

RECONNAISSANCE INVENTORY OF

DAMSUMLO LAKE

WATERSHED CODE 480-0278-657-01

SURVEY DATES : AUGUST 23 - 25, 1996

*BASINE R
SHEENA C
DAMSUMLO C*

Prepared for:

MINISTRY OF ENVIRONMENT, LANDS AND PARKS

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1. SUMMARY

Damsumlo Lake is located in the Kispiox Forest District, 75 km north of the town of Hazelton. Reconnaissance inventory of the lake was made August 23 - 25, 1996. The lake covers 103.3 surface hectares, is roughly triangular in shape and mostly shallow (mean and maximum depths of 3.6 m and 16.5 m). It lies 940 m above sea level and drains via Damsumlo Creek to Shed in Creek in the Skeena watershed. Access was achieved by floatplane from Tyhee Lake in Telkwa. The closest road is located 2 km north of the lake.

During the survey the lake was stratified. The thermocline was located between 8 m and 12 m in the deepest basin. Dissolved oxygen also declined at this depth. The lake is neutral and has very low specific conductance. Nitrogen and phosphorus concentrations indicate oligotrophy and the N : P ratio suggests that phosphorus likely limits primary productivity. Chlorophyll *a* concentration in the surface water implies very low phytoplankton standing crop at time of survey.

The Damsumlo Lake fish community was sampled with two standard experimental multi-mesh gillnets (one floating and one sinking) and five Gee-type minnow traps baited with salmon roe. Inlets and the outlet stream were sampled for fish presence by electrofishing. No fish were captured in the lake, its inlets or outlet. No signs of fish activity were observed during the survey. The near surface zooplankton were indicative of fish absence from Damsumlo Lake.

The lake outlet stream and 5 inlet channels were examined for fisheries potential. Three third order streams flow into Damsumlo Lake. Many of the streams flow over cobble and boulder substrate and flow appears perennial in most. Habitats suitable for salmonid spawning and rearing habitats were present in some of the channels. Smaller channels contained barriers which would seasonally obstruct fish passage.

Damsumlo Lake is pristine, highly aesthetic and fairly remote. Moose, waterfowl and abundant sign of both were observed. No evidence of recreational use was seen during the survey. The lake's remoteness suggests only fly-in recreational use. This survey should satisfy resource agencies that the inlets and near-lake outlet reaches of Damsumlo Lake are non-fish bearing streams under the Forest Practices Code. Access management status is not recommended at this time.

2. INTRODUCTION

This document was prepared to fulfil requirements of Service Contract CSK 2043 between Joseph S. DeGisi and the Province of British Columbia for the term of July 22, 1996 to March 31, 1997. The contract was funded by Forest Renewal BC and administered by the Ministry of Environment, Lands and Parks, Fisheries Branch, Skeena Region.

The report presents the results of a reconnaissance level "Fish and Fish Habitat Inventory" of Damsumlo Lake performed to the current standards provided by the Resource Inventory Committee (RIC). In addition to the lake inventory as per the contract terms of reference, inlets and the outlet were surveyed to 500 channel metres from the lake. Damsumlo Lake is located in the Kispiox Forest District, 75 km north of the town of Hazelton. A search of Ministry files revealed no previous survey for Damsumlo Lake and its tributaries though a FISS entry exists for Damsumlo Lake.

The field component of the survey was carried out by Joseph DeGisi (crew leader) and Chris Schell (assistant) August 23 – 25, 1996. Chris Schell, Joe Jazvac and Jay Leopkey contributed to data compilation. Chris Schell and Joseph DeGisi co-authored this report. Stream cards, photographs and negatives, field notes, lab reports and all other materials associated with this survey were deposited with the Ministry of Environment, Lands and Parks, Fisheries Branch, Skeena Region.

3. DATA ON FILE

Location	<u>√</u>	Dissolved Oxygen Profile	<u>√</u>
Physical Data	<u>√</u>	Temperature Profile	<u>√</u>
Bench Mark	<u>√</u>	Netting Record	<u>√</u>
Terrain Features	<u>√</u>	Lake Catch Summary	<u>√</u>
Access	<u>√</u>	Fisheries Comments	<u>√</u>
Resorts & Campsites	<u>√</u>	Individual Fish Data	<u>-</u>
Other Developments	<u>√</u>	Fish Preserved	<u>-</u>
Obstructions and Pollutants	<u>√</u>	Stomach Analysis	<u>-</u>
Special Restrictions	<u>√</u>	Scale Reading	<u>-</u>
Aquatic Plants	<u>√</u>	History of Previous Surveys	<u>√</u>
Wildlife Observations	<u>√</u>	Location of Inventory Sites	<u>√</u>
Miscellaneous Comments	<u>√</u>	Photograph Directory	<u>√</u>
Lake Drainage	<u>√</u>	Appendices	<u>√</u>
Inlets/Outlets	<u>√</u>	Bathymetric Reduction	<u>√</u>
Water Chemistry	<u>√</u>	Contour Map	<u>√</u>

4. GEOGRAPHIC AND MORPHOLOGIC INFORMATION

4.1 Location

Survey Dates August 23- 25, 1996

Location 75 km north of the town of Hazelton

Elevation 940 m

Drainage Damsumlo C → Shedin C → Babine R → Skeena R

Watershed Code..... 480-0278-657-01

Latitude / Longitude 55° 55' 49'' / 127° 44' 46''

U.T.M..... 09.578358.6199047 (Watershed Atlas)

Biogeoclimatic Zone..... ICHmc1

N.T.S. Map..... 93M/13 (1:50,000 scale)

TRIM Map 93M.092 (1:20,000 scale)

Forest Region..... Prince Rupert

Forest District Kispiox

Management Unit 6-7

Native Land Claims Gitxsan Nation

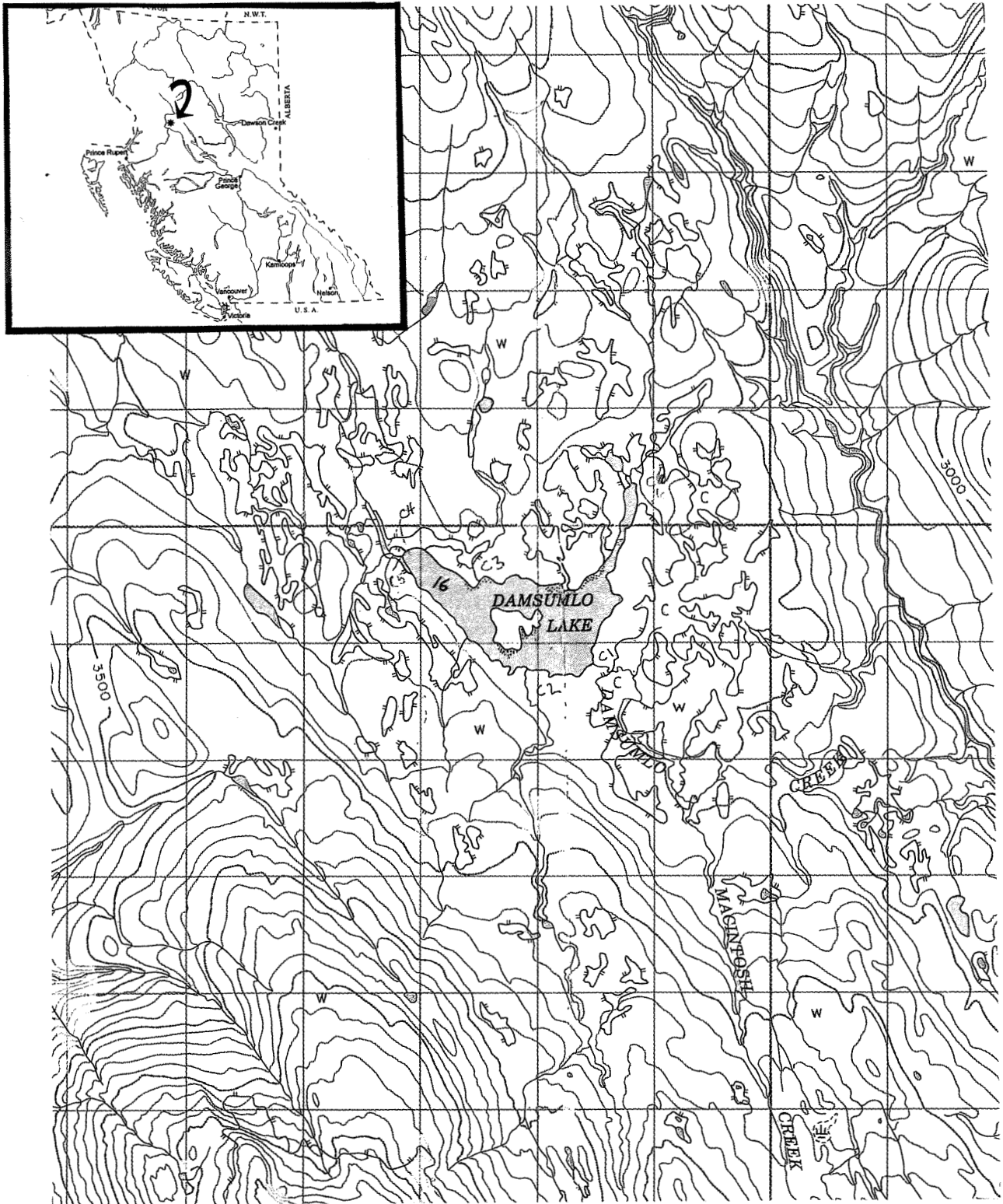


Figure 1. Damsumlo Lake and surrounding features, as depicted on NTS mapsheet 93M/13 (1:50,000 scale). Inset map shows the location within the province of British Columbia.

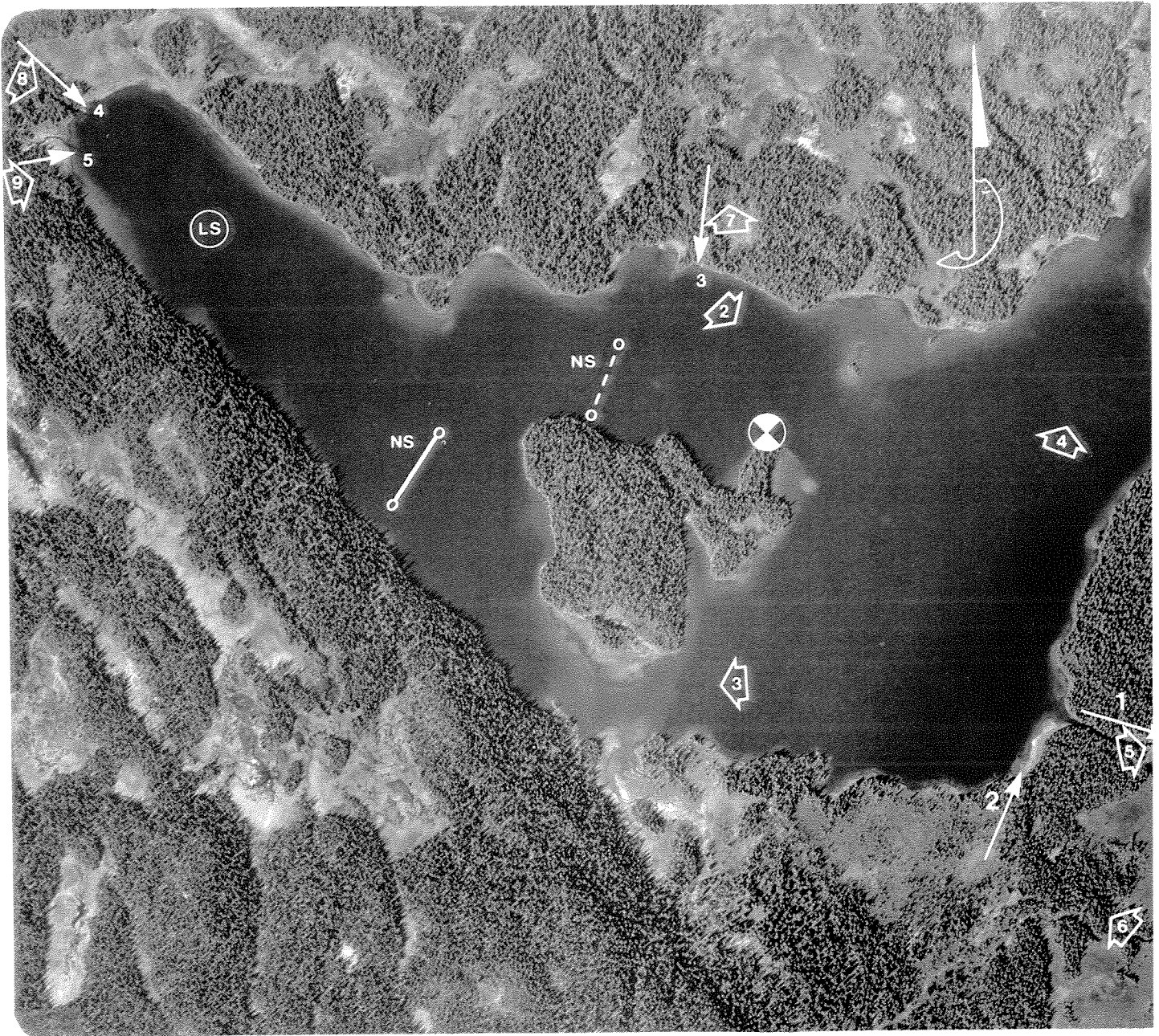


Figure 2. Damsumlo Lake except northeast arm. Enlargement from air photo.

LAKE: Damsumlo


WC: 480-0278-657-01


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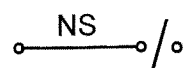
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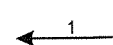
OUTLET UTM: 09.578358.6199047

LEGEND

 Benchmark

 Photo site, direction, number

 Floating/Sinking gillnet set

 Stream number, flow direction

LS Limnology station

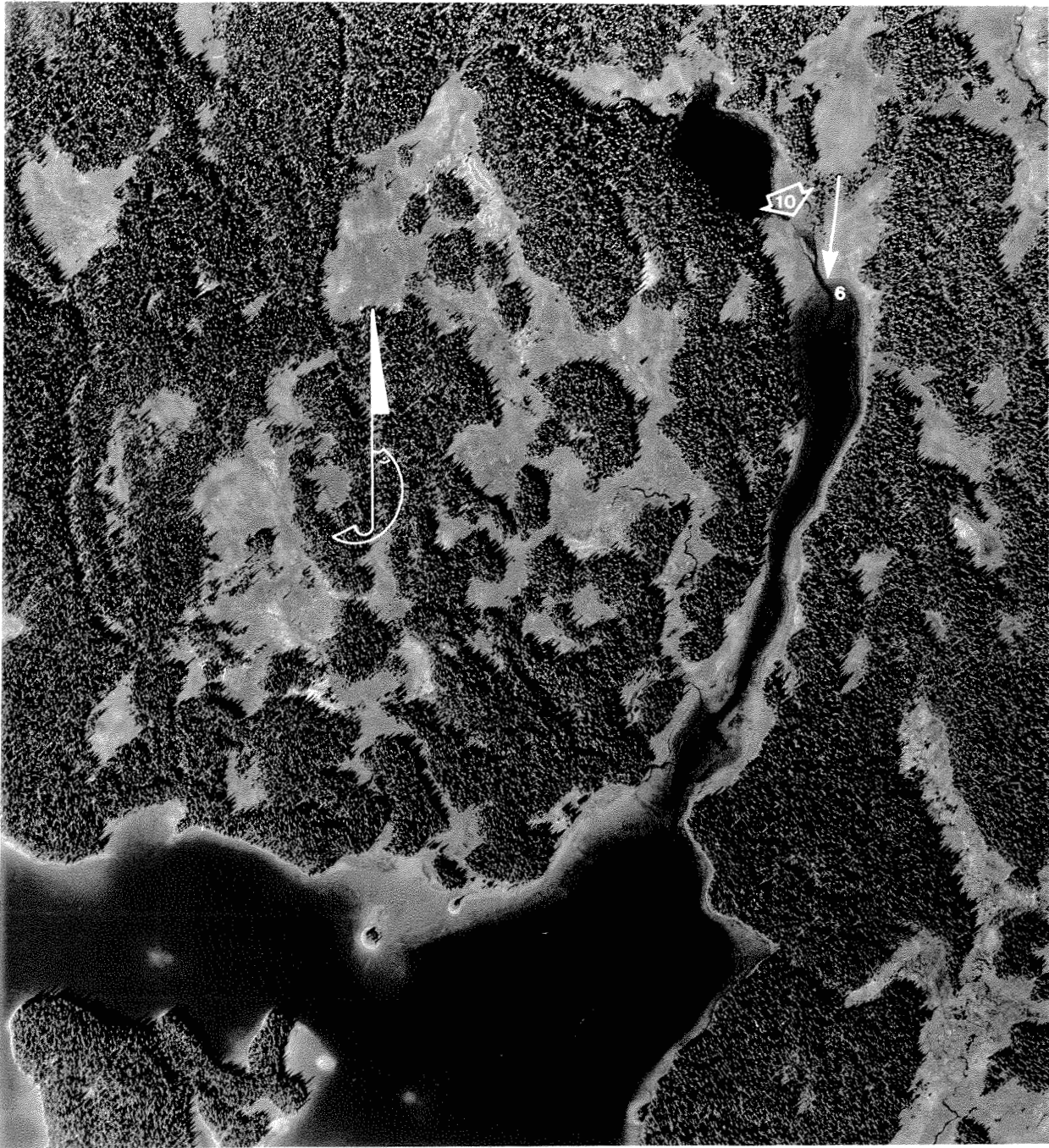


Figure 3. Northeast arm of Lake. Enlargement from air photo. LEGEND


LAKE: Damsumlo


WC: 480-0278-657-01

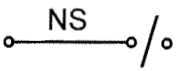
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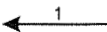
SCALE: 1 : 8 330

OUTLET UTM: 09.578358.6199047

 Benchmark

 Photo site, direction, number

 Floating/Sinking gillnet set

 Stream number, flow direction

LS Limnology station

4.2 Physical Data

Elevation	940 m	Elevation Source.....	NTS mapsheet
Water Surface Area.....	1033078 m ²	Area Above 6 m Contour.....	829039 m ²
Lake Drainage Area.....	40.3 km ²	Flushing Time.....	12.4 days
Shoreline Perimeter	7521 m	Volume	3325130 m ³
Number of Islands.....	3	Perimeter of Islands.....	1946 m
Maximum Depth	18.0 m	Mean Depth	3.63 m
Secchi Depth.....	4.8 m	Filterable Residue (T.D.S.)...	44 mg/L
Sounding Device	Lowrance X15A		

4.3 Benchmark

The benchmark was established in a 50 cm dbh subalpine fir 10 m from shore on the northeast point of the large island. An iron spike was placed in an orange circle painted on the tree trunk, 2.15 m above the current lake level. The location of the benchmark is shown in Figure 2. The high water mark was located 0.15 m above the current lake level.

4.4 Prior Surveys

A search of Skeena Region inventory files yielded no records for Damsumlo Lake, its outlet or inlets. The Fisheries Information Summary System (FISS) indicates that rainbow trout (*Oncorhynchus mykiss*) occur in Damsumlo Lake. No reference number was associated with the FISS entry, so the source is unknown.

4.5 Lake Drainage

Quantitative characteristics of the stream surveys and fish collection can be found on the stream survey forms in Appendix B and Table 1. Numbering of the streams (C1, C2, etc.) in this section corresponds to labels on Figures 2 and 3, and other figures and tables in this report. Six channels were examined.

- C1. Damsumlo Creek, WC 480-0278-657, outlet from the east shore of Damsumlo Lake at UTM 09.578475.6198816 (NAD27). Proposed classification S5. The 500 m length of channel surveyed contains two distinct reaches. For 100 m immediately downstream from the lake the stream bears riffle over large cobble and boulder bed material. Further downstream the channel meanders through sedge wetland. Flow is slower and non-turbulent here and bed material is organic fines. Discharge was estimated at 3.11 m³/s. Electrofishing for 141 seconds captured no fish.

- C2. Unnamed channel, WC 480-0278-657-453, inlet to the south shore of Damsumlo Lake at UTM 09.577900.6198775 (NAD27). Order 3, magnitude 15, drainage area 15.0 km², proposed classification S5. This channel branches upstream of the lake. One branch enters the lake and the other flows into C1. The branch that flows into the lake was surveyed. The channel has many side channels and shows evidence of a debris torrent or other high energy event. Large amounts of gravel are deposited on the bank. Gradient is 1–2 % and bed material is primarily cobble and boulder. Flow appears seasonally variable but not ephemeral. Discharge was estimated at 0.75 m³/s. Electrofishing for 116 seconds captured no fish.
- C3. Unnamed channel, WC 480-0278-657-493, inlet to the north shore of Damsumlo Lake at UTM 09.577500.6199525 (NAD27). Order 1, magnitude 1, drainage area 2.1 km², proposed classification S6. This channel drains several adjacent wetlands and was relatively acidic. Stage was medium and discharge appeared stable at 0.01 m³/s. Bed material is predominately organic fines. Gradient was estimated at 2.5 %. A small (0.6 m high) chute would form a seasonal barrier to fish passage 20 m from the lake. Visual observation during the survey revealed no fish.
- C4. Unnamed channel, WC pending, inlet to northwest bay of Damsumlo Lake at UTM 09.576867.6199800 (NAD27). Order 3, magnitude 6, drainage area 12.5 km², proposed classification S5. The channel meanders near the lake although it is more confined further upstream. The stream offers mostly riffle and run over cobble substrate. Gradient was estimated at 3 % and stage appeared high at 0.52 m³/s discharge. Electrofishing for 180 seconds captured no fish.
- C5. Damsumlo Creek, WC 480-0278-657, inlet to the northwest bay of Damsumlo Lake at UTM 09.576850.6199750 (NAD27). Order 2, magnitude 2, drainage area 1.5 km², proposed classification S6. Channel is flooded with lake water to 100 m from the lake. Upstream of this, gradient is relatively moderate (5-6.5 %) and the flow plunges over several debris dams which would form seasonal barriers to fish passage. Bed material was dominated by larges. The channel drains several wetlands and flow appears perennial. Discharge at the time of survey was estimated at 0.02 m³/s. Electrofishing for 98 seconds captured no fish.
- C6. Unnamed channel, WC 480-0278-657-434, inlet to the northeast arm of Damsumlo Lake at UTM 09.578800.6200425 (NAD27). Order 3, magnitude 7, drainage area 5.3 km², proposed classification S5. The channel borders several wetlands and drains them via many small seepage channels. Alders close the canopy over the channel in many locations. The stream contains primarily riffle and run over cobble and boulder substrate. Flow appeared perennial and stage was medium at the time of survey, with an estimated discharge of 0.19 m³/s. Electrofishing for 211 seconds captured no fish.

The channels of Damsumlo Lake contain mostly cobble and boulder substrate but good spawning gravels are located in the outlet and some of the inlets. Salmonid rearing potential would be good to excellent in the outlet where it meanders through the sedge wetland.

4.6 Terrain and Vegetation

4.6.1 Immediate Shore

Shoreline substrate is cobble, except in bays where it is primarily organic fines. Sedges, alder and willow vegetate a 5 to 10 m wide band which separates the lakeshore from the surrounding mature forest. Sedge wetlands occur at the ends of the northeast and northwest arms, and at the west end of the south shore. Sweepers are present but not abundant and generally do not impede shore access.

4.6.2 Surrounding Country

Damsumlo Lake is located within the Nass variant of the Moist Cold subzone of the Interior Cedar - Hemlock biogeoclimatic zone. The surrounding country is relatively flat and forested by a mix of spruce and subalpine fir. Rolling hills rise in the mid-distance to form the foothills of mountain ranges to the south and east. Wetland meadows are present in many places adjacent to the lake, but most are not visible from the lake's surface. Views from the lake are dominated by peaks and snowfields of the Atna Range, and the rock of Shelf Ridge.

5. ACCESS, DEVELOPMENTS AND LAND USE

5.1 Access

Access to the lake was by DeHavilland Otter from Tyhee Lake in Telkwa, a 125 km flight. The approach was made from the east. The crew disembarked at the small forested island northeast of the large island.

5.2 Development and Land Use

5.2.1 Resorts and Campsites

The survey crew camped on the small forested island northeast of the main island. Brush clearing was required and the shoreline was flooded and littered with waterfowl droppings. No cabins or campsites were observed by the survey crew.

5.2.2 Mining Claims

No evidence of mining claims or mineral exploration were observed during the survey. Omineca Mining Division four-post registration files for the locale showed no claims. No placer staking is allowed in this region of BC.

5.2.3 Timber Harvest

No evidence of timber harvest was visible from the lake surface. Damsumlo Lake lies within the Repap - Carnaby operating area, in the Kispiox TSA. A logging road is planned for construction 2 km north of the lake. No cutblocks were located within the Damsumlo Lake catchment area at the time of survey. The closest planned cutblock will be 1.5 km northeast of the lake and is scheduled for harvest in 1997. Four additional cutblocks are planned within 5 km north of the lake in 1997 – 1998. All the aforementioned cutblocks are located in the catchment area of Damsumlo Lake.

5.2.4 Waste Permits

A search of the provincial waste management database (WASTE) showed no active effluent permits in the watershed of Damsumlo Lake.

5.2.5 Water Permits

A search of Skeena Region water permit files yielded no records for Damsumlo Lake.

5.2.6 Obstructions and Pollutions

No definite evidence of past or current beaver activity was observed. The pond north of the northeast arm may have originally been created by a beaver dam.

5.2.7 Recreation Resource Inventory

The latest Forest Service Recreation Resource Inventory for the Kispiox Forest District was completed in June 1994. IGDS-format coding for the polygon which includes the lake is:

X1E8E3

ajcB1

1

ROS status is thus "Primitive". Note that although the "feature-related recreational activities" code includes angling, there were no fish captured in Damsumlo Lake, its inlets or outlet.

5.2.8 Special Regulations and Restrictions

None known; none listed in the BC Freshwater Angling Regulations synopsis for 1996.

5.2.9 Comments

Damsumlo Lake has very high aesthetic value due to its pristine setting and outstanding views of the Atna Range and Shelf Ridge. A partially submerged fuel drum was found in the outlet, and two very old saw-cut logs were found near C4. No other evidence of human activity was observed during the survey.

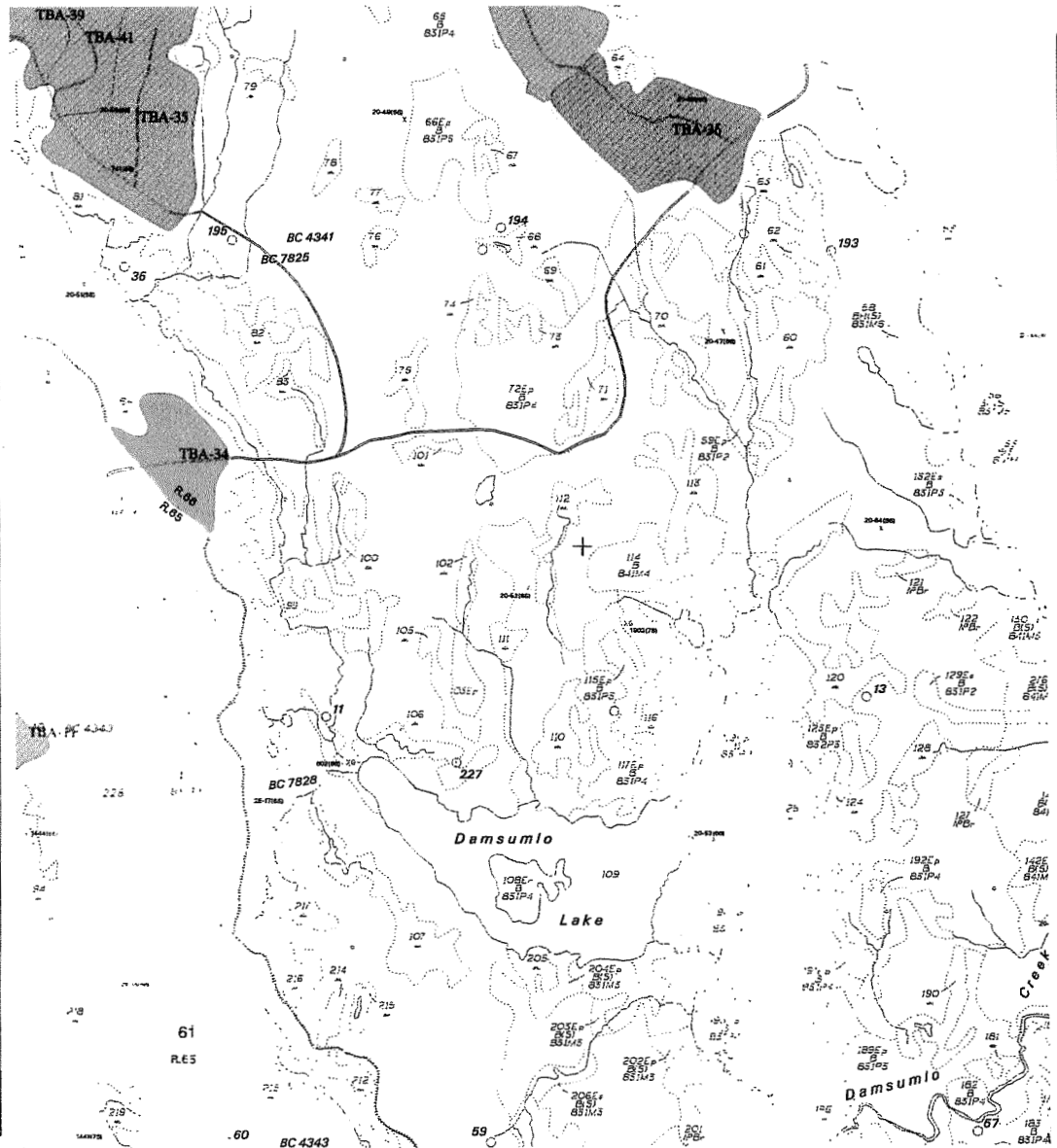
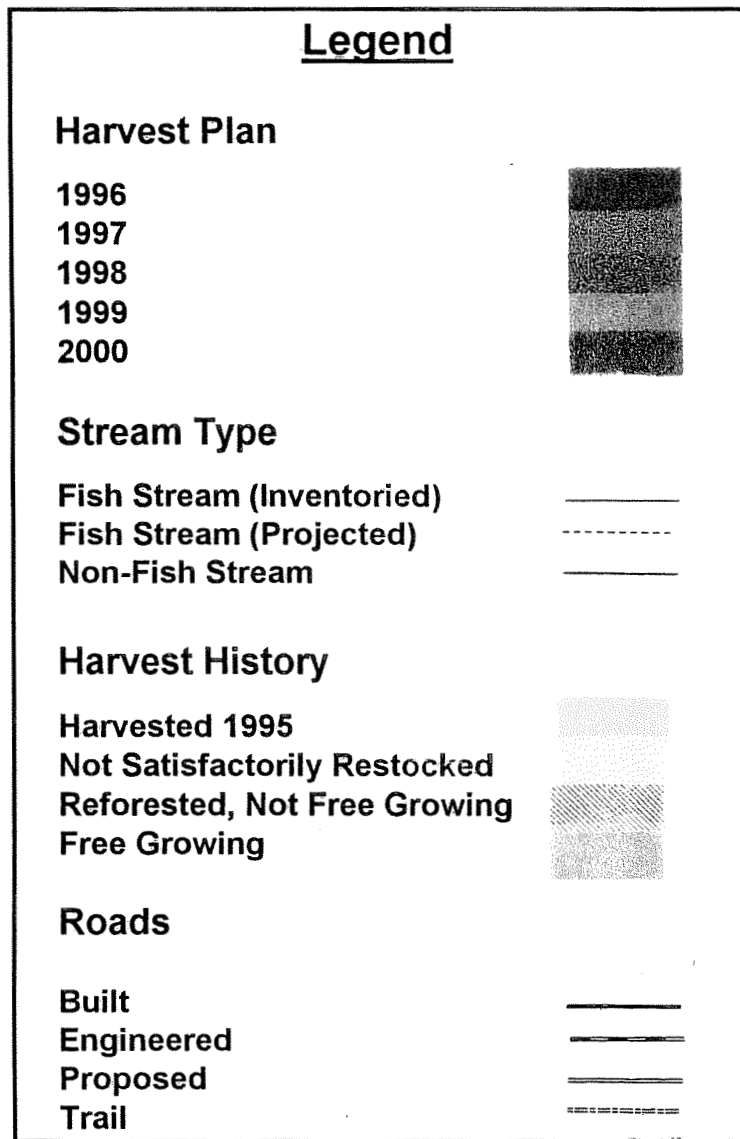


Figure 4. Planned cutblocks within the Damsumlo Lake area. Reproduced with permission from Repap, Carnaby Division.

6. FISH POPULATION SAMPLING

Details of fish population sampling in Damsumlo Lake and its inlets and outlet are given in Table 1. The raw data were recorded on RIC standard form "Fish Collection Method Information Form" which is reproduced in Appendix C. No fish were captured in Damsumlo Lake, its inlets or outlet channel. No sign of fish activity was seen during the survey.

Table 1. Fish sampling effort for all methods used at Damsumlo Lake and its inlet-outlet streams, August 23 - 25, 1996. **Water Body** gives the location where the gear was fished, where Lake = Damsumlo Lake; and C1, C2 etc. are streams numbered as in Section 4.5. **Date** is set date for gear fished overnight. **Capture Effort** gives the time in minutes for which the gear was deployed. **Depth** unit is metres. GN(S)/GN(F) = MOE / RIC standard experimental sinking/floating gillnets, length 91.2 m and depth 2.4 m with panels (in order) of 25, 76, 51, 89, 38, and 64 mm mesh. Sinking net set was made with small mesh close to shore. See Figures 2 and 3 for exact set locations and orientation. MT = Gee-type minnow trap baited with salmon roe; EL = electrofishing; VO = visual observation.

Water Body	Capture Method	Site or Trap #	Date	Set Time	Haul Time	Capture Effort	Depth
Lake	GN(F)	-	96/08/23	2040	0700	620	0-2.4
Lake	GN(S)	-	96/08/23	2050	0715	625	0-5
Lake	MT	1	96/08/24	0900	1150	1610	0.3
Lake	MT	2	96/08/24	0925	1155	1590	0.5
Lake	MT	3	96/08/24	1110	1158	1488	0.4
Lake	MT	4	96/08/24	1125	1202	1477	0.4
Lake	MT	5	96/08/24	1235	1205	1410	0.4
C1	EL	1	69/08/24	-	-	2.4	-
C2	EL	1	96/08/24	-	-	1.9	-
C3	VO	1	96/08/24	-	-	-	-
C4	EL	1	96/08/25	-	-	3.0	-
C5	EL	1	96/08/25	-	-	1.6	-
C6	EL	1	96/08/25	-	-	3.5	-

7. LIMNOLOGICAL SAMPLING

Limnological sampling was conducted at midday on August 25, 1996 at the Damsumlo Lake limnology station labelled on Figure 2. The survey was performed under clear skies with a light southeasterly wind creating calm surface conditions. Raw data and associated information were recorded on the RIC standard "Lake Biophysical Data Form" which is reproduced in Appendix D. Water samples were collected at 0.0 m, 10.0 m and 16.0 m depths, apportioned into aliquots for general chemistry and metals analysis, and shipped to Zenon Laboratories on ice for processing. Zenon's records show that the Damsumlo Lake samples were received on August 27, 1996 within the 72 hr RIC standard time frame for water sample transport.

7.1 Stratification

The oxygen - temperature profile of Damsumlo Lake on August 25, 1996 is shown in Figure 5. The lake was stratified at time of survey. The thermocline was located between 8 m and 12 m. Substantial near-surface warming was also evident. Dissolved oxygen was depleted below 8 m though the hypolimnion was not anoxic.

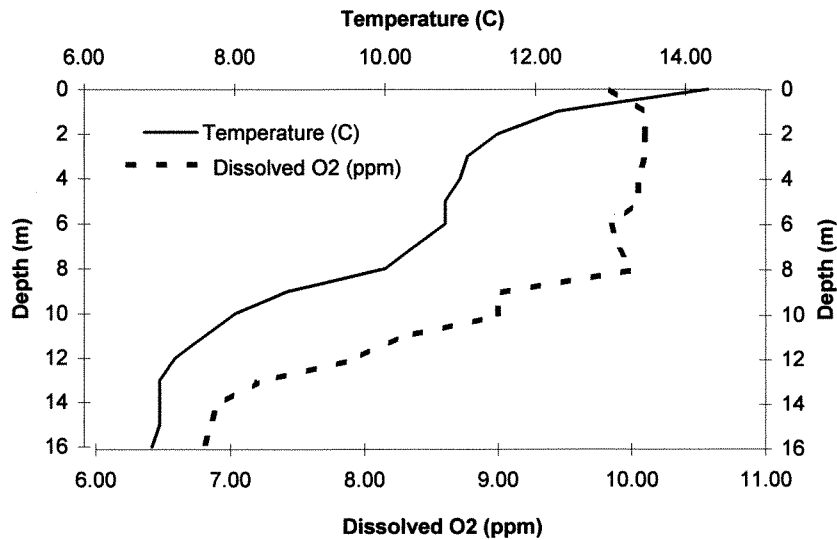


Figure 5. Temperature and dissolved O₂ profiles for Damsumlo Lake on August 25, 1996. The sampling device was a YSI 57 temperature/oxygen meter. Sample interval was 1 m.

Table 2. Water chemistry parameters estimated by Zenon Laboratories. Samples were collected at the limnology station labelled in Figure 2. Each sample was collected by a single cast of a 3.2 L non-metallic Van Dorn bottle on August 25, 1996. MDC = minimum detectable concentration for the analytic method.

Parameter	Shallow	Thermocline	Deep	Unit	MDC	Method
Time of Day	13:45	13:40	13:35	h	-	-
Depth	0.0	10.0	16.0	m	-	-
pH	7.3	7.1	6.9	pH	0.1	Automated pH Meter
Specific Conductance	30	27	25	uS/cm	1	Cond.Meter Siebold
Residue Filterable 1.0u (TDS)	44	32	36	mg/L	4	Grav; Subsamp Buch 105C
Alkalinity Phen. 8.3	< 0.5	< 0.5	< 0.5	mg/L	0.5	Automated Electrometer
Alkalinity Total 4.5	15.7	14.2	13.3	mg/L	0.5	Automated Electrometer
Carbonate	< 0.5	< 0.5	< 0.5	mg/L		Calculated Result
Bicarbonate	19.1	17.3	16.2	mg/L		Calculated Result
Hydroxide	< 0.5	< 0.5	< 0.5	mg/L		Calculated Result
Organic Nitrogen - Total	0.11	0.15	0.14	mg/L		Calculated Result
Total Kjeldahl Nitrogen	0.11	0.15	0.14	mg/L	0.04	HgSO4 Dig.Auto.Colour.
Total Nitrogen	0.11	0.15	0.16	mg/L		Calculated Result
Ammonia Nitrogen	< 0.005	< 0.005	< 0.005	mg/L	0.005	Berthelot Reaction
Nitrate+Nitrite (N)	< 0.02	< 0.02	0.02	mg/L	0.02	Auto. Cadmium Reduction
Nitrate Nitrogen Dissolved	< 0.02	< 0.02	< 0.02	mg/L		Calculated Result
Nitrite Nitrogen	< 0.005	< 0.005	< 0.005	mg/L	0.005	Auto. Diazotization
Phosphorus Total Dissolved	< 0.003	< 0.003	0.003	mg/L	0.003	Dig.Auto.Ascorbic Acid
Phosphorus - Total	0.004	0.005	0.01	mg/L	0.003	Pres.Dig.Auto.Ascorbic A

7.2 Water Chemistry

Results of the general chemistry and metals analyses are given in Table 2 and Table 4. Damsumlo Lake is neutral with very low specific conductance and filterable residue. Lake water was moderately clear at time of survey. Phosphorus and nitrogen concentrations imply oligotrophy and the estimated N : P ratio (Table 3) is greater than 15 : 1, indicating phosphorus is likely limiting algal growth. Chlorophyll *a* concentration in the surface water showed low phytoplankton standing crop at time of survey.

Table 3. Estimated nitrogen : phosphorus ratio and chlorophyll *a* concentration for shallow water samples from Damsumlo Lake. All analyses were performed by Zenon Laboratories, except for calculation of ratio. For chlorophyll *a*, sample water was filtered through a 0.45 µ membrane filter. The filter was desiccated immediately after collection and shipped on ice to Zenon Laboratories for extraction.

Parameter	Value	Unit	MDC	Method
Chlorophyll <i>a</i>	0.6	ug/L	0.5	Spectrophotometer
Nitrogen - Total	0.11	mg/L		Calculated result
Phosphorus - Total	0.004	mg/L	0.003	Pres. Dig. Auto Ascorbic Acid
N : P RATIO	28 : 1			Calculated result (total N / total P)

Table 4. Metals concentrations estimated by Zenon Laboratories. Sample collection is described in the caption to Table 2. All metals aliquots were fixed immediately after collection with 1 ml HNO₃ and subjected to HNO₃ digestion by Zenon. Analysis was performed using a Jarrell-Ash Model 61E (inductively coupled argon plasma analysis). MDC = minimum detectable concentration for the analytic method.

Parameter	Shallow	Thermocline	Deep	Unit	MDC	Method
Time of Day	13:45	13:40	13:35	h	-	-
Depth	0.0	10.0	16.0	m	-	-
Silver	< 0.03	< 0.03	< 0.03	mg/L	0.03	ICAP 61E
Aluminum	0.07	0.09	0.17	mg/L	0.06	ICAP 61E
Arsenic	< 0.04	< 0.04	< 0.04	mg/L	0.04	ICAP 61E
Boron	< 0.04	< 0.04	< 0.04	mg/L	0.04	ICAP 61E
Barium	0.005	0.005	0.006	mg/L	0.001	ICAP 61E
Beryllium	< 0.001	< 0.001	< 0.001	mg/L	0.001	ICAP 61E
Bismuth	< 0.02	< 0.02	< 0.02	mg/L	0.02	ICAP 61E
Calcium	5.44	4.9	4.51	mg/L	0.05	ICAP 61E
Cadmium	< 0.002	< 0.002	< 0.002	mg/L	0.002	ICAP 61E
Cobalt	< 0.004	< 0.004	< 0.004	mg/L	0.004	ICAP 61E
Chromium	< 0.002	< 0.002	0.004	mg/L	0.002	ICAP 61E
Copper	< 0.002	< 0.002	< 0.002	mg/L	0.002	ICAP 61E
Iron	0.09	0.13	0.51	mg/L	0.05	ICAP 61E
Potassium	< 0.4	< 0.4	0.5	mg/L	0.4	ICAP 61E
Magnesium	0.55	0.5	0.46	mg/L	0.02	ICAP 61E
Manganese	0.005	0.007	0.018	mg/L	0.002	ICAP 61E
Molybdenum	< 0.004	< 0.004	< 0.004	mg/L	0.004	ICAP 61E
Sodium	1.2	0.9	0.9	mg/L	0.4	ICAP 61E
Nickel	< 0.01	< 0.01	< 0.01	mg/L	0.01	ICAP 61E
Phosphorus	< 0.04	< 0.04	< 0.04	mg/L	0.04	ICAP 61E
Lead	< 0.03	< 0.03	< 0.03	mg/L	0.03	ICAP 61E
Sulphur	0.5	0.4	0.3	mg/L	0.1	ICAP 61E
Antimony	< 0.02	< 0.02	< 0.02	mg/L	0.02	ICAP 61E
Selenium	< 0.03	< 0.03	< 0.03	mg/L	0.03	ICAP 61E
Silicon	1	1.1	1.4	mg/L	0.8	ICAP 61E
Tin	< 0.02	< 0.02	< 0.02	mg/L	0.02	ICAP 61E
Strontium	0.035	0.031	0.028	mg/L	0.001	ICAP 61E
Tellurium	< 0.02	< 0.02	< 0.02	mg/L	0.02	ICAP 61E
Titanium	< 0.003	< 0.003	< 0.003	mg/L	0.003	ICAP 61E
Thallium	< 0.03	< 0.03	< 0.03	mg/L	0.03	ICAP 61E
Vanadium	< 0.003	< 0.003	< 0.003	mg/L	0.003	ICAP 61E
Zinc	< 0.01	< 0.01	< 0.01	mg/L	0.01	ICAP 61E
Zirconium	< 0.003	< 0.003	< 0.003	mg/L	0.003	ICAP 61E

8. OTHER FLORA AND FAUNA

8.1 Aquatic Plants

Greater than 95 % of the lake surface is open water. *Nuphar polysepalum*, *Potamogeton gramineus*, *P. filiformis*, *Cabomba caroliniana*, and *Hippuris vulgaris* are present in the northeast and northwest arms of the lake, to the south of the large island, and to the northeast of the smaller islands near the north shore. Identification references used for aquatic plants are listed in Appendix A.

8.2 Zooplankton

The Damsumlo Lake zooplankton community was numerically dominated by small cyclopoid copepods. Medium size calanoid copepods were also abundant and many large individuals were present. The zooplankton size structure was indicative of a fishless lake.

Table 5. Zooplankton collected by horizontal tow of a 150 μ mesh conical plankton net, Damsumlo Lake offshore, 14:03 h. on August 25, 1996. Net mouth diameter was 30 cm and net length was 1 m. Tow duration was 2 minutes, at velocity of 0.42 m/sec and depth between 0 and 2 m.

Taxa	No. / L	Max (mm)	Mode (mm)
Calanoida	10.6	3.1	0.9
Cyclopoida	16.6	0.5	0.3

8.3 Waterfowl and Other Fauna

The lake supports an abundance of waterfowl, including common loons, kingfishers and various ducks. Copious quantities of waterfowl droppings were found on the shore of the island used as a campsite. Moose were observed feeding along the south shore of the lake, and many shoreline sedges showed signs of heavy grazing. No molluscs were found during the survey.

8.4 Summary of Rare and Endangered Species

No tailed frogs or harlequin ducks were observed during the survey.

9. MANAGEMENT COMMENTS

Damsumlo Lake is highly aesthetic and pristine. Moose and waterfowl were abundant around the lake though no fish were captured during the survey. No evidence of recreational use of the area was observed. Forest harvest is scheduled in the lake's catchment area in 1997 though the closest cutblock will still leave the lake fairly remote.

The absence of fish from Damsumlo Lake is likely due to impassable barriers on Damsumlo Creek or further downstream. The survey found no limnological explanation for fish absence. This survey should satisfy resource agencies that the inlets and near-lake outlet reaches of Damsumlo Lake are non-fish bearing streams under the Forest Practices Code. Special access management status is not recommended for Damsumlo Lake at this time.

10. PHOTOGRAPHS



Photograph 1. Aerial view of northwest end of Damsumlo Lake from the north.



Photograph 2. Atna Range to the southeast as seen from the surface of Damsumlo Lake.



Photograph 3. View west from the bay south of the largest island in Damsumlo Lake.



Photograph 4. View into the northeast arm of Damsumlo Lake.



Photograph 5. Downstream view of Damsumlo Creek, C1, WC 480-0278-657, outlet of Damsumlo Lake.



Photograph 6. Upstream view of C2, WC 480-0278-657-453, inlet to the south shore of Damsumlo Lake.



Photograph 7. Upstream view of C3, WC 480-0278-657-493, inlet to the north shore of Damsumlo Lake.



Photograph 8. Downstream view of C4 (WC pending), inlet to the northwest bay of Damsumlo Lake.



Photograph 9. Downstream view of C5, WC 480-0278-657, inlet to the northwest bay of Damsumlo Lake.



Photograph 10. Downstream view of C6, WC 480-0278-657-434, inlet to the northeast arm of Damsumlo Lake.

APPENDIX A. ABBREVIATIONS AND OTHER NOTES

MOE = Ministry of Environment, Lands and Parks

RIC = Resources Inventory Committee

TSA = Timber Supply Area

UTM = Universal Transverse Mercator

WC = Watershed Code

WCD = Watershed Code Dictionary

NTS = National Topographic Survey

NAD27 = North American Datum 1927

Note: UTM values were derived from two sources:

1. For lakes, UTM at the outlet was obtained from the WCD, and this is noted after the UTM.
2. For streams, UTM at the point they enter/exit the lake was estimated from NTS 1:50,000 mapsheets, using interpolation. UTM datum year (i.e. NAD27) is recorded after the estimate.

NTS 1 : 50,000 scale mapsheets were used to determine lake drainage area, stream order, stream magnitude and stream drainage area. Corrections were made for NTS mapsheet inaccuracies noted during the field survey.

Native land claims information was derived from the following source:

“Native Land Claims in Skeena Region.” Skeena Region GIS. Ministry of Environment Lands and Parks. February 1995. Map scale 1 : 1,500,000.

All information from the above source was confirmed current as of February 1997 by the following

First Nation band council offices: Gitanyow Hereditary Chiefs
 Gitxsan Hereditary Chiefs
 Lake Babine Nation (Nat’oot’en)
 Wet’suwet’en Nation
 Nisga’a Nation

Aquatic plants were identified using the following sources:

Brayshaw, T.C. 1985. Pondweeds and bur-reeds, and their relatives, of British Columbia. British Columbia Provincial Museum No. 26 Occasional papers series.

Pojar, J. and A. MacKinnon. 1994. Plants of coastal British Columbia including Washington, Oregon and Alaska. B.C. Ministry of Forests and Lone Pine Publishing.

Warrington, P.D. 1994. Identification keys to the aquatic plants of British Columbia. Resources Inventory Committee Report 029. Discussion Document.

The contractor assigned a reference number of 9616 to Damsumlo Lake 480-0278-657-01. This number appears in field notes and other contractor records associated with this survey.

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Damsumlo Creek

Stream Survey Report

Watershed Code:

480-0278-657-000-000-000-000-000-000-000

Header Information

Stream Name:	Damsumlo Creek	Stream "Local":	Contractor Reference Number = 9616-C1	Access:	FT
Watershed Code:	480-0278-657-000-000-000-000-000-000-000-000	Map #:	93/M13	Reach No.:	1
Location:	Outlet of Damsumlo Lake	U.T.M.:	09.578475.6198816	Site No.:	1
Date:	24/08/96	Agency:	C58	Fish Card:	N
Time:	15:30	Survey Crew:	JD\CS\ \ \ \ \ \ \ \	Field:	Yes
				Historical:	No
				Photos:	Air Photos:

Channel Characteristics

Av. Chan. Width (m):	11.5	Method Av. Chan. Width (m):	T	21.5	15.9	6.5	6.9	7.6	10.4
Av. Wet. Width (m):	11.5	Method Av. Wet. Width (m):	T	21.5	15.9	6.5	6.9	7.6	10.4
Av. Max. Rif. Depth (cm):	37	Av. Max. Riffle Depth (cm):	MS	45	28	38			
Av. Max. Pool Depth (cm):	157	Av. Max. Pool Depth (cm):	37	110	160	200			
Gradient (%):	1.0	Method Gradient:	CL						
% Pool:	10	% Riffle:	5	% Run:	85	% Other:	0	Method:	GE
% Side Channel:	0-10	Method Side Channel:	GE						
% Debris Area:	0-10	Method Debris Area:	GE						

Bed Material

% Fines (<2mm):	70	% Fines (<2mm):	70
% Gravels:	20	Small (2-16mm):	10
		Large (16-64mm):	10
% Larges:	10	Small cobble (64-128mm):	5
		Large cobble (128-256mm):	5
		Boulder cobble (>256mm):	0
% Bedrock:	0	% Bedrock:	0
D90 (cm):		Compaction:	High

Cover

Cover Total %:	10	Method Cover Total %:	GE
Dp Pool:	40	L.O.D.:	0
Boulder:	0	In Veg.:	0
Over Veg.:	30	Cutbank:	30
Crown Closure %:	0	Method Crown Closure:	GE
Aspect:	E	Method Aspect:	GE

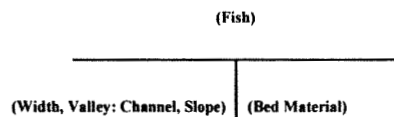
Banks

Height (m):	0.3	% Unstable:	0
Textures Fines:	Yes	Gravel:	No
Larges:	No	Bedrock:	No
Confinement:	5		
Valley: Chan. Ratio:	5		
Stage:	H		
Flood Signs Ht(m):	0.1	Method Flood Signs:	
Braided:	N	Method Braided:	
Bars (%):	0	Method Bars:	
pH:	6.5	Method pH:	
02 (ppm):		Method Dissolved Oxygen:	
Water Temp. (°C):	13.0	Method Temperature:	
Turb. (cm):		Method Turbidity:	
Cond. (µmhos):	32	Method Conductivity:	

Discharge

Wetted Width (m):	8.3	Method Wetted Width (m):	T						
Mean Depth (m):	0.3	Method Mean Depth (m):	MS	0.1	0.2	0.2	0.3	0.4	0.4
Mean Velocity (m/s):	1.25	Method Mean Velocity (m/s):	F						
Discharge (m3/s):	3.11	Method Discharge (m3/s):	F						

Reach Symbol



DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Damsunlo Creek

Stream Survey Report

Watershed Code:

480-0278-657-000-000-000-000-000-000-000

Stream/Valley Cross-Section

Fish Summary

Obstructions

NF			J				EL
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Comments

- 1 141 sec of electrofishing yielded no fish.

- 2 The first 100 m d/s of the lake is shallow and fast flowing; substrate is mostly boulder with some smaller cobble, more suitable for spawning, is located near the lake. All of the riffle depths come from this reach, and the rest of the survey data from the lower reach (100 m to 500 m d/s). The second reach flows through an open sedge wetland, the channel is deeper (0.5 - 2.0 m), has a slower flow, and a substrate composed of fines.

- 3 The first 100 m of the channel was straight, while the remainder surveyed was meandering.

- 4 All distances estimated by ground estimate.

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-453-000-000-000-000-000-000-000

Header Information

Stream Name:	Unnamed	Stream "Local":	Contractor Reference Number = 9616-C2	Access:	FT
Watershed Code:	480-0278-657-453-000-000-000-000-000-000-000	Map #:	93/M13	Reach No.:	1
Location:	Inflow to Dansumlo Lake, 150 m S of the outflow	U.T.M.:	09 577900.6198775	Reach Length (km):	Method:
Date:	24/08/96	Agency:	C58	Site No.:	1
Time:	17:30	Survey Crew:	JD\CS\ \ \ \ \ \ \ \ \	Length surveyed (m):	500.0
				Fish Card:	N
				Field:	Yes
				Historical:	No
				Photos:	
				Air Photos:	

Channel Characteristics

Av. Chan. Width (m):	5.1	Method Av. Chan. Width (m):	T	Specific Data			
Av. Wet. Width (m):	4.0	Method Av. Wet. Width (m):	T	7.5	3.5	3.3	4.2
Av. Max. Rif. Depth (cm):	30	Av. Max. Riffle Depth (cm):	MS	6.6	3.5	2.7	3.6
Av. Max. Pool Depth (cm):	63	Av. Max. Pool Depth (cm):	30	3.5	30	40	21
Gradient (%):	1.5	Method Gradient:	CL	75	55	58	22
% Pool:	10	% Riffle:	40	Method: GE			
% Side Channel:	10-40	Method Side Channel:	GE				
% Debris Area:	0-10	Method Debris Area:	GE				

Bed Material

% Fines (<2mm):	10	% Fines (<2mm):	10
% Gravels:	25	Small (2-16mm):	10
		Large (16-64mm):	15
% Larges:	65	Small cobble (64-128mm):	15
		Large cobble (128-256mm):	20
		Boulder cobble (>256mm):	30
% Bedrock:	0	% Bedrock:	0
D90 (cm):		Compaction:	Medium

Cover

Cover Total %:	10	Method Cover Total %:	GE
Dp Pool:	20	L.O.D.:	20
Boulder:	20	In Veg.:	0
Over Veg.:	20	Cutbank:	20
Crown Closure %:	70	Method Crown Closure:	GE
Aspect:	N	Method Aspect:	GE

Discharge

Wetted Width (m):	3.8	Method Wetted Width (m):	T	Specific Data			
Mean Depth (m):	0.6	Method Mean Depth (m):	MS	0.7	0.7	0.5	0.5
Mean Velocity (m/s):	0.33	Method Mean Velocity (m/s):	F				
Discharge (m3/s):	0.75	Method Discharge (m3/s):	F				

Reach Symbol

(Fish)

(Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m):	0.3	% Unstable:	5
Textures Fines:	No	Gravel: Yes	Larges: No
Confinement:	5	Bedrock:	No
Valley: Chan. Ratio:	5		
Stage:	H		
Flood Signs Ht(m):	0.4	Method Flood Signs:	
Braided:	N	Method Braided:	
Bars (%):	20	Method Bars:	
pH:	6.3	Method pH:	
O2 (ppm):		Method Dissolved Oxygen:	
Water Temp. (°C):	10.1	Method Temperature:	
Turb. (cm):		Method Turbidity:	
Cond. (µmhos):	40	Method Conductivity:	

Dansumlo Lake 480-0278-657-01

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-453-000-000-000-000-000-000-000

Stream/Valley Cross-Section

Fish Summary

NF			J				EL
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Obstructions

Comments

- 1 The first 200 m of the channel u/s of the lake has moderate side channel development; 200 - 500 m u/s of the lake, the channel shows signs of a debris torrent or extreme spring floods. Several side channels exist and larges have been widely deposited on the banks.
 - 2 At 500 m u/s of the lake, the channel forks into the channel surveyed and a larger channel that flows into Damsunlo Creek. At the fork, the channel surveyed becomes much larger (wider) and the substrate is predominantly boulders.
 - 3 116 sec of electrofishing yielded no fish; salmonid spawning potential is fair to good, and rearing potential fair.
 - 4 There is a large alluvial fan composed of mineral fines and gravel at the mouth of the channel
 - 5 All distances estimated by ground estimate.
-

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-193-000-000-000-000-000-000-000

Header Information

Stream Name: Unnamed Stream "Local": Contractor Reference Number = 9616-C3 Access: FT
 Watershed Code: 480-0278-657-493-000-000-000-000-000-000-000-000 Reach No.: 1 Reach Length (km): Method: GE
 Location: Inflow to the N shore of Damsumlo Lake, across from the island Map #: 93/M13 Site No.: 1 Length surveyed (m): 400.0 Method: GE
 U.T.M.: 09.577500.6199525 Fish Card: N Field: Yes Historical: No
 Date: 24/08/96 Time: 20:00 Agency: C58 Survey Crew: JD\CS \ \ \ \ \ \ \ \ Photos: Air Photos:

Channel Characteristics

		Specific Data							
Av. Chan. Width (m):	1.1	Method Av. Chan. Width (m):	MS	0.6	1.0	1.2	1.6	1.1	
Av. Wet. Width (m):	1.0	Method Av. Wet. Width (m):	MS	0.6	1.0	0.9	1.6	1.0	
Av. Max. Rif. Depth (cm):	6	Av. Max. Riffle Depth (cm):	MS	10	4	6	8	2	
Av. Max. Pool Depth (cm):	34	Av. Max. Pool Depth (cm):	6	30	45	32	27	35	
Gradient (%):	2.5	Method Gradient:	CL						
% Pool:	40	% Riffle:	30	% Run:	30	% Other:	0	Method:	GE
% Side Channel:	0-10	Method Side Channel:	GE						
% Debris Area:	>40	Method Debris Area:	GE						

Bed Material

% Fines (<2mm):	70	% Fines (<2mm):	70
% Gravels:	10	Small (2-16mm):	5
		Large (16-64mm):	5
% Larges:	20	Small cobble (64-128mm):	5
		Large cobble (128-256mm):	5
		Boulder cobble (>256mm):	10
% Bedrock:	0	% Bedrock:	0
D90 (cm):		Compaction:	High

Cover

Cover Total % : 20 Method Cover Total %: GE
 Dp Pool : 0 L.O.D.: 40 Boulder: 0 In Veg.: 0 Over Veg: 20 Cutbank: 40
 Crown Closure % : 90 Method Crown Closure: GE Aspect : S Method Aspect: GE

Banks

Height (m):	0.4	% Unstable:	10	
Textures Fines:	Yes	Gravel: No	Larges: No	Bedrock: No
Confinement:	5			
Valley: Chan. Ratio:	5			
Stage:	M			
Flood Signs Ht(m):	0.1	Method Flood Signs:		
Braided:	N	Method Braided:		
Bars (%):	5	Method Bars:		
pH:	5.2	Method pH:		
O2 (ppm):		Method Dissolved Oxygen:		
Water Temp. (°C):	9.5	Method Temperature:		
Turb. (cm):		Method Turbidity:		
Cond. (µmhos):	15	Method Conductivity:		

Discharge

		Specific Data			
Wetted Width (m) :	0.5	Method Wetted Width (m) :	MS		
Mean Depth (m) :	0.2	Method Mean Depth (m) :	MS	0.1	0.2
Mean Velocity (m/s) :	0.13	Method Mean Velocity (m/s) :	F		
Discharge (m3/s) :	0.01	Method Discharge (m3/s) :	F		

Reach Symbol

(Fish)

(Width, Valley: Channel, Slope) | (Bed Material)

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-493-000-000-000-000-000-000-000

Stream/Valley Cross-Section

Fish Summary

Species	Number	Site Name (m)	Life Stage	Sex 1	Sex 2	Sex 3	Method/Reference
NF			J				VO

Obstructions

Obstruction ID(m)	Type	Location
1	C	20.0

Comments

- 1 Approx. 20 m u/s from the lake, the stream falls over a 0.6 m rocky chute, this is likely a barrier to fish passage at the flow rate at time of survey.
- 2 A visual observation of the channel yielded no fish, the channel offers poor salmonid spawning potential, and fair rearing potential.
- 3 The channel borders and drains several wetlands.
- 4 Flow is slow and appears stable.
- 5 All distances estimated by ground estimate.

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-545-000-000-000-000-000-000-000

Header Information

Stream Name:	Unnamed	Stream "Local":	Contractor Reference Number - 9616-C4	Access:	FT
Watershed Code:	480-0278-657-545-000-000-000-000-000-000-000	Map #:	93/M13	Reach No.:	1
Location:	Inflow to the NW bay of Damsumlo Lake	U.T.M.:	09.576867.6199800	Site No.:	1
Date: 25/08/96	Time: 09:00	Agency: CS8	Survey Crew: JD\CS \ \ \ \ \ \ \ \	Fish Card:	N
				Photos:	
				Air Photos:	
				Reach Length (km):	Method: GE
				Length surveyed (m):	500.0
				Field: Yes	Historical: No

Channel Characteristics

Av. Chan. Width (m):	8.2	Method Av. Chan. Width (m):	T	<i>Specific Data</i>				
Av. Wet. Width (m):	4.8	Method Av. Wet. Width (m):	T	6.9	3.9	16.2	7.9	5.9
Av. Max. Rif. Depth (cm):	22	Av. Max. Riffle Depth (cm):	MS	5.7	3.9	6.6	4.4	3.5
Av. Max. Pool Depth (cm):	70	Av. Max. Pool Depth (cm):	22	24	33	20	17	21
Gradient (%):	3.0	Method Gradient:	CL	55	60	73	80	83
% Pool:	10	% Riffle:	50	% Run:	40	% Other:	0	Method: GE
% Side Channel:	0-10	Method Side Channel:	GE					
% Debris Area:	0-10	Method Debris Area:	GE					

Bed Material

% Fines (<2mm):	0	% Fines (<2mm):	0
% Gravels:	20	Small (2-16mm):	10
		Large (16-64mm):	10
% Larges:	80	Small cobble (64-128mm):	20
		Large cobble (128-256mm):	30
		Boulder cobble (>256mm):	30
% Bedrock:	0	% Bedrock:	0
D90 (cm):		Compaction:	Medium

Cover

Cover Total % :	10	Method Cover Total %:	GE
Dp Pool :	20	L.O.D.:	20
Crown Closure % :	30	Method Crown Closure:	GE
		Boulder:	10
		In Veg.:	0
		Over Veg.:	0
		Cutbank:	50
		Aspect :	SE
		Method Aspect:	GE

Discharge

Wetted Width (m) :	6.4	Method Wetted Width (m) :	T	<i>Specific Data</i>				
Mean Depth (m) :	0.3	Method Mean Depth (m) :	MS	0.1	0.2	0.2	0.4	0.4
Mean Velocity (m/s) :	0.27	Method Mean Velocity (m/s) :	F					
Discharge (m3/s) :	0.52	Method Discharge (m3/s) :	F					

Reach Symbol

(Fish)

(Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m):	0.5	% Unstable:	1
Textures Fines:	Yes	Gravel: Yes	Larges: No
Confinement:	4	Bedrock:	No
Valley: Chan. Ratio:	5		
Stage:	H		
Flood Signs Ht(m):	0.4	Method Flood Signs:	
Braided:	N	Method Braided:	
Bars (%):	35	Method Bars:	
pH:	6.2	Method pH:	
O2 (ppm):		Method Dissolved Oxygen:	
Water Temp. (°C):	7.8	Method Temperature:	
Turb. (cm):		Method Turbidity:	
Cond. (µmhos):	40	Method Conductivity:	

Damsumlo Lake 480-0278-657-01

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-545-000-000-000-000-000-000

Stream/Valley Cross-Section

Fish Summary

Species	Number	Distance (m)	Depth (m)	Velocity (m/s)	Temperature (C)	Water Quality	Notes
NF			J				EL

Obstructions

Obstruction	Height (m)	Type	Location
	0	D	200.0

Comments

- 1 Debris dam does not create an obstruction to fish.
- 2 180 sec of electrofishing yielded no fish.
- 3 Channel offers good to excellent salmonid spawning potential, and fair rearing potential.
- 4 Channel is highly meandering near lake; a large alluvial fan is located at the mouth of the stream. The channel becomes more confined further from the lake.
- 5 All distances estimated by ground estimate.

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Damsumlo Creek

Stream Survey Report

Watershed Code:

480-0278-657-000-000-000-000-000-000-000-000-000

Header Information

Stream Name: Damsumlo Creek Stream "Local": Contractor Reference Number = 9616-C5 Access: FT
Watershed Code: 480-0278-657-000-000-000-000-000-000-000-000 Reach No.: 1 Reach Length (km): Method:
Location: Inlet to the S side of bay at the NW end of Damsumlo Lake Map #: 93/M13 Site No.: 1 Length surveyed (m): 500.0 Method: GE
U.T.M.: 09.576850.6199750 Fish Card: N Field: Yes Historical: No
Date: 25/08/96 Time: 10:30 Agency: C58 Survey Crew: JD\C/S\ \ \ \ \ \ \ \ Photos: Air Photos:

Channel Characteristics

Av. Chan. Width (m):	1.4	Method Av. Chan. Width (m):	MS	Specific Data					
Av. Wet. Width (m):	1.3	Method Av. Wet. Width (m):	MS	1.9	0.9	0.8	1.6	2.1	1.1
Av. Max. Rif. Depth (cm):	7	Av. Max. Riffle Depth (cm):	MS	1.9	0.9	0.8	1.6	1.6	0.9
Av. Max. Pool Depth (cm):	28	Av. Max. Pool Depth (cm):	7	6	7	4	11	9	7
Gradient (%):	3.6	Method Gradient:	CL	25	31	25	41	17	
% Pool: 10 % Riffle: 40 % Run: 50 % Other: 0 Method: GE									
% Side Channel:	0-10	Method Side Channel:	GE						
% Debris Area:	>40	Method Debris Area:	GE						

Bed Material

% Fines (<2mm):	5	% Fines (<2mm):	5
% Gravels:	15	Small (2-16mm):	5
		Large (16-64mm):	10
% Larges:	80	Small cobble (64-128mm):	30
		Large cobble (128-256mm):	30
		Boulder cobble (>256mm):	20
% Bedrock:	0	% Bedrock:	0
D90 (cm):		Compaction:	Medium

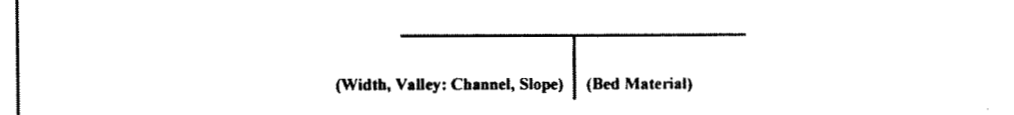
Cover

Cover Total % :	25	Method Cover Total %:	GE	
Dp Pool : 10 L.O.D.: 30		Boulder: 10 In Veg.: 0 Over Veg: 30 Cutbank: 20		
Crown Closure % :	65	Method Crown Closure:	GE	Aspect : NE Method Aspect: GE

Discharge

Wetted Width (m) :	1.4	Method Wetted Width (m) :	MS	Specific Data					
Mean Depth (m) :	0.2	Method Mean Depth (m) :	MS	0.1	0.2	0.2	0.2	0.1	
Mean Velocity (m/s) :	0.07	Method Mean Velocity (m/s)	F						
Discharge (m3/s) :	0.02	Method Discharge (m3/s) :	F						

Reach Symbol



Banks

Height (m):	0.3	% Unstable:	5
Textures Fines:	Yes	Gravel: No Larges: No Bedrock: No	
Confinement:	3		
Valley: Chan. Ratio:	2		
Stage:	H		
Flood Signs Ht(m):	0.25	Method Flood Signs:	
Braided:	N	Method Braided:	
Bars (%):	5	Method Bars:	
pH:	5.9	Method pH:	
O2 (ppm):		Method Dissolved Oxygen:	
Water Temp. (°C):	9.6	Method Temperature:	
Turb. (cm):		Method Turbidity:	
Cond. (µmhos):	23	Method Conductivity:	

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Damsumlo Creek

Watershed Code:

Stream Survey Report

480-0278-657-000-000-000-000-000-000-000

Stream/Valley Cross-Section**Fish Summary**

Number	Distance	Method	Reference
NF		J	EL

Obstructions

Obstruction	H(m)	Type	Location
	0	D	
	1	D	

Comments

- 1 Several chutes over debris dams were found during the survey, and all would be passable at higher flows.
- 2 98 sec of electrofishing yielded no fish.
- 3 The first 100 m of the channel is flooded with lake water. The channel runs by a number of small wetlands, with several seepage channels draining the wetlands into the channel. The flow is stable.
- 4 All distances were estimated by ground estimate.

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-434-000-000-000-000-000-000-000

Header Information

Stream Name:	Unnamed	Stream "Local":	Contractor Reference Number = 9616-C6	Access:	FT
Watershed Code:	480-0278-657-434-000-000-000-000-000-000-000	Map #:	93/M13	Reach No.:	1
Location:	Inlet to the narrow bay at the NE end of Damsumlo Lake	U.T.M.:	09.578800.6200425	Site No.:	1
Date:	25/08/96	Agency:	C58	Fish Card:	N
Time:	15:30	Survey Crew:	JD\CS\ \ \ \ \ \ \ \ \	Field:	Yes
				Historical:	No
				Photos:	
				Air Photos:	

Channel Characteristics

Av. Chan. Width (m):	2.9	Method Av. Chan. Width (m):	T
Av. Wet. Width (m):	2.7	Method Av. Wet. Width (m):	T
Av. Max. Rif. Depth (cm):	16	Av. Max. Riffle Depth (cm):	MS
Av. Max. Pool Depth (cm):	57	Av. Max. Pool Depth (cm):	16
Gradient (%):	1.3	Method Gradient:	CL
% Pool:	5	% Riffle:	50
% Side Channel:	0-10	% Run:	45
% Debris Area:	0-10	% Other:	0
		Method:	GE
		Method Side Channel:	GE
		Method Debris Area:	GE

Specific Data						
3.4	3.7	1.6	1.8	3.7	3.1	
3.4	2.9	1.6	1.8	3.4	3.1	
15	20	8	15	16	19	
60	62	50	47	60	64	

Bed Material

% Fines (<2mm):	10	% Fines (<2mm):	10
% Gravels:	20	Small (2-16mm):	10
		Large (16-64mm):	10
% Larges:	70	Small cobble (64-128mm):	20
		Large cobble (128-256mm):	20
		Boulder cobble (>256mm):	30
% Bedrock:	0	% Bedrock:	0
D90 (cm):		Compaction:	Medium

Cover

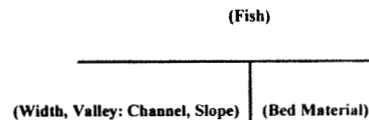
Cover Total %:	30	Method Cover Total %:	GE
Dp Pool:	10	L.O.D.:	20
Crown Closure %:	30	Boulder:	0
		In Veg.:	0
		Over Veg.:	40
		Cutbank:	30
		Aspect:	S
		Method Aspect:	GE

Discharge

Wetted Width (m):	2.7	Method Wetted Width (m):	T
Mean Depth (m):	0.2	Method Mean Depth (m):	MS
Mean Velocity (m/s):	0.36	Method Mean Velocity (m/s):	F
Discharge (m3/s):	0.19	Method Discharge (m3/s):	F

Specific Data				
0.0	0.1	0.2	0.2	0.3

Reach Symbol



Banks

Height (m):	0.3	% Unstable:	0
Textures Fines:	Yes	Gravel:	No
Confinement:	5	Larges:	No
Valley: Chan. Ratio:	5	Bedrock:	No
Stage:	H		
Flood Signs Ht(m):	0.3	Method Flood Signs:	
Braided:	N	Method Braided:	
Bars (%):	20	Method Bars:	
pH:	6.8	Method pH:	
O2 (ppm):		Method Dissolved Oxygen:	
Water Temp. (°C):	10.1	Method Temperature:	
Turb. (cm):		Method Turbidity:	
Cond. (µmhos):	62	Method Conductivity:	

DFO/MoELP Stream Survey Form

15-Mar-97

Stream: Unnamed

Watershed Code:

Stream Survey Report

480-0278-657-434-000-000-000-000-000-000-000

Stream/Valley Cross-Section

Fish Summary***Obstructions***

Comments

- 1 Short alder (approx. 3 m) create the canopy over short lengths of the channel.
 - 2 The channel borders wetland habitat and drains it via many small seepage channels.
 - 3 the channel offers good to excellent salmonid spawning potential, and fair rearing potential.
 - 4 All distances estimated by ground estimate.
-

APPENDIX C. FISH SAMPLING FORMS

FISH COLLECTION METHOD INFORMATION

Card 1 of 1

Date (yy/mm/dd):	<u>96/08/23</u>	Agency:	<u>C58</u>	Crew:	<u>JD / CS</u>
Gazetted Name:	<u>Damsumlo</u>	Alias:	<u>N/A</u>	UTM:	<u>09,578358.6199047</u>
Lake/Stream/Wetland	<u>Lake</u>	Location:	<u></u>	Source:	<u>Watershed Atlas</u>
Sequence No.	<u>1</u>	Weather:	<u></u>		
Watershed code:	<u>480-0278-657</u>	Reach #:	<u></u>		

Date (yy/mm/dd)	Sample Site No.	Pass # or trap/net #	Capture Method	Time In (24 hr clock)	Time Out (24 hr clock)	Sampling time (min)	Depth (m)
96/08/23			GN(F)	2040	0700	620	
96/08/23			GN(S)	2050	0715	625	0-5
96/08/24		1	MT	0900	1150	1610	0.3
96/08/24		2	MT	0925	1155	1590	0.5
96/08/24		3	MT	1110	1158	1488	0.4
96/08/24		4	MT	1125	1202	1477	0.4
96/08/24		5	MT	1235	1205	1410	0.4

Comments : All gear set over one night. Date recorded is date of setting; GN(S) was set with small mesh inshore; GN(F) was set with larger mesh inshore. No fish captured in any gear.

APPENDIX D. LIMNOLOGICAL SAMPLING FORMS

Lake Biophysical Data Form					
Date (yy/mm/dd):	<u>96/08/25</u>	Crew:	<u>JD / CS</u>		
Site ID		Sequence No.:	<u>1</u>		
Watershed code:	<u>480-0278-657</u>	Alias:	<u>N/A</u>		
Gazetted name:	<u>Damsumlo</u>	UTM : Zone	<u>09</u>		
FW Region:	<u>6</u>	Easting	<u>578358</u>		
Management Unit:	<u>7</u>	Northing	<u>6199047</u>		
NTS Map No.:	<u>93M/ 13</u>	Source	<u>Watershed Atlas</u>		
<i>Biophysical</i>					
Biogeo Zone	<u>ICHmc1</u>				
Benchmark (Y/N)	<u>Y</u>				
Benchmark details:	<u>see report</u>				
<i>Nutrient Status</i>					
SEAM No.:	<u>E223339</u>	Limno Station No:	<u>01</u>		
Secchi depth (m)	<u>4.8</u>	H2S (mg/l)	<u>none</u>		
Other samples taken:	<u>Zooplankton</u>	H2S comments	<u>no odour</u>		
		TDS method			
		DO method	<u>YSI 57</u>		
		TEMP method	<u>YSI 57</u>		
		Alkalinity			
<i>Field Conditions</i>					
wind velocity (km/h)	<u>0-1</u>	wind direction:	<u>SE</u>	air temp. (c):	<u>22</u>
cloud cover (/10 O.C.)	<u>0</u>	surface condition:	<u>calm</u>	water colour:	<u>clear</u>
<i>Development</i>					
MOF rec sites (Y/N)	<u>N</u>	Resort cmpsts (Y/N)	<u>N</u>	Residences (Y/N)	<u>N</u>
MOF campsites (Y/N)	<u>N</u>	Resorts (Y/N)	<u>N</u>	Co. Rec facilities	<u>N</u>
Parks campgrds (Y/N)	<u>N</u>	Resort cabins (Y/N)	<u>N</u>		
<i>Recreation</i>					
ROS	<u>1</u>	Biophys features:		Biophys sub-feat.:	
<i>Inlets/Outlets</i>					
	<u>see Stream Survey Card for mandatory fields</u>				
<i>Biological</i>					
Fish Card attached (Y/N)	<u>N</u>	Fish. Man. Com.	<u>see report</u>		
Wildlife:	<u>see report</u>	Reptiles:	<u>see report</u>		
Aquatic birds:	<u>see report</u>	Invertebrates:	<u>see report</u>		
Amphibians:	<u>see report</u>	Aquatic Plants:	<u>see report</u>		
<i>Comments:</i>					
Water samples:	<u>16.0m @1335</u>	Chlorophyll-a:	<u>1.0 L. filtered</u>		
	<u>10.0m @ 1340</u>				
	<u>0.0m @ 1345</u>				
Zooplankton:	<u>horizontal tow for 120 s @ 0.42m/s @ 14:03, 150um mesh, 30cm dia. net</u>				

Lake Survey Profile Data

Sequence number: 01

Date : 96/08/25 Time: 13:20
 (yy/mm/dd) (hhmm)

Limnology station: 01

Depth (m)	D.O. (mg/l)	Temp (c)	TDS (ppm)	Conduct. (umhos/cm)
surface	9.85	14.3		
0.5				
1.0	10.10	12.3		
1.5				
2.0	10.10	11.5		
2.5				
3.0	10.10	11.1		
3.5				
4.0	10.05	11.0		
4.5				
5.0	10.05	10.8		
5.5				
6.0	9.85	10.8		
6.5				
7.0	9.90	10.4		
7.5				
8.0	10.00	10.0		
8.5				
9.0	9.00	8.7		
9.5				
10.0	9.00	8.0		
10.5				
11.0	8.25	7.6		
11.5				
12.0	7.90	7.2		
12.5				
13.0	7.20	7.0		
13.5				
14.0	6.90	7.0		
14.5				
15.0	6.85	7.0		
15.5				
16.0	6.80	6.9		
16.5				
17.0				
17.5				
18.0				
18.5				
19.0				
19.5				
20.0				

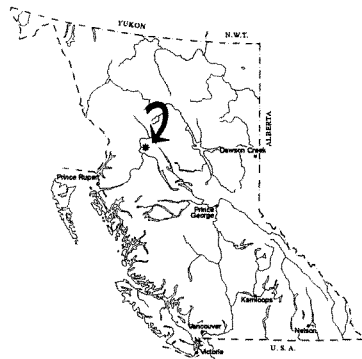
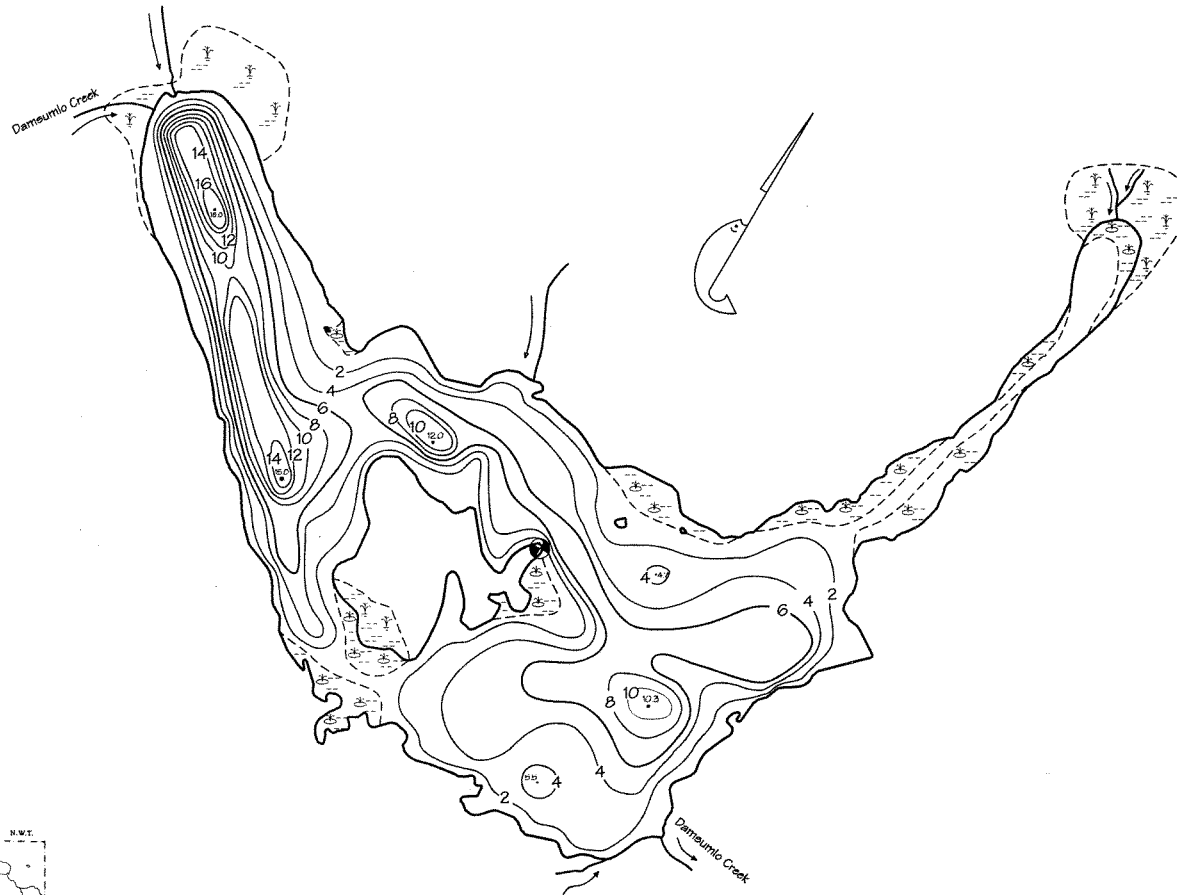
Depth (m)	D.O. (mg/l)	Temp (c)	TDS (ppm)	Conduct. (umhos/cm)
20.5				
21.0				
21.5				
22.0				
22.5				
23.0				
23.5				
24.0				
24.5				
25.0				
25.5				
26.0				
26.5				
27.0				
27.5				
28.0				
28.5				
29.0				
29.5				
30.0				
30.5				
31.0				
31.5				
32.0				
32.5				
33.0				
33.5				
34.0				
34.5				
35.0				
35.5				
36.0				
36.5				
37.0				
37.5				
38.0				
38.5				
39.0				
39.5				
40.0				

APPENDIX E. PHOTOGRAPH / NEGATIVE DIRECTORY

Negative #	Photo # (report)	Description
9616 - 1		start of a 360° clockwise panorama, taken from SE of the large island, view to the SW
9616 - 2		panorama continued, view to the WSW
9616 - 3	3	panorama continued, view to the W
9616 - 4		panorama continued, view to the NW
9616 - 5		panorama continued, view to the NNW
9616 - 6		panorama continued, view to the N
9616 - 7		panorama continued, view to the NE
9616 - 8		panorama continued, view to the ENE
9616 - 9		panorama continued, view to the E
9616 - 10		panorama continued, view to the SE
9616 - 11		panorama continued, view to the S
9616 - 12		Damsumlo Creek, WC 480-0278-657, outlet of Damsumlo Lake; upstream view, 100 m downstream of the lake
9616 - 13	5	Damsumlo Creek, WC 480-0278-657, outlet of Damsumlo Lake; downstream view, 100 m downstream of the lake
9616 - 14	6	unnamed channel C2, WC 480-0278-657-453, inlet to the SE shore of Damsumlo Lake; upstream view, 500 m upstream of the lake
9616 - 15		unnamed channel C2, WC480-0278-657-453, inlet to the SE shore of Damsumlo Lake; downstream view, 500 m upstream of the lake
9616 - 16		unnamed channel C2, WC 480-0278-657-453, inlet to the SE shore of Damsumlo Lake; downstream view, 50 m upstream of the lake
9616 - 17	7	unnamed channel C3, WC 480-0278-657-493, inlet to the N shore of Damsumlo Lake; upstream view
9616 - 18	2	view of the Atna Range to the SE of Damsumlo Lake
9616 - 19		unnamed channel C4, WC pending, inlet to the NW end of Damsumlo Lake; upstream view, 500 m upstream of the lake
9616 - 20	8	unnamed channel C4, WC pending, inlet to the NW end of Damsumlo Lake; downstream view, 500 m upstream of the lake
9616 - 21	9	Damsumlo Creek, WC 480-0278-657, inlet to the NW end of Damsumlo Lake; downstream view, 200 m upstream of the lake
9616 - 22	10	unnamed channel C6, WC 480-0278-657-434, inlet to the far NE bay of Damsumlo Lake; downstream view, 100 m upstream of the lake
9616 - 23		unnamed channel C6, WC 480-0278-657-434, inlet to the far NE bay of Damsumlo Lake; downstream view, 100 m upstream of the lake

9616 - 24	4	view of the long, narrow NE bay of Damsumlo Lake
9616 - 25		start of a 135° clockwise panorama of the SE shore of Damsumlo Lake, taken from E of the large island, view to the SE
9616 - 26		panorama continued, view to the SSW
9616 - 27		panorama continued, view to the W
9616 - 28		view of NW arm of Damsumlo Lake
9616 - 29		aerial view of Damsumlo Lake
9616 - 30	1	aerial view of Damsumlo Lake
9616 - 31		aerial view of Damsumlo Lake
9616 - 32		aerial view of Damsumlo Lake
9616 - 33		view to west from west of large island

APPENDIX F. BATHYMETRIC MAP



Reduced to
33%
of Original Size

NOTES: 1 - Depths are in Metres; 2 - Denotes Bench Mark; 3 - Not intended for navigational use. Uncharted rocks and shoals may exist.

SURVEYED BY: J. DEGISI / C. SCHELL DATE: AUG. 23-25, 1996
OUTLINE SOURCE: Air Photo 50BCD92073; 112 (JUN. 1992)

PREPARED FOR: Fisheries Branch Ministry of Environment, Lands and Parks BY: Joseph S. DeGisi Smithers, British Columbia

Elevation	940	m. t
Surface Area	1 033 076	sq.m.
Area above 6m. contour	829 039	sq.m.
Volume	3 325 130	cu.m.
Mean Depth	3.6	m.
Maximum Depth	16.0	m.
Perimeter, Main Shore	7521	m.
Perimeter, Islands	1946	m.
Bench Mark	2.15	m.

DAMSUMLO LAKE

DEPTHS IN METRES		
WATERSHED CODE 460-0219-051-01	UTM COORDINATE 08 876550 6199047	
MU: 06-01	PLOT DATE: MARCH 31, 1997	SCALE 1:4500
DIGITIZED: CompuGrid	REVISION DATE:	
CONTOURS: J.J.J.	APPROVED:	NTS NO: 93M/13
TECH. CHECK:		

APPENDIX G. WATER CHEMISTRY ANALYSIS BY ZENON LABORATORIES



A Division of PHILIP Analytical Services Corp.

10-Sep-96
Page 1 of 5

ZENON LABORATORIES
Certificate of Analysis

8577 Commerce Court
Burnaby, B.C.
Canada V5A 4N5
Tel 604 444 4808
Fax 604 444 4511

Reported To :

JOSEPH S. DEGISI

Client Code DJ

R.R.#1, SITE 27, C2
SMITHERS, B.C.
VOJ 2N0

Attention : JOE DEGISI
Phone : (604) 847-3575
FAX : (604) 847-2959

Project Information :

Project ID : DAMSUMLO LAKE
Submitted By : JOE DEGISI

Requisition Forms :

Form 06111169 logged on 27-Aug-96 completed on 10-Sep-96

Remarks :

- All organic data is blank corrected except for PCDD/F, Hi-res MS and CLP volatile analyses
- 'MDC' = Minimum Detectable Concentration, '<' = Less than MDC, '---' = Not analyzed
- Solids results are based on dry weight except Biota Analyses & Special Waste Oil & Grease
- Organic analyses are not corrected for extraction recovery standards except for Isotope Dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)
- All Groundwater samples are decanted and/or filtered prior to analysis

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', 18th Edition, published by the American Public Health Association, or on US EPA protocols found in the 'Test Methods For Evaluating Solid Waste, Physical/Chemical Method, SW846', 3rd Edition. Other procedures are based on methodologies accepted by the appropriate regulatory agency. Methodology briefs are available by written request.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied.

Your samples will be retained at Zenon for a period of 30 days from receipt of data or as per contract.

ZENON Project Manager: Jack Wilson



Division of PHILIP Analytical Services Corp.

10-Sep-96
Page 2 of 5

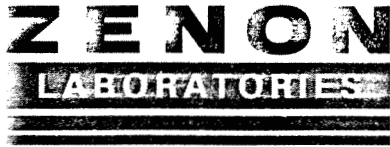
ANALYTICAL REPORT
Form 06111169

Client : JOSEPH S. DEGISI
Project : DAMSUMLO LAKE

Zenon ID :	METHOD	96023434	96023435	METHOD	96023436
Client ID :	BLANK	E223339	E223339	BLANK	E223339
		16.0m	10.0m		0.0m

Sparcode	Parameter	Unit	MDC						
PHYSICAL									
00041220	pH	pH units	0.1	n/a	6.9	7.1	=	7.3	
00111160	Specific Conductance	uS/cm	1	n/a	25	27	=	30	
007H1033	Residue Filterable 1.0u (TDS)	mg/L	4	8	36	32	=	44	
GENERAL INORGANICS									
01011211	Alkalinity Phen. 8.3	mg/L	0.5	< 0.5	< 0.5	< 0.5	=	< 0.5	
01021210	Alkalinity Total 4.5	mg/L	0.5	n/a	13.3	14.2	=	15.7	
CO3-CALC	Carbonate	mg/L			< 0.5	< 0.5		< 0.5	
HCO3CALC	Bicarbonate	mg/L			16.2	17.3		19.1	
OH--CALC	Hydroxide	mg/L			< 0.5	< 0.5		< 0.5	
NITROGEN									
0112CALC	Organic Nitrogen - Total	mg/L			0.14	0.15		0.11	
0113136A	Total Kjeldahl Nitrogen	mg/L	0.04	< 0.04	0.14	0.15	=	0.11	
0114CALC	Total Nitrogen	mg/L			0.16	0.15		0.11	
11081351	Ammonia Nitrogen	mg/L	0.005	< 0.005	< 0.005	< 0.005	=	< 0.005	
11091350	Nitrate+Nitrite (N)	mg/L	0.02	< 0.02	0.02	< 0.02	=	< 0.02	
1110CALC	Nitrate Nitrogen Dissolved	mg/L			< 0.02	< 0.02		< 0.02	
11111354	Nitrite Nitrogen	mg/L	0.005	< 0.005	< 0.005	< 0.005	=	< 0.005	
PHOSPHORUS									
P--D1390	Phosphorus Total Dissolved	mg/L	0.003	0.004	0.003	< 0.003	=	< 0.003	
P--T139A	Phosphorus - Total	mg/L	0.003	0.004	0.010	0.005	=	0.004	
METALS TOTAL									
Ag-T0042	Silver	mg/L	0.03	< 0.03	< 0.03	< 0.03	=	< 0.03	
Al-T0042	Aluminum	mg/L	0.06	< 0.06	0.17	0.09	=	0.07	
As-T0042	Arsenic	mg/L	0.04	< 0.04	< 0.04	< 0.04	=	< 0.04	
B--T0042	Boron	mg/L	0.04	< 0.04	< 0.04	< 0.04	=	< 0.04	
Ba-T0042	Barium	mg/L	0.001	< 0.001	0.006	0.005	=	0.005	
Be-T0042	Beryllium	mg/L	0.001	< 0.001	< 0.001	< 0.001	=	< 0.001	
Bi-T0042	Bismuth	mg/L	0.02	< 0.02	< 0.02	< 0.02	=	< 0.02	
Ca-T0042	Calcium	mg/L	0.05	< 0.05	4.51	4.90	=	5.44	
Cd-T0042	Cadmium	mg/L	0.002	< 0.002	< 0.002	< 0.002	=	< 0.002	
Co-T0042	Cobalt	mg/L	0.004	< 0.004	< 0.004	< 0.004	=	< 0.004	
Cr-T0042	Chromium	mg/L	0.002	< 0.002	0.004	< 0.002	=	< 0.002	
Cu-T0042	Copper	mg/L	0.002	< 0.002	< 0.002	< 0.002	=	< 0.002	
Fe-T0042	Iron	mg/L	0.05	< 0.05	0.51	0.13	=	0.09	

Matrix :	Fresh Water	Fresh Water	Fresh Water
Sampled on:	96/08/25 13:35	96/08/25 13:40	96/08/25 13:45



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10-Sep-96
Page 3 of 5

**ANALYTICAL REPORT
Form 06111169**

Client : JOSEPH S. DEGISI
Project : DAMSUMLO LAKE

Zenon ID :	METHOD	96023434	96023435	METHOD	96023436
Client ID :	BLANK	E223339	E223339	BLANK	E223339
		16.0m	10.0m		0.0m

Sparcode	Parameter	Unit	MDC					
K_T0042	Potassium	mg/L	0.4	< 0.4	0.5	< 0.4	=	< 0.4
Mg-T0042	Magnesium	mg/L	0.02	< 0.02	0.46	0.50	=	0.55
Mn-T0042	Manganese	mg/L	0.002	< 0.002	0.018	0.007	=	0.005
Mo-T0042	Molybdenum	mg/L	0.004	< 0.004	< 0.004	< 0.004	=	< 0.004
Na_T0042	Sodium	mg/L	0.4	< 0.4	0.9	0.9	=	1.2
Ni-T0042	Nickel	mg/L	0.01	< 0.01	< 0.01	< 0.01	=	< 0.01
P_T0042	Phosphorus	mg/L	0.04	< 0.04	< 0.04	< 0.04	=	< 0.04
Pb-T0042	Lead	mg/L	0.03	< 0.03	< 0.03	< 0.03	=	< 0.03
S_T0042	Sulphur	mg/L	0.1	< 0.1	0.3	0.4	=	0.5
Sb-T0042	Antimony	mg/L	0.02	< 0.02	< 0.02	< 0.02	=	< 0.02
Se-T0042	Selenium	mg/L	0.03	< 0.03	< 0.03	< 0.03	=	< 0.03
Si-T0042	Silicon	mg/L	0.8	< 0.8	1.4	1.1	=	1.0
Sn-T0042	Tin	mg/L	0.02	< 0.02	< 0.02	< 0.02	=	< 0.02
Sr-T0042	Strontium	mg/L	0.001	< 0.001	0.028	0.031	=	0.035
Te-T0042	Tellurium	mg/L	0.02	< 0.02	< 0.02	< 0.02	=	< 0.02
Ti-T0042	Titanium	mg/L	0.003	< 0.003	< 0.003	< 0.003	=	< 0.003
Tl-T0042	Thallium	mg/L	0.03	< 0.03	< 0.03	< 0.03	=	< 0.03
V--T0042	Vanadium	mg/L	0.003	< 0.003	< 0.003	< 0.003	=	< 0.003
Zn-T0042	Zinc	mg/L	0.01	< 0.01	< 0.01	< 0.01	=	< 0.01
Zr-T0042	Zirconium	mg/L	0.003	< 0.003	< 0.003	< 0.003	=	< 0.003

GENERAL BIOLOGY

01431810	Chlorophyll A	ug/L	0.5	---	---	---	n/a	0.6
----------	---------------	------	-----	-----	-----	-----	-----	-----

Matrix :	Fresh Water	Fresh Water	Fresh Water
Sampled on:	96/08/25 13:35	96/08/25 13:40	96/08/25 13:



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10-Sep-96
Page 4 of 5

SPIKE SUMMARY
Form 06111169

Parameter	Client ID	Zenon ID	Sample Conc.	Sample & Spike Conc.	Spike Amount	Unit	Percent Recover
pH	Blank Spike. Batch :	64402626	< 0.1	4.0	4	pH units	100
Residue Filterable 1.0u (TDS)	Blank Spike. Batch :	64402586	8	112	100	mg/L	104
Nitrite Nitrogen	Blank Spike. Batch :	64100926	< 0.005	0.102	.1	mg/L	102
Nitrate+Nitrite (N)	Blank Spike. Batch :	64100926	< 0.02	0.41	.4	mg/L	102



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ANALYSIS DATES
Form 06111169

	Zenon ID:	96023434	96023435	96023436
	Client ID:	E223339	E223339	E223339
		16.0m	10.0m	0.0m
00041220	pH	03-SEP-1996	03-SEP-1996	03-SEP-1996
00111160	Specific Conductance	03-SEP-1996	03-SEP-1996	03-SEP-1996
007H1033	Residue Filterable 1.0u (TDS)	03-SEP-1996	03-SEP-1996	03-SEP-1996
01011211	Alkalinity Phen. 8.3	03-SEP-1996	03-SEP-1996	03-SEP-1996
01021210	Alkalinity Total 4.5	03-SEP-1996	03-SEP-1996	03-SEP-1996
0113136A	Total Kjeldahl Nitrogen	05-SEP-1996	05-SEP-1996	05-SEP-1996
11081351	Ammonia Nitrogen	04-SEP-1996	04-SEP-1996	04-SEP-1996
11091350	Nitrate+Nitrite (N)	04-SEP-1996	04-SEP-1996	04-SEP-1996
11111354	Nitrite Nitrogen	04-SEP-1996	04-SEP-1996	04-SEP-1996
P--D1390	Phosphorus Total Dissolved	03-SEP-1996	03-SEP-1996	03-SEP-1996
P--T139A	Phosphorus - Total	03-SEP-1996	03-SEP-1996	03-SEP-1996
MET-F	Metals ICP Water Total	30-AUG-1996	30-AUG-1996	30-AUG-1996
01431810	Chlorophyll A	---	---	30-AUG-1996
	Matrix:	Fresh Water	Fresh Water	Fresh Water
	Sampled on:	25-AUG-1996	25-AUG-1996	25-AUG-1996



Zenon Environmental Laboratories Inc.
 8577 Commerce Court Phone: (604) 444-4808
 Burnaby, B.C. V5A 4N5 Fax: (604) 444-4511

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

6111169

PAGE 1 OF 1

COMPANY NAME: Joseph S. Degisi
 PH. #: 604 847-2575
 FAX #: 604 847-2959

COMPANY ADDRESS: RP #1, Damsunlo Lake, BC
Smilbar, BC
V0J2N0
 SITE LOCATION AND/OR NUMBER: Damsunlo LAKE
E223339 9616

CLIENT PROJECT ID: (#)
 (NAME)

SAMPLER NAME (PRINT): JOE DEGISI
 PROJECT MANAGER:

ANALYSIS REQUEST

FIELD SAMPLE ID	ZENON LAB # (Lab Use Only)	MATRIX			# CONTAINERS	SAMPLING			HEADSPACE VAPOUR	HIGH RES MS	LOW RES MS	PCDD/PCDF	PULP & PAPER CHLOROPHENOLICS	RESIN ACIDS	CHLOROPHENOLS (TRI, TETRA & PENTA)	POLYCHLORINATED BIPHENYLS (PCBs)	DIAGNOSTIC PESTICIDE SCAN	PHENOXY ACID HERBICIDES	SEMI-VOLATILE ORGANICS (BNA's)	VOLATILE ORGANICS (VOC's)	PAH'S LEVEL A ___ LEVEL B ___ LEVEL C ___	BTEX LEVEL A ___ LEVEL B ___ LEVEL C ___	BTEX / LH LEVEL A ___ LEVEL B ___ LEVEL C ___	TEH LEVEL A ___ LEVEL B ___ LEVEL C ___	MINERAL OIL & GREASE GRAY IR	TOTAL METALS LEVEL A ___ LEVEL B ___ LEVEL C ___	DISSOLVED METALS LEVEL A ___ LEVEL B ___	ICAP METALS TOTAL <input checked="" type="checkbox"/> DISSOLVED ___	LOW LEVEL As & Se TOTAL ___ DISSOLVED ___	MERCURY TOTAL ___ DISSOLVED ___	PH / CONDUCTIVITY / ALKALINITY	TSS (NFR) ___ TDS (FR) <input checked="" type="checkbox"/> TS ___	TOTAL KJELDAHL NITROGEN (TKN)	NITRATE / NITRITE / AMMONIA	PHOSPHORUS TOTAL <input checked="" type="checkbox"/> ORTHO ___	CHLORIDE ___ FLUORIDE ___ SULPHATE ___	BOD ___ COD ___	CYANIDE SAD ___ WAD ___	PHENOLICS - 4-AAP	COLIFORM	FECAL ___ TOTAL ___	TOTAL DISSOLVED <u>Fluoride</u>	CHLOROPHENOLS <u>VOLUMETRIC (I.D.L)</u>		
		WATER	SOIL	OTHER		DATE	TIME																																						
<u>E223339</u>	<u>16.0m</u>	<u>23434</u>	<input checked="" type="checkbox"/>		<u>2</u>	<u>25-Aug-96</u>	<u>1335</u>																				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
<u>E223339</u>	<u>10.0m</u>	<u>23435</u>	<input checked="" type="checkbox"/>		<u>2</u>	<u>25-Aug-96</u>	<u>1340</u>																				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<u>E223339</u>	<u>0.0m</u>	<u>23436</u>	<input checked="" type="checkbox"/>		<u>2</u>	<u>25-Aug-96</u>	<u>1345</u>																				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

TAT
 Urgent (72 hr)* ___
 Rush (1 week)* ___
 Regular (2 weeks)
 Other ___
 * Surcharge May Apply

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE

SPECIAL REPORTING OR BILLING INSTRUCTIONS EDT

LAB USE ONLY

CLIENT CODE _____
 ADDRESS CODE _____
 PROJECT MANAGER _____
 QUOTE NUMBER _____

ADDITIONAL SPARCODES

LAB INFORMATION
Sept 11
LOB
JJ

CUSTODY RECORD

RELINQUISHED BY SAMPLER: <u>JOE DEGISI</u>	DATE: <u>25 Aug 96</u>	TIME: <u>1900</u>	RECEIVED BY: <u>JOE JAZVAC</u>
RELINQUISHED BY: <u>JOE JAZVAC</u>	DATE: <u>26 Aug</u>	TIME: <u>1400</u>	RECEIVED BY:
RELINQUISHED BY:	DATE: <u>27 Aug 96</u>	TIME: <u>15:31</u>	RECEIVED BY LABORATORY: <u>[Signature]</u>

Damsunlo Lake 480-0278-657-01

APPENDIX H. ORIGINAL FIELD NOTES

Reconnaissance Lake Inventory Field Notes

Gazetted Name : DAMSUMLO

Alias : N/A

Location and Access

Watershed code (including sequence no.) :

UTM (with source) :

N.T.S. map no. :

SEAM site no. : E 22 3339

Forest District : Kispiox

Drainage : Damsumlo C → → Shedin R

Accessed by De Havilland Otter from Smokee Lake
pickup

Details

(Road: surface condition; directions; odometer distances; Air: mode, distance, flight path, time, disembarkment point)

- landing was E to W (ie towards West) at the W end of the main lake basin
- disembarkment at the small forested island (where MTI was set) NE of the large (main) island
- camp also at small forested island (not previously used as a campsite; before used by survey crew)

Physical Data and Sources

Elevation _____ m

Elevation Source NTS

Sounding Device Lowrance X15 A

Contractor lake reference number: 9616

Benchmark

The benchmark was established in a 50 cm dbh subalpine fir located 10 m inshore, on the NE point of the large island.

An iron spike was placed in an orange circle painted on the tree trunk, 2.15 m above the current lake level. The high water mark was located 0.15 m above the current lake level.

Terrain and Vegetation

Immediate shore

(shoreline substrates; immediate shoreline vegetation; transition to forest; wetland locations; sweepers)

Most shoreline substrates are cobble, except in bays where fines predominate. The immediate shoreline is vegetated by sedges in many places, with alder and willow in a thin discontinuous layer giving way to mature forest within 5-10 m of the lakeshore. Major wetlands form the lakeshore at the NE end of the NE arm, at the N end of the NW arm, and the W end of the south lakeshore. Sweepers are present but do not generally impede access to/from the lakeshore, and are not particularly abundant.

Surrounding country

(terrain; forest cover; cliffs / rock outcrops / meadows; mountains or other visible features)

The terrain near the lake is relatively flat; rolling hills rise in the middle distance and form foothills to the mountain ranges which virtually surround the lake in the far distance. The nearby forest cover is primarily spruce and subalpine fir. Wetland, meadows are present in many places near the lake but most are not visible from the lake surface. Alpine, rock, and snow fields of the Atna Ranges and Shelf Ridge dominate the views from the lake.

Aquatic macrophytes

(types, relative abundance, location of beds)

- N. polysepalum, P. gramineus, P. filiformis (?), H. vulgaris
- beds in NE arm, NW arm, and south of large island, as well as NE of campsite island

Development and Land Use

Campsites or cabins

Neither campsites nor cabins were seen at the lake.

Timber harvest

(locations visible from lake; along inlets or outlet)

None visible or apparent from any location on the lake's surface.

Mining claims, trapping or other human activity

No mining claims or evidence of mining or trapping were observed.

- fuel drum partially submerged in outlet stream debris jam
- very old cut logs (2 pieces) during survey of C4, near lake

Obstructions and pollutions

(beaver dams; beaver activity; other obstructions - waterfalls, cascades, etc. near the lake)

No definite evidence of past or current beaver activity was seen.

The pond N of the NE arm may have been formed by a beaver dam long ago,

Comments, including fish population / angling quality

(trails; aesthetics; fish condition/ appearance; other features/characteristics of interest not previously mentioned)

No human trails were found. No molluscs were collected or seen.

The lake and its setting/surroundings are highly aesthetic due to the pristine condition of the area and the outstanding views of the Atna Ranges and Shelf Ridge.

Moose and abundant waterfowl were observed during the survey, including loons, kingfishers and various ducks. Goose droppings were extremely abundant on the campsite island shore and most sedges had been grazed.

Lake Biophysical Data Form

Date (yy/mm/dd): 96/8/25 Crew: JD/CS

Site ID _____
 Watershed code: _____ Sequence No.: _____
 Gazetted name: DAMSUMLO LAKE. Alias: _____
 FW Region: _____ UTM (Zone, Easting, Northing): _____
 Management Unit: _____ NTS Map No.: _____

Biophysical
 Biogeo Zone _____
 Benchmark (Y/N) _____
 Benchmark details: _____

Nutrient Status
 SEAM No.: E 223339
 Secchi depth (m) 4.8
 Other samples taken: Zooplankton

Limno Station No:			
H2S (mg/l)	<u>0</u>		
H2S comments	<u>no odor</u>		
TDS method			
DO method			
TEMP method			
Alkalinity			

Field Conditions
 wind velocity (km/h) <1 wind direction: SE air temp. (c): 22
 cloud cover (/10 O.C.) 0 surface condition: FLAT CALM water colour: CLEAR

Development
 MOF rec sites (Y/N) N Resort cmpsts (Y/N) N Residences (Y/N) N
 MOF campsites (Y/N) N Resorts (Y/N) N Co. Rec facilities N
 Parks campgrds (Y/N) N Resort cabins (Y/N) N

Recreation
 ROS _____ Biophys features: _____ Biophys sub-feat.: _____

Inlets/Outlets see Stream Survey Card for mandatory fields

Biological
 Fish Card attached (Y/N) N Fish. Man. Com. _____
 Wildlife: _____ Reptiles: _____
 Aquatic birds: _____ Invertebrates: _____
 Amphibians: _____ Aquatic Plants: _____

Comments:
 Water samples: 1335 @ 16.0 m Zooplankton TDW - 120 SECS @ 0.42 m/s
 1340 @ 10.0 m - 30cm DIA NET OPENING, 150µ
 1345 @ 0.0 m - 1403, 96-8-25
 Zenon Requisition # 611169

Lake Survey Profile Data

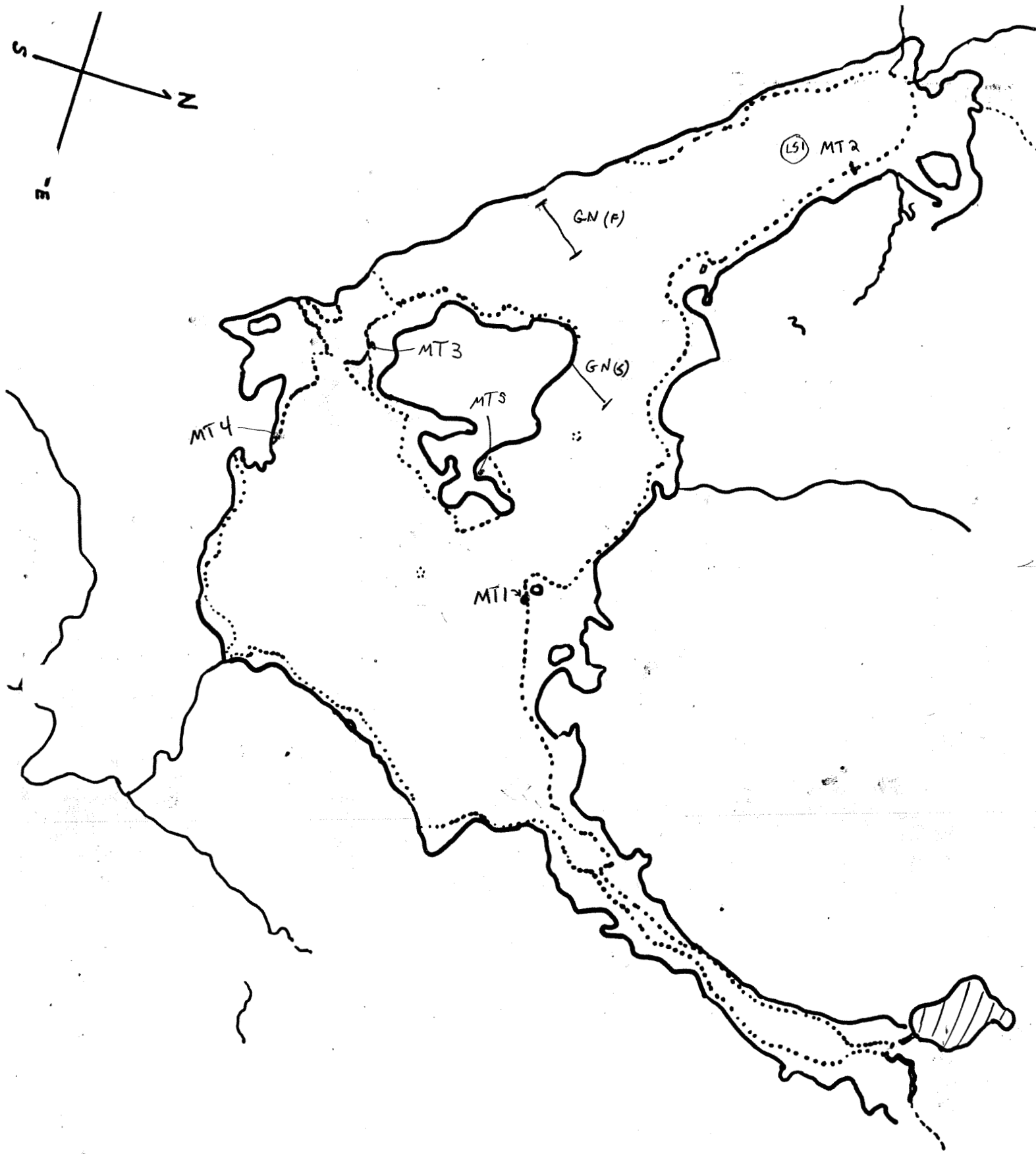
Sequence number: _____

Date : 96-08-25 : 1320
(yy/mm/dd)

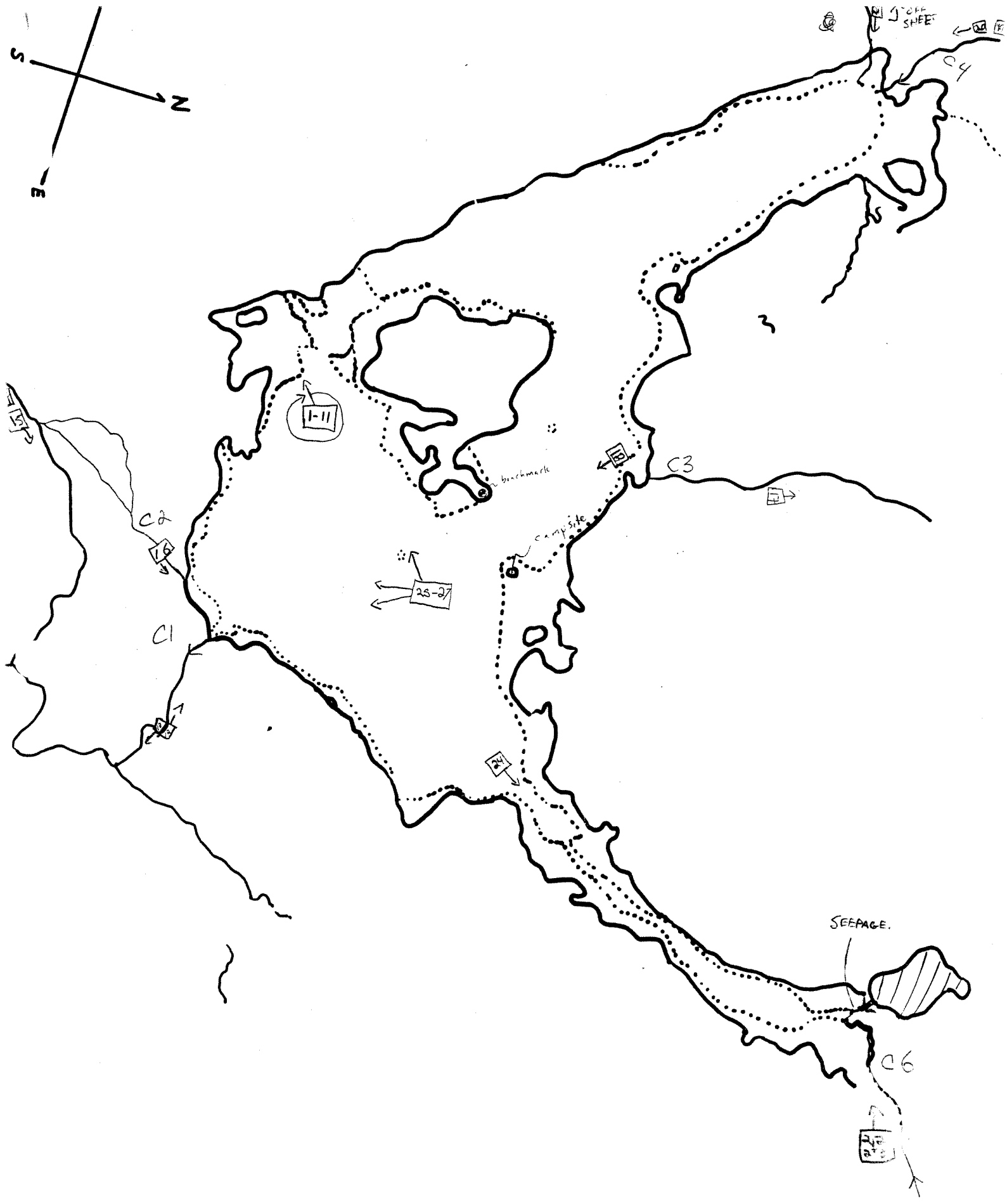
Limnology station: LS1

Depth (m)	D.O. (mg/l)	Temp (c)	TDS (ppm)	Conduct. (umhos/cm)
surface	9.85	14.3		
0.5				
1.0	10.10	12.3		
1.5				
2.0	10.70	11.5		
2.5				
3.0	10.10	11.1		
3.5				
4.0	10.05	11.0		
4.5				
5.0	10.05	10.8		
5.5				
6.0	9.85	10.8		
6.5				
7.0	9.90	10.4		
7.5				
8.0	10.00	10.0		
8.5				
9.0	9.00	8.7		
9.5				
10.0	9.00	8.0		
10.5				
11.0	8.25	7.6		
11.5				
12.0	7.9	7.2		
12.5				
13.0	7.2	7.0		
13.5				
14.0	6.9	7.0		
14.5				
15.0	6.85	7.0		
15.5				
16.0	6.8	6.9		
16.5				
17.0				
17.5				
18.0				
18.5				
19.0				
19.5				
20.0				

Depth (m)	D.O. (mg/l)	Temp (c)	TDS (ppm)	Conduct. (umhos/cm)
20.5				
21.0				
21.5				
22.0				
22.5				
23.0				
23.5				
24.0				
24.5				
25.0				
25.5				
26.0				
26.5				
27.0				
27.5				
28.0				
28.5				
29.0				
29.5				
30.0				
30.5				
31.0				
31.5				
32.0				
32.5				
33.0				
33.5				
34.0				
34.5				
35.0				
35.5				
36.0				
36.5				
37.0				
37.5				
38.0				
38.5				
39.0				
39.5				
40.0				



DAMSUMLO LAKE
SURVEYED BY.



DAMSUMLO LAKE
SURVEYED BY:

9616

FISH COLLECTION METHOD INFORMATION

Card 1 of 1

Date (yy/mm/dd): 96-08-23 Agency: CS8 Crew: JD/CS
 Gazetted Name: DAMSUMLO Alias: _____ UTM: _____
 Lake/Stream/Wetland: LAKE Location: _____ Datum: _____
 Sequence No. _____ Weather: _____
 Watershed code: _____ Reach #: _____

Date (yy/mm/dd)	Sample Site No.	Pass # or trap/net #	Capture Method	Time In (24 hr clock)	Time Out (24 hr clock)	Sampling time (min)	Depth (m)
96-8-23 96-8-23			GN(F)	2040	700		-
			GN(S)	2050	715		0-5
96-8-24		1	MT	900	1150		0.3
		2	MT	925	1155		0.5
		3	MT	1110	1158		0.4
		4	MT	1125	1202		0.4
		5	MT	1235	1205		0.4

BOULDER/FINES/SHELLS
 FINES
 SEDGES
 WEEDS/SEDGES
 WEEDS/FINES

Comments : All GEAR WAS FISHED OVERNIGHT. DATE RECORDED IS
DATE OF SET. GN(S) WAS FISHED WITH SMALLER MESH NEAR
SHORE. GN(F) WAS FISHED WITH LARGER MESH CLOSER TO SHORE.

DFO / MOE
STREAM SURVEY FORM

Stream Name (gaz)		(local)		Access	Method
Watershed Code		DAMSUMLO CREEK.		Reach No	Length (km)
Location		OUTLET OF DAMSUMLO LAKE.		Site No	HTS (m)
Date YMD		7 6 0 8 2 4		Time	1530
Agency		CSB		Crew	JD/CS
U.T.M.		Photos		AirPhotos	
PARAMETER		VALUE		METH	
Ave. Chan. Width (m)		21.5, 15.9, 6.5, 6.9, 7.6, 10.4, 11.8		T	
Ave. Wet. Width (m)		21.5, 15.9, 6.5, 6.9, 7.6, 10.4, 11.8		T	
Ave. Max. Riffle Depth (cm)		45, 28, 38		MS	
Ave. Max. Pool Depth (cm)		1.1, 1.6, 2.0, (m)		MS	
Gradient %		1		CL	
% Pool		10		GE	
Side Chan. %		0		GE	
Debris Area %		90		GE	
COVER: Total %		10		GE	
Comp. sum 100%		40		30	
Crown Closure %		0		E	
DISCHARGE		REACH SYMBOL (Fish)			
Parameter		Value		Method	
Wetted Width (m)		8.3		T	
Mean Depth (m)		0.1, 0.23, 0.24, 0.28, 0.36, 0.38		MS	
Mean Velocity (m/s)		1.25		F	
Discharge (m3/s)		0.33, 0.30, 0			

FISH SUMMARY						STREAM/VALLEY CROSS-SECTION (Looking Downstream)		<input type="checkbox"/>	
C	Species	No.	Size Range (mm)	Use	Medicinal	PLANIMETRIC VIEW		<input type="checkbox"/>	
1		0							
COMMENTS									
Channel Stability <input type="checkbox"/> Debris <input type="checkbox"/> Management Concerns <input type="checkbox"/> Obstructions <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Valley Wall Processes <input type="checkbox"/> Etc.									
- FIRST 100 m FROM LAKE CHANNEL IS SHALLOW AND FAST FLOWING. BED IS MOSTLY BOULDER ALTHOUGH SOME SPAWNING COBBLE IS LOCATED NEAR LAKE. ALL RIFFLE DEPTHS COME FROM THIS REACH. REST OF SURVEY DATA FROM LOWER REACH.									
- CHANNEL FLOWS THROUGH OPEN SEDGE WETLAND BELOW 1ST REACH. CHANNEL HERE IS DEEPER (0.5 - 2 m), HAS SLOWER FLOW AND A SUBSTRATE OF FINES.									
- 1ST REACH FLOWS STRAIGHT WHILE 2ND REACH MEANDERS.									
- 141 SECS OF ELECTROFISHING CAPTURED NO FISH									
								Edited by:	
								Date YMD	

141 SECS

9616 - C1

DFO / MOE
STREAM SURVEY FORM

Stream Name: (gaz)		(local)		Access	Method
Watershed Code:		Reach No.	Length (km)		
Location: Inflow INTO DAM SUMLO LAKE		Map	Site No.	Ln Survey	300m
150 m SOUTH OF OUTFLOW		U.T.M.	File No.	Y N	Field X Hist
Date: YMD	9 6 0 8 2 4	Time	1730	Agency	CSB
				Crwy	JD/CS
				Photos	AirPhotos
C	PARAMETER	VALUE	METH	SPECIFIC DATA	
	Ave.Chan.Width (m)		T	7.5 // 3.5, 3.3, 4.2, 3.4, 8.8	
	Ave.Wet.Width (m)		T	6.6 // 3.5, 2.7, 3.6, 2.7, 5.0	
	Ave.Max.Riffle Depth (cm)		MS	35 // 30, 40, 21, 22	
	Ave.Max.Pool Depth (cm)		MS	75, 55, 38	
	Gradient %	2 // 1	CL	BED MATERIAL %	
	% Pool	1 0	Rife	4 0	Rin
			5 0	Other	
	Side Chan. %	0	GE	BANKS	
	Area %	0	GE	Height (m) 0.3 % Unstable 5	
	Debris Stable %	20 %	GE	Texture F G L R	
	COVER: Total %	10 %	GE	Confinement BN CO FC OC (U) NA	
	Comp. Op.Pool L.O.D. Boulder InVeg OverVeg Cutbank	20 20 20 - 20 20	GE	Valley Channel Ratio 0-2 2-5 5-10 10+ (NA)	
	sum 100%	20 20 20 - 20 20	GE	Stage Dry L M (H) Flood	
	Crown Closure %	70	Aspect N	Flood Signs H(m) 0.4 Braided Y (N)	
			D90 (cm)	Bars (%) 20 pH 6.31 O2 (ppm) -	
			Compaction L/M/H	Water Temp (C) 10.1 Turb (cm) - Cond (25C) 40	
DISCHARGE					
	Parameter	Value	Method	Specific Data	
	Wetted Width (m)	3.8	T		
	Mean Depth (m)		MS	0.71, 0.72, 0.53, 0.49, 0.40	
	Mean Velocity (m/s)	0.33	F		
	Discharge (m3/s)				
REACH SYMBOL (Fish)					
(Width Valley/Channel Slope) Bed Material					

FISH SUMMARY						STREAM/VALLEY CROSS-SECTION (Looking Downstream) <input type="checkbox"/>		R
C	Species	No.	Size Range (mm)	Life Stage	Use	Method	Rec	
2		0				FL		
COMMENTS						PLANIMETRIC VIEW <input type="checkbox"/>		
Channel Stability <input type="checkbox"/> Debris <input type="checkbox"/> Management Concerns <input type="checkbox"/> Obstructions <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Valley Wall Processes <input type="checkbox"/> Etc.								
1 - FIRST 200m FROM LAKE CHANNEL HAS MODERATE SIDE CHANNEL DEVELOPMENT;								
200-300m FROM LAKE STREAM SHOWS SIGNS OF DEBRIS TOPRANT, OR								
EXTREME SPRING FLOODS. SEVERAL SIDE CHANNELS EXIST AND LARGES ARE								
DEPOSITED ON WIDE AREAS OF THE BANK.								
- AT ~ 300m CHANNEL FORKS INTO CHANNEL SURVEYED AND A LARGER								
CHANNEL THAT FLOWS INTO DAMSUMLO CREEK. ABOVE THIS POINT CHANNEL								
IS MUCH LARGER AND HAS A SUBSTRATE OF MOSTLY BOULDERS. PARAMETERS								
LEFT OF // ARE FROM CHANNE U/S OF FORK.								
- SPAWNING HABITAT FAIR TO GOOD IN SOME LOCATIONS; REARING FAIR.								
2 116 SECS OF ELECTROFISHING CAPTURED NO FISH.								
- LARGE ALLUVIAL FAN OF MINERAL FINES AND GRAVEL AT MOUTH								
Edited by:								
Date YMD								

116 SEC

9616-C2

DFO / MOE
STREAM SURVEY FORM

Stream Name (gaz)		(local)		Access	Method
Watershed Code				Reach No.	Length (km)
Location: INFLOW INTO DAMSUMLO LAKE				Map#	Site No.
ON NORTH SIDE OF LAKE ACROSS EPOM ISLAND U.T.M.				Field Card	Y N
Date YMD	9/6/08	Time	2:00	Photos	AirPhotos
PARAMETER		VALUE	METH	SPECIFIC DATA	
Ave. Chan. Width (m)			MS	0.56, 1.00, 1.2, 1.65, 1.05	
Ave. Wet. Width (m)			MS	0.56, 1.00, 0.9, 1.65, 1.00	
Ave. Max. Riffle Depth (cm)			MS	10, 4, 6, 8, 2	
Ave. Max. Pool Depth (cm)			MS	30, 45, 32, 27, 35	
Gradient %		2.5	CL	BED MATERIAL %	
% Pool		40	GE	clay, silt, sand (<2mm)	70
Side Chan. %		0	GE	small (2-15mm)	S
Debris Stable %		70	GE	large (16-64mm)	S
COVER: Total %		20%	GE	sm. cobble (64-128mm)	S
Comp. sum 100%		40	40	lge. cobble (128-256mm)	9
Crown Closure %		90%	S	boulder (>256mm)	10
DISCHARGE		REACH SYMBOL (Fish)		BANKS	
Parameter	Value	Method	Specific Data		
Wetted Width (m)	0.45	MS			
Mean Depth (m)		MS	0.06, 0.21, 0.21, 0.18		
Mean Velocity (m/s)	0.13	F			
Discharge (m3/s)					

FISH SUMMARY						STREAM/VALLEY CROSS-SECTION (Looking Downstream)	
C	Species	No.	Size Range (mm)	Use	Method/Rec.	L	R
2	-	0			VO		
COMMENTS						<input type="checkbox"/> PLANIMETRIC VIEW <input type="checkbox"/> STREAM/VALLEY CROSS-SECTION	
Channel Stability <input type="checkbox"/> Debris <input type="checkbox"/> Management Concerns <input type="checkbox"/> Obstructions <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Valley Wall Processes <input type="checkbox"/> Etc.							
- CHANNEL BORDERS AND DRAINS SEVERAL WETLANDS.							
- FLOW IS SLOW AND APPEARS VERY STABLE							
1 - ~ 20 m FROM LAKE STREAM FALLS OVER A ROCKY CHUTE. THIS IS LIKELY A BARRIER TO MOST FISH PASSAGE AT THIS FLOW LEVEL.							
- POOR SPAWNING HABITAT AND FAIR REARING.							
2 - VISUAL OBSERVATION DURING SURVEY CAPTURED NO FISH.							
						Edited by:	
						Date YMD	

9616-C3

DFO / MOE
STREAM SURVEY FORM

Stream Name (gaz)		(local)		Access	Method
Watershed Code		RACE No.		Length (km)	
Location: INFLOW INTO DAMSUMLO LAKE IN		Map	Scale	Asy (m)	500
NORTH WEST BAY, MOUTH OF STREAM ON POINT		U.T.M.	File Card	Y N	Field #
Date YMD	9 6 0 8 2 5	Time	0900	Agency	CSB
		Agency	CSB	Project	CS/JD
PARAMETER		VALUE	METH	SPECIFIC DATA	
Ave. Chan. Width (m)			T	6.9, 3.9, 16.7, 7.9, 5.9	
Ave. Wet. Width (m)			T	5.7, 3.9, 6.6, 4.4, 3.5	
Ave. Max. Riffle Depth (cm)			MS	24, 33, 26, 17, 21, 14	
Ave. Max. Pool Depth (cm)			MS	55, 60, 73, 80, 83, 70	
Gradient %		3/3	CL	BED MATERIAL %	
% Pool		10	GE	Height (m)	
Side Chan. %		0	GE	Texture	
Debris		50	GE	Confinement	
COVER: Total %		10	GE	Valley Channel Ratio	
Comp. sum 100%		20	50	Flood Signs H(m)	
Crown Closure %		30	GE	Bars (%)	
DISCHARGE		Parameter		REACH SYMBOL (Fish)	
		Value		7.8	
		Method			
		Specific Data			
Wetted Width (m)		6.7	F		
Mean Depth (m)			M	0.12, 0.17, 0.18, 0.40, 0.39, 0.26, 0.2	
Mean Velocity (m/s)		0.27	F		
Discharge (m3/s)					

FISH SUMMARY							STREAM/VALLEY CROSS-SECTION (Looking Downstream)		<input type="checkbox"/>	
C	Species	No.	Size Range (mm)	Life Stage	Use	Method/Ref.	PLANIMETRIC VIEW		<input type="checkbox"/>	
1		0				EL				
COMMENTS										
Channel Stability <input type="checkbox"/> Debris <input type="checkbox"/> Management Concerns <input type="checkbox"/> Obstructions <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Valley Wall Processes <input type="checkbox"/> Etc.										
- CHANNEL IS HIGHLY MEANDERING NEAR LAKE. A LARGE ALUVIAL FAN IS LOCATED AT STREAM MOUTH. CHANNEL BECOMES MORE CONFINED FURTHER FROM LAKE.										
- CHANNEL OFFERS GOOD TO EXCELLENT SPAWNING HABITAT AND PAID REARING HABITAT.										
- 180 SECS OF ELECTROFISHING CAPTURED NO FISH.										
1 DOES NOT CREATE BARRIER TO FISH										
Edited by:										
Date YMD										

180 SECS

9616-C4

DFO / MOE
STREAM SURVEY FORM

Stream Name: (gaz) <u>DAMSUMLO CREEK</u> (local)		Access	Method
Watershed Code		Length (km)	
Location: <u>INLET INTO DAMSUMLO LAKE ON SOUTH SIDE OF BAY AT NORTH WEST END OF LAKE</u> U.T.M.		Map Scale	500m
Date: YMD <u>9/6/08</u>	Time <u>1030</u>	Agency <u>CSB</u>	Project <u>JD/CS</u>
PARAMETER		VALUE	METH
Ave. Chan. Width (m)			MS 1.9, 0.9, 0.85, 1.65, 2.15, 1.15
Ave. Wet. Width (m)			MS 1.9, 0.9, 0.85, 1.65, 1.60, 0.95
Ave. Max. Riffle Depth (cm)			MS 6, 7, 4, 11, 9, 7
Ave. Max. Pool Depth (cm)			MS 25, 31, 25, 41, 17
Gradient (%)		<u>< 1.65, 5.23</u>	CL
% Pool		<u>110</u>	GE
Side Chan. %		<u>0</u>	GE
Debris Stable %		<u>80</u>	GE
COVER: Total %		<u>25</u>	GE
Comp. sum 100%		<u>10 30 10 - 30 20</u>	
Crown Closure %		<u>65</u>	Aspect <u>NE</u>
BED MATERIAL			
Fine		clay, silt, sand (<2mm)	5
Gravel		small (2-16mm)	5
Large		large (16-64mm)	10
Larger		sm. cobble (64-128mm)	30
Bedrock		lge. cobble (128-256mm)	30
		boulder (>256mm)	20
BANKS		Height (m) <u>0.25</u> % Unstable <u>5</u>	
		Texture <u>F</u> G L R	
Confinement		EN CO <u>FC</u> OC UC N/A	
Valley: Channel Ratio		<u>0-2</u> <u>2.5</u> 5-10 10+ N/A	
Flood Signs H(m)		<u>0.25</u> Braided <u>Y</u> <u>N</u>	
Bars (%)		<u>5</u> pH <u>5.86</u> O ₂ (ppm) <u>-</u>	
Water Temp (C)		<u>-</u> Turb (cm) <u>-</u> Cond (25C) <u>23</u>	
DISCHARGE			
Parameter	Value	Method	Specific Data
Wetted Width (m)	<u>1.4</u>	<u>MS</u>	
Mean Depth (m)		<u>MS</u>	<u>0.07, 0.18, 0.23, 0.23, 0.10</u>
Mean Velocity (m/s)	<u>0.07</u>	<u>F</u>	
Discharge (m ³ /s)			
REACH SYMBOL (Fish)		<u>19.6</u>	

FISH SUMMARY				STREAM/VALLEY CROSS-SECTION (Looking Downstream)	
C	Species	No.	Size Range (mm)	Use	Method
1		0			EL
COMMENTS					
Channel Stability <input type="checkbox"/> Debris <input type="checkbox"/> Management Concerns <input type="checkbox"/> Obstructions <input type="checkbox"/> Riparian Zone <input type="checkbox"/> Valley Wall Processes <input type="checkbox"/> Etc.					
- FIRST 100 m OF CHANNEL IS FLOODED WITH LAKE WATER.					
- CHANNEL RUNS BY A NUMBER OF SMALL WETLANDS, SEVERAL SEEPAGE CHANNELS DRAIN WETLANDS INTO CHANNEL.					
- FLOW APPEARS EXTREMELY STABLE.					
- SEVERAL CHUTES OVER DEBRIS DAMS WERE FOUND DURING SURVEY. ALL WOULD BE PASSABLE AT HIGHER FLOWS					
- 98 SECS OF ELECTROFISHING CAPTURED NO FISH.					
Edited by:					
Date YMD					

98 sec

7616-05

DFO / MOE
STREAM SURVEY FORM

Stream Name (gaz)	(local)	Access	Method
Watershed Code	Reach No.	Lngh(km)	
Location: INLET INTO DAMSUMLO LAKE IN	Map	W. Side (m)	E. Side (m)
NARROW BAY AT NORTH END OF LAKE	U.T.M.	Field No.	Field X
Date YMD 9/6/08	Time 15:30	Surveyor CSB	JD/CS
PARAMETER		VALUE	METH
Ave. Chan. Width (m)			T 3.4, 3.7, 1.6, 1.8, 3.7, 3.1
Ave. Wet. Width (m)			T 3.4, 2.9, 1.6, 1.8, 3.4, 3.1
Ave. Max. Riffle Depth (cm)			MS 15, 20, 8, 15, 16, 19
Ave. Max. Pool Depth (cm)			MS 60, 62, 50, 47, 60, 64
Gradient %		0.5	CL
% Pool		0.5	GE
Side Chan. %		0	GE
Debris Stable %		50	GE
COVER: Total %		30	GE
Comp. sum 100%	Dp. Pool	L.O.D.	Boulder
	10	20	-
	-	-	40
	-	-	30
Crown Closure %	30	Aspect	S
BED MATERIAL %			
Fine	clay, silt, sand (<2mm)	10	
Gravels	small (2-16mm)	10	
	large (16-64mm)	10	
	sm. cobble (64-128mm)	20	
	lge. cobble (128-256mm)	20	
	boulder (>256mm)	30	
BANKS			
Height (m)	0.3	% Unstable	C
Texture	(F) G L R		
Confinement	EN CO FC OC UC NA		
Valley Channel Ratio	0-2 2-5 5-10 10+	(N/A)	
Flood Signs H(m)	Dry L (M) H Flood		
Bars (%)	20	pH	6.79
		O ₂ (ppm)	-
Water Temp (C)		Turb (cm)	-
		Cond (25C)	62
DISCHARGE			
Parameter	Value	Method	Specific Data
Wetted Width (m)	2-7	T	
Mean Depth (m)		MS	0.04, 0.12, 0.21, 0.23, 0.25
Mean Velocity (m/s)	0.36	V	
Discharge (m3/s)			
REACH SYMBOL		(Fish)	
10.1		_____	

Specie	No.	Size Range (mm)	Life Span	Use	Method/Ref

STREAM/VALLEY CROSS-SECTION

(Looking Downstream)

PLANIMETRIC VIEW

COMMENTS

Channel Stability <input type="checkbox"/>	Debris <input type="checkbox"/>	Management Concerns <input type="checkbox"/>	Obstructions <input type="checkbox"/>	Riparian Zone <input type="checkbox"/>	Valley Wall Processes <input type="checkbox"/>	Etc.
- SHORT (~ 3m) ALDER CLOSE THE CANOPY OVER SHORT LENGTHS OF CHANNEL.						
- CHANNEL BORDERS WETLAND HABITAT AND DRAINS IT VIA MANY SMALL SEEPAGE CHANNELS.						
- GOOD TO EXCELLENT SPAWNING HABITAT AND FAER REARING HABITAT.						

211 SECS

9616-C6

PHOTO SURVEY FORM - PHOTO DETAILS

Card ___ of ___

Date (yy/mm/dd): 96/08/24
 Gazetted Name: DAMSUMLO LAKE

Agency: C58
 Alias: N/A

Crew: JD/CS
 UTM: _____

318
 3200 7770000
 3200 7770000

Date (yy/mm/dd)	Roll No. Counter No.	Direction (N, S, E, W)	Subject description / location taken from
960824	1-11	SW→SW	PANORAMA OF DAMSUMLO FROM BAY SOUTH OF LARGE ISLAND
	12		U/S VIEW OF C1 ≈ 100m FROM LAKE
	13		D/S VIEW OF C1 ≈ 100m FROM LAKE
	14+15		U/S + D/S VIEWS OF C2 ≈ 500m FROM LAKE.
	16	N	D/S VIEW OF C2 ≈ 50m FROM LAKE.
	17		U/S VIEW OF C3
	18	SE	Atna Ranges
	19		U/S VIEW OF C4 ≈ 500m FROM LAKE
	20		D/S VIEW OF C4 " " "
	21		D/S VIEW OF C5 ≈ 200m FROM LAKE
	22+23		D/S VIEW OF C6 ≈ 100m " "
	24	NE	VIEW OF LONG, NARROW BAY AT NE. END OF LAKE.
	25-27	SE→W	PANORAMA OF DAMSUMLO SHORE SOUTH EAST TO WEST
	28		Unkram
	29-32		Aerial photographs 9616
	33		Unkram

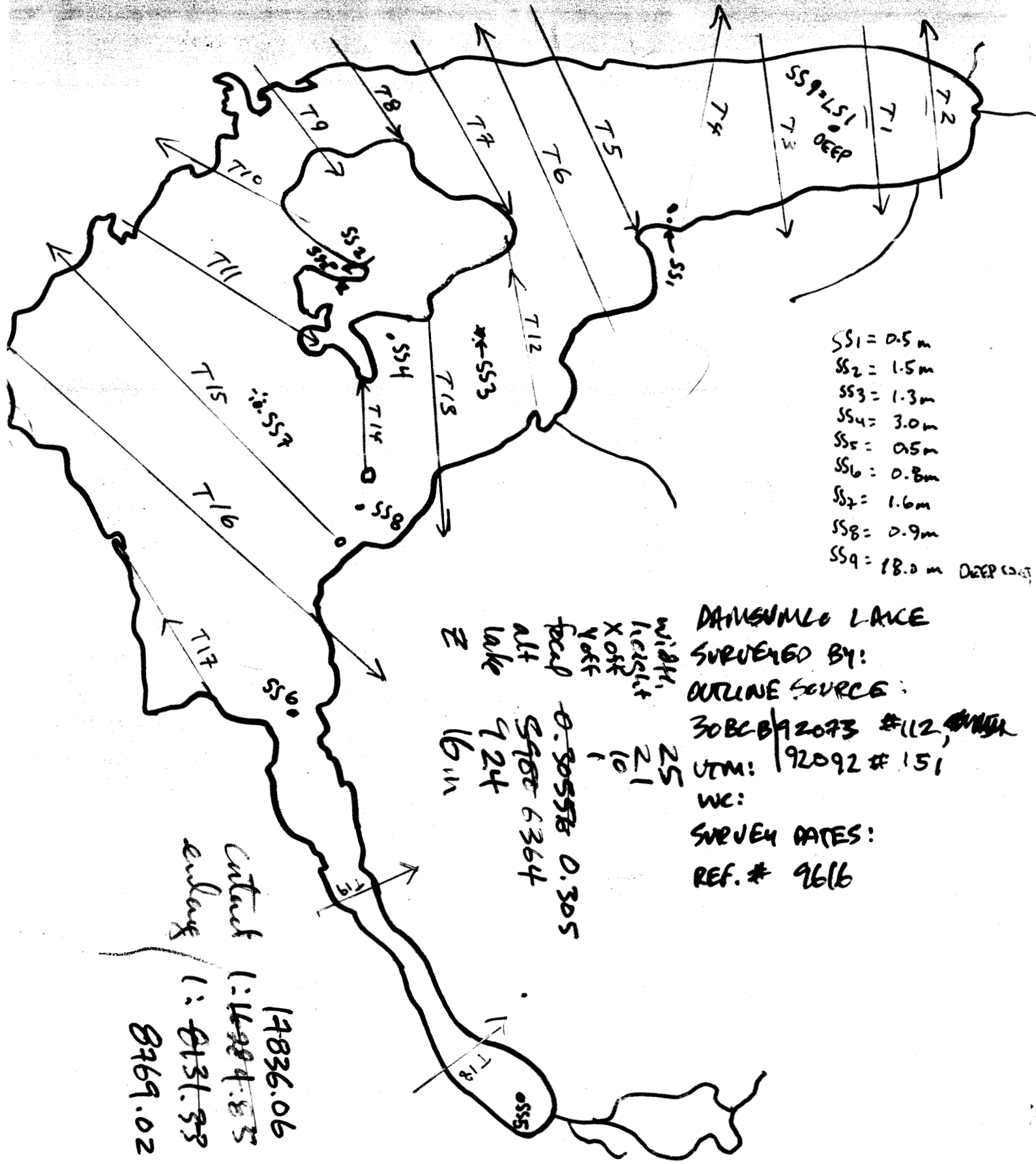
BATHYMETRIC SURVEY DATA

Card ___ of ___

Date (yy/mm/dd): 96/08/24 Agency: C58 Crew: JD/CS
 Gazetted Name: DAMSUMLO Alias: N/A UTM: _____
 Watershed code: _____ Seq. No. _____ Datum: _____

Transect number	Distance from shore		Maximum depth (m)	Comments
	start (m)	end (m)		
1	8	5	16	
2	5	0	15	
3	3	4	11	
4	3	3	14	
5	4	2	13	
6	5	2	15	
7	5	3	7	
8	5	2	4.3	
9	5	10	1.1	
10	4	3	3	
11	5	3	6	
12	3	3	12	
13	3	4	7	
14	4	4	7	
15	6	4	7	
16	5	5	10	
17	3	3	8.5	
18	5	10	1.5	
19	8	10	1.0	

Comments : _____



- SS1 = 0.5 m
- SS2 = 1.5 m
- SS3 = 1.3 m
- SS4 = 3.0 m
- SS5 = 0.5 m
- SS6 = 0.8 m
- SS7 = 1.6 m
- SS8 = 0.9 m
- SS9 = 18.0 m DEEP (cont.)

DAMSUNLO LAKE
 SURVEYED BY:
 OUTLINE SOURCE:
 30BCB/2073 #112, ~~UNCL~~
 UTM: 92092 #151
 WC:
 SURVEY DATES:
 REF. # 9616

width, 25
 height, 21
 X off, 1
 Y off, 10
 focal, 0.305578 0.305
 alt lake, 5708 6364
 lake, 924
 Z, 16 m

17836.06
 contact 1: 14984.85
 enlarge 1: 8131.93
 8769.02