



Province of
British Columbia

Ministry of
Environment
Lands & Parks
Bulkley District
Smithers, B.C.

A RECONNAISSANCE INVENTORY OF CERBER LAKE (ALIAS)

Watershed Code Unknown

FINAL REPORT

Klohn-Crippen Consultants Ltd.
10200 Shellbridge Way
Richmond, British Columbia
Canada, V6X 2W7

PW7507 0105

MARCH, 1997

Klohn-Crippen



March 19, 1997

Ministry of Environment, Lands and Parks
Skeena Region
Box 5000
Smithers, British Columbia
V0J 2N0

Mr. Paul Giroux

Dear Mr. Giroux:

The following represents our final report for a Reconnaissance Survey of Cerber Lake (alias); Watershed Code unknown.

Yours truly,

KLOHN-CRIPPEN CONSULTANTS LTD.

Richard Couture, R.P. Bio.
Project Manager

EXECUTIVE SUMMARY

Klohn-Crippen Consultants Ltd. was retained by the Fisheries Branch of the Ministry of Environment, Lands and Parks in Smithers to conduct a reconnaissance survey of Cerber Lake (alias - watershed code unknown) which lies within the Bulkley River watershed. Cerber lake is located approximately 22.1 km northwest of Smithers, just south of the much larger Hankin Lake. The maximum depth in the lake is 5.5 metres with mean depths and volumes of 2.1 metres and 267,916 m³, respectively. There are no shoal areas that would present a hazard to navigation. The lake has a very complex shoreline with many small bays as well as potential spawning habitat scattered along the shoreline

Only two fish specimens were captured in this lake and both were large, adult rainbow trout. Scales from these fish were regenerate (could not be aged) but growth rings suggest that each fish had previously spawned. Juvenile rainbow were not captured in the lake.

Cerber Lake's water chemistry is suitable for salmonids (Anon. 1996b) and dissolved oxygen remains above 8 mg/L in all depths except that immediately above the sediment. Potential fish food sources in this lake also appeared abundant. Overall, there is no obvious explanation for the apparently small fish population. Furthermore, due to the lack of captured juveniles, future studies should emphasize juvenile selective sampling gear to establish if juveniles are present in this lake. Future studies should also investigate this lake for potential stocking enhancement.

The combination of trail access to the lake from a nearby Forestry Service Road, the large size of adults captured in this lake and the potential for stocking enhancement, suggest that this lake has good potential as a recreational fishing site.

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1. INTRODUCTION

Klohn-Crippen Consultants Ltd. was retained by the Fisheries Branch of the BC Ministry of Environment, Lands and Parks in Smithers to conduct a reconnaissance survey of Cerber Lake within the Bulkley River watershed. The field survey was conducted on September 15 and 16, 1996 by G. Scarborough and J. Sterritt. The lake is located approximately 1 km south of the larger Hankin Lake, 21.9 km northwest of Smithers (Figure 1).

The purpose of this survey was to provide essential fish and fish habitat information required for resource planning or making management decisions for Cerber Lake. Fish sampling was conducted through the combination of set lines, gillnets, and minnow traps left in the lake overnight. Electrofishing was conducted in the lake's inlet and outlet during the daytime only. All surveys (except the bathymetric survey) were conducted according to Anon (1995a). The bathymetric survey of this lake utilized a Trimble Pro-XL GPS-data logger combined with a Meridata depth sounder which after post-mission differential correction, provided submeter positional accuracy from which individual depth soundings were plotted. The perimeter of this lake was also traced using the GPS system. This provided accuracy in the measurements of lake perimeter and surface area. Lastly, although this lake is not gazetted, it is referred to herein as Cerber Lake. It should be emphasized, however, that this is not the lake's official name and is only an alias.

Figure 1 Lake Location

2. DATA ON FILE

The following represents a directory of the specific components that comprise a reconnaissance lake survey and also indicates those components that are completed in this survey.

Location	<u>√</u>	Winter Diss. O₂/Temp. Profiles	<u> </u>
Lake Morphometric Data	<u>√</u>	Netting record	<u>√</u>
Bench Mark	<u>√</u>	Lake Catch Summary	<u>√</u>
Terrain Features	<u>√</u>	Individual Fish Summary	<u>√</u>
Access	<u>√</u>	Fish Preserved	<u> </u>
Resorts and Campsites	<u>√</u>	Stomach Analysis	<u> </u>
Special Restrictions	<u>√</u>	Scale Reading	<u>√</u>
Aquatic Plants	<u>√</u>	Location of Inventory Sites	<u>√</u>
Wildlife Observations	<u>√</u>	Appendices:	<u>√</u>
Summary of Rare or Endangered Species	<u>√</u>	I: Tributary Stream Data and Data Forms	<u>√</u>
Lake Drainage	<u>√</u>	II: Fish Scale Microfiche Prints	<u>√</u>
Fisheries Management Comments	<u>√</u>	III: Water Chemistry Analysis	<u>√</u>
History of Previous Surveys	<u>√</u>	IV: Photograph Directory	<u>√</u>
Water Chemistry Summary	<u>√</u>	Bathymetric Map Reduction	<u> </u>
Dissolved O₂/Temp. Profiles	<u>√</u>	Bathymetric Map	<u>√</u>

3. SURVEY AND ANALYTICAL METHODS

3.1 Bathymetry

The bathymetric survey utilized a Trimble Pro-XL GPS datalogger unit coupled to a Meridata digital depth sounder. The datalogger was programmed to record position (NAD83) once every second and depth and position every three seconds. The GPS antenna was attached to one end of a length of plywood (4' x 1/2' x 36') and the depth sounder transponder was attached to the other end. This plywood was then fixed to the boat's transom with a C-clamp and an angular wedge placed between the transom and plywood such that the plywood, antenna and transponder were oriented perpendicular to the water surface. The antenna was positioned approximately 1 metre above the water while the transponder was positioned immediately below the surface.

Due to the inherent error in GPS signals, post-mission processing of the field GPS data was necessary to achieve the sub-metre accuracy required to plot bathymetric data. Post-mission differential correction was achieved with the P-Finder software package (Trimble Corp.) by matching the field GPS data with British Columbia Active Control System (BCACS) 1-second network base station data from the Maps BC base station in Terrace, British Columbia. A base station very close to the actual field GPS unit would provide the most accurate post-mission differential correction but Terrace was close enough (<500 km) to still provide sub-metre accuracy (*pers. comm.* Amin Kassam, September 9, 1996).

The first task during a bathymetric survey was to trace the perimeter of the study lake. This was achieved by placing the outboard motor in shallow drive (to avoid collisions with rocks and logs) and driving around the perimeter while maintaining a constant distance from shore for the entire perimeter trace. A distance of 4 metres was usually sufficient to avoid collisions and still allow a detailed trace of the perimeter. Following differential correction and analysis of the perimeter trace data, the perimeter was expanded by 4 metres to delineate the actual lake perimeter and not just the boat's path.

Following the perimeter trace, the lake's longest axis (e-line) was traced to illuminate the general depth trends and then transects were made across the shorter axis in directions generally perpendicular to the e-line. These shorter transects were conducted such that the depth sounder was allowed to track depths from shore to opposite shore. Additional depth data were obtained through excursions into small bays along the shoreline. The coordinates for these bathymetric data were then differentially corrected and analyzed along with the corrected perimeter data to generate bathymetric contours via the AdCADD® Civil/Survey software package. The resulting bathymetric map was then examined and adjustments to contours were made as necessary. Bathymetric statistics

(volume, area at 6 metre contour, etc.) were also generated from the AdCADD® Civil/Survey software package.

3.2 Stream Surveys

Inlet and Outlet stream surveys were conducted according to Resource Inventory Committee (RIC) standards (Anon. 1995a). Wherever possible, 500 metres of stream was surveyed. Alternatively, when this was not possible due to the presence of an impossible barrier or other lake, the stream was surveyed up to this habitat feature. At a section of the stream possessing representative habitat, an area no less than 9 bank-full widths long was surveyed and the mandatory fields of the DFO/MoELP stream card were completed. Wherever possible, electrofishing of at least 100 m² of fish habitat was also conducted. Photographs of stream habitat and views from the upstream and downstream limits of the survey site were also taken if they provided additional detail of the surrounding habitat.

3.3 Gillnetting

Mesh sizes of monofilament gillnets used in this study, in experimental order, were: 18, 38, 63 and 88 mm. Each gillnet panel measured 17.4 metres long by 2.8 metres deep and the panels were ganged together for a total net size of 69.6 metres by 2.8 metres representing a sample surface area of 194.9 m². Each gillnet gang was set with the 18 mm mesh closest to shore and mesh size increasing towards the lake's center.

The Resource Inventory Committee (RIC) standards for gillnetting require a gillnet with six panels of varying mesh sizes to be ganged together in a specific sequence (i.e., 25 mm, 76 mm, 51 mm, 89 mm, 38 mm and 64 mm). The gillnet dimensions used for this inventory did not exactly match the RIC standard. Gillnet mesh sizes increased in size in the order as stated above. The only difference with the RIC standard net design is the absence of the 54 mm and 76 mm panels. RIC standard nets were not used for this survey because the Lake and Stream Inventory manual was unavailable to Klohn-Crippen when this project was initiated. The gillnets used for this inventory have been used by Klohn-Crippen for many years and have produced consistently defensible catch results. For comparison purposes with RIC standard gillnets and where catch data permit, an analysis of the catch length distribution has been provided to highlight trends in the fish length data and the occurrence of any bias in the catch population. See results for this discussion.

3.4 Minnow Traps

Standard gee type minnow traps were used in this study. Each trap was baited with a small piece of salted roe that was suspended by a length of line near the trap's center.

The traps were then attached to the shoreline with a long piece of line and the shoreline area was marked with flagging tape for easy re-location.

3.5 Set Lines

The set line used in this study consisted of a 30 lb monofilament center line with 1 m long 30 lb monofilament leaders extending outwards from this center line at 1 m intervals. Barbed hooks were fixed to the end of each leader and baited with small pieces of salted roe. The set line was weighted with a rock, then lowered to the bottom, after which the line was pulled taught and fixed to a large float at the surface.

3.6 Limnological Investigations

Bathymetric investigations (Section 3.1) allowed Klohn-Crippen to estimate the lake's deepest point. The boat was anchored here and general observations on weather and surface conditions were noted. Lake water temperature and dissolved oxygen were determined along a vertical profile at 1 metre intervals to the lake bottom and the resulting field data were examined to determine metalimnetic depth. Water samples were then extracted from the surface (0.5m) and from a depth below the metalimnion with a Van Dorn water sampler. Measurements of specific conductance and pH were also determined in the field at the two sample depths.

3.7 Water Chemistry

Water chemistry was determined in the field (e.g., temperature, pH, specific conductance) or by a laboratory from samples collected in the field. Water samples collected in the field were stored in properly labeled, clean plastic sample bottles. A glass jar was used to store water for NH₃ analysis. These samples were then stored in a cooler under ice and subsequently refrigerated overnight at 4°C until shipment to Vancouver the following day. When samples were collected on a Friday or Saturday, they were stored in a freezer (-10°C) until shipment the following Monday.

3.7.1 Alkalinity

Alkalinity was determined by the titration method outlined in Eaton et al. (1995).

3.7.2 Total Dissolved Solids

TDS was examined according to Eaton et al. (1995).

3.7.3 Ammonia (NH₃)

Ammonia was examined according to the Nessler method (Hach 1994).

3.7.4 Nitrate

Nitrate was examined according to the Nessler method (Hach 1994).

3.7.5 Total Phosphorus

Total phosphorus was examined through the ascorbic acid method using powder pillows. A method equivalent to USEPA method 365.2 and Standard Method 4500-P-E for wastewater (Hach 1994).

3.7.6 Total Dissolved Phosphorus

Total dissolved phosphorus was examined by the ascorbic acid method using powder pillows after first filtering the sample through a Whatman GFC filter (Hach 1994).

3.7.7 Chlorophyll *a*

The measurement of chlorophyll *a* followed APHA Standard Methods, 18th Edition, pages 10-17. Phytoplankton were extracted from the sample through a Whatman GFC filter prior to pigment extraction in aqueous acetone. The optical density of the extract is then determined by spectrophotometry.

3.7.8 Total Kjeldhal Nitrogen

The measurement of total nitrogen followed APHA Standard Methods, 18th Edition, pages 94-94 as well as the EPA-600/4-79-020 Method 351. The method basically involved conversion of all the solution's nitrogenous compounds into ammonia through acidification then distillation. Measurement was then made with an ammonia selective electrode.

3.7.9 Filterable Residue

Filterable residue was estimated by passing 25 ml of solution through a washed and weighed 0.45 µm filter. This filter was then washed again, dried and weighed with the amount of filterable residue equal to the difference in weight of the filter and the volume of sample used.

3.7.10 Metals (Sodium, Magnesium and Calcium)

Solution was filtered through 0.45 µm filter and then acidified with nitric acid, prior to analysis with ICPMS.

3.8 Biogeoclimatic zone

Biogeoclimatic zone was determined with PC-Arc Info by matching lake outflow coordinates with those on a digital map of British Columbia's biogeoclimatic zones.

3.9 Native Land Claim Area

The Native land claim area applicable to each lake was determined from up to date land claim area maps provided by the British Columbia Treaty Commission and, for the Gitksan Nation claim, from a map provided directly from the Gitksan First Nation.

3.10 Mining Claims

Existing mining claims were searched under the Mineral and Placer, No Staking Reserve document, BC Reg. 91/91, March 24, 1993: Amended by BC Reg. 119/95 on March 29, 1995.

4. LAKE GEOGRAPHICAL AND MANAGEMENT INFORMATION

The following represents a summary of the geographical and management information for Cerber Lake.

Dates of Survey:	September 15-16, 1996
Watershed Name:	Bulkley River Watershed
Watershed Code:	Unknown
Watershed Area:	1,110,000 m ²
Location:	Approximately 1 km south of Hankin Lake, 21.9 km northwest of Smithers
Elevation:	1017.1 m ± 1.7 m (determined from corrected GPS data)
Latitude/Longitude:	lat. - 54° 50' 20" long. - 127° 36' 40"
U.T.M.:	9. 589191. 6077763
N.T.S. Map No.:	93L.13
TRIM Map No.:	93L.082
Biogeoclimatic Zone:	Engelmann Spruce - Subalpine Fir
Forest Region:	Prince Rupert
Wildlife Management Unit:	6-9
Forest District:	Bulkley
LRMP Planning Unit:	12: Copper River (Anon. 1996c)
LRMP Management Zone:	Integrated Resource Management Zone <ul style="list-style-type: none">• A full range of resource values is recognized in this zone (see Anon. 1996c)• Equal consideration must be given to all values
LRMP Ecosystem Network:	Landscape Corridor
Native Land Claim Area:	Nat'oot'en First Nation, Wet'suwet'en Nation, Gitksan Nation
Drainage:	Unnamed outlet >Unnamed Lake> Unnamed stream> Hankin Lake

4.1 Lake Morphometric Data

An investigation of Cerber Lake's morphometry was conducted on September 16, 1996. Twenty-two transects were conducted across the short axis of the lake and a single transect was made along the lake's long axis (the e-line). Excursions into the many shallow bays of Cerber lake were also conducted. As the survey technique used here involved a GPS unit with post-mission differential correction allowing sub-meter positional accuracy, the standard method for bathymetric surveys was not followed in this study. This resulted in the lack of paper traces, transect calculation sheets and percentage distance along transect determinations (see Anon. 1996a) so these required items are not summarized here. However, the survey transects for assessing Cerber Lake's bathymetry have been recorded and are depicted in Figure 2. The bathymetric map generated from these surveys is depicted in Figure 3.

The following bathymetric summary statistics for Cerber Lake are:

Total surface area:	124,800 m ²
Surface area at 6m contour:	0
Shoreline perimeter:	2,680 m
Island perimeter:	70 m
Maximum depth:	5.5 m
Mean depth:	2.1 m
Lake drainage area:	1,110,000 m ²
Number of islands:	1
Secchi depth:	2.8 m
Sounding device:	Meridata depth sounder

Figure 2 Bathymetric Survey Transects

Figure 3 Bathymetric Contours

Volume (by stratum and total):

Stratum	Volume (m ³)
0 - 1 m	114,779
1 - 2 m	84,701
2 - 3 m	48,095
3 - 4 m	17,959
4 - 5 m	2,311
5 m - max. depth	71
Total	267,916

4.2 Benchmark

The benchmark in Cerber Lake was indicated by an iron spike driven 75.3 cm above the water surface into the base of an old pine tree located approximately 10 m from shore on the northeast shore of the long southern arm of Ceber Lake. The spike itself is marked by fluorescent orange flagging tape, as is the surrounding area, for easy re-location (Plate 1). The coordinates for the benchmark, as recorded in the field by GPS, are 9.588883.6077755 (NAD83). The location of the benchmark in relation to the lake is indicated in Figure 4. Figure 5 depicts an air photo enlargement that also shows the benchmark's location.

The high water mark for this lake was not determined. However, the water level appeared to be near its highest point because exposed beaches and other normally submerged features were not evident.

4.3 Terrain Features

4.3.1 Immediate Shoreline

Cerber Lake is forested with pine and spruce trees which grow to the water's edge around the lake perimeter except for small areas where grassy meadows extend from the treeline to the water's edge. The littoral zone is augmented by abundant windfall (Plate 2) which provides excellent habitat for juvenile fish. The littoral area also possessed abundant gravel shoals that would present good spawning habitat. Furthermore, Cerber lake possesses a fairly complex shoreline with a small island and extensive embayments.

Figure 4 Location of Lake Inventory Sites

Figure 5 Air Photo Enlargement Showing Location of Benchmark

Plate 1 View of Benchmark

Plate 2 View of littoral area and Minnow Trap Sample Site #3

4.3.2 Surrounding Terrain

Cerber Lake is located approximately 21.9 km west by northwest of Smithers, just south of the much larger Hankin Lake. The surrounding terrain has considerable relief as the lake is bounded to the north by a large forested hill. The surrounding area is forested primarily with coniferous trees although extensive logging roads to the area indicate considerable logging activity. A recently constructed logging road, which is not documented on the MoF Recreation Map for the Bulkley Forest District, terminates approximately 1.5 km southeast of the lake. Plate 3 shows an aerial view of Cerber Lake and the surrounding terrain from the helicopter.

4.4 Stream Surveys

The outflow of Cerber Lake was surveyed using standard Department of Fisheries and Oceans (DFO)/Ministry of Environment, Lands and Parks (MoELP) stream survey methodology as outlined in Anonymous (1995a). A DFO/MoELP stream card was filled out for the investigated site and photocopies of these stream cards are included in Appendix I. Data from these stream cards were also entered into the DFO/MoELP stream survey digital data entry tool. Stream card summary reports are also included in Appendix I from the digital data entry tool.

Stream #1 (Watershed Code unknown)

Stream #1 is the only outlet of Cerber Lake which flows from the lake through a small grassy area (Plate 4) prior to descending through a steep, confined chute. The outlet's substrate exhibited an even mix of gravels and larges. The latter dominated in the steeper sections of the stream while the former dominated elsewhere. As the stream flows from the lake, it passes over a small 0.8 metre falls, 60 metres downstream (Plate 6). The stream then enters a steep chute section between 70 and 90 metres, where the channel drops a total of approximately 2.8 metres. A further 100 metres from the outlet, the stream passes over a 1.9 metre falls (Plate 7). This falls was considered to be a barrier to fish migration. As such, the stream sample site was located downstream of the lake, between 10 and 55 metres. Plates 8 and 9 depict views from the termini of the sample site while Plate 10 shows an example of the abundant vegetative cover that exists along this stream.

Overall, due to its high gradient (average = 24%) and the presence of potential and probable barriers to fish migration, Stream #1 does not present abundant salmonid spawning or rearing habitat.

Plate 3 View looking north of Cerber Lake from the helicopter.

Plate 4 View of outlet taken from the lakeshore.

Plate 5 Example of large rainbow trout (*Oncorhynchus mykiss*) mortality captured by gillnet.

Plate 6 View of 80 cm falls downstream of lake

Plate 7 View of 1.9 m high chute, 100 m downstream of lake

Plate 8 View of downstream limit of outlet sample site.

Plate 9 View of upstream limit of outlet sample site.

Stream #2 (Watershed Code unknown)

Stream #2 is the only apparent inlet to Cerber Lake. This stream drains a bog area approximately 300 m long through which no obvious channel was observed. The only channel observed flowed with a negligible discharge for 35 metres before it entered Cerber Lake (Plate 11). Due to the lack of any obvious channel upstream of the 35 metre point, this channel was not inventoried. Preliminary water chemistry observations indicated a water temperature of 5°C (air temp. = 7°C), a conductivity of 30 µS/cm and a pH of 8.0.

5. LAKE ACCESS AND AREA DEVELOPMENT

5.1 Access and Directions

Access to Cerber Lake for the current investigations was by helicopter. To reduce the time required for transporting field equipment, a nearest point pick-up was arranged with the helicopter charter company. The pick-up point was located approximately 26.4 km west of Smithers and was reached by driving south of Smithers to the Hudson Bay Mountain road, following the Hudson Bay Mountain road for approximately 10 km, then turning left onto the 7000 FSR heading west for 16.3 km prior to turning right onto 7600 FSR. The pick up point was located approximately 7.7 km northwest along the FSR 7600 road in the loading area of a clear-cut. All roads were navigable with two-wheel drive vehicle. Cerber Lake was only an eight minute helicopter flight from the clear cut, but was a 20 minute flight west by northwest from Smithers via the Toboggan Creek valley located north of Hudson Bay Mountain. Additionally, the Bulkley Forest District Recreation Map indicates that a trail network connects Cerber Lake with the 7600 FSR.

5.2 Road Type and Conditions

The road south from Smithers is paved but Hudson Bay Mountain road and all of the FSR roads are gravel.

5.3 Restrictions

The FSR roads are frequented by logging trucks so as a safety precaution, appropriate VHF radio channels should be monitored for logging truck activity. There were no aircraft restrictions applicable to Cerber Lake.

5.4 Resorts and Campsites

None is known.

5.5 Mining Claims

One claim (Tenn 5 - 305945) applies to the immediate area of the lake.

5.6 Timber Harvests

There has been some logging activity approximately 5 km to the southeast. However, forest cover maps do not indicate any planned logging activity in the immediate vicinity of Cerber Lake.

5.7 Waste Permits

None is known (Remington and Lough 1995).

5.8 Water Licenses

None is known (Remington and Lough 1995).

6. FLORA AND FAUNA

6.1 Aquatic Plants

Aquatic plants were identified in the field to genus with the aid of Prescott (1969) and Warrington (1994) and their distribution throughout the lake was recorded. Figure 6 summarizes the distribution of the three aquatic plants taxa recorded in the lake; horsetail (*Equisetum sp.*), *Potamogeton sp.*, and the water lily (*Nuphar sp.*). A variety of unidentified grasses were also noted along the shore.

6.2 Aquatic Invertebrates

Copepods (*Crustacea sp.*) were noted in significant abundance throughout the lake.

6.3 Wildlife Observations

Wildlife were not directly observed on or around Cerber Lake. Beaver activity was also not noted near the lake.

6.4 Summary of Rare and Endangered Species

No rare or endangered species were encountered in or around Cerber Lake.

Figure 6 Distribution of Aquatic Plant Communities

7. FISH POPULATION SAMPLING

7.1 Total Fish Catch Summary

Only two large (length range = 511 and 570 mm) adult rainbow trout (*Oncorhynchus mykiss*) were captured in Cerber Lake. Figure 7 shows the relationship between fork length and weight for these captured fish. The low abundance of fish in this lake is reflected in the very low average netting catch per unit effort (CPUE - #fish/100 m²/12 hour period) for this lake of 0.395. The CPUE for minnow trap and set line gear in this lake was 0.

7.2 Netting Record

The gillnetting sample record for Cerber Lake is shown in Table 1.

Table 1 Gillnet Summary

Site No.	Net Type	Date Set	Time Set	Date Lifted	Time Lifted	Soak Time (hr)	Depths (m)		CPUE
							Shallow	Deep	
1	floating	96/9/15	16:00	96/9/16	8:30	16:30	0-2	0-2	0.79
2	sinking	96/9/15	16:20	96/9/16	9:15	16:55	0-2	3-5	0

Notes:

- See Figure 4 for location of gillnet sample sites.
- CPUE = #fish/100 m²/12 hr period.

7.3 Minnow Trap Record

The minnow trap sample record for Cerber Lake is shown in Table 2.

Table 2 Minnow Trap Summary

Site No.	Gee Trap No	Date Set	Time Set	Depth (m)	Substrate	Date Lifted	Time Lifted	Soak Time	CPUE
3	1	96/9/15	15:20	0.5	Rock	96/9/16	9:37	18:17	0
4	2	96/9/15	15:23	0.5	Rock	96/9/16	9:40	18:17	0
5	3	96/9/15	15:30	0.25	Rock	96/9/16	9:30	18:00	0
6	4	96/9/15	15:33	0.25	Rock	96/9/16	9:33	18:00	0
7	5	96/9/15	15:40	0.5	Rock	96/9/16	9:35	17:55	0

Notes:

- See Figure 4 for location of minnow trap sample sites.
- CPUE = #fish/trap/12 hr period

Figure 7 Relationship Between Fork Length and Weight for Captured Fish

7.4 Set Line Record

The set line sample record for Cerber Lake is shown in Table 3.

Table 3 Set Line Summary

Site No.	Date Set	Time Set	Depth (m)	Substrate	Date Lifted	Time Lifted	Soak Time	CPUE
8	96/9/15	16:30	0-6	Unknown	96/9/16	8:15	15:45	0

Notes:

- See Figure 4 for location of set line sample site.
- Roe was still intact on all hooks upon retrieval of set line.
- CPUE = #fish/line/12 hr period.

7.5 Electrofishing Record

Electrofishing was conducted throughout the survey site in the outlet of Cerber Lake. Despite an electrofishing effort of 124 seconds applied evenly among the habitat units in the outlet, fish specimens were not captured.

7.6 Fish Data

The gear sampled this lake for a total of 139 hours and 39 minutes (not including 124 seconds of electrofishing). Only 2 fish were captured from the site number 1 in Cerber Lake. From each of these specimens, a scale was taken for aging and the adipose fin was removed for DNA analysis, all prior to measuring (fork length) and weighing the specimen. One of the specimens was a mortality upon removal from the gillnet (Plate 5) but the other was revived and released following sampling. The released specimen did not show any signs of bleeding from the gills and appeared to swim away vigorously.

Table 4 Fish Sampling and Biological Data

Site No.	Species Code	Fork Length (mm)	Weight (g)	Sex	Scale Sample No.	DNA Vial Sample No.	Age	Samples
1	RB	511	1620	F	e223692-1	e223692-1	R	AF, SC
1	RB	570	2584	M	e223692-2	e223692-2	R	AF, SC

Notes:

- See Figure 4 for location of net sample site.
- RB-rainbow trout (*Oncorhynchus mykiss*)
- Sex-M=male, F=female
- R-retrograde scale, could not be aged
- AF-Adipose fin clip for DNA analysis (DNA vial code is shown), SC-scale sample for age analysis.

The relationship between length and weight of the captured rainbow trout is depicted in Figure 7. Field observations suggest that the two specimens were of good health and their growth was not limited.

Scales were removed from the specimens but unfortunately, the scales were regenerate and age could not be determined. However, growth rings on the scales indicate that each fish had previously spawned which suggests that the specimens are at least several years old. Photocopies of fish scale microfiche prints are provided in Appendix II.

7.7 Fisheries Management Concerns

The rainbow trout captured in Cerber Lake appeared healthy suggesting that growth was not limited. Only two adult specimens were captured despite considerable sampling effort suggesting that the population is very small. The fish appear to have previously spawned so population densities are not too small so as to prevent spawning pair coupling. Based on the variable mesh size of the gillnets employed for this lake plus the use of five minnow traps, it is not likely that the sampling gear was size-selective. Future studies should, therefore, investigate the reason that despite the apparent occurrence of spawning in this lake, juveniles do not appear to exist. Furthermore, due to small fish population and the appearance of abundant food, this lake should also be reviewed for stocking potential.

7.8 History of Previous Surveys

Previous surveys of Cerber Lake do not appear to exist.

8. FIELD CONDITIONS AND WATER CHEMISTRY

The following is a summary of the limnological investigations of Cerber Lake.

Date: September 16, 1996 **Time:** 13:00
Limnology Station: LS **Maximum Depth:** 5.5 m
Seam Site: e223692 **Water Sampler Used:** Van Dorn
Laboratories Used

- 1) Elemental Research Inc.: #309-267 West Esplanade, North Vancouver, British Columbia, V7M 1A5.
- 2) Klohn-Crippen in-house laboratory
- 3) Chlorophyll *a* and Total Kjeldahl Nitrogen were measured by the CAEAL certified laboratory: Analytical Services Laboratories Ltd., 1988 Triumph St., Vancouver, British Columbia, V5L 1K5.

8.1 Field Conditions

The limnology of Cerber Lake was investigated on a cool sunny day. The remaining field conditions at the time of the limnological survey are summarized in Table 5.

Table 5 Field Conditions

Parameter Measured	Result	Method Used
Wind Velocity (m/s)	0	Estimation
Wind Direction	n/a	Observation
Air Temperature (°C)	8°C	Glass thermometer
Cloud Cover	10%	Observation
Surface Condition	smooth	Observation
Water Colour	brown/green	Observation
Water Clarity (m)	2.8	Secchi Disk

8.2 Water Chemistry

Water samples were removed from Cerber Lake at depths of 0.5 and 4 metres. There did not appear to be a thermocline in this lake (Section 8.3) so the latter depth was selected to sample limnological conditions near the lake bottom. The basic water chemistry data from the two sample depths are shown in Table 6 while Table 7 shows water nutrient data from the two sample depths. Laboratory summary reports for the Cerber Lake water quality are provided in Appendix II.

Table 6 Water Chemistry Summary.

Parameter Measured	Result (0.5 m)	Result (4 m)	Method Used
Dissolved Oxygen (mg/L)	11.8	9.5	YSI model 57 O ₂ meter
Water Temperature (°C)	12.2	11.7	YSI model 57 O ₂ meter
pH (field)	8.0	8.0	Oakpon pH tester-2
Specific Conductance (µS/cm)	30	40	Oakpon TDS tester
Chlorophyll <i>a</i> (mg/m ³)	0.61	0.77	See Section 3
Filterable Residue(ppm)	<1	<1	See Section 3
Dissolved Sodium (ppb)	2010	2090	See Section 3
Dissolved Magnesium (ppb)	4330	4540	See Section 3
Calcium (ppb)	7440	7880	See Section 3
Alkalinity (mg/L)	68.43	63.05	See Section 3
TDS (mg/L)	43.75	35.71	See Section 3

8.3 Water Nutrient Summary

Table 7 Summary of Available Phosphorus and Nitrogen

Parameter Measured	Result (0.5 m)	Result (4 m)	Method Used
NH ₃ (mg/L)	0.18	0.09	See Section 3
Total Dissolved Phosphorus (ppm)	0.0	0.0	See Section 3
Total Phosphorus (ppm)	0.17	0.04	See Section 3
Total Kjeldahl Nitrogen (ppm)	0.326	0.307	See Section 3
N:P Ratio	2.0	7.7	Average = 4.8

Notes:

- N:P ratio determined as:
$$\frac{\text{Total Kjeldahl Nitrogen}}{\text{Total Phosphorus}}$$

The nutrient data suggest that Cerber Lake is not phosphorus limited (i.e., N:P < 15) and also that the lake can be classified between an oligo-mesotrophic and a meso-eutrophic lake (Wetzel 1983) based only on the average lake total phosphorus concentration.

8.4 Oxygen and Temperature Data

Dissolved oxygen concentration and temperature were determined at 1 metre intervals from a vertical profile below the limnological station in Cerber Lake (Figure 4) on September 16, 1996. The data from this vertical profile are summarized in Table 8 and displayed in Figure 8. This figure shows that both temperature and dissolved oxygen decrease with depth but a thermocline is not evident. The oxygen profile also

demonstrates moderate clinograde characteristics (Wetzel 1983) suggesting that organic decomposition in the benthic zone regulates lake oxygen concentration.

Table 8 - Dissolved Oxygen Concentration and Temperature Data

Depth (m)	Dissolved Oxygen (ppm)	Temperature (°C)
0	11.8	12.2
1	11.8	11.8
2	11.8	11.8
3	11.8	11.8
4	9.5	11.8
5	4.86	11.7

Figure 8 Dissolved Oxygen and Temperature Profiles

9. SUMMARY AND RECOMMENDATIONS

Cerber lake is located approximately 21.9 km northwest of Smithers, just south of the much larger Hankin Lake. The maximum depth is 5.5 metres with mean depths and volumes of 2.1 metres and 267,916 m³, respectively. There are no shoal areas that would present a hazard to navigation. An abundance of fish habitat is provided by the lake, with its very complex shoreline, small bays and spawning habitat scattered along the shoreline. Only two fish specimens were captured in this lake and both were large, adult rainbow trout. Scales from these fish were regenerate (could not be aged) but growth rings suggested that each fish has previously spawned. Juvenile rainbows were not captured in the lake.

Cerber Lake's water chemistry is suitable for salmonids (Anon. 1996b) and dissolved oxygen remains above 8 mg/L in all depths of the lake except the area immediately above the sediment. Potential food sources for fish in this lake also appeared to be abundant. Overall, there is no obvious explanation for the apparently small fish population in this lake. Furthermore, due to the lack of captured juveniles, future studies should attempt to establish if juveniles are present in this lake. Future studies should also investigate this lake for potential stocking enhancement.

The combination of trail access to the lake from a nearby FSR, the large size of adults captured in this lake and the potential for stocking enhancement, suggest that this lake has untouched potential as a recreational fishing site. However, due to the large size of the rainbow trout in this system and their attractiveness as trophy fish, angler pressure should be monitored and regulated as necessary.

Richard Couture, R.P.Bio.
Project Manager

Greg Scarborough, B.Sc.
Aquatic Ecologist

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APPENDIX I

Stream Card Survey Information, Fish Collection Data Form and Lake Biophysical Data Form

Fish Collection Data Form

Card 1 of 1

Date (yy/mm/dd): 96/9/15-16
 Gazetted Name: n/a
 Lake/Stream/Wetland: Lake
 Sequence No.: n/a
 Watershed Code: n/a

Agency: Kohn-Crippen
 Alias: Cerber Lake
 Location: 21.9 km northwest of Smithers
 Weather: clam and sunny
 Reach #: n/a

Crew: GS/JS
 UTM: 9.589/91.6077763

Area Sampled: <u>n/a</u> Air Temp (C): <u>8</u> Water Temp (C): <u>12.2-11.7</u> EC ms/cm: <u>30-40</u>											
Site No.	Capture Method	Pass # or trap/net #	Species (code)	Mark or Tag No.	Length FL (mm)	Weight (g)	Fish #	Sex (code)	Maturity (code)	Activity (code)	Scale and DNA vial No.
1	GL	1	RB		511	1620	1	F	n/a	n/a	e223692-1
1	GL	1	RB		570	2584	2	M	n/a	n/a	e223692-2

- 1 Capture method: angler report (AR), angling (AG), creel census (CR), dead capture (DC), dip netting (DN), electroshocking (EL), gill netting (GN), minnow trapping (MT), seining (SN), swimming (SW), visual observation above water (VO), method unknown (UN).
- 2 Activity: migration (MI), spawning (S), incubation (I), rearing (feeding or resting) (R).
- 3a Level of life phase, Method 1: egg/alevin (E), fry (F), juvenile (J), adult (A) - or use Method 2.
- 3b Level of maturity, Method 2: egg/alevin (E), fry (F), immature (IM), maturing (MT), mature (M), spawning (SP), spent (ST).
- 4 Species codes: see manual.

Fish Collection Data Form

Card 1 of 1

Date (yy/mm/dd): 96/9/15-16
 Gazetted Name: n/a
 Lake/Stream/Wetland: Lake
 Sequence No.: n/a
 Watershed Code: n/a

Agency: Kohn-Crippen
 Alias: Cerber Lake
 Location: 21.9 km northwest of Smithers
 Weather: clam and sunny
 Reach #: n/a

Crew: GS/JS
 UTM: 9.589/91.6077763

Area Sampled: <u>n/a</u> Air Temp (C): <u>8</u> Water Temp (C): <u>12.2-11.7</u> EC ms/cm: <u>30-40</u>											
Site No.	Capture Method	Pass # or trap/net #	Species (code)	Mark or Tag No.	Length FL (mm)	Weight (g)	Fish #	Sex (code)	Maturity (code)	Activity (code)	Scale and DNA vial No.
1	GL	1	RB		511	1620	1	F	n/a	n/a	e223692-1
1	GL	1	RB		570	2584	2	M	n/a	n/a	e223692-2

- 1 Capture method: angler report (AR), angling (AG), creel census (CR), dead capture (DC), dip netting (DN), electroshocking (EL), gill netting (GN), minnow trapping (MT), seining (SN), swimming (SW), visual observation above water (VO), method unknown (UN).
- 2 Activity: migration (MI), spawning (S), incubation (I), rearing (feeding or resting) (R).
- 3a Level of life phase, Method 1: egg/alevin (E), fry (F), juvenile (J), adult (A) - or use Method 2.
- 3b Level of maturity, Method 2: egg/alevin (E), fry (F), immature (IM), maturing (MT), mature (M), spawning (SP), spent (ST).
- 4 Species codes: see manual.

APPENDIX II

Fish Scale Microfiche Prints

APPENDIX III

Water Chemistry Analysis

APPENDIX IV

Photograph Directory

Photo Survey Form 1 - Equipment Details

Survey Start Date: 13/09/1996
Survey end Date: 27/09/1996

Agency: Klohn-Crippen
Crew: GS/JS or GS/JC

Camera # 1

Make and Model: Ricoh LX-33W date	Lenses: A
Format: 35 mm film	

Camera # 2

Make and Model: Fuji Disposable	Lenses: A
Format: 35 mm film	

Lenses

Focal Length (mm)
A - fixed

Roll and/or Batch Details

Roll #	Camera #	Output Medium	Film Type	ISO
1	1	neg, print	colour	400
2	1	neg, print	colour	400
3	2	neg, print	colour	400
4	1	neg, print	colour	400
5	1	neg, print	colour	400
6	1	neg, print	colour	400
7	1	neg, print	colour	400
8	1	neg, print	colour	400

Date	Roll	Negative	Counter	NTS Map Sheet	Watershed Code	Description	Photodocumentation Form 1 Direction	Photodocumentation Form 2 Reach	Site	Picture Type	UTM Zone	Efield	Nfield	Ecorrect	Ncorrect	Crew	Focal Length	Scale
12/09/1996	1	4	4	93L10	460-7449-858	Gee Trap #1 in North L, note the lack of aquatic vegetation	NW			L						GS/JS	St	n/a
14/09/1996	1	5	5	93L10	460-7449-858	View west over the Bulkley Valley taken from above North L	W			WS						GS/JS	St	n/a
14/09/1996	1	6	6	93L10	460-7449-858	Panoramic of the south end of North L taken from the helicopter				L						GS/JS	Wd	n/a
14/09/1996	1	7	7	93L10	460-7449-858	North L Inlet looking upstream from the L	W	1		Ch	9			677930	6048686	GS/JS	St	n/a
14/09/1996	1	8	8	93L10	460-7449-858	Marsh located 110m upstream of North L Inlet	Up	1		Ch						GS/JS	St	n/a
14/09/1996	1	9	9	93L10	460-7449-858	Looking S from outlet of L that drains into North L (190m upstream from North L)	S	1		Ch						GS/JS	St	n/a
14/09/1996	1	10	10	93L10	460-7449-858	Looking upstream from downstream limit of North L Inlet site	Up	1	1	Ch						GS/JS	St	Folding ruler hanging in tree
14/09/1996	1	11	11	93L10	460-7449-858	Old cabin near North L outlet				O	9			647794	6049278	GS/JS	St	n/a
14/09/1996	1	12	12	93L10	460-7449-858	Example of the falls that cover the North L Outlet (falls are 1.2 m high, 140 m downstream from outlet)	Up	1		Ch						GS/JS	St	Folding ruler placed near top of falls
14/09/1996	1	13	13	93L10	460-7449-858	looking down chute section of North L outlet	Dn	1	1	Ch						GS/JS	St	n/a
12/09/1996	1	14	14	93L10	460-7449-858	90 cm high falls 90 m downstream from North L outlet	Up	1	1	Ch						GS/JS	St	Folding ruler
14/09/1996	1	16	16	93L10	460-7449-858	Just upstream of falls in #14: Bottom end of North L Outflow site	Up	1	1	Ch						GS/JS	St	n/a
14/09/1996	1	17	17	93L10	460-7449-858	Upstream limit of North L outflow site	Dn	1	1	Ch						GS/JS	St	n/a
14/09/1996	1	18	18	93L10	460-7449-858	North L outlet taken from L	E			L,Ch	9			647794	6049278	GS/JS	St	n/a
14/09/1996	1	19	19	93L10	460-7449-858	Panoramic (#1) of north end of North L	S			L						GS/JS	Wd	n/a
14/09/1996	1	20	20	93L10	460-7449-858	Panoramic (#2) of north end of North L	S			L						GS/JS	Wd	n/a
14/09/1996	1	21	21	93L10	460-7449-858	Panoramic (#3) of north end of North L	S			L						GS/JS	Wd	n/a
14/09/1996	1	22	22	93L10	460-7449-858	Panoramic (#1) of south end of North L	N			L						GS/JS	Wd	n/a
14/09/1996	1	23	23	93L10	460-7449-858	Panoramic (#2) of south end of North L	N			L						GS/JS	Wd	n/a
14/09/1996	1	24	24	93L10	460-7449-858	Panoramic (#3) of south end of North L	N			L						GS/JS	Wd	n/a
14/09/1996	1	25	25	93L10	460-7449-858	Panoramic (#4) of south end of North L	N			L						GS/JS	Wd	n/a
14/09/1996	1	26	26	93L10	460-7449-858	Benchmark in North L (note aquatic vegetation)	E			L	9			647878	6048791	GS/JS	St	n/a
14/09/1996	1	27	27	93L10	460-7449-858	Aerial view of North L from helicopter	W			WS						GS/JS	St	n/a
14/09/1996	1	28	28	93L10	460-7449-858	Aerial view of North L from helicopter	E			WS						GS/JS	St	n/a
14/09/1996	1	30	30	93L10	460-5177-361	Zodiac in Coppermine L on shore near old mine entrance	N			L						GS/JS	St	10'2" Zodiac
14/09/1996	1	31	31	93L10	460-5177-361	Panoramic (#1, E to W) of Coppermine L taken from mine site	NE			L						GS/JS	Wd	n/a
14/09/1996	1	32	32	93L10	460-5177-361	Panoramic (#2, E to W) of Coppermine L taken from mine site	N			L						GS/JS	Wd	n/a
14/09/1996	1	34	34	93L10	460-5177-361	Panoramic (#4, E to W) of Coppermine L taken from mine site	NW			L						GS/JS	Wd	n/a
14/09/1996	1	35	35	93L10	460-5177-361	Panoramic (#5, E to W) of Coppermine L taken from mine site	W			L						GS/JS	Wd	n/a
14/09/1996	1	35	35	93L10	460-5177-361	Old cabin near the outlet of Coppermine L	NW			WS						GS/JS	St	n/a
14/09/1996	1	37	37	93L10	460-5177-361	Sunset over Coppermine L	W			L						GS/JS	St	n/a
15/09/1996	2	0	1	93L10	460-5177-361	Coppermine inflow from the edge of Coppermine L	Up	1		Ch						GS/JS		
15/09/1996	2	1	2	93L10	460-5177-361	Benchmark in Coppermine L	W			L	9			647157	6048020	GS/JS	St	n/a

Date	Roll	Negative	Counter	NTS Map Sheet	Watershed Code	Description	Photodocumentation Direction	Photo Reach	Form2 Site	Picture Type	UTM Zone	Efield	Nfield	Ecorrect	Ncorrect	Crew	Focal Length	Scale
15/09/1996	2	2	3	93L10	460-5177-361	Coppermine L outflow taken from the lake, note the structure in background	n/a			L, Ch	9	647181	6047903			GS/JS	St	n/a
15/09/1996	2	3	4	93L10	460-5177-361	Upstream limit of Coppermine outflow stream site	Dn	1	1	Ch	9					GS/JS	St	n/a
15/09/1996	2	4	5	93L10	460-5177-361	Downstream limit of Coppermine L outlet	Up	1	1	Ch	9					GS/JS	St	n/a
15/09/1996	2	5	6	93L10	460-5177-361	Meadow below the downstream limit of Coppermine L outlet site	Dn	1		Ch	9					GS/JS	St	n/a
15/09/1996	2	6	7	93L10	460-5177-361	Coppermine L from helicopter	E			WS	9					GS/JS	St	n/a
15/09/1996	2	7	8	93L10	460-5177-361	North L form helicopter	N			WS	9					GS/JS	St	n/a
15/09/1996	2	8	9	n/a	n/a	Access (helicopter) to Ceber L from Smithers along Toboggan Creek	W			O	9					GS/JS	St	n/a
15/09/1996	2	9	10	n/a	n/a	Toboggan Glacier from helicopter	S			O	9					GS/JS	St	n/a
15/09/1996	2	10	11	93L13	n/a	Shoreline area where gee trap #2 was placed in Ceber L	NW			L	9					GS/JS	St	n/a
15/09/1996	2	11	12	93L13	n/a	Shoreline area where gee trap #3 was placed in Ceber L	NE			L	9					GS/JS	St	n/a
15/09/1996	2	13	13	93L13	n/a	Tree fall to which gee trap #4 was attached in Ceber L	E			L	9					GS/JS	St	n/a
15/09/1996	2	15	15	93L13	n/a	Shoreline area where gee trap #1 was placed in Ceber L. Note the aquatic vegetation	E			L	9					GS/JS	St	n/a
16/09/1996	2	17	17	93L13	n/a	Ceber L from helicopter (south end)	W			WS	9					GS/JS	St	n/a
16/09/1996	2	16	16	93L13	n/a	Ceber L from helicopter (north end)	NW			WS	9					GS/JS	St	n/a
15/09/1996	2	18	18	93L10	n/a	Rainbow trout mortality from gillnet in Ceber L	n/a			Fi	9					GS/JS	St	10 L pail near fish's head
16/09/1996	2	19	19	93L13	n/a	Greg releasing rainbow that remained alive in gillnet in Ceber L	n/a			Fi	9					GS/JS	St	Person
16/09/1996	2	20	20	93L10	n/a	Example of invertebrate (copepods) size found in Ceber L (also in North L and Coppermine L)	n/a			O	9					GS/JS	St	persons hand
16/09/1996	2	21	21	93L13	n/a	Ceber L outlet taken from lakeshore	S			L, Ch	9			589191	6077763	GS/JS	St	person and boat
16/09/1996	2	22	22	93L13	n/a	80 cm falls in Ceber L outlet, 60 m from lake	Up	1		Ch	9					GS/JS	St	folding ruler
16/09/1996	2	23	23	93L13	n/a	Habitat and vegetation at Ceber outlet sample site. Note the abundant tree fall	Up	1	1	Ch	9					GS/JS	St	n/a
16/09/1996	2	24	24	93L13	n/a	1.8 m chute in Ceber outflow 100 m from outlet	Up	1		Ch	9					GS/JS	St	field book with scale in inches
16/09/1996	2	25	25	93L10	n/a	Downstream limit of Ceber L outlet site	Up	1	1	Ch	9					GS/JS	St	n/a
16/09/1996	2	26	26	93L13	n/a	Upstream limit of Ceber L outlet site. Note the extensive cover	Dn	1	1	Ch	9					GS/JS	St	n/a
16/09/1996	2	27	27	93L13	n/a	Ceber L inlet from the shoreline	E, Up	1		L, Ch	9			582282	6078000	GS/JS	St	n/a
16/09/1996	2	28	28	93L13	n/a	Benchmark in tree near Ceber L (note flagging tape)	N			L	9	588883	6077755			GS/JS	St	n/a
16/09/1996	2	29	29	93L13	n/a	Jack Mould L from helicopter. Note access rode in foreground and background	N			WS	9					GS/JS	St	n/a
16/09/1996	2	30	30	93L13	n/a	Jack Mould L inlet taken from the boat. Note beaver dam in background	E			L, Ch	9					GS/JS	St	n/a
16/09/1996	2	31	31	93L13	n/a	Beaver dam in Jack Mould outlet, seperates lake from channel	W, Up	1		L, Ch	9					GS/JS	St	n/a
16/09/1996	2	32	32	93L13	n/a	1.2 m high beaver dam at Jack Mould L outlet	W, Up	1		L, Ch	9					GS/JS	St	note book with scale in inches

Date	Roll	Negative	Counter	NTS Map Sheet	Watershed Code	Description	Photodocumentation Direction	Platform	Form2 Reach	Site	Picture Type	UTM Zone	Efield	Nfield	Ecorrect	Ncorrect	Crew	Focal Length	Scale
16/09/1996	2	33	33	93L13	n/a	1.2 m high beaver dam in Jack Mould L outlet	W				L, Ch	9					GS/JS	St	n/a
16/09/1996	2	35	35	103I16	440-6382-012	Mulwain Creek from helicopter, also represents access to Mulwain L	NW				WS	9					GS/JS	St	n/a
16/09/1996	2	36	36	103I16	n/a	Mulwain L from helicopter	n/a				WS	9					GS/JS	St	n/a
17/09/1996	3	0	1	103I16	n/a	Moose near Mulwain L inlet	E				O	9					GS/JS	St	n/a
17/09/1996	3	1	2	103I16	n/a	Moose near Mulwain L inlet	E				O	9					GS/JS	St	n/a
17/09/1996	3	2	3	103I16	n/a	Jamie under zodiac seeking protection from the rain	NW				L, O	9					GS/JS	St	10'6" boat & person
17/09/1996	3	3	4	103I16	n/a	Benchmark in Mulwain L	SE				L	9					GS/JS	St	n/a
17/09/1996	3	4	5	103I16	n/a	Unsurveyed inflow into Mulwain L	Up				L, Ch	9					GS/JS	St	n/a
17/09/1996	3	5	6	103I16	440-6382-012	Small 0.7 m falls in Mulwain L inlet	Up	1			Ch	9					GS/JS	St	note book with scale in inches
17/09/1996	3	6	7	103I16	440-6382-012	Downstream limit of Mulwain L outlet sample site	Up	1	1		Ch	9					GS/JS	St	30 m tape
17/09/1996	3	7	8	103I16	440-6382-012	Upstream limit of Mulwain L outlet sample site	Dn	1	1		Ch	9					GS/JS	St	n/a
17/09/1996	3	8	9	103I16	440-6382-012	Example of a ground water pool discharging into Mulwain L outlet. Pool was 0.7 m above main channel	Dn	1			Ch	9					GS/JS	St	notebook with scale in inches
17/09/1996	3	9	10	103I16	440-6382-012	Large meadow at 500m mark of Mulwain L outlet	Dn	1			Ch	9					GS/JS	St	n/a
17/09/1996	3	10	11	103I16	440-6382-012	Example of meandering outlet of Mulwain L	Up	1			Ch	9					GS/JS	St	n/a
17/09/1996	3	12	13	103I16	440-6382-012	Small 100m x 30m lake immediately downstream of Mulwain L	Dn	1			Ch	9					GS/JS	St	n/a
17/09/1996	3	11	12	103I13	440-6382-012	Area where large tributary empties into Mulwain L outlet	Dn	1			Ch	9					GS/JS	St	n/a
1006/9/17	3	13	14	103I16	n/a	Mulwain L outlet taken from stream section	Up, N	1			L, Ch	9					GS/JS	St	boat in background
17/09/1996	3	14	15	103I16	n/a	Downstream limit of Mulwain L inlet sampling site	Up	1	1		Ch	9					GS/JS	St	notebook with scale in inches
17/09/1996	3	15	16	103I16	n/a	Upstream limit of Mulwain L inlet sample site	Dn	1	1		Ch	9					GS/JS	St	rain jacket and 30m tape
17/09/1996	3	16	17	103I16	n/a	End of Mulwain L Inlet at a groundwater pool	Up	1			Ch	9					GS/JS	St	n/a
17/09/1996	3	17	18	103I16	n/a	Example of how Mulwain L inlet meanders through meadow	Up	1			Ch	9					GS/JS	St	20x13 cm field chemistry case placed in grass
17/09/1996	3	18	19	103I16	n/a	Mulwain L inlet taken from edge of lake	Up	1			Ch	9					GS/JS	St	n/a
17/09/1996	3	19	20	103I16	n/a	Gee trap #5 in Mulwain L	E				L	9					GS/JS	St	n/a
17/09/1996	3	24	24	103I16	n/a	Mulwain L from helicopter	NW				WS	9					GS/JS	St	n/a
18/09/1996	4	3	3	93L13	n/a	Old beaver dam across outlet of Bud L (doesn't hold water)	Dn	1			Ch	9			586644	6078191	GS/JS	St	n/a
18/09/1996	4	4	4	93L13	n/a	Second old beaver dam across Bud L outlet (doesn't hold water)	Up	1			Ch	9					GS/JS	St	30m tape coil
18/09/1996	4	5	5	93L13	n/a	Example of how Bud L outlet flows through a meadow area immediately downstream of outlet	Up	1	1		Ch	9					GS/JS	St	person (6')
18/09/1996	4	6	6	93L13	n/a	2 m high chute/falls in Bud L outlet	Up	1	1		Ch	9					GS/JS	St	Person (6')
18/09/1996	4	7	7	93L13	n/a	Looking upstream from 500 m mark on Bud L outlet	Up	1			Ch	9					GS/JS	St	Person (6')
18/09/1996	4	8	8	93L13	n/a	Upstream limit of Bud L outlet sample site	Dn	1	1		Ch	9					GS/JS	St	n/a
18/09/1996	4	9	9	93L13	n/a	Downstream limit of Bud L outlet sample site	Dn	1	1		Ch	9					GS/JS	St	n/a
18/09/1996	4	10	10	93L13	n/a	GS electrofishing in Bud L outlet	Up	1	1		Ch	9					GS/JS	St	Person (6'1")

Date	Roll	Negative	Counter	NTS Map Sheet	Watershed Code	Description	Photodocumentation Platform Direction	Form 2 Reach	Site	Picture Type	UTM Zone	Efield	Nfield	Ecorrect	Ncorrect	Crew	Focal Length	Scale
18/09/1996	4	11	11	93L13	n/a	Possible inlet to Bud L, no water or channel visible though	Up, XS			Ch	9					GS/JS	St	n/a
18/09/1996	4	12	12	93L13	n/a	Gee trap #1 in Bud L	S			L	9					GS/JS	St	Gee trap
18/09/1996	4	13	13	93L13	n/a	Gee trap # 3 in Bud L	NW			L	9					GS/JS	St	n/a
18/09/1996	4	14	14	93L13	n/a	Second possible inlet to Bud L. No water or channel visible	Up, S			L, Ch	9					GS/JS	St	n/a
18/09/1996	4	15	15	93L13	n/a	Shoreline area where gee trap # 5 was placed in Bud L	E			L	9					GS/JS	St	n/a
18/09/1996	4	16	16	93L13	n/a	Benchmark in Bud L. Note old high water marks	SW			L	9					GS/JS	St	n/a
19/09/1996	4	17	17	93L13	n/a	Gee trap # 5 in Bud L	E			L	9					GS/JS	St	n/a
19/09/1996	4	18	18	93L13	n/a	Gee trap # 4 in Bud L	N			L	9					GS/JS	St	Gee trap
19/09/1996	4	19	19	93L13	n/a	Shoreline area of Bud L where gee trap #2 was placed	W			L	9					GS/JS	St	n/a
19/09/1996	4	21	21	93L13	n/a	Example of invertebrates in Bud L	n/a			O	9					GS/JS	St	Note book with scale in inches
19/09/1996	4	22	22	93M3	n/a	Netalzul Meadow L from the helicopter	n/a			WS	9					GS/JC	St	n/a
19/09/1996	4	23	23	93M3	n/a	Netalzul Meadow L from the helicopter	n/a			WS	9					GS/JC	St	n/a
19/09/1996	4	24	24	93M3	n/a	Netalzul Meadow L from the helicopter	n/a			WS	9					GS/JC	St	n/a
19/09/1996	4	25	25	93M3	n/a	Netalzul Meadow L from the helicopter	n/a			WS	9					GS/JC	St	n/a
19/09/1996	4	26	26	93M3	n/a	Netalzul Meadow L from the helicopter	n/a			WS	9					GS/JC	St	n/a
19/09/1996	4	27	27	93M3	n/a	Netalzul Meadow L from the helicopter	n/a			WS	9					GS/JC	St	n/a
21/09/1996	4	28	28	93M3	n/a	Netalzul Meadow L from helicopter				WS	9					GS/JC	St	n/a
21/09/1996	4	29	29	93M3	n/a	Helicopter landing area and Netalzul Meadow inlet	Up, E			L, Ch	9					GS/JC	St	n/a
21/09/1996	4	30	30	93M3	n/a	Example of fish caught in gillnets	n/a			Fi	9					GS/JC	St	Zodiac pontoon
21/09/1996	4	31	31	93M3	n/a	Tadpoles and invertebrates captured in gee trap # 1 in Netalzul Meadow L	n/a			Fi	9					GS/JC	St	Zodiac pontoon
21/09/1996	4	32	32	93M6	n/a	Netalzul L form N end, zodiac in foreground	S			L	9					GS/JC	St	10'6" zodiac
22/09/1996	4	34	34	93M6	n/a	Netalzul L from helicopter, approached from SE end	NW			WS	9					GS/JC	St	n/a
22/09/1996	4	35	35	93M6	n/a	Netalzul L from helicopter, approached from SE end	NW			WS	9					GS/JC	St	n/a
22/09/1996	4	36	36	93M6	n/a	Netalzul L from helicopter, view of N end of lake	NW			WS	9					GS/JC	St	n/a
22/09/1996	5	1	1	93M6	n/a	Gee trap #1 in Netalzul L	N			L	9					GS/JC	St	n/a
22/09/1996	5	2	2	93M6	n/a	Example of large lake trout captured in Netalzul L gillnets	n/a			Fi	9					GS/JC	St	n/a
22/09/1996	5	3	3	93M6	n/a	Example of abundant tree-fall in Netalzul L	n/a			L	9					GS/JC	St	n/a
22/09/1996	5	4	4	93M6	n/a	Netalzul L inflow. Note abundant cover	Up	1		Ch	9					GS/JC	St	n/a
22/09/1996	5	5	5	93M6	n/a	Upstream limit of Netalzul L inflow sample site	Dn	1	1	Ch	9					GS/JC	St	n/a
22/09/1996	5	6	6	93M6	n/a	Downstream limit of Netalzul L inflow sample site	Up	1	1	Ch	9					GS/JC	St	n/a
22/09/1996	5	7	7	93M6	n/a	Panoramic (#1) looking N from lake's S end	N			L	9					GS/JC	St	n/a
22/09/1996	5	8	8	93M6	n/a	Panoramic (#2) looking N from lake's S end	N			L	9					GS/JC	St	n/a
22/09/1996	5	9	9	93M6	n/a	Panoramic (#3) looking N from lake's S end	N			L	9					GS/JC	St	10'6" zodiac

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22/09/1996	5	10	10	93M6	n/a	Netalzul L outflow from lake's edge	S		1		L, Ch	9			624878	6128369	GS/JC	St	n/a
22/09/1996	5	11	11	93M6	n/a	Example of habitat in Netalzul L outlet	Bd		1	1	Ch	9					GS/JC	St	n/a
22/09/1996	5	12	12	93M6	n/a	lake downstream from Netalzul L	Dn		1		Ch, L	9					GS/JC	St	n/a
22/09/1996	5	13	13	93M6	n/a	Downstream limit of Netalzul lake outlet sample site	Up		1	1	Ch	9					GS/JC	St	note book
22/09/1996	5	14	14	93M6	n/a	Upstream limit of Netalzul L outflow sample site	Dn		1	1	Ch	9					GS/JC	St	notebook
22/09/1996	5	15	15	93M6	n/a	Benchmark in Netalzul lake	NE				L	9					GS/JC	St	n/a
23/09/1996	5	16	16	93M3	n/a	Helicopter access to Camp L	SW				WS	9					GS/JC	St	n/a
23/09/1996	5	17	17	93M3	n/a	Camp L from helicopter	NE				WS	9					GS/JC	Wd	n/a
23/09/1996	5	18	18	93M3	n/a	Gee trap #1 in Camp L	n/a				L	9					GS/JC	St	Side of zodiac
23/09/1996	5	19	19	93M3	n/a	Shoreline area near which gee trap #2 is placed	SW				L	9					GS/JC	St	n/a
23/09/1996	5	20	20	93M3	n/a	Tree fall where gee trap #3 is placed in Camp L	n/a				L	9					GS/JC	St	Side of zodiac
23/09/1996	5	21	21	93M3	n/a	Tree fall where gee trap #4 was placed in Camp L	n/a				L	9					GS/JC	St	n/a
23/09/1996	5	22	22	93M3	n/a	LOD where gee trap #5 was placed in Camp L	n/a				L	9					GS/JC	St	n/a
23/09/1996	5	23	23	93M3	n/a	Panoramic (#1) of Camp L from N end	NW				L	9					GS/JC	Wd	n/a
23/09/1996	5	24	24	93M3	n/a	Panoramic (#2) of Camp L from N end	NW				L	9					GS/JC	Wd	n/a
23/09/1996	5	25	25	93M3	n/a	Panoramic (#3) of Camp L from N end	W				L	9					GS/JC	Wd	n/a
23/09/1996	5	26	26	93M3	n/a	Panoramic (#4) of Camp L from N end	W				L	9					GS/JC	Wd	n/a
23/09/1996	5	27	27	93M3	n/a	Panoramic (#5) of Camp L from N end	SW				L	9					GS/JC	Wd	n/a
23/09/1996	5	28	28	93M3	n/a	Panoramic (#6) of Camp L from N end	SW				L	9					GS/JC	Wd	n/a
23/09/1996	5	29	29	93M3	n/a	Panoramic (#7) of Camp L from N end	S				L	9					GS/JC	Wd	n/a
23/09/1996	5	30	30	93M3	n/a	Dock for the hunting camp on Camp L	NE				L	9					GS/JC	St	n/a
23/09/1996	5	31	31	93M3	n/a	Road crossing on Camp L outlet, also bottom of sample site	Bd		1	1	Ch	9					GS/JC	St	n/a
23/09/1996	5	32	32	93M3	n/a	Upstream limit of Camp lake outlet sample site	Dn		1	1	Ch	9					GS/JC	St	n/a
23/09/1996	5	33	33	93M3	n/a	Black wolf shot the previous night at hunting camp	n/a				O	9					GS/JC	St	n/a
23/09/1996	5	34	34	93M3	n/a	Benchmark on Camp lake	NE				L	9	626275	6122305			GS/JC	St	n/a
23/09/1996	5	35	35	93M3	n/a	Camp L inlet taken from shoreline	NW				L, Ch	9	626275	6122305			GS/JC	St	n/a
23/09/1996	5	36	36	93M3	n/a	Camp L outlet taken from boat	S				L, Ch	9					GS/JC	St	n/a
23/09/1996	6	1	1	93M7	480-4026	Young bear swimming across Clota L	W				L	9					GS/JC	St	n/a
23/09/1996	6	2	2	93M7	480-4026	Young bear swimming across Clota L	W				L	9					GS/JC	St	n/a
24/09/1996	6	3	3	93M10		Twin L from floatplane	S				WS	9					GS/JC	Wd	n/a
24/09/1996	6	4	4	93M10		Twin L from floatplane	S				WS	9					GS/JC	Wd	n/a
24/09/1996	6	5	5	93M7	480-4026	Clota L from floatplane	S				WS	9					GS/JC	Wd	n/a
24/09/1996	6	6	6	93M7	480-4026	Clota L from floatplane	S				WS	9					GS/JC	Wd	n/a
24/09/1996	6	7	7	93M7	480-4026	Clota L from floatplane	S				WS	9					GS/JC	Wd	n/a
24/09/1996	6	8	8	93M7	480-4026	Clota L from floatplane	S				WS	9					GS/JC	Wd	n/a
24/09/1996	6	9	9	93M7	480-4026	Floatplane leaving Clota L	S				L	9					GS/JC	St	n/a
24/09/1996	6	10	10	93M7	480-4026	Shoreline area where gee trap #1 was placed in Clota L	W				L	9					GS/JC	St	n/a
24/09/1996	6	11	11	93M7	480-4026	Shoreline area where gee trap #2 was placed in Clota L	W				L	9					GS/JC	St	n/a
24/09/1996	6	12	12	93M7	480-4026	Shoreline area where gee trap #3 was placed in Clota L	W				L	9					GS/JC	St	n/a
24/09/1996	6	13	13	93M7	480-4026	Shoreline area where gee trap #4 was placed in Clota L	SE				L	9					GS/JC	St	n/a
24/09/1996	6	14	14	93M7	480-4026	Shoreline area where gee trap #5 was placed in Clota L	E				L	9					GS/JC	St	n/a
24/09/1996	6	15	15	93M7	480-4026	Panoramic (#1) showing marshy section between main and secondary basins of Clota L	SE				L	9					GS/JC	Wd	n/a

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24/09/1996	6	16	16	93M7	480-4026	Panoramic (#2) showing marshy section between main and secondary basins of Clota L	SE				L	9					GS/JC	Wd	n/a
24/09/1996	6	17	17	93M7	480-4026	Extensive marshy area surrounding Clota L inlet	N				L	9					GS/JC	St	n/a
24/09/1996	6	18	18	93M7	480-4026	Beaver dam at Clota L outlet	N	1			L, Ch	9	651187	6139961			GS/JC	St	notebook
24/09/1996	6	19	19	93M7	n/a	Upstream limit of Clota L outlet sample site	Dn	1	1		Ch	9					GS/JC	St	n/a
24/09/1996	6	20	20	93M7	n/a	Downstream limit of Clota L outlet sample site	Up	1	1		Ch	9					GS/JC	St	n/a
24/09/1996	6	21	21	93M7	n/a	Substrate of Clota L outlet sample site	Bd	1	1		Ch	9					GS/JC	St	Electrofisher backpack
24/09/1996	6	22	22	93M7	480-4026	Benchmark in Clota L	E				L	9	651606	6140218			GS/JC	St	n/a
24/09/1996	6	23	23	93M7	480-4026	Panoramic (#1) of Clota L from S end going E to W	SE				L	9					GS/JC	St	n/a
24/09/1996	6	24	24	93M7	480-4026	Panoramic (#2) of Clota L from S end going E to W	S				L	9					GS/JC	St	n/a
24/09/1996	6	25	25	93M7	480-4026	Panoramic (#3) of Clota L from S end going E to W	SW				L	9					GS/JC	St	n/a
24/09/1996	6	26	26	93M7	480-4026	Example of water lilies that are found throughout N, S, and W shores of Clota L	n/a				L	9					GS/JC	St	notebook with scale in inches
24/09/1996	6	27	27	93M7	480-4026	Panoramic (#1) of Clota L from N end going W to E	NW				L	9					GS/JC	St	Equipment on zodiac
24/09/1996	6	28	28	93M7	480-4026	Panoramic (#2) of Clota L from N end going W to E	NW				L	9					GS/JC	St	Equipment on zodiac
24/09/1996	6	29	29	93M7	480-4026	Panoramic (#3) of Clota L from N end going W to E	N				L	9					GS/JC	St	n/a
24/09/1996	6	30	30	93M7	480-4026	Panoramic (#4) of Clota L from N end going W to E	NE				L	9					GS/JC	St	n/a
24/09/1996	6	31	31	93M7	480-4026	Panoramic (#5) of Clota L from N end going W to E	NE				L	9					GS/JC	St	n/a
24/09/1996	6	32	32	93M7	480-4026	Example of tree fall and macrophyte habitat along shoreline of Clota L	W				L	9					GS/JC	St	n/a
24/09/1996	6	33	33	93M7	480-4026	GS on top of beaver lodge at N end of Clota L	W				L	9					GS/JC	St	n/a
25/09/1996	6	34	34	93M10	n/a	Gee trap #2 in Twin L	E				L	9					GS/JC	St	Gee trap
25/09/1996	6	35	35	93M10	n/a	Habitat in which gee trap #3 was placed in Twin L	n/a				L	9					GS/JC	St	n/a
25/09/1996	6	36	36	93M10	n/a	Gee trap #4 in Twin L	S				L	9					GS/JC	St	Gee trap
25/09/1996	6	37	37	93M10	n/a	Gee trap #5 in Twin L	n/a				L	9					GS/JC	St	Bow of zodiac
25/09/1996	7	1	1	93M10	n/a	Example of the number of fish caught in Twin L gillnets	n/a				L	9					GS/JC	St	Side of zodiac
25/09/1996	7	2	2	93M10	n/a	Only accessible site on Twin L inlet	Dn	1	1		Ch	9					GS/JC	St	n/a
25/09/1996	7	3	3	93M10	n/a	Only accessible site on Twin L inlet	Up	1	1		Ch	9					GS/JC	St	n/a
25/09/1996	7	4	4	93M10	n/a	Twin L inlet from lake shore: inaccessible	Dn, W	1			Ch, L	9	640730	6154528			GS/JC	St	n/a
25/09/1996	7	5	5	93M10	n/a	Panoramic (#1) of Twin L from S end	NE				L	9					GS/JC	St	n/a
25/09/1996	7	6	6	93M10	n/a	Panoramic (#2) of Twin L from S end	N				L	9					GS/JC	St	n/a
25/09/1996	7	7	7	93M10	n/a	Panoramic (#3) of Twin L from S end	N				L	9					GS/JC	St	n/a
25/09/1996	7	8	8	93M10	n/a	Panoramic (#4) of Twin L from S end	NW				L	9					GS/JC	St	n/a
25/09/1996	7	9	9	93M10	n/a	Panoramic (#5) of Twin L from S end	W				L	9					GS/JC	St	n/a
25/09/1996	7	10	10	93M10	n/a	Twin L outlet from boat	SE	1			L	9	640837	6154539			GS/JC	St	
25/09/1996	7	11	11	93M10	n/a	Panoramic (#1) of Twin L from N end going W to S	W				L	9					GS/JC	St	n/a
25/09/1996	7	12	12	93M10	n/a	Panoramic (#2) of Twin L from N end going W to S	W				L	9					GS/JC	St	n/a
25/09/1996	7	13	13	93M10	n/a	Panoramic (#3) of Twin L from N end going W to S	SW				L	9					GS/JC	St	n/a
25/09/1996	7	14	14	93M10	n/a	Panoramic (#4) of Twin L from N end going W to S	S				L	9					GS/JC	St	n/a

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25/09/1996	7	15	15	93M10	n/a	Panoramic (#5) of Twin L from N end going W to S	S			L	9					GS/JC	St	n/a
25/09/1996	7	16	16	93M7	n/a	Moose on shoreline of Boucher L. Note abundant macrophytes	E			L	9					GS/JC	St	n/a
26/09/1996	7	17	17	93M7	n/a	N end of Boucher L from helicopter	n/a			WS	9					GS/JC	St	n/a
26/09/1996	7	18	18	93M7	n/a	Boucher L from helicopter. Note old lake in top right corner	S			WS	9					GS/JC	St	n/a
26/09/1996	7	19	19	93M7	n/a	Looking NW from center of lake showing aquatic plant coverage	NW			L	9					GS/JC	St	n/a
26/09/1996	7	20	20	93M7	n/a	Habitat in which gee trap #1 was placed in Boucher L	n/a			L	9					GS/JC	St	n/a
26/09/1996	7	21	21	93M7	n/a	Habitat in which gee trap #2 was placed in Boucher L	n/a			L	9					GS/JC	St	bow of zodiac, gee trap
26/09/1996	7	22	22	93M7	n/a	Habitat in which gee trap #3 was placed in Boucher L	n/a			L	9					GS/JC	St	Gee trap
26/09/1996	7	23	23	93M7	n/a	Habitat in which gee trap #4 was placed in Boucher L	n/a			L	9					GS/JC	St	n/a
26/09/1996	7	25	25	93M7	n/a	Habitat in which gee trap #6 was placed in Boucher L	n/a			L	9					GS/JC	St	n/a
26/09/1996	7	26	26	93M7	n/a	Inlet to Boucher L. Note the 2 beaver dams	E			L, Ch	9			653205	6147248	GS/JC	St	n/a
26/09/1996	7	27	27	93M7	n/a	Another angle showing the aquatic vegetation infestation of Boucher L	E			L	9					GS/JC	St	n/a
26/09/1996	7	28	28	93M7	n/a	Boucher L outlet from boat	S			L, Ch	9			653289	6146103	GS/JC	St	n/a
26/09/1996	7	29	29	93M7	n/a	Beaver lodge 80 m from Boucher L outlet	S			L	9					GS/JC	St	n/a
26/09/1996	7	30	30	93M10	n/a	Upstream limit of Boucher L outlet sample site	Dn	1	1	Ch	9					GS/JC	St	notebook
26/09/1996	7	31	31	93M10	n/a	Downstream limit of Boucher L outlet sample site	Up	1	1	Ch	9					GS/JC	St	30m tape
26/09/1996	7	32	32	93M10	n/a	Example of habitat at Boucher L outlet sample site	Bd	1	1	Ch	9					GS/JC	St	30m tape
26/09/1996	7	33	33	93M10	n/a	Marsh above beaver dam at Boucher L inlet: not surveyed	E	1		L, Ch	9					GS/JC	St	n/a
26/09/1996	7	34	34	93M10	n/a	Beaver dam in Boucher L inlet	E	1		L, Ch	9					GS/JC	St	n/a
26/09/1996	7	35	35	93M10	n/a	Benchmark in Boucher L	E			L	9	653247	6146464			GS/JC	St	n/a
26/09/1996	7	36	36	93M10	n/a	Panoramic (#1) of Boucher L from S end going E to W	NE			L	9					GS/JC	St	n/a
26/09/1996	7	37	37	93M10	n/a	Panoramic (#2) of Boucher L from S end going E to W	N			L	9					GS/JC	Wd	n/a
26/09/1996	8	1	5	93M10	n/a	Panoramic (#3) of Boucher L from S end going E to W	N			L	9					GS/JC	Wd	n/a
26/09/1996	8	2	6	93M10	n/a	Panoramic (#4) of Boucher L from S end going E to W	N			L	9					GS/JC	Wd	n/a
26/09/1996	8	3	7	93M10	n/a	Panoramic (#5) of Boucher L from S end going E to W	N			L	9					GS/JC	Wd	n/a
26/09/1996	8	4	8	93M10	n/a	Panoramic (#6) of Boucher L from S end going E to W	NW			L	9					GS/JC	Wd	n/a
26/09/1996	8	5	9	93M10	n/a	Panoramic (#7) of Boucher L from S end going E to W	NW			L	9					GS/JC	Wd	n/a
26/09/1996	8	6	10	93M10	n/a	Panoramic (#8) of Boucher L from S end going E to W	NW			L	9					GS/JC	Wd	n/a
26/09/1996	8	7	11	93M10	n/a	Panoramic (#1) of Boucher L from N end going W to E	SW			L	9					GS/JC	Wd	n/a
26/09/1996	8	8	12	93M10	n/a	Panoramic (#2) of Boucher L from S end going W to E	S			L	9					GS/JC	Wd	n/a
26/09/1996	8	9	13	93M10	n/a	Panoramic (#3) of Boucher L from S end going W to E	SE			L	9					GS/JC	Wd	n/a
27/09/1996	8	11	15	93L10	n/a	Unnamed L from helicopter	E			WS	9					GS/JC	St	n/a
27/09/1996	8	12	15	93L10	n/a	S end of Unnamed L from helicopter including meandering inlet	E			WS	9					GS/JC	St	n/a

Date	Roll	Negative	Counter	NTS Map Sheet	Watershed Code	Description	Photodocumentation Direction	Platform	Form2 Reach	Site	Picture Type	UTM Zone	Efield	Nfield	Ecorrect	Ncorrect	Crew	Focal Length	Scale
27/09/1996	8	15	18	93L10	n/a	Gee trap #3 in littoral habitat of Unnamed L	E				L	9					GS/JC	St	Gee trap
27/09/1996	8	16	19	93L10	n/a	Littoral habitat of Unnamed L in which gee trap #4 was placed	S				L	9					GS/JC	St	n/a
27/09/1996	8	17	20	93L10	n/a	Unnamed L outlet including beaver lodge to right. Gee trap #5 placed at edge of dam	N				L	9	647527	6166191			GS/JC	Wd	n/a
27/09/1996	8	18	21	93L10	n/a	Gee trap #4 in Unnamed L	W				L	9					GS/JC	St	Gee trap
27/09/1996	8	19	22	93L10	n/a	View from behind 1m high beaver dam at Unnamed L outlet	S	1			L	9					GS/JC	St	30m tape roll
27/09/1996	8	20	23	93L10	n/a	Second beaver dam 20m below first in Unnamed L outlet	S	1			Ch	9					GS/JC	St	n/a
27/09/1996	8	21	24	93L10	n/a	Third beaver dam below second in Unnamed L outlet	S	1			Ch	9					GS/JC	St	n/a
27/09/1996	8	22	25	93L10	n/a	Fourth beaver dam below third in Unnamed L outlet	S	1			Ch	9					GS/JC	St	30m tape roll
27/09/1996	8	23	26	93L10	n/a	Downstream limit of Unnamed L outlet sample site	Up	1	1		Ch	9					GS/JC	St	30m tape roll
27/09/1996	8	24	27	93L10	n/a	Upstream limit of Unnamed L outlet sample site	Dn	1	1		Ch	9					GS/JC	St	30m tape roll
27/09/1996	8	25	28	93L10	n/a	GS electrofishing in Unnamed L outlet	XS	1	1		Ch	9					GS/JC	St	Person (6'1")
27/09/1996	8	26	29	93L10	n/a	Example of habitat in Unnamed L outlet sample site	Bd	1	1		Ch	9					GS/JC	St	Person (6'1")
27/09/1996	8	27	30	93L10	n/a	Beaver dam in Unnamed L inlet	Up, S	1			Ch, L	9					GS/JC	St	Person and notebook
27/09/1996	8	28	31	93L10	n/a	Benchmark in Unnamed L	E				L	9	651565	6054572			GS/JC	St	n/a
27/09/1996	8	29	32	93L10	n/a	Littoral habitat of Unnamed L in which gee trap #1 was placed	E				L	9					GS/JC	St	n/a
27/09/1996	8	30	33	93L10	n/a	Littoral habitat of Unnamed L in which gee trap #2 was placed	E				L	9					GS/JC	St	n/a
27/09/1996	8	32	35	93L10	n/a	Marshy area of Unnamed L Inlet: inaccessible by boat	S	1			WS, Ch	9					GS/JC	St	n/a