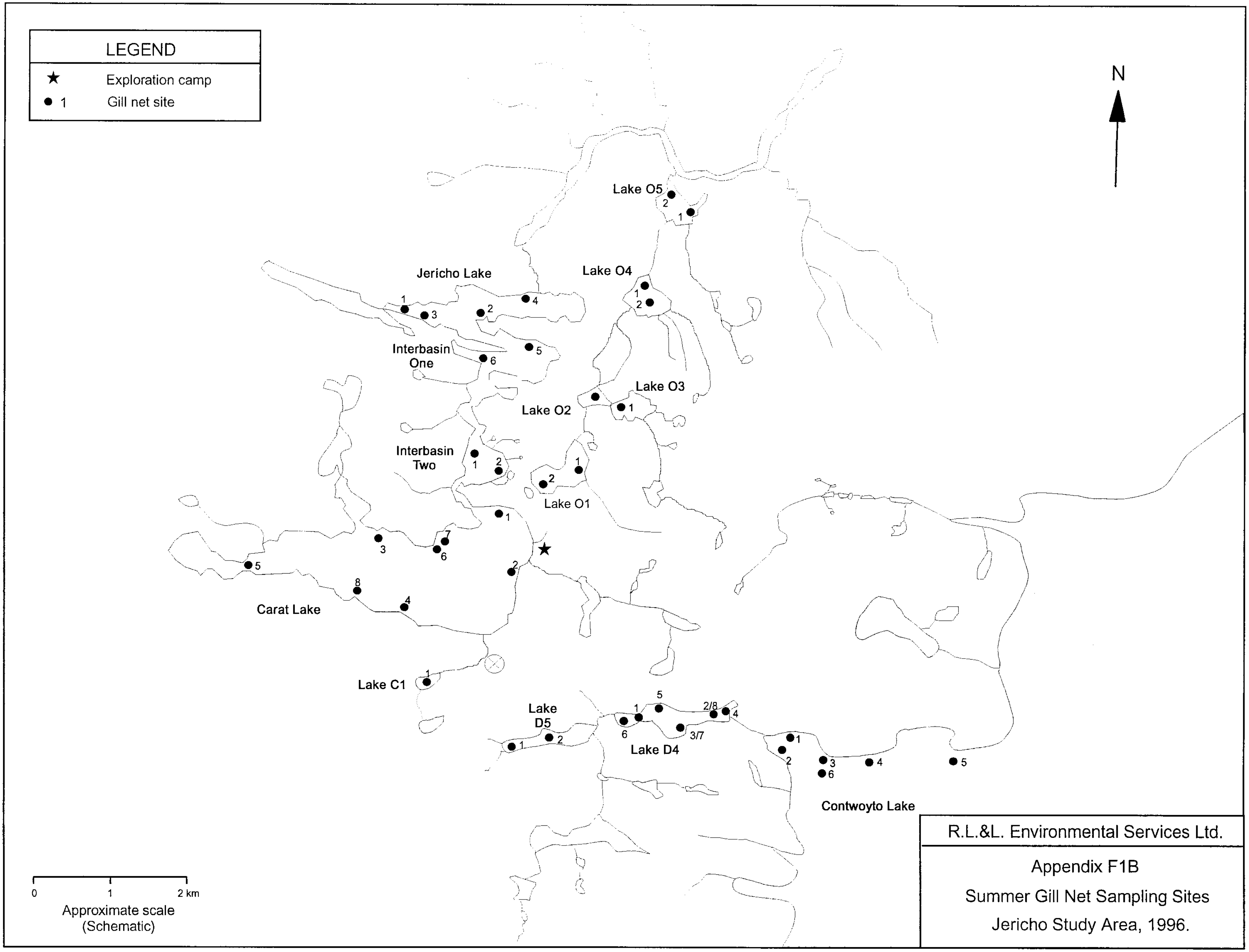
Appendix F1A Gill net sampling effort in sampled lakes during summer and fall, Jericho study area, 1996.

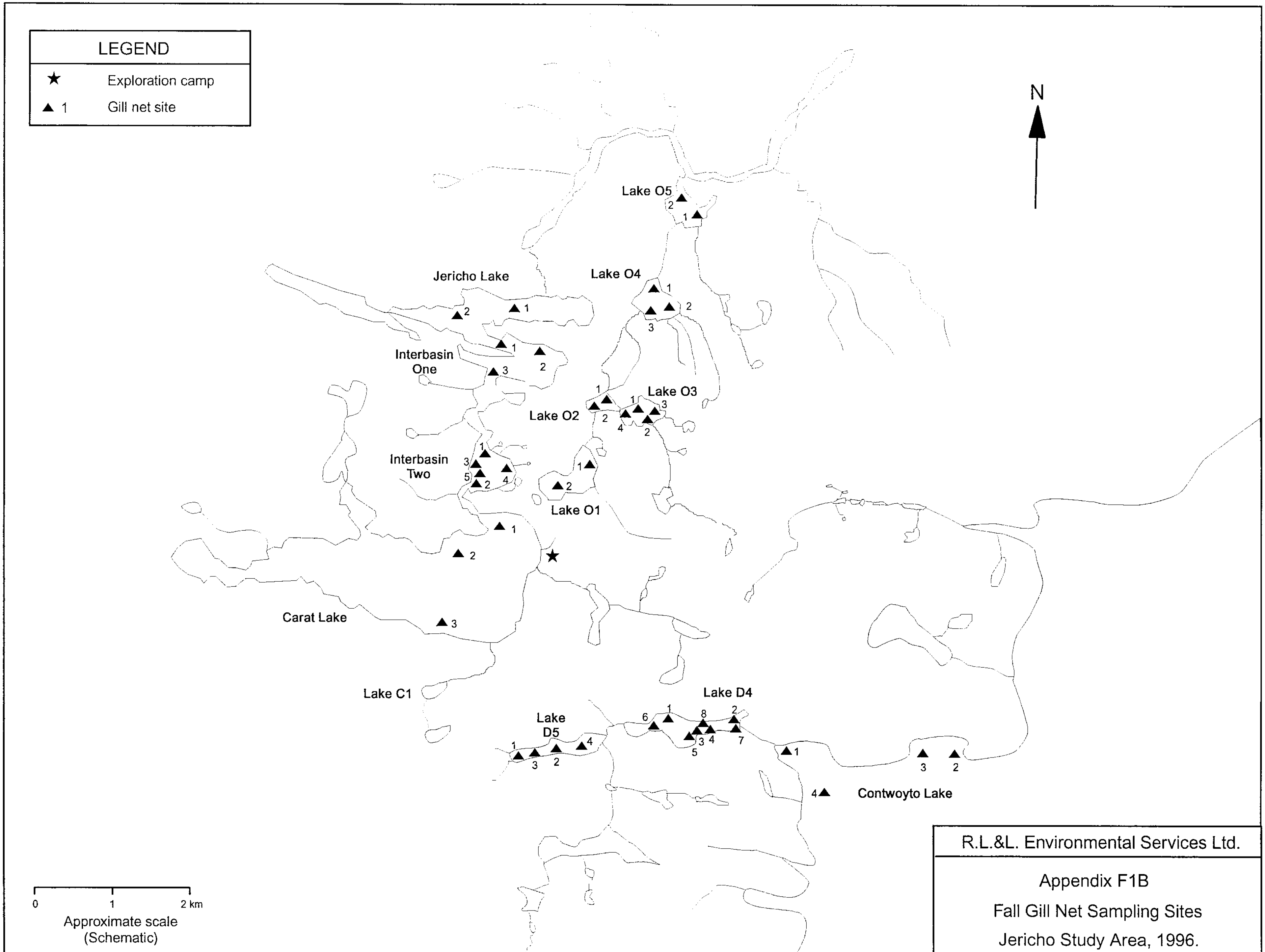
Lake	Site	Pull	UTM	Set		Pulled		Depth (m)		Substrate		Set	Water
			Coordinates	Date	Time	Date	Time	Nearshore	Offshore	Nearshore	Offshore	Type	Temperature (°C)
Carat	1	1	12W 0478260 7321275	23-Jul-96	17:50	24-Jul-96	13:40	3.0	7.5	sand	sand	Bottom	14
	2	1	12W 0478484 7320625	23-Jul-96	18:10	24-Jul-96	12:12	3.0	4.0	boulder	boulder	Bottom	14
	3	1	12W 0476897 7321155	24-Jul-96	14:15	25-Jul-96	10:15	3.0	5.0	boulder	silt	Bottom	14
	4	1	12W 0477517 7320334	24-Jul-96	16:30	25-Jul-96	11:00	3.0	12.0	boulder/silt	silt	Bottom	14
	5	1	12W 0476087 7320899	25-Jul-96	20:15	26-Jul-96	09:10	3.0	15.0	boulder	boulder	Bottom	13
	6	1	12W 0477790 7320972	25-Jul-96	19:50	26-Jul-96	11:00	2.0	8.0	boulder	silt	Bottom	13
	7	1	12W 0476710 7320828	29-Jul-96	11:10	29-Jul-96	13:40	1.8	4.0	boulder	boulder	Bottom	
	7	2	12W 0476710 7320828	29-Jul-96	13:40	29-Jul-96	16:17	1.8	4.0	boulder	boulder	Bottom	
	7	3	12W 0476710 7320828	29-Jul-96	16:17	29-Jul-96	20:45	1.8	4.0	boulder	boulder	Bottom	
	8	1	nd[1]	29-Jul-96	11:36	30-Jul-96	10:30	6.0	11.0			Surface	
	1	1	12W 0478260 7321275	4-Sep-96	09:30	4-Sep-96	11:00	3.0	9.0	boulder	silt	Bottom	7
	1	2	12W 0478260 7321275	4-Sep-96	11:30	4-Sep-96	14:15	3.0	9.0	boulder	silt	Bottom	7
	1	3	12W 0478260 7321275	4-Sep-96	14:30	4-Sep-96	17:45	3.0	9.0	boulder	silt	Bottom	7
	2	1	12W 0477790 7320972	4-Sep-96	09:45	4-Sep-96	12:30	2.5	7.0	silt/sand	silt/sand	Bottom	7
	3	1	12W 0477304 7320461	4-Sep-96	14:00	4-Sep-96	17:00	2.5	16.0	boulder	silt	Bottom	7
Jericho	1	1	12W 0477299 7323693	22-Jul-96	11:57	22-Jul-96	18:00	2.5	12.0	cobble	silt	Bottom	15
	1	2	12W 0477299 7323693	22-Jul-96	18:00	23-Jul-96	09:15	2.5	12.0	cobble	silt	Bottom	16
	2	1	12W 0478395 7323682	22-Jul-96	12:35	22-Jul-96	17:00	2.0	9.0	silt	silt	Bottom	15
	2	2	12W 0478395 7323682	22-Jul-96	17:00	23-Jul-96	12:30	2.0	9.0	silt	silt	Bottom	16
	3	1	12W 0477526 7323706	30-Jul-96	14:30	30-Jul-96	18:50	7.0	17.0	silt	silt	Bottom	
	4	1	12W 0478335 7323725	30-Jul-96	14:45	31-Jul-96	09:33	5.0	9.0	boulder	silt	Surface	16
	5	1	12W 0478722 7323215	31-Jul-96	10:45	31-Jul-96	13:00	6.5	10.0	sand/boulder	sand	Bottom	
	5	2	12W 0478722 7323215	31-Jul-96	13:15	31-Jul-96	18:45	6.5	10.0	sand/boulder	sand	Bottom	
	5	3	12W 0478722 7323215	31-Jul-96	19:00	1-Aug-96	10:00	6.5	10.0	sand/boulder	sand	Bottom	
	6	1	12W 0478150 7323158	31-Jul-96	09:58	31-Jul-96	18:00	6.0	6.4	sand	sand	Bottom	
	6	2	12W 0478150 7323158	31-Jul-96	18:15	1-Aug-96	09:35	6.0	6.4	sand	sand	Bottom	
	1	1	12W 0478336 7323756	4-Sep-96	09:35	4-Sep-96	11:35	5.7	5.3	boulder	silt/sand	Bottom	8
	1	2	12W 0478336 7323756	4-Sep-96	11:40	4-Sep-96	14:30	5.7	5.3	boulder	silt/sand	Bottom	
	1	3	12W 0478336 7323756	4-Sep-96	14:40	4-Sep-96	17:40	5.7	5.3	boulder	sand	Bottom	
	2	1	12W 0477572 7323762	4-Sep-96	10:20	4-Sep-96	12:25	3.0	20.2	boulder	silt	Bottom	8
	2	2	12W 0477572 7323762	4-Sep-96	12:30	4-Sep-96	14:50	3.0	20.2	boulder	silt	Bottom	
Interbasin One	1	1	12W 0478307 7323214	5-Sep-96	09:30	5-Sep-96	11:30	3.0	3.5	boulder/sand	sand/boulder	Bottom	
	1	2	12W 0478307 7323214	5-Sep-96	11:35	5-Sep-96	14:10	3.0	3.5	boulder/sand	sand/boulder	Bottom	
	1	3	12W 0478307 7323214	5-Sep-96	14:15	5-Sep-96	17:00	3.0	3.5	boulder/sand	sand/boulder	Bottom	
	2	1	12W 0478228 7323050	5-Sep-96	10:10	5-Sep-96	12:40	2.0	2.5	boulder	boulder/sand	Bottom	
	2	2	12W 0478228 7323150	5-Sep-96	12:45	5-Sep-96	14:45	2.0	2.5	boulder	boulder/sand	Bottom	
	3	1	12W 0478778 7323165	5-Sep-96	15:15	5-Sep-96	17:15	3.0	13.3	boulder	silt	Bottom	
Interbasin Two	1	1	12W 0478049 7322031	31-Jul-96	16:00	01-Aug-96	09:30	2.0	4.0	sand	sand	Bottom	17
	2	1	12W 0478252 7321992	31-Jul-96	16:30	1-Aug-96	09:50	4.0	11.5	sand	sand	Bottom	
	1	1	12W 0478188 7322143	5-Sep-96	09:50	5-Sep-96	11:30	2.0	8.0	boulder	silt	Bottom	6
	2	1	12W 0478250 7321946	5-Sep-96	10:15	5-Sep-96	12:00	2.0	9.0	silt	silt	Bottom	6
	3	1	12W 0478090 7322128	5-Sep-96	11:45	5-Sep-96	14:30	3.0	3.0	silt	silt/sand	Bottom	6
	3	2	12W 0478090 7322128	5-Sep-96	14:30	5-Sep-96	17:20	3.0	3.0	silt	silt/sand	Bottom	6
	4	1	12W 0478117 7321620	5-Sep-96	12:15	5-Sep-96	14:45	3.0	6.0	silt/sand	silt/sand	Bottom	6
	5	1	12W 0478064 7321946	5-Sep-96	15:00	5-Sep-96	17:40	3.0	3.0	silt	silt	Bottom	6
C1	1	1	12W 0477551 7319422	3-Aug-96	11:54	4-Aug-96	09:22	2.0	9.0	boulder	silt	Bottom	14
Contwoyto	1	1	12W 0481569 7318804	28-Jul-96	15:10	29-Jul-96	10:45	4.0	12.0	silt/boulder	silt	Bottom	7
	2	1	12W 0481645 7318698	28-Jul-96	15:20	29-Jul-96	10:12	4.0	12.0	silt	silt	Bottom	7
	3	1	12W 0481855 7318671	29-Jul-96	11:12	30-Jul-96	10:16	14.0	8.0			Surface	6
	4	1	12W 0482284 7318769	29-Jul-96	11:36	30-Jul-96	09:43	2.0	14.0	boulders	silt	Bottom	6
	5	1	12W 0482589 7318821	30-Jul-96	10:00	31-Jul-96	09:30	3.0	6.0	silt	silt	Bottom	
	6	1	12W 0481895 7318544	30-Jul-96	10:40	31-Jul-96	10:15	4.0	5.0	boulder	boulder	Bottom	
	1	1	12W 0481549 7318801	6-Sep-96	09:35	6-Sep-96	11:30	3.0	9.0	boulder	boulder	Bottom	6
	1	2	12W 0481549 7318801	6-Sep-96	11:35	6-Sep-96	14:00	3.0	9.0	boulder	boulder	Bottom	6
	2	1	12W 0482480 7318807	6-Sep-96	09:50	6-Sep-96	11:45	2.5	15.0	silt/sand/cobble	silt	Bottom	6
	3	1	12W 0482247 7318925	6-Sep-96	12:00	6-Sep-96	14:43	4.0	12.0	boulder	silt	Bottom	6
	3	2	12W 0482247 7318925	6-Sep-96	14:45	6-Sep-96	17:00	4.0	12.0	boulder	silt	Bottom	6
	4	1	12W 0481819 7318327	6-Sep-96	14:20	6-Sep-96	17:30	6.0	12.0	boulder	boulder	Bottom	6
D4	1	1	12W 0479736 7318997	27-Jul-96	14:55	28-Jul-96	09:48	7.4	12.0	silt	silt	Surface	16
	2	1	12W 0480510 7319152	27-Jul-96	15:20	28-Jul-96	11:20	11.0	9.0	silt	silt	Bottom	16
	3	1	12W 0480113 7319091	4-Aug-96	14:38	4-Aug-96	16:30	3.0	3.0	boulder		Bottom	
	4	1	12W 0480509 7319067	4-Aug-96	15:10	4-Aug-96	17:10	3.0	10.0	boulder	silt	Bottom	
	5	1	12W 0479695 7319212	4-Aug-96	17:00	4-Aug-96	18:30	4.0	10.0	silt	silt	Bottom	
	6	1	nd[1]	4-Aug-96	17:40	4-Aug-96	18:20	5.0	11.0	silt	silt	Bottom	
	7	1	12W 0480076 7319047	6-Aug-96	09:30	6-Aug-96	17:10	6.5	18.6	boulders	silt	Bottom	
	8	1	12W 0480395 7319211	6-Aug-96	09:50	6-Aug-96	17:10	7.1	12.7	boulders	silt	Bottom	
	1	1	12W 0479695 7319212	3-Sep-96	11:00	3-Sep-96	13:12	3.0	10.5	boulder	boulder	Bottom	8
	1	2	12W 0479695 7319212	3-Sep-96	13:13	3-Sep-96	15:30	3.0	10.5	boulder	boulder	Bottom	8
	1	3	12W 0479695 7319212	3-Sep-96	15:10	3-Sep-96	17:10	3.0	10.5	boulder	boulder	Bottom	
	2	1	12W 0480562 7319254	3-Sep-96	11:25	3-Sep-96	13:38	4.5	10.0	boulder	silt	Bottom	8
	2	2	12W 0480562 7319254	3-Sep-96	13:40	3-Sep-96	15:00	4.5	10.0	boulder	silt	Bottom	
	3	1	12W 0480264 7319091	3-Sep-96	15:45	3-Sep-96	17:20	8.3	4.5			Bottom	
	4	1	12W 0480425 7319142	9-Sep-96	09:16	9-Sep-96	11:23	3.0	10.8	boulder/sand	silt	Bottom	
	4	2	12W 0480425 7319142	9-Sep-96	11:25	9-Sep-96	12:30	3.0	10.8	boulder/sand	silt	Bottom	
	5	1	12W 0480201 7319150	9-Sep-96	09:30	9-Sep-96	11:33	3.0	13.8	boulder	silt	Bottom	
	5	2	12W 0480201 7319150	9-Sep-96	11:35	9-Sep-96	12:53	3.0	13.8	boulder	silt	Bottom	
	5	3	12W 0480201 7319150	9-Sep-96	12:55	9-Sep-96	16:40	3.0	13.8	boulder	silt	Bottom	
	6	1	12W 0479639 7318918	9-Sep-96	10:10	9-Sep-96	11:40	2.0	14.7	boulder/silt	silt	Bottom	
	6	2	12W 0479639 7318918	9-Sep-96	11:43	9-Sep-96	14:00	2.0	14.7	boulder/silt	silt	Bottom	
	7	1	nd[1]	9-Sep-96	12:40	9-Sep-96	16:40	2.5	12.0	boulder	silt	Bottom	
	8	1	12W 0480161 7219093	9-Sep-96	14:20	9-Sep-96	17:30	16.0	1.5			Bottom	

Appendix F1A Concluded.

Lake	Site	Pull	UTM	Set		Pulled		Depth (m)		Substrate		Set	Water
			Coordinates	Date	Time	Date	Time	Nearshore	Offshore	Nearshore	Offshore	Type	Temperature (°C)
D5	1	1	12W 0478735 7318677	26-Jul-96	16:10	27-Jul-96	09:15	3.0	10.0	boulder	silt	Bottom	14
	2	1	12W 0478884 7318819	26-Jul-96	16:20	27-Jul-96	10:00	7.0	7.0	silt	silt	Bottom	14
	1	1	12W 0478735 7318677	4-Aug-96	11:00	4-Aug-96	16:00	3.0	10.0	boulder	silt	Bottom	
	2	1	12W 0478884 7318819	4-Aug-96	11:30	4-Aug-96	16:30	7.0	7.0	silt	silt	Bottom	
	1	1	12W 0478713 7318683	3-Sep-96	10:56	3-Sep-96	13:30	11.0	3.0	silt	silt	Bottom	5
	1	2	12W 0478713 7318683	3-Sep-96	13:35	3-Sep-96	15:30	11.0	3.0	silt	silt	Bottom	
	1	3	12W 0478713 7318683	3-Sep-96	15:35	3-Sep-96	17:00	11.0	3.0	silt	silt	Bottom	
	2	1	12W 0479011 7318814	3-Sep-96	11:00	3-Sep-96	14:00	7.0	5.0	silt	silt	Bottom	5
	3	1	12W 0478713 7318683	3-Sep-96	14:20	3-Sep-96	16:00	1.0	7.5	boulder	silt	Bottom	
	3	2	12W 0478713 7318683	3-Sep-96	16:05	3-Sep-96	17:30	1.0	7.5	boulder	silt	Bottom	
	1	1	12W 0478735 7318677	9-Sep-96	09:25	9-Sep-96	11:30	4.5	11.0	boulder	silt	Bottom	6
	1	2	12W 0478735 7318677	9-Sep-96	11:35	9-Sep-96	13:30	4.5	11.0	boulder	silt	Bottom	6
	2	1	12W 0479011 7318814	9-Sep-96	09:35	9-Sep-96	11:40	4.5	5.0	silt	silt	Bottom	6
	2	2	12W 0479011 7318814	9-Sep-96	11:45	9-Sep-96	13:50	4.5	5.0	silt	silt	Bottom	6
	2	3	12W 0479011 7318814	9-Sep-96	13:55	9-Sep-96	15:30	4.5	5.0	silt	silt	Bottom	6
	2	4	12W 0479011 7318814	9-Sep-96	15:35	9-Sep-96	17:00	4.5	5.0	silt	silt	Bottom	6
	3	1	nd[1]	9-Sep-96	10:00	9-Sep-96	11:50	1.5	9.3	boulder	silt	Bottom	6
	3	2	nd[1]	9-Sep-96	11:55	9-Sep-96	13:40	1.5	9.3	boulder	silt	Bottom	6
	3	3	nd[1]	9-Sep-96	13:45	9-Sep-96	15:45	1.5	9.3	boulder	silt	Bottom	6
	3	4	nd[1]	9-Sep-96	15:50	9-Sep-96	17:20	1.5	9.3	boulder	silt	Bottom	6
	4	1	nd[1]	9-Sep-96	14:20	9-Sep-96	15:55	2.5	4.0	boulder/silt	silt	Bottom	
	4	2	nd[1]	9-Sep-96	16:00	9-Sep-96	17:40	2.5	4.0	boulder/silt	silt	Bottom	
O1	1	1	12W 0479059 7321833	3-Aug-96	11:19	4-Aug-96	09:50	5.0	8.0	sand/silt	sand/silt	Bottom	
	2	1	12W 0478844 7321785	3-Aug-96	11:30	4-Aug-96	11:50	5.0	13.0	sand/silt	silt	Bottom	
	1	1	12W 0479051 7321977	6-Sep-96	09:16	6-Sep-96	11:25	2.0	4.0	boulder/silt	silt	Bottom	5
	1	2	12W 0479051 7321977	6-Sep-96	11:30	6-Sep-96	13:45	2.0	4.0	boulder/silt	silt	Bottom	5
	1	3	12W 0479051 7321977	6-Sep-96	13:50	6-Sep-96	16:50	2.0	4.0	boulder/silt	silt	Bottom	5
	2	1	12W 0478890 7321833	6-Sep-96	09:40	6-Sep-96	12:00	9.0	3.0	silt	boulder/sand	Bottom	5
	2	2	12W 0478890 7321833	6-Sep-96	12:05	6-Sep-96	14:15	9.0	3.0	silt	boulder/sand	Bottom	5
	2	3	12W 0478890 7321833	6-Sep-96	14:20	6-Sep-96	17:30	9.0	3.0	silt	boulder/sand	Bottom	5
O2	1	1	12W 0479301 7322790	2-Aug-96	12:46	3-Aug-96	09:14	5.7	6.8	sand	sand	Bottom	
	1	1	12W 0479307 7322817	7-Sep-96	09:30	7-Sep-96	11:30	1.0	2.5	silt	silt	Bottom	5
	1	2	12W 0479307 7322817	7-Sep-96	11:30	7-Sep-96	13:30	1.0	2.5	silt	silt	Bottom	5
	1	3	12W 0479307 7322817	7-Sep-96	13:30	7-Sep-96	15:30	1.0	2.5	silt	silt	Bottom	5
	1	4	12W 0479307 7322817	7-Sep-96	15:30	7-Sep-96	17:00	1.0	2.5	silt	silt	Bottom	5
	2	1	12W 0479218 7322662	7-Sep-96	09:40	7-Sep-96	11:45	2.0	6.5	silt	silt	Bottom	5
	2	2	12W 0479218 7322662	7-Sep-96	11:50	7-Sep-96	13:50	2.0	6.5	silt	silt	Bottom	5
	2	3	12W 0479218 7322662	7-Sep-96	13:50	7-Sep-96	15:50	2.0	6.5	silt	silt	Bottom	5
	2	4	12W 0479218 7322662	7-Sep-96	15:50	7-Sep-96	17:10	2.0	6.5	silt	silt	Bottom	5
O3	1	1	12W 0479586 7322601	2-Aug-96	13:00	3-Aug-96	10:00	2.0	5.0	boulder	sand	Bottom	16
	1	1	12W 0479608 7322491	7-Sep-96	09:20	7-Sep-96	11:25	1.7	4.8	cobble/boulder	silt	Bottom	6
	1	2	12W 0479608 7322491	7-Sep-96	11:30	7-Sep-96	13:30	1.7	4.8	cobble/boulder	silt	Bottom	6
	1	3	12W 0479608 7322491	7-Sep-96	13:35	7-Sep-96	17:15	1.7	4.8	cobble/boulder	silt	Bottom	6
	2	1	12W 0479653 7322503	7-Sep-96	09:40	7-Sep-96	11:40	2.0	4.8	silt/cobble	silt	Bottom	6
	3	1	12W 0479772 7322681	7-Sep-96	12:15	7-Sep-96	13:45	2.0	5.0	boulder	silt	Bottom	6
	4	1	12W 0479608 7322491	7-Sep-96	14:15	7-Sep-96	17:40	2.0	4.0	cobble/silt	silt	Bottom	6
O4	1	1	12W 0479733 7324101	1-Aug-96	11:50	2-Aug-96	09:20	6.0	8.5	sand	sand	Bottom	
	2	1	12W 0479751 7323853	1-Aug-96	11:50	2-Aug-96	10:30	3.1	6.0	sand	sand	Bottom	
	1	1	12W 0479592 7323311	8-Sep-96	09:27	8-Sep-96	11:15	3.0	3.0	silt/sand	silt/sand	Bottom	5
	1	2	12W 0479592 7323311	8-Sep-96	11:20	8-Sep-96	14:15	3.0	3.0	silt/sand	silt/sand	Bottom	5
	1	3	12W 0479592 7323311	8-Sep-96	14:20	8-Sep-96	17:10	3.0	3.0	silt/sand	silt/sand	Bottom	5
	2	1	12W 0479779 7323810	8-Sep-96	09:37	8-Sep-96	11:30	3.0	3.0	silt/sand	silt/sand	Bottom	5
	2	2	12W 0479779 7323810	8-Sep-96	11:35	8-Sep-96	14:30	3.0	3.0	silt/sand	silt/sand	Bottom	5
	3	1	12W 0479918 7323571	8-Sep-96	15:05	8-Sep-96	17:30	2.5	5.0	silt/sand	silt/sand	Bottom	5
O5	1	1	12W 0480183 7324800	1-Aug-96	13:15	2-Aug-96	10:00	2.0	6.5	sand	sand	Bottom	16
	2	1	12W 0480033 7324790	1-Aug-96	13:25	2-Aug-96	10:30	2.0	4.6	sand/boulder	sand	Bottom	16
	1	1	12W 0480244 7324847	8-Sep-96	09:30	8-Sep-96	11:30	2.0	4.5	silt	silt	Bottom	4
	1	2	12W 0480244 7324847	8-Sep-96	11:30	8-Sep-96	14:50	2.0	4.5	silt	silt	Bottom	4
	1	3	12W 0480244 7324847	8-Sep-96	14:50	8-Sep-96	16:50	2.0	4.5	silt	silt	Bottom	4
	2	1	12W 0480140 7324958	8-Sep-96	09:40	8-Sep-96	11:40	2.0	4.8	boulder	silt	Bottom	4
	2	2	12W 0480140 7324958	8-Sep-96	11:40	8-Sep-96	15:00	2.0	4.8	boulder	silt	Bottom	4
	2	3	12W 0480140 7324958	8-Sep-96	15:00	8-Sep-96	17:00	2.0	4.8	boulder	silt	Bottom	4
Control	1	1	12W 0466974 7321082	4-Aug-96	18:00	5-Aug-96	10:15	2.0	6.0	boulder	silt	Bottom	
	2	1	12W 0467306 7321019	4-Aug-96	18:30	5-Aug-96	11:30	3.0	8.0	boulder	silt	Bottom	
	1	2	12W 0466974 7321082	5-Aug-96	10:15	5-Aug-96	15:40	2.0	6.0	boulder	silt	Bottom	
	1	3	12W 0466974 7321082	5-Aug-96	15:40	5-Aug-96	17:15	2.0	6.0	boulder	silt	Bottom	
	2	2	12W 0467306 7321019	5-Aug-96	11:30	5-Aug-96	15:55	3.0	8.0	boulder	silt	Bottom	
	2	3	12W 0467306 7321019	5-Aug-96	15:55	5-Aug-96	17:35	3.0	8.0	boulder	silt	Bottom	
	3	1	12W 0467541 7320893	5-Aug-96	12:45	5-Aug-96	16:05	3.5	5.0	boulder	silt	Bottom	
	3	2	12W 0467541 7320893	5-Aug-96	16:05	6-Aug-96	09:00	3.5	5.0	boulder	silt	Bottom	
	4	1	12W 0467255 7321129	5-Aug-96	13:10	5-Aug-96	15:45	5.0	14.0	sand	silt	Bottom	
	4	2	12W 0467255 7321129	5-Aug-96	15:45	6-Aug-96	09:45	5.0	14.0	sand	silt	Bottom	
	3	3	12W 0467541 7320893	6-Aug-96	09:00	6-Aug-96	16:25	3.5	5.0	boulder	silt	Bottom	
	4	3	12W 0467255 7321129	6-Aug-96	09:45	6-Aug-96	16:40	5.0	14.0	sand	silt	Bottom	

[1] nd = no data.


LEGEND
★ Exploration camp
● 1 Gill net site
N
Lake O5
Jericho Lake
Lake O4
Interbasin One
Lake O3
Lake O2
Interbasin Two
Lake O1
Carat Lake
Lake C1
Lake D5
Lake D4
Contwoyto Lake
0 1 2 km
Approximate scale
(Schematic)
R.L.&L. Environmental Services Ltd.
Appendix F1B
Summer Gill Net Sampling Sites
Jericho Study Area, 1996.



R.L.&L. Environmental Services Ltd.

Appendix F1B

Fall Gill Net Sampling Sites

Jericho Study Area, 1996.

Appendix F2 Number of fish captured by gill net sampling and catch-per-unit effort values during the summer and fall, Jericho study area, 1996.

Session	Lake	Site	Set Type	Time (h)	Effort (100m²/12h)	Arctic Char Number	Arctic Char CPUE[1]	Arctic Grayling Number	Arctic Grayling CPUE	Lake Trout Number	Lake Trout CPUE	Round Whitefish Number	Round Whitefish CPUE	Sculpin Number	Sculpin CPUE
Summer	Carat	1	Bottom	19.8	3.6	3	0.8			8	2.2	3	0.8		
		2	Bottom	18.0	3.3	2	0.6			10	3.0	2	0.6		
		3	Bottom	20.0	3.6					3	0.8	8	2.2		
		4	Bottom	18.5	3.4	1	0.3			12	3.6				
		5	Bottom	12.9	2.4	2	0.8			11	4.7				
		6	Bottom	15.2	2.8	3	1.1			15	5.4	7	2.5		
		7	Bottom	9.6	1.7	1	0.6			2	1.1	7	4.0		
		8	Surface	22.9	4.2	4	1.0			11	2.6				
		Total		**136.9**	**25.0**	**16**	**0.6**			**72**	**2.9**	**27**	**1.1**		
	Contwoyto	1	Bottom	19.6	3.6					12	3.4				
		2	Bottom	18.9	3.4	1	0.3			5	1.5				
		3	Surface	23.1	4.2	1	0.2			5	1.2				
		4	Bottom	22.1	4.0					12	3.0				
		5	Bottom	23.5	4.3					14	3.3				
		6	Bottom	23.6	4.3	2	0.5			6	1.4				
		Total		**130.7**	**23.8**	**4**	**0.2**			**54**	**2.3**				
	Interbasin One	5	Bottom	22.8	4.1					11	2.7	1	0.2		
		6	Bottom	23.4	4.3	1	0.2			5	1.2	1	0.2		
		Total		**46.1**	**8.4**	**1**	**0.1**			**16**	**1.9**	**2**	**0.2**		
	Interbasin Two	1	Bottom	17.5	3.2					13	4.1	3	0.9		
		2	Bottom	17.3	3.2					15	4.7				
		Total		**34.8**	**6.4**					**28**	**4.4**	**3**	**0.5**		
	Jericho	1	Bottom	21.3	3.9	22	5.7			10	2.6				
		2	Bottom	23.9	4.4	6	1.4			24	5.5				
		3	Bottom	4.3	0.8	1	1.3			3	3.8				
		4	Surface	18.8	3.4										
		Total		**68.3**	**12.5**	**29**	**2.3**			**37**	**3.0**				
	LC1	1	Bottom	21.5	3.9					11	2.8				
		Total		**21.5**	**3.9**					**11**	**2.8**				
	LD4	1	Surface	18.9	3.4	8	2.3			13	3.8				
		2	Bottom	20.0	3.6	4	1.1			8	2.2				
		3	Bottom	1.9	0.3	1	2.9								
		4	Bottom	2.0	0.4	8	21.9			1	2.7				
		5	Bottom	1.5	0.3										
		6	Bottom	0.7	0.1										
		7	Bottom	7.7	1.4	1	0.7			3	2.1				
		8	Bottom	7.3	1.3	5	3.7								
		Total		**59.9**	**10.9**	**27**	**2.5**			**25**	**2.3**				
	LD5	1	Bottom	22.1	4.0	10	2.5			11	2.7				
		2	Bottom	22.7	4.1	19	4.6			7	1.7				
		Total		**44.8**	**8.2**	**29**	**3.6**			**18**	**2.2**				
	LO1	1	Bottom	22.5	4.1	18	4.4			2	0.5			1	0.2
		2	Bottom	24.3	4.4	21	4.7			4	0.9				
		Total		**46.8**	**8.5**	**39**	**4.6**			**6**	**0.7**			**1**	**0.1**
	LO2	1	Bottom	20.5	3.7					1	0.3	4	1.1		
		Total		**20.5**	**3.7**					**1**	**0.3**	**4**	**1.1**		
	LO3	1	Bottom	21.0	3.8	1	0.3	1	0.3	7	1.8	1	0.3		
		Total		**21.0**	**3.8**	**1**	**0.3**	**1**	**0.3**	**7**	**1.8**	**1**	**0.3**		
	LO4	1	Bottom	21.5	3.9	7	1.8			1	0.3	1	0.3		
		2	Bottom	22.7	4.1	1	0.2			4	1.0	4	1.0		
		Total		**44.2**	**8.1**	**8**	**1.0**			**5**	**0.6**	**5**	**0.6**		
	LO5	1	Bottom	20.8	3.8			5	1.3	11	2.9	1	0.3		
		2	Bottom	21.1	3.8	1	0.3	2	0.5	6	1.6	2	0.5		
		Total		**41.8**	**7.6**	**1**	**0.1**	**7**	**0.9**	**17**	**2.2**	**3**	**0.4**		
Fall	Carat	1	Bottom	7.5	1.4	3	2.2			48	35.1	4	2.9		
		2	Bottom	2.7	0.5	1	2.0			2	4.0				
		3	Bottom	3.0	0.5					2	3.7				
		Total		**13.2**	**2.4**	**4**	**1.7**			**52**	**21.5**	**4**	**1.7**		
	Contwoyto	1	Bottom	4.3	0.8										
		2	Bottom	1.9	0.3										
		3	Bottom	5.0	0.9					1	1.1				
		4	Bottom	3.2	0.6										
		Total		**14.4**	**2.6**					**1**	**0.4**				
	Interbasin One	1	Bottom	7.3	1.3	7	5.2			3	2.2	2	1.5		
		2	Bottom	4.5	0.8	1	1.2			2	2.4	4	4.9		
		3	Bottom	2.0	0.4										
		Total		**13.8**	**2.5**	**8**	**3.2**			**5**	**2.0**	**6**	**2.4**		
	Interbasin Two	1	Bottom	1.7	0.3										
		2	Bottom	1.8	0.3										
		3	Bottom	5.6	1.0					1	1.0				
		4	Bottom	2.5	0.5										
		5	Bottom	2.7	0.5										
		Total		**14.2**	**2.6**					**1**	**0.4**				
	Jericho	1	Bottom	7.8	1.4	1	0.7			6	4.2				
		2	Bottom	4.4	0.8	8	10.0			4	5.0				
		Total		**12.2**	**2.2**	**9**	**4.0**			**10**	**4.5**				
	LD4	1	Bottom	6.5	1.2	2	1.7			1	0.8				
		2	Bottom	3.5	0.6					1	1.6				
		3	Bottom	1.6	0.3	1	3.5			1	3.5				
		4	Bottom	3.2	0.6	4	6.9			1	1.7				
		5	Bottom	7.2	1.3	5	3.8								
		6	Bottom	3.8	0.7										
		7	Bottom	4.0	0.7	2	2.7								
		8	Bottom	3.2	0.6	1	1.7			1	1.7				
		Total		**32.9**	**6.0**	**15**	**2.5**			**5**	**0.8**				
	LD5	1	Bottom	9.9	1.8	11	6.1			1	0.6				
		2	Bottom	10.2	1.9	4	2.2								
		3	Bottom	10.2	1.9										
		4	Bottom	3.2	0.6										
		Total		**33.5**	**6.1**	**15**	**2.5**			**1**	**0.2**				
	LO1	1	Bottom	7.4	1.3	15	11.1			2	1.5	1	0.7		
		2	Bottom	7.7	1.4	12	8.6			12	8.6				
		Total		**15.1**	**2.7**	**27**	**9.8**			**14**	**5.1**	**1**	**0.4**		
	LO2	1	Bottom	7.5	1.4	1	0.7								
		2	Bottom	7.4	1.4	3	2.2			2	1.5	3	2.2		
		Total		**14.9**	**2.7**	**4**	**1.5**			**2**	**0.7**	**3**	**1.1**		
	LO3	1	Bottom	7.7	1.4	4	2.8			4	2.8				
		2	Bottom	2.0	0.4					1	2.7				
		3	Bottom	1.5	0.3					1	3.7				
		4	Bottom	3.4	0.6										
		Total		**14.7**	**2.7**	**4**	**1.5**			**6**	**2.2**				
	LO4	1	Bottom	7.6	1.4					1	0.7	7	5.1		
		2	Bottom	4.8	0.9					2	2.3	2	2.3		
		3	Bottom	2.4	0.4										
		Total		**14.8**	**2.7**					**3**	**1.1**	**9**	**3.3**		
	LO5	1	Bottom	7.3	1.3			2	1.5	3	2.2				
		2	Bottom	7.3	1.3	1	0.7			5	3.7	2	1.5		
		Total		**14.7**	**2.7**	**1**	**0.4**	**2**	**0.7**	**8**	**3.0**	**2**	**0.7**		

[1] CPUE denotes catch-per-unit-effort (number of fish per 100m²·12h).

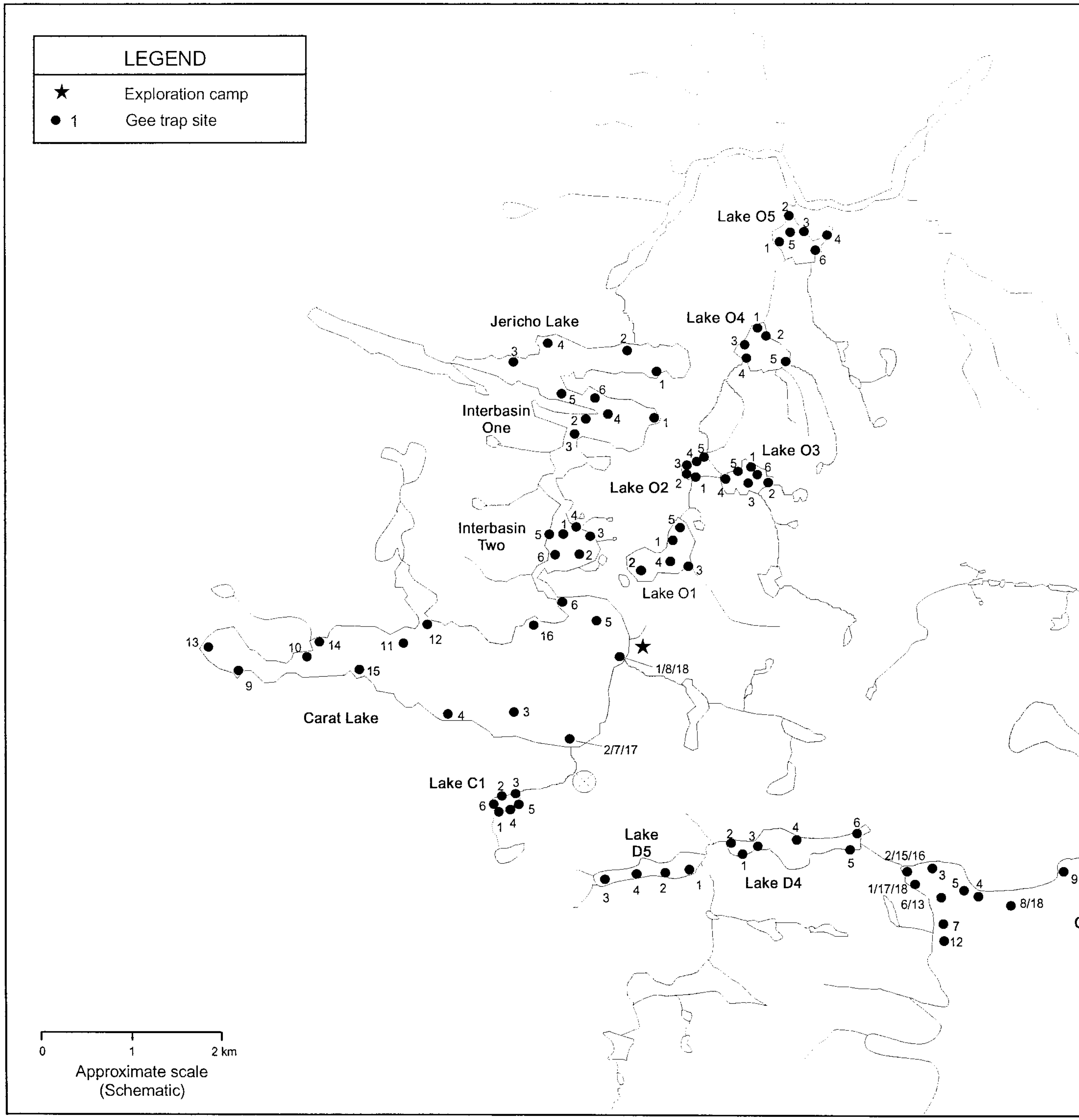
Appendix F3A Gee trap sampling effort in sampled lakes during summer, Jericho study area, 1996.

Lake	Site	UTM Coordinates	Trap Type	Set Date	Set Time	Pulled Date	Pulled Time	Depth (m)
Carat	1	12W 0478627 7320880	Normal	23-Jul-96	15:44	24-Jul-96	11:20	0.5
	2	12W 0478166 7319977	Normal	23-Jul-96	15:50	24-Jul-96	11:24	1.0
	3	12W 0477565 7320271	Giant	23-Jul-96	16:00	24-Jul-96	11:35	8.5
	4	12W 0476977 7320295	Normal	23-Jul-96	16:10	24-Jul-96	11:31	1.0
	5	12W 0478314 7321178	Giant	23-Jul-96	16:20	24-Jul-96	11:44	9.0
	6	12W 0478099 7321397	Normal	23-Jul-96	16:50	24-Jul-96	11:40	1.0
	7	12W 0478166 7319977	Normal	24-Jul-96	14:45	25-Jul-96	09:50	0.5
	8	12W 0478627 7320880	Normal	24-Jul-96	14:50	25-Jul-96	09:30	0.5
	9	12W 0475284 7320817	Normal	24-Jul-96	15:05	25-Jul-96	08:43	0.5
	10	12W 0475988 7321036	Normal	24-Jul-96	15:10	25-Jul-96	08:48	0.5
	11	12W 0476349 7320909	Giant	24-Jul-96	15:25	25-Jul-96	09:10	10.0
	12	12W 0476944 7321031	Giant	24-Jul-96	15:36	25-Jul-96	09:15	15.0
	13	12W 0475084 7320656	Normal	25-Jul-96	08:45	26-Jul-96	08:30	0.8
	14	12W 0476045 7321062	Normal	25-Jul-96	09:01	26-Jul-96	08:40	0.5
	15	12W 0476025 7320798	Giant	25-Jul-96	09:10	26-Jul-96	08:50	8.0
	16	12W 0477894 7321170	Giant	25-Jul-96	09:20	26-Jul-96	11:30	12.0
	17	12W 0478166 7319977	Normal	25-Jul-96	09:40	26-Jul-96	12:05	0.4
	18	12W 0478627 7320880	Normal	25-Jul-96	09:45	26-Jul-96	11:50	0.3
Jericho	1	nd[1]	Normal	22-Jul-96	13:35	31-Jul-96	09:15	1.5
	2	12W 0478798 7323877	Normal	22-Jul-96	13:40	23-Jul-96	11:24	1.5
	3	12W 0477614 7323497	Giant	22-Jul-96	13:50	23-Jul-96	11:10	15.0
	4	12W 0477910 7323835	Normal	22-Jul-96	14:00	23-Jul-96	11:18	1.8
	5	12W 0478252 7323410	Normal	22-Jul-96	14:05	23-Jul-96	13:40	1.5
	6	12W 0478342 7323371	Giant	22-Jul-96	14:10	23-Jul-96	13:45	9.2
Interbasin One	1	12W 0478931 7323081	Normal	31-Jul-96	08:50	1-Aug-96	08:45	1.0
	2	12W 0478418 7323163	Normal	31-Jul-96	10:08	1-Aug-96	08:50	0.8
	3	12W 0478334 7323732	Giant	31-Jul-96	12:20	1-Aug-96	09:20	6.0
	4	12W 0478722 7323215	Giant	31-Jul-96	12:45	1-Aug-96	09:15	10.0
Interbasin Two	1	12W 0478131 7322147	Giant	31-Jul-96	15:19	1-Aug-96	08:45	5.2
	2	12W 0478292 7321978	Giant	31-Jul-96	15:30	1-Aug-96	08:50	6.8
	3	12W 0478136 7322172	Normal	31-Jul-96	15:31	1-Aug-96	09:00	2.0
	4	12W 0478235 7322041	Normal	31-Jul-96	15:38	1-Aug-96	08:55	1.0
	5	12W 0478049 7322031	Normal	31-Jul-96	15:31	1-Aug-96	09:01	1.5
	6	12W 0478099 7321785	Normal	31-Jul-96	15:44	1-Aug-96	09:05	1.5
C1	1	12W 0477479 7319335	Normal	3-Aug-96	11:00	4-Aug-96	08:34	0.6
	2	12W 0477602 7319438	Normal	3-Aug-96	11:02	4-Aug-96	08:36	1.0
	3	12W 0477664 7319467	Normal	3-Aug-96	11:05	4-Aug-96	08:40	0.5
	4	12W 0477593 7319364	Normal	3-Aug-96	11:07	4-Aug-96	08:45	0.4
	5	12W 0477593 7319364	Giant	3-Aug-96	11:09	4-Aug-96	08:47	6.0
	6	12W 0477500 7319403	Giant	3-Aug-96	11:13	4-Aug-96	08:49	5.5
O1	1	12W 0479016 7321875	Normal	3-Aug-96	10:30	4-Aug-96	09:16	0.8
	2	12W 0478706 7321763	Giant	3-Aug-96	10:40	4-Aug-96	09:18	9.0
	3	12W 0478958 7321724	Normal	3-Aug-96	10:45	4-Aug-96	09:20	0.4
	4	12W 0479092 7321781	Giant	3-Aug-96	10:50	4-Aug-96	09:21	8.0
	5	12W 0479126 7322217	Normal	3-Aug-96	10:56	4-Aug-96	09:07	0.5
O2	1	12W 0479225 7322624	Normal	2-Aug-96	12:56	3-Aug-96	08:48	0.8
	2	12W 0479246 7322684	Giant	2-Aug-96	12:58	3-Aug-96	08:38	4.5
	3	12W 0479181 7322766	Normal	2-Aug-96	13:01	3-Aug-96	08:49	0.7
	4	12W 0479277 7322781	Giant	2-Aug-96	13:04	3-Aug-96	08:50	6.2
	5	12W 0479356 7322797	Normal	2-Aug-96	13:12	3-Aug-96	08:52	0.6
O3	1	12W 0479694 7322767	Normal	2-Aug-96	12:16	3-Aug-96	08:35	1.0
	2	12W 0479893 7322600	Normal	2-Aug-96	12:20	3-Aug-96	08:30	1.0
	3	12W 0479688 7322591	Normal	2-Aug-96	12:25	3-Aug-96	08:40	0.5
	4	12W 0479486 7322592	Normal	2-Aug-96	12:30	3-Aug-96	08:43	0.5
	5	12W 0479636 7322654	Giant	2-Aug-96	12:30	3-Aug-96	08:45	4.0
	6	12W 0479775 7322583	Giant	2-Aug-96	12:35	3-Aug-96	08:48	14.0
O4	1	12W 0479733 7324101	Giant	1-Aug-96	12:10	2-Aug-96	11:45	8.5
	2	12W 0479773 7324012	Giant	1-Aug-96	12:15	2-Aug-96	11:50	8.0
	3	12W 0479650 7323943	Normal	1-Aug-96	12:20	2-Aug-96	11:50	0.3
	4	12W 0479680 7323740	Normal	1-Aug-96	12:25	2-Aug-96	11:55	0.5
	5	12W 0480019 7323718	Normal	1-Aug-96	12:25	2-Aug-96	11:55	0.7

Appendix F3A Concluded.

Lake	Site	UTM Coordinates	Trap Type	Set		Pulled		Depth (m)
				Date	Time	Date	Time	
O5	1	12W 0479903 7324840	Normal	1-Aug-96	12:34	2-Aug-96	09:00	1.2
	2	12W 0480039 7325097	Normal	1-Aug-96	12:38	2-Aug-96	09:07	0.8
	3	12W 0480202 7324976	Normal	1-Aug-96	12:40	2-Aug-96	09:11	1.0
	4	12W 0480323 7324864	Normal	1-Aug-96	12:44	2-Aug-96	09:15	0.5
	5	12W 0480128 7324864	Giant	1-Aug-96	12:50	2-Aug-96	09:17	6.0
	6	12W 0480211 7324801	Giant	1-Aug-96	12:52	2-Aug-96	09:20	3.0
D4	1	12W 0479853 7319148	Normal	27-Jul-96	12:57	28-Jul-96	08:41	1.0
	2	12W 0480485 7319186	Normal	27-Jul-96	13:04	28-Jul-96	08:47	0.3
	3	12W 0480297 7319537	Giant	27-Jul-96	13:15	28-Jul-96	08:51	10.0
	4	12W 0480136 7319010	Normal	27-Jul-96	13:19	28-Jul-96	09:01	0.5
	5	12W 0479609 7319018	Giant	27-Jul-96	13:25	28-Jul-96	09:30	11.0
	6	12W 0479594 7318962	Normal	27-Jul-96	13:30	28-Jul-96	09:28	0.8
D5	1	12W 0479150 7318796	Normal	26-Jul-96	14:30	27-Jul-96	08:35	1.0
	2	12W 0479057 7318761	Normal	26-Jul-96	14:36	27-Jul-96	08:40	0.5
	3	12W 0478545 7318669	Normal	26-Jul-96	14:40	27-Jul-96	08:42	0.5
	4	12W 0478712 7318725	Giant	26-Jul-96	14:45	27-Jul-96	08:45	8.0
	5	12W 0478793 7318814	Normal	26-Jul-96	14:50	27-Jul-96	08:47	0.8
	6	12W 0478909 7318817	Giant	26-Jul-96	14:55	27-Jul-96	08:50	4.0
Contwoyto	1	12W 0481676 7318549	Normal	28-Jul-96	13:05	29-Jul-96	08:43	0.3
	2	12W 0481547 7318875	Normal	28-Jul-96	13:14	29-Jul-96	08:52	2.0
	3	12W 0481690 7318863	Normal	28-Jul-96	13:18	29-Jul-96	08:52	1.0
	4	12W 0481895 7318750	Normal	28-Jul-96	13:22	29-Jul-96	08:54	1.0
	5	12W 0481870 7318767	Giant	28-Jul-96	13:25	29-Jul-96	08:56	12.0
	6	12W 0481728 7318669	Giant	28-Jul-96	13:36	29-Jul-96	08:59	12.0
	7	12W 0481719 7318414	Giant	29-Jul-96	09:27	30-Jul-96	11:17	10.0
	8	12W 0482241 7318888	Giant	29-Jul-96	09:34	30-Jul-96	11:35	9.0
	9	12W 0482214 7318968	Normal	29-Jul-96	09:36	30-Jul-96	11:28	0.8
	10	12W 0482607 7319000	Normal	29-Jul-96	09:41	30-Jul-96	11:25	1.0
	11	12W 0482362 7318989	Normal	29-Jul-96	09:47	30-Jul-96	11:30	1.0
	12	12W 0481695 7318610	Normal	29-Jul-96	09:51	30-Jul-96	11:15	1.2
	13	12W 0481719 7318414	Giant	30-Jul-96	11:36	31-Jul-96	08:32	9.0
	14	12W 0482241 7318888	Giant	30-Jul-96	11:41	31-Jul-96	08:40	9.0
	15	12W 0481547 7318875	Normal	30-Jul-96	11:45	31-Jul-96	08:45	1.5
	16	12W 0481547 7318875	Normal	30-Jul-96	11:46	31-Jul-96	08:47	1.5
	17	12W 0481676 7318549	Normal	30-Jul-96	11:48	31-Jul-96	08:49	2.0
	18	12W 0481676 7318549	Normal	30-Jul-96	11:50	31-Jul-96	08:50	2.0

[1] nd = no data



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Appendix F3B

Gee Minnow Trap Sampling Sites

Jericho Study Area, 1996.

Appendix F4 Angling effort in sampled lakes during summer and fall, Jericho study area, 1996.

Lake	Date	Start	Finish	Effort (h)	Lake trout
Lake D4	06-Aug-96	10:14	10:30	0.3	1
	06-Aug-96	10:14	10:30	0.3	
	06-Aug-96	10:46	11:34	0.9	
	06-Aug-96	10:46	11:34	0.9	
	06-Aug-96	13:08	14:24	1.3	1
	06-Aug-96	13:08	14:24	1.3	
	06-Aug-96	15:20	16:50	1.5	1
	06-Aug-96	15:20	16:50	1.5	1
	Sum			**8.0**	**4**
Lake D5	27-Jul-96	11:15	12:00	0.8	
	27-Jul-96	11:15	12:00	0.8	
	04-Aug-96	12:15	13:00	0.8	
	04-Aug-96	12:15	13:00	0.8	
	04-Aug-96	14:00	16:00	2.0	
	Sum			**5.2**	**0**
Interbasin One	05-Sep-96	15:30	16:30	1.0	
	Sum			**1.0**	**0**
Interbasin Two	05-Sep-96	14:00	15:00	1.0	
	Sum			**1.0**	**0**
Lake O2	07-Sep-96	13:40	15:10	1.5	
	07-Sep-96	13:40	15:10	1.5	
	Sum			**3.0**	**0**
Lake O3	07-Sep-96	14:30	16:30	2.0	1
	Sum			**2.0**	**1**
Lake D4	03-Sep-96	14:00	14:50	0.9	
	03-Sep-96	15:45	16:50	0.9	
	Sum			**1.8**	**2**
Lake D5	03-Sep-96	15:00	15:30	0.5	1
	03-Sep-96	15:00	15:30	0.5	
	03-Sep-96	16:30	17:00	0.5	
	03-Sep-96	16:30	17:00	0.5	
	09-Sep-96	13:00	15:30	2.5	
	Sum			**4.5**	**3**

Appendix F5 R.L. & L. ENVIRONMENTAL SERVICES LTD. FISH SPECIES ABBREVIATIONS

ABBR.	COMMON NAME	SCIENTIFIC NAME	ABBR.	COMMON NAME	SCIENTIFIC NAME
CTTR	Cutthroat trout	*Oncorhynchus clarki*	BURB	Burbot	*Lota lota*
BLTR	Bull trout	*Salvelinus malma*	SLSC	Slimy sculpin	*Cottus cognatus*
LKTR	Lake trout	*Salvelinus namaycush*	SPSC	Spoonhead sculpin	*Cottus ricei*
ARCH	Arctic char	*Salvelinus alpinus*	PRSC	Prickly sculpin	*Cottus asper*
ARGR	Arctic grayling	*Thymallus arcticus*	SHSC	Shorthead sculpin	*Cottus confusus*
MNWH	Mountain whitefish	*Prosopium williamsoni*	PSSC	Pacific staghorn sculpin	*Leptocottus armatus*
RNWH	Round whitefish	*Prosopium cylindraceum*	MTSC	Mottled sculpin	*Cottus bairdi*
PGWH	Pygmy whitefish	*Prosopium coulteri*	TRSC	Torrent sculpin	*Cottus rhotheus*
LKWH	Lake whitefish	*Coregonus clupeaformis*	BRST	Brook stickleback	*Culaea inconstans*
BRWH	Broad whitefish	*Coregonus nasus*	NNST	Ninespine stickleback	*Pungitius pungitius*
CISC	Ciscoe	*Coregonus artedii*	THST	Threespine stickleback	*Gasterosteus aculeatus*
INCO	Inconnu	*Stenodus leucichthys*	RDSH	Redside shiner	*Richardsonius balteatus*
PINK	Pink salmon	*Oncorhynchus gorbuscha*	NRSQ	Northern squawfish	*Ptychocheilus oregonensis*
CHUM	Chum salmon	*Oncorhynchus keta*	PRDC	Pearl dace	*Semotilus margarita*
COHO	Coho salmon	*Oncorhynchus kisutch*	PEAM	Peamouth	*Mylocheilus caurinus*
SOCK	Sockeye salmon	*Oncorhynchus nerka*	FLCH	Flathead chub	*Platygobid gracilis*
KOKA	Kokanee	*Oncorhynchus nerka*	LKCH	Lake chub	*Couesius plumbeus*
CHIN	Chinook salmon	*Oncorhynchus tshawytscha*	LNDC	Longnose dace	*Rhinichthys cataractae*
LNSC	Longnose sucker	*Catostomus catostomus*	FNDC	Finescale dace	*Pfrille neogaeus*
WHSC	White sucker	*Catostomus commersoni*	NRDC	Northern redbelly dace	*Chrosomus eos*
LRSC	Largescale sucker	*Catostomus macrocheilus*	LPDC	Leopard dace	*Rhinichthys falcatus*
BRSC	Bridgelip sucker	*Catostomus columbianus*	EMSH	Emerald shiner	*Notropis atherinoides*
MNSC	Mountain sucker	*Catostomus platyrhynchus*	SPSH	Spottail shiner	*Notropis hudsonius*
CARP	Carp	*Cyprinus carpio*	FTMN	Fathead minnow	*Pimephales promelas*
CHIS	Chiselmouth	*Acrocheilus alutaceus*	TRPR	Trout-perch	*Percopsis omiscomaycus*
SMBS	Smallmouth bass	*Micropterus dolomievi*	IWDR	Iowa darter	*Etheostoma exile*
LKST	Lake sturgeon	*Acipenser fulvescens*	STFL	Starry flounder	*Platichthys stellatus*
WHST	White sturgeon	*Acipenser transmontanus*	LNSM	Longfin smelt	*Spirinchus thaleichthys*
GOLD	Goldeye	*Hiodon alosdides*	EUAL	Eualchon	*Thaleichthys pacificus*
NRPK	Northern pike	*Esox lucius*	PCLM	Pacific lamprey	*Entosphenus tridentatus*
WBLM	Western brook lamprey	*Lampetra richardsoni*	ARLM	Arctic lamprey	*Lampetra japonica*
LSCS	Least cisco	*Coregonus sardinella*	ARCS	Arctic cisco	*Coregonus autumnalis*

SEX AND MATURITY DESCRIPTIONS

M	F	CLASS	DESCRIPTION
		Immature A	Sex indeterminable due to small gonad size.
01	11	Immature B	Small gonad size; fish has never spawned and will not spawn during the coming spawning season.
02	12	Maturity questionable	Small gonad size; it cannot be determined if fish is immature or if it will spawn during the coming spawning season.
03	13	Developing A	Definite gonad development; fish has never spawned before but will spawn during the coming season.
04	14	Developing B	Definite gonad development; the fish has spawned before and will spawn during the coming season.
05	15	Developing C	Definite gonad development; the fish has spawned before but will not spawn during the coming spawning season, i.e., alternate year spawners.
06	16	Developing D	Used to indicate definite gonad development when the classification into categories "developing A,B, or C cannot be determined, or when such a breakdown is unsuitable or unnecessary.
07	17	Gravid/fully developed	Sexual organs fill ventral cavity testes white, drops of milt fall with pressure; eggs completely round, some already translucent.
08	18	Ripe	Roe or milt are extruded by slight pressure on the belly.
09	19	Spent	Spawning completed; resorption of residual ovarian tissue is not yet complete.
10	20	External	Sex determined by external characteristics; maturity and sex not verified by gonad examination.
99	99	Adult/Juvenile	Based on fish size; sex not determined.

OTHER CODES

CODE	AGEING METHODS	CODE	AGEING METHODS
SC	Scales	CL	Cleithra
OT	Otoliths	CS	Cleithra and scales
SO	Scales and otoliths	VE	Vertebrae
FR	Fin ray	OB	Other bones
SF	Scales and fin rays	LF	Length-frequency

CODE	CAPTURE METHODS
FD	Found dead
SL	Set line
DN	Dip net
GN	Gill net
ES	Electroshocker - Boat shocker
EF	Electrofisher - backpack shocker
BS	Beach seine
OB	Observed - not captured
TU	Trap - fish moving upstream
TD	Trap - fish moving downstream
AL	Angling (Using lures)
AF	Angling (Using flies)
AB	Angling (Using bait)
CR	Creel - sampled from a fisherman's creel
CF	Commercial fisherman's catch
GE	Small Gee trap
GT	Large Gee trap

CODE	TAG CODE
Y, W, R	Color code for tag (i.e., Yellow, White, or Red)
F	Fin clip: 1=Adipose, 2=R. Pectoral, 3=L. Pectoral, 4=R. Pelvic, 5=L. Pelvic, 6=Dorsal, 9=Fin Punch.

CODE	CAPTURE CODE
0	First capture, released
1	First capture, sacrificed
2	Recapture, released
3	Recapture, sacrificed

CODE	STOMACH CONTENT CODE
ZOO	Zooplankton
CHI	Chirnomids
TRI	Trichopterans
FIS	Fish
DIP	Dipterans
COL	Coleopterans
PEL	Pelecypods
BRA	Brachiopods
INS	Insects
ROD	Rodent
GAS	Gastropods
UNI	Unidentified

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
1	A	1	ARGR	126	20	0		SC	EF	0	0	12	6	96	FUEL	LO3	TO16	1	0			
1	A	2	ARCH	560	1950	0		FR	EF	0	0	12	6	96	FUEL	LO1	TO18	1	0			
1	A	3	ARGR	120	18	0		SC	EF	0	0	13	6	96	FUEL	LO1	TO19	1	0			
1	A	4	ARCH	78	4	0		SC	EF	0	0	14	6	96	MINE	CARAT	TC02	1	0			
1	A	5	ARCH	51	0	0	0	SC	EF	0	0	14	6	96	MINE	CARAT	TC02	1	1			
1	A	6	SLSC	64	2	0			EF	0	0	14	6	96	MINE	CARAT	TC02	1	0			
1	A	7	SLSC	46	0	0			EF	0	0	14	6	96	MINE	CARAT	TC02	1	0			
1	A	8	ARCH	52	0	0	0	SC	EF	0	0	14	6	96	MINE	CARAT	TC02	1	0			
1	A	9	SLSC	41	0	0			EF	0	0	14	6	96	MINE	CARAT	TC02	1	1			
1	A	10	ARGR	118	16	0		SC	EF	0	0	15	6	96	FUEL	LO5	TO14	1	0			
1	A	11	ARGR	112	16	0	1	SC	EF	0	0	15	6	96	FUEL	LO5	TO05	1	0			
1	A	12	ARGR	137	20	0		SC	EF	0	0	15	6	96	FUEL	LO5	TO05	1	0			
1	A	13	ARCH	212	94	0		SC	EF	0	0	15	6	96	FUEL	LO5	TO14	1	0			
1	A	14	ARGR	109	14	0		SC	EF	0	0	15	6	96	FUEL	LO5	TO14	1	0			
1	A	15	ARCH	46	0	0			EF	0	0	16	6	96	MINE	INTER	TC10	1	0			
1	A	16	BURB	102	6	0			EF	0	0	16	6	96	MINE	INTER	TC12	1	0			
1	A	17	SLSC	91	8	0			EF	0	0	16	6	96	MINE	INTER	TC12	1	0			
1	A	18	SLSC	45	0	0			EF	0	0	16	6	96	MINE	INTER	TC12	1	0			
1	A	19	SLSC	48	0	0			EF	0	0	16	6	96	MINE	INTER	TC12	1	0			
1	A	20	SLSC	55	0	0			EF	0	0	16	6	96	MINE	INTER	TC13	1	0			
1	A	21	ARGR	125	8	0		SC	EF	0	0	16	6	96	FUEL	LO2	TO22	1	0			
1	A	22	NNST	45	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0			
1	A	23	ARGR	126	20	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	2	SCALES TAKEN PREV.		
1	A	24	SLSC	62	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0			
1	A	25	SLSC	20	0	0			EF	0	0	16	6	96	FUEL	LO4	TO10	1	0			
1	A	26	ARCH	91	10	0		SC	EF	0	0	16	6	96	FUEL	LO4	TO12	1	0			
1	A	27	SLSC	49	0	0			EF	0	0	16	6	96	FUEL	LO4	TO12	1	0			
1	A	28	BURB	129	14	0			EF	0	0	16	6	96	FUEL	LO4	TO12	1	0			
1	A	29	ARGR	106	8	0		SC	EF	0	0	16	6	96	FUEL	LO4	TO12	1	0			
1	A	30	BURB	168	32	0			EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	31	ARGR	119	20	0	1	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	32	ARGR	135	24	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	33	ARGR	124	22	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	34	ARGR	119	16	0	1	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	35	ARGR	58	0	0			EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	36	ARGR	110	16	0	1	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	37	ARGR	131	22	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	38	ARGR	121	18	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO01	1	0			
1	A	39	ARGR	123	16	0	1	SC	EF	0	0	17	6	96	MINE	RIVER	TO02	1	0			
1	A	40	ARGR	125	14	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO02	1	0			
1	A	41	ARGR	168	48	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO03	1	0			
1	A	42	ARGR	258	202	0	4	SC	EF	0	2906	17	6	96	MINE	RIVER	TO04	1	0	SMALL TAG		
1	A	43	ARGR	171	54	0	3	SC	EF	0	0	17	6	96	MINE	RIVER	TO04	1	0			
1	A	44	ARGR	170	56	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO04	1	0			
1	A	45	ARGR	181	58	0	3	SC	EF	0	0	17	6	96	MINE	RIVER	TO04	1	0			
1	A	46	ARGR	125	20	0	2	SC	EF	0	0	17	6	96	MINE	RIVER	TO04	1	0			
1	A	47	ARCH	48	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	48	ARCH	52	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	49	ARCH	52	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	50	ARCH	56	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	51	ARCH	53	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	52	ARCH	52	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	53	ARCH	54	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	54	ARCH	48	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	55	ARCH	54	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	56	ARCH	53	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	57	ARCH	52	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	58	ARCH	61	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	59	ARCH	49	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	60	ARCH	48	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	61	ARCH	52	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	62	ARCH	50	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	63	RNWH	53	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	1			
1	A	64	SLSC	44	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	65	RNWH	102	10	0		SC	EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	66	RNWH	84	4	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	67	RNWH	108	10	0	2	SC	EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	68	RNWH	86	6	0		SC	EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	69	RNWH	74	4	0	1	SC	EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	70	ARCH	45	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	71	ARCH	47	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	72	ARCH	49	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	73	ARCH	50	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	74	ARCH	53	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	75	ARCH	51	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	76	ARCH	54	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	77	ARCH	48	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	78	ARCH	98	14	0	1	SC	EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	79	RNWH	88	6	0	1	SC	EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	80	ARCH	53	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	81	ARCH	55	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	82	ARCH	57	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	83	ARCH	46	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	84	ARCH	59	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	85	ARCH	48	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	86	ARCH	87	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	87	ARCH	68	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	88	ARCH	62	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	89	RNWH	86	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0			
1	A	90	SLSC	74	0	0			EF	0	0	18	6	96	TAIL	CONTW	TB01	1	0			
1	A	91	LKTR	175	54	0		SC	EF	0	0	18	6	96	TAIL	CONTW	TB01	1	0			
1	A	94	ARCH	75	4	0			EF	0	0	18	6	96	TAIL	LD4	TD01	1	0	LAKE OUTLET		
1	A	109	LKTR	204	90	0		FR	EF	0	2781	19	6	96	TAIL	CONTW	TF01	1	0			
1	A	110	LKTR	214	106	0		FR	EF	0	2780	19	6	96	TAIL	CONTW	TF01	1	0			
1	A	111	SLSC	28	0	0			EF	0	0	19	6	96	TAIL	CONTW	TE01	1	0			
1	A	112	SLSC	74	0	0			EF	0	0	19	6	96	TAIL	CONTW	TE01	1	0			
1	A	113	SLSC	70	0	0			EF	0	0	19	6	96	TAIL	CONTW	TE01	1	0			
1	A	114	SLSC	30	0	0			EF	0	0	19	6	96	TAIL	CONTW	TE01	1	0			
1	A	115	SLSC	32	0	0			EF	0	0	19	6	96	TAIL	CONTW	TE01	1	0			
1	A	116	SLSC	80	0	0			EF	0	0	19	6	96	TAIL	CONTW	TE01	1	0			
1	A	117	LKTR	116	16	0	2	SC	EF	0	0	19	6	96	TAIL	LD5	TD06	1	0	LAKE OUTLET		
1	A	118	LKTR	129	22	0	2	SC	EF	0	0	19	6	96	TAIL	LD5	TD06	1	0			
1	A	119	LKTR	119	20	0	2	SC	EF	0	0	19	6	96	TAIL	LD5	TD06	1	0			
1	A	120	SLSC	70	0	0			EF	0	0	19	6	96	MINE	CARAT	TC01	1	0			
1	A	121	RNWH	113	0	0	2	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	122	RNWH	115	0	0	2	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	123	RNWH	125	0	0	2	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	124	RNWH	111	0	0	2	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	125	ARCH	97	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	126	ARCH	72	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	127	ARGR	113	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
1	A	128	RNWH	145	0	0	2	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	129	ARCH	75	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	130	ARGR	130	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	131	ARGR	132	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	132	ARGR	119	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	133	ARGR	119	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	134	ARCH	70	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	135	RNWH	116	0	0	2	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	136	ARCH	66	0	0	0	SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	137	ARCH	117	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	138	SLSC	85	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	139	SLSC	69	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	140	ARCH	75	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	141	ARCH	66	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	142	ARCH	71	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	143	ARCH	48	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	144	LKTR	170	0	0			EF	0	0	20	6	96	MINE	CARAT	TC02	1	0	CAUGHT BY HAND		
1	A	145	ARCH	75	0	0		SC	EF	0	0	20	6	96	FUEL	LO1	TO18	1	0			
1	A	146	RNWH	126	10	0	2	SC	EF	0	0	21	6	96	FUEL	LO4	TO06	1	0			
1	A	147	ARCH	119	10	0		SC	EF	0	0	21	6	96	FUEL	LO4	TO06	1	0			
1	A	148	SLSC	57	0	0			EF	0	0	21	6	96	FUEL	LO4	TO06	1	0			
1	A	149	SLSC	49	0	0			EF	0	0	21	6	96	FUEL	LO4	TO06	1	0			
1	A	150	ARGR	120	14	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	151	ARGR	111	16	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	152	ARGR	136	24	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	153	ARGR	122	18	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	154	ARGR	121	28	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	155	ARGR	122	16	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	156	ARGR	133	22	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	157	ARGR	124	20	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	158	ARGR	113	10	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	159	ARGR	125	16	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	160	ARGR	166	50	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	161	ARGR	135	20	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	162	ARGR	126	20	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	163	ARGR	136	28	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	164	ARGR	178	84	0		SC	EF	0	0	21	6	96	FUEL	LO5	TO05	1	0			
1	A	165	SLSC	70	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0			
1	A	166	ARGR	62	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0			
1	A	167	ARGR	58	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0			
1	A	168	ARGR	121	12	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	169	ARGR	117	12	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	170	ARGR	120	8	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	171	ARGR	114	10	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	172	ARGR	95	6	0	1	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	173	SLSC	59	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	174	ARGR	137	20	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	175	ARGR	133	28	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	176	ARGR	146	38	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	177	ARGR	123	22	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	178	ARGR	122	16	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	179	ARGR	133	28	0	2	SC	EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	180	SLSC	83	4	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	181	SLSC	63	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0			
1	A	182	SLSC	56	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	183	ARCH	66	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	184	ARCH	73	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	185	ARCH	75	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	186	ARCH	72	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	187	ARCH	73	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	188	ARCH	66	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	189	SLSC	42	0	0			EF	0	0	24	6	96	FUEL	LO1	TO19	1	0			
1	A	190	SLSC	0	0	0			EF	0	0	12	6	96	FUEL	LO3	TO21	1	0	OBSERVED		
1	A	191	LKTR	0	0	0			EF	0	0	14	6	96	MINE	CARAT	TC02	1	0	OBSERVED		
1	A	192	ARGR	0	0	0			EF	0	0	15	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	193	ARGR	0	0	0			EF	0	0	15	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	194	LKTR	0	0	0			SN	0	0	16	6	96	MINE	MINE	TC15	1	0	OBSERVED		
1	A	195	LKTR	0	0	0			SN	0	0	16	6	96	MINE	MINE	TC15	1	0	OBSERVED		
1	A	196	LKTR	0	0	0			EF	0	0	18	6	96	TAIL	CONTW	TB01	1	0	OBSERVED		
1	A	200	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	201	LKTR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	202	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	203	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	204	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	205	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	206	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	207	ARGR	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	208	RNWH	0	0	0			EF	0	0	20	6	96	FUEL	LO1	TO18	1	0	OBSERVED		
1	A	209	ARGR	0	0	0			SN	0	0	21	6	96	MINE	RIVER	TO07A	1	0	OBSERVED JUVENILE		
1	A	210	SLSC	0	0	0			EF	0	0	21	6	96	FUEL	LO4	TO06	1	0	OBSERVED		
1	A	211	SLSC	0	0	0			EF	0	0	21	6	96	FUEL	LO4	TO06	1	0	OBSERVED		
1	A	212	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	213	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	214	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	215	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	216	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	217	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	218	ARGR	0	0	0			EF	0	0	21	6	96	FUEL	LO5	TO05	1	0	OBSERVED		
1	A	219	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	OBSERVED		
1	A	220	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	OBSERVED		
1	A	221	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	OBSERVED		
1	A	222	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	OBSERVED		
1	A	223	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	OBSERVED		
1	A	224	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	0BSERVED		
1	A	225	ARGR	0	0	0			EF	0	0	16	6	96	FUEL	LO2	TO22	1	0	OBSERVED		
1	A	226	ARGR	0	0	0			EF	0	0	17	6	96	MINE	RIVER	TO02	1	0	OBSERVED		
1	A	227	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	228	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	229	SLSC	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	230	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	231	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	232	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	233	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	234	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	235	LKTR	0	0	0			EF	0	0	18	6	96	MINE	CARAT	TC01	1	0	OBSERVED		
1	A	237	ARGR	0	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0	OBSERVED		
1	A	238	ARGR	0	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0	OBSERVED		
1	A	239	ARGR	0	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0	OBSERVED		
1	A	240	ARGR	0	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0	OBSERVED		
1	A	241	ARGR	0	0	0			EF	0	0	24	6	96	MINE	RIVER	TO08	1	0	OBSERVED		
1	A	242	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
1	A	243	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	244	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	245	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	246	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	247	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	248	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	249	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	250	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	251	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	252	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	253	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	254	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	255	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	256	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	257	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	258	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	259	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	260	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	261	ARGR	0	0	0			EF	0	0	24	6	96	MINE	CARAT	TC06	1	0	OBSERVED		
1	A	262	ARGR	183	54	0			EF	0	0	15	6	96	FUEL	LO5	TO05	1	0			
1	A	263	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	264	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	265	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	266	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	267	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	268	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	269	ARGR	0	0	0			OB	0	0	17	6	96	CROSS	CROSS	TX53	1	0	OBSERVED		
1	A	270	SLSC	0	0	0			EF	0	0	13	6	96	FUEL	LO1	TO19	1	0	OBSERVED		
1	A	271	NNST	0	0	0			EF	0	0	16	6	96	FUEL	LO4	TO11	1	0	OBSERVED		
1	A	272	NNST	0	0	0			EF	0	0	16	6	96	FUEL	LO4	TO11	1	0	OBSERVED		
1	A	273	NNST	0	0	0			EF	0	0	16	6	96	FUEL	LO4	TO11	1	0	OBSERVED		
1	A	274	NNST	0	0	0			EF	0	0	16	6	96	FUEL	LO4	TO11	1	0	OBSERVED		
1	A	275	NNST	0	0	0			EF	0	0	16	6	96	FUEL	LO4	TO11	1	0	OBSERVED		
1	A	276	NNST	0	0	0			EF	0	0	6	6	96	FUEL	LO4	TO11	1	0	OBSERVED		
2	A	301	ARCH	586	2004	0		FR	GN	64	364	22	7	96	MINE	MINE	JERIC	1	0			
2	A	302	ARCH	548	2140	0		FR	GN	89	0	22	7	96	MINE	MINE	JERIC	1	0			
2	A	303	ARCH	249	188	0		SF	GN	19	0	22	7	96	MINE	MINE	JERIC	1	0			
2	A	304	ARCH	293	390	0		SF	GN	38	0	22	7	96	MINE	MINE	JERIC	1	0			
2	A	305	ARCH	290	432	11		OT	GN	38	0	22	7	96	MINE	MINE	JERIC	1	1			08ZOO02CHI
2	A	306	ARCH	229	312	1		OT	GN	38	0	22	7	96	MINE	MINE	JERIC	1	1			10ZOO
2	A	307	ARCH	229	286	11			GN	64	0	22	7	96	MINE	MINE	JERIC	1	1			10ZOO
2	A	308	ARCH	416	792	1		OT	GN	64	0	22	7	96	MINE	MINE	JERIC	1	1			0
2	A	309	ARCH	407	838	17		OT	GN	64	0	22	7	96	MINE	MINE	JERIC	1	1			10ZOO
2	A	310	ARCH	560	1092	12		OT	GN	89	459	22	7	96	MINE	MINE	JERIC	1	3			0
2	A	311	ARCH	519	1400	0		FR	GN	64	500	22	7	96	MINE	MINE	JERIC	2	0			
2	A	312	LKTR	542	1470	0		FR	GN	64	0	22	7	96	MINE	MINE	JERIC	2	0			
2	A	313	LKTR	602	2026	2		OT	GN	114	0	22	7	96	MINE	MINE	JERIC	2	1	INGESTED RLL355/356		0
2	A	314	ARCH	568	1900	0		FR	GN	89	0	23	7	96	MINE	MINE	JERIC	1	0			
2	A	315	ARCH	390	650	0		SF	GN	89	0	23	7	96	MINE	MINE	JERIC	1	0			
2	A	316	ARCH	0	0	0			GN	0	364	23	7	96	MINE	MINE	JERIC	1	2	RND		
2	A	317	LKTR	229	125	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			0
2	A	318	LKTR	178	55	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			4ZOO1CHI
2	A	319	ARCH	264	155	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			05ZOO
2	A	320	LKTR	190	65	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			01FIS
2	A	321	ARCH	195	95	1			GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			10ZOO
2	A	322	LKTR	170	45	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			15ZOO
2	A	323	ARCH	265	180	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			05ZOO
2	A	324	LKTR	166	60	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			3ZOO2DIP
2	A	325	ARCH	173	65	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			01ZOO
2	A	326	ARCH	206	85	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			15SCU
2	A	327	LKTR	202	90	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			15SCU05ZOO
2	A	328	LKTR	160	30	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			01ZOO
2	A	329	ARCH	293	280	11		OT	GN	64	0	23	7	96	MINE	MINE	JERIC	1	1			0
2	A	330	ARCH	289	275	11		OT	GN	64	0	23	7	96	MINE	MINE	JERIC	1	1			10ZOO
2	A	331	ARCH	269	235	11		OT	GN	64	0	23	7	96	MINE	MINE	JERIC	1	1			10ZOO
2	A	332	LKTR	374	605	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1			0
2	A	333	LKTR	655	3240	12		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	1	1	INGESTED RLL TAG457		05ROD05FIS
2	A	334	ARCH	639	2000	2		OT	GN	89	0	23	7	96	MINE	MINE	JERIC	1	1			0
2	A	335	LKTR	504	1400	12		OT	GN	114	0	23	7	96	MINE	MINE	JERIC	1	1			05ZOO
2	A	336	LKTR	482	1250	0		FR	GN	114	0	23	7	96	MINE	MINE	JERIC	2	0			
2	A	337	ARCH	443	900	0		FR	GN	89	0	23	7	96	MINE	MINE	JERIC	2	0			
2	A	338	LKTR	478	1200	1		OT	GN	64	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	339	LKTR	458	1100	1		OT	GN	64	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	340	ARCH	529	1040	12		OT	GN	89	0	23	7	96	MINE	MINE	JERIC	2	1			05ZOO
2	A	341	LKTR	618	2050	2		OT	GN	89	0	23	7	96	MINE	MINE	JERIC	2	1			5FIS
2	A	342	LKTR	510	1050	17		OT	GN	89	0	23	7	96	MINE	MINE	JERIC	2	1			10ZOO
2	A	343	LKTR	358	500	11		OT	GN	89	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	344	LKTR	270	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			4ZOO1CHI
2	A	345	LKTR	218	0	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	346	LKTR	280	0	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	347	LKTR	237	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			01ZOO
2	A	348	LKTR	238	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			05ZOO
2	A	349	LKTR	171	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			3INS1ZOO1PEL
2	A	350	ARCH	210	0	0		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1	ROTTEN		
2	A	351	LKTR	229	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	352	LKTR	224	0	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			05ZOO
2	A	353	LKTR	198	0	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	354	LKTR	200	0	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			10ZOO
2	A	355	LKTR	174	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			5ZOO5FIS
2	A	356	ARCH	228	0	0		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1	ROTTEN		
2	A	357	LKTR	208	0	0		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1	ROTTEN		
2	A	358	LKTR	228	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			05ZOO
2	A	359	LKTR	245	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			10ZOO
2	A	360	ARCH	203	0	1			GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			05ZOO
2	A	361	LKTR	196	0	11		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			05ZOO
2	A	362	LKTR	187	0	1		OT	GN	38	0	23	7	96	MINE	MINE	JERIC	2	1			0
2	A	363	BURB	120	0	0			GT	38	0	23	7	96	MINE	MINE	JERIC	4	0			
2	A	364	ARCH	520	1595	0		FR	GN	89	0	24	7	96	MINE	MINE	CARAT	2	0			
2	A	365	LKTR	85	5	99	1	OT	GN	19	0	24	7	96	MINE	MINE	CARAT	2	1			10ZOO
2	A	366	LKTR	174	50	99		OT	GN	19	0	24	7	96	MINE	MINE	CARAT	2	1			10ZOO
2	A	367	LKTR	98	10	99		OT	GN	19	0	24	7	96	MINE	MINE	CARAT	2	1			05ZOO
2	A	368	ARCH	562	1420	10		SF	GN	19	499	24	7	96	MINE	MINE	CARAT	1	0	KYPE		
2	A	369	ARCH	314	335	1	6	OT	GN	38	0	24	7	96	MINE	MINE	CARAT	1	1			01ZOO
2	A	370	LKTR	263	200	11		OT	GN	38	0	24	7	96	MINE	MINE	CARAT	1	1			11ZOO04FIS
2	A	371	LKTR	201	80	11		OT	GN	38	0	24	7	96	MINE	MINE	CARAT	1	1			10FIS
2	A	372	LKTR	195	80	11		OT	GN	38	0	24	7	96	MINE	MINE	CARAT	1	1			0
2	A	373	ARCH	466	1175	17	10	OT	GN	64	0	24	7	96	MINE	MINE	CARAT	1	1			4ZOO1CHI
2	A	374	LKTR	331	370	11		OT	GN	38	0	24	7	96	MINE	MINE	CARAT	2	1			01CHI
2	A	375	LKTR	226	105	99		OT	GN	38	0	24	7	96	MINE	MINE	CARAT	2	1			0
2	A	376	LKTR	230	105	1		OT	GN	38	0	24	7	96	MINE	MINE	CARAT	2	1			0
2	A	377	LKTR	356	440	11		OT	GN	64	0	24	7	96	MINE	MINE	CARAT	2	1			5COL5FIS

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	378	LKTR	475	1200	12	25	OT	GN	64	0	24	7	96	MINE	MINE	CARAT	1	1		501-99	4ZOO1CHI
2	A	379	LKTR	520	1500	12	22	OT	GN	64	0	24	7	96	MINE	MINE	CARAT	1	1		501-97	05ZOO
2	A	380	LKTR	410	780	1	14	OT	GN	64	0	24	7	96	MINE	MINE	CARAT	1	1		501100	05ZOO
2	A	381	LKTR	481	1425	12	22	OT	GN	38	0	24	7	96	MINE	MINE	CARAT	2	1		501-84	3ZOO2CHI
2	A	382	RNWH	407	1260	7	29	OT	GN	38	0	24	7	96	MINE	MINE	CARAT	2	1		501-92	15TRI
2	A	383	LKTR	428	940	12	11	OT	GN	89	0	24	7	96	MINE	MINE	CARAT	1	1		501-77	4ZOO1CHI
2	A	384	LKTR	580	2300	7	26	OT	GN	64	0	24	7	96	MINE	MINE	CARAT	2	1		501-87	0
2	A	385	LKTR	420	950	12	14	OT	GN	89	0	24	7	96	MINE	MINE	CARAT	2	1		501-94	4ZOO1CHI
2	A	386	LKTR	439	900	1	13	OT	GN	38	0	24	7	96	MINE	MINE	CARAT	1	1		501-85	0
2	A	387	RNWH	424	940	7	10	OT	GN	64	0	25	7	96	MINE	MINE	CARAT	3	1		501-95	10TRI
2	A	388	RNWH	469	1200	17	25	OT	GN	64	0	25	7	96	MINE	MINE	CARAT	3	1		501-76	10TRI
2	A	389	RNWH	465	1130	7	23	OT	GN	89	0	25	7	96	MINE	MINE	CARAT	3	1		501-67	0
2	A	390	RNWH	485	1500	7	22	OT	GN	89	0	25	7	96	MINE	MINE	CARAT	3	1		501-89	10TRI05CHI
2	A	391	LKTR	421	950	7	15	OT	GN	89	0	25	7	96	MINE	MINE	CARAT	3	1		501-83	4ZOO1DIP
2	A	392	RNWH	475	1310	7	21	OT	GN	114	0	25	7	96	MINE	MINE	CARAT	3	1		501-82	2CHI8TRI
2	A	393	RNWH	455	1050	7	16	OT	GN	114	0	25	7	96	MINE	MINE	CARAT	3	1		501-72	3FIS2TRI
2	A	394	RNWH	464	1150	17	13	OT	GN	114	0	25	7	96	MINE	MINE	CARAT	3	1		501-71	6PEL4ZOO
2	A	395	LKTR	546	1960	7	24	OT	GN	38	0	25	7	96	MINE	MINE	CARAT	4	1		501-79	10PEL
2	A	396	LKTR	490	1280	7	22	OT	GN	38	0	25	7	96	MINE	MINE	CARAT	4	1		501-80	3ZOO1COL1PEL
2	A	397	LKTR	488	1350	7	25	OT	GN	38	0	25	7	96	MINE	MINE	CARAT	4	1		501-86	01TRI03ZOO01DIP
2	A	398	LKTR	619	2550	17	25	OT	GN	38	0	25	7	96	MINE	MINE	CARAT	4	1		501-74	15PEL
2	A	399	LKTR	488	1200	7	29	OT	GN	38	0	25	7	96	MINE	MINE	CARAT	4	1		501-69	3ZOO2PEL
2	A	400	LKTR	443	1100	12		OT	GN	64	0	25	7	96	MINE	MINE	CARAT	4	1		501-68	01ZOO
2	A	401	LKTR	482	1290	7	22	OT	GN	89	0	25	7	96	MINE	MINE	CARAT	4	1		501-73	18TRI02PEL
2	A	402	LKTR	465	1160	7	20	OT	GN	89	0	25	7	96	MINE	MINE	CARAT	4	1		501-75	2ZOO2PEL1CHI
2	A	403	LKTR	485	1480	7	16	OT	GN	89	0	25	7	96	MINE	MINE	CARAT	4	1		501-81	01COL
2	A	404	LKTR	488	1350	7	21	OT	GN	114	0	25	7	96	MINE	MINE	CARAT	4	1		501-78	0
2	A	405	LKTR	506	1500	17	22	OT	GN	114	0	25	7	96	MINE	MINE	CARAT	4	1		501-70	05ZOO
2	A	406	ARCH	623	2550	7	11	OT	GN	64	0	25	7	96	MINE	MINE	CARAT	4	1			10PEL05FIS
2	A	407	LKTR	181	60	99		OT	GN	38	0	25	7	96	MINE	MINE	CARAT	4	1			0
2	A	408	LKTR	226	110	99		OT	GN	38	0	25	7	96	MINE	MINE	CARAT	3	1			0
2	A	409	LKTR	206	95	99		OT	GN	38	0	25	7	96	MINE	MINE	CARAT	3	1			0
2	A	410	ARCH	98	0	0		SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	411	ARCH	70	0	0	1	SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	412	ARCH	37	0	0	0	SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	413	ARCH	44	0	0	0	SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	414	ARCH	41	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	415	ARCH	37	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	416	ARCH	34	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	417	ARCH	43	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	418	ARCH	64	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	419	ARCH	83	5	0	1	SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	420	ARCH	43	0	0	0	SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	421	ARCH	38	0	0	0	SC	EF	0	0	25	7	96	MINE	CARAT	TC01	1	0			
2	A	422	SLSC	78	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	1			
2	A	423	SLSC	64	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	1			
2	A	424	LKTR	616	2075	0		FR	GN	38	230	26	7	96	MINE	MINE	CARAT	5	2			
2	A	425	ARCH	555	1075	10		SF	GN	89	0	26	7	96	MINE	MINE	CARAT	5	0			
2	A	426	LKTR	360	500	0		SF	GN	64	0	26	7	96	MINE	MINE	CARAT	5	0			
2	A	427	ARCH	565	2000	7	11	OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			0
2	A	428	LKTR	201	85	1		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			3ZOO2DIP
2	A	429	ARCH	403	800	0		SF	GN	89	366	26	7	96	MINE	MINE	CARAT	6	0			
2	A	430	LKTR	497	1500	17		SF	GN	38	367	26	7	96	MINE	MINE	CARAT	6	0			
2	A	431	LKTR	415	900	0		SF	GN	38	0	26	7	96	MINE	MINE	CARAT	6	0			
2	A	432	LKTR	323	305	0		SF	GN	64	0	26	7	96	MINE	MINE	CARAT	6	0			
2	A	433	LKTR	411	725	0		SF	GN	89	0	26	7	96	MINE	MINE	CARAT	6	0			
2	A	434	LKTR	362	480	11		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			05ZOO
2	A	435	LKTR	280	255	11		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			10DIP
2	A	436	LKTR	402	320	1		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			10ZOO
2	A	437	ARCH	225	115	99	3	OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			0
2	A	438	LKTR	209	85	11		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			05ZOO
2	A	439	LKTR	173	45	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			01ZOO
2	A	440	LKTR	192	65	0		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1	ROTTEN		
2	A	441	LKTR	170	55	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	6	1			0
2	A	442	ARCH	460	1120	7	12	OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1			05ZOO
2	A	443	LKTR	365	435	12		OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1			0
2	A	444	LKTR	323	335	99		OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1			10ZOO
2	A	445	LKTR	176	50	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			0
2	A	446	LKTR	182	55	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			05ZOO
2	A	447	LKTR	163	25	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			05ZOO
2	A	448	LKTR	174	40	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			01FIS
2	A	449	LKTR	166	50	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			05ZOO
2	A	450	LKTR	182	45	99		OT	GN	38	0	26	7	96	MINE	MINE	CARAT	5	1			0
2	A	451	RNWH	428	1060	17		OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1			0
2	A	452	RNWH	396	690	7	12	OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1		501-93	5TRI
2	A	453	RNWH	358	600	17	8	OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1		501-90	15TRI
2	A	454	RNWH	375	650	17		OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1			15TRI
2	A	455	RNWH	316	400	17	7	OT	GN	64	0	26	7	96	MINE	MINE	CARAT	6	1			10TRI
2	A	456	RNWH	462	1300	17	16	OT	GN	89	0	26	7	96	MINE	MINE	CARAT	6	1		501-88	20PEL
2	A	457	RNWH	445	1160	17	15	OT	GN	114	0	26	7	96	MINE	MINE	CARAT	6	1		501-91	5FIS10TRI
2	A	458	LKTR	455	1350	12		OT	GN	114	0	26	7	96	MINE	MINE	CARAT	6	1			01FIS
2	A	459	ARCH	342	385	0		SF	GN	64	2908	27	7	96	TAIL	TAIL	LD05	1	0			
2	A	460	ARCH	307	290	0		FR	GN	64	369	27	7	96	TAIL	TAIL	LD05	1	0			
2	A	461	LKTR	385	560	0		FR	GN	38	368	27	7	96	TAIL	TAIL	LD05	1	0			
2	A	462	LKTR	252	165	0		SF	GN	38	370	27	7	96	TAIL	TAIL	LD05	1	0			
2	A	463	ARCH	350	0	1	8	OT	GN	89	0	27	7	96	TAIL	TAIL	LD05	1	1			05ZOO
2	A	464	LKTR	288	220	11	9	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	1	1			15ZOO
2	A	465	LKTR	265	185	1	3	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	1	1			10ZOO
2	A	466	LKTR	187	0	11	10	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	1	1			01ZOO
2	A	467	LKTR	235	110	1	7	OT	GN	64	0	27	7	96	TAIL	TAIL	LD05	1	1			0
2	A	468	LKTR	446	725	1	20	OT	GN	64	0	27	7	96	TAIL	TAIL	LD05	1	1			3ZOO2CHI
2	A	469	LKTR	229	0	11	12	OT	GN	64	0	27	7	96	TAIL	TAIL	LD05	1	1			10ZOO
2	A	470	LKTR	203	90	0		SC	GN	38	0	27	7	96	TAIL	TAIL	LD05	1	0			
2	A	471	ARCH	368	465	0		SF	GN	38	0	27	7	96	TAIL	TAIL	LD05	1	0			
2	A	472	LKTR	385	520	0		SF	GN	64	495	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	473	ARCH	401	585	0		SF	GN	64	494	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	474	ARCH	389	530	0		SF	GN	64	371	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	475	ARCH	333	350	0		SF	GN	64	497	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	476	ARCH	306	300	0		SF	GN	64	0	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	477	ARCH	306	275	0		SF	GN	38	0	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	478	LKTR	361	445	0		SF	GN	38	498	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	479	LKTR	247	145	0		SC	GN	38	493	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	480	LKTR	323	320	0		SF	GN	38	0	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	481	ARCH	365	0	0		SF	GN	19	0	27	7	96	TAIL	TAIL	LD05	2	0			
2	A	482	ARCH	332	0	17	8	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	2	1			15ZOO
2	A	483	ARCH	288	255	11	5	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	2	1			10ZOO
2	A	484	ARCH	266	240	1	6	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	2	1			0
2	A	485	LKTR	249	135	11	8	OT	GN	38	0	27	7	96	TAIL	TAIL	LD05	2	1			0
2	A	486	LKTR	314	300	11	11	OT	GN	64	0	27	7	96	TAIL	TAIL	LD05	2	1			01ZOO
2	A	487	ARCH	113	0	0	1	SC	EF	0	0	27	7	96	MINE	CARAT	TC01	2	0			
2	A	488	ARCH	142	0	0	3	SC	EF	0	0	27	7	96	MINE	CARAT	TC01	5	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	489	SLSC	48	0	0			EF	0	0	27	7	96	MINE	CARAT	TC01	5	0			
2	A	490	SLSC	68	0	0			EF	0	0	27	7	96	MINE	CARAT	TC01	5	0			
2	A	491	SLSC	76	0	0			EF	0	0	27	7	96	MINE	CARAT	TC01	5	0			
2	A	492	LKTR	305	235	0		SC	GN	38	487	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	493	LKTR	251	155	0		SC	GN	38	483	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	494	LKTR	488	1090	0		SF	GN	38	485	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	495	LKTR	409	625	0		SF	GN	38	489	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	496	LKTR	342	320	0		SF	GN	38	482	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	497	ARCH	398	600	0		SF	GN	64	484	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	498	LKTR	323	325	0		SF	GN	64	491	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	499	ARCH	390	605	0		SF	GN	89	486	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	500	ARCH	384	520	0		SF	GN	89	490	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	501	ARCH	398	645	0		FR	GN	89	488	28	7	96	TAIL	TAIL	LD04	1	0			
2	A	502	LKTR	263	170	0			GT	0	492	28	7	96	TAIL	TAIL	LD04	5	0			
2	A	503	LKTR	408	950	0		SF	GN	38	481	28	7	96	TAIL	TAIL	LD04	2	0			
2	A	504	LKTR	365	495	0		SF	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	0			
2	A	505	ARCH	364	480	0		SF	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	0			
2	A	506	ARCH	378	490	0		SF	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	0			
2	A	507	ARCH	364	505	17	10	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	1			14PEL01ZOO
2	A	508	LKTR	450	845	2	24	OT	GN	89	0	28	7	96	TAIL	TAIL	LD04	2	1			05ZOO
2	A	509	LKTR	522	1560	17	36	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	2	1			01ZOO
2	A	510	ARCH	310	253	11	8	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	2	1			08ZOO02TRI
2	A	511	LKTR	420	745	7	17	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	1			0
2	A	512	LKTR	357	495	7	16	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	1			01ZOO
2	A	513	LKTR	327	840	7		OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	1			05ZOO
2	A	514	LKTR	375	470	12	15	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	2	1			0
2	A	515	ARCH	400	590	1	9	OT	GN	89	0	28	7	96	TAIL	TAIL	LD04	1	1			01DIP04ZOO
2	A	516	LKTR	331	360	7	12	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	1	1			05ZOO
2	A	517	ARCH	386	500	1	9	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	1	1			01ZOO
2	A	518	LKTR	365	465	12	14	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	1	1			05ZOO
2	A	519	LKTR	320	325	11	13	OT	GN	64	0	28	7	96	TAIL	TAIL	LD04	1	1			01ZOO
2	A	520	LKTR	243	135	99	8	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	1	1			0
2	A	521	LKTR	274	185	11	9	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	1	1			01ZOO
2	A	522	ARCH	300	280	11	8	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	1	1			05ZOO
2	A	523	ARCH	283	225	11	5	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	1	1			5TRI
2	A	524	LKTR	232	125	99	6	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	1	1			0
2	A	525	LKTR	218	95	99	7	OT	GN	38	0	28	7	96	TAIL	TAIL	LD04	1	1			0
2	A	526	ARCH	129	20	0	2	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	527	ARCH	103	10	0		SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	528	ARCH	106	10	0	1	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	529	ARCH	84	5	0	1	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	530	BURB	86	5	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	531	SLSC	82	5	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	532	SLSC	85	5	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	533	SLSC	80	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	534	SLSC	86	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	535	SLSC	71	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	536	SLSC	77	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	537	NNST	57	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	538	NNST	58	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	539	NNST	57	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	540	NNST	49	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	541	BURB	34	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	542	BURB	31	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	543	BURB	38	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	544	BURB	30	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	545	BURB	30	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	546	BURB	36	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	547	BURB	35	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	548	BURB	37	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	549	SLSC	64	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	550	SLSC	64	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	551	SLSC	56	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	552	SLSC	49	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	553	ARCH	54	0	0	0	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	554	ARCH	52	0	0	0	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	555	ARCH	50	0	0	0	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	556	ARCH	47	0	0	0	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	557	SLSC	77	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	558	SLSC	70	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	559	SLSC	84	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	560	SLSC	73	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	561	SLSC	64	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	562	SLSC	57	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	563	SLSC	55	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	564	ARCH	98	0	0		SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	565	ARCH	79	0	0		SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	566	ARCH	45	0	0	0	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	567	ARCH	50	0	0	0	SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	568	ARCH	91	0	0		SC	EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	569	ARCH	90	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	570	ARCH	90	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	571	ARCH	84	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	572	ARCH	51	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	573	ARCH	47	0	0			EF	0	0	28	7	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	574	LKTR	208	85	0			GN	38	0	29	7	96	TAIL	DOCK	CONTW	1	0			
2	A	575	LKTR	226	115	0			GN	38	0	29	7	96	TAIL	DOCK	CONTW	1	0			
2	A	576	LKTR	320	350	0			GN	38	480	29	7	96	TAIL	DOCK	CONTW	1	0			
2	A	577	ARCH	204	65	0			GN	38	0	29	7	96	TAIL	DOCK	CONTW	2	0			
2	A	578	LKTR	194	65	0			GN	38	0	29	7	96	TAIL	DOCK	CONTW	2	0			
2	A	579	LKTR	174	40	99		OT	GN	38	0	29	7	96	TAIL	DOCK	CONTW	2	1			10ZOO
2	A	580	LKTR	490	1400	17	32	OT	GN	64	0	29	7	96	TAIL	DOCK	CONTW	1	1		501-08	0
2	A	581	LKTR	481	1240	2	17	OT	GN	64	0	29	7	96	TAIL	DOCK	CONTW	1	1		501-21	05ZOO
2	A	582	LKTR	454	1120	2	17	OT	GN	64	0	29	7	96	TAIL	DOCK	CONTW	1	1		501-11	01ZOO
2	A	583	LKTR	612	2360	12	33	OT	GN	64	0	29	7	96	TAIL	DOCK	CONTW	1	1		501-16	05FIS
2	A	584	LKTR	436	1060	12	14	OT	GN	64	0	29	7	96	TAIL	DOCK	CONTW	2	1		501-17	06ZOO04CHI
2	A	585	LKTR	484	1210	2	16	OT	GN	64	0	29	7	96	TAIL	DOCK	CONTW	1	1		501-09	0
2	A	586	LKTR	608	2570	12	20	OT	GN	114	0	29	7	96	TAIL	DOCK	CONTW	1	1		501-20	10LKT05EGG
2	A	587	LKTR	395	800	2	15	OT	GN	89	0	29	7	96	TAIL	DOCK	CONTW	2	1		501-14	08ZOO02TRI
2	A	588	LKTR	455	1300	12		OT	GN	89	0	29	7	96	TAIL	DOCK	CONTW	2	1			03COL05ZOO
2	A	589	LKTR	515	1370	2		OT	GN	89	0	29	7	96	TAIL	DOCK	CONTW	1	1			0
2	A	590	LKTR	240	200	1		OT	GN	38	0	29	7	96	TAIL	DOCK	CONTW	1	1			05ZOO
2	A	591	LKTR	202	140	1			GN	15	0	29	7	96	TAIL	DOCK	CONTW	1	1			10TRI
2	A	592	SLSC	83	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	593	SLSC	89	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	594	SLSC	88	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	595	SLSC	86	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	596	SLSC	74	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	597	SLSC	95	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	598	SLSC	54	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	599	SLSC	49	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	600	SLSC	49	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	601	SLSC	37	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	602	ARCH	85	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0			
2	A	603	LKTR	381	505	0			GN	64	87	30	7	96	TAIL	DOCK	CONTW	3	0			
2	A	604	LKTR	337	435	11	15	OT	GN	38	0	30	7	96	TAIL	DOCK	CONTW	3	1			0
2	A	605	LKTR	175	55	99	6	OT	GN	38	0	30	7	96	TAIL	DOCK	CONTW	3	1			10ZOO
2	A	606	LKTR	193	70	99	6	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			10ZOO
2	A	607	LKTR	184	55	99	6	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			10ZOO
2	A	608	LKTR	187	60	99		OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			05ZOO
2	A	609	LKTR	236	120	1	8	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			03ZOO02CHI
2	A	610	LKTR	219	115	11	10	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			0
2	A	611	LKTR	168	45	99		OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			10CHI
2	A	612	LKTR	195	70	99		OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			15CHI
2	A	613	LKTR	162	45	99	5	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			05ZOO
2	A	614	LKTR	108	10	99	2	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			05ZOO
2	A	615	LKTR	112	10	99		OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	4	1			0
2	A	616	ARCH	525	1410	1	12	OT	GN	114	0	30	7	96	TAIL	DOCK	CONTW	3	1			05ZOO05CHI
2	A	617	LKTR	495	1500	1	17	OT	GN	19	0	30	7	96	TAIL	DOCK	CONTW	3	1		501-04	10ROD
2	A	618	LKTR	495	1350	7	21	OT	GN	64	0	30	7	96	TAIL	DOCK	CONTW	3	1		501-02	10ZOO
2	A	619	LKTR	684	3150	12	20	OT	GN	114	0	30	7	96	TAIL	DOCK	CONTW	4	1		501-10	05FIS(2CIS+3UNI)
2	A	620	LKTR	510	1400	1	24	OT	GN	114	0	30	7	96	TAIL	DOCK	CONTW	4	1		501-07	0
2	A	622	RNWH	455	1100	2	23	OT	GN	64	0	29	7	96	MINE	MINE	CARAT	7	1		501-66	05CHI15TRI
2	A	623	RNWH	442	1000	17		OT	GN	114	0	29	7	96	MINE	MINE	CARAT	7	1			07TRI03CHI
2	A	624	ARGR	163	42	0	2	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	625	ARGR	159	42	0	2	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	626	ARGR	102	8	0	1	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	627	BURB	142	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	628	SLSC	62	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	629	ARGR	53	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	630	ARGR	48	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	631	SLSC	73	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	632	ARGR	45	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	633	ARGR	46	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	634	ARGR	47	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	635	ARGR	36	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	636	ARGR	49	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	637	ARGR	40	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	638	ARGR	46	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	639	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	640	ARGR	52	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	641	ARGR	46	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	642	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	643	ARGR	38	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	644	ARGR	37	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	645	ARGR	89	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	646	ARGR	37	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	647	ARGR	37	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	648	ARGR	45	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	649	SLSC	76	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	650	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	651	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	652	SLSC	69	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	653	SLSC	69	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	654	ARGR	45	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	655	SLSC	81	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	656	SLSC	78	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	657	SLSC	84	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	658	ARGR	41	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	659	ARGR	56	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	660	ARGR	52	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	661	ARGR	41	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	662	ARGR	46	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	663	ARGR	48	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	664	ARGR	48	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	665	ARGR	40	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	666	ARGR	45	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	667	ARGR	52	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	668	ARGR	39	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	669	ARGR	40	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	670	ARGR	43	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	671	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	672	ARGR	39	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	673	ARGR	45	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	674	SLSC	34	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	675	BURB	37	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	676	BURB	36	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	677	BURB	35	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	678	BURB	34	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	679	BURB	39	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	680	BURB	41	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	681	SLSC	36	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	682	BURB	37	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	683	BURB	29	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	684	BURB	32	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	685	BURB	29	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0			
2	A	686	ARGR	129	8	0	2	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	687	SLSC	98	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	688	SLSC	81	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	689	SLSC	86	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	690	SLSC	83	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	691	SLSC	81	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	692	SLSC	81	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	693	ARGR	48	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	694	ARGR	49	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	695	ARGR	35	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	696	ARGR	54	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	697	ARGR	52	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	698	ARGR	53	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	699	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	700	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	701	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	702	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	703	ARGR	43	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	704	ARGR	48	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	705	ARGR	56	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	706	ARGR	54	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	707	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	708	ARGR	47	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	709	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	710	ARGR	47	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	711	ARGR	44	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	712	ARGR	40	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	713	BURB	36	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	714	BURB	43	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	715	ARGR	29	0	0	0	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	716	ARGR	48	0	0	0	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	717	ARGR	43	0	0	0		EF	0	0	30	7	96	MINE	CARAT	TC06	2	0			
2	A	718	ARGR	145	0	0	2	SC	EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	719	ARGR	117	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	720	SLSC	72	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	721	SLSC	77	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	722	ARGR	40	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	723	ARGR	48	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	724	ARGR	54	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	725	ARGR	57	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	726	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	727	ARGR	41	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	728	ARGR	42	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	3	0			
2	A	729	LKTR	460	775	0			GT	0	89	31	7	96	TAIL	DOCK	CONTW	3	0			
2	A	730	LKTR	242	110	0			GN	38	0	31	7	96	TAIL	DOCK	CONTW	5	0			
2	A	731	LKTR	301	335	0			GN	38	0	31	7	96	TAIL	DOCK	CONTW	5	0			
2	A	732	LKTR	96	0	0	1	SC	GN	19	0	31	7	96	TAIL	DOCK	CONTW	5	0			
2	A	733	LKTR	100	0	0		SC	GN	19	0	31	7	96	TAIL	DOCK	CONTW	5	0			
2	A	734	LKTR	101	0	0			GN	19	0	31	7	96	TAIL	DOCK	CONTW	5	0			
2	A	735	ARCH	509	1515	0			GN	114	90	31	7	96	TAIL	DOCK	CONTW	6	0			
2	A	736	ARCH	517	1650	0			GN	114	91	31	7	96	TAIL	DOCK	CONTW	6	0			
2	A	737	LKTR	517	1310	12	20	OT	GN	38	0	31	7	96	TAIL	DOCK	CONTW	5	1		501-06	
2	A	738	LKTR	427	850	1	16	OT	GN	64	0	31	7	96	TAIL	DOCK	CONTW	5	1		501-05	01ZOO
2	A	739	LKTR	528	1550	7	24	OT	GN	89	0	31	7	96	TAIL	DOCK	CONTW	5	1		501-03	01COL01INS03CHI
2	A	740	LKTR	436	770	1	18	OT	GN	89	0	31	7	96	TAIL	DOCK	CONTW	5	1		501-12	15FIS
2	A	741	LKTR	188	65	11		OT	GN	38	0	31	7	96	TAIL	DOCK	CONTW	5	1			01TRI
2	A	742	LKTR	461	960	12	20	OT	GN	89	0	31	7	96	TAIL	DOCK	CONTW	5	1		501-01	05FIS03CHI02ZOO
2	A	743	LKTR	179	70	7		OT	GN	38	0	31	7	96	TAIL	DOCK	CONTW	5	1			0
2	A	744	LKTR	374	560	12	14	OT	GN	10	0	31	7	96	TAIL	DOCK	CONTW	5	1			01COL14ZOO
2	A	745	LKTR	461	1100	12	19	OT	GN	64	0	31	7	96	TAIL	DOCK	CONTW	6	1		501-19	05ZOO
2	A	746	LKTR	525	1900	7	33	OT	GN	38	0	31	7	96	TAIL	DOCK	CONTW	6	1		501-18	10CHI
2	A	748	LKTR	168	40	11	4	OT	GN	38	0	31	7	96	TAIL	DOCK	CONTW	6	1			05TRI
2	A	749	LKTR	469	1040	1	17	OT	GN	89	0	31	7	96	TAIL	DOCK	CONTW	6	1		501-15	0
2	A	750	LKTR	330	360	0			GN	64	0	31	7	96	TAIL	DOCK	CONTW	6	1		501-13	0
2	A	751	LKTR	211	100	0			GN	38	0	1	8	96	MINE	MINE	INTE2	2	0			
2	A	752	LKTR	506	1460	0			GN	38	0	1	8	96	MINE	MINE	INTE2	2	0			
2	A	753	LKTR	516	1450	12		OT	GN	64	0	1	8	96	MINE	MINE	INTE2	2	1			10ZOO
2	A	754	LKTR	495	1550	0			GN	64	0	1	8	96	MINE	MINE	INTE2	2	0			
2	A	755	LKTR	483	1290	0			GN	114	0	1	8	96	MINE	MINE	INTE2	2	0			
2	A	756	LKTR	498	1375	0			GN	114	0	1	8	96	MINE	MINE	INTE2	2	0			
2	A	757	LKTR	511	1535	12		OT	GN	114	0	1	8	96	MINE	MINE	INTE2	2	1			01ZOO
2	A	758	LKTR	516	1535	12		OT	GN	114	0	1	8	96	MINE	MINE	INTE2	2	1			09ZOO01PEL
2	A	759	LKTR	521	1620	7		OT	GN	114	0	1	8	96	MINE	MINE	INTE2	2	1			10ZOO
2	A	760	LKTR	515	1565	7		OT	GN	89	0	1	8	96	MINE	MINE	INTE2	2	1			0
2	A	761	LKTR	286	200	11		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	2	1			0
2	A	762	LKTR	259	175	11		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	2	1			05ZOO
2	A	763	LKTR	244	140	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	2	1			15ZOO
2	A	764	LKTR	196	70	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	2	1			15ZOO
2	A	765	LKTR	193	75	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	2	1			0
2	A	766	LKTR	109	15	99		SC	GN	19	0	1	8	96	MINE	MINE	INTE2	1	1			0
2	A	767	LKTR	165	55	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			01ZOO
2	A	768	LKTR	236	130	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			01ZOO
2	A	769	LKTR	234	140	1		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			0
2	A	770	LKTR	198	90	11		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			10ZOO
2	A	771	LKTR	228	115	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			0
2	A	772	LKTR	209	90	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			0
2	A	773	LKTR	160	45	11		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			01ZOO
2	A	774	LKTR	163	60	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			10ZOO
2	A	775	LKTR	203	100	11		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			01ZOO
2	A	776	RNWH	196	90	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			05TRI
2	A	777	RNWH	167	55	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			05ZOO
2	A	778	RNWH	188	70	0		SC	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			05ZOO
2	A	779	LKTR	375	530	11		OT	GN	38	0	1	8	96	MINE	MINE	INTE2	1	1			05ZOO
2	A	780	LKTR	591	2060	2		OT	GN	89	0	1	8	96	MINE	MINE	INTE2	1	1			0
2	A	781	LKTR	469	1340	17		OT	GN	89	0	1	8	96	MINE	MINE	INTE2	1	1			04LKTR01ZOO
2	A	782	NNST	54	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	3	0			
2	A	783	NNST	52	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	3	0			
2	A	784	NNST	53	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	3	0			
2	A	785	NNST	62	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	3	0			
2	A	786	NNST	51	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	3	0			
2	A	787	NNST	51	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	788	NNST	56	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	789	NNST	58	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	790	NNST	59	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	791	NNST	49	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	792	NNST	59	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	793	NNST	37	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO05	4	0			
2	A	794	LKTR	566	2020	0			GN	64	92	2	8	96	FUEL	FUEL	LO05	1	0			
2	A	795	ARGR	400	905	20	7	SC	GN	64	93	2	8	96	FUEL	FUEL	LO05	1	0			
2	A	796	LKTR	517	2560	0			GN	89	0	2	8	96	FUEL	FUEL	LO05	1	0			
2	A	797	LKTR	511	1385	0			GN	140	0	2	8	96	FUEL	FUEL	LO05	1	0			
2	A	798	LKTR	349	555	0			GN	140	0	2	8	96	FUEL	FUEL	LO05	1	0			
2	A	799	LKTR	426	890	1	10	OT	GN	64	0	2	8	96	FUEL	FUEL	LO05	1	1			02NNST13BRA
2	A	800	ARGR	169	65	11	2	SC	GN	38	0	2	8	96	FUEL	FUEL	LO05	1	1			10ZOO05CHI
2	A	801	LKTR	411	855	12		OT	GN	64	0	2	8	96	FUEL	FUEL	LO05	2	1			15ZOO
2	A	802	LKTR	377	675	1	8	OT	GN	64	0	2	8	96	FUEL	FUEL	LO05	2	1			08BRA01PEL06ZOO
2	A	803	LKTR	430	850	1	12	OT	GN	38	0	2	8	96	FUEL	FUEL	LO05	2	1			20BRA
2	A	804	LKTR	283	280	11	9	OT	GN	38	0	2	8	96	FUEL	FUEL	LO05	2	1			10BRA
2	A	805	ARCH	434	995	12		OT	GN	38	0	2	8	96	FUEL	FUEL	LO05	2	1			04ZOO01BRA
2	A	806	LKTR	247	190	11	6	OT	GN	38	0	2	8	96	FUEL	FUEL	LO05	2	1			04ZOO01CHI
2	A	807	ARGR	247	195	11	3	SC	GN	38	0	2	8	96	FUEL	FUEL	LO05	2	1			08ZOO02COL
2	A	808	LKTR	435	975	12	9	OT	GN	89	0	2	8	96	FUEL	FUEL	LO05	2	1			03ZOO02BRA
2	A	809	RNWH	432	1120	7		OT	GN	89	0	2	8	96	FUEL	FUEL	LO05	2	1			10ZOO
2	A	810	RNWH	505	1650	17	22	OT	GN	89	0	2	8	96	FUEL	FUEL	LO05	2	1			10TRI
2	A	811	ARGR	385	820	7	7	SC	GN	89	0	2	8	96	FUEL	FUEL	LO05	2	1			10ZOO
2	A	812	ARGR	327	395	7	4	SC	GN	38	0	2	8	96	FUEL	FUEL	LO05	1	1			14ZOO01COL
2	A	813	LKTR	442	960	1	12	OT	GN	38	0	2	8	96	FUEL	FUEL	LO05	1	1			0
2	A	814	LKTR	332	465	1	8	OT	GN	64	0	2	8	96	FUEL	FUEL	LO05	1	1			10BRA
2	A	815	LKTR	442	1020	1		OT	GN	64	0	2	8	96	FUEL	FUEL	LO05	1	1			05BRA
2	A	816	LKTR	455	1070	1		OT	GN	89	0	2	8	96	FUEL	FUEL	LO05	1	1			05FIS
2	A	817	LKTR	408	805	11	8	OT	GN	89	0	2	8	96	FUEL	FUEL	LO05	1	1			05BRA
2	A	818	ARGR	404	900	17	6	SC	GN	89	0	2	8	96	FUEL	FUEL	LO05	1	1			20BRA
2	A	819	SLSC	80	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	820	SLSC	55	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	821	SLSC	81	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	822	SLSC	79	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	823	NNST	57	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	824	NNST	57	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	825	BURB	47	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	826	BURB	46	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	827	SLSC	38	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	828	SLSC	41	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	829	BURB	39	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	830	NNST	51	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	831	NNST	35	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	832	NNST	55	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	833	NNST	34	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	834	NNST	59	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	835	NNST	38	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	836	SLSC	44	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	837	NNST	31	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	838	BURB	50	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	839	ARGR	101	0	0		SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	840	ARGR	55	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	841	ARGR	55	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	842	ARGR	51	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	843	ARGR	49	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	844	ARGR	56	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	845	ARGR	50	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	846	ARCH	50	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	847	ARGR	45	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	848	ARGR	50	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	849	ARGR	160	0	0	2	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	850	BURB	37	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0			
2	A	851	BURB	44	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	2	0			
2	A	852	ARGR	112	0	0		SC	EF	0	0	2	8	96	FUEL	LO4	TO06	2	0			
2	A	853	ARGR	146	26	0	2	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	854	ARGR	168	58	0		SC	EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	855	ARGR	108	10	0	1	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	856	ARGR	114	18	0	1	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	857	ARGR	104	14	0		SC	EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	858	ARCH	91	8	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	859	ARCH	113	16	0		SC	EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	860	SLSC	65	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	861	NNST	52	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	862	BURB	37	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	863	BURB	40	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0			
2	A	864	RNWH	168	0	0	2	SC	EF	0	0	2	8	96	FUEL	LO4	TO06	4	0			
2	A	865	ARGR	113	0	0		SC	EF	0	0	2	8	96	FUEL	LO4	TO06	4	0			
2	A	866	SLSC	59	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	867	SLSC	42	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	868	SLSC	45	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	869	SLSC	62	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	870	SLSC	45	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	871	BURB	47	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	872	ARGR	157	36	0		SC	EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	873	ARGR	105	10	0	1	SC	EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	874	ARGR	53	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	875	ARGR	50	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	876	ARGR	54	0	0	0	SC	EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0			
2	A	877	NNST	58	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO03	3	0			
2	A	878	NNST	54	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO03	3	0			
2	A	879	BURB	33	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO03	3	0			
2	A	880	LKTR	583	2475	0			GN	140	0	3	8	96	FUEL	FUEL	LO03	1	0			
2	A	881	ARGR	98	0	99		OT	GN	19	0	3	8	96	FUEL	FUEL	LO03	1	1			05ZOO
2	A	882	RNWH	97	0	99			GN	19	0	3	8	96	FUEL	FUEL	LO03	1	1			05ZOO
2	A	883	ARCH	384	645	11		OT	GN	19	0	3	8	96	FUEL	FUEL	LO03	1	1			15ZOO
2	A	884	LKTR	218	195	11		OT	GN	38	0	3	8	96	FUEL	FUEL	LO03	1	1			05ZOO
2	A	885	LKTR	217	125	99	5	OT	GN	38	0	3	8	96	FUEL	FUEL	LO03	1	1			0
2	A	886	LKTR	160	45	99	5	OT	GN	38	0	3	8	96	FUEL	FUEL	LO03	1	1			15BUR
2	A	887	LKTR	478	1410	2	9	OT	GN	64	0	3	8	96	FUEL	FUEL	LO03	1	1			01RNW
2	A	888	LKTR	490	1650	7	10	OT	GN	89	0	3	8	96	FUEL	FUEL	LO03	1	1			0
2	A	889	LKTR	622	3160	17	36	OT	GN	140	0	3	8	96	FUEL	FUEL	LO03	1	1			20BUR
2	A	890	ARCH	113	10	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	891	ARCH	101	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	892	ARCH	89	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	893	ARCH	96	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	894	ARCH	87	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	895	ARCH	59	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	896	ARCH	46	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	897	ARCH	45	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	898	ARCH	54	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	899	ARCH	48	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	900	ARCH	87	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0			
2	A	901	ARCH	52	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	902	ARCH	53	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	903	ARCH	46	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	904	ARCH	45	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	905	ARCH	56	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	906	ARCH	48	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	907	ARCH	44	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	908	ARCH	35	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	909	ARCH	53	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	910	ARCH	48	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	911	ARCH	52	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	912	ARCH	43	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	913	ARCH	42	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	914	ARCH	39	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	915	ARCH	49	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	916	ARCH	38	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	917	ARCH	38	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	918	ARCH	89	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	919	ARCH	46	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	920	ARCH	47	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	921	ARCH	44	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	922	ARCH	53	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	923	SLSC	79	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	924	SLSC	73	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	925	SLSC	68	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	926	SLSC	63	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	927	SLSC	82	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	928	SLSC	56	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	929	ARCH	83	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	930	SLSC	49	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	931	SLSC	69	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	932	SLSC	68	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	933	SLSC	72	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 1		
2	A	934	ARCH	48	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	935	ARCH	53	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	936	ARCH	52	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	937	ARCH	47	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	938	ARCH	52	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	939	ARCH	49	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	940	ARCH	46	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	941	ARCH	47	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	942	ARCH	45	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	943	ARCH	34	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	944	NNST	53	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	945	SLSC	65	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	946	SLSC	78	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	947	SLSC	67	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	948	SLSC	65	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	949	SLSC	64	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	950	SLSC	32	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 2		
2	A	951	ARCH	53	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	952	ARCH	48	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	953	ARCH	50	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	954	ARCH	93	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	955	SLSC	66	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	956	SLSC	73	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	957	SLSC	77	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	958	SLSC	59	0	0			EF	0	0	3	8	96	FUEL	LO1	TO18	1	0	RUN 3		
2	A	959	LKTR	192	65	0			GE	0	0	4	8	96	MINE	MINE	LC01	5	0			
2	A	960	LKTR	182	45	0			GN	38	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	961	LKTR	176	55	0			GN	38	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	962	LKTR	208	90	0			GN	38	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	963	LKTR	192	65	0			GN	38	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	964	LKTR	177	55	0			GN	38	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	965	LKTR	191	70	0			GN	38	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	966	LKTR	193	60	0			GN	19	0	4	8	96	MINE	MINE	LC01	1	0			
2	A	967	LKTR	192	65	7	7	OT	GN	38	0	4	8	96	MINE	MINE	LC01	1	1			0
2	A	968	LKTR	210	75	1	9	OT	GN	38	0	4	8	96	MINE	MINE	LC01	1	1			0
2	A	969	LKTR	429	940	7	19	OT	GN	38	0	4	8	96	MINE	MINE	LC01	1	1			01FIS
2	A	970	LKTR	200	75	12	8	OT	GN	38	0	4	8	96	MINE	MINE	LC01	1	1			01ZOO
2	A	971	ARCH	348	345	0			GN	38	479	4	8	96	TAIL	TAIL	LD05	1	0			
2	A	972	ARCH	336	0	0			GN	38	478	4	8	96	TAIL	TAIL	LD05	1	0			
2	A	973	ARCH	333	320	0			GN	38	95	4	8	96	TAIL	TAIL	LD05	1	0			
2	A	974	ARCH	347	400	0			GN	38	96	4	8	96	TAIL	TAIL	LD05	1	0			
2	A	975	ARCH	385	0	0			GN	38	0	4	8	96	TAIL	TAIL	LD05	1	0			
2	A	976	ARCH	328	385	17	10	OT	GN	89	0	4	8	96	TAIL	TAIL	LD05	1	1			13CHI02ZOO
2	A	977	ARCH	320	330	0			GN	38	97	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	978	ARCH	385	590	10			GN	38	98	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	979	ARCH	314	280	0			GN	64	99	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	980	ARCH	396	520	10			GN	64	100	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	981	ARCH	386	530	10			GN	64	88	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	982	ARCH	334	395	0			GN	64	94	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	983	ARCH	409	680	10			GN	64	426	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	984	ARCH	304	290	0			GN	64	450	4	8	96	TAIL	TAIL	LD05	2	0			
2	A	985	ARCH	365	390	17			GN	64	0	4	8	96	TAIL	TAIL	LD05	2	1			15CHI05ZOO
2	A	986	ARCH	368	380	0	12	OT	GN	64	0	4	8	96	TAIL	TAIL	LD05	2	1			05ZOO05CHI
2	A	987	LKTR	0	0	0			GN	38	0	4	8	96	TAIL	TAIL	LD05	1	0	RND		
2	A	988	LKTR	0	0	0			GN	64	0	4	8	96	TAIL	TAIL	LD05	2	0	RND		
2	A	989	RNWH	438	890	7	21	OT	GN	89	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-45	10BRA
2	A	990	RNWH	428	910	7	18	OT	GN	89	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-24	01BRA
2	A	991	LKTR	473	965	7	18	OT	GN	89	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-38	05BRA
2	A	992	LKTR	466	1000	17	18	OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-52	0
2	A	993	RNWH	375	610	7	9	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-26	0
2	A	994	LKTR	424	740	12	17	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-42	10ZOO
2	A	995	RNWH	409	740	17	10	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-31	05BRA10ZOO
2	A	996	RNWH	423	830	7	15	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-34	05ZOO
2	A	997	LKTR	404	649	12	11	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-37	04BRA06ZOO
2	A	998	LKTR	303	240	12		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			
2	A	999	LKTR	343	390	12		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			05ZOO
2	A	1000	LKTR	295	240	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			15ZOO
2	A	1001	RNWH	261	170	7		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			05ZOO
2	A	1002	LKTR	257	150	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			05ZOO
2	A	1003	LKTR	221	55	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			0
2	A	1004	LKTR	210	50	99		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			05FIS
2	A	1005	LKTR	203	45	99		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			0
2	A	1006	RNWH	346	440	7	9	OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-40	01ZOO
2	A	1007	LKTR	327	310	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			05ZOO
2	A	1008	LKTR	309	210	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	1	1			10ZOO
2	A	1009	LKTR	423	775	7	20	OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-28	0
2	A	1010	LKTR	410	740	7	19	OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-43	0
2	A	1011	LKTR	408	715	12	16	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-44	10ZOO
2	A	1012	LKTR	359	380	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1			0
2	A	1013	LKTR	371	530	12		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1			15ZOO
2	A	1014	LKTR	282	195	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1			10ZOO
2	A	1015	RNWH	440	855	7	20	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-36	2ZOO01TRI01INS1CHI
2	A	1016	LKTR	268	165	11		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1			20ZOO
2	A	1017	RNWH	400	790	17	11	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-27	10PEL02ZOO03BRA
2	A	1018	RNWH	321	380	17	8	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-50	10TRI
2	A	1019	LKTR	433	930	17	14	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-51	10ZOO
2	A	1020	LKTR	423	855	7	19	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-25	0
2	A	1021	LKTR	410	780	17	20	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-41	05ZOO
2	A	1022	LKTR	408	710	12	12	OT	GN	89	0	5	8	96	CONTR	CONTR	CONTR	3	1		501-29	0
2	A	1023	LKTR	428	930	7	23	OT	GN	89	0	5	8	96	CONTR	CONTR	CONTR	3	1		501-33	10ZOO
2	A	1024	LKTR	413	750	7	14	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-39	10ZOO
2	A	1025	ARCH	458	980	0			GN	114	0	5	8	96	CONTR	CONTR	CONTR	2	0			
2	A	1026	RNWH	335	460	17	7	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	2	1		501-32	15PEL
2	A	1027	LKTR	366	470	11		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1			01ZOO
2	A	1028	LKTR	344	465	12		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	0			10ZOO
2	A	1029	LKTR	363	460	1		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	1			05ZOO
2	A	1030	LKTR	263	185	99		OT	GN	38	0	5	8	96	CONTR	CONTR	CONTR	4	1			01ZOO
2	A	1031	LKTR	486	1420	7	19	OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	1		501-35	05PEL
2	A	1032	LKTR	392	495	7		OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	4	1			05ZOO
2	A	1033	ARCH	455	745	1		OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	4	1			05ZOO
2	A	1034	ARCH	466	840	7		OT	GN	64	0	5	8	96	CONTR	CONTR	CONTR	4	1			01ZOO
2	A	1035	RNWH	0	0	0			GN	19	0	5	8	96	CONTR	CONTR	CONTR	1	0	RND		
2	A	1036	RNWH	113	10	0			GN	19	0	5	8	96	CONTR	CONTR	CONTR	1	0			
2	A	1037	LKTR	180	65	0			GN	64	0	5	8	96	CONTR	CONTR	CONTR	1	0			
2	A	1038	LKTR	795	0	0			GN	38	334	5	8	96	CONTR	CONTR	CONTR	1	2	RECAPTURE,RELEASED		
2	A	1039	LKTR	376	530	0			GN	38	0	5	8	96	CONTR	CONTR	CONTR	2	0			
2	A	1040	LKTR	420	795	7	18	OT	GN	140	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-61	15ZOO
2	A	1041	LKTR	400	770	12	19	OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	3	1		501-62	05ZOO
2	A	1042	RNWH	395	745	7	11	OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	1		501-30	05ZOO
2	A	1043	LKTR	426	830	12	21	OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	1		501-63	04FIS01CHI15ZOO
2	A	1044	LKTR	431	865	7	19	OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-64	10ZOO
2	A	1045	LKTR	473	1040	1	18	OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-60	10ZOO

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	1046	LKTR	402	755	7	16	OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-56	10ZOO
2	A	1047	LKTR	406	745	7	13	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-49	10ZOO
2	A	1048	RNWH	423	930	7	13	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-47	03CHI04TRI03ZOO
2	A	1049	RNWH	430	980	7	17	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-48	05TRI
2	A	1050	RNWH	431	910	7	15	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-46	18ZOO02CHI
2	A	1051	RNWH	336	490	7	7	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-59	03ZOO02UNI
2	A	1052	RNWH	336	445	7	7	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-58	05UNI
2	A	1053	RNWH	441	1030	17	23	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-53	01TRI
2	A	1054	RNWH	332	430	17	7	OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1		501-54	02CHI01PEL02ZOO
2	A	1055	LKTR	392	720	2		OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1			05ZOO
2	A	1056	LKTR	234	110	99		OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1			01UNI
2	A	1057	LKTR	314	340	1		OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	1			10ZOO
2	A	1058	LKTR	398	740	2		OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	1			02PEL05BRA13ZOO
2	A	1059	LKTR	410	805	17		OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	1			01PEL14ZOO
2	A	1060	LKTR	389	630	12		OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	1			10ZOO
2	A	1061	LKTR	411	870	17		OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	1			05PEL15ZOO
2	A	1062	LKTR	316	350	11		OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	1			02BRA03ZOO
2	A	1063	BURB	230	90	0			GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	1			
2	A	1064	ARCH	466	1050	7		OT	GN	114	0	6	8	96	CONTR	CONTR	CONTR	3	1			05ZOO
2	A	1065	ARCH	446	815	12		OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	3	1			05ZOO
2	A	1066	LKTR	295	280	11		OT	GN	38	0	6	8	96	CONTR	CONTR	CONTR	3	1			10ZOO
2	A	1067	RNWH	440	900	7	19	OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	1		501-55	05TRI
2	A	1068	RNWH	413	820	7	14	OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	1		501-57	05ZOO
2	A	1069	RNWH	414	835	7		OT	GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	1			05TRI05ZOO
2	A	1070	LKTR	439	815	12		OT	GN	64	327	6	8	96	CONTR	CONTR	CONTR	3	3			10ZOO
2	A	1071	LKTR	414	800	12		OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	3	1			15ZOO
2	A	1072	LKTR	421	810	7		OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	3	1			03BRA12ZOO
2	A	1073	LKTR	433	820	2		OT	GN	89	0	6	8	96	CONTR	CONTR	CONTR	4	1			12FIS08ROD
2	A	1074	ARCH	465	1075	0			GN	114	0	6	8	96	CONTR	CONTR	CONTR	3	0			
2	A	1075	LKTR	397	465	0			GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	0			
2	A	1076	LKTR	236	125	0			GN	38	0	6	8	96	CONTR	CONTR	CONTR	4	0			
2	A	1077	LKTR	0	0	0			GN	64	0	6	8	96	CONTR	CONTR	CONTR	3	0	RND		
2	A	1078	LKTR	0	0	0			GN	38	0	6	8	96	CONTR	CONTR	CONTR	3	0	RND		
2	A	1079	ARCH	0	0	0			GN	19	0	6	8	96	CONTR	CONTR	CONTR	4	0	RND		
2	A	1080	LKTR	0	0	0			GN	64	0	6	8	96	CONTR	CONTR	CONTR	4	0	RND		
2	A	1081	RNWH	0	0	0			GN	19	0	23	7	96	MINE	MINE	CARAT	1	0	RND		
2	A	1082	RNWH	0	0	0			GN	19	0	23	7	96	MINE	MINE	CARAT	1	0	RND		
2	A	1083	RNWH	0	0	0			GN	19	0	23	7	96	MINE	MINE	CARAT	1	0	RND		
2	A	1084	RNWH	0	0	0			GN	19	0	23	7	96	MINE	MINE	CARAT	2	0	RND		
2	A	1085	RNWH	0	0	0			GN	19	0	24	7	96	MINE	MINE	CARAT	3	0	RND		
2	A	1086	RNWH	0	0	0			GN	19	0	1	8	96	FUEL	FUEL	LO05	1	0	RND		
2	A	1087	LKTR	0	0	0			GN	38	0	1	8	96	FUEL	FUEL	LO05	1	0	RND		
2	A	1088	ARGR	0	0	0			GN	64	0	1	8	96	FUEL	FUEL	LO05	1	0	RND		
2	A	1089	LKTR	0	0	0			GN	19	0	26	7	96	MINE	MINE	CARAT	6	0	RND		
2	A	1090	LKTR	0	0	0			GN	38	0	26	7	96	MINE	MINE	CARAT	5	0	RND		
2	A	1091	LKTR	0	0	0			GN	38	0	26	7	96	MINE	MINE	CARAT	5	0	RND		
2	A	1092	LKTR	0	0	0			GN	19	0	31	7	96	TAIL	DOCK	CONTW	5	0	RND		
2	A	1093	LKTR	0	0	0			GN	38	0	4	8	96	TAIL	TAIL	LD05	1	0	RND		
2	A	1094	LKTR	177	56	0			EF	0	0	5	8	96	CROSS	CROSS	TX22	1	0			
2	A	1095	SLSC	108	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX22	1	0			
2	A	1096	SLSC	94	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX22	1	0			
2	A	1097	SLSC	103	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX22	1	0			
2	A	1098	LKTR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX22	1	0	OBSERVED		
2	A	1099	LKTR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX22	1	0	OBSERVED		
2	A	1100	LKTR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX22	1	0	OBSERVED		
2	A	1101	ARGR	162	50	0	2	SC	EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1102	ARGR	119	26	0	1	SC	EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1103	ARGR	114	24	0	1	SC	EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1104	ARGR	115	16	0	1	SC	EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1105	SLSC	82	8	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1106	SLSC	77	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1107	LKTR	122	22	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1108	SLSC	52	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0			
2	A	1109	ARGR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1110	ARGR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1111	ARGR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1112	ARGR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1113	ARGR	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1114	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1115	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX37	1	0	OBSERVED		
2	A	1116	ARCH	76	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1117	ARCH	61	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1118	ARCH	74	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1119	ARCH	64	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1120	NNST	21	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1121	SLSC	44	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1122	SLSC	69	10	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1123	SLSC	50	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0			
2	A	1124	NNST	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX07	2	0	OBSERVED		
2	A	1125	ARCH	75	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1126	ARCH	61	10	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1127	ARCH	85	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1128	ARCH	90	10	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1129	ARCH	74	8	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1130	ARCH	70	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1131	ARCH	95	12	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1132	ARCH	74	10	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1133	ARCH	76	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1134	SLSC	59	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1135	ARCH	75	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1136	ARCH	83	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1137	ARCH	65	2	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1138	ARCH	65	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1139	ARCH	65	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	0			
2	A	1140	ARCH	75	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	1			
2	A	1141	ARCH	63	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX08	1	1			
2	A	1142	SLSC	57	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1143	SLSC	69	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1144	SLSC	54	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1145	SLSC	57	2	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1146	SLSC	79	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1147	SLSC	84	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1148	SLSC	65	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1149	SLSC	56	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1150	SLSC	78	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1151	SLSC	57	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1152	SLSC	62	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1153	SLSC	64	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0			
2	A	1154	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0	OBSERVED		
2	A	1155	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0	OBSERVED		
2	A	1156	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0	OBSERVED		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	1157	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX18	1	0	OBSERVED		
2	A	1158	SLSC	61	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1159	SLSC	88	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1160	SLSC	85	8	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1161	SLSC	86	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1162	SLSC	78	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1163	SLSC	86	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1164	SLSC	81	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1165	SLSC	75	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1166	SLSC	73	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1167	SLSC	70	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1168	SLSC	66	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1169	SLSC	57	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1170	SLSC	56	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1171	SLSC	55	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1172	SLSC	60	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1173	SLSC	41	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0			
2	A	1174	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1175	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1176	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1177	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1178	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1179	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1180	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1181	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX21	1	0	OBSERVED		
2	A	1182	LKTR	295	340	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1183	ARCH	118	22	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1184	ARCH	166	66	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1185	ARCH	137	36	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1186	ARCH	123	24	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1187	ARCH	101	20	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1188	ARCH	79	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1189	ARCH	79	6	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1190	SLSC	77	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1191	SLSC	101	12	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1192	SLSC	78	4	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1193	SLSC	55	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1194	SLSC	65	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1195	NNST	46	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0			
2	A	1196	ARCH	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0	OBSERVED		
2	A	1197	ARCH	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0	OBSERVED		
2	A	1198	ARCH	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0	OBSERVED		
2	A	1199	NNST	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0	OBSERVED		
2	A	1200	SLSC	0	0	0			EF	0	0	5	8	96	CROSS	CROSS	TX20	1	0	OBSERVED		
2	A	1201	ARGR	55	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1202	ARGR	55	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1203	ARGR	112	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1204	ARGR	55	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1205	ARGR	58	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1206	ARGR	60	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1207	ARGR	57	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1208	NNST	42	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0			
2	A	1209	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0	OBSERVED		
2	A	1210	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0	OBSERVED		
2	A	1211	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0	OBSERVED		
2	A	1212	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX53	1	0	OBSERVED		
2	A	1213	RNWH	98	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX50	1	0			
2	A	1214	ARGR	156	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX50	1	0			
2	A	1215	NNST	61	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX50	1	0			
2	A	1217	SLSC	65	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX41	1	0			
2	A	1218	BURB	33	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX41	1	0			
2	A	1219	BURB	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX41	1	0	OBSERVED		
2	A	1220	ARGR	58	0	0	0	SC	EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1221	ARGR	58	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1222	SLSC	87	4	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1223	SLSC	59	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1224	SLSC	60	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1225	SLSC	65	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1226	ARGR	54	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1227	ARGR	58	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1228	SLSC	71	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0			
2	A	1229	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1230	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1231	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1232	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1233	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1234	ARGR	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1235	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1236	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1237	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1238	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1239	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1240	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1241	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1242	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1243	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1244	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1245	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1246	SLSC	0	0	0			EF	0	0	6	8	96	CROSS	CROSS	TX24	1	0	OBSERVED		
2	A	1247	LKTR	0	0	0			EF	0	0	25	7	96	MINE	CARAT	TC01	1	0	OBSERVED		
2	A	1248	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1249	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1250	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1251	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1252	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1253	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1254	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1255	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1256	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1257	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1258	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1259	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1260	SLSC	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1261	LKTR	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1262	LKTR	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1263	LKTR	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1264	LKTR	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1265	LKTR	0	0	0			EF	0	0	29	7	96	MINE	CARAT	TC04	1	0	OBSERVED		
2	A	1266	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1267	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1268	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	1269	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1270	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1271	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1272	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1273	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1274	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1275	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1276	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1277	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1278	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1279	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1280	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1281	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1282	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1283	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1284	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1285	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1286	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1287	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1288	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1289	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1290	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1291	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1292	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1293	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1294	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1295	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1296	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1297	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1298	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1299	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1300	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1301	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1302	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1303	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1304	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1305	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1306	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1307	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1308	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1309	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1310	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1311	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1312	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1313	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1314	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO5	TO06A	1	0	OBSERVED		
2	A	1315	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1316	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1317	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1318	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1319	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1320	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1321	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1322	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1323	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1324	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1325	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1326	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1327	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1328	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1329	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1330	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1331	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1332	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1333	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1334	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1335	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1336	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1337	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1338	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1339	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1340	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1341	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1342	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1343	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1344	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1345	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1346	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1347	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1348	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1349	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1350	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1351	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1352	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1353	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1354	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1355	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1356	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1357	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1358	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1359	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1360	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1361	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1362	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1363	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1364	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1365	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1366	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1367	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1368	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1369	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1370	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1371	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1372	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1373	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1374	NNST	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	1	0	OBSERVED		
2	A	1375	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0	OBSERVED		
2	A	1376	ARGR	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0	OBSERVED		
2	A	1377	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0	OBSERVED		
2	A	1378	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0	OBSERVED		
2	A	1379	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0	OBSERVED		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	1380	SLSC	0	0	0			EF	0	0	2	8	96	FUEL	LO4	TO06	3	0	OBSERVED		
2	A	1381	SLSC	116	14	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1382	ARCH	187	78	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1383	ARCH	129	28	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1384	ARCH	109	18	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1385	ARCH	134	32	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1386	ARGR	99	12	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1387	ARCH	119	20	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1388	ARCH	106	16	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1389	ARCH	97	14	0			EF	0	0	5	7	96	CROSS	CROSS	TX04	1	0			
2	A	1390	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	1	0			
2	A	1391	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	1	0			
2	A	1392	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	1	0			
2	A	1393	SLSC	0	0	0			SN	0	0	3	8	96	MINE	MINE	TC15	1	0			
2	A	1394	SLSC	0	0	0			SN	0	0	3	8	96	MINE	MINE	TC15	1	0			
2	A	1395	SLSC	0	0	0			SN	0	0	3	8	96	MINE	MINE	TC15	2	0			
2	A	1396	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1397	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1398	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1399	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1400	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1401	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1402	ARGR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	2	0			
2	A	1403	LKTR	0	0	0			SN	0	0	3	8	96	MINE	INTER	TC15	1	0			
2	A	1404	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1405	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1406	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1407	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1408	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1409	ARCH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1410	ARGR	0	0	10			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1411	ARGR	0	0	20			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1412	ARGR	0	0	20			SN	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1413	LKTR	0	0	0			OB	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1414	SLSC	0	0	0			OB	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1415	ARGR	0	0	0			OB	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1416	ARGR	0	0	0			OB	0	0	3	8	96	MINE	RIVER	TO07A	1	0	CASCADE		
2	A	1417	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1418	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1419	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1420	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1421	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1422	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1423	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1424	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1425	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1426	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1427	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1428	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1429	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1430	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1431	ARGR	0	0	10			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1432	ARGR	0	0	10			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1433	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1434	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1435	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1436	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1437	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1438	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1439	LKTR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	2	0	RABG1		
2	A	1440	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1441	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1442	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1443	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1444	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1445	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1446	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1447	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1448	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1449	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1450	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1451	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1452	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1453	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1454	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1455	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1456	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1457	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1458	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1459	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07A	3	0	RABG2		
2	A	1460	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1461	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1462	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1463	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1464	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1465	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1466	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1467	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1468	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1469	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1470	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1471	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1472	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1473	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1474	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1475	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1476	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1477	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1478	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1479	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1480	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1481	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1482	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1483	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1484	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1485	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1486	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1487	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1488	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1489	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1490	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	A	1491	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1492	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1493	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1494	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	5	0	RABG4		
2	A	1495	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1496	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1497	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1498	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1499	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1500	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1501	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1502	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1503	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1504	ARGR	0	0	20			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1505	RNWH	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1506	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1507	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1508	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1509	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1510	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1511	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1512	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1513	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1514	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1515	ARGR	0	0	0			SN	0	0	3	8	96	MINE	RIVER	TO07B	4	0	RABG3		
2	A	1516	SLSC	0	0	0			EF	0	0	27	7	96	MINE	CARAT	TC01	3	0	OBSERVED		
2	A	1517	LKTR	0	0	0			OB	0	0	28	7	96	TAIL	TAIL	LD04	1	0	OBSERVED		
2	A	1518	LKTR	0	0	0			OB	0	0	28	7	96	TAIL	TAIL	LD04	1	0	OBSERVED		
2	A	1519	LKTR	0	0	0			OB	0	0	28	7	96	TAIL	DOCK	CONTW	1	0	OBSERVED		
2	A	1520	SLSC	0	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0	OBSERVED		
2	A	1521	SLSC	0	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0	OBSERVED		
2	A	1522	SLSC	0	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0	OBSERVED		
2	A	1523	SLSC	0	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0	OBSERVED		
2	A	1524	SLSC	0	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0	OBSERVED		
2	A	1525	SLSC	0	0	0			EF	0	0	30	7	96	MINE	CARAT	TC06	1	0	OBSERVED		
2	B	1	ARCH	89	8	0	1	SO	EF	0	0	29	7	96	FUEL	LO1	TO18	2	1			
2	B	2	ARCH	53	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	3	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	4	ARCH	43	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	5	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	6	ARCH	54	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	7	ARCH	97	10	0	1	SC	EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	8	ARCH	86	6	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0			
2	B	9	ARCH	41	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	1			
2	B	10	ARGR	116	18	0	2	SC	EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	11	ARGR	157	40	0	2	SC	EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	12	ARGR	107	8	0		SC	EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	13	SLSC	64	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	14	SLSC	80	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	15	SLSC	63	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	16	SLSC	67	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	17	SLSC	68	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	18	SLSC	41	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	19	SLSC	79	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	20	SLSC	83	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	21	SLSC	57	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	22	NNST	48	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	23	NNST	51	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	24	NNST	50	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	25	NNST	47	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	26	NNST	51	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	27	NNST	27	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0			
2	B	28	ARCH	99	10	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	29	ARCH	102	10	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	30	ARCH	107	12	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	31	ARCH	93	8	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	32	ARCH	94	8	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	33	ARCH	105	14	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	34	ARCH	90	8	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	35	ARCH	46	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	36	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	37	ARCH	46	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	38	ARCH	45	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	39	ARCH	42	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	40	ARCH	57	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	41	ARCH	46	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	42	SLSC	93	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	43	SLSC	66	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	44	NNST	53	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	45	NNST	72	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0			
2	B	46	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO3	TO16	1	0			
2	B	47	ARCH	45	0	0			EF	0	0	29	7	96	FUEL	LO3	TO16	1	0			
2	B	48	SLSC	77	0	0			EF	0	0	29	7	96	FUEL	LO3	TO16	1	0			
2	B	49	ARCH	91	10	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	50	ARCH	104	10	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	51	SLSC	37	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	52	SLSC	58	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	53	ARCH	54	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	54	BURB	37	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	55	BURB	43	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	56	BURB	46	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	57	BURB	36	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0			
2	B	58	ARCH	49	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	59	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	60	ARCH	50	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	61	ARCH	44	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	62	ARCH	50	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	63	ARCH	50	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	64	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	65	ARCH	53	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	66	ARCH	44	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	67	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	68	SLSC	62	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	69	SLSC	60	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	70	SLSC	62	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	71	SLSC	73	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	72	SLSC	60	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	73	SLSC	77	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	74	SLSC	78	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	75	SLSC	68	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	76	SLSC	62	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	B	77	SLSC	61	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	78	SLSC	55	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	79	SLSC	68	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	80	NNST	47	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	81	NNST	44	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	82	NNST	38	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	83	NNST	47	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	84	ARCH	44	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	85	ARCH	48	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	86	ARCH	47	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	87	BURB	149	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	88	BURB	128	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	102	0			
2	B	89	ARGR	176	68	0	2	SC	EF	0	0	29	7	96	FUEL	LO2	TO09	2	0			
2	B	90	LKTR	187	80	0			EF	0	0	29	7	96	FUEL	LO2	TO09	2	0			
2	B	91	SLSC	82	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	2	0			
2	B	92	SLSC	81	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	2	0			
2	B	93	ARGR	162	50	0		SC	EF	0	0	29	7	96	FUEL	LO2	TO09	3	0			
2	B	94	ARGR	145	30	0		SC	EF	0	0	29	7	96	FUEL	LO2	TO09	3	0			
2	B	95	ARGR	87	8	0	1	SC	EF	0	0	29	7	96	FUEL	LO2	TO09	3	0			
2	B	96	ARGR	97	10	0	1	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	4	0			
2	B	97	RNWH	111	12	0	1	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	4	0			
2	B	98	BURB	125	10	0			EF	0	0	29	7	96	FUEL	LO2	TO22	4	0			
2	B	99	ARGR	177	68	0	2	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	100	ARGR	167	54	0	2	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	101	ARGR	188	72	0	2	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	102	ARGR	183	62	0	2	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	103	ARGR	175	68	0		SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	104	ARGR	142	32	0	2	SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	105	ARGR	107	12	0		SC	EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	106	ARGR	103	10	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0			
2	B	107	NNST	22	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	108	BURB	42	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	109	NNST	22	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	110	NNST	41	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	111	BURB	28	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	112	BURB	34	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	113	BURB	48	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	114	BURB	44	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	115	BURB	26	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	116	BURB	40	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0			
2	B	117	ARGR	47	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0			
2	B	118	BURB	45	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0			
2	B	119	BURB	45	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0			
2	B	120	BURB	40	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0			
2	B	121	ARGR	172	60	0	2	SC	EF	0	0	30	7	96	MINE	RIVER	TO04	1	0			
2	B	122	ARGR	43	0	0	0	SC	EF	0	0	30	7	96	MINE	RIVER	TO04	1	0			
2	B	123	ARGR	101	14	0	1	SC	EF	0	0	30	7	96	MINE	RIVER	TO04	1	0			
2	B	124	ARCH	106	10	0			EF	0	0	30	7	96	MINE	RIVER	TO04	1	0			
2	B	125	ARCH	116	18	0		SC	EF	0	0	30	7	96	MINE	RIVER	TO04	1	0			
2	B	126	ARCH	104	6	0			EF	0	0	30	7	96	MINE	RIVER	TO03	1	0			
2	B	127	ARCH	99	12	0			EF	0	0	30	7	96	MINE	RIVER	TO03	1	0			
2	B	128	LKTR	509	1400	12		OT	GN	89	0	31	7	96	MINE	MINE	INTE1	5	1			05PEL
2	B	129	LKTR	339	1040	11		OT	GN	64	0	31	7	96	MINE	MINE	INTE1	5	1			10ZOO
2	B	130	LKTR	495	1350	12		OT	GN	64	0	31	7	96	MINE	MINE	INTE1	5	1			05ZOO
2	B	131	LKTR	437	1000	11		OT	GN	64	0	31	7	96	MINE	MINE	INTE1	5	1			01FIS
2	B	132	RNWH	502	1425	7		OT	GN	38	0	31	7	96	MINE	MINE	INTE1	6	1			20TRI
2	B	133	LKTR	343	0	99		OT	GN	64	220	31	7	96	MINE	MINE	INTE1	5	0			
2	B	134	LKTR	344	400	11		OT	GN	64	0	31	7	96	MINE	MINE	INTE1	6	1			10ZOO
2	B	135	LKTR	240	130	99		OT	GN	114	0	31	7	96	MINE	MINE	INTE1	5	1			
2	B	136	LKTR	425	750	11		OT	GN	89	0	31	7	96	MINE	MINE	INTE1	6	1			0
2	B	137	LKTR	337	375	1		OT	GN	64	0	31	7	96	MINE	MINE	INTE1	6	1			10ZOO
2	B	138	ARCH	466	990	2		OT	GN	64	0	1	8	96	MINE	MINE	INTE1	6	1			05ZOO
2	B	139	LKTR	248	146	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE1	5	1			05ZOO
2	B	140	LKTR	189	50	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE1	5	1			01ZOO
2	B	141	LKTR	207	70	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE1	5	1			15ZOO
2	B	142	LKTR	176	48	99		OT	GN	38	0	1	8	96	MINE	MINE	INTE1	5	1			0
2	B	143	RNWH	498	1392	7		OT	GN	89	0	1	8	96	MINE	MINE	INTE1	5	1			15TRI
2	B	144	LKTR	0	0	99			GN	140	0	1	8	96	MINE	MINE	INTE1	5	1	RND		
2	B	145	SLSC	64	0	0			EF	0	0	1	8	96	TAIL	LD5	TD06	1	0			
2	B	146	SLSC	73	0	0			EF	0	0	1	8	96	TAIL	LD5	TD06	1	0			
2	B	147	SLSC	33	0	0			EF	0	0	1	8	96	TAIL	LD5	TD06	1	0			
2	B	148	SLSC	36	0	0			EF	0	0	1	8	96	TAIL	LD5	TD06	1	0			
2	B	149	LKTR	136	30	0			EF	0	0	1	8	96	TAIL	LD5	TD06	1	0			
2	B	150	ARCH	106	14	0			EF	0	0	1	8	96	TAIL	LD5	TD06	1	0			
2	B	151	ARCH	182	48	0			EF	0	0	1	8	96	TAIL	LD5	TD04	1	0			
2	B	152	ARCH	136	18	0			EF	0	0	1	8	96	TAIL	LD5	TD04	1	0			
2	B	153	LKTR	327	338	0		OT	GN	64	0	1	8	96	MINE	MINE	INTE1	6	1			
2	B	154	LKTR	543	1524	0			GN	64	218	1	8	96	MINE	MINE	INTE1	6	0			
2	B	155	LKTR	545	2650	0			GN	64	217	2	8	96	FUEL	FUEL	LO04	1	0			
2	B	156	ARCH	569	1648	0			GN	38	215	2	8	96	FUEL	FUEL	LO04	1	0			
2	B	157	RNWH	513	1580	17	15	OT	GN	89	0	2	8	96	FUEL	FUEL	LO04	1	1			02INS08TRI
2	B	158	ARCH	620	2365	7		OT	GN	89	0	2	8	96	FUEL	FUEL	LO04	1	1			0
2	B	159	ARCH	601	2430	11		OT	GN	64	0	2	8	96	FUEL	FUEL	LO04	1	1			15BRA
2	B	160	ARCH	551	1430	1		OT	GN	64	0	2	8	96	FUEL	FUEL	LO04	1	1			0
2	B	161	ARCH	599	2335	2		OT	GN	64	0	2	8	96	FUEL	FUEL	LO04	1	1			0
2	B	162	ARCH	494	1425	17		OT	GN	64	0	2	8	96	FUEL	FUEL	LO04	1	1			0
2	B	163	ARCH	393	585	12		OT	GN	64	0	2	8	96	FUEL	FUEL	LO04	1	1			0
2	B	164	LKTR	575	2430	0			GN	140	214	2	8	96	FUEL	FUEL	LO04	2	0			
2	B	165	ARCH	565	1850	0			GN	64	212	2	8	96	FUEL	FUEL	LO04	2	0			
2	B	166	LKTR	174	52	0			GN	38	0	2	8	96	FUEL	FUEL	LO04	2	0			
2	B	167	RNWH	187	72	11	3	OT	GN	38	0	2	8	96	FUEL	FUEL	LO04	2	1			05ZOO05TRI
2	B	168	RNWH	188	52	99	3	OT	GN	38	0	2	8	96	FUEL	FUEL	LO04	2	1			15TRI05INS
2	B	169	LKTR	598	2610	7	26	OT	GN	89	0	2	8	96	FUEL	FUEL	LO04	2	1			05BUR05BRA
2	B	170	LKTR	497	1484	11		OT	GN	89	0	2	8	96	FUEL	FUEL	LO04	2	1			0
2	B	171	RNWH	471	1330	17	10	OT	GN	114	0	2	8	96	FUEL	FUEL	LO04	2	1			10TRI
2	B	172	RNWH	476	1240	7	11	OT	GN	114	0	2	8	96	FUEL	FUEL	LO04	2	1			15TRI
2	B	173	NNST	52	0	0			GE	0	0	2	8	96	FUEL	FUEL	LO04	3	0			
2	B	174	NNST	38	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO02	1	0			
2	B	175	SLSC	55	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO02	3	0			
2	B	176	NNST	51	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO02	5	0			
2	B	177	NNST	52	0	0			GE	0	0	3	8	96	FUEL	FUEL	LO02	5	0			
2	B	178	RNWH	486	1340	17	23	OT	GN	64	0	3	8	96	FUEL	FUEL	LO02	1	1			14PEL01TRI
2	B	179	LKTR	452	1188	12	10	OT	GN	64	0	3	8	96	FUEL	FUEL	LO02	1	1			10STI
2	B	180	RNWH	104	10	99	1	OT	GN	19	0	3	8	96	FUEL	FUEL	LO02	1	1			20TRI
2	B	181	RNWH	100	10	99	1	OT	GN	19	0	3	8	96	FUEL	FUEL	LO02	1	1			20ZOO
2	B	182	RNWH	105	10	99	1	OT	GN	19	0	3	8	96	FUEL	FUEL	LO02	1	1			15ZOO
2	B	183	LKTR	334	396	0			AL	0	449	6	8	96	TAIL	TAIL	LD04	1	0			
2	B	184	LKTR	336	362	0			GN	64	447	6	8	96	TAIL	TAIL	LD04	7	0			
2	B	185	ARCH	293	250	1			GN	38	0	6	8	96	TAIL	TAIL	LD04	8	1			20PEL
2	B	186	ARCH	0	0	0			GN	64	0	6	8	96	TAIL	TAIL	LD04	8	0	RND		
2	B	187	LKTR	336	475	0			AL	0	446	6	8	96	TAIL	TAIL	LD04	0	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	B	188	ARCH	308	225	0			GN	64	445	6	8	96	TAIL	TAIL	LD04	8	0			
2	B	189	ARCH	352	300	0			GN	64	444	6	8	96	TAIL	TAIL	LD04	8	0			
2	B	190	ARCH	367	500	17			GN	114	0	6	8	96	TAIL	TAIL	LD04	8	1			05ZOO
2	B	191	LKTR	332	450	0			AL	0	443	6	8	96	TAIL	TAIL	LD04	0	0			
2	B	192	LKTR	355	500	0			AL	0	442	6	8	96	TAIL	TAIL	LD04	0	0			
2	B	193	LKTR	244	175	0			GN	38	0	6	8	96	TAIL	TAIL	LD04	7	0			
2	B	194	LKTR	382	625	0			GN	38	441	6	8	96	TAIL	TAIL	LD04	7	0			
2	B	195	ARCH	317	275	0			GN	38	439	6	8	96	TAIL	TAIL	LD04	7	0			
2	B	198	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	199	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	200	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	201	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	202	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	203	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	204	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	205	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	206	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	207	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	208	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	209	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	210	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	211	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	212	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	213	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	214	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	215	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	216	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	217	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	218	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	219	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	220	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	221	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	222	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	223	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	224	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	225	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	226	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO21	1	0	OBSERVED		
2	B	227	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	228	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	229	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	230	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	231	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	232	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	233	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	234	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	235	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	236	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	237	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO3	TO17	1	0	OBSERVED		
2	B	238	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO10	1	0	OBSERVED		
2	B	239	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO11	1	0	OBSERVED		
2	B	240	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	241	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	242	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	243	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	244	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	245	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	246	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	247	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	248	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	249	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	250	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	251	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	2	0	OBSERVED		
2	B	252	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	253	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	254	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	255	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	256	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	257	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	258	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	259	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	260	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	261	NNST	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	262	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	263	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	264	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	265	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	266	BURB	0	0	0			EF	0	0	29	7	96	FUEL	LO4	TO12	1	0	OBSERVED		
2	B	267	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	268	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	269	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	270	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	271	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	272	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	273	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	274	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	3	0	OBSERVED		
2	B	275	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO09	4	0	OBSERVED		
2	B	276	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	277	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	278	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	279	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	280	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	281	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	282	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	283	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	284	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	285	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	286	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	287	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	288	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	289	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	290	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	291	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	292	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	293	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	294	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	295	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	296	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	297	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	298	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	299	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	300	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	B	301	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	302	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	303	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	304	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	305	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	306	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	307	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	308	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	5	0	OBSERVED		
2	B	309	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	310	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	311	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	312	ARGR	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	313	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	314	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	315	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	316	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	317	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	318	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	319	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	320	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	321	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	322	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	323	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	324	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	325	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	326	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO2	TO22	6	0	OBSERVED		
2	B	327	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	328	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	329	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	330	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	331	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	332	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	333	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	334	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	335	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	336	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	337	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	338	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	339	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	340	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	341	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	342	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	343	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	344	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	345	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	346	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	347	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	348	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	349	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	350	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	351	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	352	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	353	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	354	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	355	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	356	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	357	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	358	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	359	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	360	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	361	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	362	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	363	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	364	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	365	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	366	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	367	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	368	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	369	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	370	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	371	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	372	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	373	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	1	0	OBSERVED		
2	B	374	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	375	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	376	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	377	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	378	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	379	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	380	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	381	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	382	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	383	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	384	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	385	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	386	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	387	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	388	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	389	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	390	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	391	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	392	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	393	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	394	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	395	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	396	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	397	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	398	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	399	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	400	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	401	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	402	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	403	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	404	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	405	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	406	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	407	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	408	ARCH	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	409	SLSC	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	410	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	411	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	B	412	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	413	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	414	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	415	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	416	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	417	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO01	2	0	OBSERVED		
2	B	418	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	419	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	420	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	421	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	422	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	423	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	424	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	425	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	426	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	427	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	428	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	429	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	430	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	431	NNST	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	432	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	433	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	434	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	435	BURB	0	0	0			EF	0	0	30	7	96	MINE	RIVER	TO02	1	0	OBSERVED		
2	B	436	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	437	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	438	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	439	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	440	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	441	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	442	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	443	ARCH	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	444	SLSC	0	0	0			EF	0	0	29	7	96	FUEL	LO1	TO18	2	0	OBSERVED		
2	B	445	SLSC	76	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	446	SLSC	59	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	447	SLSC	58	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	448	SLSC	62	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	449	SLSC	39	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	450	SLSC	59	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	451	SLSC	72	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0			
2	B	452	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0	OBSERVED		
2	B	454	ARCH	0	0	0			EF	0	0	2	8	96	TAIL	LD5	TD06	2	0	OBSERVED		
2	B	455	SLSC	62	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0			
2	B	456	SLSC	53	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0			
2	B	457	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0	OBSERVED		
2	B	458	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0	OBSERVED		
2	B	459	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0	OBSERVED		
2	B	460	ARCH	54	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0			
2	B	461	ARCH	158	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0			
2	B	462	ARCH	122	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	I	0			
2	B	463	SLSC	79	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	464	SLSC	90	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	465	SLSC	87	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	466	ARCH	186	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	467	SLSC	59	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	468	SLSC	87	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	469	SLSC	59	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0			
2	B	470	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0	OBSERVED		
2	B	471	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	1	0	OBSERVED		
2	B	472	SLSC	87	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	4	0			
2	B	473	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	4	0	OBSERVED		
2	B	474	SLSC	0	0	0			EF	0	0	2	8	96	TAIL	LD4	TD02	4	0	OBSERVED		
2	C	1	LKTR	510	1400	17		OT	GN	64	0	29	7	96	MINE	MINE	CARAT	7	1		501-96	05BUR
2	C	2	RNWH	484	1200	7	21	OT	GN	89	0	29	7	96	MINE	MINE	CARAT	7	1		501102	20TRI
2	C	3	RNWH	532	1495	17	26	OT	GN	64	0	29	7	96	MINE	MINE	CARAT	7	1		501101	12PEL03TRI
2	C	4	LKTR	575	1950	0			GN	38	225	29	7	96	MINE	MINE	CARAT	7	0			
2	C	5	ARCH	598	1400	2		OT	GN	64	0	29	7	96	MINE	MINE	CARAT	7	1			0
2	C	6	RNWH	477	1150	7	23	OT	GN	89	0	29	7	96	MINE	MINE	CARAT	7	1		501-98	10PEL05TRI05ZOO
2	C	7	RNWH	507	1450	0			GN	114	0	29	7	96	MINE	MINE	CARAT	7	1	DUP OF A#623		
2	C	8	LKTR	498	1300	7		OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			0
2	C	9	LKTR	475	1275	17		OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			01ZOO
2	C	10	LKTR	437	895	12		OT	GN	89	0	30	7	96	MINE	MINE	CARAT	8	1			02FIS08ZOO
2	C	11	ARCH	515	1240	7	10	OT	GN	114	0	30	7	96	MINE	MINE	CARAT	8	1			01ZOO
2	C	12	LKTR	0	960	7		OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			10ZOO
2	C	13	LKTR	457	1060	7		OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			20ZOO
2	C	14	LKTR	418	130	17		OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			20ZOO
2	C	15	LKTR	489	1290	12		OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			15ZOO04FIS01GAS
2	C	16	ARCH	360	495	11	6	OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			15ZOO
2	C	17	ARCH	328	405	11	6	OT	GN	64	0	30	7	96	MINE	MINE	CARAT	8	1			15ZOO
2	C	18	LKTR	619	2250	12		OT	GN	89	0	30	7	96	MINE	MINE	CARAT	8	1			0
2	C	19	LKTR	439	1580	17	21	OT	GN	89	0	30	7	96	MINE	MINE	CARAT	8	1			0
2	C	20	LKTR	472	1295	7		OT	GN	114	0	30	7	96	MINE	MINE	CARAT	8	1			0
2	C	21	ARCH	547	1650	1	9	OT	GN	114	0	30	7	96	MINE	MINE	CARAT	8	1			01ZOO
2	C	22	LKTR	671	3150	12		OT	GN	114	0	30	7	96	MINE	MINE	CARAT	8	1			0
2	C	23	ARCH	555	1900	7			GN	114	223	30	7	96	MINE	MINE	JERIC	3	0			
2	C	24	LKTR	676	3150	0			GN	89	222	30	7	96	MINE	MINE	JERIC	3	0			
2	C	25	LKTR	505	1550	0			GN	64	221	30	7	96	MINE	MINE	JERIC	3	0			
2	C	26	LKTR	240	130	99		OT	GN	114	0	31	7	96	MINE	MINE	JERIC	3	1			05ZOO
2	C	27	RNWH	491	1100	0		OT	GN	114	0	29	7	96	MINE	MINE	CARAT	7	1	DUP OF A#622		
2	C	28	ARCH	447	900	0			GN	114	238	4	8	96	FUEL	FUEL	LO01	2	0			
2	C	29	ARCH	337	410	0			GN	64	219	4	8	96	FUEL	FUEL	LO01	1	0			
2	C	30	ARCH	362	525	0			GN	89	239	4	8	96	FUEL	FUEL	LO01	1	0			
2	C	31	ARCH	311	325	0			GN	89	216	4	8	96	FUEL	FUEL	LO01	2	0			
2	C	32	ARCH	574	1395	0			GN	114	190	4	8	96	FUEL	FUEL	LO01	1	0			
2	C	33	LKTR	494	1455	0			GN	114	0	4	8	96	FUEL	FUEL	LO01	2	0			
2	C	34	LKTR	999	18000	0			GN	89	211	4	8	96	FUEL	FUEL	LO01	2	0	TOOHEAVYFORSPRGSCA		
2	C	35	ARCH	378	566	99		OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	36	ARCH	273	190	99	5	OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	37	ARCH	173	46	99	2	OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	1	1			15ZOO
2	C	38	LKTR	104	6	99	1	OT	GN	19	0	4	8	96	FUEL	FUEL	LO01	1	1			05ZOO
2	C	39	SLSC	0	0	0			GN	19	0	4	8	96	FUEL	FUEL	LO01	1	1			
2	C	40	ARCH	560	1646	7	11	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	41	ARCH	457	982	11	7	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	42	ARCH	329	378	99	3	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	43	ARCH	472	854	99		OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	44	ARCH	465	1140	7	8	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	1	1			15MYS
2	C	45	LKTR	530	1430	17	33	OT	GN	114	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	46	ARCH	318	322	99	4	OT	GN	140	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	47	ARCH	541	1732	7		OT	GN	140	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	48	ARCH	485	1236	17	9	OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	49	ARCH	468	1048	99		OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	1	1			0

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	C	50	ARCH	575	1288	2		OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	1	1			0
2	C	51	LKTR	567	1930	0			GN	38	210	4	8	96	FUEL	FUEL	LO01	2	0			
2	C	52	ARCH	528	1250	12	9	OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	53	ARCH	376	555	11	7	OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	54	ARCH	451	996	11		OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	55	ARCH	446	865	99		OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	56	ARCH	522	1412	2		OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	57	LKTR	447	950	7	11	OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	58	ARCH	486	1074	99		OT	GN	89	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	59	ARCH	613	1984	7	12	OT	GN	114	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	60	ARCH	556	1236	17		OT	GN	114	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	61	ARCH	522	1262	17	11	OT	GN	114	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	62	ARCH	563	1322	17	12	OT	GN	114	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	63	ARCH	342	400	99	8	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	2	1			07ZOO03PEL
2	C	64	ARCH	502	1130	11	9	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	2	1	PARASITES		0
2	C	65	ARCH	396	424	99	7	OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	66	ARCH	374	562	99		OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	2	1			05ZOO05BRA
2	C	67	ARCH	373	520	99		OT	GN	64	0	4	8	96	FUEL	FUEL	LO01	2	1			0
2	C	68	ARCH	229	126	99	6	OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	2	1			15ZOO
2	C	69	ARCH	257	180	99	4	OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	2	1			15ZOO
2	C	70	ARCH	197	78	99	4	OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	2	1			10ZOO
2	C	71	ARCH	176	56	99		OT	GN	38	0	4	8	96	FUEL	FUEL	LO01	2	1			15ZOO
2	C	72	ARCH	0	0	0			GN	38	0	4	8	96	FUEL	FUEL	LO01	1	0	RND		
2	C	73	ARCH	0	0	0			GN	38	0	4	8	96	FUEL	FUEL	LO01	1	0	RND		
2	C	74	ARCH	345	365	0			GN	64	209	4	8	96	TAIL	TAIL	LD04	3	0			
2	C	75	ARCH	326	304	0			GN	64	208	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	76	ARCH	378	534	0			GN	64	207	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	77	ARCH	334	362	0			GN	64	206	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	78	ARCH	347	364	0			GN	64	205	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	79	ARCH	347	366	0			GN	64	204	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	80	ARCH	416	642	0			GN	38	203	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	81	ARCH	334	0	0			GN	38	202	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	82	ARCH	315	280	99	10	OT	GN	38	0	4	8	96	TAIL	TAIL	LD04	4	1			15ZOO
2	C	83	LKTR	486	1196	0			GN	64	201	4	8	96	TAIL	TAIL	LD04	4	0			
2	C	84	ARGR	48	0	0			EF	0	0	1	8	96	MINE	RIVER	TO23	1	0	ALSOSHOCKEDLUBOFJ.R		
2	C	85	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO23	1	0			
2	C	86	ARGR	54	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	87	ARGR	51	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	88	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	89	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	90	ARGR	54	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	91	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	92	ARGR	51	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	93	ARGR	50	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	94	ARGR	448	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	95	ARGR	55	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	96	ARGR	45	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	97	ARGR	55	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	98	ARGR	53	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	99	ARGR	48	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	100	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	101	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	102	ARGR	56	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	103	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	104	ARGR	57	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	105	ARGR	43	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0			
2	C	106	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	107	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	108	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	109	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	110	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	111	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	112	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	113	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	114	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	115	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	116	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	117	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	118	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO24	1	0	OBSERVED		
2	C	119	ARGR	98	10	0		SC	EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	120	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	121	ARGR	40	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	122	ARGR	44	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	123	ARGR	45	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	124	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	125	ARGR	45	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	126	ARGR	43	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	127	ARGR	42	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	128	ARGR	44	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	129	ARGR	48	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	130	ARGR	45	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	131	ARGR	43	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	132	ARGR	43	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	133	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	134	NNST	64	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	135	NNST	63	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	136	NNST	55	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	137	NNST	59	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	138	NNST	36	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	139	NNST	33	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	140	NNST	29	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	141	NNST	36	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	1	0			
2	C	142	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	143	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	144	ARGR	51	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	145	ARGR	54	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	146	ARGR	43	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	147	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	148	ARGR	45	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	149	ARGR	53	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	150	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	151	ARGR	56	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	152	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	153	ARGR	51	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	154	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	155	ARGR	54	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	156	ARGR	45	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	157	ARGR	44	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	158	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	159	ARGR	41	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	160	ARGR	43	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	C	161	ARGR	59	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	162	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	163	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	164	ARGR	53	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	165	ARGR	44	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	166	ARGR	46	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0			
2	C	167	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0	OBSERVED		
2	C	168	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0	OBSERVED		
2	C	169	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0	OBSERVED		
2	C	170	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0	OBSERVED		
2	C	171	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO25	3	0	OBSERVED		
2	C	172	ARGR	102	10	0		SC	EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	173	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	174	ARGR	48	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	175	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	176	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	177	NNST	37	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	178	NNST	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	179	NNST	63	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	180	NNST	57	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	181	NNST	60	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	182	ARGR	54	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	183	ARGR	50	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	184	ARGR	48	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	185	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	186	ARGR	49	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	187	ARGR	52	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	188	ARGR	47	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	189	ARGR	44	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	190	NNST	29	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0			
2	C	191	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	192	ARGR	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	193	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	194	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	195	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	196	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	197	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	198	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	199	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	200	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	201	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	202	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	203	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	204	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	205	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	206	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	207	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	208	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	209	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	210	NNST	0	0	0			EF	0	0	1	8	96	MINE	RIVER	TO26	1	0	OBSERVED		
2	C	211	ARGR	44	0	0			EF	0	0	1	8	96	MINE	RIVER	TO27	1	0			
2	C	212	ARGR	54	0	0			EF	0	0	1	8	96	MINE	RIVER	TO27	1	0			
2	C	213	NNST	57	0	0			EF	0	0	1	8	96	MINE	RIVER	TO27	1	0			
2	C	214	SLSC	40	0	0			EF	0	0	1	8	96	MINE	RIVER	TO27	1	0			
2	C	215	SLSC	42	0	0			EF	0	0	1	8	96	MINE	RIVER	TO27	1	0			
2	C	216	BURB	288	168	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	217	ARGR	104	10	0		SC	EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	218	ARGR	48	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	219	ARGR	36	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	220	ARGR	55	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	221	ARGR	61	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	222	ARGR	48	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	223	ARCH	62	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	224	ARGR	51	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	225	ARGR	53	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	226	ARGR	52	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	227	ARGR	49	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	228	ARGR	50	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	229	NNST	53	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	230	NNST	46	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	231	NNST	55	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	232	NNST	49	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	233	SLSC	64	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	234	SLSC	81	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	235	SLSC	58	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	236	SLSC	39	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	237	BURB	40	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	238	BURB	38	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	239	BURB	32	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	240	BURB	41	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0			
2	C	241	ARGR	155	40	0		SC	EF	0	0	1	8	96	FUEL	LO5	TO05	2	0			
2	C	242	ARGR	107	12	0		SC	EF	0	0	1	8	96	FUEL	LO5	TO05	3	0			
2	C	243	ARGR	113	16	0		SC	EF	0	0	1	8	96	FUEL	LO5	TO05	3	0			
2	C	244	ARGR	100	8	0		SC	EF	0	0	1	8	96	FUEL	LO5	TO05	4	0			
2	C	245	SLSC	84	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	3	0			
2	C	246	SLSC	85	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	3	0			
2	C	247	SLSC	87	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	3	0			
2	C	248	SLSC	94	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	4	0			
2	C	249	SLSC	73	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	4	0			
2	C	250	SLSC	63	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	4	0			
2	C	251	NNST	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0	OBSERVED		
2	C	252	NNST	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0	OBSERVED		
2	C	253	NNST	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0	OBSERVED		
2	C	254	NNST	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0	OBSERVED		
2	C	255	NNST	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0	OBSERVED		
2	C	256	ARGR	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	1	0	OBSERVED		
2	C	257	ARGR	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	3	0	OBSERVED		
2	C	258	ARGR	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	4	0	OBSERVED		
2	C	259	ARGR	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	4	0	OBSERVED		
2	C	260	ARGR	0	0	0			EF	0	0	1	8	96	FUEL	LO5	TO05	4	0	OBSERVED		
2	C	261	ARGR	0	0	0			EF	0	0	3	8	96	FUEL	LO2	TO09	1	0	OBSERVED		
2	C	262	ARGR	0	0	0			EF	0	0	3	8	96	FUEL	LO2	TO09	1	0	OBSERVED		
2	C	263	ARGR	0	0	0			EF	0	0	3	8	96	FUEL	LO2	TO09	1	0	OBSERVED		
2	C	264	ARGR	0	0	0			EF	0	0	3	8	96	FUEL	LO2	TO09	1	0	OBSERVED		
2	C	265	ARCH	73	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	266	ARCH	46	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	267	ARCH	47	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	268	ARCH	45	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	269	ARCH	48	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	270	ARCH	48	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	271	ARCH	51	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
2	C	272	ARCH	46	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	273	ARCH	47	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	274	SLSC	58	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	275	SLSC	56	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02A	1	0			
2	C	276	ARCH	48	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0			
2	C	277	ARCH	77	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0			
2	C	278	ARCH	78	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0			
2	C	279	ARCH	90	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0			
2	C	280	ARCH	83	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0			
2	C	281	ARCH	71	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0			
2	C	282	ARCH	0	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0	OBSERVED		
2	C	284	SLSC	0	0	0			EF	0	0	6	8	96	MINE	CARAT	TC02	1	0	OBSERVED		
2	C	285	ARCH	0	0	0			GN	0	0	30	7	96	MINE	MINE	CARAT	2	0	RND		
3	A	2001	ARCH	388	550	0			GN	64	4426	3	9	96	TAIL	TAIL	LD05	1	0			
3	A	2002	LKTR	333	400	18			GN	64	4427	3	9	96	TAIL	TAIL	LD05	1	0			
3	A	2003	ARCH	349	440	0			GN	64	4428	3	9	96	TAIL	TAIL	LD05	1	0			
3	A	2004	ARCH	407	720	9	12	OT	GN	64	426	3	9	96	TAIL	TAIL	LD05	1	3			05PEL
3	A	2005	ARCH	335	430	0			GN	64	4429	3	9	96	TAIL	TAIL	LD05	2	0			
3	A	2006	ARCH	0	0	8			GN	89	100	3	9	96	TAIL	TAIL	LD05	1	2			
3	A	2007	ARCH	390	0	8			GN	89	4430	3	9	96	TAIL	TAIL	LD05	1	0			
3	A	2008	ARCH	388	515	0			GN	64	4431	3	9	96	TAIL	TAIL	LD05	1	0			
3	A	2009	ARCH	381	530	8			GN	89	4433	3	9	96	TAIL	TAIL	LD05	1	0			
3	A	2010	LKTR	482	1385	0			AL	0	4432	3	9	96	TAIL	TAIL	LD05		0			
3	A	2011	ARCH	394	680	8			GN	64	488	3	9	96	TAIL	TAIL	LD04	1	2	01LTPELVICLIP		
3	A	2012	LKTR	352	486	8			GN	64	4876	3	9	96	TAIL	TAIL	LD04	1	0			
3	A	2013	ARCH	401	520	8			GN	64	4877	3	9	96	TAIL	TAIL	LD04	1	0			
3	A	2014	LKTR	345	426	0			GN	64	4878	3	9	96	TAIL	TAIL	LD04	2	0			
3	A	2015	LKTR	329	340	0			GN	64	4879	3	9	96	TAIL	TAIL	LD04	3	0			
3	A	2016	ARCH	395	576	8			GN	38	4880	3	9	96	TAIL	TAIL	LD04	3	0			
3	A	2017	LKTR	465	1090	9			GN	64	4434	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2018	LKTR	482	1280	8			GN	64	4436	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2019	LKTR	465	1290	8			GN	64	4437	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2020	LKTR	480	1225	9			GN	64	4438	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2021	LKTR	482	1190	9			GN	64	4439	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2022	LKTR	498	1275	9			GN	64	4440	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2023	LKTR	478	1215	9			GN	64	4441	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2024	LKTR	511	1545	9			GN	38	4442	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2025	LKTR	449	1100	9			GN	38	4443	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2026	LKTR	510	1375	9			GN	38	4444	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2027	LKTR	448	1000	9			GN	38	4445	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2028	LKTR	473	1225	9			GN	38	4446	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2029	LKTR	318	390	0			GN	38	4448	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2030	LKTR	465	1185	9			GN	38	0	4	9	96	MINE	MINE	CARAT	1	0	NOTAGGIVEN		
3	A	2031	LKTR	434	1025	9		OT	GN	38	0	4	9	96	MINE	MINE	CARAT	1	1			05ZOO
3	A	2032	LKTR	403	705	11		OT	GN	38	0	4	9	96	MINE	MINE	CARAT	1	1			0
3	A	2033	LKTR	315	350	0			GN	64	4449	4	9	96	MINE	MINE	CARAT	2	0			
3	A	2034	ARCH	515	1340	0			GN	19	4450	4	9	96	MINE	MINE	CARAT	2	0			
3	A	2035	LKTR	776	4600	9			GN	64	4435	4	9	96	MINE	MINE	CARAT	2	0			
3	A	2036	LKTR	960	14000	10			GN	114	4447	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2037	LKTR	450	995	19			GN	38	4576	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2038	LKTR	474	1220	9			GN	38	4577	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2039	LKTR	510	1575	9			GN	38	23	4	9	96	MINE	MINE	CARAT	1	2			
3	A	2040	LKTR	486	1385	9			GN	38	4578	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2041	ARCH	531	1670	20			GN	19	4579	4	9	96	MINE	MINE	CARAT	1	0	SEX20?		
3	A	2042	ARCH	500	1280	0			GN	38	4580	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2043	LKTR	438	995	9			GN	64	4581	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2044	LKTR	481	1320	0			GN	64	4582	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2045	LKTR	481	1315	8			GN	64	4583	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2046	LKTR	472	1260	9			GN	64	4584	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2047	LKTR	474	1235	9			GN	64	4585	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2048	LKTR	458	1175	9			GN	64	4586	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2049	LKTR	480	1315	8		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			10ZOO
3	A	2050	LKTR	475	1135	8		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			05EGG
3	A	2051	LKTR	468	1220	9		OT	GN	89	0	4	9	96	MINE	MINE	CARAT	1	1			05EGG
3	A	2052	RNWH	461	1375	17	17	OT	GN	38	0	4	9	96	MINE	MINE	CARAT	1	1		501103	05ZOO05EGG
3	A	2053	RNWH	473	1380	8	24	OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1		501104	05EGG
3	A	2054	RNWH	340	490	8	6	OT	GN	89	0	4	9	96	MINE	MINE	CARAT	1	1		501105	10CHI
3	A	2055	LKTR	535	1635	0			GN	89	0	4	9	96	MINE	MINE	CARAT	3	0			
3	A	2056	LKTR	460	1210	9			GN	38	4587	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2057	LKTR	466	1135	9			GN	38	4588	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2058	ARCH	418	1000	0			GN	38	4589	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2059	LKTR	475	1290	9			GN	38	4590	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2060	LKTR	504	1385	9			GN	38	4591	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2061	LKTR	505	1255	9			GN	89	4592	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2062	LKTR	462	1125	9			GN	114	4593	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2063	LKTR	470	1155	9			GN	64	4594	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2064	LKTR	464	1235	9			GN	64	4595	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2065	LKTR	450	1145	9			GN	38	4596	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2066	LKTR	457	1250	9			GN	64	0	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2067	LKTR	493	1035	0			GN	38	4597	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2068	LKTR	572	1765	9			GN	64	4598	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2069	LKTR	459	1150	9			GN	64	4599	4	9	96	MINE	MINE	CARAT	1	0			
3	A	2070	LKTR	480	1195	9		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			0
3	A	2071	LKTR	470	1210	8		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			03EGG02CHI
3	A	2072	LKTR	472	1280	9		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			10ZOO
3	A	2073	LKTR	480	1235	8		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			02EGG03ZOO
3	A	2074	LKTR	502	1265	8		OT	GN	64	0	4	9	96	MINE	MINE	CARAT	1	1			05ZOO
3	A	2075	RNWH	455	1375	8	15	OT	GN	89	0	4	9	96	MINE	MINE	CARAT	1	1		501106	20ZOO
3	A	2076	LKTR	485	1440	0			GN	64	4600	5	9	96	MINE	MINE	INTE2	3	0			
3	A	2077	LKTR	494	1496	0			GN	89	4881	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2078	ARCH	549	1830	8			GN	64	223	4	9	96	MINE	MINE	JERIC	2	2			
3	A	2079	ARCH	548	1414	0			GN	89	4882	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2080	ARCH	346	468	0			GN	38	4883	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2081	ARCH	331	386	0			GN	38	4884	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2082	LKTR	514	1542	0			GN	38	4885	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2083	LKTR	485	1434	9			GN	64	4886	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2084	LKTR	472	1324	9			GN	64	4887	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2085	LKTR	700	3000	0			GN	89	4889	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2086	LKTR	432	770	0			GN	89	4888	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2087	ARCH	526	1547	0			GN	38	4890	4	9	96	MINE	MINE	JERIC	2	0	NOCOLOR-SPAWNING		
3	A	2088	ARCH	579	2070	8			GN	64	4891	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2089	LKTR	503	1330	0			GN	64	4892	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2090	LKTR	664	3000	9			GN	64	4893	4	9	96	MINE	MINE	JERIC	2	0			
3	A	2091	ARCH	535	1774	18		OT	GN	64	0	4	9	96	MINE	MINE	JERIC	2	1			05ZOO
3	A	2092	ARCH	0	0	0			GN	38	0	4	9	96	MINE	MINE	JERIC	2	0	RND		
3	A	2093	LKTR	495	1432	9			GN	114	4894	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2094	LKTR	478	1374	9			GN	64	4895	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2095	ARCH	504	1542	9			GN	38	4896	4	9	96	MINE	MINE	JERIC	1	0			
3	A	2096	RNWH	458	1160	0			GN	89	4898	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2097	LKTR	316	390	0			GN	64	4900	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2098	ARCH	581	1918	9			GN	64	364	5	9	96	MINE	MINE	INTE1	1	2			

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
3	A	2099	ARCH	518	1606	2		OT	GN	64	0	5	9	96	MINE	MINE	INTE1	1	1			20ZOO
3	A	2100	RNWH	211	94	0			GN	38	0	5	9	96	MINE	MINE	INTE1	2	0			
3	A	2101	RNWH	218	112	0			GN	38	0	5	9	96	MINE	MINE	INTE1	2	0			
3	A	2102	RNWH	179	72	0			GN	38	0	5	9	96	MINE	MINE	INTE1	2	0			
3	A	2103	LKTR	351	566	0			GN	64	4899	5	9	96	MINE	MINE	INTE1	2	0			
3	A	2104	ARCH	595	2060	8			GN	64	4901	5	9	96	MINE	MINE	INTE1	2	0			
3	A	2105	RNWH	213	92	11		OT	GN	38	0	5	9	96	MINE	MINE	INTE1	2	1			20ZOO
3	A	2106	ARCH	605	2800	8			GN	38	4902	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2107	ARCH	615	2500	8			GN	64	4903	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2108	ARCH	581	2600	8			GN	114	4904	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2109	ARCH	0	0	0			GN	64	4891	5	9	96	MINE	MINE	INTE1	1	2	CAUGHTDAYBEFORE		
3	A	2110	ARCH	0	0	0			GN	64	0	5	9	96	MINE	MINE	INTE1	1	0	RND		
3	A	2111	LKTR	521	1474	0			GN	64	4905	5	9	96	MINE	MINE	INTE1	2	0			
3	A	2112	LKTR	530	1368	9			GN	64	4906	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2113	LKTR	501	1290	19			GN	64	4907	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2114	RNWH	70	0	0			GN	19	0	5	9	96	MINE	MINE	INTE1	1	0			
3	A	2115	RNWH	375	612	0			GN	64	4908	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2116	LKTR	568	2052	0			GN	38	4909	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2117	ARCH	514	1460	20			GN	114	4910	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2118	ARCH	563	1988	9			GN	89	4911	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2119	ARCH	488	1342	9			GN	89	4912	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2120	ARCH	479	1146	20			GN	64	4913	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2121	LKTR	590	2364	9			GN	64	4914	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2122	ARCH	489	1032	0			GN	64	4915	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2123	LKTR	615	2544	20			GN	114	4916	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2124	LKTR	472	1872	9			GN	89	4917	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2125	ARCH	487	1290	20			GN	114	4918	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2126	LKTR	531	2024	9			GN	89	4919	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2127	LKTR	544	1904	9			GN	64	4920	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2128	ARCH	514	1422	9			GN	64	4921	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2129	LKTR	548	1726	10			GN	38	4922	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2130	ARCH	494	1168	0			GN	89	4923	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2131	ARCH	395	714	0			GN	64	4924	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2132	ARCH	478	1916	9			GN	114	4925	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2133	ARCH	386	576	0			GN	89	4926	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2134	ARCH	327	358	0			GN	64	4927	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2135	ARCH	385	580	0			GN	64	4928	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2136	ARCH	445	912	1	8	OT	GN	64	0	6	9	96	FUEL	FUEL	LO01	1	1			18ANT02CHI
3	A	2137	ARCH	502	1404	0			GN	114	4929	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2138	ARCH	490	1106	0			GN	38	4930	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2139	ARCH	435	1416	0			GN	38	4931	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2140	LKTR	463	1260	9			GN	89	4932	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2141	LKTR	581	2172	9			GN	114	4933	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2142	ARCH	574	1912	0			GN	64	0	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2143	LKTR	568	1782	19			GN	89	4934	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2144	ARCH	564	2054	9			GN	64	4935	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2145	LKTR	516	1868	19			GN	64	4936	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2146	ARCH	533	1494	0			GN	64	4937	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2147	ARCH	542	1634	9			GN	64	4938	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2148	LKTR	609	2905	9			GN	64	4939	6	9	96	FUEL	FUEL	LO01	2	0			
3	A	2149	LKTR	594	2326	0	36	OT	GN	114	0	6	9	96	FUEL	FUEL	LO01	2	1			0
3	A	2150	ARCH	605	3100	9			GN	114	4940	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2151	ARCH	594	2406	9			GN	89	4941	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2152	ARCH	568	1788	9			GN	114	4942	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2153	ARCH	502	1484	9			GN	64	4943	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2154	ARCH	390	584	0			GN	64	4944	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2155	ARCH	343	440	0			GN	64	4945	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2156	LKTR	326	368	0			GN	38	4946	6	9	96	FUEL	FUEL	LO01	1	0			
3	A	2157	ARCH	453	1042	0			GN	38	4950	7	9	96	FUEL	FUEL	LO02	1	0			
3	A	2158	RNWH	382	774	0			GN	64	4947	7	9	96	FUEL	FUEL	LO02	2	0			
3	A	2159	RNWH	381	628	0			GN	64	0	7	9	96	FUEL	FUEL	LO02	2	0			
3	A	2160	RNWH	388	784	18	8	OT	GN	64	0	7	9	96	FUEL	FUEL	LO02	2	1			
3	A	2161	ARCH	505	1322	10			GN	114	4948	7	9	96	FUEL	FUEL	LO02	2	0			
3	A	2162	ARCH	455	1020	0			GN	89	4949	7	9	96	FUEL	FUEL	LO02	2	0			
3	A	2163	LKTR	420	872	1		OT	GN	38	0	7	9	96	FUEL	FUEL	LO02	2	1			14STI06TRI
3	A	2164	LKTR	442	1040	0			GN	64	4951	7	9	96	FUEL	FUEL	LO02	2	0			
3	A	2165	ARCH	457	1120	0			GN	64	4952	7	9	96	FUEL	FUEL	LO02	2	0			
3	A	2166	LKTR	620	3000	19			GN	64	4602	7	9	96	FUEL	FUEL	LO03	2	0			
3	A	2167	ARCH	454	950	0			GN	38	4603	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2168	ARCH	428	805	0			GN	38	4604	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2169	ARCH	497	1235	0			GN	38	4605	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2170	ARCH	255	175	0			GN	38	0	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2171	LKTR	307	345	0			GN	64	4606	7	9	96	FUEL	FUEL	LO03	3	0			
3	A	2172	LKTR	570	2750	9			GN	19	4608	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2173	LKTR	557	3000	9			GN	64	4609	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2174	LKTR	560	2150	0			GN	64	4610	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2175	LKTR	935	9000	9			GN	64	4611	7	9	96	FUEL	FUEL	LO03	1	0			
3	A	2176	LKTR	516	2250	19			AL	0	4607	7	9	96	FUEL	FUEL	LO03		0			
3	A	2177	RNWH	445	1230	0			GN	89	0	8	9	96	FUEL	FUEL	LO04	1	0			
3	A	2178	RNWH	481	1480	0			GN	114	0	8	9	96	FUEL	FUEL	LO04	1	0			
3	A	2179	RNWH	466	1465	0			GN	64	0	8	9	96	FUEL	FUEL	LO04	1	0			
3	A	2180	RNWH	98	10	0			GN	19	0	8	9	96	FUEL	FUEL	LO04	1	0			
3	A	2181	RNWH	459	1560	0			GN	89	0	8	9	96	FUEL	FUEL	LO04	2	0			
3	A	2182	RNWH	485	1810	0			GN	114	0	8	9	96	FUEL	FUEL	LO04	2	0			
3	A	2183	LKTR	589	2415	9			GN	38	4612	8	9	96	FUEL	FUEL	LO04	2	0			
3	A	2184	LKTR	564	2500	9			GN	38	217	8	9	96	FUEL	FUEL	LO04	2	2			
3	A	2185	RNWH	424	1080	0			GN	89	0	8	9	96	FUEL	FUEL	LO04	1	0			
3	A	2186	LKTR	607	2500	0			GN	38	4613	8	9	96	FUEL	FUEL	LO04	1	0			
3	A	2187	ARGR	426	1024	10			GN	38	4957	8	9	96	FUEL	FUEL	LO05	1	0			
3	A	2188	LKTR	511	1444	8			GN	38	4953	8	9	96	FUEL	FUEL	LO05	1	0			
3	A	2189	LKTR	511	1532	0			GN	38	4954	8	9	96	FUEL	FUEL	LO05	1	0			
3	A	2190	ARGR	330	490	20			GN	64	4958	8	9	96	FUEL	FUEL	LO05	1	0			
3	A	2191	LKTR	446	966	12		OT	GN	89	0	8	9	96	FUEL	FUEL	LO05	1	1			17STI01PEL1BRA1TRI
3	A	2192	LKTR	566	1692	20			GN	140	4956	8	9	96	FUEL	FUEL	LO05	2	0			
3	A	2193	ARCH	538	1734	2		OT	GN	64	0	8	9	96	FUEL	FUEL	LO05	2	1			10ZOO10TRI
3	A	2194	RNWH	288	286	0			GN	64	0	8	9	96	FUEL	FUEL	LO05	2	0			
3	A	2195	RNWH	271	224	1	4	OT	GN	64	0	8	9	96	FUEL	FUEL	LO05	2	1			05ZOO
3	A	2196	LKTR	505	1492	9			GN	38	4955	8	9	96	FUEL	FUEL	LO05	2	0			
3	A	2197	LKTR	502	1384	18			GN	114	4959	8	9	96	FUEL	FUEL	LO05	2	0			
3	A	2198	LKTR	493	1492	0			GN	89	4960	8	9	96	FUEL	FUEL	LO05	2	0			
3	A	2199	LKTR	439	948	0			GN	38	4961	8	9	96	FUEL	FUEL	LO05	2	0			
3	A	2200	ARCH	386	565	8			GN	89	88	9	9	96	TAIL	TAIL	LD05	2	2			
3	A	2201	ARCH	387	530	8			GN	15	371	9	9	96	TAIL	TAIL	LD05	1	2			
3	A	2202	ARCH	365	505	18			GN	89	4614	9	9	96	TAIL	TAIL	LD05	1	0			
3	A	2203	ARCH	385	570	8			GN	89	98	9	9	96	TAIL	TAIL	LD05	1	2			
3	A	2204	ARCH	382	515	8			GN	89	4433	9	9	96	TAIL	TAIL	LD05	1	2			
3	A	2205	ARCH	391	455	8			GN	64	4430	9	9	96	TAIL	TAIL	LD05	2	2			
3	A	2206	ARCH	302	180	0			GN	38	4615	9	9	96	TAIL	TAIL	LD05	2	0			
3	A	2207	LKTR	361	504	0			GN	38	4962	9	9	96	TAIL	TAIL	LD04	4	0			
3	A	2208	ARCH	334	352	0			GN	38	4963	9	9	96	TAIL	TAIL	LD04	4	0			
3	A	2209	ARCH	385	672	8	10	OT	GN	64	488	9	9	96	TAIL	TAIL	LD04	4	3			0

Appendix F5. Jericho Diamond Project Aquatic Studies Fish Data (1996)

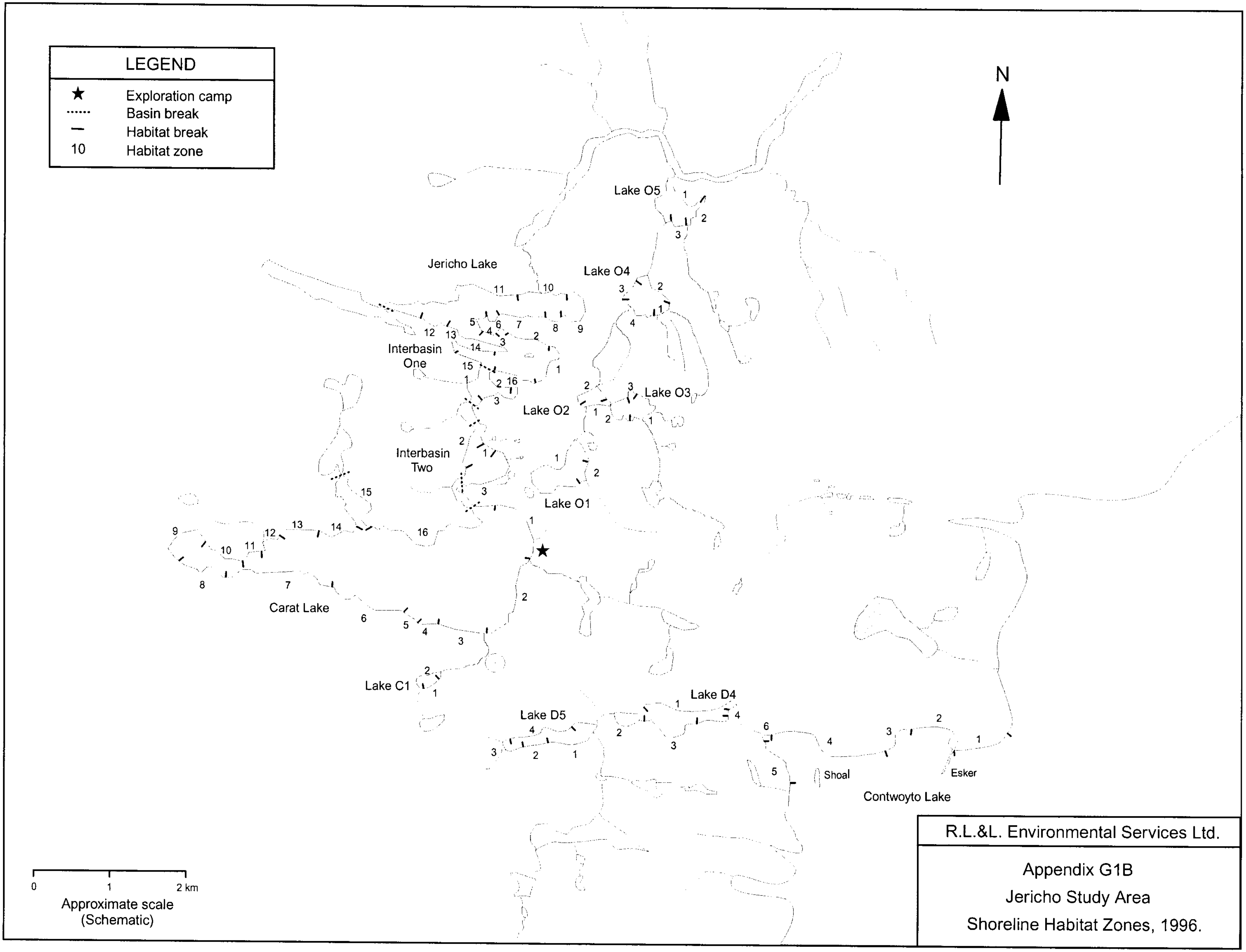
Period	Crew	Sample No.	Species	Fork Len. (mm)	Weight (g)	Sex	Age	Age Meth.	Capt. Meth.	Mesh Size	Tag No.	Day	Mo	Yr	Zone	Local	Loc.	Site	Capt. Code	Comments	Tissue No.	Stomach Contents
3	A	2210	ARCH	314	342	0			GN	64	4964	9	9	96	TAIL	TAIL	LD04	4	0			
3	A	2211	ARCH	379	590	19			GN	64	4965	9	9	96	TAIL	TAIL	LD04	4	0			
3	A	2212	ARCH	375	574	0			GN	64	486	9	9	96	TAIL	TAIL	LD04	5	2			
3	A	2213	ARCH	385	630	8			GN	64	484	9	9	96	TAIL	TAIL	LD04	5	2			
3	A	2214	ARCH	391	592	8			GN	64	4880	9	9	96	TAIL	TAIL	LD04	5	2			
3	A	2215	ARCH	392	594	0			GN	64	4966	9	9	96	TAIL	TAIL	LD04	5	0			
3	A	2216	ARCH	409	724	8			GN	38	4967	9	9	96	TAIL	TAIL	LD04	5	0			
3	A	2217	ARCH	394	638	8			GN	64	4968	9	9	96	TAIL	TAIL	LD04	7	0			
3	A	2218	ARCH	399	694	8			GN	64	4969	9	9	96	TAIL	TAIL	LD04	7	0			
3	A	2219	ARCH	369	530	20			GN	64	4970	9	9	96	TAIL	TAIL	LD04	8	0			
3	A	2220	LKTR	372	500	11	13	OT	GN	114	0	9	9	96	TAIL	TAIL	LD04	8	1			
3	A	2221	LKTR	581	1950	0			GN	0	4601	6	9	96	TAIL	DOCK	CONTW	3	0			
3	A	2222	RNWH	0	0	0			GN	64	0	8	9	96	FUEL	FUEL	LO04	1	0	RND		
3	A	2223	RNWH	0	0	0			GN	64	0	8	9	96	FUEL	FUEL	LO04	1	0	RND		
3	A	2224	LKTR	0	0	0			GN	38	0	8	9	96	MINE	MINE	CARAT	3	0	RND		

APPENDIX G
FISH HABITAT

Appendix G1A Lake habitat characteristics for waterbodies sampled in the Jericho study area, 1996.

Lake	Date	Zone	Shoreline Length (m)	Shoreline Habitat Type (%) Grass	Boulder	Bedrock	Substrate Type (%) OM	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	Slope[1]	Shoreline Vegetation (%) Emergent	Submergent
Carat	29-Jul-96	1	914		100				90			10		1		
		2	988	10	90				30		10	60		1		
		3	219	90	10				10	5	10	70		1		
		4	101		30	70			10		20	70		1		
		5	82	95	5				10		20	70		1		
		6	411	10	40	50			10		20	70		2		
		7	1216	20	70	10				10	30	60		1		
		8	302	95	5						15	85		1		
		9	293	20	65	15					5	95		2		
		10	274	70	30						20	80		1		
		11	128	10	60	30			30		20	50		1		
		12	192	60	30	10					30	70		1		
		13	238		60	40			20		20	60		3		
		14	183	5	50	45			20		20	60		2		
		15	1234	60	40						20	80		1		
		16	1765	25	70	5					20	80		2		
Jericho	31-Jul-96	5	146	50	50			50			20	30		1	30	
		6	96	80	20				30		20	50		1	80	
		7	265	5	20	75		10				90		3		
		8	82	75	25				35		15	50		1	60	
		9	283	100					85		10	5		1		
		10	1006	5	15	80						90	10	1		
		11	1948	20	40	40			20		10		70	3		
		12	110	30	60	10			75		5	20		2	40	
Interbasin One	31-Jul-96	1	274	85	10	5			95			5		1		
		2	274	5	20	75		10				90		3		
		3	96	60	40				30		20	50		1	40	
		4	96	5	20	75		10				90		3		
		13	439	80	20				80	5		15		1		
		14	320	25	75				30			70		1	35	
		15	229	35	50	15			25			65	10	1		
		16	279	70	15	15			50			50		1	20	
	04-Aug-96	17	280	100					20			80		2		
		18	205	40	60				20			80		2	20	
		19	325	100					100					2		
Interbasin Two	01-Aug-96	1	165	100					100					2		
		2	942	80	20							100		1		
		3	905	100					100					1		
	04-Aug-96	4	1100	95	5				45	25		30		1	30	
C1	03-Aug-96	1	137	80	20							100		1	80	
		2	247		70	30						100		2		
O1		1	1161	95	5				30	50	10	5		1		
		2	265	95	5				80	5	10	5		1		
O2	02-Aug-96	1	229	100					75	5	20			1		
		2	238	100					75	5	10	5		3		
O3	02-Aug-96	1	279	100					100					1		
		2	293	80	20				30			70		2		
		3	46		50	50						50	50	3		
O4	02-Aug-96	1	220	100					95			5		1		
		2	150	100					95			5		2		
		3	110	100					95			5		3		
		4	40	100					85		10	5		1		
		5	180	100					95		5	5		3		
		6	190	100					70	10		20		2		
O5	01-Aug-96	1	1079	100					100					1		
		2	201		100							100		2		
		3	96		100							100		2		
D4	05-Aug-96	1	293		100								100	3		
		2	91	80	20							100		1	30	
		3	165		100							100		2		
		4	274	20	70	10						100		1	10	
D5	05-Aug-96	1	942	90	10							100		1	20	
		2	379		100							100		2		
		3	311	20	80							100		1	10	
		4	165		100							100		2		
Contwoyto	30-Jul-96	1	238		80	20						100		2		
		2	219		100				60		20	80		1		
		3	183		80	20						100		2		
		4	384			100						100		3		
		5	283		80	20						100		2		

[1] See Appendix A for definitions.



Appendix G1B
Jericho Study Area
Shoreline Habitat Zones, 1996.

Appendix G2 Habitat characteristics[1] measured during stream surveys in the Jericho study area, 1996.

Stream	Reach	Date Sampled	Average Length (m)	Average Width (m)	Average Depth (m)	Slope	Channel Type (%) C1	C2	C3	Bank Type (%) D1	D2	Habitat Type (%) POOL	RUN	FLAT	RF/RA	CAS	DIS	Substrate Type (%) OM	SI	SA	GR	CO	BO	BE
TB01	1	18-Jun-96	50	1.00		7	100			100		20			80						10	80	10	
TC01	1	25-Jul-96		0.50	0.15			100		90	10	5	15	10	70				20		5	45	30	
TC01	2	25-Jul-96			0.10		100				100			100				20	80					
TC01	3	25-Jul-96		0.50	0.10			100		100					100						10	30	60	
TC01	4	25-Jul-96		2.00	0.15		100			100				65	35				60		10	30		
TC01	5	25-Jul-96			0.10			100			100			90		10							100	
TC02	1	06-Aug-96	300	0.50		5		100			100				100						40	50	10	
TC02A	1	06-Aug-96	100	0.50		3	80	20		60	40	30	70					69			10	14	7	
TC04	1	29-Jul-96	350	0.60	0.30		85	15				10	70	15	5			25	50		10		15	
TC06	1	30-Jul-96	55	0.80	0.15	1	100			70	30		80	15	5			15	5	25	30		25	
TC10	1	30-Jul-96	75	8.00	0.05			100			100			100				100						
TC12	1	16-Jun-96	50	0.40		1		100			100						100			100				
TC13	1	16-Jun-96	50	0.30		1		100			100						100			100				
TC15	1	20-Jun-96	150	35.00		1	100			100			65	20	10				70		5	10	15	
TD01	1	02-Aug-96	500	15.00		3		100			100						100						100	
TD02	1	02-Aug-96	70	1.50		4	93	7		20	80		73		8	14	7	4			4	15	77	
TD04	1	01-Aug-96	80	0.50	0.05		10		90	5	95	5	35			5	55	25	5				65	5
TD06	1	01-Aug-96	100	1.00	0.05			100			100		95			5		70			5	5	20	
TD06	2	01-Aug-96	150	4.50	0.10				100		100						100						100	
TE01	1	19-Jun-96	50	1.00		6		100			100						100				5	15	80	
TF01	1	19-Jun-96	50	1.00		12		100			100						100			30			70	
TO01	1	30-Jul-96	350	7.50	0.10	1	100			10	90		25	70	5			45	45	5		5		
TO02	1	30-Jul-96	500			1	100			90	10	40	60					60	35	5				
TO02	2	30-Jul-96	300	1.50	0.10		100			10	90	25	75					20	75	5				
TO03	1	30-Jul-96	75	0.40	0.10	4	100			100		25	75					45	20	25			10	
TO04	1	30-Jul-96	100	0.40	0.20	4	100			100		10	75			15			5	5	5	10	75	
TO05	1	01-Aug-96	100	1.30	0.70		100			100			55	40		5			50		10	30	10	
TO05	2	01-Aug-96	60	0.60	0.80		100			100		5	45	30	20				30	20	5	40	5	
TO05	3	01-Aug-96	40	0.30	0.50		100			100		40	60					5		40	15	30	10	
TO05	4	01-Aug-96	200	0.50	0.60		20	80		100			70	30				15	20	20	15	15	15	
TO05	5	01-Aug-96	100	0.30	0.60		40	60		100			40		20	40			10		10	20	60	
TO05	6	01-Aug-96	100	0.40	0.40		100			100		20	80						15	30	5	10	40	
TO06	1	02-Aug-96	100	3.50	0.70		100			100				100					90			5	5	
TO06	2	02-Aug-96	150	2.00	0.80		100			100			10	65	25				85			5	10	
TO06	3	02-Aug-96	75	1.00	0.20		95	5		100					100				10	5	5	5	75	
TO06	4	02-Aug-96	250	1.00	0.40		100			100		5	50	40	5			5	30	5	25	25	10	
TO06A	1	02-Aug-96	300	2.00	0.50	1	100			80	20		55	40	5			35	50	5		5	5	
TO07A	1	06-Aug-96	1715	37.90		2	93	7		100			7	79	7	7				26		41	27	6
TO07B	1	06-Aug-96	2500	35.00		2	95	5		100		5	45	30	20					30	10	15	35	10
TO08	1	03-Aug-96	224	1.70		2	100			15	85	2	75		23					17	42	33	9	
TO09	1	03-Aug-96	60	7.00	1.00		100			100				100						100				
TO09	2	03-Aug-96	50	5.00	0.50		100			100				100						20		10	70	
TO09	3	03-Aug-96	80	1.50	0.35		100			100					100					5	5	15	75	
TO09	4	03-Aug-96	300	1.80	0.20		100			100			90	10						60	30	10		
TO09	5	03-Aug-96	325	0.50	0.20		100			100			95		5					60	30	10		
TO09	6	03-Aug-96	200	1.00	0.30		100			100			70		30					10		10	80	
TO09	7	03-Aug-96	300	1.50	0.50		100			100		30	40	20	10					40		40	20	
TO09	8	03-Aug-96	75	2.00	0.40		100			100		5	10	85				5	20	10	15	30	20	
TO10	1	29-Jul-96	100	0.40	0.05	2	100			90	10	15	85							95		5		
TO11	1	29-Jul-96	100	0.90	0.08	1	100			100			50	50				100						
TO12	1	29-Jul-96	300	0.40	0.05		100			100			100					95		5				
TO14	1	15-Jun-96	40	0.80		2	100			100		10			90					5	10	80	5	
TO16	1	29-Jul-96	30	0.50	0.05	1	100			100				100						100				
TO17	1	29-Jul-96	120	0.50	0.15	2	100			100		15	55	10	20					65	20	15		
TO18	1	03-Aug-96	300	0.45	0.25	1	80	20		100		15	80	5				10	10	40	28	10	2	
TO18	2	03-Aug-96	150	0.80	0.10		100			100		10	50	20	20					5	15	30	45	5
TO19	1	13-Jun-96	150	0.50		1	50	50		50	50	10	70	10	10			70			10	20		
TO21	1	29-Jul-96	90	5.00	0.05	1	100			40	60		40	60						60	25	15		
TO22	1	29-Jul-96	325	0.50	0.20		100			100			95		5				60		30	10		
TO23	1	01-Aug-96	50	0.60	0.80		100			100				100					85			5	10	
TO24	1	01-Aug-96	30	0.70	0.30		100			100			60	30	10			50			15	5	30	
TO24	2	01-Aug-96	320	0.50	0.40		100			100			50	40	10			75			5	5	15	
TO25	1	01-Aug-96	45	1.10	0.20		100			100		5	85	10					50				50	
TO25	2	01-Aug-96	35						100		100						100						100	
TO25	3	01-Aug-96	300	1.00	0.30		100			100		10	90						15		5		80	
TO25	4	01-Aug-96	300	1.00	1.00		100			100		10	80	10					15		5		80	
TO26	1	01-Aug-96	200	2.00	0.90		100				100	50	50					30		60		5	5	
TO27	1	01-Aug-96	100	1.50			95	5		100		25	55		20					15	70	10	5	

[1] For definition of habitat codes see Appendix A.

Appendix G3 Locations of waterbodies investigated in the Jericho study area, 1996.

Zone	Area	Waterbody	UTM Coordinates
Mine Operations	Lakes	Carat Lake	12W 0477600 7320700
		Jericho Lake	12W 0477650 7323600
		Interbasin One	12W 0478742 7323185
		Interbasin Two	12W 0478138 7321869
		Lake C1	12W 0477524 7319381
		Control Lake	12W 0467150 7321150
	Streams	Stream C1	12W 0478200 7319800
		Stream C2	12W 0478650 7327750
		Stream C2A	12W 0478744 7321068
		Stream C4	12W 0475950 7321000
		Stream C6	12W 0476675 7322250
		Stream C8	12W 0475300 7320550
		Stream C9	12W 0474600 7319050
		Stream C10	12W 0477850 7321700
		Stream C11	12W 0478300 7321675
		Stream C12	12W 0478400 7321975
		Stream C13	12W 0478250 7322050
		Stream C14	12W 0478150 7322150
		Stream C15	12W 0479900 7325650
		Stream O1	12W 0479900 7325650
		Stream O2	12W 0479400 7325400
		Stream O3	12W 0479100 7325400
		Stream O4	12W 0478450 7325150
		Stream O5	12W 0480200 7324650
		Stream O7A	12W 0478700 7324000
		Stream O7B	12W 0481250 7329500
		Stream O23	12W 0484125 7325000
		Stream O24	12W 0483705 7331466
		Stream O25	12W 0481269 7331006
		Stream O26	12W 0481055 7327881
		Stream O27	12W 0480707 7325509
Borrow Extraction	Lakes	Lake O1	12W 0480048 7318619
		Lake O2	12W 0479216 7322841
		Lake O3	12W 0479762 7322571
		Lake O4	12W 0479806 7324051
		Lake O5	12W 0479806 7324051
	Streams	Stream O5	12W 0480200 7324650
		Stream O6	12W 0479975 7324675
		Stream O6A	12W 0479975 7325150
		Stream O9	12W 0479643 7323425
		Stream O10	12W 0479965 7323599
		Stream O11	12W 0479999 7323620
		Stream O12	12W 0480076 7323619
		Stream O13	12W 0480575 7323175
		Stream O14	12W 0480600 7323450
		Stream O15	12W 0480200 7324625
		Stream O16	12W 0479931 7322594
		Stream O17	12W 0479818 7322428
		Stream O18	12W 0479213 7322375
		Stream O19	12W 0479125 7321625
		Stream O20	12W 0479950 7321525
		Stream O21	12W 0479451 7322677
		Stream O22	12W 0479325 7322800
Tailings Impoundment Docking Facility	Lakes	Lake D4	12W 478714 7319095
		Lake D5	12W 480048 7318619
		Contwoyto Lake	12W 481757 7318682
	Streams	Stream B1	12W 482900 7319550
		Stream D1	12W 481525 7318900
		Stream D2	12W 479200 7319075
		Stream D3	12W 479350 7320075
		Stream D4	12W 478556 7318626
		Stream D5	12W 478525 7318750
		Stream D6	12W 479230 7318796
		Stream D7	12W 479125 7318150
		Stream D8	12W 479550 7318000
		Stream D13	12W 481500 7317600
		Stream E1	12W 480975 7317250
		Stream F1	12W 480450 7316525

APPENDIX H
METALS

Appendix H1 Metal concentrations in liver and muscle tissue samples collected from Carat Lake, Jericho study area, 1996.

Laboratory Label	Sample Number	Species	Fork Length (mm)	Tissue Type	Moisture H^2O (%)	Metal Concentrations in ug/g on dry weight basis (detection limits in italics)																										
						Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Hg	Mo	Ni	PO4	K	Ag	Na	Sr	Sn	Ti	V	Zn
						1.0	*1.0*	*0.05*	*0.01*	*0.05*	*0.5*	*0.05*		*0.5*	*0.5*	*0.05*	*1*	*0.05*	*0.05*	*0.05*	*0.005*	*0.1*	*0.1*	*0.5*	*0.5*	*0.01*	*0.5*	*0.01*	*0.1*	*0.15*	*0.5*	*0.05*
501-96M	01	LKTR	510	Muscle	79.8	<	<	0.21	<	<	<	<	303	<	<	0.91	30	<	1340.00	0.30	2.100	<	0.1	11400.0	18400.0	0.02	2130.0	0.24	<	0.10	<	19.60
501-99M	378	LKTR	475	Muscle	78.3	<	<	<	0.08	<	<	0.07	643	<	<	0.94	20	<	1410.00	0.39	1.550	<	<	12000.0	17400.0	0.04	1300.0	0.65	<	<	<	13.60
501-97M	379	LKTR	520	Muscle	76.8	<	<	0.07	<	<	<	<	359	<	0.1	1.53	21	<	1240.00	0.40	1.100	<	<	10100.0	18400.0	<	1460.0	0.22	<	<	<	14.20
501-100M	380	LKTR	410	Muscle	77.1	<	<	0.10	0.05	<	<	<	575	<	<	0.93	11	<	1390.00	0.46	0.500	<	<	11800.0	17600.0	0.02	1300.0	0.89	<	0.80	<	16.00
501-84M	381	LKTR	481	Muscle	78.3	<	<	<	0.01	<	<	<	310	<	0.1	0.74	12	<	1350.00	0.37	1.250	<	<	11400.0	17300.0	0.02	929.0	0.24	<	<	<	12.90
501-77M	383	LKTR	428	Muscle	77.2	<	<	<	0.04	<	0.8	<	517	<	<	0.87	7	<	1390.00	0.33	0.600	<	<	11400.0	18000.0	0.02	762.0	0.69	<	<	<	14.30
501-87M	384	LKTR	580	Muscle	79.6	<	<	0.21	0.02	<	<	<	438	<	0.1	0.62	7	<	1380.00	0.39	2.100	<	<	11300.0	17700.0	0.02	1190.0	0.36	<	0.30	<	14.10
501-94M	385	LKTR	420	Muscle	78.6	<	<	0.10	0.04	0.06	<	<	416	<	<	1.19	12	<	1360.00	0.43	0.750	<	<	11500.0	16300.0	0.03	1120.0	0.51	<	<	<	14.60
501-85M	386	LKTR	439	Muscle	78.3	<	<	<	0.06	<	<	<	673	<	<	0.83	7	<	1490.00	0.51	0.800	<	<	13300.0	21700.0	0.01	953.0	0.94	<	<	<	16.60
501-83M	391	LKTR	421	Muscle	75.8	<	<	0.09	0.03	<	<	<	325	<	<	0.83	9	<	1360.00	0.38	0.750	<	<	11500.0	18300.0	0.02	808.0	0.27	<	<	<	14.50
501-79M	395	LKTR	546	Muscle	77.6	<	<	0.07	<	<	0.6	<	335	<	0.1	0.93	8	<	1480.00	0.44	1.000	<	<	11200.0	17100.0	<	1320.0	0.22	<	<	<	12.70
501-79M DUP				Muscle		<	<	<	<	<	<	<	338	<	<	0.86	8	<	1500.00	0.47	1.200	<	<	11300.0	16800.0	0.03	1270.0	0.21	<	0.40	<	13.20
501-80M	396	LKTR	490	Muscle	79.3	<	<	<	0.05	<	<	<	625	<	0.1	0.90	15	<	1150.00	0.46	0.850	<	<	10100.0	19400.0	<	1020.0	0.68	<	<	<	14.00
501-86M	397	LKTR	488	Muscle	80.9	<	<	0.09	0.10	<	<	<	1250	<	0.1	0.87	22	<	1320.00	0.71	1.150	<	<	11800.0	19700.0	0.03	1080.0	1.43	<	<	<	14.30
501-74M	398	LKTR	619	Muscle	79.1	<	<	<	0.02	<	<	<	299	<	<	0.77	13	<	1340.00	0.31	1.900	<	<	10600.0	21000.0	0.02	1330.0	0.19	<	<	<	13.50
501-69M	399	LKTR	488	Muscle	79.1	<	<	<	0.02	0.07	<	<	289	<	<	1.04	29	<	1260.00	0.45	1.250	<	0.6	10800.0	19600.0	0.01	1730.0	0.17	<	0.20	<	16.20
501-69M DUP				Muscle		<	<	<	0.01	0.10	0.8	<	312	<	0.1	1.10	30	<	1340.00	0.47	1.400	<	0.7	11500.0	19400.0	<	1710.0	0.18	<	<	<	15.80
501-68M	400	LKTR	443	Muscle	74.0	<	<	0.16	0.06	<	<	<	676	<	<	0.73	8	<	1220.00	0.35	0.759	<	<	9120.0	20300.0	<	1200.0	0.74	<		<	12.60
501-73M	401	LKTR	482	Muscle	76.7	<	<	<	0.02	<	<	<	380	<	0.1	0.93	15	<	1150.00	0.50	0.900	<	<	9510.0	16200.0	0.05	1530.0	0.35	<	<	<	13.00
501-75M	402	LKTR	465	Muscle	78.3	<	<	0.40	0.03	<	<	0.13	282	<	<	1.25	26	<	1020.00	0.47	0.400	<	<	6890.0	17900.0	0.02	863.0	0.23	<	0.60	<	12.70
501-81M	403	LKTR	485	Muscle	77.4	<	<	0.10	0.02	0.07	<	<	335	<	<	0.99	15	<	1300.00	0.29	0.700	<	0.2	10900.0	17400.0	0.02	998.0	0.23	<	<	<	14.30
501-78M	404	LKTR	488	Muscle	79.4	<	<	<	0.01	<	<	<	261	<	<	0.87	20	<	1310.00	0.38	0.950	<	<	10700.0	18900.0	0.02	1030.0	0.19	<	<	<	15.60
501-70M	405	LKTR	506	Muscle	80.6	<	<	0.15	<	<	1.2	<	316	<	0.1	0.79	20	<	1260.00	0.36	1.200	<	0.2	10500.0	19300.0	0.02	1220.0	0.19	<	0.30	<	14.50
501-102M	02	RNWH	484	Muscle	76.6	<	<	0.11	0.02	<	<	<	313	<	0.1	1.56	28	<	1440.00	0.40	0.800	<	<	12000.0	19600.0	0.02	2130.0	0.41	<	<	<	14.60
501-101M	03	RNWH	532	Muscle	75.4	<	<	<	0.14	0.11	<	<	879	<	<	0.99	10	<	1330.00	0.48	0.750	<	0.2	11300.0	17700.0	0.03	2080.0	1.34	<	<	<	14.40
501-98M	06	RNWH	477	Muscle	75.3	<	<	<	0.01	<	<	<	277	<	0.1	0.92	18	<	1300.00	0.29	0.500	<	<	11200.0	18900.0	0.02	1530.0	0.25	<	<	<	13.60
501-92M	382	RNWH	407	Muscle	77.2	<	<	<	0.03	0.16	<	<	394	<	0.1	1.05	21	<	1390.00	0.48	0.750	<	<	12500.0	21100.0	0.02	1730.0	0.35	<	<	<	15.40
501-95M	387	RNWH	424	Muscle	74.6	<	<	0.14	0.04	0.06	<	<	456	<	0.1	1.10	13	<	1410.00	0.47	-0.005	<	<	11800.0	16900.0	<	1240.0	0.56	<	0.30	<	13.00
501-76M	388	RNWH	469	Muscle	76.6	2	<	<	0.30	<	1.4	<	1570	<	0.1	0.97	14	<	1460.00	1.10	0.700	<	<	13500.0	20600.0	0.01	1560.0	2.49	<	<	<	14.60
501-67M	389	RNWH	465	Muscle	76.8	<	<	0.18	0.04	<	<	<	505	<	<	1.10	26	<	1300.00	0.51	0.726	<	<	9770.0	16500.0	0.06	1190.0	0.30	<		<	13.40
501-89M	390	RNWH	485	Muscle	73.7	<	<	0.13	0.02	0.08	<	<	347	<	0.1	1.05	14	<	1290.00	0.40	0.450	<	<	11700.0	17900.0	0.03	1390.0	0.36	<	<	<	14.30
501-82M	392	RNWH	475	Muscle	76.3	<	<	0.12	0.03	<	<	<	390	<	<	1.04	22	<	1440.00	0.41	0.500	<	<	12400.0	20500.0	0.03	1190.0	0.37	<	0.10	<	12.70
501-72M	393	RNWH	455	Muscle	76.8	<	<	0.08	0.27	<	0.9	<	1210	<	<	1.22	22	<	1470.00	1.01	0.500	<	<	12700.0	21100.0	0.03	1160.0	2.14	<	<	<	15.00
501-71M	394	RNWH	464	Muscle	78.2	<	<	0.10	0.06	0.10	1.2	<	481	<	0.1	0.87	17	<	1380.00	0.45	0.500	<	<	12000.0	21000.0	0.02	1560.0	0.71	<	<	<	12.20
501-93M	452	RNWH	396	Muscle	74.8	<	<	0.23	0.05	<	<	<	470	<	0.1	1.17	20	<	1550.00	0.61	0.300	<	<	12600.0	17700.0	0.03	1430.0	0.64	<	<	<	17.50
501-90M	453	RNWH	358	Muscle	75.4	<	<	<	0.02	0.10	<	<	242	<	<	0.96	9	<	1500.00	0.42	-0.005	<	<	12000.0	19000.0	<	1160.0	0.31	<	<	<	15.30
501-88M	456	RNWH	462	Muscle	77.1	<	<	0.12	0.01	<	<	<	284	<	0.1	0.87	15	<	1510.00	0.38	0.350	<	<	12400.0	19600.0	0.03	1190.0	0.26	<	0.80	<	16.20
501-91M	457	RNWH	445	Muscle	74.9	<	<	<	0.01	<	<	<	277	<	<	0.91	10	<	1320.00	0.35	0.300	<	<	10700.0	18900.0	0.01	998.0	0.37	<	<	<	12.20
501-66M	622	RNWH	455	Muscle	78.6	<	<	0.14	0.04	<	<	<	517	<	<	1.17	16	<	1300.00	0.46	0.891	<	<	10200.0	18800.0	0.14	1590.0	0.38	<		<	14.60
501-96L	01	LKTR	510	Liver	81.9	29	<	0.41	0.10	<	<	1.93	1100	0.9	0.6	11.4	6130	0.05	960.00	8.09	3.170	0.9	0.4	16100.0	13300.0	<	8840.0	1.42	<	0.60	<	104.00
501-99L	378	LKTR	475	Liver	78.8	15	<	0.81	0.15	<	<	3.82	396	0.6	0.5	69.9	5890	<	645.00	6.15	3.070	1.0	0.2	14800.0	11500.0	0.46	7590.0	0.72	<	1.70	0.7	141.00
501-97L	379	LKTR	520	Liver	89.2	72	<	0.55	0.50	<	<	5.99	822	1.0	1.7	100	8500	<	1040.00	7.72	3.760	0.9	<	19400.0	19900.0	0.81	16700.0	1.01	<	4.00	1.2	187.00
501-100L	380	LKTR	410	Liver	76.2	8	<	0.20	0.08	0.09	<	0.63	460	0.5	0.2	27.8	1670	<	576.00	7.32	1.430	0.6	<	13400.0	8520.0	0.18	5780.0	1.16	0.1	1.20	<	102.00
501-84L	381	LKTR	481	Liver	87.0	49	<	<	0.19	<	<	4.24	795	0.8	2.2	118	7310	<	833.00	8.14	3.630	1.2	<	17200.0	15800.0	0.76	13500.0	1.47	0.1	0.50	0.7	192.00
501-77L	383	LKTR	428	Liver	80.8	2	<	<	0.22	<	0.5	0.79	663	<	0.1	25.1	1290	0.05	721.00	9.09	1.560	0.7	<	14200.0	12100.0	0.10	6510.0	1.41	<	2.30	<	132.00
501-87L	384	LKTR	580	Liver	83.3	11	<	0.30	0.14	<	<	0.80	547	0.6	0.9	34.9	3130	<	641.00	5.48	4.260	0.5	0.2	11400.0	12200.0	0.40	11100.0	0.90	<	1.70	<	120.00
501-94L	385	LKTR	420	Liver	88.2	11	<	0.32	0.09	<	0.7	1.51	890	1.2	0.6	38.3	3610	<	1090.00	11.80	2.250	0.9	<	22000.0	18500.0	0.22	11600.0	2.86	<	3.10	<	177.00
501-85L	386	LKTR	439	Liver	79.3	3	<	0.15	0.25	<	<	0.76	336	0.7	0.2	35.6	1680	<	626.00	7.59	1.520	0.6	<	13400.0	11900.0	0.26	6460.0	1.04	<	1.60	<	117.00
501-83L	391	LKTR	421	Liver	79.8	13	<	<	0.03	<	<	2.14	687	0.8	0.7	93.2	3650	<	1030.00	11.80	1.560	0.7	<	20100.0	18800.0	0.75	12200.0	1.35	0.1	<	<	200.00
501-79L	395	LKTR	546	Liver	83.4	8	<	0.37	0.10	<	<	1.47	519	0.9	0.4	105	2820	<	773.00	7.16	2.350	0.6	<	14000.0	14900.0	0.84	7590.0	0.94	<	<	<	155.00
501-80L	396	LKTR	490	Liver	79.8	33	<	0.51	<	<	<	3.38	376	0.7	1.0	124	7760	<	737.00	11.20	2.920	1.4	<	13600.0	11100.0	2.13	4890.0	0.54	0.2	3.20	0.5	160.00
501-86L	397	LKTR	488	Liver	79.6	27	<	0.56	<	<	<	4.13	348	0.6	0.6	139	8370	<	639.00	8.78	3.800	1.7	<	13700.0	9180.0	3.18	5210.0	0.49	<	2.70	<	171.00
501-74L	398	LKTR	619	Liver	83.4	7	<	0.54	0.03	<	<	1.45	688	<	0.2	43.5	1690	<	923.00	14.20	3.860	0.6	<	18900.0	17300.0	0.44	10400.0	1.10	0.1	1.40	<	160.00
501-69L	399	LKTR	488	Liver	79.3	25	<	0.95	0.14	<	<	4.53	387	0.8	0.6	133	9330	0.06	567.00	8.42	4.070	1.0	1.1	11800.0	10800.0	2.94	6570.0	0.56	<	2.90	0.9	163.00
501-69L DUP				Liver		23	<	0.79	0.10	<	2.2	4.52	412	0.7	0.7	136	9010	0.06	528.00	8.20	3.930	1.1	1.1	11400.0	10400.0	2.82	6230.0	0.49	<	2.60	<	160.00
501-68L	400	LKTR	443	Liver	76.6	9	<	0.74	0.05	<	<	1.07	269	<	0.2	54.2	2060	<	500.00	5.13	0.240	0.4	<	7440.0	11200.0	0.42	6610.0	0.69	<	1.90	<	134.00
501-73L	401	LKTR	482	Liver	87.5	17	<	<	0.67	<	5.2	5.32	800	1.8	1.1	213	6270	0.19	1540.00	13.20	4.760	1.5	3.2	23400.0	16100.0	1.21	10600.0	5.85	0.1	10.00	<	226.00
501-75L	402	LKTR	465	Liver	81.5	37	<	0.54	0.07	<	<	3.96	341	0.5	0.5	131	5280	<	660.00	10.70	3.260	0.8	<	13800.0	11000.0	1.96	5760.0	0.34	<	1.30	<	159.00
501-81L	403	LKTR	485	Liver	74.6	12	<	0.08	<	<	<	1.80	378	1.0	0.9	113	5120	<	559.00	7.52	1.960	0.9	<	12300.0	9000.0	0.60	4080.0	0.59	<	0.40	<	143.00
501-78L	404	LKTR	488	Liver	80.7	34	<	0.51	0.02	<	<	2.60	450	0.6	0.5	83.8	8310	<	840.00	8.88	3.240	1.4	1.2	15600.0	13600.0	0.81	6150.0	0.69	<	1.00	<	148.00
501-70L	405	LKTR	506	Liver	81.2	19	<	0.26	<	<	<	2.41	577	<	0.6	17.7	2930	0.12	818.00	11.20	2.200	0.1	0.7	16600.0	12500.0	0.07	4900.0	0.61	0.1	1.90	<	114.00
501-102L	02	RNWH	484	Liver	80.3	17	<	<	0.13	<	<	0.47	297	<	0.4	4.97	807	<	498.00	6.44	1.170	0.6	<	10100.0	9480.0	<	4180.0	0.64	<	1.40	<	60.20
501-101L	03	RNWH	532	Liver	77.8	13	<	<	<	<	<	0.76	415	<	0.2	5.81	499	<	870.00	10.50	1.330	0.7	<	15700.0	14200.0	<	5620.0	0.88	<	2.00	<	85.10
501-98L	06	RNWH	477	Liver	79.8	11	<	0.43	<	<	<	0.66	416	0.7	0.3	7.90	529	<	671.00	7.92	1.120	0.7	0.2	13700.0	13000.0	<	7220.0	0.80	<	1.50	<	85.30
501-92L	382	RNWH	407	Liver	80.5	30	<	0.23	<	<	<	0.96	428	0.8	0.4	8.71	1080	<	722.00	11.40	1.720	0.9	0.2	14800.0	14000.0	0.03	8380.0	0.82	<	1.60	0.6	93.10
501-95L	387	RNWH	424	Liver	80.7	9	<	0.52	0.13	<	<	0.13	354	<	0.5	10.2	783	<	694.00	9.57	0.533	1.8	<	13400.0	14000.0	<	6660.0	0.93	<	1.60	<	87.40
501-76L	388	RNWH	469	Liver	80.3	31	<	0.61	0.14	<	<	2.06	321	<	0.4	10.5	558	<	795.00	13.40	1.210	0.7	<	15700.0	14800.0	0.12	5220.0	0.53	0.1	2.50	<	87.80
501-67L	389	RNWH	465	Liver	78.3	7	<	0.44	0.08	<	<	0.72	172	<	0.3	8.02	1180	<	486.00	6.49	0.250	0.8	0.1	6780.0	13300.0	0.03	4510.0	0.54	<	1.50	<	81.50
501-89L	390	RNWH	485	Liver	81.0	10	<	0.62	0.38	<	2.2	0.88	691	0.6	0.6	9.82	1090	<	825.00	10.70	1.010	1.1	0.4	15300.0	15800.0	0.01	8590.0	1.22	<	4.10	<	112.00
501-82L	392	RNWH	475	Liver	87.4	7	<	0.41	0.23	<	<	0.97	443	0.7	0.4	7.79	1190	<	640.00	8.71	1.290	0.6	<	12700.0	12900.0	<	6430.0	0.96	0.1	2.10	0.7	75.10
501-72L	393	RNWH	455	Liver	79.2	15	<	<	<	<	3.6	0.54	480	0.7	0.4	10.1	1450	0.06	660.00	11.40	1.070	0.9	0.2	13700.0	11300.0	<	5330.0	1.20	0.1	1.80	<	111.00
501-71L	394	RNWH	464	Liver	78.5	3	<	0.33	0.52	<	<	1.46	896	0.8	0.4	9.25	614	<	908.00	8.60	1.110	0.9	<	15600.0	15100.0	<	4320.0	2.11	<	1.90	<	92.80
501-71L DUP				Liver		6	<	0.24	0.40	<	<	1.44	908	<	0.4	8.40	642	<	750.00	8.40	1.210	0.5	<	14800.0	13000.0	<	3560.0	2.04	0.1	1.50	<	91.30
501-93L	452	RNWH	396	Liver	81.9	2	<	0.35	0.26	<	<	0.26	347	0.6	0.5	8.48	474	<	765.00	13.50	0.559	0.8	<	15300.0	14200.0	<	4990.0	0.85	<	1.00	<	95.30
501-90L	453	RNWH	358	Liver	75.9	4	<	0.20	0.15	<	<	0.29	363	<	0.4	7.84	461	<	652.00	10.80	0.702	0.7	0.4	13900.0	11800.0	<	4360.0	0.99	<	1.80	<	77.30
501-88L	456	RNWH	462	Liver	79.3	6	<	<	0.05	<	<	0.54	549	<	0.1	7.17	445	<	554.00	2.61	0.793	0.2	<	5020.0	9960.0	<	3780.0	0.91	<	6.20	<	68.30
501-91L	457	RNWH	445	Liver	79.8	4	<	0.35	<	<	<	0.31	613	<	0.7	9.40	444	<	840.00	11.70	0.767	0.7	<	16200.0	15000.0	0.02	6990.0	1.83	<	4.00	0.6	94.30
501-66L	622	RNWH	455	Liver	75.6	11	<	0.30	0.10	<	<	1.08	129	0.7	0.2	7.39	534	<	463.00	8.22	0.300	0.6	<	6990.0	12300.0	0.04	3480.0	0.38	<	1.50	<	67.90
501 103L	2052	RNWH	461	Liver	75.1	2	<	0.27	0.02	<	1.1	0.57	387	1.1	<	4.85	88	<	857.00	9.57	0.856	0.4	<	20700.0	15400.0	<	2420.0	0.22	<		<	66.90
501 104L	2053	RNWH	473	Liver	76.1	2	<	0.27	<	<	1.1	0.22	449	1.4	0.1	6.77	529	<	607.00	6.68	0.656	0.5	<	15100.0	14100.0	<	3750.0	0.22	<		<	68.90
501 105L	2054	RNWH	340	Liver	77.8	<	<	<	0.03	<	0.8	0.09	344	<	0.3	7.63	275	0.19	560.00	6.66	0.406	0.5	0.1	14800.0	10400.0	<	3200.0	0.23	<		<	79.60
501 106L	2075	RNWH	455	Liver	76.2	<	<	0.16	<	<	1.0	0.28	221	<	0.2	6.86	180	<	538.00	7.17	<	0.6	<	13800.0	13900.0	0.01	2420.0	0.13	<		<	57.40

Note: < = below detection limit; LKTR = Lake trout; RNWH = Round whitefish

Appendix H2 Metal concentrations in liver and muscle tissue samples collected from Control Lake, Jericho study area, 1996.

Laboratory Label	Sample Number	Species	Fork Length (mm)	Tissue Type	Moisture H_2O (%)	Al *1.0*	Sb *0.1*	As *0.05*	Ba *0.01*	Be *0.05*	B *0.5*	Cd *0.05*	Ca *0.5*	Cr *0.5*	Co *0.05*	Cu *0.05*	Fe *1*	Pb *0.05*	Mg *0.05*	Mn *0.05*	Hg *0.005*	Mo *0.1*	Ni *0.1*	PO4 *10*	K *0.5*	Ag *0.01*	Na *0.5*	Sr *0.01*	Sn *0.1*	Ti *0.15*	V *0.5*	Zn *0.05*
						Metal Concentrations in ug/g on dry weight basis (detection limits in italics)																										
501-38M	991	LKTR	473	Muscle	75.4	<	<	0.48	0.04	<	<	<	544	<	0.14	0.73	12	0.16	1080.00	0.49	2.140	<	0.4	9010	17700.0	0.06	1180.0	0.26	<		<	11.80
501-52M	992	LKTR	466	Muscle	79.7	<	<	0.12	0.02	<	<	<	491	<	<	0.91	10	0.24	1300.00	0.54	1.120	<	<	9620	19000.0	<	926.0	0.26	<		<	12.10
501-42M	994	LKTR	424	Muscle	75.7	<	<	<	<	<	<	<	403	<	<	0.49	8	0.12	1150.00	0.43	0.759	<	<	8100	15300.0	<	963.0	0.20	<		<	11.00
501-37M	997	LKTR	404	Muscle	74.7	<	<	<	0.02	<	<	<	531	<	<	1.06	10	<	1240.00	0.51	0.528	<	<	8880	15600.0	<	1200.0	0.36	<		<	13.60
501-28M	1009	LKTR	423	Muscle	75.5	<	<	<	0.01	<	<	<	239	<	<	0.54	11	<	790.00	0.20	0.911	<	<	5170	15900.0	<	992.0	0.12	<	0.20	<	8.93
501-43M	1010	LKTR	410	Muscle	77.7	<	<	<	0.02	<	<	<	452	<	<	0.75	14	0.16	1320.00	0.46	0.759	<	<	9250	17800.0	<	931.0	0.16	<		<	12.40
501-44M	1011	LKTR	408	Muscle	77.9	<	<	<	0.10	<	<	<	1580	<	<	0.86	12	0.22	1320.00	0.86	0.792	<	<	10000	18200.0	<	948.0	1.74	<		<	13.10
501-51M	1019	LKTR	433	Muscle	77.3	<	<	<	0.08	<	<	<	927	<	<	0.82	10	0.20	1210.00	0.38	0.825	<	<	9090	14200.0	<	891.0	0.88	<		<	11.40
501-25M	1020	LKTR	423	Muscle	76.9	<	<	<	0.02	<	<	<	308	<	<	0.74	14	<	1070.00	0.25	0.966	<	<	6900	16100.0	<	787.0	0.17	0.1	0.30	<	12.80
501-41M	1021	LKTR	410	Muscle	75.2	<	<	<	0.06	<	<	<	1000	2.0	<	0.95	18	<	1220.00	0.73	0.924	<	<	8320	14900.0	0.10	848.0	0.88	<		<	11.40
501-29M	1022	LKTR	408	Muscle	73.8	<	<	<	0.03	<	<	<	337	<	<	0.44	10	<	996.00	0.43	0.626	<	<	6530	15400.0	<	828.0	0.25	<	0.30	<	10.10
501-33M	1023	LKTR	428	Muscle	76.5	<	<	<	0.01	<	<	<	151	<	<	0.50	16	<	728.00	0.33	1.090	<	<	4960	17900.0	<	1040.0	0.04	<	0.10	<	8.45
501-39M	1024	LKTR	413	Muscle	74.2	<	<	<	0.04	<	<	<	1040	<	<	0.86	14	0.12	1160.00	0.70	0.660	<	<	9080	14900.0	<	955.0	1.02	<		<	12.00
501-35M	1031	LKTR	486	Muscle	75.7	<	<	<	0.04	<	<	<	555	<	<	1.24	16	<	1290.00	0.51	0.693	<	<	9320	16200.0	<	962.0	0.34	<		<	12.70
501-35M DUP				Muscle		<	<	<	0.04	<	<	<	484	<	<	1.13	14	<	1130.00	0.49	0.726	<	<	8270	15600.0	<	925.0	0.32	<		<	12.10
501-61M	1040	LKTR	420	Muscle	78.5	<	<	<	<	<	<	<	527	<	<	1.04	18	<	1240.00	0.51	1.220	<	<	8590	15200.0	<	1420.0	0.26	<		<	15.00
501-62M	1041	LKTR	400	Muscle	76.1	<	<	0.12	0.04	<	<	<	677	<	<	0.58	6	<	1170.00	0.41	1.020	<	<	8280	14300.0	<	1010.0	0.52	<		<	12.20
501-63M	1043	LKTR	426	Muscle	77.0	<	<	0.12	<	<	<	<	505	<	<	0.71	18	<	1290.00	0.35	0.957	<	<	9200	16600.0	<	1410.0	0.26	<		<	13.80
501-64M	1044	LKTR	431	Muscle	78.4	<	<	<	<	<	<	<	476	<	<	0.73	10	<	1240.00	0.41	0.891	<	<	8510	16600.0	0.06	1020.0	0.24	<		<	13.10
501-65M				Muscle	79.6	<	<	0.18	0.02	<	<	<	486	<	<	0.58	14	<	1260.00	0.38	2.210	<	<	8990	15500.0	0.06	1470.0	0.22	<		<	15.70
501-60M	1045	LKTR	473	Muscle	76.9	<	<	0.14	0.10	<	<	<	1690	<	<	0.60	16	0.14	1250.00	0.97	1.220	<	<	9790	17100.0	0.02	1250.0	2.10	<		<	14.90
501-56M	1046	LKTR	402	Muscle	75.9	<	<	0.12	<	<	<	<	477	<	<	0.97	8	0.16	1170.00	0.57	0.660	<	<	8550	15700.0	0.04	980.0	0.26	<		<	11.40
501-49M	1047	LKTR	406	Muscle	75.1	<	<	<	<	<	<	<	486	<	<	0.84	12	0.22	1270.00	0.57	0.660	<	<	9660	16700.0	<	1130.0	0.24	<		<	13.00
501-45M	989	RNWH	438	Muscle	75.9	<	<	<	0.02	<	<	<	523	<	<	1.17	14	0.26	1360.00	0.49	0.429	<	<	10600	18900.0	<	1380.0	0.44	<		<	13.40
501-45M DUP				Muscle		<	<	<	<	<	<	<	534	<	<	1.08	12	0.26	1360.00	0.49	0.396	<	<	10700	18500.0	<	1290.0	0.42	<		<	13.10
501-24M	990	RNWH	428	Muscle	74.6	<	<	<	0.02	<	<	<	258	<	<	0.68	14	<	1030.00	0.27	0.422	<	<	6920	19300.0	<	1280.0	0.26	<	0.20	<	10.60
501-26M	993	RNWH	375	Muscle	73.2	<	<	0.07	0.22	<	1.1	<	1860	0.6	<	0.95	15	<	1810.00	2.04	0.177	<	<	12400	20200.0	<	1000.0	2.87	<	0.60	<	14.90
501-31M	995	RNWH	409	Muscle	73.0	<	<	<	0.18	<	<	<	1190	<	<	0.75	13	<	1290.00	1.26	0.231	<	<	8930	19700.0	0.02	904.0	2.31	<	0.30	<	12.10
501-34M	996	RNWH	423	Muscle	72.0	<	<	<	0.53	<	<	<	3360	<	<	0.68	31	<	1340.00	2.59	0.394	<	<	9480	15600.0	<	1090.0	5.70	<	0.20	<	13.70
501-40M	1006	RNWH	346	Muscle	74.5	<	<	<	0.18	<	<	<	967	<	<	1.15	12	0.14	1420.00	1.22	<	<	<	10100	18500.0	0.10	1070.0	1.62	<		<	13.10
501-36M	1015	RNWH	440	Muscle	76.3	<	<	<	0.28	<	1.2	<	1880	<	<	0.91	18	<	1550.00	2.70	0.363	<	<	12500	19900.0	0.06	1660.0	3.12	<		<	14.00
501-27M	1017	RNWH	400	Muscle	71.9	<	<	<	0.20	<	<	<	1290	<	<	1.07	18	<	1250.00	1.59	0.177	<	<	9370	16900.0	<	1220.0	2.50	<	0.40	<	12.40
501-50M	1018	RNWH	321	Muscle	75.3	<	<	<	0.06	<	<	<	509	<	<	0.93	12	0.24	1510.00	0.49	0.198	<	<	11000	20000.0	<	1360.0	0.44	<		<	12.70
501-32M	1026	RNWH	335	Muscle	73.1	<	<	<	0.57	<	<	<	2590	<	<	0.70	18	<	1260.00	2.38	0.177	<	<	9720	20200.0	<	1080.0	5.79	<	0.30	<	13.10
501-30M	1042	RNWH	395	Muscle	73.7	<	<	<	0.02	<	<	<	347	<	<	0.70	13	<	1220.00	0.32	0.177	<	<	8490	16300.0	<	947.0	0.38	<	0.40	<	11.60
501-47M	1048	RNWH	423	Muscle	72.4	<	<	<	0.04	<	<	<	454	<	<	0.86	14	0.22	1200.00	0.38	0.231	<	<	9380	15300.0	<	1050.0	0.36	<		<	12.00
501-48M	1049	RNWH	430	Muscle	76.2	<	<	<	0.02	<	<	<	556	<	<	0.95	18	0.24	1410.00	0.49	0.429	<	<	10400	17400.0	<	1290.0	0.40	<		<	12.60
501-46M	1050	RNWH	431	Muscle	76.8	<	<	<	0.04	<	<	<	518	<	<	1.28	12	0.26	1360.00	0.41	0.297	<	<	10400	18900.0	<	1330.0	0.46	<		<	12.80
501-59M	1051	RNWH	336	Muscle	74.2	<	<	<	0.10	<	0.7	<	668	3.6	<	1.30	24	0.16	1190.00	0.62	0.231	<	<	8990	15200.0	<	773.0	1.02	<		<	16.60
501-58M	1052	RNWH	336	Muscle	74.9	<	<	<	0.26	<	0.6	<	1330	<	<	1.06	12	0.20	1370.00	1.51	0.231	<	<	10600	17600.0	<	1150.0	2.64	<		<	14.20
501-53M	1053	RNWH	441	Muscle	74.7	<	<	<	0.02	<	<	<	474	<	<	1.19	12	0.24	1160.00	0.41	0.462	<	<	9440	16200.0	<	1050.0	0.38	<		<	11.90
501-54M	1054	RNWH	332	Muscle	72.8	<	<	<	0.04	<	<	<	540	<	<	1.19	10	0.20	1250.00	0.49	0.165	<	<	9580	15300.0	<	831.0	0.64	<		<	12.60
501-55M	1067	RNWH	440	Muscle	75.0	<	<	<	0.02	<	<	<	534	<	<	1.19	14	0.20	1290.00	0.41	0.429	<	<	10200	17400.0	<	1330.0	0.42	<		<	14.20
501-57M	1068	RNWH	413	Muscle	74.7	<	<	<	0.04	<	<	<	542	5.6	<	1.06	22	0.22	1240.00	0.54	0.330	<	<	9940	16900.0	<	995.0	0.50	<		<	15.00
501-38L	991	LKTR	473	Liver	76.0	24	<	2.51	0.03	<	<	1.78	478	0.9	1.49	107	5000	<	688.00	15.1	0.310	0.9	0.6	13900	9620.0	1.25	5850.0	0.55	<	4.70	0.9	174.00
501-52L	992	LKTR	466	Liver	75.3	12	<	1.28	0.03	<	<	1.35	232	<	0.67	62.7	3140	<	543.00	6.44	0.230	0.7	0.1	9790	11000.0	0.45	4050.0	0.32	<	2.70	<	120.00
501-42L	994	LKTR	424	Liver	77.2	23	<	0.46	0.05	<	<	3.00	423	0.7	0.43	97.0	2950	<	721.00	4.80	0.190	0.7	<	13200	12200.0	0.61	5040.0	0.58	<	3.60	<	160.00
501-37L	997	LKTR	404	Liver	76.9	5	<	0.75	0.04	<	<	1.66	524	0.8	0.27	56.3	2010	<	624.00	7.00	0.070	0.6	<	12500	12200.0	0.57	5370.0	0.73	<	3.50	<	128.00
501-28L	1009	LKTR	423	Liver	74.9	39	0.1	2.55	0.03	<	0.5	4.36	562	3.0	0.57	84.4	7990	0.41	743.00	8.38	2.120	1.3	<	15700	9090.0	1.04	4690.0	0.60	<	5.00	1.2	181.00
501-43L	1010	LKTR	410	Liver	79.6	47	<	2.68	0.05	<	<	3.55	352	3.1	1.01	188	6600	0.07	754.00	8.04	0.260	1.3	0.3	13000	10800.0	2.91	4610.0	0.43	<	5.80	0.7	189.00
501-44L	1011	LKTR	408	Liver	79.7	24	<	1.08	0.04	<	<	1.97	643	1.7	0.63	46.5	2790	<	809.00	12.9	0.180	1.0	0.1	14500	12800.0	0.47	6000.0	0.68	<	3.50	0.8	155.00
501-51L	1019	LKTR	433	Liver	79.0	5	<	1.31	0.03	<	<	1.26	439	1.7	0.22	10.3	1410	<	1000.00	10.2	0.150	0.4	<	14000	19100.0	0.03	3080.0	0.36	<	2.70	<	99.00
501-25L	1020	LKTR	423	Liver	78.8	20	<	3.57	0.01	0.08	<	4.59	1660	4.9	0.46	114	5090	0.21	741.00	8.38	1.600	0.9	<	14200	10800.0	1.05	4580.0	1.70	<	5.10	<	211.00
501-41L	1021	LKTR	410	Liver	79.2	46	<	0.51	0.07	<	<	2.09	583	0.6	0.42	95	1780	<	1050.00	18.2	0.166	0.5	<	17400	19500.0	1.66	4130.0	0.45	<	4.60	<	150.00
501-29L	1022	LKTR	408	Liver	73.6	12	<	7.50	0.47	0.16	<	6.16	920	2.4	1.00	4.34	803	0.07	588.00	11.0	1.400	0.4	<	9750	6610.0	0.01	5920.0	1.45	<	5.90	0.6	118.00
501-33L	1023	LKTR	428	Liver	72.3	30	<	3.82	0.02	<	<	1.63	1300	1.9	0.66	189	5550	0.30	752.00	22.0	1.230	1.0	<	16100	9190.0	2.71	4470.0	0.95	<	5.10	<	192.00
501-39L	1024	LKTR	413	Liver	75.9	13	<	0.40	0.04	<	<	1.81	233	0.7	0.47	85.3	3340	<	615.00	13.7	0.120	0.9	<	14100	12400.0	1.15	4390.0	0.23	0.6	3.70	<	169.00
501-35L	1031	LKTR	486	Liver	74.5	15	<	1.08	0.02	<	<	1.66	297	1.1	0.54	232	2030	<	650.00	6.16	0.160	0.7	<	12500	11600.0	1.49	3990.0	0.41	<	4.60	<	171.00
501-35L DUP				Liver		13	<	0.68	0.03	<	<	1.71	268	0.9	0.51	211	1960	<	624.00	5.78	0.190	0.7	<	10900	11800.0	1.47	4160.0	0.41	<	3.40	<	170.00
501-61L	1040	LKTR	420	Liver	78.4	15	<	0.66	0.05	<	<	3.34	313	-0.5	0.46	71.7	4820	<	469.00	7.76	0.460	0.7	<	7260	11700.0	1.07	4650.0	0.38	<	2.10	<	123.00
501-62L	1041	LKTR	400	Liver	80.3	15	<	0.55	0.04	<	<	3.48	315	-0.5	0.31	128	1770	<	512.00	4.33	0.260	0.7	<	7800	14800.0	1.06	5450.0	0.54	<	1.80	<	166.00
501-63L	1043	LKTR	426	Liver	80.3	23	<	1.83	0.08	<	<	2.87	234	1.0	0.54	71.7	6790	0.05	497.00	6.10	0.290	0.5	0.2	7510	10800.0	0.54	7110.0	0.37	<	2.10	<	129.00
501-64L	1044	LKTR	431	Liver	77.5	15	<	1.14	0.06	<	<	2.52	326	1.7	0.46	44.8	5820	0.06	616.00	11.0	0.340	1.0	0.1	7710	10300.0	0.45	4970.0	0.48	<	2.10	<	132.00
501-60L	1045	LKTR	473	Liver	76.8	29	<	0.69	0.10	<	<	2.48	367	1.0	0.60	49.5	7780	0.06	444.00	5.88	0.600	0.9	0.4	7460	8620.0	0.56	6080.0	0.73	<	1.70	<	151.00
501-56L	1046	LKTR	402	Liver	79.4	8	<	2.20	0.05	<	<	2.12	415	0.6	0.58	71.5	2160	<	502.00	16.4	0.190	0.7	0.1	7970	12200.0	0.97	6810.0	0.54	<	3.00	<	135.00
501-49L	1047	LKTR	406	Liver	78.1	5	<	0.31	0.04	<	<	1.88	262	1.3	0.63	76.4	2440	<	502.00	13.3	0.200	0.7	0.2	8300	10200.0	1.23	6020.0	0.35	<	2.30	<	130.00
501-45L	989	RNWH	438	Liver	78.5	9	<	1.89	0.04	<	<	1.27	194	0.8	0.48	11.7	1400	<	731.00	8.53	0.090	0.9	0.2	11900	14200.0	<	3360.0	0.36	<	4.00	<	92.30
501-24L	990	RNWH	428	Liver	75.7	15	<	1.49	0.09	0.14	<	0.99	375	0.7	0.39	6.00	918	0.14	619.00	7.86	0.667	0.8	<	12100	9800.0	0.08	2860.0	0.68	<	2.90	<	97.40
501-26L	993	RNWH	375	Liver	79.1	5	<	7.10	0.02	<	<	0.39	582	1.7	0.66	7.60	546	0.08	649.00	7.13	0.317	0.7	<	13100	13500.0	0.06	5240.0	0.91	<	6.50	<	100.00
501-31L	995	RNWH	409	Liver	84.5	8	<	7.05	0.08	<	<	0.71	776	2.4	0.49	10.2	405	0.19	1460.00	25.7	0.650	1.0	<	25900	20800.0	0.17	5420.0	1.12	<	9.50	<	159.00
501-34L	996	RNWH	423	Liver	77.7	29	<	4.62	0.11	0.26	1.4	1.64	599	1.8	0.49	25.4	1720	0.68	1040.00	13.5	0.800	1.7	<	20700	12300.0	0.15	3490.0	0.97	<	7.30	<	162.00
501-40L	1006	RNWH	346	Liver	76.6	3	<	0.27	0.10	<	<	0.23	308	-0.5	0.59	10.5	463	<	666.00	9.69	<	0.6	0.2	13000	11900.0	<	4830.0	0.80	<	3.80	<	96.60
501-36L	1015	RNWH	440	Liver	79.1	17	<	1.32	0.07	<	<	1.43	354	1.1	0.48	11.2	2250	<	759.00	9.74	0.090	1.0	0.3	12600	15900.0	0.08	5820.0	0.58	<	4.60	<	91.80
501-27L	1017	RNWH	400	Liver	76.4	6	<	8.25	0.02	<	<	0.66	612	2.1	0.46	7.50	617	0.20	1110.00	17.1	0.500	0.8	<	20100	19000.0	0.05	4480.0	0.66	<	8.20	<	113.00
501-50L	1018	RNWH	321	Liver	74.9	4	<	0.26	0.17	<	<	0.31	276	2.5	0.39	9.99	319	<	738.00	14.0	0.070	0.6	0.2	12200	12800.0	0.01	3430.0	0.68	<	2.30	<	89.70
501-32L	1026	RNWH	335	Liver	78.4	3	<	6.70	0.05	<	2.2	0.13	620	1.7	0.68	21.3	667	0.71	954.00	14.1	0.317	0.7	<	19600	14300.0	0.04	6160.0	1.25	<	6.70	<	101.00
501-30L	1042	RNWH	395	Liver	77.6	5	<	3.94	0.02	<	<	0.57	355	1.5	0.39	7.50	734	0.11	679.00	8.80	0.483	0.6	<	12000	11600.0	0.08	3700.0	0.52	<	4.60	<	98.20
501-47L	1048	RNWH	423	Liver	77.5	5	<	0.45	0.04	<	<	0.58	239	0.8	0.44	7.78	812	<	577.00	6.75	0.100	0.7	0.1	9560	12900.0	0.02	4270.0	0.54	<	2.90	<	88.70
501-48L	1049	RNWH	430	Liver	77.0	7	<	0.23	0.13	<	<	0.91	347	1.5	0.43	8.05	1450	<	524.00	5.22	0.150	0.6	0.1	8800	12200.0	0.03	4840.0	0.77	<	2.50	<	78.20
501-46L	1050	RNWH	431	Liver	78.6	5	<	0.33	0.09	<	<	0.52	407	1.8	0.50	8.72	880	<	546.00	7.15	0.070	1.0	0.3	9840	13300.0	0.04	5850.0	0.89	<	2.60	<	85.60
501-59L	1051	RNWH	336	Liver	76.9	3	<	1.78	0.18	<	<	0.21	480	2.1	0.52	7.48	414	<	506.00	7.08	0.070	0.6	0.1	6670	11400.0	0.01	3640.0	1.30	<	2.40	<	74.00
501-58L	1052	RNWH	336	Liver	77.1	5	<	1.81	0.05	<	<	0.25	219	3.4	0.43	9.24	469	<	565.00	7.02	0.080	0.7	<	8300	12400.0	-0.05	3610.0	0.51	<	2.50	<	79.70
501-53L	1053	RNWH	441	Liver	75.6	16	<	0.62	0.08	<	<	0.97	289	0.7	0.23	6.46	454	<	626.00	5.32	0.140	0.5	<	9230	13000.0	<	4080.0	0.63	<	2.20	<	68.70
501-54L	1054	RNWH	332	Liver	76.0	3	<	0.39	0.13	<	<	0.20	391	1.0	0.59	7.15	394	<	574.00	10.4	0.060	0.4	0.1	8660	12500.0	0.02	5160.0	1.13	<	1.90	<	74.90
501-55L	1067	RNWH	440	Liver	77.4	7	<	0.34	0.07	<	<	1.18	185	<	0.23	6.83	652	<	482.00	5.18	0.170	0.6	0.2	6650	14300.0	0.06	4580.0	0.47	<	1.70	<	76.90
501-55L DUP				Liver		8	<	0.51	0.07	<	<	1.23	224	<	0.27	7.60	676	<	545.00	5.67	0.140	0.7	0.2	7710	14200.0	0.06	4390.0	0.53	<	2.10	<	82.90
501-57L	1068	RNWH	413	Liver	79.5	4	<	0.46	0.04	<	<	0.63	220	0.8	0.39	7.17	1020	<	500.00	7.17	0.130	0.6	0.2	7240	13300.0	<	5920.0	0.60	<	2.00	<	79.10

Note: < = below detection limit; LKTR = Lake trout; RNWH = Round whitefish

Appendix H3 Metal concentrations in liver and muscle tissue samples collected from Contwoyto Lake, Jericho study area, 1996.

Laboratory Label	Sample Number	Species	Fork Length (mm)	Tissue Type	Moisture H_2O (%)	Metal Concentrations in ug/g on dry weight basis (detection limits in italics) Al *1.0*	Sb *0.1*	As *0.05*	Ba *0.01*	Be *0.05*	B *0.5*	Cd *0.05*	Ca *0.5*	Cr *0.5*	Co *0.05*	Cu *0.05*	Fe *1*	Pb *0.05*	Mg *0.05*	Mn *0.05*	Hg *0.005*	Mo *0.1*	Ni *0.1*	PO4 *10*	K *0.5*	Ag *0.01*	Na *0.5*	Sr *0.01*	Sn *0.1*	Ti *0.15*	V *0.5*	Zn *0.05*
501-8M	580	LKTR	490	Muscle	79.5	<	<	0.18	0.01	<	<	<	405.0	<	<	0.58	10	<	1410.00	0.42	1.070	<	<	9700	21100.0	0.01	1060.0	0.14	<	0.30	<	13.50
501-22M				Muscle	81.0	<	<	0.12	0.01	<	<	<	229.0	<	<	0.32	12	<	1040.00	0.37	1.630	<	<	5850	21100.0	<	1800.0	0.04	<	0.30	<	10.60
501-23M				Muscle	77.4	<	<	<	0.05	<	<	<	561.0	3.6	<	0.84	51	<	1040.00	0.51	0.857	<	<	7700	12800.0	<	692.0	0.51	<	0.10	<	12.80
501-21M	581	LKTR	481	Muscle	77.9	<	<	0.19	0.04	<	<	<	324.0	<	<	0.82	12	<	1070.00	0.39	1.500	<	<	8200	22000.0	<	1070.0	0.31	0.1	0.10	<	12.20
501-11M	582	LKTR	454	Muscle	75.8	<	<	0.08	0.01	<	<	<	371.0	<	<	0.61	13	<	1110.00	0.34	0.626	<	<	9020	21800.0	<	1200.0	0.28	<	0.20	<	12.50
501-11M DUP				Muscle		<	<	0.09	0.01	<	<	<	367.0	<	<	0.65	14	<	1190.00	0.32	0.598	<	<	9230	21600.0	<	1200.0	0.24	<	0.30	<	12.20
501-16M	583	LKTR	612	Muscle	79.6	3.0	<	0.41	0.09	<	<	<	471.0	0.7	0.06	0.48	11	<	1310.00	0.82	1.890	<	<	8660	20200.0	<	1240.0	0.22	<	0.50	<	12.20
501-17M	584	LKTR	436	Muscle	74.6	<	<	0.07	0.13	<	0.6	<	808.0	<	0.06	0.70	16	<	1370.00	0.47	0.299	<	<	9950	18000.0	<	1320.0	1.09	<	0.30	<	14.60
501-9M	585	LKTR	484	Muscle	77.7	<	<	0.10	0.02	<	<	<	343.0	<	<	0.65	11	<	1270.00	0.50	0.762	<	<	9570	20700.0	<	928.0	0.17	<	0.20	<	12.20
501-20M	586	LKTR	608	Muscle	76.3	<	<	0.09	0.01	<	<	<	177.0	<	0.08	0.55	9	<	859.00	0.29	1.240	<	<	6110	21800.0	<	1390.0	0.14	<	0.10	<	9.23
501-20M DUP				Muscle		<	<	0.10	0.01	<	<	<	207.0	<	0.07	0.64	11	<	976.00	0.32	1.100	<	<	7300	17900.0	<	1140.0	0.11	<	0.10	<	10.50
501-14M	587	LKTR	395	Muscle	76.6	<	<	0.07	0.03	<	<	<	346.0	<	<	0.66	15	<	1340.00	0.45	0.408	<	<	9520	18400.0	<	862.0	0.15	<	0.30	<	12.80
501-4M	617	LKTR	495	Muscle	79.8	<	<	0.11	0.02	<	<	<	289.0	<	<	0.54	11	<	1210.00	0.38	0.816	<	0.2	9020	19200.0	0.01	1000.0	0.08	<	0.30	<	10.40
501-2M	618	LKTR	495	Muscle	78.6	<	<	0.12	0.12	<	<	<	1020.0	<	<	0.71	11	<	1240.00	0.40	0.952	<	0.2	9780	21000.0	<	1100.0	1.53	<	0.10	<	11.50
501-10M	619	LKTR	684	Muscle	75.8	<	<	0.20	0.01	<	<	<	197.0	<	0.07	2.18	11	<	970.00	0.29	2.070	<	<	8080	19700.0	<	1290.0	0.09	<	0.40	<	11.90
501-7M	620	LKTR	510	Muscle	79.1	<	<	0.13	0.02	<	<	<	353.0	<	<	0.53	9	<	1340.00	0.43	0.843	<	<	9610	20800.0	<	877.0	0.26	<	0.30	<	10.50
501-6M	737	LKTR	517	Muscle	78.5	<	<	0.15	0.04	<	<	<	282.0	<	<	0.71	8	<	1090.00	0.31	0.925	<	<	8850	21100.0	0.06	958.0	0.27	0.1	0.10	<	11.90
501-5M	738	LKTR	427	Muscle	75.9	<	<	0.14	0.05	<	2.4	<	721.0	0.6	0.09	1.01	18	<	1940.00	0.63	0.367	<	0.3	13700	19400.0	<	1220.0	0.44	<	0.50	<	15.30
501-3M	739	LKTR	528	Muscle	75.9	<	<	0.09	0.03	<	<	<	295.0	<	<	0.90	9	<	1170.00	0.32	0.857	<	0.3	8350	17000.0	<	1110.0	0.13	<	0.30	<	9.43
501-12M	740	LKTR	436	Muscle	78.2	<	<	0.10	0.05	<	<	<	427.0	<	<	0.38	8	<	1130.00	0.51	0.680	<	<	7730	21700.0	<	847.0	0.47	<	0.20	<	11.70
501-1M	742	LKTR	461	Muscle	77.2	<	<	0.22	0.06	<	<	<	657.0	<	<	0.56	10	<	1480.00	0.69	0.639	<	<	11400	20900.0	0.02	1440.0	0.76	<	0.40	<	13.60
501-19M	745	LKTR	461	Muscle	77.4	<	<	0.12	0.03	<	<	<	366.0	<	<	0.40	11	<	918.00	0.34	0.503	<	<	6460	16700.0	<	816.0	0.36	<	0.20	<	8.93
501-18M	746	LKTR	525	Muscle	81.1	<	<	0.15	0.02	<	<	<	267.0	<	<	0.43	25	<	1080.00	0.46	1.630	<	<	7670	20600.0	<	1710.0	0.05	<	<	<	11.20
501-15M	749	LKTR	469	Muscle	77.2	<	<	0.10	0.02	<	<	<	290.0	<	<	0.39	9	<	983.00	0.40	0.544	<	<	7710	16200.0	<	961.0	0.12	<	0.20	<	10.70
501-13M	750	LKTR	330	Muscle	78.5	<	<	0.18	0.06	<	<	<	612.0	<	<	0.44	13	<	1340.00	0.76	0.476	<	<	9580	19500.0	<	974.0	0.54	<	0.30	<	13.30
501-8L	580	LKTR	490	Liver	79.2	6.0	<	2.11	0.03	<	<	1.43	514.0	0.7	0.51	20.3	1420	0.60	956.00	9.08	1.200	0.5	<	15900	16300.0	0.40	5290.0	0.74	<	4.10	<	118.00
501-21L	581	LKTR	481	Liver	79.4	5.0	<	5.05	<	0.14	<	1.26	409.0	1.1	0.54	50.6	1370	0.18	795.00	6.21	2.580	0.6	<	15000	12000.0	0.57	5820.0	0.70	<	5.50	<	141.00
501-11L DUP	582	LKTR	454	Liver		11.0	<	3.96	0.09	<	<	2.02	600.0	1.3	0.58	59.7	2240	0.37	912.00	8.35	1.330	0.9	<	16900	14100.0	0.68	9700.0	1.30	<	5.30	<	177.00
501-11L				Liver	84.7	9.0	<	4.53	0.11	0.21	<	2.19	623.0	1.5	0.54	51.0	2260	0.46	900.00	8.43	1.320	0.8	<	16700	13200.0	0.69	8860.0	1.23	<	6.00	<	178.00
501-16L	583	LKTR	612	Liver	81.4	45.0	<	7.60	0.04	<	<	2.28	715.0	1.6	0.79	38.5	2530	0.16	824.00	7.50	2.600	0.7	<	14500	11700.0	0.50	6250.0	0.94	<	6.40	<	162.00
501-17L	584	LKTR	436	Liver	80.4	11.0	<	7.25	0.04	<	<	1.35	517.0	1.8	0.68	28.8	2170	0.15	731.00	7.57	0.483	0.7	<	13200	11000.0	0.35	6110.0	0.99	<	5.70	<	132.00
501-9L	585	LKTR	484	Liver	83.7	17.0	<	2.70	0.03	0.12	<	1.13	570.0	1.3	0.62	46.3	937	0.53	864.00	8.41	1.030	0.7	<	14100	11900.0	0.24	6970.0	0.98	<	4.30	<	163.00
501-20L	586	LKTR	608	Liver	74.4	8.0	<	1.95	0.01	<	<	1.69	482.0	1.3	1.11	48.4	2120	0.12	501.00	10.10	1.700	0.4	<	10700	6330.0	1.02	4610.0	0.70	<	2.50	<	124.00
501-14L	587	LKTR	395	Liver	81.3	38.0	<	4.74	0.07	0.05	<	2.19	563.0	1.8	0.54	31.2	1520	0.27	926.00	8.48	0.950	0.8	<	16600	10800.0	0.55	6660.0	1.28	<	4.70	0.6	164.00
501-4L	617	LKTR	495	Liver	80.2	42.0	<	2.24	0.04	<	<	2.87	458.0	0.7	0.74	41.8	3130	0.59	787.00	7.49	0.983	0.8	<	12400	12400.0	0.73	6910.0	0.63	<	3.50	<	144.00
501-2L	618	LKTR	495	Liver	81.8	8.0	<	2.77	0.01	<	<	2.53	543.0	1.0	0.64	64.3	1650	0.41	867.00	8.42	1.500	0.9	1.2	13400	13100.0	0.18	6800.0	0.88	<	4.00	<	191.00
501-10L	619	LKTR	684	Liver	83.7	8.0	<	2.95	0.01	<	0.6	1.11	535.0	0.9	1.35	78.0	1850	0.45	742.00	6.37	4.330	0.8	<	13900	11700.0	0.97	7840.0	0.88	<	5.00	<	211.00
501-7L	620	LKTR	510	Liver	80.2	38.0	<	1.76	0.03	0.09	<	2.72	412.0	<	0.72	26.8	2880	0.41	783.00	8.37	2.080	0.8	<	12800	11300.0	0.53	5950.0	0.85	<	3.00	0.7	139.00
501-6L	737	LKTR	517	Liver	78.1	6.0	<	7.85	0.03	<	1.1	1.78	545.0	1.3	0.49	24.3	835	0.25	893.00	7.87	1.170	0.7	<	13900	12000.0	0.22	5810.0	0.99	<	5.50	<	132.00
501-6L DUP				Liver		6.0	<	7.60	0.06	0.17	1.1	1.81	572.0	1.4	0.41	28.4	929	0.20	938.00	8.33	1.220	0.8	<	15900	12400.0	0.19	6410.0	1.11	<	6.50	<	143.00
501-5L	738	LKTR	427	Liver	80.7	15.0	<	11.8	0.06	<	0.6	1.73	618.0	2.1	0.86	28.3	2170	0.41	800.00	6.63	0.633	0.8	<	14600	13300.0	0.31	7150.0	1.08	<	9.20	<	147.00
501-3L	739	LKTR	528	Liver	82.2	8.0	<	1.72	0.05	<	<	2.59	421.0	6.5	0.75	62.7	3520	0.86	703.00	7.51	1.680	1.0	8.6	11800	11400.0	1.05	8230.0	0.71	<	4.00	<	152.00
501-12L	740	LKTR	436	Liver	78.8	5.0	<	4.43	0.02	0.07	<	1.69	472.0	1.1	0.48	31.9	1440	0.40	816.00	6.60	1.230	0.7	<	14100	9090.0	0.47	5060.0	0.99	<	5.70	<	155.00
501-1L	742	LKTR	461	Liver	84.6	11.0	<	5.55	0.07	<	<	1.59	714.0	1.3	0.87	30.9	1290	0.64	954.00	7.49	1.170	0.9	<	16100	16500.0	0.34	9470.0	1.58	<	6.40	<	172.00
501-19L	745	LKTR	461	Liver	76.7	6.0	<	3.68	0.01	<	<	1.19	426.0	0.9	0.41	28.0	1660	0.14	692.00	5.31	0.967	0.6	<	11600	9330.0	0.61	4830.0	0.70	<	3.40	<	121.00
501-18L	746	LKTR	525	Liver	84.9	24.0	<	6.30	0.11	<	<	6.17	2240.0	1.4	1.32	75.7	9470	0.27	1090.00	8.75	4.750	1.8	1.6	16900	14000.0	0.88	8100.0	3.13	<	7.90	1.0	232.00
501-15L	749	LKTR	469	Liver	80.1	8.0	<	8.20	0.04	<	<	1.57	439.0	1.4	0.69	61.6	2050	0.15	752.00	6.92	0.850	0.7	<	13400	10500.0	1.28	6010.0	0.69	<	6.00	<	155.00
501-13L	750	LKTR	330	Liver	76.0	17.0	<	7.55	0.05	<	<	1.48	790.0	1.8	0.38	20.2	901	0.24	817.00	6.40	0.600	0.5	<	13700	8590.0	0.23	4470.0	1.16	<	6.70	<	131.00

Note: < = below detection limit; LKTR = Lake trout; RNWH = Round whitefish

APPENDIX I
STREAM CROSSING DATA

Appendix I1 Locations of streams investigated along the proposed all-weather route, Jericho study area, 1996.

Stream Crossing	UTM Coordinates	Stream Crossing	UTM Coordinates
1A	12W 0477200 7318150	29	12W 0474875 7298225
1	12W 0476850 7317425	30	12W 0472925 7298100
2	12W 0476650 7316850	31	12W 0472850 7298175
3	12W 0477875 7315050	32	12W 0472950 7298550
4	12W 0479180 7313556	33	12W 0472850 7298425
5	12W 0479200 7313700	34	12W 0472400 7298000
6	12W 0479300 7313500	35	12W 0472000 7297525
7	12W 0479038 7312595	36	12W 0472150 7297025
8	12W 0478986 7312223	37	12W 0472249 7296722
9	12W 0479000 7312150	38	12W 0473300 7296075
10	12W 0478750 7309550	39	12W 0473525 7295075
11	12W 0478550 7309275	40	12W 0473650 7294625
12	12W 0478250 7308850	41	12W 0473733 7294625
13	12W 0476600 7307950	42	12W 0473375 7294275
14	12W 0476550 7306425	43	12W 0473700 7294150
15	12W 0476550 7306650	44	12W 0473375 7294175
16	12W 0476075 7306100	45	12W 0473900 7293500
17	12W 0476150 7306100	46	12W 0473150 7293025
18	12W 0476248 7306075	47	12W 0473450 7292400
19	12W 0476425 7304500	48	12W 0473600 7292150
20	12W 0476356 7304157	49	12W 0474900 7292025
21	12W 0476521 7303988	49A	12W 0475025 7291850
22	12W 0476519 7303191	50	12W 0479747 7290617
23	12W 0476750 7301875	51	12W 0477350 7290000
24	12W 0476163 7300746	52	12W 0479425 7289725
25	12W 0475925 7300250	53	12W 0480417 7289943
26	12W 0475825 7300500	54	12W 0482678 7290004
27	12W 0475275 7299700	55	12W 0487500 7292500
28	12W 0475725 7299400		