RECONNAISSANCE LAKE INVENTORY
OF
UPPER TUCHODI LAKE*

AUGUST 16-18, 1999

WSC: 212-580800-40300

Prepared for:
BC Environment
Fisheries Section
400-10003-110 Ave.
Fort St. John, B.C.
V1J 6M7

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MARCH 2000

Project Reference Information

MoELP Project Number	2734
FDIS Project Number	2734
MoELP Region	07B
MoELP District	Fort St. John District
FW Management Unit	7-50
Forest Region	Prince George
Forest District	Fort Nelson Forest District
Forest Licensee and Tenure #	N/A

Watershed Information

Watershed Group	Middle Muskwa
Watershed Code	212-580800-40300
Waterbody Identifier	00366MMUS
UTM at Lake Outlet	10.413620.6454000
Order at Lake Outlet	6
Number of Tributaries	4
Drainage Area	822 km²
Magnitude	3975
Elevation	879 m
NTS Map	94K/1 & 94K/2
TRIM Map	094K.017, 094K.018, 094K.028
BEC Zone	SWB
Air Photos	15 BC 86102 #016

Lake Sampling Summary

Lake Survey Type	Primary
Lake Survey Date	August 16-18, 1999
Water Surface Area	804.15 ha
Max. Depth	42.5 m
Mean Depth	19.9 m
Secchi Depth	1.7 m
Volume	159,797,700 m^3
Area Above 6m Contour	223.49 ha
Shoreline Perimeter	25,600 m
Lake Length	9,750 m
Number of Islands	0
Species Present in Lake	LT BT LW MW LSU BB CCG

Contractor Information

Project Manager	B. Culling, Diversified Environmental Services Box 6263, Fort St. John, B.C. V1J 4H7 (250) 787-9101
Field Crew	B. Culling, T. Euchner
Data Entry by:	T. Euchner, K. Newsholme
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Report edited by:	D. Culling
Maps prepared by:	Waberski-Darrow Survey Group 10720-100 Avenue, Fort St. John, B.C. V1J 1Z3 (250) 787-0300
Water Chemistry Conducted by:	CanTest Ltd., 1523 West 3rd Ave., Vancouver, B.C. V6J 1JB (604) 734-7276
Scale and Otolith sample analysis by:	T. Euchner, B. Culling Diversified Environmental Services Box 6263, Fort St. John, B.C. V1J 4H7 (250) 787-9101
Pelvic Fin Ray sample analysis by:	North/South Consultants Ltd. 2-1475 Chevrier Blvd., Winnipeg, Manitoba R3T 1Y7 (204) 284-3366

Disclaimer

This product has been accepted as being in accordance with approved standards within the limits of Ministry quality assurance procedures. Users are cautioned that interpreted information on this product developed for the purposes of the Forest Practices Code Act and Regulations, for example stream classifications, is subject to review by a statutory decision maker for the purposes of determining whether or not to approve an operational plan.

Acknowledgments

Funding for this inventory was provided by the Muskwa-Kechika Trust Fund and BC Environment. The authors wish to thank Jeff Burrows, Fisheries Inventory Biologist, BC Environment - Fisheries Branch; and Nick Baccante, Regional Fisheries Biologist, BC Environment - Fisheries Branch; for their support throughout this project. We also wish to thank Ross Peck - Ross Peck Outfitters Ltd. - Fort St. John for his historical perspective of the Tuchodi Lakes area, and his hospitality and assistance with transporting our field gear from Upper Tuchodi Lake* to Lower Tuchodi Lake*.

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1.0 INTRODUCTION

1.1 Project Scope and Objectives

In 1998, following the formal designation of the Muskwa-Kechika Management Area and the Muskwa-Kechika Trust Fund, the Fort St. John Fisheries Section of BC Environment undertook an inventory project designed to gather overview fish and fish habitat inventory information on the Middle Muskwa watershed group. While this survey concentrated on riverine habitats, a number of lakes within the Muskwa-Kechika Management Area were also identified as having no previous fisheries surveys or dated, incomplete surveys. The Tuchodi Lakes, known locally as "Upper" or "West Tuchodi Lake*" and "Lower" or "East Tuchodi Lake*", were among this group of lakes.

Diversified Environmental Services was contracted by the Fort St. John Fisheries Section of BC Environment to undertake primary lake surveys of Upper and Lower Tuchodi Lakes* according to Reconnaissance 1:20,000 Fish and Fish Habitat Inventory Standards for primary lake surveys. The survey of Upper Tuchodi Lake* was conducted from August 16 to 18, 1999. The survey was part of a B.C. Environment objective to complete an overview inventory of the Middle-Muskwa watershed group initiated in 1998. The survey also fulfills part of a long term objective to complete an overview inventory of the entire Muskwa watershed.

1.2 Location

Upper Tuchodi Lake* is located on the eastern slopes of the Muskwa Ranges of the Rocky Mountains, approximately 114 km southwest of Fort Nelson. The lake is situated within the Spruce Willow Birch (SWB) biogeoclimatic zone of the Eastern Muskwa Ranges ecosection.

The lake is located along the upper mainstem of the Tuchodi River (WSC 212-580800-40300) approximately 60 km upstream of its confluence with the Muskwa River (Fig. 1).

1.2.1 Access

Upper Tuchodi Lake* is located in a remote wilderness area and is not accessible by road. Alternate access methods include fixed-wing aircraft on floats in summer, or skis in winter, and by riverboat, foot, or horseback.

Floatplanes generally depart from Parker Lake near Fort Nelson or from Muncho Lake. Directions from Fort Nelson to Upper Tuchodi Lake* are as follows: from the centre of Fort Nelson travel west on the Alaska Highway for approximately 12 km. Turn left from

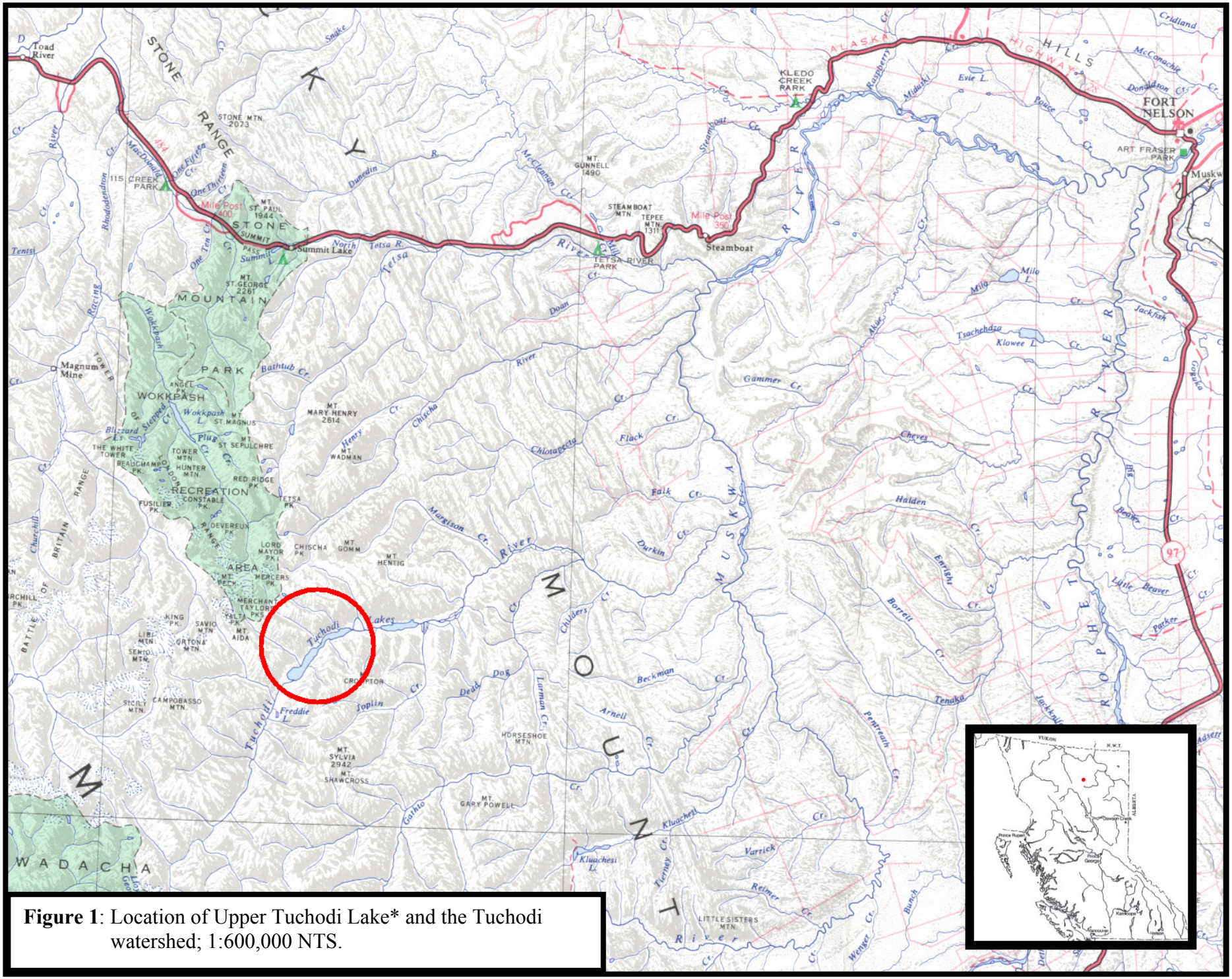

Figure 1: Location of Upper Tuchodi Lake* and the Tuchodi watershed; 1:600,000 NTS.

the highway and travel south along a gravel road for approximately 1.5 km (Parker Lake is visible directly ahead in the distance after turning off the highway). From the lake, depart by plane on a bearing of 246 degrees. Flying time, which will vary depending on aircraft type, is approximately one hour (approximately 114 km).

Directions to Upper Tuchodi Lake*, via Muncho Lake, are as follows: from the centre of Fort Nelson travel approximately 246 km north on the Alaska Highway to Muncho Lake. Depending on the air charter company hired, departure may occur anywhere along the eastern shore where shoreline access has been developed by either private landowners or BC Parks. Flying time to Upper Tuchodi Lake* is approximately one hour (approximately 114 km).

Riverboaters travelling to Upper Tuchodi Lake* generally depart from a boat launch located near the confluence of Kledo Creek and the Muskwa River. Directions from Fort Nelson to the boat launch are as follows: from the centre of Fort Nelson travel approximately 57 km west on the Alaska Highway. Shortly after crossing the Alaska Highway bridge over Kledo Creek, a narrow gravel road joins the highway from the left (south). Turn south off the highway and travel approximately 3.5 km to the banks of the Muskwa River. This launch is open to the public and is maintained by the Fort Nelson Rod and Gun Club and the BC Forest Service. Amenities include parking, outhouses and a battery powered winch to assist vehicles unable to ascend the launch. During peak use periods (generally September 1 to October 31), a number of riverboat charter operators establish permanent camps at the launch area to provide packing services for elk and moose hunters.

Traditional, unmarked pack trails lead to the Tuchodi River valley from various locations along the Alaska Highway where it parallels the Tetsa River (R. Peck, pers. comm.). To travel by horse to the Tuchodi River valley, from trail-heads along the Alaska Highway, requires approximately 3-5 days depending on the route taken. Guide outfitter, Ross Peck's main camp is located adjacent to the Tuchodi River at the mouth of Margison Creek, approximately 15 km downstream of Lower Tuchodi Lake*. Riding time from the main camp to Lower and Upper Tuchodi Lakes* is approximately 3 and 6 hours, respectively (R. Peck, pers. comm.).

2.0 RESOURCE INFORMATION

2.1 First Nations Issues and Interests

Upper Tuchodi Lake* falls within the traditional use area of the Kaska Dene, Sekani, Slavey, and Beaver cultures of the Lower Post, Prophet River, Fort Nelson, and Halfway River First Nations (Anonymous, 1997). The lake and surrounding area have potential for archaeological, cultural, and heritage resources and are significant in terms of hunting, trapping, and fishing values.

2.2 Development and Land Use

Industrial activity within the vicinity of Upper Tuchodi Lake* has been limited by its remote location. Disturbances related to industrial activity have been confined to occasional oil, gas and mineral exploration that occurred sometime in the 1950's (R. Peck, pers. comm.). The only noticeable traces of these activities at the lake are the remains of a wooden dock constructed by Standard Oil near the mouth of an unnamed tributary (alias: Standard Creek) entering Upper Tuchodi Lake* from the north. Old seismic lines are visible, downstream of the lake, within the Tuchodi River valley.

Further industrial development in the area of Upper Tuchodi Lake* is now unlikely as the lake lies in the core of the newly formed Northern Rocky Mountains Park. Formally designated as a Protected Area in 1998 to preserve the area's natural diversity and unique wilderness and recreational values, activities such as logging, mining, hydroelectric, and oil and gas exploration and development are prohibited (Anonymous, 1997). Recognition and special consideration is given to existing tenures, licenses, authorizations, and public use where these are deemed compatible with the objectives of the Protected Areas Strategy.

Activities, uses, and facilities within the Northern Rocky Mountains Park that have been specifically identified in the Fort Nelson Land and Resource Management Plan (LRMP) include grazing, water control structures, road construction, motorized water activities, commercial back-country recreation (CBR) and human/bear interactions. Issuance of grazing permits will continue as necessary to support CBR activities. Small-scale water diversion structures will be permitted with the intent of providing water to base camps of commercial operators with approved CBR plans. Road construction is prohibited, as is the use of motorized boats upstream of Upper Tuchodi Lake*. Environmentally sustainable CBR activities will be approved provided they maintain a balance between public recreation and other uses. These activities must be conducted to minimize negative bear/human interactions. Recurring aircraft and riverboat use and access must be sensitive to the values of the area and other resource user activities.

Guide outfitting operations around Upper Tuchodi Lake* have been active since at least 1948. In 1961 individual guide outfitting areas were officially created by the Province and the outfitting area encompassing the Tuchodi Lakes was allocated to Don Peck. In 1964, occupied parcels of land were officially surveyed by the Province, and tenure was granted to Don Peck. Since 1980, the guide outfitting area has been owned and operated by Ross Peck of Ross Peck Outfitting Ltd. There are a variety of tenures associated with the current operation. Upon expiration, they are expected to fall under the Park Use Permit granted to Ross Peck since creation of the Northern Rocky Mountains Park (R. Peck, pers. comm.).

The only development at Upper Tuchodi Lake* associated with Peck's guiding operation is a small cabin located on District Lot 2623 at the east end of the lake. It is believed that the cabin was originally constructed around 1942 by the US Armed Forces during the

construction of the Alaska Highway. At the time of the survey, the cabin was undergoing some renovation.

There are no established recreational facilities at Upper Tuchodi Lake* however several informal sites, as evidenced by fire-pits, sawed logs and wall tent frames, are scattered around the perimeter of the lake.

2.3 Wildlife Values

The Northern Rocky Mountains Park, which includes the Tuchodi River watershed, is referred to as the Serengeti of the North due to its outstanding wildlife values. Ungulate species around the lake include elk, moose, caribou, whitetail and mule deer, Stone's sheep, and mountain goat. Predators, including black and grizzly bears, wolves, coyotes, and wolverine, are abundant. Smaller furbearers such as fisher, marten, red squirrel, and snowshoe hare are also present. A variety of bird species are known to use portions of the area as important staging and migration routes (Anonymous, 1997).

Prescribed fire has been historically used to increase winter forage availability for both wildlife and horses within the Tuchodi River valley. The majority of this burning has occurred downstream of the Tuchodi Lakes and is especially prevalent on south-facing valley slopes from the mouth of Margison Creek downstream to the Muskwa River. The slopes now provide critical winter range for elk, moose and sheep that reside within the Tuchodi valley year around or migrate from as far away as the Lower Muskwa River near Fort Nelson (R.B. Woods, pers. comm.).

2.4 Historical Fisheries and Water Quality Information

The limited historical fisheries data available for Upper Tuchodi Lake* includes lake and stream surveys, annual reports of angling guide activities, and anecdotal file information (Table 1).

A lake survey was conducted August 30 - September 1, 1982 by D. Coombes and J. Hammond of the Fish and Wildlife Branch, BC Ministry of Environment. In 1998, the Fisheries Section of Ministry of Environment, Lands and Parks (MoELP) began an overview fisheries assessment of the Middle Muskwa watershed group that included several sites within the Tuchodi River watershed. Although no direct lake sampling was conducted during the survey, fish collections at sites within close proximity to Upper Tuchodi Lake* provide some additional insight on possible species occurrences within the lake.

Table 1: Fish species previously recorded in Upper Tuchodi Lake* and its tributaries prior to this survey.

SPECIES	DATE	INFORMATION SOURCE
lake trout (*Salvelinus namaycush*)	1982	MoELP lake survey
bull trout (*Salvelinus confluentus*)	1998	MoELP Overview Inventory of Middle Muskwa
Arctic grayling (*Thymallus arcticus*)	not specified	MoELP lake files
rainbow trout (*Onchorhynchus mykiss*)	not specified	MoELP lake files
mountain whitefish (*Prosopium williamsoni*)	1998	MoELP Overview Inventory of Middle Muskwa
lake whitefish (*Coregonus clupeaformis*)	1982	MoELP lake survey
slimy sculpin (*Cottus cognatus*)	1998	MoELP Overview Inventory of Middle Muskwa

The 1982 lake survey was only partially completed due to inclement weather. A full bathymetric survey was not completed and subsequently a bathymetric map of the lake was not produced. Fish sampling was limited to one sinking experimental gill-net set and some angling; no floating gill-net or minnow trap sets were made. The total catch of the survey included 4 lake trout *(Salvelinus namaycush*) and 11 lake whitefish (*Coregonus clupeaformis*). Aging structures were collected from only 2 lake trout and 3 lake whitefish that were netted however no ages were noted in the lake survey report; attempts to locate the structures were unsuccessful.

The 1982 lake survey report indicates that 2 live lake trout and 1 lake whitefish were transported to the Fish Health Laboratory at the Pacific Biological Station in Nanaimo in June 1983. The reason for the examination and how the fish were captured and transported nearly a year after the lake survey is unclear, however a document attached to the lake survey report describing the findings of the analysis is entitled "Hatchery Disease Investigation Report". Each specimen was found to be infected with a *Diphyllobothrium sp*. cestode and *Cotylurus sp*. fluke. White nodules appearing in the pericardial cavity were attributed to the metacercariae (secondary host, encysted stage) stage of the *Cotylurus sp*. fluke while white cysts on the gut tissue were the encysted stage of the *Diphyllobothrium sp*. cestode.

The only water quality data available for Upper Tuchodi Lake* is from the 1982 survey. Again due to weather conditions a limnology station could not be established and only an opportunistic water sample was taken. The subsequent analysis included routine water quality parameters and a full spectrum of metals.

In 1998, overview inventory sampling (MoELP) in the Tuchodi River watershed augmented existing fisheries information for the area. Fish species sampled at sites located immediately upstream and downstream of Upper Tuchodi Lake* included bull trout (*Salvelinus confluentus*), mountain whitefish (*Prosopium williamsoni*) and slimy sculpin (*Cottus cognatus*).

Rainbow trout (*Onchorhynchus mykiss*) may have been released into the Tuchodi Lakes on two occasions (FISS 1999). The first release occurred in 1962 with the introduction of 9000 rainbow fingerlings in a joint effort by former guide outfitter, Don Peck, and the Province. According to Ross Peck these fish were only released into Lower Tuchodi Lake*. Whether a second stocking occurred is unclear; the 1982 survey report cites anecdotal information from local residents and an inscription on the wall of the cabin at Upper Tuchodi Lake* indicating the lake was stocked in 1976 (Coombes and Hammond 1982); the current outfitter is not aware of the 1976 stocking attempt. There is no record of rainbow trout being caught in Upper Tuchodi Lake* since their introduction to the watershed.

Additional information on fish occurrence in Upper Tuchodi Lake* was derived from activity reports submitted by angling guides, as a condition of their licence renewal. These reports list bull trout, Arctic grayling (*Thymallus arcticus*), and mountain whitefish captures in Upper Tuchodi Lake* (Anonymous 1988).

3.0 METHODS

The lake survey was conducted in accordance with methodologies outlined in *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures, RIC, Version 1.1 (April 1998, Errata March 1999); Bathymetric Standards for Lake Inventories, RIC, Version 2.0 (Jan 1999); Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Data Forms and User Notes, RIC, Version 1.1 (April 1998, Errata March 1999);* and *Fish Collection Methods and Standards, RIC, Version 4.0 (Jan 1997, Errata #1 March 1999).*

The following deviations from the above standards are incorporated into this report:

- In consideration of contradictions between the *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures, RIC, Version 1.1* (March 1999 Errata) and the *Bathymetric Standards for Lake Inventories, RIC, Version 2.0,* (Jan 1999), the outlet of the lake, and not the inlet or centre, was used as the geo-reference point for the lake. This decision was made as the lake outlet is not expected to shift over time and outlets have traditionally been used as the standard geo-reference point for surveyed lakes.
- Although required by the *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures, RIC, Version 1.1 (April 1998, Errata March 1999),* the total metals package laboratory analysis was omitted as agreed by the Fisheries Inventory Biologist.

- "D" size bathymetric maps were produced as per *Bathymetric Standards for Lake Inventories, RIC, Version 2.0 (Jan 1999),* despite a contradictory requirement for "E" size plots found in the *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures, RIC, Version 1.1 (April 1998, Errata March 1999).*

The survey of Upper Tuchodi Lake* was undertaken on August 16-18, 1999. The equipment and surveyors were transported to Upper Tuchodi Lake* from Muncho Lake by a DHC-6 Beaver. The survey was conducted from a 4.2 m Zodiac inflatable boat with 30 hp outboard motor.

Table 2 lists equipment used during the course of the lake survey, as well as surveys of inlet and outlet streams.

Table 2: List of field equipment.

EQUIPMENT	PARAMETER	MAKE AND MODEL
Gill-nets	fish species present	300′ (91.4 m) 6-panel experimental (1 sinking and 1 floating)
Electro-fisher	fish species present	Coffelt Mark X
Minnow trap	fish species present	Gee
Depth sounder	bathymetric profile	Lowrance X-15A
Boat and motor	-	3 m Zodiac with 15 hp outboard
Water column sampler	water samples from depth	Lamotte Horizontal Water Sampler, Model # JT-1
Field pH meter	water pH	Hanna Instruments Model pHep-1
DO meter	dissolved O_2 and temp. at depth	YSI Model 51B
GPS receiver	field geo-referencing	Garmin GPS II PLUS
Camera	photodocumentation	Pentax ME-Super 35 mm with 35 and 50 mm lenses
Abney level	site gradient	Can-measure 5X
Meter stick	channel and wetted width, impasse height, pool depth	2-metre folding
Thermometer	water temperature	Fisher alcohol
Range finders	channel and wetted width	Ranging 120, Ranging 620
Conductivity meter	water conductivity	Hanna Instruments HI 8033
Hip chain	site length	Chainman II

Lake bathymetry data was collected with a Lowrance X-15A sounder. One lake-length e-line transect and 17 cross-basin transects were recorded at boat speeds of approximately 1.8 m/s.

Raw transect data was used to establish the limnology stations where maximum lake depth was recorded. A YSI Model 51B oxygen meter with YSI 5739 probe and 50 m cable were used to record dissolved oxygen and water temperature at 1 m intervals from surface to bottom. Secchi depth, water colour, surface and bottom pH and conductivity were also recorded. Routine water chemistry analysis was conducted on water samples collected at the surface and near bottom at limnology station #1.

Fish sampling was conducted using a Coffelt Mark X gas-generator backpack electro-fisher, 6 Gee minnow traps and 2 - 300 ft (91.4 m) experimental sinking and floating gill-nets. Species, total number, and size range were recorded for all fish captured. Fork length, weight, sex and maturity were recorded and aging structures were collected.

Stream sample sites were evaluated on the outlet and on all inlets where a wetted stream channel was apparent.

Bathymetric profile data was transcribed as per *Bathymetric Standards for Lake Inventories, RIC, Version 2.0 (Jan 1999)* and a suitable CAD program was used to interpolate contours and calculate bathymetric statistics.

4.0 RESULTS AND DISCUSSION

All photographic plates referred to in Section 4.0 are found in Appendix I. Lake survey forms, results of water chemistry analyses, site data cards, fish collection forms, and site photographs may be found in Appendices II to VIII. A site card data legend, useful for interpreting the cards, may be found in Appendix IX.

4.1 Logistics

No logistical problems related to weather, equipment, or sampling were encountered following departure from Muncho Lake on August 16, 1999. Safety considerations due to swift current and high total suspended solids (TSS) in the Tuchodi River mainstem, required estimating some channel measurements during the survey of the primary inlet and outlet.

4.2 Benchmark

The original lake level benchmark was established during the 1982 survey, on the east-northeast shoreline, approximately 1 km upstream of the outlet (Figs. 2 to 4, Plates 1 and 2). An orange painted steel spike was driven into a 15 cm DBH Engelmann spruce at a height of 2 m above the water level, and 0.8 m above the high water mark.
The established benchmark was located during the 1999 survey. The current water level was determined to be 1.8 m below the benchmark. The high water mark remains unchanged at 0.8 m below the benchmark.

4.3 Immediate Shoreline

Shorelines are typically low on alluvial fans (Plate 3) and moderate to steeply sloped in most other areas (Plate 4). Gravel and sand beaches are dominant, with cobble and boulder occurring in areas washed frequently by wave action. Emergent and submergent vegetation occurs sporadically in the shallows of bays that offer some protection from wave action and where there is adequate littoral area such as the inlet delta at the west end of the lake.

Coniferous forest and scattered patches of willow and dwarf birch grow to within a few metres of the water's edge around most of the lake and are generally dense. Exceptions are alluvial fans where forest cover is thinner and includes more frequent components of willow and birch, and occasional patches of balsam poplar.

4.4 Terrain

The lake is situated in a steep sided "U" shaped valley, and surrounded by mountainous terrain (plates 5 and 6). Slopes rise sharply away from the lake giving way to rugged peaks up to 2600 m. Valley walls are paralleled by benches originating from lateral moraines deposited by receding glaciers. These are especially evident along the north side of the lake. The middle slopes are heavily vegetated, with white spruce dominant. Upper slopes are characterized by krummholz and alpine tundra, with exposed bedrock above. The larger tributaries entering the valley have formed immense alluvial fans that project into the lake (Plate 7). One alluvial fan, at approximately the midpoint of the lake shore, pinches off the lake bringing the opposing shorelines within 260 m of each other, resulting in two distinct lake basins. In a similar fashion, another alluvial fan blocks the valley at the lake outlet.

4.5 Aquatic Flora

Submergent and emergent species including clasping leaf pondweed (*Potamogeton perfoliatus* var, *richardsonii*), sago pondweed (*Potamogeton pectinatus*) and *Equisetum spp.* are present, however they are extremely limited in distribution. The majority of the littoral zone is unvegetated.

4.6 Site Summary

An annotated aerial photograph (Fig. 2) and lake outline maps (Figs. 3-4) show locations of photographs, gill-net, minnow trap, and stream electro-fishing sites, limnological stations, benchmark, lake inlets and the outlet. For clarity, annotations related to bathymetry and limnology site activities are depicted in Figure 3 while annotations related to fish sampling are depicted in Figure 4.

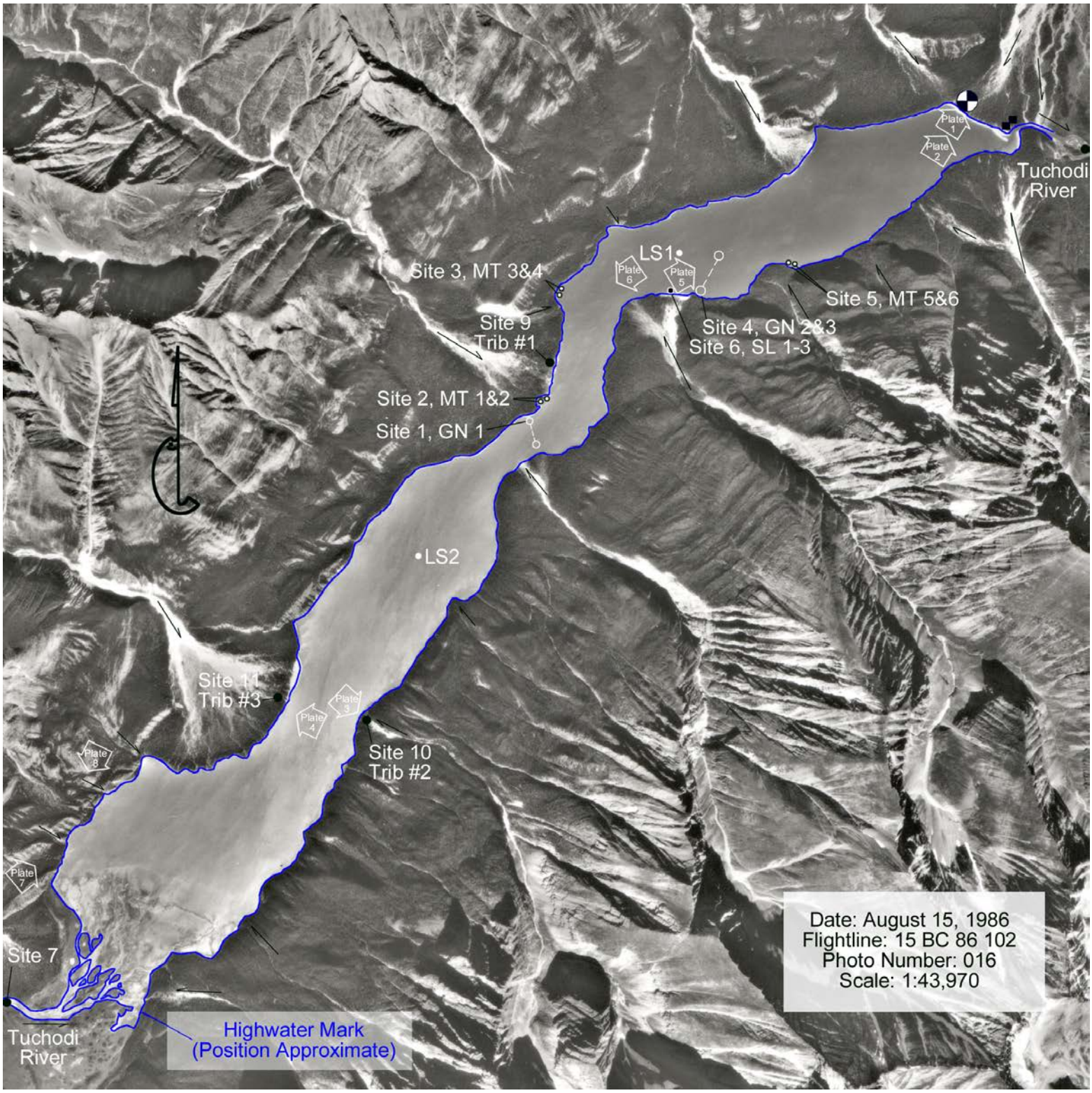

Figure 2: Annotated air photo of Upper Tuchodi Lake*.

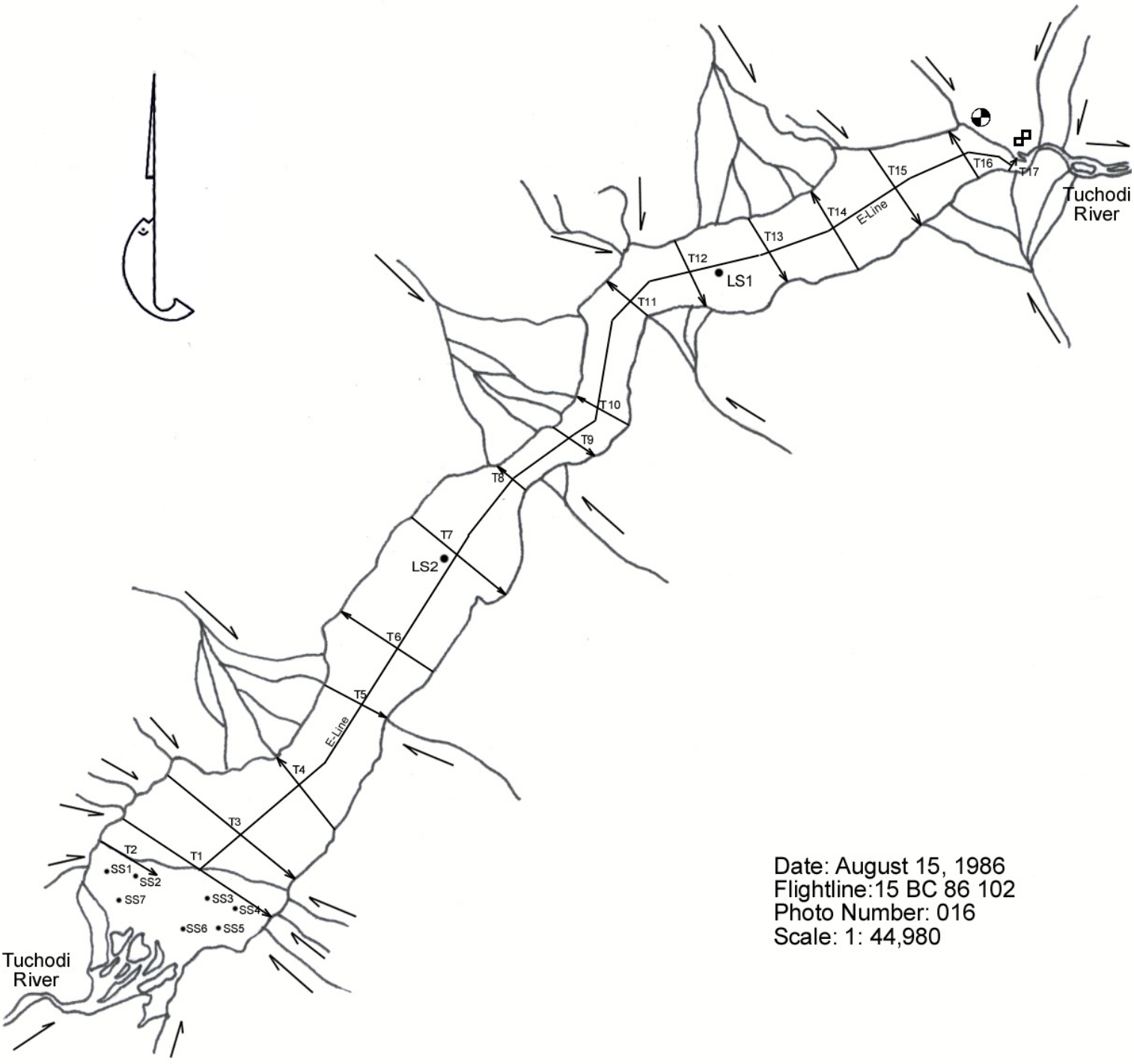

Figure 3: Annotated outline of Upper Tuchodi Lake*; bathymetry and limnological sampling sites.

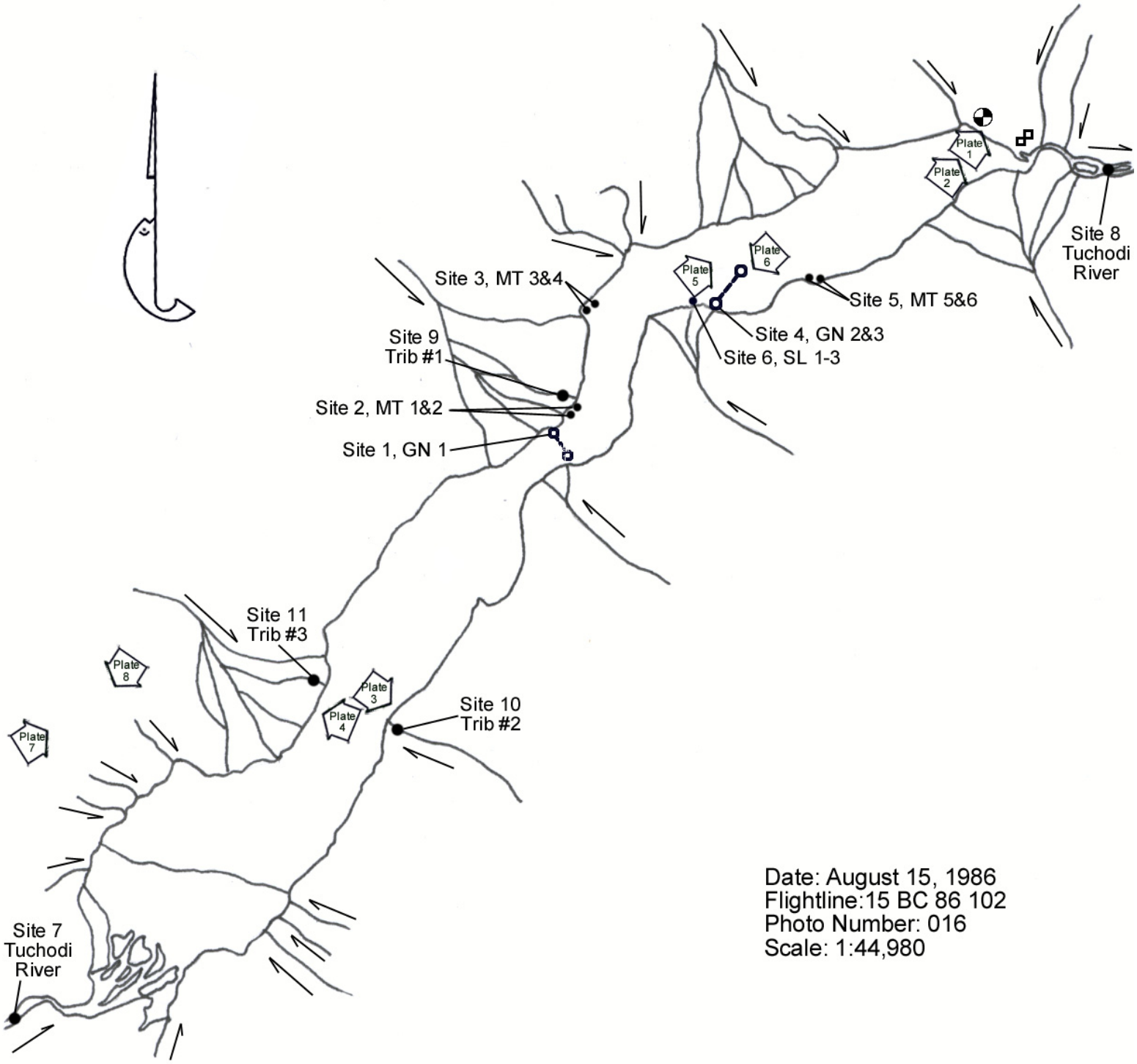

Figure 4: Annotated outline of Upper Tuchodi Lake*; fish sampling and photograph locations.

4.7 Bathymetry

Seventeen bathymetric sounding transects and an e-line were recorded during the survey (Fig. 3). Table 3 shows CAD generated surface areas and calculated lake volume per contour interval based on:

$$Volume = \frac{h_1}{3}\left(a_1 + a_2 + \sqrt{a_1 \times a_2}\right) + \frac{h_2}{3}\left(a_2 + a_3 + \sqrt{a_2 \times a_3}\right) + \frac{h_3}{3}\left(a_3 + a_4 + \sqrt{a_3 \times a_4}\right) + \cdots$$

where a = the plan area inside the contour line in square metres (m^2) and h = the depth of the contour interval in metres (m).

Table 3: Volume calculations for Upper Tuchodi Lake* by contour interval.

Contour Interval	Area	Volume
Surface	8,041,497 m²	-
Surface – 6 m	5,806,577 m²	41,362,687 m³
6 – 12 m	4,897,083 m²	32,072,270m³
West Basin		
12 – 18 m	2,932,655 m²	16,758,408 m³
18 – 24 m	2,655,769 m²	14,613,088 m³
24 – 30 m	2,221,711 m²	10,858,436 m³
30 - 36 m	1,426,970 m²	6,632,291 m³
36 - 39 m	812,449 m²	1,473,808 m³
39 - 40 m	229,527 m²	76,509 m³
East Basin		
12 – 18 m	1,964,450 m²	11,071,087 m³
18 – 24 m	1,728,450 m²	9,683,935 m³
24 – 30 m	1,502,173 m²	7,941,470 m³
30 - 36 m	1,152,685 m²	5,632,340 m³
36 - 39 m	739,946 m²	1,332,028 m³
39 - 42 m	203,775 m²	286,100 m³
42 - 42.5 m	19,419 m²	3,237 m³
	Total Volume	159,797,695 m³

Figure 5 represents a reduced version of the final bathymetric map of the lake including benchmark location, bathymetric statistics and survey information. A “D” size hard copy bathymetric map can be found in Appendix XI.

4.8 Limnological Sampling

Two deep basins were detected in Upper Tuchodi Lake* during the bathymetry survey. A limnological station was established at the deepest point of each basin. A summary of sampling conditions and results appears in Table 4. Dissolved oxygen (mg/l) and

temperature (°C) profiles are shown in Figures 6 and 7. Tabular dissolved oxygen and temperature data is recorded on the lake survey form in Appendix II. The values used to produce the profiles in Figure 6 and 7 are the averages of the dissolved oxygen and temperature readings taken in ascending and descending directions.

Table 4: Limnological Station #1 and 2; field sampling conditions and results.

STATION #1 (east basin)			
Date	August 17, 1999	**Cloud cover**	50% Overcast
Time	19:00 hrs.	**Water surface**	10-20 cm chop
Air temperature	+15 °C	**Water color**	Milky blue
Wind direction	Westerly	**Secchi depth**	1.7 metres
Wind velocity	<10 km/h		
Water Quality Parameter	Surface (0.5 m)		Bottom (42.5 m)
Temperature* (°C)	12.6		8.2
Dissolved oxygen* (mg/l)	9.5		4.2
pH	8.8		8.8
Conductivity (µS/cm)	301		366
STATION #2 (west basin)			
Date	August 17, 1999	**Cloud cover**	100% Overcast
Time	15:45 hrs.	**Water surface**	20-40 cm chop
Air temperature	+16.5 °C	**Water color**	Milky blue
Wind direction	Westerly	**Secchi depth**	1.3 metres
Wind velocity	20-30 km/h		
Water Quality Parameter	Surface (0.5 m)		Bottom (37.0 m)
Temperature* (°C)	12.3		8.5
Dissolved oxygen* (mg/l)	9.2		7.5
pH	8.1		8.4
Conductivity (µS /cm)	302		347

* Descending and ascending temperature and dissolved oxygen values averaged.

Metres 1:12,500

NOTES:
1 – Depths are in metres.
2 – ⛢ Denotes bench mark.
3 – Not intended for navational uses. Uncharted rocks and shoals may exist.

SURVEYED BY: T. Eucher/ B. Culling DATE: August 16–18, 1999 OUTLINE SOURCE: BCGS Trim	Diversified Environmental Services

STATISTICS AT TIME OF SURVEY

Elevation	879 m ±
Surface Area	8,041,500 sq. m
Area above 6m contour	2,234,920 sq. m
Volume	159,797,700 cu. m
Mean Depth	19.9 m
Maximum Depth	42.5 m
Perimeter, Main Shore	25,600 m
Bench Mark	1.8 m
Bench Mark Type	Spike in Tree
Estimated Annual Fluctuation	1.4 m

UPPER TUCHODI LAKE*

WATERSHED CODE: 212–580800–40300		LAKE SEQUENCE NO. 2
WATERBODY ID: 0369MMUS		UTM COORDINATE: 10, 413620, 6454000
MLI: 71–92	DATE: March, 2000	SCALE: 1:12,500
DIGITIZED: T.E.	REVISION DATE:	
CONTOURS: CAD	APPROVED:	NTS NO. 94K/2 + 94K/7
TECH. CHECK: B.A.C.		TRIM NO. 094K.017,018,028

Figure 5: Bathymetric map of Upper Tuchodi Lake*; reduced 50% from original.

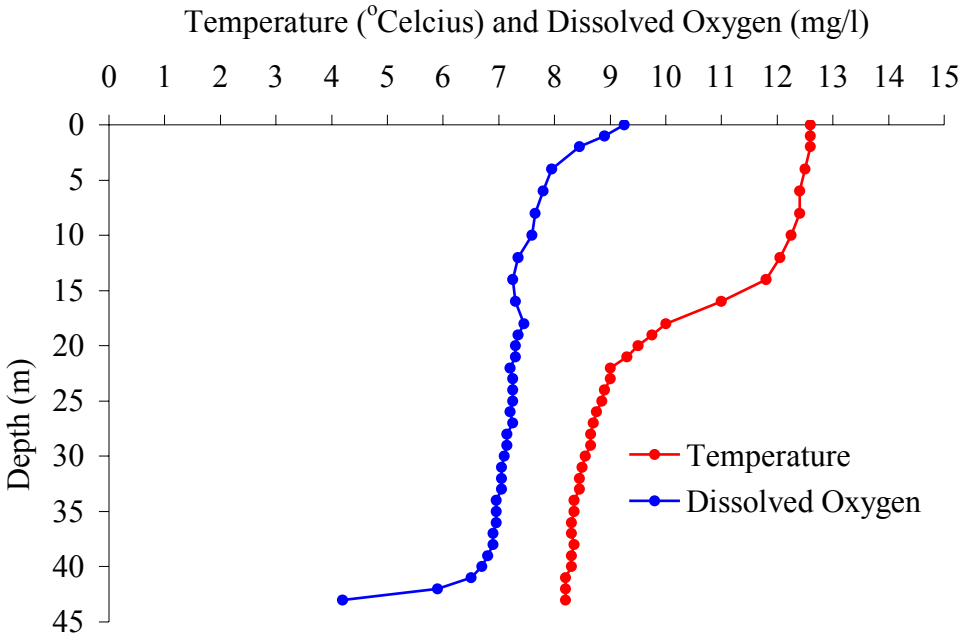

Figure 6: Dissolved oxygen and temperature profile for Upper Tuchodi Lake* Limnology Station #1 (east basin), August 17, 1999.

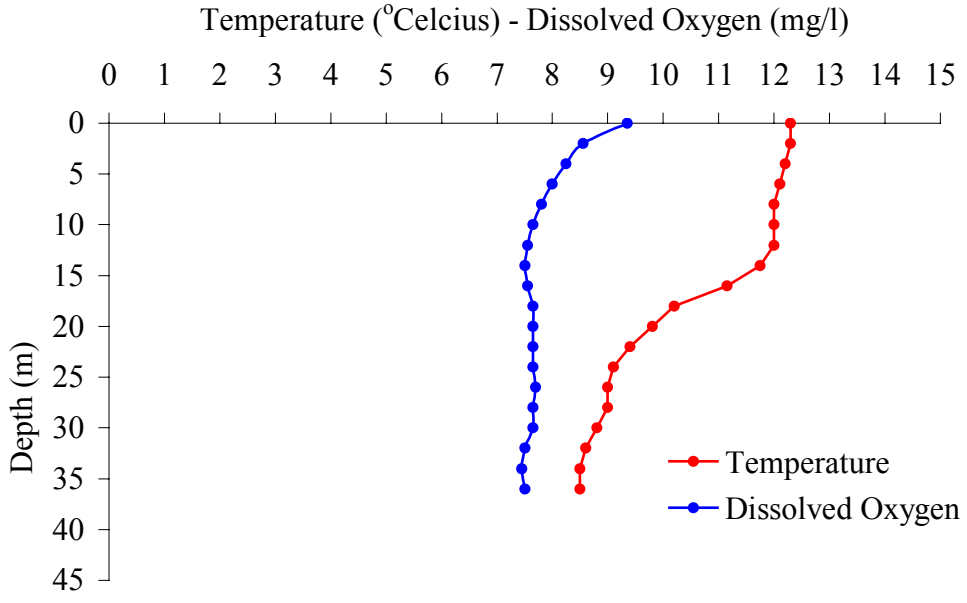

Figure 7: Dissolved oxygen and temperature profile for Upper Tuchodi Lake* Limnology Station #2 (west basin), August 17, 1999.

At the time of the survey, thermal stratification at Upper Tuchodi Lake* was well defined in each basin. A rapid decline in water temperature between 14 and 21 m at both sites indicates the position of the thermocline. Below the thermocline, water temperature and dissolved oxygen levels are nearly homogenous to the bottom. A rapid decline in dissolved oxygen was observed at Limnology Station #1 between 40 m and the lake bottom at 42.5 m.

There was no single water quality factor measured during the survey that would preclude fish survival in Upper Tuchodi Lake*. Results of laboratory analysis of water samples from the surface and bottom of Upper Tuchodi Lake* at Limnology Station #1 can be found in Appendix III.

4.9 Inlets and Outlets

Upper Tuchodi Lake* forms reach 8 of the Tuchodi River mainstem (WSC 212-580800-40300). During the lake survey, stream sampling was conducted within reach 9 of the Tuchodi River, immediately upstream of the lake, and in reach 7, immediately downstream of the lake. In addition, the lower reach of three secondary tributaries flowing into the lake, were surveyed. Site and fish cards and site photographs for the inlet and outlet surveys are found in Appendices IV to VIII.

Upstream of the influence of the lake, the primary inlet (sample site 7), has an average channel width of 47.4 m and average wetted width of 40.3 m. With a single channel and a gradient of approximately 1%, the river meanders irregularly across the valley floor, and is occasionally confined by valley walls and bedrock protrusions (Plate 8). Dominant substrates are gravels and cobbles. Fines are also abundant in slack water areas, side bars, and interstices between gravels. Total suspended solids (TSS) from melt waters originating from the Lloyd George Glacier, at the headwaters of the Tuchodi River, cause the river to be highly turbid and milky-blue in colour even in late summer. Reduced visibility and swift flows caused by the glacial runoff prevented safe measurement of residual pool depths. Flood signs including rafted debris and staining on exposed bedrock outcrops indicate that the Tuchodi River may rise as much as 1.2 m above the level recorded at the time of the survey. Site card, fish collection form, and site photographs for the primary inlet are found in Appendix IV.

High TSS levels and low mean annual water temperature may limit the habitat potential of this reach of the Tuchodi River, and most likely the entire Tuchodi River upstream of Upper Tuchodi Lake*. Low light penetration and temperatures reduce overall primary production and consequently the abundance of food resources for fishes entering the river from Upper Tuchodi Lake*. Large predatory fishes, such as lake trout and bull trout, depending largely on sight for catching their prey would have difficulty foraging in these conditions. Egg to fry survival rates would be compromised by the low temperatures and deposition of fines.

The lake outlet (sample site 8) begins as a relatively narrow channel 40-50 m wide as it exits the lake. Within 300 m downstream, the channel becomes braided, with several channels coursing through an accumulation of alluvial deposits originating from a large tributary flowing from the north. Because of moderately high flows and water depth, many of these channels could not be waded safely; channel widths were estimated by range-finder. Average channel and wetted widths were 104 (range 64-170 m) and 91.5 m (range 64-139), respectively. Average gradient over the surveyed reach was approximately 1.3 %. Pool depths were difficult to obtain due to flow conditions but were estimated to be at least 2 m. The dominant substrate type was cobbles followed by gravels. The dominant cover feature was deep pool habitat. Small woody debris accumulations, and boulders were also present in moderate abundance. Site card, fish collection form and site photographs for the outlet site appear in Appendix V.

The Tuchodi River, between Upper and Lower Tuchodi Lakes*, provides a moderate abundance of quality fish habitat. Adult bull trout and mountain whitefish may use the deep pool habitat both as summer rearing habitat and perhaps as overwintering habitat. It is also likely that bull trout, mountain whitefish and perhaps lake trout use some portions of the Tuchodi River in this reach for spawning. An abundance of granular substrates, deep pool escape cover, and the moderating effect of the lake on temperature, and flow conditions, combine to increase the suitability of the reach for spawning. Large bull trout were observed congregating a short distance downstream of Upper Tuchodi Lake* on approximately September 10 of the previous years (R. Peck, pers. comm.). The braided nature of the channel increases the amount of side channel habitats available for juvenile bull trout and mountain whitefish rearing.

Tributary #1 (Unnamed Creek WSC 212-580800-40300-59700 Site 9, Reach 1) enters Upper Tuchodi Lake* from the north near the lake's centre. Although TRIM mapping indicates the channel splits and rejoins numerous times as it flows across a large alluvial fan before entering the lake, only a single wetted channel was found during the survey. Average channel and wetted widths of the surveyed reach were 4.15 and 3.15 m respectively. The gradient averaged 2 %. The tributary has deposited an immense alluvial fan, which, over time may eventually divide the lake into two separate basins. The channel is characterized by low sloping banks comprised mainly of fines. The riparian area is forested mainly with immature conifers. There are numerous abandoned channels and elevated bars indicating that the present channel is unstable and unlikely to remain in its current position as more material is deposited over the alluvial fan. Site card, fish collection form, and site photographs for Tributary #1 are found in Appendix VI.

Tributary #1 offers only a moderate amount of habitat suitable as cover for rearing fish such as bull trout and mountain whitefish. Pools averaging 0.41 m are the dominant cover type, followed by a limited amount of undercut bank and small woody debris. The tributary may also provide limited spawning habitat for bull trout and mountain whitefish residing in Upper Tuchodi Lake*. Successful recruitment, however, is likely limited by factors such as inadequate flow through the incubation period, and spring freshet, which appears to alter the position of the channel from one season to the next.

Tributary #2 (Unnamed Creek WSC 212-580800-40300-62500 Site 10, Reach 1) enters Upper Tuchodi Lake* from the south. From its source high in the adjacent mountains, the creek flows down a steep, confined valley, terminating at Upper Tuchodi Lake* by dispersing through an accumulation of alluvial debris and the forest floor. The absence of a well defined channel made measurement of most channel features difficult. The average channel width of the surveyed portion of the tributary was estimated to be approximately 2 m. Described as a cascade-pool morphology, the tributary was characterized by steep gradient (13%) and boulder and cobble dominated substrates, and was almost exclusively riffle. The system is likely unstable and prone to wide variations in flow. Flood signs 1 m above the stream bed, abandoned channels, and elevated bars were common within the sample site. Because of its high gradient and unstable nature Tributary # 2 offers limited habitat potential. Site card, fish collection form and site photographs for Tributary #2 appear in Appendix VII.

Tributary #3 (Unnamed Creek WSC 212-580800-40300-63200 Site 11, Reach 1) enters Upper Tuchodi Lake* from the north. It is similar in character to Tributary #1 in that it travels across an immense alluvial fan that spills into Upper Tuchodi Lake*. TRIM mapping indicates the channel splits and rejoins numerous times as it flows toward the lake. At the time of the survey, Tributary #3 was actively cutting several new channels through a forested portion of the alluvial fan. Abandoned and multiple channels, eroding banks, accumulations of large woody debris, and extensive riffle typify the lower reach. Average channel and wetted widths were estimated to be 3.47 m. Substrates were dominated by cobble and boulders. The gradient averaged 6.5%. The system is unstable, prone to wide variations in flow, and offers only a trace usable fish habitat in the form of infrequent deep pools and boulders pockets. Site card, fish collection form and site photographs for Tributary #3 appear in Appendix VIII.

In addition to these inlets there are approximately 56 other inlets indicated on TRIM mapping. No visible channel or evidence of surface flow was found at any of these drainages, suggesting their ephemeral or intermittent nature.

4.10 Fish Populations

4.10.1 Fish Sampling Summary

Lake trout, bull trout, lake whitefish, mountain whitefish, burbot, slimy sculpin and longnose sucker were collected during sampling in the August 16-18, 1999 lake survey. With the exception of slimy sculpin electro-fished in tributaries, and bull trout angled in the outlet, all fish were captured by sampling within the lake by either gill-nets, set-lines, or minnow traps.

A summary of fish sampling activities for the lake survey is presented in Table 5. Sampling locations are shown in Figures 2 and 4. In total, 14 lake trout, 3 bull trout, 75 lake whitefish, 22 mountain whitefish, 2 burbot, 20 slimy sculpins, and 18 longnose suckers were captured.

Table 5: Sampling summary for Upper Tuchodi Lake* including inlets and outlets, August 16-18, 1999.

Net and Trap Summary						
Site No.	**Method**	**Set**		**Pull**		**Species**
Site 1	Sinking Gill-Net	Aug. 16	20:40 hrs.	Aug. 17	09:40 hrs.	LT, LW, MW, LSU
Site 4	Floating Gill-Net	Aug. 16	21:20 hrs.	Aug. 17	08:20 hrs.	LT, LW
Site 4	Floating Gill-Net	Aug. 17	08:20 hrs.	Aug. 17	14:35 hrs.	MW
Site 2	Minnow Trap 1	Aug. 16	08:30 hrs.	Aug. 17	10:40 hrs.	NFC
Site 2	Minnow Trap 2	Aug. 16	08:31 hrs.	Aug. 17	10:41 hrs.	BB
Site 3	Minnow Trap 3	Aug. 16	10:45 hrs.	Aug. 17	14:25 hrs.	NFC
Site 3	Minnow Trap 4	Aug. 16	10:40 hrs.	Aug. 17	14:25 hrs.	NFC
Site 5	Minnow Trap 5	Aug. 16	21:25 hrs.	Aug. 17	16:39 hrs.	NFC
Site 5	Minnow Trap 6	Aug. 16	21:26 hrs.	Aug. 17	16:40 hrs.	BB
Site 6	Set Line 1	Aug. 17	22:00 hrs.	Aug. 18	08:00 hrs.	LT
Site 6	Set Line 2	Aug. 17	22:00 hrs.	Aug. 18	08:00 hrs.	NFC
Site 6	Set Line 3	Aug. 17	22:00 hrs.	Aug. 18	08:00 hrs	NFC

Lake Tributary Sampling Summary					
Watershed Code	**Site No.**	**Inlet or Outlet**	**Length Surveyed**	**Stream Order**	**Species Caught**
212-580800-40300	7	Inlet	200 m	6	CCG, MW
212-580800-40300	8	Outlet	300 m	6	BT, MW, CCG
212-580800-40300-59700	9	Inlet	100 m	4	CCG
212-580800-40300-62500	10	Inlet	100 m	3	CCG
212-580800-40300-63200	11	Inlet	100 m	4	NFC

4.10.2 Fish Age, Growth, and Life History

A summary of average length- and weight-at-age for all fish sampled during the Upper Tuchodi Lake* survey is presented in Table 6.

Ages of all 14 lake trout captured were determined from pelvic fin ray sections. Only a brief summary of population characteristics is presented as too few lake trout were captured to allow a detailed analysis. Lake trout captured during the survey ranged in age from 6 to 22 years (Fig. 8, Plates 9 and 10). Figures 9 and 10 show average length-at-age and the length-weight relationship of sampled lake trout. The equation that expresses the rate of growth for lake trout in Upper Tuchodi Lake* is as follows:

$$L = 61.87 \times W^{0.2938}$$

where L is the fork length (mm) and W is the weight (g).

Table 6: Summary of length-at-age and weight-at-age data for fish sampled in Upper Tuchodi Lake*, August 16-18, 1999.

Individual Fish Data Summary								
Stream Name	**Watershed Code**	**Species**	**Age (yr)**	**Number of fish**	**Mean Length (mm)**	**Range of Lengths (mm)**	**Mean Weight (g)**	**Range of Weights (g)**
Upper Tuchodi Lake*	212-580800-40300	LT	6+	1	302	302	252	252
			7+	1	470	470	1010	1010
			8+	1	436	436	758	758
			9+	4	430.5	385-462	738.8	494-1040
			10+	3	506.7	460-600	1630	872-3100
			14+	1	685	685	3415	3415
			16+	1	695	695	3600	3600
			20+	1	757	757	5000	5000
			22+	1	680	680	2980	2980
		LW	1+	4	151.5	118-125	19.6	18-22
			2+	11	160.8	149-189	43.5	32-80
			3+	19	202.2	190-225	92.1	70-130
			4+	7	228.7	203-242	131.7	90-172
			5+	7	242.3	205.262	162.3	100-212
			6+	5	260.2	255-263	196	182-214
			7+	4	262.8	244-278	199.8	156-247
			8+	3	292	278-303	272	238-300
			9+	1	319	319	428	428
			11+	1	345	345	554	554
		MW	1+	1	161	161	34	34
			2+	8	205.3	188-220	77.4	66-108
			3+	1	222	222	88	88
			5+	1	275	275	216	216
			9	1	363	363	552	552
Tuchodi River	212-580800-40300 Outlet - Site 8	BT	4+	1	298	298	256	256
			5+	1	340	340	360	360
			8+	1	490	490	1160	1160
		MW	1+	3	137.7	137-138	30	26-34
			2+	2	192	187-197	91	88-94
			3+	3	207	201-212	99.3	96-104
			5+	2	257	256-258	193	172-214

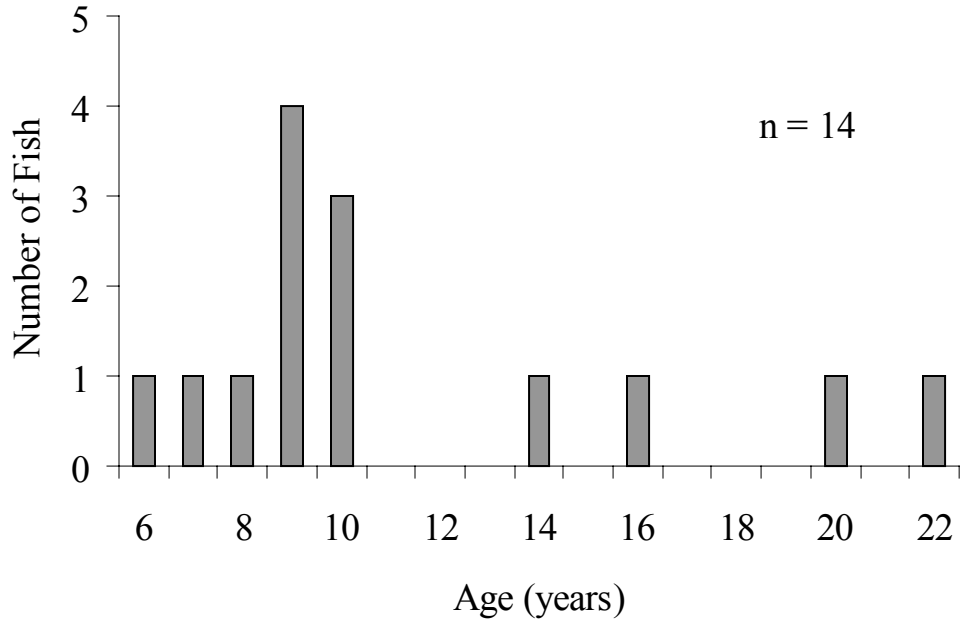

Figure 8: Age-frequency histogram for lake trout sampled from Upper Tuchodi Lake*, August 16-18, 1999.

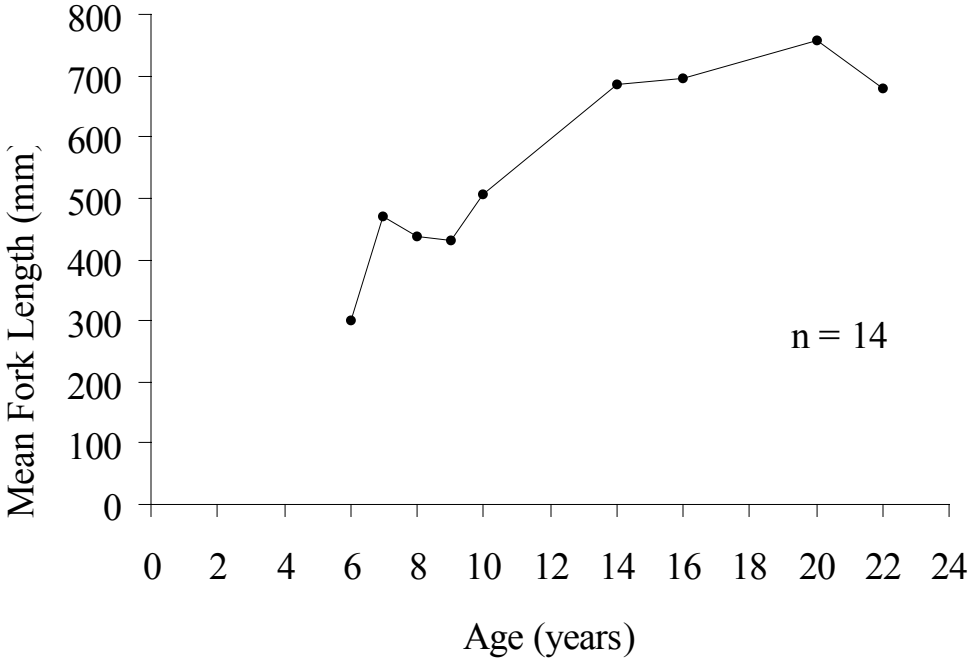

Figure 9: Average length-at-age for lake trout sampled from Upper Tuchodi Lake*, August 16-18, 1999.

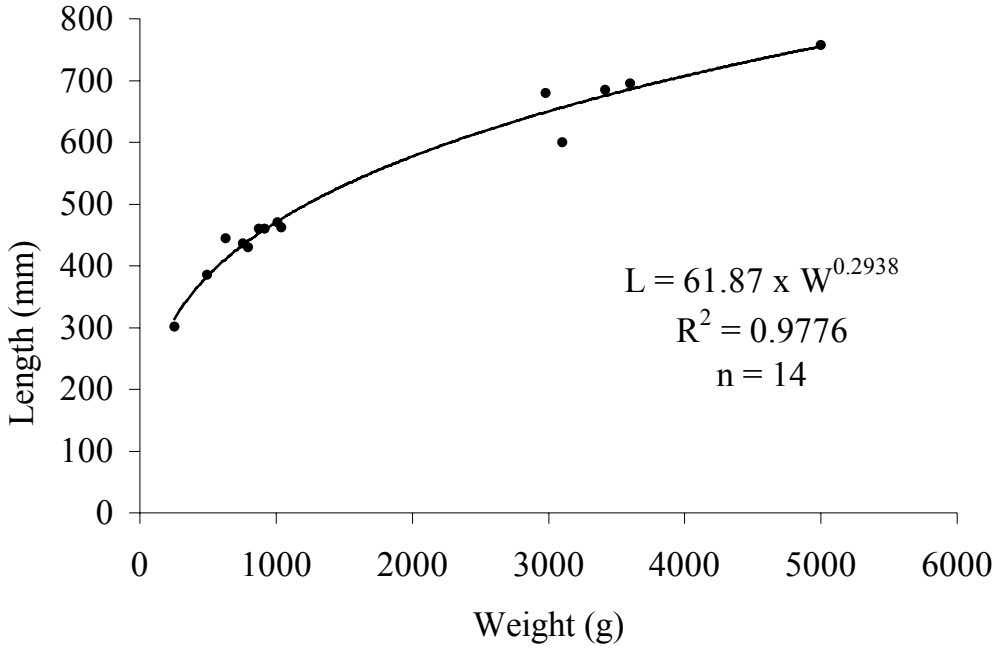

Figure 10: Length-weight relationship for lake trout sampled from Upper Tuchodi Lake*, August 16-18, 1999.

Of the 75 lake whitefish captured in Upper Tuchodi Lake*, the ages of 62 were determined from scales. Age-frequency, length-at-age, and the length-weight relationships of these lake whitefish are shown in Figures 11 to 13. Ages ranged from 1 to 11 years, with the 3+ age class most abundant (Fig. 11). Fork lengths ranged from 118 to 345 mm.

The equation that expresses the rate of growth for lake whitefish in Upper Tuchodi Lake* is as follows:

$$L = 49.825 \times W^{0.3114}$$

where L is the fork length (mm) and W is the weight (g).

Approximately 60% (n = 45) of lake whitefish examined internally exhibited minor to heavy parasite infestations affecting heart and/or stomach tissues. Although not confirmed, the parasites are most likely the same as those observed during the original 1982 survey, namely a *Diphyllobothrium sp.* cestode and *Cotylurus sp*. fluke.

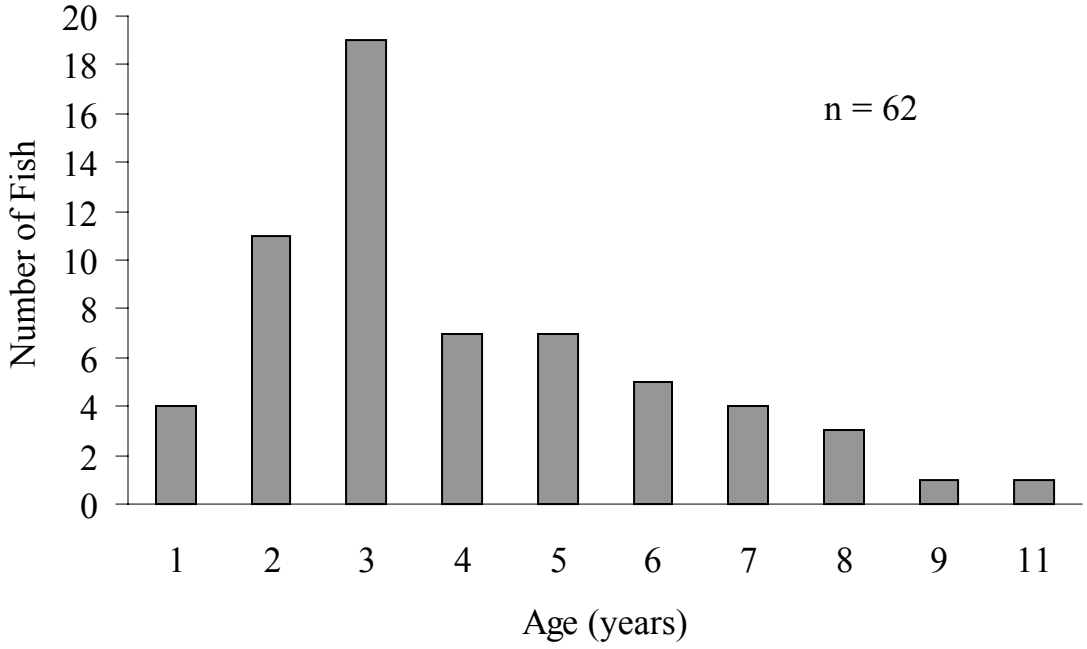

Figure 11: Age-frequency for lake whitefish sampled from Upper Tuchodi Lake*, August 16-18, 1999.

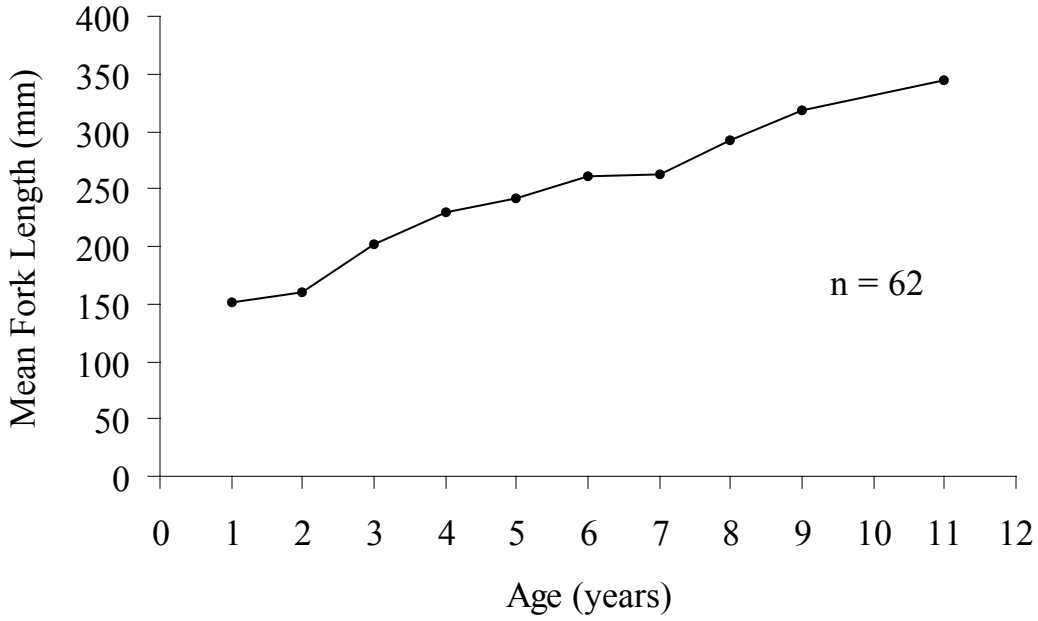

Figure 12: Average length-at-age for lake whitefish sampled from Upper Tuchodi Lake*, August 16-18, 1999.

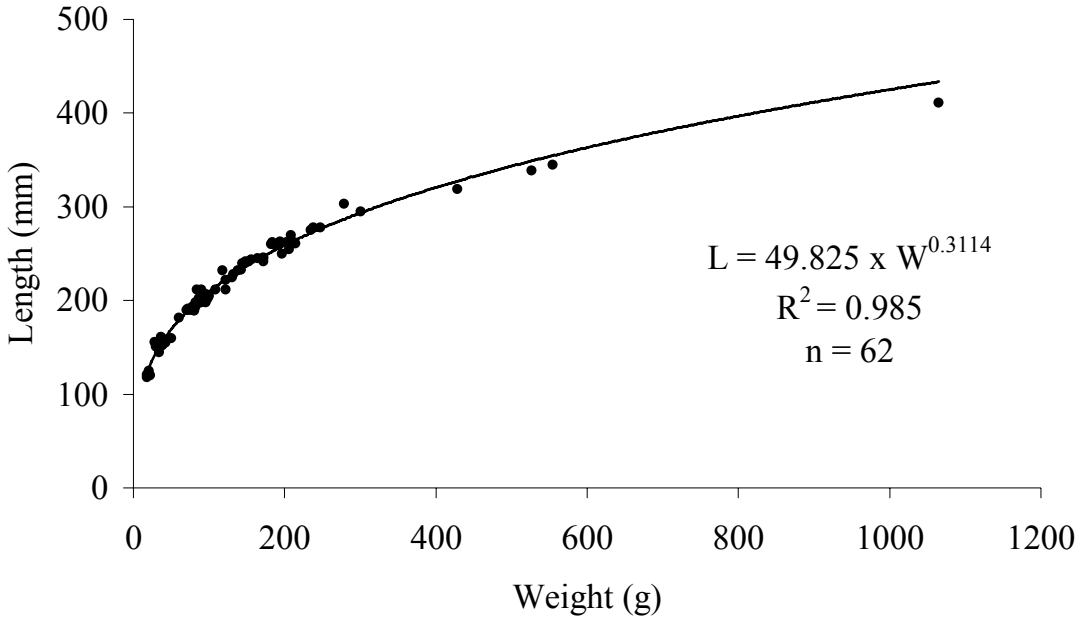

Figure 13: Length-weight relationship for lake whitefish sampled from Upper Tuchodi Lake*, August 16-18, 1999.

There was an insufficient number of bull trout, mountain whitefish, longnose sucker and slimy sculpin sampled to present a meaningful summary of age-frequency, length-at-age, or growth rate.

4.11 Significant Features and Fisheries Observations

4.11.1 Fish and Fish Habitat

The assemblage of fish species in Upper Tuchodi Lake* is typical of many of the remote, cold, unproductive lakes of the upper Muskwa and Kechika watersheds. Lake trout and lake whitefish form the primary predator-prey component of the lake population with other species such as bull trout, mountain whitefish, burbot, slimy sculpin and longnose sucker occupying peripheral niches within the system. Limited available spawning habitat within tributary streams may be one variable controlling population numbers. The high TSS of the main inlet, the Tuchodi River, may limit egg-to-fry survival along shoals not affected by wave action.

4.11.2 Sport Fishing Opportunities

Lake trout in Upper Tuchodi Lake* have endured a history of over-fishing, at least since construction of the Alaska Highway, beginning in 1942 (R. Peck, pers. comm.). The limited number of lake trout caught and the absence of any truly trophy size fish in the catch may be a result of these past abuses. According to Conservation Officers in Fort Nelson, this trend continues today and is unlikely to change given the recent proliferation

of shallow-draught riverboats, and limited provincial enforcement resources in the north (J. Hart, pers. comm.).

4.11.3 Habitat Concerns

Upper Tuchodi Lake* and its surrounding area remain essentially undeveloped with the exception of occasional hand-cut horse trails, rough campsites and a single cabin. Creation of the Northern Rocky Mountains Park under the authority of the British Columbia Park Act has also raised the public profile of the area. This designation alone will likely attract more visitors and the usual range of impacts associated with humans in the wilderness.

There are no watershed restoration activities required as a result of past industrial activity.

4.12 Wildlife Observations

Mallard ducks, numerous gulls, and a bald eagle were observed during the survey. Sporadic evidence of beaver activity around the lake was observed. A single moose was seen in the water during the survey, and evidence of their use of aquatic vegetation, in the form of tracks on the lake bottom, was apparent.

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PERSONAL COMMUNICATIONS

Hart, J. 2000. Conservation Officer Service, B.C. Ministry of Environment, Lands and Parks, Fort Nelson, B.C.

Peck, R. 2000. Ross Peck Outfitters Ltd., Fort St. John, B.C.

Woods, R.B. 2000. Wildlife Branch, B.C. Ministry of Environment, Lands and Parks, Fort St. John, B.C.

APPENDIX I

UPPER TUCHODI LAKE*

Plates 1 to 10

Plate 1: Upper Tuchodi Lake*; view of 1982 benchmark from shore.
(Roll 2 - Exp 0A; CD 1 – Im 27)

Plate 2: Upper Tuchodi Lake*; view of 1982 benchmark from 200 m off shore.
(Roll 2 - Exp 1A; CD 1 – Im 28)

Plate 3: Upper Tuchodi Lake *; southern shoreline, view south from lake centre.
(Roll 1 - Exp 9; CD 1 – Im 10)

Plate 4: Upper Tuchodi Lake*; northern shoreline, view north from lake centre.
(Roll 1 - Exp 8; CD 1 – Im 9)

Plate 5: Upper Tuchodi Lake*; panorama, from camp looking east toward outlet.
(Roll 1 - Exp 19-21; CD 1 – Im 20-22)

Plate 6: Upper Tuchodi Lake*; panorama west from Limnology Station #1.
(Roll 1 - Exp 24-25; CD 1 – Im 25-26)

Plate 7: Upper Tuchodi Lake*; aerial view east of Tuchodi River confluence and delta of Upper Tuchodi Lake*.
(Roll 3 - Exp 20; CD 1 – Im 69)

Plate 8: Upper Tuchodi Lake*; aerial view upstream of Upper Tuchodi Lake*, Tuchodi River delta, and upstream Upper Tuchodi River valley.
(Roll 3 - Exp 18; CD 1 – Im 67)

Plate 9: Upper Tuchodi Lake*; 700 mm lake trout (GN2-005) from floating gill-net.
(Roll 1 - Exp 17; CD 1 - Im 18)

Plate 10: Upper Tuchodi Lake*; 685 mm lake trout (SL1-001) captured at camp by set-line.
(Roll 1 - Exp 22; CD 1 – Im 23)

APPENDIX II

UPPER TUCHODI LAKE*

Lake Survey Form and Fish Collection Forms

FDIS Lake Card

Reach # **ILP Map #** **ILP #**

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000 8.0

WATERBODY

Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000
Waterbody Type: Primary **Sample Type:** Primary Fish Form: ☑

Lake Names **Gazetted Name:** TUCHODI LAKES **Local Name:** Upper Tuchodi Lake*
Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000
Reach #: 8.0 **Air Photo:** 15BC86102 016 **Comment:** Aug 28, 1986

Waterbody ID: 00366MMUS **ILP Map #:** **ILP #:** **Project ID:** 2734 **Magnitude:** 3975
NID Map #: **NID #:**

094K.028
094K.017

Surface Area: 804.15 **Source:** TRIM **Mthd:** GIS
Elevation: 879 **Source:** TRIM **Mthd:** MAP

UTM(Zone/East/North/Method)
10 | 413620 | 6454000 | MAP

Biogeoclimatic Zone: SWB

Incomplete: ☑ **Ref:**

TERRAIN CHARACTERISTICS

Setting: VW **Aspect:** NE
Hillslope Coupling: CO **Basin Genesis:** FD

Land Use:	NO	AG	FB	FR	MI	PR	UD	OT
Percentage:	100							

SHORELINE CHARACTERISTICS

Shoreline Type:	i	ii	iii	iv	v
Percentage:	45	55	0	0	0

Cover SP
Rec. Features: Resorts: 0 Camps: 1 Boatlaunch: 0

INLETS / OUTLETS

Inlets (Perm.): 4 Inlets (Other): 56 Outlets: 1 Spawning hab. present?: ☐

I/O	Watershed Code	ILP Map #	ILP #	Comments
I	212-580800-40300-00000-0000-0000-000-000-000-000-000-			Tuchodi River
I	212-580800-40300-59700-0000-0000-000-000-000-000-000-			Unnamed Creek, Trib 1
I	212-580800-40300-62500-0000-0000-000-000-000-000-000-			Unnamed Creek, Trib 2
I	212-580800-40300-63200-0000-0000-000-000-000-000-000-			Unnamed Ck, Trib 3, Alias-"Standard Creek" R. Peck
I	212-580800-40300-60500-0000-0000-000-000-000-000-000-			dry at time of survey
O	212-580800-40300-00000-0000-0000-000-000-000-000-000-			Tuchodi River

SURVEY INFORMATION

Date: 1999-08-16 **to** 1999-08-18 **Agency:** C032 **Crew:** TE BC

AQUATIC FLORA

EMERGENT VEG.: Sparse: ☑ OR % SUBMERGENT VEG.: Sparse ☑ OR % Floating Algae?: ☑ Voucher Specimen:

ACCESS

Air: FW ☑ H ☐ **Road:** V2 ☐ V4 ☐ **Auto within:** 114.0
Off Road: FT ☐ ATV ☐ V4 ☐ BT ☑ HO ☐ **Distance:**
Trail?: ☐ **Distance:**

Closest Community: Fort Nelson

Comments:

114 km southwest from Fort Nelson, approximately 1 hour flying time (DHC Beaver) from either Parker Lake near Fort Nelson or Muncho Lake. Riverboats can access Upper Tuchodi Lake via the Muskwa and Tuchodi Rivers starting at a rough launch at Kledo Creek.

LAKE BATHYMETRY

Type of Survey: FL Littoral Area: 27.79 % Method: BT
Max. Depth: 42.5 Benchmark Height: 1.8 High Water Mark: 0.8
Benchmark Type/Location: Iron Spike in white spruce. 70 m north along shore from Peck's cabin at outlet.

Comments:

Established in 1982 by Hammond and Coombes BC Environment lake survey. UTM 10.414290.6454290

PHOTO DOCUMENTATION

Photo (R/F)				Foc Lg	Dir	NID Map #	NID #	UTM (zone/east/north)			Method	Comments
R:	1	F:	0	WD	E	094K.018	5	10	406500	6449846	MAP	aerial view of Upper Tuchodi Lake*
R:	1	F:	1	WD	E	094K.028	7	10	412460	6453600	MAP	aerial view of Upper Tuchodi Lake* toward outlet
R:	1	F:	13	WD	E	094K.017	2	10	405560	6447480	MAP	d/s view of Upper Tuchodi Lake* from mouth of Tuchodi River
R:	1	F:	19	WD	E	094K.028	8	10	410720	6452790	MAP	panorama, south shoreline from camp
R:	1	F:	20	WD	E	094K.028	8	10	410720	6452790	MAP	panorama, toward outlet and lake centre.
R:	1	F:	21	WD	N	094K.028	8	10	410720	6452790	MAP	panorama toward opposite shoreline.
R:	1	F:	24	WD	W	094K.028	9	10	411220	6453190	MAP	panorama, northwest from limnology stn. #1.
R:	1	F:	25	WD	W	094K.028	9	10	411220	6453190	MAP	panorama, west-southwest from limnology stn. #1.
R:	2	F:	0A	WD	N	094K.028	10	10	414290	6454290	MAP	1982 benchmark from shore.
R:	2	F:	1A	WD	N	094K.028	11	10	414290	6454220	MAP	1982 benchmark 200 m from shore.
R:	3	F:	11	WD	E	094K.028	12	10	413520	6455120	MAP	aerial view of outlet area.
R:	3	F:	12	WD	W	094K.028	13	10	412220	6454820	MAP	aerial view of outlet area.

FDIS Lake Card

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000 8.0

PHOTO DOCUMENTATION

Photo (R/F)				Foc Lg	Dir	NID Map #	NID #	UTM (zone/east/north)			Method	Comments
R:	3	F:	13	WD	W	094K.028	14	10	412560	6454880	MAP	aerial view of Upper Tuchodi Lake* outlet.
R:	3	F:	14	WD	E	094K.028	15	10	412420	6454680	MAP	aerial view of outlet of Upper Tuchodi L*, Lower Tuchodi L*. in background.
R:	3	F:	15	WD	E	094K.028	16	10	412310	6453920	MAP	aerial view downstrem from Upper Tuchodi L*. toward Lower Tuchodi L*.
R:	3	F:	16	WD	S	094K.018	7	10	407440	6450840	MAP	inlet delta (Tuchodi River) at Upper Tuchodi Lake*.
R:	3	F:	17	WD	S	094K.018	8	10	406140	6450880	MAP	aerial view of Unnamed Trib #3 alluvial fan.
R:	3	F:	18	WD	S	094K.018	9	10	407240	6450800	MAP	aerial view of Tuchodi River delta/confluence with Upper Tuchodi Lake.
R:	3	F:	19	WD	E	094K.017	3	10	405120	6448780	MAP	aerial view of Tuchodi River delta/confluence with Upper Tuchodi Lake.
R:	3	F:	20	WD	E	094K.017	4	10	404840	6448060	MAP	aerial view of Tuchodi R delta, d/s towrd Upper Tuchodi Lake.
R:	3	F:	21	WD	E	094K.017	5	10	405000	6446900	MAP	Tuchodi River delta at Upper Tuchodi Lake*.
R:	3	F:	22	WD	W	094K.017	6	10	405160	6446820	MAP	Upper Tuchodi River valley upstream of Upper Tuchodi Lake*.

AQUATIC WILDLIFE OBSERVATIONS

Group	Observations
MAM	Beaver, moose
BIR	Mallards, gulls, bald eagle

LIMNOLOGICAL STATION WATER QUALITY

FDIS Lake Card

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000 8.0

LIMNOLOGICAL STATION WATER QUALITY

Station No.: 1 **Date:** 1999-08-17 **Time:** 19:00 **UTM (Zone/East/North/Mtd):** 10.411220.6453190 - MAP **EMS #:** E238544

Secchi Depth: 1.7 **Water Color:** MP **pH (surf/bottom/cmt):** 8.8 - 8.8 - **Ice Depth:** 0

WATER SAMPLE

Depth (m)	Requisition #
43.5	908240348
0.5	908240347

DISSOLVED OXYGEN, TEMPERATURE PROFILE AND CONDUCTIVITY

Depth	DO (d)	T(C)	DO (a)	T (C)	Cond.
.1	9.5	12.6	9.0	12.6	301
1.0	9.3	12.6	8.5	12.6	
2.0	9.3	12.6	8.5	12.6	
3.0	8.7	12.6			
4.0	8.3	12.6	7.6	12.4	
5.0	8.3	12.5			
6.0	8.2	12.5	7.4	12.3	
7.0	8.2	12.5			
8.0	7.9	12.5	7.4	12.3	
9.0	7.9	12.3			
10.0	7.9	12.2	7.3	12.3	
11.0	7.8	12.1			
12.0	7.6	11.8	7.1	12.3	
13.0	7.6	11.5			
14.0	7.5	11.3	7.0	12.3	
15.0	7.6	10.5			
16.0	7.5	10.0	7.1	12.0	
17.0	7.5	10.0			
18.0	7.6	9.8	7.3	10.2	
19.0	7.5	9.5	7.2	10.0	
20.0	7.5	9.3	7.1	9.7	
21.0	7.5	9.2	7.1	9.4	
22.0	7.4	9.0	7.0	9.0	
23.0	7.5	9.0	7.0	9.0	
24.0	7.5	9.0	7.0	8.8	
25.0	7.5	8.9	7.0	8.8	
26.0	7.4	8.8	7.0	8.7	
27.0	7.5	8.7	7.0	8.7	
28.0	7.5	8.6	6.8	8.7	
29.0	7.5	8.6	6.8	8.7	
30.0	7.5	8.6	6.7	8.5	
31.0	7.4	8.5	6.7	8.5	
32.0	7.4	8.5	6.7	8.4	
33.0	7.4	8.5	6.7	8.4	
34.0	7.3	8.4	6.6	8.4	
35.0	7.3	8.3	6.6	8.4	
36.0	7.3	8.3	6.6	8.3	
37.0	7.2	8.3	6.6	8.3	
38.0	7.2	8.3	6.6	8.4	
39.0	7.1	8.3	6.5	8.3	
40.0	7	8.3	6.4	8.3	
41.0	6.8	8.2	6.2	8.2	
42.0	6.6	8.2	5.2	8.2	
43.0	4.2	8.2	4.2	8.2	
43.5					366
MEAN	7.60	10.00	6.93	9.73	333.50

EQUIPMENT USED

pH: P2 **Water Temp:** T2

Conductivity: S4 **Dis. Oxygen:** D2

H2S: 0

FDIS Lake Card

Reach # ILP Map # ILP #

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LIMNOLOGICAL STATION WATER QUALITY

Station No.: 2 **Date:** 1999-08-17 **Time:** 15:45 **UTM (Zone/East/North/Mtd):** 10.404700.6450840 - MAP **EMS #:** N

Secchi Depth: 1.3 **Water Color:** MP **pH (surf/bottom/cmt):** 8.1 - 8.4 - **Ice Depth:** 0

WATER SAMPLE

DISSOLVED OXYGEN, TEMPERATURE PROFILE AND CONDUCTIVITY

Depth	DO (d)	T(C)	DO (a)	T (C)	Cond.
.2	9.2	12.3	9.5	12.3	302
2.0	8.5	12.3	8.6	12.3	
4.0	8.4	12.1	8.1	12.3	
6.0	8.2	12.1	7.8	12.1	
8.0	8.1	12.0	7.5	12.0	
10.0	8	12.0	7.3	12.0	
12.0	8	12.0	7.1	12.0	
14.0	7.9	11.8	7.1	11.7	
16.0	8	11.3	7.1	11.0	
18.0	8.1	10.2	7.2	10.2	
20.0	8.1	9.8	7.2	9.8	
22.0	8.1	9.5	7.2	9.3	
24.0	8.1	9.1	7.2	9.1	
26.0	8.1	9.0	7.3	9.0	
28.0	8	9.0	7.3	9.0	
30.0	7.9	8.8	7.4	8.8	
32.0	7.7	8.6	7.3	8.6	
34.0	7.6	8.5	7.3	8.5	
36.0	7.5	8.5	7.5	8.5	
36.5					
37.0					347
MEAN	8.08	10.47	7.53	10.45	324.50

EQUIPMENT USED

pH: P2 **Water Temp:** T3

Conductivity: S4 **Dis. Oxygen:** D2

H2S: 0

COMMENTS

Section	Comments
SHORELINE CHARACTERISTICS	a cabin (Lack-a-nookie Lodge) belonging to Ross Peck Outfitting is located at the east end of the lake adjacent to the outlet
SHORELINE CHARACTERISTICS	numerous picnic and camping sites are found throughout the lake shore
WATERBODY	C1 - dry, not surveyed
LIMNOLOGICAL STATION	1999/08/17 @ LS#1intermittently sunny, light westerly wind, +15 Celcius at 1900 hr.
LIMNOLOGICAL STATION	1999/08/17 @ LS#2 intermittently sunny, brisk westerly wind, waves 20-40 cm, +16.5 Celcius at 1545 hr.

FDIS Fish Form

Reach # ILP Map # ILP #

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WATERBODY

Gazetted Name: TUCHODI LAKES **Local:** Upper Tuchodi Lake*

Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-0

WS Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

Waterbody ID: 00366MMUS **ILP Map #:** **ILP #:** **Reach #:** 8 -

Project ID: 2734 **Lake/Stream:** L **Lake From Date:** 1999-08-16

Fish Permit #: SC99-017 **Date:** 1999/08/16 **To:** 1999/08/18 **Agency:** C032 **Crew:** TE BC **Resample:** ☐

SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd				MTD/NO		Temp	Cond	Turbid	Comment
6	094K.028	4	10	410860	6452760	MAP	UN	3				setline
6	094K.028	4	10	410860	6452760	MAP	UN	2				setline
6	094K.028	4	10	410860	6452760	MAP	UN	1				setline
5	094K.028	3	10	411840	6452980	MAP	MT	6				
5	094K.028	3	10	411840	6452980	MAP	MT	5				
4	094K.028	2	10	410980	6452800	MAP	GN	3				
4	094K.028	2	10	410980	6452800	MAP	GN	2				
3	094K.028	1	10	409880	6452860	MAP	MT	4				
3	094K.028	1	10	409880	6452860	MAP	MT	3				
2	094K.018	2	10	409640	6451880	MAP	MT	2				
2	094K.018	2	10	409640	6451880	MAP	MT	1				
1	094K.018	1	10	409580	6451840	MAP	GN	1				

A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
6	UN	3	1	1999/08/17	22:00	1999/08/18	08:00	setline baited with whitefish entrails
6	UN	2	1	1999/08/17	22:00	1999/08/18	08:00	setline baited with whitefish entrails
6	UN	1	1	1999/08/17	22:00	1999/08/18	08:00	setline baited with whitefish entrails
5	MT	6	1	1999/08/16	21:26	1999/08/17	16:40	baited with sardines
5	MT	5	1	1999/08/16	21:25	1999/08/17	16:39	baited with sardines
4	GN	3	1	1999/08/17	08:20	1999/08/17	14:35	
4	GN	2	1	1999/08/16	21:20	1999/08/17	08:20	
3	MT	4	1	1999/08/16	21:05	1999/08/17	14:25	baited with sardines
3	MT	3	1	1999/08/16	21:00	1999/08/17	14:25	baited with sardines
2	MT	2	1	1999/08/16	20:50	1999/08/17	10:41	baited with sardines
2	MT	1	1	1999/08/16	20:50	1999/08/17	10:40	baited with sardines
1	GN	1	1	1999/08/16	20:40	1999/08/17	09:40	

B. NET/TRAP SPECIFICATIONS

Site #	MTD/NO.		H/P	Net Type	Length	Depth	Mesh	Set	Habitat
5	MT	6	1			1.0		BT	L
5	MT	5	1			1.0		BT	L
4	GN	3	1	FL	91.4	28.0	ST	SU	L
4	GN	2	1	FL	91.4	28.0	ST	SU	L
3	MT	4	1			1.0		BT	L
3	MT	3	1			1.0		BT	L
2	MT	2	1			1.0		BT	L
2	MT	1	1			1.0		BT	L
1	GN	1	1	SK	91.4	12.0	ST	BT	L

FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
4	GN	2	1	LT	A		5	430	695	R	
1	GN	1	1	LW	NS		92	112	345	R	juveniles and adults in sample
1	GN	1	1	MW	A		8	202	363	R	
1	GN	1	1	LSU	A		18	216	382	R	
2	MT	1	1	NFC			0				
2	MT	2	1	BB	J		1	192	192	R	
1	GN	1	1	LT	A		8	302	757	R	
3	MT	4	1	NFC			0				
6	UN	3	1	NFC			0				
4	GN	3	1	MW	J		3	155	199	R	
4	GN	2	1	LW	NS		11	151	339	R	
5	MT	5	1	NFC			0				

FDIS Fish Form

Reach # ILP Map # ILP #

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FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
5	MT	6	1	BB	J		1	121	121	R	
6	UN	1	1	LT	A		1	685	685	R	
6	UN	2	1	NFC			0				
3	MT	3	1	NFC			0				

INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl#/Age				Str/Smpl#				
1	GN	1	1	LSU	282	254.0	U	U									
1	GN	1	1	LSU	332	436.0	U	U									
1	GN	1	1	LSU	277	242.0	U	U									
1	GN	1	1	LSU	382	658.0	U	U									
1	GN	1	1	LSU	363	550.0	U	U									
1	GN	1	1	LSU	365	604.0	U	U									
1	GN	1	1	LSU	265	238.0	U	U									
1	GN	1	1	LSU	277	254.0	U	U									
1	GN	1	1	LSU	266	248.0	U	U									
1	GN	1	1	LSU	342	506.0	U	U									
1	GN	1	1	LSU	307	316.0	U	U									
1	GN	1	1	LSU	262	200.0	U	U									
1	GN	1	1	LSU	305	310.0	U	U									
1	GN	1	1	LSU	257	192.0	U	U									
1	GN	1	1	LSU	267	210.0	U	U									
1	GN	1	1	LSU	312	340.0	U	U									
1	GN	1	1	LSU	265	214.0	U	U									
1	GN	1	1	LW	156	32.0	M	IM	SC	1	2						cysts on stomach
1	GN	1	1	LW	240	144.0	F	IM	SC	2	5						no parasite visible
1	GN	1	1	LW	270	208.0	F	MT	SC	3	7						cysts on intestine
1	GN	1	1	LW	255	206.0	F	MT	SC	4	6						no parasites visible
1	GN	1	1	LW	212	108.0	M	IM	SC	5	3						no parasites visible
1	GN	1	1	LW	242	152.0	F	MT	SC	6	4						cysts on intestine
1	GN	1	1	LW	319	428.0	F	MT	SC	7	9						snails in stomach
1	GN	1	1	LW	410	1065.0	F	MT	SC	8	EGEN						snails and clams in stomach,1.5cm stomach wall
1	GN	1	1	LW	345	554.0	F	MT	SC	9	11						snails, thick stomach wall
1	GN	1	1	LW	259	188.0	M	MT	SC	10	7						snails
1	GN	1	1	LW	263	194.0	M	MT	SC	11	6						no parasites evident
1	GN	1	1	LW	196	82.0	F	IM	SC	12	3						cysts on stomach
1	GN	1	1	LW	212	84.0	M	MT	SC	13	3						no parasites evident
1	GN	1	1	LW	245	164.0	F	MT	SC	14	5						cysts on stomach
1	GN	1	1	LW	303	278.0	F	IM	SC	15	8						
1	GN	1	1	LW	261	214.0	M	IM	SC	16	6						
1	GN	1	1	LW	262	212.0	F	MT	SC	17	5						snails, lots of cysts on stomach
1	GN	1	1	LW	295	300.0	M	MT	SC	18	8						mush in stomach, lots of cysts on stomach
1	GN	1	1	LW	278	274.0	F	MT	SC	19	7						cysts on stomach, unid. Mush
1	GN	1	1	LW	242	172.0	M	IM	SC	20	4						unid. mush, cysts on stomach
1	GN	1	1	LW	260	182.0	F	MT	SC	21	6						snails, no parasites evident
1	GN	1	1	LW	278	238.0	F	MT	SC	22	8						bloodworms, cysts on stomach
1	GN	1	1	LW	228	132.0	M	MT	SC	23	4						unid. mush, cysts on stomach
1	GN	1	1	LW	250	196.0	F	MT	SC	24	5						whitefish scales in gut, cysts on stomach
1	GN	1	1	LW	207	96.0	M	IM	SC	25	3						unid. mush, cysts on stomach
1	GN	1	1	LW	198	90.0	F	IM	SC	26	3						unid. mush, no parasites evident
1	GN	1	1	LW	212	122.0	F	IM	SC	27	3						cysts on stomach
1	GN	1	1	LW	193	82.0	M	IM	SC	28	3						cysts on stomach
1	GN	1	1	LW	198	88.0	M	IM	SC	29	3						cysts on stomach
1	GN	1	1	LW	232	138.0	M	IM	SC	30	4						cysts on stomach, bloodworms

FDIS Fish Form

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INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl#		Age		Str/Smpl#				
1	GN	1	1	LW	189	80.0	M	IM	SC	31	2						cysts on stomach
1	GN	1	1	LW	262	202.0	F	IM	SC	32	5						bloodworms, snails, cysts on stomach
1	GN	1	1	LW	202	98.0	M	IM	SC	33	3						cysts on stomach
1	GN	1	1	LW	193	78.0	M	IM	SC	34	3						numerous cysts
1	GN	1	1	LW	225	130.0	F	IM	SC	35	3						
1	GN	1	1	LW	242	148.0	F	MT	SC	36	4						unid. mush, cysts
1	GN	1	1	LW	200	86.0	M	IM	SC	37	3						
1	GN	1	1	LW	212	90.0	M	IM	SC	38	4						lots of cysts
1	GN	1	1	LW	262	184.0	M	IM	SC	39	6						unid. Mush
1	GN	1	1	LW	190	74.0	M	IM	SC	40	3						cysts on stomach
1	GN	1	1	LW	198	82.0	F	IM	SC	41	3						cysts on stomach
1	GN	1	1	LW	191	72.0	M	IM	SC	42	3						snails, cysts on stomach
1	GN	1	1	LW	182	60.0	M	IM	SC	43	2						cysts on stomach
1	GN	1	1	LW	203	90.0	F	IM	SC	45	4						
1	GN	1	1	LW	232	118.0	M	IM	SC	46	5						unid. mush, cysts
1	GN	1	1	LW	244	156.0	M	IM	SC	47	7						lots of cysts
1	GN	1	1	LW	190	70.0	F	IM	SC	48	3						lots of cysts
1	GN	1	1	LW	205	100.0	F	IM	SC	49	5						unid. mush in stomach, lots of cysts
1	GN	1	1	LW	198	96.0	U	IM	SC	50	3						cysts on stomach
1	GN	1	1	LW	222	122.0	M	IM	SC	51	3						cysts on stomach
1	GN	1	1	LW	155	42.0	U	IM	SC	52	2						
1	GN	1	1	LW	121	20.0	U	IM	SC	53	1						
1	GN	1	1	LW	149	34.0	U	IM	SC	54	2						
1	GN	1	1	LW	160	38.0	M	IM	SC	55	2						cysts on stomach
1	GN	1	1	LW	152	38.0	M	IM	SC	56	2						no parasites evident
1	GN	1	1	LW	152	38.0	M	IM	SC	57	2						cysts on stomach
1	GN	1	1	LW	156	28.0	U	IM	SC	58	2						
1	GN	1	1	LW	205	90.0	F	IM	SC	59	3						lots of cysts
1	GN	1	1	LW	158	38.0	M	IM	SC	60	2						cysts on stomach
1	GN	1	1	MW	363	552.0	M	MT	SC	61	9						
1	GN	1	1	MW	220	108.0	M	MT	SC	62	2						
1	GN	1	1	MW	202	76.0	M	MT	SC	63	2						
1	GN	1	1	LW	160	50.0	M	IM	SC	64	2						
1	GN	1	1	LW	152	42.0	M	IM									cysts
1	GN	1	1	LW	240	154.0	M	IM									cysts
1	GN	1	1	LW	240	170.0	M	IM									cysts on stomach
1	GN	1	1	LW	230	131.0	F	MT									cysts on stomach
1	GN	1	1	LW	151	42.0	U	IM									
1	GN	1	1	LW	159	44.0	U	IM									
1	GN	1	1	LW	172	48.0	U	IM									
1	GN	1	1	LW	150	36.0	U	IM									
1	GN	1	1	LW	146	36.0	U	IM									
1	GN	1	1	LW	146	36.0	U	IM									
1	GN	1	1	LW	200	84.0	U	IM									
1	GN	1	1	LW	164	56.0	M	IM									
1	GN	1	1	LW	200	92.0	F	IM									
1	GN	1	1	LW	178	66.0	M	IM									
1	GN	1	1	LW	145	28.0	U	IM									
1	GN	1	1	LW	138	24.0	U	IM									
1	GN	1	1	LW	125	20.0	U	IM									
1	GN	1	1	LW	119	16.0	U	IM									
1	GN	1	1	LW	115	14.0	U	IM									
1	GN	1	1	LW	121	16.0	U	IM									
1	GN	1	1	LW	155	38.0	U	IM									
1	GN	1	1	LW	165	46.0	U	IM									
1	GN	1	1	LW	163	48.0	U	IM									
1	GN	1	1	LW	192	68.0	U	IM									
1	GN	1	1	LW	122	20.0	U	IM	SC	65	1						
1	GN	1	1	LW	112	18.0	U	IM	SC	66	1						

FDIS Fish Form

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000 8.0

INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl#		Age		Str/Smpl#				
1	GN	1	1	LW	120	22.0	U	IM	SC	67	1						
1	GN	1	1	LW	118	18.0	U	IM	SC	68	1						
1	GN	1	1	LW	112	16.0	U	IM									
1	GN	1	1	LW	115	18.0	U	IM									
1	GN	1	1	LW	113	18.0	U	IM									
1	GN	1	1	LW	180	60.0	U	IM									
1	GN	1	1	LSU	216	116.0	U	U									
1	GN	1	1	MW	275	216.0	F	MT	SC	69	5						no parasites evident
1	GN	1	1	MW	222	88.0	F	MT	SC	70	3						
1	GN	1	1	MW	188	58.0	F	MT	SC	71	2						
1	GN	1	1	MW	205	75.0	F	MT	SC	72	2						
1	GN	1	1	MW	218	86.0	F	MT	SC	73	2						
2	MT	2	1	BB	192	34.0	M	IM	OT	74	2						
1	GN	1	1	LT	445	629.0	F	MT	FR	75	9		TP	75			
1	GN	1	1	LT	436	758.0	M	IM	FR	76	8		TP	76			empty stomach
1	GN	1	1	LT	462	1040.0	F	MT	FR	77	9		TP	77			empty stomach
1	GN	1	1	LT	460	872.0	F	MT	FR	78	10		TP	78			grasshopper and beetle in stomach
1	GN	1	1	LT	385	494.0	F	MT	FR	79	9		TP	79			empty stomach
1	GN	1	1	LT	302	252.0	M	IM	FR	80	6		TP	80			
1	GN	1	1	LT	460	918.0	F	MT	FR	81	10						empty stomach
1	GN	1	1	LT	757	5000.0	F	MT	FR	82	20						fish vertebrae in stomach
4	GN	2	1	LW	339	526.0	F	MT									unid. mush in stomach
4	GN	2	1	LW	233	142.0	M	IM									cysts on stomach
4	GN	2	1	LW	275	234.0	M	IM									cysts on stomach
4	GN	2	1	LW	245	172.0	F	MT									cysts on stomach
4	GN	2	1	LW	190	78.0	M	IM									cysts on stomach
4	GN	2	1	LW	202	86.0	M	IM									cysts on stomach
4	GN	2	1	LW	246	172.0	F	MT									cysts on stomach
4	GN	2	1	LW	145	34.0	U	IM									cysts on stomach
4	GN	2	1	LW	161	36.0	U	IM									
4	GN	2	1	LW	151	30.0	U	IM									
4	GN	2	1	LW	156	34.0	U	IM									
4	GN	2	1	MW	199	68.0	M	MT	SC	83	2						
4	GN	2	1	MW	198	66.0	F	MT	SC	84	2						
4	GN	2	1	MW	155	22.0	F	IM	SC	85	EGEN						
4	GN	2	1	LT	660	3100.0	F	MT	FR	86	10						stomach empty
4	GN	2	1	LT	695	3600.0	M	MT	FR	87	16				1	17	stomach empty
4	GN	2	1	LT	680	2980.0	M	IM	FR	88	22						mouse in stomach
4	GN	2	1	LT	470	1010.0	M	IM	FR	89	7						empty
4	GN	2	1	LT	430	792.0	M	IM	FR	80	9						
4	GN	3	1	MW	212	82.0	M	MT	SC	91	2						
4	GN	3	1	MW	161	34.0	M	IM	SC	92	1						
5	MT	6	1	BB	121		U	U	OT	93	1						
6	UN	1	1	LT	685	3415.0	M	MT	FR	94	14				1	22	
2	MT	2	1	BB	192	34.0	M	IM	OT	95	2						empty stomach

APPENDIX III

UPPER TUCHODI LAKE*

Water Chemistry Analysis

Analysis Report

CANTEST

REPORT ON: Analysis of Water Samples

REPORTED TO: Diversified Environmental Services
Box 6263
Fort St. John, B.C.
V1J 4H7

Att'n: Mr. Brad Culling

CHAIN OF CUSTODY: 21835

NUMBER OF SAMPLES: 4

REPORT DATE: September 10, 1999

DATE SUBMITTED: August 24, 1999

GROUP NUMBER: 9082441

SAMPLE TYPE: Water

TEST METHODS:

pH, Laboratory - pH analysis was performed in the laboratory using a pH meter. It must be recognized that the B.C. Ministry of Environment and other regulatory agencies recommend that pH be analyzed immediately upon sample collection. In light of this, pH measurements should be performed in the field.

Conventional Parameters - analyses were performed using procedures based on those described in "British Columbia Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (1994 Edition), Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" 19th Edition, (1995) and 17th Edition (1989), published by the American Public Health Association.

TEST RESULTS:

(See following page)

CAN TEST LTD.

T. Matsushita

Tim Matsushita
Coordinator, Water Laboratory

REPORTED TO: Diversified Environmental Services

REPORT DATE: September 10, 1999

GROUP NUMBER: 9082441

CANTEST

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:		Upper Tuchodi Lake - Surface	Upper Tuchodi Lake - 43.5m	Lower Tuchodi Lake - Surface	Lower Tuchodi Lake - Bottom	DETECTION LIMIT	UNITS
DATE SAMPLED:		Aug 17/99	Aug 17/99	Aug 18/99	Aug 18/99		
CAN TEST ID:		908240347	908240348	908240349	908240350		
pH, Laboratory		7.98	7.95	8.13	8.04	-	pH units
Conductivity		289	285	276	279	1	µS/cm
Total Dissolved Solids		192	207	206	206	10	mg/L
Total Alkalinity	CaCO3	96.4	101	96.7	99.5	0.5	mg/L
Total Acidity		4	3.6	2.2	2.2	0.5	mg/L
Nitrate	N	0.08	0.12	0.07	0.08	0.05	mg/L
Nitrite	N	<	<	<	<	0.002	mg/L
Ammonia Nitrogen	N	0.03	0.03	0.03	0.03	0.02	mg/L
Total Kjeldahl Nitrogen	N	<	<	<	<	0.5	mg/L
Total Nitrogen	N	<	<	<	<	0.5	mg/L
Total Phosphorus	P	<	<	<	<	0.02	mg/L
Total Diss. Phosphorus	P	<	<	<	<	0.02	mg/L

µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
< = Less than detection limit

APPENDIX IV

TUCHODI RIVER
212-580800-40300

Inlet to Upper Tuchodi Lake*
Stream Sample Site 7

Site Data Card, Fish Collection Form and Site Photographs

FDIS Site Card

Reach #	ILP Map #	ILP #	Site
9.0			7

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

PROJECT

Project Name: Lake Surveys of Tuchodi Lakes
Stream Name (gaz.): TUCHODI RIVER **Project Code:** 2734
Project Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

WATERSHED

Gazetted Name: TUCHODI RIVER **Local Name:** Tuchodi River - Upper
Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000
ILP Map#: **ILP #:** **NID Map #:** 094K.017 **NID #:** 1 **Reach #:** 9.0 **Site #:** 7

Field UTM(Zone/East/North/Method)				GIS UTM(Zone/East/North)		
10	405480	6447200	MAP			

Site Lg: 300 **Method:** GE **Access:** FW
Ref. Name:

Date: 1999/08/16 **Time:** 15:30 **Agency:** C032 **Crew:** TE BC **Fish Crd?:** ☑ **Incomplete:** ☑

CHANNEL

	Mtd	width	width	width	width	width	width	width	width	width	width	Avg
Channel Width (m):	RF	50.00	41.50	52.00	32.00	53.00	56.00					47.42
Wetted Width (m):	RF	50.00	36.00	38.00	32.00	37.00	48.50					40.25
Pool Depth (m):	MS											0.00

	Gadient %		Mtd	Avg
Method I:	1.0	1.0	C	1.00
Method II:				

Wb Depth:	1.6	1.4	1.6

Avg: 1.53 **Method:** MS **Stage:** L☐ M☑ H☐

No Vis.Ch.: ☐ **Intermittent:** ☐
Dw: ☐ **Tribs.:** ☐

COVER Total: M

Type:	SWD	LWD	B	U	DP	OV	IV
Amount:	T	T	N	N	D	T	N
Loc: P/S/O:	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐

CROWN CLOSURE
0 0%
INSTREAM VEG: N ☑ A ☐ M ☐ V ☐

LWD: F **DIST:** E

LB SHP: V
Texture: ☑ F ☐ G ☐ C ☐ B ☐ R ☐ A
RIP: S
STG: SHR

RB SHP: S
Texture: ☑ F ☐ G ☐ C ☐ B ☐ R ☐ A
RIP: S
STG: SHR

WATER

EMS: **Req #:**
Temp: Method: **Cond.:** Method:
pH: Method: P2 **Turb.:** ☐ T ☐ M ☐ L ☐ C Method: GE
Flood Signs: 1.2M RAFTED DEB Method: MS

MORPHOLOGY

Bed Material: Dominant: G Subdom: C
D95: 25.0 D (cm): 30.00 Morph: RP
Pattern: IR
Islands: N
Coupling: PC
Confinement: OC
FSZ ☐

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3
☐	☐	☐	☐	☐	☐	☐

C1	C2	C3	C4	C5	S1	S2	S3	S4	S5
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Bars: ☐ N ☑ SIDE ☐ DIAG ☐ MID ☐ SPAN ☐ BR

PHOTOS

Photo				Foc Lg	Dir	Comments
R:	1	F:	10	WD	D	downstream from top of site
R:	1	F:	11	WD	U	upstream from centre of site
R:	1	F:	12	WD	U	upstream from bottom of site

COMMENTS

Section	Comments
CHANNEL	too deep, turbid, and fast to wade safely therefore no measurement of riffle crest made
WATER	glacial coloration, very high TSS

FDIS Fish Form

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000 9.0

WATERBODY

Gazetted Name: TUCHODI RIVER **Local:** Tuchodi River
Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-0
WS Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000
Waterbody ID: **ILP Map #:** **ILP #:** **Reach #:** 9 -
Project ID: 2734 **Lake/Stream:** S **Lake From Date:**

Fish Permit #: SC99-017 **Date:** 1999/08/16 **To:** 1999/08/16 **Agency:** C032 **Crew:** TE BC **Resample:** ☐

SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd				MTD/NO		Temp	Cond	Turbid	Comment
7	094K.017	1	10	405480	6447200	MAP	EF	1	13		T	glacial flour coloration

A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
7	EF	1	1	1999/08/16	15:30	1999/08/16	15:45	

C. ELECTROFISHER SPECIFICATIONS

Site#	MTD/NO		H/P	Encl	Sec	Lnth	Wdth	Voltage	Frequency	Pulse	Make	Model
7	EF	1	1	O	394	300.0	35.0	250	60	fixed	COFFELT	MARK 10

FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
7	EF	1	1	CCG	A		8	45	59	R	
7	EF	1	1	MW	J		1	39	39	R	

INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl#/Age				Str/Smpl#				
7	EF	1	1	MW	39		U	U									
7	EF	1	1	CCG	57		U	U									
7	EF	1	1	CCG	57		U	U									
7	EF	1	1	CCG	59		U	U									
7	EF	1	1	CCG	56		U	U									
7	EF	1	1	CCG	52		U	U									
7	EF	1	1	CCG	53		U	U									
7	EF	1	1	CCG	52		U	U									
7	EF	1	1	CCG	45		U	U									

Tuchodi River, Inlet to Upper Tuchodi Lake*
Site 7: View downstream from top of site.
(Roll 1 - Exp 10; CD 1 – Im 11)

Tuchodi River, Inlet to Upper Tuchodi Lake*
Site 7: Aerial view of Tuchodi River valley from above western end of Upper Tuchodi Lake*.
(Roll 3 - Exp 22; CD 1 – Im 71)

Tuchodi River, Inlet to Upper Tuchodi Lake*
Site 7: View upstream from centre of site.
(Roll 1 - Exp 11; CD 1 – Im 12)

Tuchodi River, Inlet to Upper Tuchodi Lake*
Site 7: View upstream from bottom of site.
(Roll 1 - Exp 12; CD 1 – Im 13)

APPENDIX V

TUCHODI RIVER
212-580800-40300

Outlet of Upper Tuchodi Lake*
Stream Sample Site 8

Site Data Card, Fish Collection Form and Site Photographs

FDIS Site Card

Reach #	ILP Map #	ILP #	Site
7.0			8

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

PROJECT

Project Name: Lake Surveys of Tuchodi Lakes
Stream Name (gaz.): TUCHODI RIVER **Project Code:** 2734
Project Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

WATERSHED

Gazetted Name: TUCHODI RIVER **Local Name:** Tuchodi River - Middle
Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000
ILP Map#: **ILP #:** **NID Map #:** 094K.028 **NID #:** 5 **Reach #:** 7.0 **Site #:** 8

Field UTM(Zone/East/North/Method)				GIS UTM(Zone/East/North)		
10	413920	6454000	MAP			

Site Lg: 300 **Method:** GE **Access:** FW
Ref. Name:
Date: 1999/08/18 **Time:** 10:00 **Agency:** C032 **Crew:** TE BC **Fish Crd?:** ☑ **Incomplete:** ☑

CHANNEL

	Mtd	width	width	width	width	width	width	width	width	width	width	Avg
Channel Width (m):	RF	64.00	132.00	112.00	170.00	71.00	75.00					104.00
Wetted Width (m):	RF	64.00	92.00	108.00	139.00	71.00	75.00					91.50
Pool Depth (m):	MS	2.00										2.00

	Gadient %		Mtd	Avg
Method I:	1.5	1.0	C	1.33
Method II:	1.5		C	

Wb Depth:	2.5		

Avg: 2.50 **Method:** GE **Stage:** L☐ M☑ H☐
No Vis.Ch.: ☐ **Intermittent:** ☐
Dw: ☐ **Tribs.:** ☐

COVER Total: M

Type:	SWD	LWD	B	U	DP	OV	IV
Amount:	S	N	S	T	D	N	N
Loc: P/S/O:	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐

CROWN CLOSURE 1 1-20%
INSTREAM VEG: N ☑ A ☐ M ☐ V ☐

LWD: N **DIST:**

LB SHP: S
Texture: ☐ F ☐ G ☑ C ☐ B ☐ R ☐ A
RIP: S
STG: MF

RB SHP: S
Texture: ☐ F ☐ G ☑ C ☐ B ☐ R ☐ A
RIP: S
STG: MF

WATER

EMS:
Temp: 13 Method: T3
pH: Method: P2
Flood Signs: 0.7M RAFTED DEB Method: MS
Req #:
Cond.: Method:
Turb.: ☐ T ☐ M ☑ L ☐ C Method: GE

MORPHOLOGY

Bed Material: Dominant: C Subdom: G
D95: 35.0 D (cm): 45.00 Morph: RP
Pattern: ME
Islands: F
Coupling: DC
Confinement: OC
FSZ ☐

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3
☐	☑	☑	☐	☑	☐	☐

C1	C2	C3	C4	C5	S1	S2	S3	S4	S5
☐	☐	☐	☑	☐	☐	☐	☐	☐	☐

Bars: ☐ N ☑ SIDE ☐ DIAG ☑ MID ☐ SPAN ☐ BR

HABITAT QUALITY

Name	Comments
Other	Ross Peck indicated catching large bull trout at outlet of Upper Tuchodi Lake* around September 10 in previous years
OverWinter Habitat	numerous deep pools for overwintering whitefish and bull trout
Rearing Habitat	numerous secondary channels offering habitat for whitefish and bull trout, deep pool habitat for adult whitefish, bull and lake trout, no juvenile bull trout sampled despite abundance of side channel habitat

PHOTOS

Photo				Foc Lg	Dir	Comments
R:	2	F:	2A	WD	U	upstream from bottom of site
R:	2	F:	7	WD	D	downstream from top of site on primary channel
R:	2	F:	8	WD	D	panorama from top of site
R:	2	F:	9	WD	D	panorama from top of site

FDIS Site Card

Watershed Code:	Reach #	ILP Map #	ILP #	Site
212-580800-40300-00000-0000-0000-000-000-000-000-000	7.0			8

WILDLIFE	
Group	**Observations**
MAM	black bear and elk tracks abundant

COMMENTS	
Section	**Comments**
COVER	vegetated sections covered by fines
WATER	pale green coloration
CHANNEL	multiple channel braids too deep to wade or cross safely, impaired ability to measure depths and widths accurately

FDIS Fish Form

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000 7.0

WATERBODY

Gazetted Name: TUCHODI RIVER **Local:** Tuchodi River - Middle
Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-0
WS Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000
Waterbody ID: **ILP Map #:** **ILP #:** **Reach #:** 7 -
Project ID: 2734 **Lake/Stream:** S **Lake From Date:**

Fish Permit #: SC99-017 **Date:** 1999/08/18 **To:** 1999/08/18 **Agency:** C032 **Crew:** TE BC **Resample:** ☐

SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd				MTD/NO		Temp	Cond	Turbid	Comment
8	094K.028	5	10	413920	6454000	MAP	AG	1	13		L	pale green coloration
8	094K.028	5	10	413920	6454000	MAP	EF	1	12.5		L	pale green coloration

A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
8	AG	1	1	1999/08/18	10:30	1999/08/18	11:00	
8	EF	1	1	1999/08/18	10:00	1999/08/18	10:25	

C. ELECTROFISHER SPECIFICATIONS

Site#	MTD/NO		H/P	Encl	Sec	Lnth	Wdth	Voltage	Frequency	Pulse	Make	Model
8	EF	1	1	O	427	200.0	65.0	250	60	fixed	COFFELT	MARK 10

FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
8	AG	1	1	BT	A		3	298	490	R	
8	EF	1	1	CCG	A		5	42	80	R	1 BT missed while electrofishing
8	EF	1	1	MW	NS		10	137	258	R	1 BT escaped from bucket while electrofishing

INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl	#/Age			Str/Smpl#				
8	EF	1	1	MW	256	214.0	U	U	SC	1	5						
8	EF	1	1	MW	258	172.0	U	U	SC	2	5						
8	EF	1	1	MW	212	104.0	U	U	SC	3	3						
8	EF	1	1	MW	197	94.0	U	U	SC	4	2						
8	EF	1	1	MW	201	98.0	U	U	SC	5	3						
8	EF	1	1	MW	208	96.0	U	U	SC	6	3						
8	EF	1	1	MW	187	88.0	U	U	SC	7	2						
8	EF	1	1	MW	137	26.0	U	U	SC	8	1						
8	EF	1	1	MW	137	30.0	U	U	SC	9	1						
8	EF	1	1	MW	138	34.0	U	U	SC	10	1						
8	EF	1	1	CCG	80		U	U									
8	EF	1	1	CCG	50		U	U									
8	EF	1	1	CCG	42		U	U									
8	EF	1	1	CCG	42		U	U									
8	EF	1	1	CCG	46		U	U									
8	AG	1	1	BT	340	360.0	U	U	FR	11	5						
8	AG	1	1	BT	490	1160.0	M	MT	FR	12	8						
8	AG	1	1	BT	298	256.0	U	U	FR	13	4						

Tuchodi River, Outlet of Upper Tuchodi Lake*
Site 8: View upstream from bottom of site.
(Roll 2 - Exp 2A; CD 1 – Im 29)

Tuchodi River, Outlet of Upper Tuchodi Lake*
Site 8: View downstream from top of site.
(Roll 2 - Exp 7; CD 1 – Im 30)

Tuchodi River, Outlet of Upper Tuchodi Lake*; Site 8: View downstream from top of site.
(Roll 2 - Exp 8-9; CD 1 – Im 31-32)

Tuchodi River, Outlet of Upper Tuchodi Lake*
Site 8: Aerial view east toward outlet of Upper Tuchodi Lake*, alluvial fan dam, Tuchodi River and Lower Tuchodi Lake*.
(Roll 3 - Exp 15; CD 1 – Im 64)

APPENDIX VI

UNNAMED TRIBUTARY TO UPPER TUCHODI LAKE*

212-580800-40300-59700

Tributary #1
Stream Sample Site 9

Site Data Card, Fish Collection Form and Site Photographs

FDIS Site Card

Reach #	ILP Map #	ILP #	Site
1.0			9

Watershed Code: 212-580800-40300-59700-0000-0000-000-000-000-000-000-000

PROJECT

Project Name: Lake Surveys of Tuchodi Lakes
Stream Name (gaz.): TUCHODI RIVER **Project Code:** 2734
Project Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

WATERSHED

Gazetted Name: **Local Name:** Unnamed Creek - Trib #1
Watershed Code: 212-580800-40300-59700-0000-0000-000-000-000-000-000-000
ILP Map#: **ILP #:** **NID Map #:** 094K.028 **NID #:** 6 **Reach #:** 1.0 **Site #:** 9

Field UTM(Zone/East/North/Method)				GIS UTM(Zone/East/North)		
10	409820	6452370	MAP			

Site Lg: 100 **Method:** GE **Access:** FW
Ref. Name:

Date: 1999/08/16 **Time:** 12:53 **Agency:** C032 **Crew:** TE BC **Fish Crd?:** ☑ **Incomplete:** ☑

CHANNEL

	Mtd	width	width	width	width	width	width	width	width	width	width	Avg
Channel Width (m):	MS	9.50	3.90	3.20	3.20	2.30	2.80					4.15
Wetted Width (m):	MS	4.50	2.90	3.20	3.20	2.30	2.80					3.15
Pool Depth (m):	MS	0.25	0.30	0.90	0.44	0.18	0.37					0.41

	Gradient %		Mtd	Avg
Method I:	2.0		C	2.00
Method II:			AL	.

Wb Depth:	.5	.3	.3

Avg: 0.37 **Method:** MS **Stage:** L ☑ M ☐ H ☐

No Vis.Ch.: ☐ **Intermittent:** ☐ **Dw:** ☐ **Tribs.:** ☐

COVER Total: M

Type:	SWD	LWD	B	U	DP	OV	IV
Amount:	S	T	N	S	D	N	N
Loc: P/S/O:	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐

CROWN CLOSURE 1 1-20%

INSTREAM VEG: N ☑ A ☐ M ☐ V ☐

LWD: F **DIST:** C

LB SHP: S
Texture: ☑ F ☐ G ☐ C ☐ B ☐ R ☐ A
RIP: C
STG: YF

RB SHP: S
Texture: ☑ F ☐ G ☐ C ☐ B ☐ R ☐ A
RIP: C
STG: YF

WATER

EMS: **Req #:**
Temp: 11 Method: T3 **Cond.:** Method:
pH: Method: P2 **Turb.:** ☐ T ☐ M ☐ L ☑ C Method: GE
Flood Signs: 0.2M RAFTED DEB Method: MS

MORPHOLOGY

Bed Material: Dominant: G Subdom: C
D95: 12.0 D (cm): 10.00 Morph: RP
Pattern: IM
Islands: N
Coupling: DC
Confinement: UN
FSZ ☐

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3
☐	☑	☐	☐	☐	☐	☐

C1	C2	C3	C4	C5	S1	S2	S3	S4	S5
☐	☐	☑	☐	☐	☐	☐	☐	☐	☐

Bars: ☐ N ☑ SIDE ☐ DIAG ☑ MID ☐ SPAN ☐ BR

HABITAT QUALITY

Name	Comments
Cover	Deep pools offer escape cover for rearing bull trout and/or whitefish. Limited LWD cover available.

PHOTOS

Photo				Foc Lg	Dir	Comments
R:	1	F:	2	WD	U	upstream from bottom of site
R:	1	F:	3	WD	U	upstream from centre of site
R:	1	F:	4	WD	D	downstream from top of site
R:	1	F:	5	WD	U	confluence of Trib #1 with Upper Tuchodi Lake*

FDIS Fish Form

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-59700-0000-0000-000-000-000-000-000-000 1.0

WATERBODY

Gazetted Name: **Local:** Unnamed Creek - Trib #1

Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-0

WS Code: 212-580800-40300-59700-0000-0000-000-000-000-000-000-000

Waterbody ID: **ILP Map #:** **ILP #:** **Reach #:** 1 -

Project ID: 2734 **Lake/Stream:** S **Lake From Date:**

Fish Permit #: SC99-017 **Date:** 1999/08/16 **To:** 1999/08/16 **Agency:** C032 **Crew:** TE BC **Resample:** ☐

SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd				MTD/NO		Temp	Cond	Turbid	Comment
9	094K.028	6	10	409820	6452370	MAP	EF	1	11		C	

A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
9	EF	1	1	1999/08/16	13:00	1999/08/16	13:15	

C. ELECTROFISHER SPECIFICATIONS

Site#	MTD/NO		H/P	Encl	Sec	Lnth	Wdth	Voltage	Frequency	Pulse	Make	Model
9	EF	1	1	O	216	100.0	3.0	250	60	fixed	COFFELT	MARK 10

FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
9	EF	1	1	CCG	A		4	42	74	R	

INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl#/Age				Str/Smpl#				
9	EF	1	1	CCG	74		U	U									
9	EF	1	1	CCG	42		U	U									
9	EF	1	1	CCG	50		U	U									
9	EF	1	1	CCG	56		U	U									

Unnamed tributary to Upper Tuchodi Lake*
Tributary #1 - Site 9: View upstream from bottom of site.
(Roll 1 - Exp 2; CD 1 – Im 3)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #1 - Site 9: View from centre of lake, Tributary #1 valley.
(Roll 1 - Exp 5; CD 1 – Im 6)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #1 - Site 9: View upstream from centre of site.
(Roll 1 - Exp 3; CD 1 – Im 4)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #1 - Site 9: View downstream from top of site.
(Roll 1 - Exp 4; CD 1 – Im 5)

APPENDIX VII

UNNAMED TRIBUTARY TO UPPER TUCHODI LAKE*
212-580800-40300-62500

Tributary #2
Stream Sample Site 10

Site Data Card, Fish Collection Form and Site Photographs

FDIS Site Card

Reach #	ILP Map #	ILP #	Site
1.0			10

Watershed Code: 212-580800-40300-62500-0000-0000-000-000-000-000-000-000

PROJECT

Project Name: Lake Surveys of Tuchodi Lakes
Stream Name (gaz.): TUCHODI RIVER **Project Code:** 2734
Project Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

WATERSHED

Gazetted Name: **Local Name:** Unnamed Creek - Trib #2
Watershed Code: 212-580800-40300-62500-0000-0000-000-000-000-000-000-000
ILP Map#: **ILP #:** **NID Map #:** 094K.018 **NID #:** 4 **Reach #:** 1.0 **Site #:** 10

Field UTM(Zone/East/North/Method)				GIS UTM(Zone/East/North)		
10	409500	6451480	MAP			

Site Lg: 100 **Method:** GE **Access:** FW
Ref. Name:
Date: 1999/08/16 **Time:** 14:07 **Agency:** C032 **Crew:** TE BC **Fish Crd?:** ☑ **Incomplete:** ☑

CHANNEL

	Mtd	width	width	width	width	width	width	width	width	width	width	Avg
Channel Width (m):	MS											0.00
Wetted Width (m):	MS	2.00										2.00
Pool Depth (m):	MS											0.00

	Gadient %		Mtd	Avg
Method I:	13.0		C	13.00
Method II:			C	

Wb Depth: **Avg:** 0.00 **Method:** NS **Stage:** L☑ M☐ H☐
No Vis.Ch.: ☐ **Intermittent:** ☐ **Dw:** ☐ **Tribs.:** ☐

COVER Total: T

Type:	SWD	LWD	B	U	DP	OV	IV
Amount:	S	T	D	N	S	N	N
Loc: P/S/O:	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐

CROWN CLOSURE 1 1-20%
INSTREAM VEG: N☑ A☐ M☐ V☐

LWD: F **DIST:** C

LB SHP: S
Texture: ☐ F ☐ G ☑ C ☐ B ☐ R ☐ A
RIP: M
STG: INIT

RB SHP: S
Texture: ☐ F ☐ G ☑ C ☐ B ☐ R ☐ A
RIP: M
STG: SHR

WATER

EMS:
Temp: 9 Method: T3
pH: Method: P2
Flood Signs: 1.0M RAFTED DEB Method: MS
Req #:
Cond.: Method:
Turb.: ☐ T ☐ M ☐ L ☑ C Method: GE

MORPHOLOGY

Bed Material: Dominant: B Subdom: C
D95: 40.0 D (cm): 50.00 Morph: CP
Pattern: SI
Islands: N
Coupling: DC
Confinement: UN
FSZ ☐

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3
☐	☑	☐	☐	☑	☑	☐

C1	C2	C3	C4	C5	S1	S2	S3	S4	S5
☑	☐	☑	☐	☐	☐	☐	☐	☐	☐

Bars: ☐ N ☑ SIDE ☐ DIAG ☐ MID ☐ SPAN ☐ BR

HABITAT QUALITY

Name	Comments
Other	limited fisheries value, low flow, numerous vertical barriers, unstable channel

PHOTOS

Photo				Foc Lg	Dir	Comments
R:	1	F:	6	WD	U	upsteam from bottom of site
R:	1	F:	7	WD	U	upstream from centre of site
R:	1	F:	9	WD	U	confluence of trib #2 with Upper Tuchodi Lake*

COMMENTS

Section	Comments
CHANNEL	no defined channel, numerous channels spread throughout forested alluvial fan, seasonal surface flow, channel width averaged, no pools to measure

FDIS Fish Form

Reach # ILP Map # ILP #

Watershed Code: 212-580800-40300-62500-0000-0000-000-000-000-000-000-000 1.0

WATERBODY

Gazetted Name: **Local:** Unnamed Creek - Trib #2

Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-0

WS Code: 212-580800-40300-62500-0000-0000-000-000-000-000-000-000

Waterbody ID: **ILP Map #:** **ILP #:** **Reach #:** 1 -

Project ID: 2734 **Lake/Stream:** S **Lake From Date:**

Fish Permit #: SC99-017 **Date:** 1999/08/16 **To:** 1999/08/16 **Agency:** C032 **Crew:** TE BC **Resample:** ☐

SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd				MTD/NO		Temp	Cond	Turbid	Comment
10	094K.018	4	10	409500	6451480	MAP	EF	1	8.5		C	

A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
10	EF	1	1	1999/08/16	14:07	1999/08/16	14:15	

C. ELECTROFISHER SPECIFICATIONS

Site#	MTD/NO		H/P	Encl	Sec	Lnth	Wdth	Voltage	Frequency	Pulse	Make	Model
10	EF	1	1	O	201	100.0	2.0	250	60	fixed	COFFELT	MARK 10

FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
10	EF	1	1	CCG	A		3	42	56	R	

INDIVIDUAL FISH DATA

Site#	MTD/NO		H/P	Species	Length	Weight	Sex	Mat	Age			Vch#	Genetic		Roll #	Frame#	Comment
									Str/Smpl#		Age		Str/Smpl#				
10	EF	1	1	CCG	56		U	U									
10	EF	1	1	CCG	42		U	U									
10	EF	1	1	CCG	52		U	U									

Unnamed tributary to Upper Tuchodi Lake*
Tributary #2 - Site 10: View upstream from bottom of site.
(Roll 1 - Exp 6; CD 1 – Im 7)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #2 - Site 10: View upstream from centre of site.
(Roll 1 - Exp 7; CD 1 – Im 8)

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APPENDIX VIII

UNNAMED TRIBUTARY TO UPPER TUCHODI LAKE*

212-580800-40300-63200

Tributary #3
Stream Sample Site 11

Site Data Card, Fish Collection Form and Site Photographs

FDIS Site Card

Reach #	ILP Map #	ILP #	Site
1.0			11

Watershed Code: 212-580800-40300-63200-0000-0000-000-000-000-000-000-000

PROJECT

Project Name: Lake Surveys of Tuchodi Lakes
Stream Name (gaz.): TUCHODI RIVER **Project Code:** 2734
Project Watershed Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-000

WATERSHED

Gazetted Name: **Local Name:** Unnamed Ck Standard Ck- Trib #3
Watershed Code: 212-580800-40300-63200-0000-0000-000-000-000-000-000-000
ILP Map#: **ILP #:** **NID Map #:** 094K.018 **NID #:** 3 **Reach #:** 1.0 **Site #:** 11

Field UTM(Zone/East/North/Method)				GIS UTM(Zone/East/North)		
10	407620	6449820	MAP			

Site Lg: 100 **Method:** GE **Access:** FW
Ref. Name:
Date: 1999/08/17 **Time:** 08:40 **Agency:** C032 **Crew:** TE BC **Fish Crd?:** ☑ **Incomplete:** ☑

CHANNEL

	Mtd	width	width	width	width	width	width	width	width	width	width	Avg
Channel Width (m):	MS	3.50	3.40	3.40	3.10	4.00	3.40					3.47
Wetted Width (m):	MS	3.50	3.40	3.40	3.10	4.00	3.40					3.47
Pool Depth (m):	MS	0.10	0.19	0.09	0.21	0.15	0.28	0.18				0.17

	Gadient %		Mtd	Avg
Method I:	6.0	7.0	C	6.50
Method II:			AL	

Wb Depth: **Avg:** 0.00 **Method:** NS **Stage:** L☐ M☑ H☐
No Vis.Ch.: ☐ **Intermittent:** ☐ **Dw:** ☐ **Tribs.:** ☐

COVER Total: T

Type:	SWD	LWD	B	U	DP	OV	IV
Amount:	S	S	S	N	D	N	N
Loc: P/S/O:	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐	☑☐☐

CROWN CLOSURE 1 1-20%
INSTREAM VEG: N ☑ A ☐ M ☐ V ☐

LWD: A **DIST:** E

LB SHP: S
Texture: ☐ F ☐ G ☑ C ☐ B ☐ R ☐ A
RIP: M
STG: MF

RB SHP: S
Texture: ☐ F ☐ G ☐ C ☑ B ☐ R ☐ A
RIP: M
STG: MF

WATER

EMS:
Temp: 9 Method: T3
pH: Method: P2
Flood Signs: 1.7M, ELEVATED B Method: MS

Req #:
Cond.: Method:
Turb.: ☐ T ☐ M ☐ L ☑ C Method: GE

MORPHOLOGY

Bed Material: Dominant: C Subdom: B
D95: 34.0 D (cm): 50.00 Morph: CP
Pattern: IR
Islands: N
Coupling: DC
Confinement: UN
FSZ ☐

DISTURBANCE INDICATORS

O1	B1	B2	B3	D1	D2	D3
☐	☑	☑	☐	☑	☑	☐

C1	C2	C3	C4	C5	S1	S2	S3	S4	S5
☑	☐	☑	☑	☐	☐	☐	☐	☐	☐

Bars: ☐ N ☑ SIDE ☐ DIAG ☐ MID ☑ SPAN ☐ BR

HABITAT QUALITY

Name	Comments
Cover	extremely limited
Rearing Habitat	limited value due to high gradient, extensive riffle and unstable channel

PHOTOS

Photo				Foc Lg	Dir	Comments
R:	1	F:	14	WD	U	upstream from bottom, confluence with Upper Tuchodi Lake*
R:	1	F:	15	WD	U	upstream from centre of site
R:	1	F:	16	WD	D	downstream from top of site
R:	1	F:	8	WD	NS	alluvial fan created by Trib 3, view from lake centre

COMMENTS

Section	Comments

FDIS Site Card

Watershed Code:	Reach #	ILP Map #	ILP #	Site
212-580800-40300-63200-0000-0000-000-000-000-000-000-000	1.0			11

COVER	spruce / cottonwood mixed forest canopy
CHANNEL	multiple channels across alluvial fan, flow pattern most likely changes annually through rooted spruce forest, channel becomes more defined at top of site

FDIS Fish Form

Reach #	ILP Map #	ILP #
1.0		

Watershed Code: 212-580800-40300-63200-0000-0000-000-000-000-000-000-000

WATERBODY

Gazetted Name: **Local:** Unnamed Ck (Standard) Trib #3

Project Code: 212-580800-40300-00000-0000-0000-000-000-000-000-000-0

WS Code: 212-580800-40300-63200-0000-0000-000-000-000-000-000-000

Waterbody ID: **ILP Map #:** **ILP #:** **Reach #:** 1 -

Project ID: 2734 **Lake/Stream:** S **Lake From Date:**

Fish Permit #: SC99-017 **Date:** 1999/06/17 **To:** 1999/06/17 **Agency:** C032 **Crew:** TE BC **Resample:** ☐

SITE / METHOD

Site#	NID Map	NID #	UTM:Zone/East/North/Mthd				MTD/NO		Temp	Cond	Turbid	Comment
11	094K.018	3	10	407620	6449820	MAP	EF	1	9		C	

A. GEAR SETTINGS

Site#	MTD/NO		H/P	Date In	Time In	Date Out	Time Out	Comment
11	EF	1	1	1999/06/17	08:45	1999/06/17	09:00	

C. ELECTROFISHER SPECIFICATIONS

Site#	MTD/NO		H/P	Encl	Sec	Lnth	Wdth	Voltage	Frequency	Pulse	Make	Model
11	EF	1	1	O	162	100.0	3.5	250	60	fixed	COFFELT	MARK 10

FISH SUMMARY

Site#	MTD/NO		H/P	Species	Stage	Age	Total #	Lgth (Min/Max)		FishAct	Comment
11	EF	1	1	NFC			0				

Unnamed tributary to Upper Tuchodi Lake*
Tributary #3 - Site 11: View upstream from centre of site.
(Roll 1 - Exp 15; CD 1 – Im 16)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #3 - Site 11: View downstream from top of site.
(Roll 1 - Exp 16; CD 1 – Im 17)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #3 - Site 11: View upstream from bottom of site at lake confluence.
(Roll 1 - Exp 14; CD 1 – Im 15)

Unnamed tributary to Upper Tuchodi Lake*
Tributary #3: Aerial view of alluvial fan.
(Roll 3 - Exp 17; CD 1 – Im 66)

APPENDIX IX

SITE CARD DATA LEGEND

Appendix IX: Site Card Data Legend.

RES. POOL DEPTH	The difference between the maximum pool depth and the riffle crest depth.				
Wb Dp	The depth of the channel at bankfull low.				
STAGE	**L**	Light	**M** Moderate	**H**	High
No Vis. Ch.	No visible channel				
DW	Dewatered channel				
Dry/Int	Dry / Intermittent channel				
Tribs.	Tributaries present				
COVER TYPE	**SWD**	Small woody debris		**U**	Undercut banks
	LWD	Large woody debris		**DP**	Deep pools
	B	Boulders			
	OV	Overhanging vegetation within 1 m of water surface			
	IV	Instream vegetation			
TOTAL COVER	**N**	None		**M**	Moderate (5-20%)
	T	Trace (5%)		**A**	Abundant (>20%)
COVER AMOUNT	**N**	None		**S**	Sub-dominant
	T	Trace		**D**	Dominant
COVER LOCATION	**P**	Primary		**O**	Off-channel
	S	Secondary		**A**	All 3 categories
LWD FNC	The presence, amount and distribution of functional large woody debris				
	N	None		**C**	Clumped
	F	Few		**E**	Even
	A	Abundant			
INSTREAM	**N**	None		**M**	Moss
VEGETATION	**A**	Algae		**V**	Vascular
LB/RB SHP	Left and right bank shape				
	U	Undercut		**S**	Sloping (gradual)
	V	V-shaped (steep)		**O**	Overhanging
TEXTURE	Left and right bank texture				
	F	Fines		**B**	Boulders
	G	Gravels		**R**	Bedrock
	C	Cobbles		**A**	Anthropogenic
RIP. VEG.	Riparian vegetation				
	N	None		**D**	Deciduous
	G	Grass		**M**	Mixed C and D
	S	Shrubs		**W**	Wetland
	C	Coniferous			
STAGE	Level of maturity of vegetation				
	INIT	Initial (< 5% cover)		**YF**	Young forest
	SHR	Shrub/herb (< 10% trees)		**MF**	Mature forest
	PS	Pole-sapling		**NA**	Not applicable
TURB.	Turbidity				
	T	Turbid		**L**	Lightly turbid
	M	Moderately turbid		**C**	Clear
FLD SNS	Flood signs - height and type				

Appendix IX: Site Card Data Legend – Cont'd.

BED MATERIAL	**F**	Fines	**B**	Boulder
	G	Gravel	**R**	Bedrock
	C	Cobble		
D95	The size of bed material >95% of the total substrate.			
D	The size of the largest, moveable (by flowing water), sediment particle on channel bed.			
MORPHOLOGY	**RPg-w**	Riffle-pool, gravel bed, LWD functioning		
	RPc-w	Riffle-pool, cobble bed, LWD functioning		
	CPc-w	Cascade-pool, cobble bed, LWD present-minor function		
	CPb	Cascade-pool, boulder bed, LWD absent		
	SPb-w	Step-pool, boulder bed, LWD present-minimal function		
	SPb	Step-pool, boulder bed, LWD absent		
	SPr	Step-pool, boulder-block bed, LWD absent		
	LC	Large channel		
DISTURBANCE	**O1**	Beaver dam	**C3**	Elevated mid-channel bar
INDICATORS	**B1**	Abandoned channels	**C4**	Multiple channel or braids
	B2	Eroding banks	**C5**	Disturbed stone lines
	B3	Avulsions	**S1**	Homogeneous bed material
	D1	Small woody debris	**S2**	Sediment fingers
	D2	Large woody debris	**S3**	Sediment wedges
	D3	Recent LWD jam	**S4**	Extensive bars
	C1	Extensive riffles or cascades	**S5**	Extensively scoured areas
	C2	Minimal pool area		
PATTERN	**TM**	Tortuous meanders	**IR**	Irregular wandering
	ME	Regular meanders	**SI**	Sinuous
	IM	Irregular meanders	**ST**	Straight
ISLANDS	**N**	None	**F**	Frequent
	O	Occasional	**S**	Split
	I	Irregular	**AN**	Anastomosing
BARS	**N**	None	**MID**	Mid-stream (parallel to axis)
	SIDE	Side	**SPAN**	Continuous along sides
	DIAG	Diagonal (mid-stream)	**BR**	Braiding
COUPLING	Sediment transfer routes from hillslope to waterbody			
	DC	Decoupled	**CO**	Coupled
	PC	Partially coupled		
CONFINEMENT	**EN**	Entrenched	**OC**	Occasionally confined
	CO	Confined	**UN**	Unconfined
	FC	Frequently confined	**N/A**	Not applicable

APPENDIX X

PHOTODOCUMENTATION INDEX

Appendix X: Photodocumentation Index

SITE	ROLL	FRAME	CD	IMAGE	VIEW	WATERSHED
Upper Tuchodi Lake*	1	0	1	001	aerial view of Upper Tuchodi Lake* toward northeast (d/s)	Tuchodi
Upper Tuchodi Lake*	1	1	1	002	aerial view of outlet of Upper Tuchodi Lake* toward northeast (Lower Tuchodi Lake* in background)	Tuchodi
Upper Tuchodi Lake*	1	2	1	003	trib 1, site 9, u/s from bottom of site	Tuchodi
Upper Tuchodi Lake*	1	3	1	004	trib 1, site 9, u/s from centre of site	Tuchodi
Upper Tuchodi Lake*	1	4	1	005	trib 1, site 9, d/s from top of site	Tuchodi
Upper Tuchodi Lake*	1	5	1	006	trib 1, site 9, valley from which Trib 1 originates, taken from centre of lake	Tuchodi
Upper Tuchodi Lake*	1	6	1	007	trib 2, site 10, u/s from bottom of site	Tuchodi
Upper Tuchodi Lake*	1	7	1	008	trib 2, site 10, u/s from centre of site	Tuchodi
Upper Tuchodi Lake*	1	8	1	009	trib 3, site 11, alluvial fan formed by Trib 3, view from lake centre	Tuchodi
Upper Tuchodi Lake*	1	9	1	010	trib 2, site 10, confluence and alluvial fan of Trib 2	Tuchodi
Upper Tuchodi Lake*	1	10	1	011	Tuchodi River, d/s from top of site	Tuchodi
Upper Tuchodi Lake*	1	11	1	012	Tuchodi River, u/s from centre of site	Tuchodi
Upper Tuchodi Lake*	1	12	1	013	Tuchodi River, u/s from bottom of site	Tuchodi
Upper Tuchodi Lake*	1	13	1	014	d/s from confluence of Tuchodi River and Lake	Tuchodi
Upper Tuchodi Lake*	1	14	1	015	trib 3, site 11, u/s from bottom of site or lake confluence	Tuchodi
Upper Tuchodi Lake*	1	15	1	016	trib 3, site 11, u/s from centre of site	Tuchodi
Upper Tuchodi Lake*	1	16	1	017	trib 3, site 11, d/s from top of site	Tuchodi
Upper Tuchodi Lake*	1	17	1	018	70 cm lake trout (GN2-005) from floating gillnet	Tuchodi
Upper Tuchodi Lake*	1	18	1	019	70 cm lake trout (GN2-005) from floating gillnet	Tuchodi
Upper Tuchodi Lake*	1	19	1	020	panorama, south shoreline from camp looking east toward outlet	Tuchodi
Upper Tuchodi Lake*	1	20	1	021	panorama, looking northeast toward outlet and lake centre	Tuchodi

Appendix X: Photodocumentation Index Cont'd.

SITE	ROLL	FRAME	CD	IMAGE	VIEW	WATERSHED
Upper Tuchodi Lake*	1	21	1	022	panorama, from camp looking north-northeast toward opposite shoreline	Tuchodi
Upper Tuchodi Lake*	1	22	1	023	Lake trout (SL1-001) captured at camp by set-line	Tuchodi
Upper Tuchodi Lake*	1	23	1	024	Lake trout (SL1-001) captured at camp by set-line	Tuchodi
Upper Tuchodi Lake*	1	24	1	025	panorama, west-northwest from Limno. Station #1	Tuchodi
Upper Tuchodi Lake*	1	25	1	026	panorama, west-southwest from Limno. Station #1	Tuchodi
Upper Tuchodi Lake*	2	0A	1	027	1982 benchmark, from shore	Tuchodi
Upper Tuchodi Lake*	2	1A	1	028	1982 benchmark, 200 m from shore	Tuchodi
Tuchodi Lakes	2	2A	1	029	Tuchodi River, Site 8, u/s from bottom of site	Tuchodi
Tuchodi Lakes	2	7	1	030	Tuchodi River, Site 8, d/s from top, primary channel	Tuchodi
Tuchodi Lakes	2	8	1	031	Tuchodi River, Site 8, panorama, d/s from top of site	Tuchodi
Tuchodi Lakes	2	9	1	032	Tuchodi River, Site 8, panorama, d/s from top of site	Tuchodi
Tuchodi Lakes	2	10	1	033	d/s Tuchodi River looking towards confluence with Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	11	1	034	panorama - u/s from centre of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	12	1	035	panorama - u/s from centre of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	13	1	036	panorama - u/s from centre of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	14	1	037	d/s from centre of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	15	1	038	panorama - d/s from centre of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	16	1	039	panorama - d/s from centre of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	2	17	1	040	view of benchmark	Tuchodi
Lower Tuchodi Lake*	2	18	1	041	Tuchodi River, u/s from bottom of site	Tuchodi
Lower Tuchodi Lake*	2	19	1	042	Tuchodi River, u/s from centre of site	Tuchodi
Lower Tuchodi Lake*	2	20	1	043	Tuchodi River, d/s from top of site	Tuchodi
Lower Tuchodi Lake*	2	21	1	044	Lake trout (LGN1-012) from sinking gill-net	Tuchodi
Lower Tuchodi Lake*	2	22	1	045	Lake trout (LGN1-012) from sinking gill-net	Tuchodi
Lower Tuchodi Lake*	2	23	1	046	Lake whitefish (LGN1-041) from sinking gill-net	Tuchodi

Appendix X: Photodocumentation Index Cont'd.

SITE	ROLL	FRAME	CD	IMAGE	VIEW	WATERSHED
Lower Tuchodi Lake*	2	24	1	047	Lake whitefish (LGN1-041) from sinking gill-net	Tuchodi
Lower Tuchodi Lake*	2	25	1	048	Lake whitefish (LGN1-073) from sinking gill-net	Tuchodi
Lower Tuchodi Lake*	3	0	1	049	Potamogeton richardsonii - clasping pondweed	Tuchodi
Lower Tuchodi Lake*	3	1	1	050	Potamogeton richardsonii - clasping pondweed	Tuchodi
Lower Tuchodi Lake*	3	2	1	051	Equisetum sp. - horsetail species	Tuchodi
Lower Tuchodi Lake*	3	3	1	052	Equisetum sp. - horsetail species	Tuchodi
Lower Tuchodi Lake*	3	4	1	053	Potamogeton pectinatus - sago pondweed	Tuchodi
Lower Tuchodi Lake*	3	5	1	054	unidentified aquatic plant	Tuchodi
Lower Tuchodi Lake*	3	6	1	055	unidentified aquatic plant	Tuchodi
Lower Tuchodi Lake*	3	7	1	056	Tuchodi River, aerial d/s of outlet of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	3	8	1	057	Tuchodi River, aerial u/s of outlet of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	3	9	1	058	Tuchodi River, aerial outlet of Lower Tuchodi Lake*	Tuchodi
Lower Tuchodi Lake*	3	10	1	059	aerial view downstream (east) of centre of Lower Tuchodi Lake*	Tuchodi
Upper Tuchodi Lake*	3	11	1	060	Tuchodi River, aerial of outlet of Upper Tuchodi Lake* and alluvial fan dam	Tuchodi
Upper Tuchodi Lake*	3	12	1	061	aerial u/s (southwest) of Upper Tuchodi Lake*	Tuchodi
Upper Tuchodi Lake*	3	13	1	062	aerial (east) of outlet of Upper Tuchodi Lake*, alluvial fan dam and Tuchodi River	Tuchodi
Upper Tuchodi Lake*	3	14	1	063	aerial (northeast) of outlet of Upper Tuchodi Lake*, alluvial fan dam, Tuchodi River and Lower Tuchodi Lake*	Tuchodi
Upper Tuchodi Lake*	3	15	1	064	aerial (northeast) of outlet of Upper Tuchodi Lake*, alluvial fan dam, Tuchodi River and Lower Tuchodi Lake*	Tuchodi
Upper Tuchodi Lake*	3	16	1	065	aerial of Upper Tuchodi Lake*, Tuchodi River (inlet) delta	Tuchodi
Upper Tuchodi Lake*	3	17	1	066	trib 3, site 11, aerial of alluvial fan of Trib 3	Tuchodi

Appendix X: Photodocumentation Index Cont'd.

SITE	ROLL	FRAME	CD	IMAGE	VIEW	WATERSHED
Upper Tuchodi Lake*	3	18	1	067	aerial of Upper Tuchodi Lake*, Tuchodi River (inlet) delta, and Tuchodi River valley	Tuchodi
Upper Tuchodi Lake*	3	19	1	068	aerial of Tuchodi River confluence and delta with Upper Tuchodi Lake*	Tuchodi
Upper Tuchodi Lake*	3	20	1	069	aerial d/s of Tuchodi River confluence and delta toward Upper Tuchodi Lake*	Tuchodi
Upper Tuchodi Lake*	3	21	1	070	aerial detail of Tuchodi River confluence and delta toward Upper Tuchodi Lake*	Tuchodi
Tuchodi River	3	22	1	071	aerial of Tuchodi River valley from above western end of Upper Tuchodi Lake*	Tuchodi

APPENDIX XI

BATHYMETRIC MAP ("D" Size)