

**Reconnaissance (1:20,000)**  
**Fish and Fish Habitat Inventory of**  
**selected inlet streams to Babine Lake**  
Watershed Code:  
480-000000

**Prepared for**

**Houston Forest Products Co.**  
Box 5000  
Houston, B.C.  
V0J 1Z0

**Prepared by**

**SKR Consultants Ltd.**  
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Approved by:

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Biologist  
SKR Consultants Ltd.

**March 31, 2000**

## PROJECT SUMMARY SHEET

### PROJECT REFERENCE INFORMATION

|                           |                         |
|---------------------------|-------------------------|
| MELP Project #:           | HFP-SKR-001-2000        |
| FRBC Project #            | 000108                  |
| FRBC Activity #:          | 10447                   |
| FDIS Project #:           | 06-BABL-00001196-1999   |
| MELP Region:              | Skeena Region (06)      |
| FW Management Unit:       | 06-08                   |
| DFO Subdistrict:          | Prince Rupert (6)       |
| Forest Region:            | Prince Rupert           |
| Forest District:          | Morice Forest District  |
| Forest Licensee:          | Houston Forest Products |
| Tenure Number:            | FLA – 16827             |
| First Nations Claim Area: | Lake Babine Nation      |

### WATERSHED INFORMATION

|                             |                                                                                                                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Watershed Group             | BABL                                                                                                                                                                                             |
| Watershed Name              | Face units to Babine Lake                                                                                                                                                                        |
| Watershed Code              | 480-000000                                                                                                                                                                                       |
| UTM at Mouth                | Several inlet streams were surveyed                                                                                                                                                              |
| Watershed Area              | 270.35 km <sup>2</sup>                                                                                                                                                                           |
| Total of all Stream Lengths | 370.2 km (study area only)                                                                                                                                                                       |
| Stream Order                | 1,2,3,4 (study area only)                                                                                                                                                                        |
| NTS Maps (1:50,000)         | 93M/1, 93M/2, 93M/7, 93M/8 (study area)                                                                                                                                                          |
| TRIM Maps                   | 093M.008, 093M.009, 093M.018, 093M.019, 093M.028 (study area)                                                                                                                                    |
| BEC Zone                    | SBSmc, ESSfk                                                                                                                                                                                     |
| Air Photos for study area   | 30BCC96144 No. 29-40, 70-80<br>30BCC96144 No. 90-97, 140-149, 160-170<br>30BCC96145 No. 22-31, 41-55, 85-102,<br>30BCC96145 No. 114-133, 152-172, 185-207<br>30BCC96147 No. 8-30, 78-95, 116-130 |

### SAMPLING DESIGN

|                            |                                                                                 |
|----------------------------|---------------------------------------------------------------------------------|
| Total # of Reaches         | 369                                                                             |
| Random Sampling Sites      | 45 (48 proposed)                                                                |
| Discretionary Sample Sites | 33 (28 proposed)                                                                |
| Total Sample Sites         | 78 (76 proposed)                                                                |
| Field Sampling Dates       | 1999/07/19-22, 1999/07/25, 1999/08/10,<br>1999/09/07-08, 1999/09/10, 1999/10/26 |
| Fish Species in Watershed  | CO, CH, PK, SK, KO, ST,<br>CT, RB, LT, DV, BT, MW, LW, BB,<br>CSU, NSC, LKC     |

## CONTRACTOR INFORMATION

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## **DISCLAIMER**

This product has been accepted as being in accordance with the approved standards within the limits of the 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.

## **ACKNOWLEDGEMENTS**

Funding for this project was provided by Forest Renewal B.C. and Houston Forest Products Co. (HFP), Houston, B.C.. The contract was administered and monitored by Deidre Quinlan for HFP. Melissa Todd and Deidre Quinlan (HFP) were invaluable in their support throughout this project. Western Geographic Information Systems Inc. (Prince George, B.C.) conducted all digital mapping for the project, and produced the project map, the fisheries maps, and the interpretive maps. Helicopter services were provided primarily by Northern Mountain Helicopters, and the help and effort of Jim Vise and Dawn Grosset are greatly appreciated. Editorial comments on drafts of this report were provided by Regina Saimoto (SKR Consultants Ltd.), Chris Schell (QA/QC Monitor), and Paul Giroux (B.C. Environment).

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## **LIST OF ATTACHMENTS AVAILABLE AT MELP OFFICE**

Digital Overview Map  
Digital Fisheries Project Maps  
Digital Fisheries Interpretive Maps  
Photograph Kodak CD's (2 sets)  
Indexed negatives  
Digital reports  
Digital FDIS database

## 1.0 INTRODUCTION

Three of the four sub-basins in the operating area of Houston Forest Products Co. (HFP) within the northeast portion of the Babine Lake watershed were surveyed from July to October 1999. SKR Consultants Ltd. was retained by HFP (Houston, B.C.) to conduct these surveys under joint funding from Forest Renewal B.C. (FRBC) and HFP. Sub-basins I, II and III were inventoried in this initial year of a two year study, and Sub-basin IV is scheduled to be inventoried in the year 2000. For this study area (see Figure 1), the sub-basin titles and descriptions are:

- **Sub-basin I** - inlet streams to Babine Lake along the western boundary of the study area,
- **Sub-basin II** - inlet streams to Babine Lake along the southern and eastern boundary of the study area,
- **Sub-basin III** - fourth order watershed (ILP 10844; WSC 480-559500) draining into Babine Lake at southern boundary of the study area,
- Sub-basin IV - fourth order watershed (ILP 10864; WSC 480-502100) draining into Babine lake along the western boundary of the study area.

Note: Sub-basins in **Bold Text** were inventoried in 1999,  
Sub-basins in Normal text are scheduled to be inventoried in year 2000.

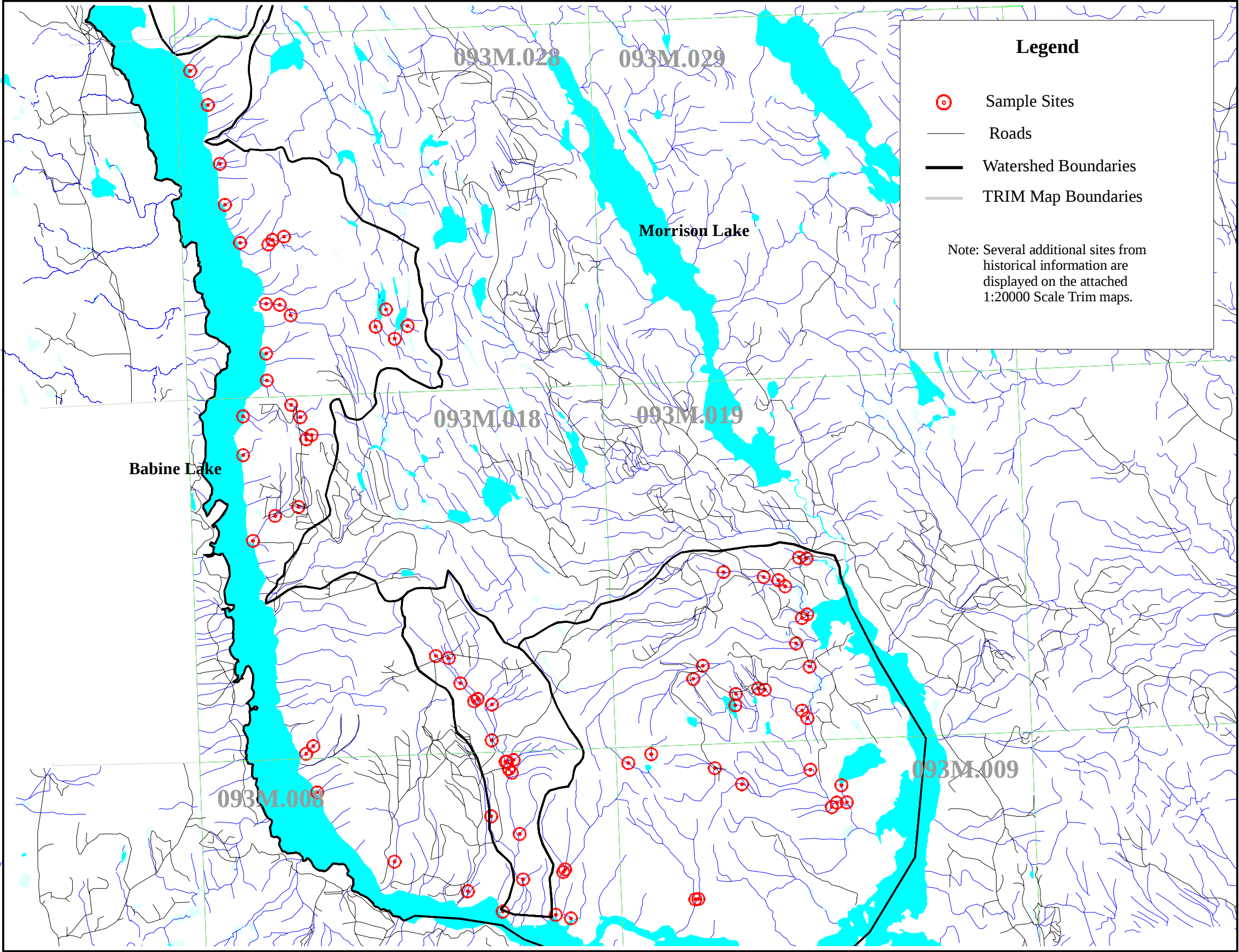
## 1.1 OBJECTIVES

The main objectives of the reconnaissance (1:20,000) fish and fish habitat stream inventory project within selected inlet streams to Babine Lake were:

- to review and summarize historical fisheries information for the study area,
- to undertake a reconnaissance level stream inventory to describe fish distribution and diversity,
- to conduct secondary lake inventory on two selected lakes,
- to document barriers to fish passage,
- to document fish habitat characteristics,
- to identify further sampling requirements, and
- to classify reaches sampled according to the B.C. Forest Practices Code Fish – Stream Identification guidebook (1998).

## 1.2 LOCATION

Inlet streams to the east shore of Babine Lake between Morrison Creek and Fort Babine are located in the Skeena Region (B.C. Environment), and in the Morice Forest District, Prince Rupert Forest Region (Figure 1). Babine Lake is a large headwater lake to the Babine River, a major tributary to the Skeena River system. The Babine River is a heritage river (Anonymous 1997) and it is one of five Class I classified waters in British Columbia (Morten 1998, Anonymous 1997). The system offers world renowned angling and wilderness experience (Morten 1998). The area surveyed in this reconnaissance fish and fish habitat inventory project is located approximately 87 km north of Houston, B.C. (Figure 1).

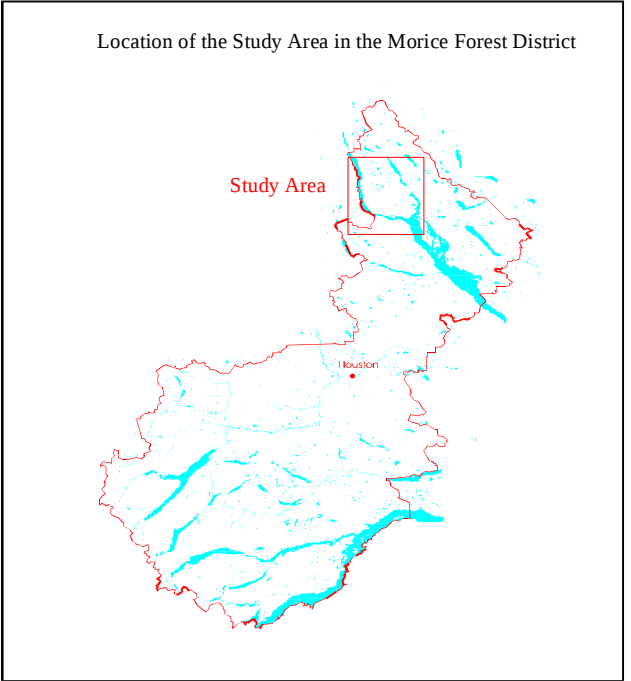
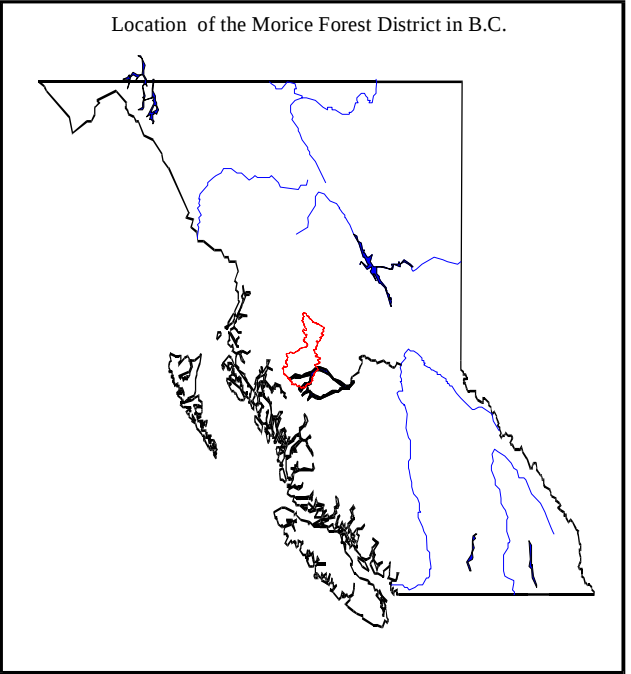


**OVERVIEW MAP**

Some small order Watersheds  
in the  
Babine Lake Watershed Group

Scale ~1:124,000

PROJECT CODE: HFP-SKR-001-2000  
DATE: 2000/03/15  
INVENTORY COMPANY: SKR Consultants Ltd.  
Printed in Canada by: SKR Consultants Ltd. and WGIS Inc.



### 1.2.1 Access

Access to this study area included four wheel drive road access, and helicopter access to several isolated areas in the watershed. The main base for this work was at the Morrison Logging Camp.

Directions from Granisle B.C. to HFP Morrison Logging Camp:

- Turn left from the Granisle Highway approximately 7 kilometers south of Granisle onto the Mitchell Bay Road to the Northwood barge terminal.
- Cross Babine Lake on the Northwood Barge to Nose Bay (Permit is required)
- Travel 9 km north on Jinx Main Forest Road
- Turn left on Hagen Forest Road and travel 39 km to the Morrison Creek bridge
- Continue travelling along the Hagen Forest Road to km 42
- Turn left onto the Morrison Main Forest Road
- Travel 6 km south on the Morrison Main Forest Road

## 1.3 HISTORICAL INFORMATION

A relatively large amount of fisheries information was available for the lower portion of the Babine Lake watershed prior to this study (FISS). Inlet streams to Babine Lake are known to support a variety of fish, including anadromous and non-anadromous species (Table 1). An adult fish counting fence is operated at the outlet of Nilkitkwa Lake, just downstream of Babine Lake, and a second counting fence is operated on Morrison Creek at the Hagen Forest Service Road bridge (FISS).

**Table 1.** A summary of fish previously documented present in Babine Lake and inlet streams within the study area.

| Species                                               | Code | Location              | Reference |
|-------------------------------------------------------|------|-----------------------|-----------|
| Coho – <i>Oncorhynchus kisutch</i>                    | CO   | Babine Lake watershed | FISS      |
| Chinook – <i>O. tshawytscha</i>                       | CH   | Babine Lake watershed | FISS      |
| Pink – <i>O. gorbuscha</i>                            | PK   | Babine Lake watershed | FISS      |
| Sockeye – <i>O. nerka</i>                             | SK   | Babine Lake watershed | FISS      |
| Kokanee – <i>O. nerka</i>                             | KO   | Babine Lake watershed | FISS      |
| Cutthroat trout – <i>O. clarki</i>                    | CT   | Babine Lake watershed | FISS      |
| Rainbow trout – <i>O. mykiss</i>                      | RB   | Babine Lake watershed | FISS      |
| Lake trout – <i>Salvelinus namaycush</i>              | LT   | Babine Lake watershed | FISS      |
| Dolly Varden - <i>S. malma</i>                        | DV   | Babine Lake watershed | FISS      |
| bull trout – <i>S. confluentus</i>                    | BT   | Babine/Nilkitkwa Lake | SKR 1999  |
| Mountain whitefish – <i>Prosopium williamsoni</i>     | MW   | Babine Lake watershed | FISS      |
| Lake whitefish – <i>Coregonus clupeaformis</i>        | LW   | Babine Lake watershed | FISS      |
| Burbot – <i>Lota lota</i>                             | BB   | Babine Lake watershed | FISS      |
| Largescale sucker – <i>Catostomus macrocheilus</i>    | CSU  | Babine Lake watershed | FISS      |
| Northern squawfish – <i>Ptychocheilus oregonensis</i> | NSC  | Babine Lake watershed | FISS      |
| Lake chub – <i>Couesius plumbeus</i>                  | LKC  | Babine Lake watershed | FISS      |
| longnose dace – <i>Rhinichthys cataractae</i>         | LNC  | Babine Lake watershed | FISS      |

Historical information pertaining to the streams draining into the east shore of Babine Lake between Morrison Arm and Fort Babine indicates that rainbow trout, coho, chinook, Dolly Varden and sockeye salmon may utilize available habitat in lower reaches of inlet streams (FISS). Rainbow trout, longnose dace, sculpins and lake chub have also been documented in mid and upper reaches of inlet streams to Babine Lake and Morrison Arm (FISS, SKR 1997, 1998a, 1998b, 1998c, 1999c, 1999d).

## 2.0 RESOURCE USE

The study area within the Babine Lake Basin is public land and as such is utilized by several different resource sectors.

1. First Nations issues and interests in the study area:
  - Land claimed by the Lake Babine Nation as part of their traditional territories includes the entire study area. The Lake Babine Nation is currently at stage three of the Treaty Negotiation Process (B.C. Treaty Commission, 1999).
2. Development and land use: forestry, mining, recreation:
  - The study area falls into tree farm license FLA-16827 which is managed by Houston Forest Products Co.. Harvest in the area has been proposed to the year 2003 (HFP, 1999).
  - There are no mineral stakes, placer stakes or coal licenses in the study area (Ministry of Employment and Investment 1999).
  - The guide outfitter territory in the study area is 604G003, and the four trap line territories are 608T020, 608T023, 608T024 and 608T025 (HFP, 1999)
  - The study area has little recreational value with no recreational sites or trails indicated on the Ministry of Forest Morice District Recreation Map (MoF 1997).
3. Other developments, concerns or points of interest:
  - No higher level plans are in place for the study area (Land Use Coordination Office 1999).
  - No water licenses have been recorded for the study area (B.C. Environment 1999).
4. Existing water quality data:
  - No existing water quality data is known to exist within the study area (Giroux, pers. comm. 1999)
5. Previous presence of fish in systems of interest:
  - Fish presence previously documented in the Babine Lake drainage is summarized in Table 1.

### 3.0 METHODS

This project closely follows all applicable RIC Standards (1998a) and the Forest Practice Code fish - stream identification guidebook (1998). Details on methodologies and value added attributes of sampling site selection, field assessments, and digital mapping are provided in the following sub-sections.

#### 3.1 SAMPLE SITE SELECTION

Sample sites were selected by conducting reach break analysis and random sampling queries using the Fish Data Information System (FDIS) ACCESS 2.0 data tool for each of the sub-basins in the study area. All streams on the 1:20,000 TRIM map scale were identified numerically by assigning an Interim Location Point (ILP) or watershed code, following 1:20,000 fish and fish habitat inventory standards (RIC 1998a, 1999). Streams were divided into reaches based on map and air photo interpretation. Necessary reach information was entered in the FDIS database, following Resource Inventory Committee standards (RIC 1998a, 1999). Version 7.0 of the FDIS ACCESS 2.0 data tool was used to randomly select sampling sites to determine the general distribution and total number of sites required in the study area. Some sites were deleted or moved based on previous fish sampling in the watershed and site accessibility. Random and biased sampling sites were mapped on 1:20,000 scale, along with existing fisheries information for presentation to the contract monitor and the ministry representative. The sampling plan was summarized in a project plan (SKR 1999a) for ministry and contract monitor approval.

#### 3.2 STREAM ASSESSMENT

All stream assessments were conducted from July to October 1999. Stream sites were accessed by four wheel drive vehicle and helicopter. Stream sections of interest were assessed to determine fish presence and habitat values. Fish Data Information System (FDIS) site cards and fish collection cards were completed at sample sites, following Resource Inventory Committee Standards (RIC 1998a, 1999), and data were entered into the FDIS database using the FDIS data entry tool.

During stream assessments, reaches visited by SKR Consultants Ltd. were intensively surveyed in notably more detail than the minimum sampling requirements outlined in the RIC standards (1999). Extra efforts frequently involved field assessment of more than 50% of stream reaches to ensure that site cards were representative of entire reaches, that barriers to fish migration were documented, and that significant or interesting features were noted. In addition, extra reaches were sampled to identify definite or potential barriers to fish migration downstream of randomly selected reaches that were sampled, but no fish were captured.

For fish sampling, electrofishing intensity was significantly increased above the minimum requirements in the RIC Standards (1999) to provide more confidence in sampling results. For smaller order streams (<1 meter wetted width) the minimum sampling area, as recommended in the RIC Standards (1999), was increased from 100 linear meters to 100 m<sup>2</sup> area. It is important to note that the sample areas described on the FDIS fish forms by SKR crews excluded sections of stream with poor habitat (e.g. poorly defined channel), and areas of channel unsuitable for electrofishing (e.g. channel too deep or water current moving too fast). This conservative

estimate of area sampled was used to more accurately represent the sampling intensity and habitat diversity at sites. The sampling intensity of SKR crews was also increased by sampling for a significantly longer duration and by sampling additional prime habitats outside the 100 linear meter or 10 channel width sample site (RIC Standards 1999) if no fish were captured in the minimum RIC sample area. These intensive sampling efforts were used to more accurately determine the upper limits of fish distribution in systems where fish appeared to be very dispersed and/or in very low densities.

All fish that were captured during this study were identified to species in the field or small subsamples were preserved for confirmation using a dissecting microscope. Fork lengths were recorded for all fish captured. Voucher specimens were retained for fish that could not be positively identified in the field. Voucher specimens were preserved in 10% formalin for a minimum of 14 days after which they were rinsed in water and transferred to 50% isopropyl alcohol.

A list of sampling equipment used during this 1:20,000 reconnaissance level fish and fish habitat inventory project is presented in Table 2.

**Table 2.** List of sampling equipment used during the 1:20,000 reconnaissance fish and fish habitat inventory project.

| Parameter         | Sampling Intensity                     | Method                                          |
|-------------------|----------------------------------------|-------------------------------------------------|
| date and time     | each site                              | wrist watch                                     |
| water temperature | each site                              | alcohol thermometer                             |
| PH                | each site                              | Oaktron pHTestr2                                |
| Conductivity      | each site                              | Hanna HI 9033, Oaktron TDSTestr 3               |
| Water clarity     | each site                              | Visual                                          |
| fish presence     | as required to determine fish presence | Smith Root Model 15C, minnow traps              |
| Photography       | each site                              | Canon Sureshot A1, Minolta Weathermatic Dual 35 |
| GPS               | where available                        | Garmen GPS 45                                   |
| Gradient          | each site                              | Abney Level or Suunto clinometer                |

### 3.3 MAPPING

Reach break analysis was conducted during phase II of this reconnaissance (1:20000) fish and fish habitat inventory project (RIC 1998a) by SKR Consultants Ltd. (SKR) and Western Geographic Information Systems Inc. (WGIS)(SKR 1999a). The majority of reach break information for the FDIS database was obtained from TRIM map and air photograph interpretations by SKR. WGIS provided lengths, gradients, and UTM coordinates for all reaches in the study area after linking new spatial data to TRIM map data that was obtained from the FTP//...TRIM library (MELP). All reach break mapping closely followed the RIC standards for reach analysis (1998a) and digital mapping (1998b).

After completing the field portion (Phase IV) of this study, SKR provided WGIS with the completed FDIS database and draft hardcopy maps. Data presented on the maps included sub-basin boundaries, sample site locations, significant features, and historical information within the study area. In addition, SKR identified reaches with known fish presence, suspected fish presence, suspected fish absence, and known fish absence for presentation of fish distribution on the interpretive maps. The criteria used by SKR for determining fish presence and absence are presented in Table 3. Digitizing of all spatial data for the final mapping deliverables of this project was conducted by WGIS.

Final digital mapping and hardcopy deliverables were provided by Nancy Elliot (WGIS), under supervision of John Rustad (WGIS), following RIC (1998b) and B.C. Environment (Skeena Region) mapping standards.

**Table 3.** Criteria used to evaluate fish distribution for presentation on the Interpretive Hardcopy Maps (Appendix 5) of this study area.

|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fish Present<br>           | <ul style="list-style-type: none"> <li>Stream reaches where fish have been captured or can be classified as fish bearing based on fish captured upstream.</li> </ul> <p>NOTE: fish distribution may not always extend to the upper limit of all reaches symbolized as fish bearing</p>                                                                                                                                                                                                                      |
| Fish Suspected Present<br> | <ul style="list-style-type: none"> <li>Stream reaches with gradients less than 21% and with any potential for fish presence, excluding first order streams less than 1 km in length on 1:20000 TRIM map</li> </ul>                                                                                                                                                                                                                                                                                          |
| Fish Suspected Absent<br>  | <ul style="list-style-type: none"> <li>First order streams less than 1 km in total length on 1:20000 TRIM map</li> <li>Streams visited with limited potential for fish presence, but no definable barriers to fish passage following RIC standards, thus still requiring resampling</li> </ul>                                                                                                                                                                                                              |
| Fish Absent<br>            | <ul style="list-style-type: none"> <li>Reaches with no fish captured in two seasons upstream of natural obstructions to fish migration</li> <li>Reaches upstream of identified natural barriers to fish migration following intensive sampling in one season</li> <li>First and small second order streams flowing into non fish bearing reaches</li> <li>Reaches with gradients exceeding 20%</li> </ul> <p>(Note: the location of lower reach break is not defined until field sampling is conducted)</p> |

## **4.0 RESULTS AND DISCUSSION**

In total, 74 of the 369 stream reaches and two lake reaches in the study areas (Sub-basins I, II, and III) were sampled during July to October 1999. Sites that were sampled were distributed among 45 randomly selected (FDIS) and 31 discretionary reaches (including two lake reaches) that were added to augment fish distribution information obtained in this and previous studies (FISS, SKR 1997, 1998a, 1998b, 1998c, 1999c, 1999d). The following sections discuss findings from this field inventory project in context with historical information available for the study area, as outlined in the “Buba Creek Example Report” (B.C. Environment 1999).

### **4.1 LOGISTICS**

Some logistical problems were encountered during the implementation of the field phase of this project. Some difficulties obtaining permission to work on local native reserves resulted in the replacement of three random sites with three discretionary sites. In addition, one day of volunteer fire fighting on crown land limited the amount of available time for adding value added sites to the project. In general, water levels and weather conditions were conducive to sampling during the inventory project.

### **4.2 SUMMARY OF SUB-BASIN BIOPHYSICAL INFORMATION**

All inlet streams within the study area drain into the east shore of Babine Lake or the west shore of Morrison Arm between Morrison Creek and Fort Babine. The majority of these drainages are located within the Sub-Boreal Spruce (SBS) biogeoclimatic zone with only a few headwater reaches in the Engleman Spruce – Subalpine Fir biogeoclimatic zone (Table 4).

The streams in the study were divided into four major areas, based on topography and drainage size (Table 5). Sub-basin I (east Babine Face Units), sub-basin II (west Babine Face Units) and sub-basin III (Unnamed Creek 480-559500) were inventoried in 1999, and Sub-basin IV (Unnamed Creek 480-502100) is slated for inventory in the year 2000. No glaciers are found within the study area. The northern portion of the study area, north of Old Fort Mountain, is characterized by generally gentle terrain, and a lack of steep lands. However, some moderate to steep gradient terrain is present at a step up to a lower bench and near the peaks of the southern face of Old Fort Mountain. Only four small lakes are present in the three sub-basins that were inventoried in 1999.

Conductivity, pH, water temperature, and turbidity were the water quality parameters that were recorded where possible. Conductivity ranged from 7  $\mu\text{S}/\text{cm}$  to 299  $\mu\text{S}/\text{cm}$ , and water temperatures ranged between 2°C and 18°C. Measurements recorded for pH indicated a slightly basic trend, with readings ranging from 7.0 to 8.5. Water was observed to be clear at all locations. Water quality data that relates to specific sampling sites is presented on site cards in Appendix I.

**Table 4.** Biogeoclimatic and Ecoregion Units present in the study area ( MOF 1988).

| Unit                   | Type                                                                                                                                                              |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ecodomain              | Humid Temperate                                                                                                                                                   |
| Ecodivision            | Humid Continental High Lands                                                                                                                                      |
| Ecoprovince            | Central Interior                                                                                                                                                  |
| Ecoregion              | Fraser Basin                                                                                                                                                      |
| Ecosections            | Babine Upland                                                                                                                                                     |
| Biogeoclimatic Zone    | Mostly Sub-Boreal Spruce (SBS) in lower reaches, some Engleman Spruce – Subalpine fir (ESSF) in upper reaches (above 4000 feet in southern portion of study area) |
| Biogeoclimatic Subzone | Moist cold SBS (SBSmc), Continental Northern Forested and Parkland ESSF (ESSFk)                                                                                   |

**Table 5.** Summary of watershed information for the four sub-basins identified along the east shore of Babine Lake drainage between Morrison Creek and Fort Babine.

| Gazetted Name                                  | Watershed Code    | Watershed Area (km <sup>2</sup> ) | Stream Length (km) | Stream Order | NTS Maps                            | BEC Zone(s)            | Named Lakes | Wetlands                                   |
|------------------------------------------------|-------------------|-----------------------------------|--------------------|--------------|-------------------------------------|------------------------|-------------|--------------------------------------------|
| <b>Sub-Basin I<br/>East Babine Face Units</b>  | <b>480</b>        | <b>158.03</b>                     | <b>177.12</b>      | <b>3</b>     | <b>93M/01<br/>93M/02</b>            | <b>SBSmc<br/>ESSFk</b> | <b>None</b> | <b>2.698 km<sup>2</sup><br/>(18 areas)</b> |
| <b>Sub-Basin II<br/>West Babine Face Units</b> | <b>480</b>        | <b>91.60</b>                      | <b>144.44</b>      | <b>4</b>     | <b>93M/02<br/>93M/07<br/>93M/08</b> | <b>SBSmc</b>           | <b>None</b> | <b>2.372 km<sup>2</sup><br/>(25 areas)</b> |
| <b>Sub-Basin III<br/>Unnamed Creek</b>         | <b>480-559500</b> | <b>20.55</b>                      | <b>48.65</b>       | <b>4</b>     | <b>93M/01</b>                       | <b>SBSmc</b>           | <b>None</b> | <b>none</b>                                |
| Sub-basin V<br>Unnamed Creek                   | 480-502100        | 23.85                             | 35.97              | 3            | 93M/07<br>93M/08                    | SBSmc                  | None        | 22 areas                                   |

Note: Bold text refers to the three sub-basins that were sampled in 1999.

### 4.3 HABITAT AND FISH DISTRIBUTION

Fish species listed in the Forest Practice Code (1998) are confirmed present in 43.6 of 366.9 kilometres of streams (11.9%) that are displayed on 1:20,000 scale TRIM maps in Sub-basins I, II, and III (Figure 2, Tables 6-9, Appendix 5). In this study area, the best fish habitat was observed to be in the lower two or three reaches of the higher order (i.e. greater than second order) inlet streams to Babine Lake (Figure 2). The limited fish use of first and second order reaches in this study area were found to be related to their lack of fish habitat due to poorly defined channels or sections of underground flow. A few short sections of cascades and small waterfalls were also identified to be potential barriers to fish migration and are described in Table 10.

Coho, cutthroat trout, and rainbow trout were the only three species in streams during this survey. Coho have only been captured during in the first reach of a few inlets to Babine Lake in this and previous studies (FISS). Cutthroat trout were only captured in the mainstem of ILP 10844 and the outlet from one of the small lakes (00352BABL) along ILP 10284. Rainbow trout was the most widely distributed species in the study area and was identified in almost all available fish habitat in streams that were sampled.

Two secondary lake inventories were conducted in conjunction with this stream inventory (2000a, 2000b). Only lake chub was captured during the secondary lake inventory of Unnamed Lake (00504BABL) and a 15 meter waterfall at the outlet from this lake was identified to be a barrier to fish migration (SKR 2000a). Rainbow trout, mountain whitefish, northern squawfish, lake chub, peamouth chub, and prickly sculpin were captured during the secondary lake inventory of Unnamed Lake (00520BABL, SKR 2000b). Interestingly, the largest lake in the study area (00520BABL) was observed to be dominated by non-salmonids (i.e. northern squawfish). This is likely due to the lack of accessible spawning habitat and poor juvenile rearing habitat due to the absence of inlet streams and the presence of beaver dams at its small outlet. Anoxic conditions in the hypolimnion of this lake (00520BABL) may also influence its habitat quality for salmonids. Rainbow trout and cutthroat trout were also captured in outlets near the only other lake complex (00348BABL and 00352BABL) in the study area. In summary, salmonids were confirmed present in three of the four small lakes in this study area.

The best fish habitat was identified to be at three of the four small lakes and in most of the third and fourth order stream reaches. In total, 5.8 km of fourth order reaches, 21.5 kilometres of third order reaches, 12.2 kilometres of second order reaches, and 4.1 kilometers of first order reaches have been identified to be fish bearing (Figure 2, Tables 6-9). Another 24.7 kilometres of first order reaches, 33.3 kilometres of second order reaches, 2.4 kilometres of third order reaches, and 1.4 kilometres of fourth order reaches have some potential to be fish bearing (Figure 2, Tables 6-9). Fish are confirmed or suspected to be absent from the remaining 203.2 kilometres of first order reaches, 48.9 kilometres of second order reaches, and 9.4 kilometres of third order reaches in this study area (Figure 2, Tables 6-8). Overall, the quantity of productive fish habitat in the area inventoried appears to be limited relative to other portions of the Babine Lake watershed.

**Table 6.** Fish presence/absence in first order reaches in Sub-basins I-III located along the northeast shore of Babine Lake.

| % Gradient Range | 1 <sup>st</sup> order reaches (km) |                        |                                  | <b>Totals</b> |
|------------------|------------------------------------|------------------------|----------------------------------|---------------|
|                  | Fish Confirmed Present             | Fish Suspected Present | Fish Absent/<br>Suspected Absent |               |
| 0-2              | 0.8                                | 4.8                    | 13.0                             | <b>18.6</b>   |
| 2-10             | 3.3                                | 19.0                   | 133.0                            | <b>155.3</b>  |
| 10-20            | ----                               | 0.9                    | 47.4                             | <b>48.3</b>   |
| >20              | ----                               | ----                   | 9.8                              | <b>9.8</b>    |
| <b>Totals</b>    | <b>4.1(1.7%)</b>                   | <b>24.7 (10.7%)</b>    | <b>203.2 (87.6 %)</b>            | <b>232.0</b>  |

**Table 7.** Fish presence/absence in second order reaches in Sub-basins I-III located along the northeast shore of Babine Lake.

| % Gradient Range | 2 <sup>nd</sup> order reaches (km) |                        |                                  | <b>Totals</b> |
|------------------|------------------------------------|------------------------|----------------------------------|---------------|
|                  | Fish Confirmed Present             | Fish Suspected Present | Fish Absent/<br>Suspected Absent |               |
| 0-2              | 1.1                                | 6.7                    | 1.8                              | <b>9.6</b>    |
| 2-10             | 11.1                               | 26.3                   | 33.2                             | <b>70.6</b>   |
| 10-20            | ----                               | 0.3                    | 13.9                             | <b>14.2</b>   |
| >20              | ----                               | ----                   | ----                             | ----          |
| <b>Totals</b>    | <b>12.2 (12.9 %)</b>               | <b>33.3 (35.4 %)</b>   | <b>48.9 (51.7 %)</b>             | <b>94.4</b>   |

**Table 8.** Fish presence/absence in third order reaches in Sub-basins I-III located along the northeast shore of Babine Lake.

| % Gradient Range | 3 <sup>rd</sup> order reaches (km) |                        |                                  | <b>Totals</b> |
|------------------|------------------------------------|------------------------|----------------------------------|---------------|
|                  | Fish Confirmed Present             | Fish Suspected Present | Fish Absent/<br>Suspected Absent |               |
| 0-2              | 7.5                                | 0.9                    | 1.0                              | <b>9.4</b>    |
| 2-10             | 14.0                               | 1.5                    | 6.2                              | <b>21.7</b>   |
| 10-20            | ----                               | ----                   | 2.2                              | <b>2.2</b>    |
| >20              | ----                               | ----                   | ----                             | ----          |
| <b>Totals</b>    | <b>21.5 (64.5 %)</b>               | <b>2.4 (7.2 %)</b>     | <b>9.4 (28.3 %)</b>              | <b>33.3</b>   |

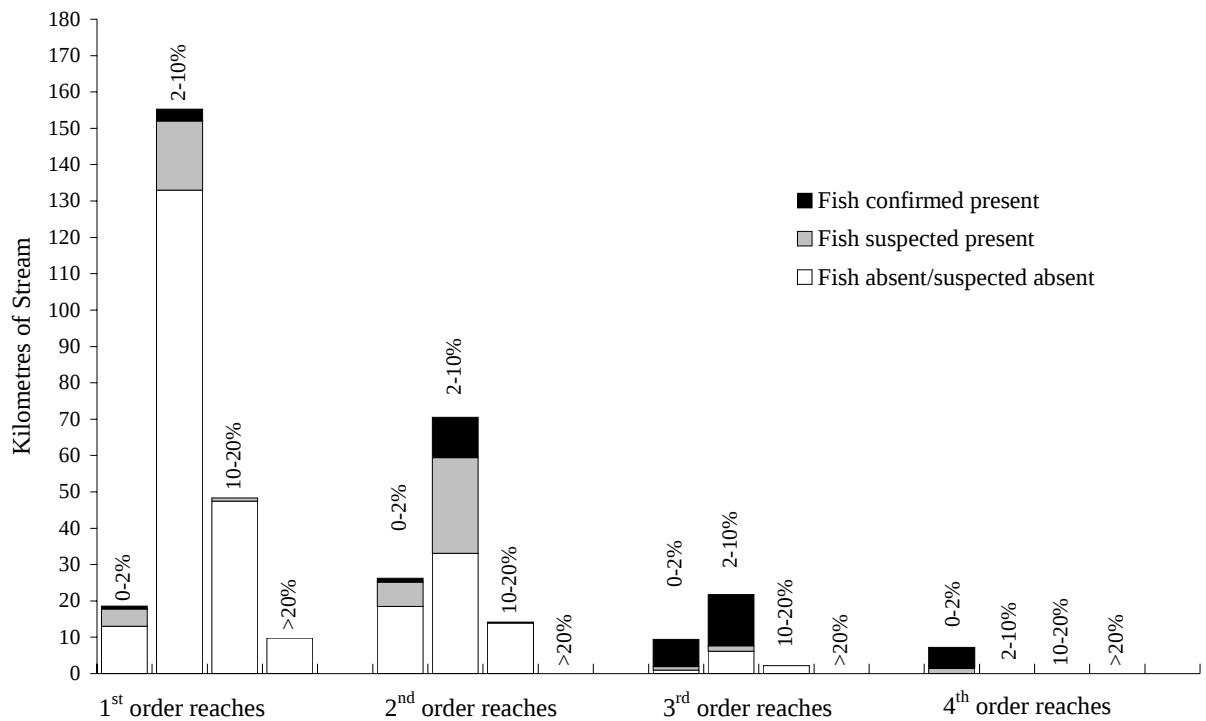
**Table 9.** Fish presence/absence in fourth order reaches in Sub-basins I-III located along the northeast shore of Babine Lake.

| % Gradient Range | 4 <sup>th</sup> order reaches (km) |                        |                                  | <b>Totals</b> |
|------------------|------------------------------------|------------------------|----------------------------------|---------------|
|                  | Fish Confirmed Present             | Fish Suspected Present | Fish Absent/<br>Suspected Absent |               |
| 0-2              | 5.8                                | 1.4                    | ----                             | <b>7.2</b>    |
| 2-10             | ----                               | ----                   | ----                             | ----          |
| 10-20            | ----                               | ----                   | ----                             | ----          |
| >20              | ----                               | ----                   | ----                             | ----          |
| <b>Totals</b>    | <b>5.8 (80.3 %)</b>                | <b>1.4 (19.7 %)</b>    | ----                             | <b>7.2</b>    |

**Table 10.** Summary of historic and new barriers to fish migration found in streams within sub-basins I, II and III (sorted by ILP and reach number).

| Stream                                     | TRIM Map # | Reach | Barrier      |            |                   |                                                                                               |
|--------------------------------------------|------------|-------|--------------|------------|-------------------|-----------------------------------------------------------------------------------------------|
|                                            |            |       | Type         | Height (m) | Verified in field | Description                                                                                   |
| ILP 10041<br>(480-545800)                  | 093M.008   | 1     | cascade      | 15         | Y                 | cascade located in reach 2 (SKR 1998a)                                                        |
| ILP 10042                                  | 093M.008   | 1     | falls        |            | Y                 | fall in reach 1 (SKR 1998a)                                                                   |
| ILP 10044<br>(480-549400)                  | 093M.008   | 1     | falls        | 1.2        | Y                 | 1.2 m falls about 120 m upstream of Babine Lake (SKR 1998a)                                   |
| ILP 10064<br>480-559500-71100              | 093M.018   | 2     | UGF          |            | Y                 | no defined channel between isolated puddles restricts fish access (SKR 1999d)                 |
| ILP 10066                                  | 093M.018   | 3     | UGF          |            | Y                 | section of undefined channel between isolated puddles restrict fish access (SKR 1999d)        |
| ILP 10067<br>(480-559500-69300-13000-5409) | 093M.018   | 1     | UGF          |            | Y                 | sections of underground flow and undefined channel (SKR 1999d)                                |
| ILP 10068                                  | 093M.018   | 1     | UGF          |            | Y                 | no defined channel in some locations restricts fish access (SKR 1999d)                        |
| ILP 10079                                  | 093M.008   | 1     | cascade      | 9          | Y                 | 9 meter high and 40 m long cascade at mouth of stream, just upstream of mainstem (480-559500) |
| ILP 10079                                  | 093M.008   | 1     | cascade      | 40         | Y                 | 40 meter high and 80 meter long cascade about 100 m upstream of mainstem (480-559500)         |
| ILP 10090<br>480-598300                    | 093M.019   | 3     | UGF          |            | Y                 | no defined channel prevent fish access (SKR 1999d)                                            |
| ILP 10094<br>(480-598200)                  | 093M.018   | 3     | cascade      | 4          | Y                 | 4 meter high and 20 meter long cascade                                                        |
| ILP 10094<br>(480-598200)                  | 093M.018   | 5     | falls        | 15         | Y                 | 15 meter falls at the outlet of lake in reach 6                                               |
| ILP 10105<br>480-598200-43400              | 093M.019   | 3     | CV           |            | Y                 | culvert at road crossing appears to be a barrier to fish migration (SKR 1999d)                |
| ILP 10106<br>480-598200-43400-29700        | 093M.019   | 1     | UGF          |            | Y                 | poorly defined channel is a barrier to fish migration (SKR 1999d)                             |
| ILP 10110                                  | 093M.019   | 1     | UGF          |            | Y                 | no defined channel upstream of lower 50 meters is a barrier to fish migration (SKR 1999d)     |
| ILP 10125<br>480-598500                    | 093M.019   | 1     | UGF          |            | Y                 | poorly defined sections of channel restrict fish passage (SKR 1999d)                          |
| ILP 10137<br>480-598500-48300-16009        | 093M.019   | 1     | CV           |            | Y                 | hanging culvert near mouth restricts fish passage (SKR 1999d)                                 |
| ILP 10182                                  | 093M.018   | 2     | CV           | 0.5        | Y                 | 0.5 m high hanging culvert                                                                    |
| ILP 10221<br>480-503400                    | 093M.018   | 1     | wetland      |            | Y                 | wetland at mouth of stream is a barrier (SKR 1999c)                                           |
| ILP 10227<br>(480-513700)                  | 093M.018   | 1     | step – falls | 1          | Y                 | a 0.5 m and 1 m high falls, no fish caught upstream in 2 seasons of sampling (SKR 1998c)      |
| ILP 10400                                  | 093M.028   | 2     | wetland      |            | Y                 | no defined channel in wetland (SKR 1999c)                                                     |
| ILP 10847<br>480-460300                    | 093M.028   | 3     | UGF          |            | Y                 | Extensive section of underground flow; stream does not flow as shown on TRIM (SKR 1999c)      |
| ILP 10848<br>(480-559500)                  | 093M.008   | 1     | log jam      |            | Y                 | log jam on a distributary of this creek (SKR 1999d)                                           |

FSB = underground flow, NVC = no visible channel, NCD = non-classified drainage, F = falls



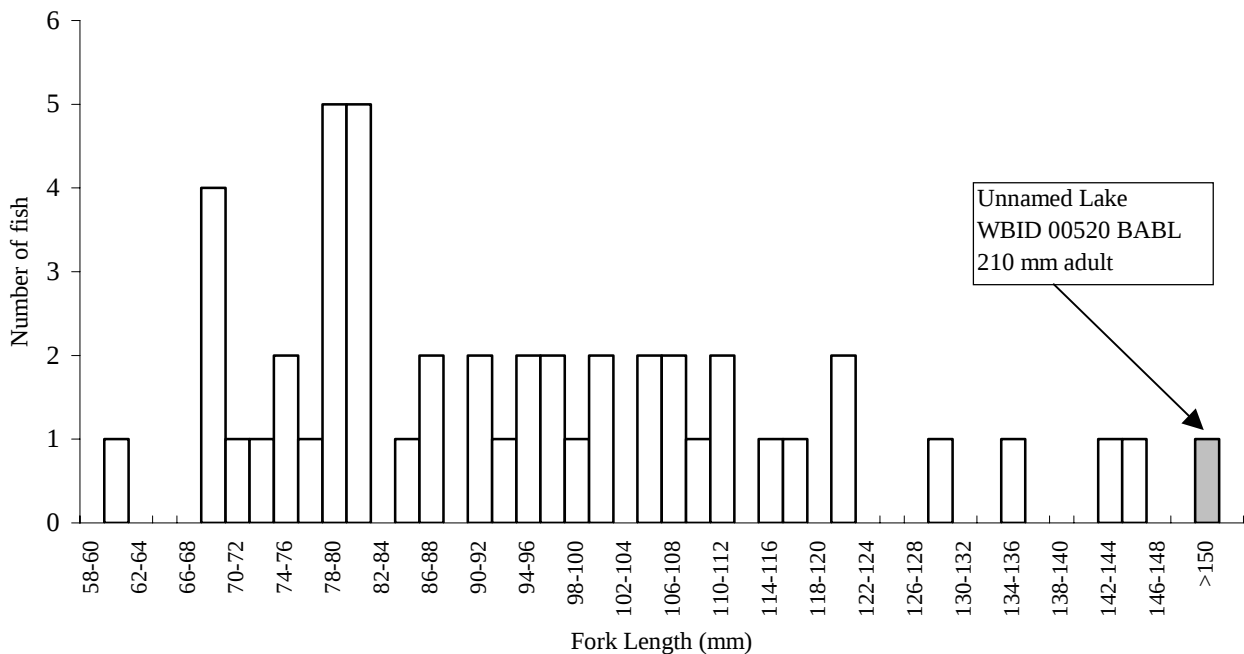
**Figure 2.** Distribution of fish presence in different order and gradient classes of stream reaches within the study area along the northeast shore of Babine Lake. Data labels represent the gradient classes (%) within each stream order.

#### 4.4 FISH AGE, SIZE AND LIFE HISTORY

Cutthroat trout, coho, rainbow trout, and mountain whitefish were the salmonid species captured in streams and lakes inventoried during this study. In addition, prickly sculpin, lake chub, peamouth chub and northern squawfish were captured in some of the reaches sampled. The following sections provide a summary of the fish data collected during this study.

##### 4.4.1 Rainbow Trout

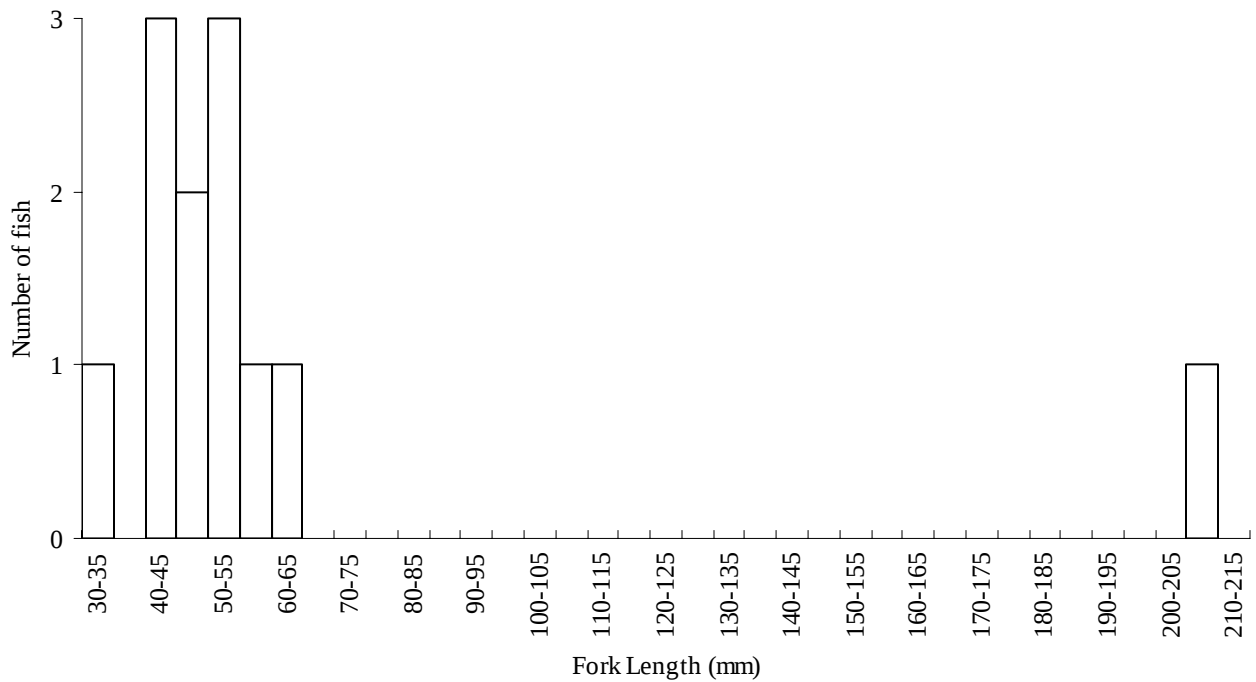
All but one of the 49 rainbow trout captured in streams and lakes sampled in the study area were captured in stream reaches. The largest rainbow trout (200 mm fork length) was captured in one of the lakes sampled (00520BABL) (SKR 2000b). Fork length of rainbow trout captured in stream reaches ranged between 62 and 146 millimeters (mean = 94.38, SD = 20.450). Fork length frequency distribution (Figure 3) suggests that four or five age classes are present in the sample of rainbow trout obtained from inlet streams to the northeast shore of Babine Lake. This is supported by fork length data collected in other systems within the Skeena River watershed (Bustard 1992, 1993; SKR 1999e, 1999f). Rainbow trout captured in the study area likely exhibit a lacustrine-adfluvial life history, as suggested by the proximity of capture locations to Babine Lake, and the presence of rainbow trout in Unnamed Lake (00520BABL) (SKR 2000b). However, the presence of stream resident populations of rainbow trout in the study area should not be precluded.



**Figure 3.** Length frequency histogram of rainbow trout captured in the inlet streams to the east shore of Babine Lake (N=49).

#### 4.4.2 Cutthroat Trout

Twelve cutthroat trout were captured in two inlet streams to the northeast shore of Babine Lake (ILP's 10284 and 10844); no cutthroat trout were captured in the two lakes sampled (SKR 2000a, 2000b). Two age classes of cutthroat trout are represented in the sample obtained during this study, as indicated by the length frequency distribution (Figure 4). Length frequency data for cutthroat trout captured in inlet streams to the northeast shore of Babine Lake are summarized in Table 11. Fork length for cutthroat trout estimated to be age 0+ coincide with fork length ranges reported for this age group in the literature (Scott and Crossman 1973, SKR 1999e, 1999f, 1999g). It is difficult to speculate on the age of the maturing 210 millimeter cutthroat trout captured in reach 2 of ILP 10844 (site 13). Cutthroat trout captured in the study area likely have a lacustrine-adfluvial life history, as indicated by the proximity of capture locations to Babine Lake, and/or a stream resident life history, as suggested by the presence of a mature cutthroat trout in reach 2 of ILP 10844.



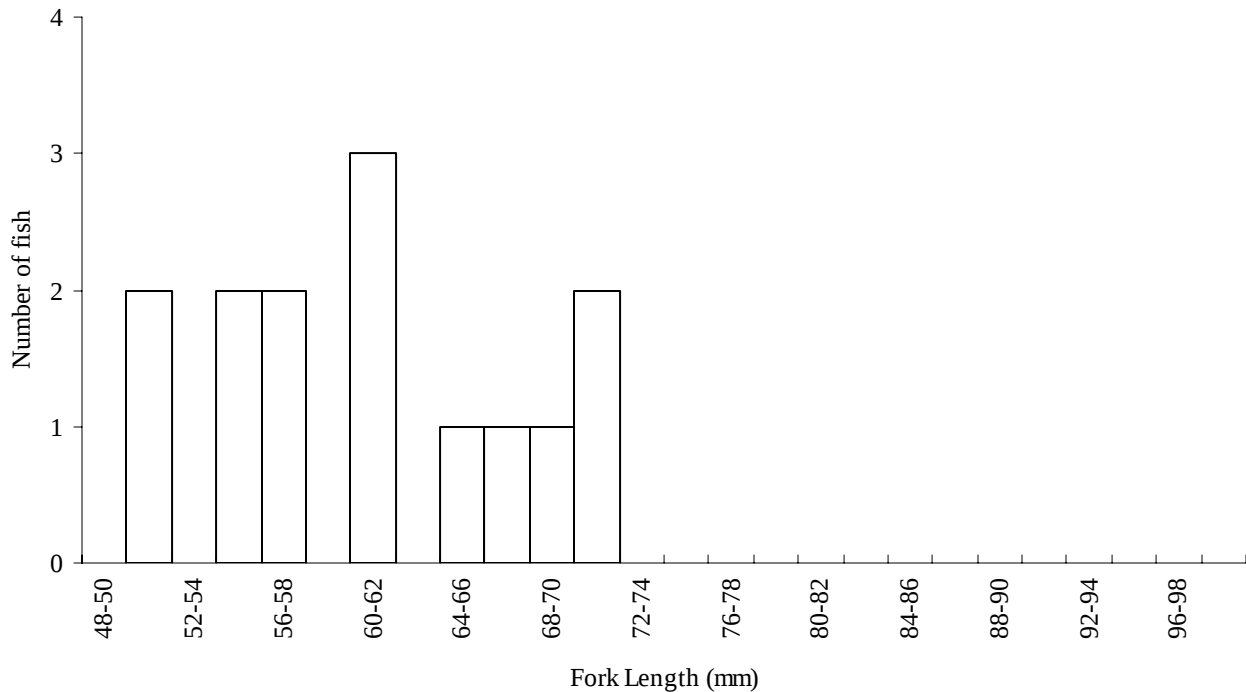
**Figure 4.** Length frequency histogram of cutthroat trout captured in the inlet streams to the east shore of Babine Lake (N=12).

**Table 11.** Mean and standard deviation (SD) of fork length data for cutthroat trout captured in inlet streams to the northeast shore of Babine Lake. Age categories are estimated based on length frequency distribution (Figure 4).

|            | Fork Length (mm) |        |       |        |
|------------|------------------|--------|-------|--------|
| Age        | N                | Range  | Mean  | SD     |
| 0+ years   | 11               | 35-65  | 49.45 | 8.371  |
| ≥ 1+ years | 1                | 210    | 210   | n.a.   |
| Combined   | 12               | 35-210 | 62.83 | 47.028 |

#### 4.4.3 Coho

Fourteen coho were captured in inlet streams to the northeast shore of Babine Lake. All of these fish were captured in close proximity to Babine Lake. Fork length frequency distribution (Figure 5) and length at age data reported in the literature (Sandercock 1991) suggests that all of these coho are age 0+. Fork length ranged between 51 and 72 millimeters (mean = 61.57, SD = 7.090). All coho captured in the inlet stream to the northeast shore of Babine Lake exhibit an anadromous life history, and the lack of coho older than 0+ suggests that juvenile coho may rear in Babine Lake.



**Figure 5.** Length frequency histogram of coho captured in the inlet streams to the east shore of Babine Lake (N=14).

#### 4.4.4 Other Species

In addition to salmon and trout, prickly sculpin, peamouth chub, lake chub, northern squawfish, and mountain whitefish were captured in the study area. Peamouth chub, mountain whitefish, and northern squawfish were only captured in lakes (*i.e.* 00520BABL (SKR 2000a) and 00504BABL (SKR 2000b)), but prickly sculpin and lake chub were captured in both lake and stream reaches. Fork length data collected for these species are summarized in Tables 12 and 13. Mountain whitefish, northern squawfish and peamouth chub captured during this study likely have a lacustrine or lacustrine-adfluvial life history, since these species were only captured in the lakes sampled. These species generally exhibit a lacustrine or lacustrine-adfluvial life history

(Scott and Crossman 1973). Five prickly sculpin and one lake chub captured in the study area also likely have a lacustrine or lacustrine-adfluvial life history. Stream reaches in which prickly sculpin (ILP 10002, reach 1) and lake chub (ILP 10094, reach 3) were captured are near lakes. Lacustrine and lacustrine-adfluvial life histories are commonly observed for prickly sculpin and lake chub (Scott and Crossman 1973).

**Table 12.** Mean and standard deviation (SD) of fork length data for prickly sculpin, peamouth chub, lake chub, mountain whitefish and northern squawfish captured in fluvial habitat in inlet streams to the northeast shore of Babine Lake.

|                 | Fork Length (mm) |       |      |        |
|-----------------|------------------|-------|------|--------|
| Species         | N                | Range | Mean | SD     |
| prickly sculpin | 5                | 60-91 | 80.2 | 12.677 |
| lake chub       | 1                | 135   | 135  | n.a.   |

**Table 13.** Mean and standard deviation (SD) of fork length data for prickly sculpin, peamouth chub, lake chub, mountain whitefish and northern squawfish captured in lacustrine habitat in inlet streams to the northeast shore of Babine Lake.

|                    | Fork Length (mm) |         |        |         |
|--------------------|------------------|---------|--------|---------|
| Species            | N                | Range   | Mean   | SD      |
| prickly sculpin    | 8                | 60-94   | 78.88  | 14.167  |
| lake chub          | 31               | 115-138 | 125.48 | 5.921   |
| mountain whitefish | 1                | 262     | 262    | n.a.    |
| peamouth chub      | 20               | 128-176 | 158.5  | 14.69   |
| northern squawfish | 27               | 90-550  | 309.70 | 119.736 |

## **4.5 SIGNIFICANT FEATURES AND FISHERIES OBSERVATIONS**

Some of the inlet streams draining into the northeast shore of Babine Lake between Fort Babine and Morrison Creek provide some good habitat for rainbow trout and cutthroat trout, as well as for coho in the first reach of the larger inlet streams. The following sections describe interesting features related to fish, fish habitat, and habitat protection concerns in the study area based on historical information and the findings from this study.

### **4.5.1 Fish and Fish Habitat**

The inlet streams to the northeast shore of Babine Lake between Morrison Creek and Fort Babine offer some good, but a limited amount of available fish habitat. Fish habitat in first and second order streams (TRIM map) within the study area was limited by no fish habitat or poor habitat quality due to extensive sections of undefined channel and underground flow. Rainbow and cutthroat trout were observed using some good perennial stream habitat in the lower two reaches of the only fourth order sub-drainage in this study area (ILP 10844 – Sub-basin III). Rainbow trout and cutthroat trout have also been identified in the largest and only third order sub-drainage in Sub-basin I (ILP 10284). A very small lake complex along the mainstem of this sub-drainage (ILP 10284) appears to play an important role in the life histories of fish in this system. Large channel morphology and beaver dam complexes were observed in the first reaches of three third order sub-drainages in Sub-basin II (ILP's 10115, 10094, and 10125), which offer good rearing and overwintering habitat for juvenile coho. Interestingly, beaver dams appear to be significantly obstructing fish passage in these three streams, as coho were not captured in their upper reaches during this study. Overall, the small sub-drainages in this study area appear to support several small sub-populations of fish, but play only a minor role toward fish production in the Babine lake watershed group.

### **4.5.2 Habitat Protection Concerns**

#### 4.5.2.1 Fisheries Sensitive Zones

One fisheries sensitive zone was identified in the lower 30 meters of reach 1 of ILP 10289. The initial 30 meters of this stream offers some potential rearing habitat for rainbow and cutthroat trout in Unnamed Lake (00348BABL; Reach 5 of ILP 10284). The remainder of the reach offers no fish habitat and no defined channel and is classified as a non-classified drainage. No other sites were observed or are suspected to be fisheries sensitive zones in the study area.

#### 4.5.2.2 Fish above 20% gradient

No fish were captured in reaches with gradients greater than 20% within the inlet streams to the northeast shore of Babine Lake.

#### 4.5.2.3 Rare and Endangered Species

No rare or endangered species were identified within the inlet streams or lakes to the northeast shore of Babine Lake.

#### 4.5.2.4 Restoration and Rehabilitation Opportunities

Hanging culverts appeared to be potential obstructions to fish passage at three road crossings identified during this study. Two of the three sites require both resampling and habitat assessments before restoration of fish passage is considered: reach 3 of ILP 10105 and reach 2 of ILP 10182). The most significant obstruction was in reach 1 of Unnamed Creek (ILP 10137) where the culvert appears to obstruct fish passage to a significant amount of potential fish habitat. In addition, a significant amount of habitat upstream of this culvert was observed to have been significantly impacted by harvest to its stream banks. Culvert replacement to allow fish passage and a detailed channel assessment of the disturbed section of stream are recommended for Unnamed Creek (ILP 10137).

## **4.6 FISH BEARING STATUS**

Fish distribution in the study area is limited by a combination of gradient barriers, intermittent channels, and subsurface flow (Table 10). Results from this study combined with historical information provide good interpretation of the fish bearing status for a Sub-basins I, II, and III. Fish bearing reaches are summarized in Table 14, while proposed non-fish bearing reaches are summarized in Table 15. Reaches located upstream of barriers to fish migration in which no fish were captured, or where no perennial fish habitat was identified, are classified as non-fish bearing based on one season of sampling. Resident populations are the concern in such reaches, in which fish should be present during all seasons, and the presence of rearing, spawning and overwintering habitat is a requirement for survival. Some reaches where no fish were captured, but no definite barrier to fish migration was observed, will require further sampling to conclusively establish if they are fish bearing or not (Table 16). Confirmed and/or suspected fish distribution for all reaches in the study area are summarized on the Interpretive Maps (Appendix 5).

### **4.6.1 Fish Bearing Reaches**

Fish bearing status was assigned to all reaches in which species listed in the Forest Practices Code Fish Stream Identification guidebook were captured (FPC 1998). In addition, reaches in which no fish were captured, but where fish presence has been documented upstream or where no barriers to fish migration are present were defaulted as fish bearing. Table 14 summarizes information obtained for 15 reaches that were documented to be fish bearing. Other reaches in the study area with some potential to be fish bearing reaches are identified on the Interpretive Hardcopy Maps (Appendix 5).

### **4.6.2 Non - Fish Bearing Reaches**

Non-fish bearing status was assigned to reaches that were intensively sampled upstream of barriers to fish migration and no fish were captured, or no perennial fish habitat was present upstream of a barrier to fish migration. Table 15 summarizes the information obtained for 34 reaches that were documented to be non-fish bearing. Other non-fish bearing reaches with gradients exceeding 20% are indicated on the interpretation map (Appendix 5).

### **4.6.3 Follow – Up Sampling Required**

Several reaches sampled in the study area during this reconnaissance fish and fish habitat inventory project could not be classified conclusively. Table 16 summarizes information and provides resampling recommendations for 27 reaches that require re-sampling to indicate if seasonal fish use is present or to confirm fish absence as determined under Forest Practices Code Standards (FPC 1998). In some of these streams, barriers to upstream fish migration were not identified, and extra efforts should be made during re-sampling to identify the barriers to fish migration.

Results and Discussion  
FISH BEARING STATUS

**Table 14.** Summary of data from the 15 fish bearing reaches (sorted by site #) sampled in the study area from July to October 1999 (for details see Appendix 1).

| Sample Site # | Stream Name              | ILP   | TRIM Map # | Reach | Species*                       | Channel      |                   | Proposed Riparian Class. | Comments                                                                                                                                                                                  |
|---------------|--------------------------|-------|------------|-------|--------------------------------|--------------|-------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                          |       |            |       |                                | Width (m)    | Site gradient (%) |                          |                                                                                                                                                                                           |
| 12            | Unnamed Creek            | 10844 | 093M.008   | 1     | NFC (RB, CT)                   | -            | 0-0.5             | <b>S3</b>                | No fish captured in one season of sampling in this braided distributary, but this reach should be considered fish bearing since RB and CT have been captured in reaches farther upstream. |
| 13            | Unnamed Creek            | 10844 | 093M.008   | 2     | RB, CT                         | 3.85         | 3                 | <b>S3</b>                | Captured 13 juvenile rainbow trout and one adult cutthroat trout.                                                                                                                         |
| 14            | Unnamed Creek            | 10844 | 093M.018   | 4     | RB                             | 1.77         | 1                 | <b>S3</b>                | Captured 1 juvenile rainbow trout.                                                                                                                                                        |
| 17            | Unnamed Creek            | 10002 | 093M.009   | 1     | CAS (RB, MW)*                  | 0.88         | 0.5               | <b>S4</b>                | Rainbow trout and mountain whitefish were captured in the unnamed lake upstream in reach 3.                                                                                               |
| 28            | Unnamed Creek            | 10094 | 093M.019   | 3-1   | RB                             | 2.63         | 1.5               | <b>S3</b>                | Captured one adult rainbow trout.                                                                                                                                                         |
| 36            | Unnamed Creek            | 10115 | 093M.009   | 3     | RB                             | 3.15         | 2                 | <b>S3</b>                | Captured six juvenile rainbow trout.                                                                                                                                                      |
| 40<br>41      | Unnamed Creek            | 10125 | 093M.019   | 2     | RB<br>NFC (RB)*                | 4.72<br>2.18 | 2-2.5<br>0.5      | <b>S3</b><br><b>S3</b>   | Captured one juvenile rainbow trout.<br>Site in beaver dam complex where electrofishing was not efficient                                                                                 |
| 42            | Unnamed Creek            | 10126 | 093M.019   | 1     | CO                             | 0.78         | 0.5               | <b>S4</b>                | Captured five juvenile coho.                                                                                                                                                              |
| 48            | Unnamed Creek            | 10055 | 093M.008   | 3     | RB                             | 3.03         | 5.5-6.5           | <b>S3</b>                | Captured eight juvenile rainbow trout.                                                                                                                                                    |
| 55            | Unnamed Creek            | 10218 | 093M.018   | 1     | CO                             | 2.37         | 7                 | <b>S3</b>                | Captured one juvenile coho.                                                                                                                                                               |
| 62            | Unnamed Creek            | 10284 | 093M.028   | 1     | CO, RB                         | 4.08         | 2-3               | <b>S3</b>                | Captured eight juvenile coho and one juvenile rainbow trout.                                                                                                                              |
| 63            | Unnamed Creek            | 10284 | 093M.028   | 2     | RB                             | 3.28         | 5-8               | <b>S3</b>                | Captured three juvenile rainbow trout.                                                                                                                                                    |
| 64            | Unnamed Creek            | 10284 | 093M.028   | 7     | CT                             | 1.57         | 2.5               | <b>S3</b>                | Captured 11 juvenile cutthroat trout.                                                                                                                                                     |
| 70            | Unnamed Creek            | 10347 | 093M.028   | 1     | RB                             | 1.82         | 4.5-5             | <b>S3</b>                | Captured seven juvenile rainbow trout.                                                                                                                                                    |
| 81,82,<br>83  | Unnamed Lake (00520BABL) | 10002 | 093M.009   | 3     | RB,MW<br>CAS, NSC,<br>LKC, PMM |              |                   | <b>L1</b>                | One rainbow trout and one mountain whitefish were captured in overnight setting of floating gillnet                                                                                       |

Results and Discussion  
NON-FISH BEARING STATUS

**Table 15.** Summary of data from the 34 non-fish bearing reaches (sorted by site #) in the study area from July to October 1999 (for details see Appendix 1).

| Sample Site # | ILP   | Reach | TRIM Map # | Gradient (%) | Channel Width (m) | Electrofishing Specifications |          |            |          |             | Proposed Riparian Class. | Comments                                                                                                                                                                                                                                                              |
|---------------|-------|-------|------------|--------------|-------------------|-------------------------------|----------|------------|----------|-------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |       |       |            |              |                   | Dist. (m)                     | Time (s) | Cond. (µS) | Temp. °C | Date (1999) |                          |                                                                                                                                                                                                                                                                       |
| 1             | 10061 | 1     | 093M.018   | 1.5-2        | ---               | ---                           | ---      | ---        | ---      | 07/21       | <b>NCD</b>               | This reach should receive non-classified drainage designation due to <100m of defined channel.                                                                                                                                                                        |
| 4             | 10067 | 1     | 093M.018   | 2            | 0.62              | ----                          | ----     | ----       | ----     | 07/21       | <b>S6</b>                | No defined channel or surface flow in lower 150 m of reach. No perennial fish habitat upstream due to lack of suitable overwintering habitat (pool depth =10cm) and lack of spawning habitat (lack of gravel pockets of sufficient size for resident trout or char)   |
| 5             | 10072 | 1     | 093M.008   | 28-41        | 0.50              | ----                          | ----     | ----       | ----     | 07/19       | <b>S4/S6</b>             | Gradient exceeds 20% approximately 15 metres upstream from the mainstem (ILP 10844). The lower 15 m of the reach should be considered fish bearing. This section of stream is also protected by the riparian reserve zone required for ILP 10844.                     |
| 6             | 10072 | 2     | 093M.008   | 2-2.5        | 0.89              | ----                          | ----     | ----       | ----     | 07/19       | <b>S6</b>                | Gradient (20%) in reach 1 of this stream has been identified as a barrier to fish migration. No perennial fish habitat (intermittent reach, no spawning habitat due to lack of gravel pockets of sufficient size for resident trout or char, lack of pools in reach). |
| 7             | 10073 | 1     | 093M.008   | 8-40         | 1.23              | ----                          | ----     | ----       | ----     | 07/19       | <b>S4/S6</b>             | Gradient increases to 40% 20 m upstream from ILP 10844; the lower 20 m of this reach may provide seasonal fish habitat but this section of stream would be protected by the riparian reserve zone required for ILP 10844                                              |
| 8             | 10076 | 1     | 093M.008   | 20           | 1.35              | ----                          | ----     | ----       | ----     | 07/19       | <b>S6</b>                | Gradient exceeds 20% starting at confluence with the mainstem (ILP 10844).                                                                                                                                                                                            |
| 9             | 10078 | 1     | 093M.008   | 37-42        | 0.47              | ----                          | ----     | ----       | ----     | 07/20       | <b>S6</b>                | Gradient exceeds 20% starting at confluence with the mainstem (ILP 10844).                                                                                                                                                                                            |
| 10            | 10079 | 2     | 093M.008   | 1.5          | 1.13              | 105                           | 445      | 42         | 10       | 07/20       | <b>S6</b>                | No fish captured in one season of sampling; an 80 m long 42% gradient cascade located in reach one at the confluence with ILP 10844 is a barrier to fish migration.                                                                                                   |
| 11            | 10080 | 1     | 093M.008   | 35           | ----              | ----                          | ----     | ----       | ----     | 07/20       | <b>S4/S6</b>             | Reach becomes intermittent approx. 30 m upstream from ILP 10844 and then disappears into 55% gradient slope; the lower 20 m may provide seasonal habitat but this section of stream would be protected by the riparian reserve zone required for ILP 10844            |
| 20            | 10013 | 3     | 093M.009   | 0.5          | ----              | ----                          | ----     | ----       | ----     | 07/22       | <b>NCD</b>               | This reach should receive non-classified drainage designation due to <100m of defined channel.                                                                                                                                                                        |
| 21            | 10024 | 2     | 093M.009   | 27-28        | 2.17              | 110                           | 519      | 75         | 9        | 08/10       | <b>S6</b>                | Gradient exceeds 20% starting at confluence with the mainstem (ILP 10026).                                                                                                                                                                                            |

Results and Discussion  
NON-FISH BEARING STATUS

**Table 15 (cont.)** Summary of data from the 34 non-fish bearing reaches (sorted by site #) in the study area from July to October 1999  
(for details see Appendix 1).

| Sample Site # | ILP   | Reach | TRIM Map # | Gradient (%) | Channel Width (m) | Electrofishing Specifications |          |            |          |             | Proposed Riparian Class. | Comments                                                                                                                                                                                                                                                                                                           |
|---------------|-------|-------|------------|--------------|-------------------|-------------------------------|----------|------------|----------|-------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |       |       |            |              |                   | Dist. (m)                     | Time (s) | Cond. (µS) | Temp. °C | Date (1999) |                          |                                                                                                                                                                                                                                                                                                                    |
| 23            | 10033 | 1     | 093M.008   | ----         | ----              | ----                          | ----     | ----       | ----     | 08/09       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 32            | 10101 | 2     | 093M.019   | 0.5          | ----              | ----                          | ----     | ----       | ----     | 07/21       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 33            | 10105 | 4     | 093M.019   | 5-5.5        | 2.60              | 100                           | 422      | 60         | 10       | 07/19       | <b>S6</b>                | No fish captured in two seasons of sampling.                                                                                                                                                                                                                                                                       |
| 34            | 10105 | 6     | 093M.009   | 5            | 1.30              | 105                           | 616      | 28         | 5        | 09/10       | <b>S6</b>                | No fish captured in this reach after one season of sampling, and two seasons of sampling downstream in reach four.                                                                                                                                                                                                 |
| 34            | 10105 | 6     | 093M.009   | 5            | 1.30              | 105                           | 616      | 28         | 5        | 09/10       | <b>S6</b>                | No fish captured in this reach after one season of sampling, and two seasons of sampling downstream in reach four.                                                                                                                                                                                                 |
| 35            | 10113 | 2     | 093M.019   | 3.5          | ----              | ----                          | ----     | ----       | ----     | 07/19       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 38            | 10115 | 8     | 093M.009   | 8            | 0.77              | 100                           | 472      | 14         | 4        | 09/10       | <b>S6</b>                | No fish captured in one season of sampling (1999/09/10); TRIM map indicates that the gradient exceeds 32% downstream of this reach; a 15 meter waterfall in reach 5 of the mainstem (ILP 10094) is a definite barrier to fish migration (Table 10). Lake chub were captured in the lake upstream of the waterfall. |
| 39            | 10118 | 1     | 093M.019   | 1            | ----              | ----                          | ----     | ----       | ----     | 07/19       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 45            | 10134 | 1     | 093M.019   | 6.5          | ----              | ----                          | ----     | ----       | ----     | 09/07       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 47            | 10053 | 1     | 093M.008   | 4-4.5        | ----              | ----                          | ----     | ----       | ----     | 08/08       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 49            | 10180 | 1     | 093M.018   | 10           | ----              | ----                          | ----     | ----       | ----     | 08/08       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 53            | 10183 | 1     | 093M.018   | 4-7          | ----              | ----                          | ----     | ----       | ----     | 07/21       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                            |
| 54            | 10184 | 1     | 093M.018   | 4            | 0.40              | ----                          | ----     | ----       | ----     | 07/21       | <b>S6</b>                | About 30 m long section of no channel or surface flow 5 m upstream from ILP 10182 was identified as a barrier to fish migration; no perennial fish habitat is available upstream (no spawning habitat due to lack of gravels in substrate, no overwintering habitat due to lack of pools deeper than 10 cm).       |

Results and Discussion  
NON-FISH BEARING STATUS

**Table 15 (cont.)** Summary of data from the 34 non-fish bearing reaches (sorted by site #) in the study area from July to October 1999  
(for details see Appendix 1).

| Sample Site #   | ILP   | Reach | TRIM Map # | Gradient (%) | Channel Width (m) | Electrofishing Specifications |          |            |          |             | Proposed Riparian Class. | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------|-------|-------|------------|--------------|-------------------|-------------------------------|----------|------------|----------|-------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |       |       |            |              |                   | Dist. (m)                     | Time (s) | Cond. (µS) | Temp. °C | Date (1999) |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 57              | 10231 | 1     | 093M.018   | 3.5          | ----              | ----                          | ----     | ----       | ----     | 08/08       | <b>NCD</b>               | This reach should receive non-classified drainage designation due to <100 m of defined channel.                                                                                                                                                                                                                                                                                                                                                                                                             |
| 58              | 10231 | 2     | 093M.018   | 5            | ----              | ----                          | ----     | ----       | ----     | 08/08       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                                                                                                                                                                                                                     |
| 59              | 10269 | 1     | 093M.018   | 15           | ----              | ----                          | ----     | ----       | ----     | 08/08       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                                                                                                                                                                                                                     |
| 66              | 10289 | 2     | 093M.028   | 0.5          | ----              | ----                          | ----     | ----       | ----     | 10/26       | <b>S4/<br/>NCD</b>       | This reach should be designated a non-classified drainage due to <100 m of defined channel, however the lower 30m should be considered fish bearing.                                                                                                                                                                                                                                                                                                                                                        |
| 67              | 10296 | 1     | 093M.028   | 18.5-19      | ----              | ----                          | ----     | ----       | ----     | 10/26       | <b>NCD</b>               | This reach should receive non-classified drainage designation.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 68              | 10342 | 1     | 093M.028   | 17-37        | ----              | ----                          | ----     | ----       | ----     | 08/07       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                                                                                                                                                                                                                     |
| 72              | 10350 | 1     | 093M.028   | 3-3.5        | ----              | ----                          | ----     | ----       | ----     | 07/25       | <b>NCD</b>               | NCD, but some puddles and pools were found in lower gradient section of reach (no intervening sections of channel or surface flow between puddles). NCD in section surveyed and lack of surface flow constitutes a barrier, but there is some potential for a continuous channel further upstream.                                                                                                                                                                                                          |
| 73              | 10352 | 1     | 093M.028   | 14           | 0.83              | 150                           | 390      | 150        | 11       | 08/07       | <b>S6</b>                | This reach contains several sections of channel discontinuities lacking surface flow and a 1 meter high step 5 m upstream of Babine Lake, which were identified as barriers to fish migration. Fish habitat is very poor; no overwintering habitat (maximum pool depth = 20cm), or spawning habitat (little gravel, and no gravel pockets of sufficient size for resident trout or char), and poor rearing habitat (discontinuous channel, relatively steep gradient of 14%) were identified in this reach. |
| 74              | 10355 | 1     | 093M.028   | 10           | ----              | ----                          | ----     | ----       | ----     | 08/07       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                                                                                                                                                                                                                     |
| 75              | 10359 | 1     | 093M.028   | 10-14        | ----              | ----                          | ----     | ----       | ----     | 08/07       | <b>NCD</b>               | NCD and lack of surface flow in section surveyed is a barrier to fish migration, but there is some potential for a continuous channel further upstream.                                                                                                                                                                                                                                                                                                                                                     |
| 77,78,<br>79,80 | 10094 | 6     | 093M.019   | 0            |                   |                               |          |            |          | 07/19       | <b>L1</b>                | Lake chub were captured during secondary lake inventory of this small lake – 00504BABL (SKR 2000a). This population may be genetically distinct from other populations of lake chub in the district.                                                                                                                                                                                                                                                                                                        |

Results and Discussion  
RESAMPLING REQUIREMENTS

**Table 16.** Follow - up sampling requirements for classification of 27 reaches (sorted by site #) sampled in the study area from July to October, 1999 (*for details see Appendix 1*).

| Sample Site # | ILP   | Reach | TRIM Map # | Channel Width (m) | Timing            | Methods | Proposed Riparian Class. | Comments                                                                                                                                                                                                           |
|---------------|-------|-------|------------|-------------------|-------------------|---------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2             | 10063 | 2     | 093M.018   | 1.05              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/20); beaver dams observed in reach 1 appear to be non-permanent obstructions to fish passage.                                                                  |
| 3             | 10066 | 1     | 093M.018   | 0.98              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/19); a few non-permanent obstructions were observed in the lower 40 metres of this reach (LWD steps).                                                          |
| 15            | 10858 | 1     | 093M.018   | 1.10              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/21); braided sections with subsurface flow near confluence with ILP 10844 may obstruct fish passage.                                                           |
| 16            | 10858 | 3     | 093M.018   | 0.95              | May – June        | EF      | S4 default               | No fish captured in one season of sampling downstream in reach 1 (1999/07/21); if no fish are captured after a second season of sampling in the first reach, then reach 3 can also be considered non-fish bearing. |
| 18            | 10006 | 1     | 093M.009   | 0.37              | spring high flows | EF      | S4 default               | Channel was observed to be intermittent and ephemeral at the time of sampling; resampling in a second season is required to assess possibility for seasonal fish use.                                              |
| 19            | 10010 | 1     | 093M.009   | 1.43              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/21); debris jams observed 20 m and 30 m upstream from ILP 10115.                                                                                               |
| 22            | 10026 | 1     | 093M.009   | 1.73              | May – June        | EF      | S3 default               | No fish captured in one season of sampling (1999/08/10); gradient exceeding 20% for a short section in reach one may be a barrier to fish passage.                                                                 |
| 24            | 10034 | 1     | 093M.008   | 1.83              | spring high flows | EF      | S3 default               | Very limited discharge at time of sampling; resampling required to assess possibility for seasonal fish use.                                                                                                       |
| 25            | 10034 | 2     | 093M.008   | 3.22              | spring high flows | EF      | S3 default               | No fish captured in one season of sampling (1999/08/09); limited discharge in first reach may obstruct fish passage.                                                                                               |
| 26            | 10038 | 1     | 093M.008   | 1.85              | May – June        | EF      | S3 default               | No fish captured immediately downstream in ILP 10034 in one season of sampling (1999/08/09)                                                                                                                        |
| 27            | 10090 | 2     | 093M.019   | 0.80              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/09/08); no permanent barriers were identified between sample site and Babine Lake.                                                                                |
| 29            | 10094 | 3-2   | 093M.019   | 2.97              | May – June        | EF      | S3 default               | No fish captured in one season of sampling (1999/07/19); a 4 m high, 20 m long cascade may be a barrier to fish passage (Table 10).                                                                                |
| 30            | 10096 | 1     | 093M.019   |                   | spring high flows | EF      | S4 default               | No fish captured in one season of sampling (1999/07/19); channel becomes poorly defined approx. 40m upstream from ILP 10094; resampling required to assess possibility for seasonal fish use.                      |

Results and Discussion  
RESAMPLING REQUIREMENTS

**Table 16 (cont.)** Follow - up sampling requirements for classification of 27 reaches (sorted by site #) sampled in the study area from July to October, 1999 (*for details see Appendix 1*).

| Sample Site # | ILP   | Reach | TRIM Map # | Channel Width (m) | Timing            | Methods | Proposed Riparian Class. | Comments                                                                                                                                                                             |
|---------------|-------|-------|------------|-------------------|-------------------|---------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31            | 10099 | 1     | 093M.019   | 0.47              | May – June        | EF      | S4 default               | No fish captured immediately downstream in ILP 10094 after one season of sampling (1999/07/19); a 4 m high, 20 m long cascade located on ILP 10094 may be a barrier to fish passage. |
| 37            | 10115 | 5     | 093M.009   | 1.30              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/21)                                                                                                                              |
| 43            | 10126 | 2     | 093M.019   | 1.72              | May – June        | EF      | S3 default               | No fish captured in one season of sampling (1999/09/07); no permanent barriers to fish migration were identified.                                                                    |
| 44            | 10131 | 1     | 093M.019   | 0.90              | spring high flows | EF      | S4 default               | No fish captured in one season of sampling (1999/07/22); lower 100 m of stream are braided and poorly defined.                                                                       |
| 46            | 10044 | 2     | 093M.008   | 1.28              | spring high flows | EF      | S4 default               | No fish captured in one season of sampling (1999/08/09); long sections of dry channel observed in the first reach (>100 m).                                                          |
| 50            | 10182 | 1     | 093M.028   | 2.25              | May – June        | EF      | S3 default               | No fish captured in one season of sampling (1999/08/07)                                                                                                                              |
| 51            | 10182 | 2     | 093M.018   | 1.10              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/21)                                                                                                                              |
| 52            | 10182 | 2     | 093M.018   | 0.80              | May – June        | EF      | S4 default               | No fish captured in one season at two sample sites downstream in reach one and two; recommend resampling in reach 1 and lower end of reach 2.                                        |
| 56            | 10218 | 3     | 093M.018   | 1.00              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/21)                                                                                                                              |
| 60            | 10271 | 1     | 093M.028   | 0.92              | spring high flows | EF      | S4 default               | The channel was dry at the time of sampling (1999/08/07); resampling required to assess possibility for seasonal fish use.                                                           |
| 61            | 10274 | 1     | 093M.028   | 1.98              | May – June        | EF      | S3 default               | No fish captured in one season of sampling (1999/08/08); highly suspect RB may be present in this reach.                                                                             |
| 65            | 10284 | 9     | 093M.028   | 0.73              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/10/26); fish passage may be obstructed by the lower 200 m of this reach which is very braided and poorly defined.                   |
| 69            | 10346 | 1     | 093M.028   | 0.65              | spring high flows | EF      | S4 default               | The channel was dry at the time of sampling (1999/08/07); resampling required to assess possibility for seasonal fish use.                                                           |
| 71            | 10349 | 1     | 093M.028   | 1.38              | May – June        | EF      | S4 default               | No fish captured in one season of sampling (1999/07/25)                                                                                                                              |
| 76            | 10854 | 1     | 093M.018   | 0.78              | May – June        | EF      | S4 default               | Requires sampling in the reach 2 of the mainstem (ILP 10218).                                                                                                                        |

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**Appendix 1.** Sample Site Information Including FDIS Site Cards, Fish Cards, and Site Photographs (sorted by Site Number).

*(see attached “SITE CARD INDEX” for the site information sorted by ILP, then Reach number)*

## SITE CARD INDEX

Sorted in Ascending Order of ILP, then Reach Number

| ILP   | REACH  | SITE        | TRIM MAP | Page #        |
|-------|--------|-------------|----------|---------------|
| 10002 | 1      | 17          | 093M.009 | S-17          |
| 10002 | 2-lake | 81,82,83    | 093M.009 | S-81,82,83    |
| 10006 | 1      | 18          | 093M.009 | S-18          |
| 10010 | 1      | 19          | 093M.009 | S-19          |
| 10013 | 3      | 20          | 093M.009 | S-20          |
| 10024 | 2      | 21          | 093M.009 | S-21          |
| 10026 | 1      | 22          | 093M.009 | S-22          |
| 10033 | 1      | 23          | 093M.008 | S-23          |
| 10034 | 1      | 24          | 093M.008 | S-24          |
| 10034 | 2      | 25          | 093M.008 | S-25          |
| 10038 | 1      | 26          | 093M.008 | S-26          |
| 10044 | 2      | 46          | 093M.008 | S-46          |
| 10053 | 1      | 47          | 093M.008 | S-47          |
| 10055 | 3      | 48          | 093M.008 | S-48          |
| 10061 | 1      | 1           | 093M.018 | S-1           |
| 10063 | 2      | 2           | 093M.018 | S-2           |
| 10066 | 1      | 3           | 093M.018 | S-3           |
| 10067 | 1      | 4           | 093M.018 | S-4           |
| 10072 | 1      | 5           | 093M.008 | S-5           |
| 10072 | 2      | 6           | 093M.008 | S-6           |
| 10073 | 1      | 7           | 093M.008 | S-7           |
| 10076 | 1      | 8           | 093M.008 | S-8           |
| 10078 | 1      | 9           | 093M.008 | S-9           |
| 10079 | 2      | 10          | 093M.008 | S-10          |
| 10080 | 1      | 11          | 093M.008 | S-11          |
| 10090 | 2      | 27          | 093M.019 | S-27          |
| 10094 | 3-1    | 28          | 093M.019 | S-28          |
| 10094 | 3-2    | 29          | 093M.019 | S-29          |
| 10094 | 6-lake | 77,78,79,80 | 093M.019 | S-77,78,79,80 |
| 10096 | 1      | 30          | 093M.019 | S-30          |
| 10099 | 1      | 31          | 093M.019 | S-31          |
| 10101 | 2      | 32          | 093M.019 | S-32          |
| 10105 | 4      | 33          | 093M.019 | S-33          |
| 10105 | 6      | 34          | 093M.009 | S-34          |
| 10113 | 2      | 35          | 093M.019 | S-35          |
| 10115 | 3      | 36          | 093M.009 | S-36          |
| 10115 | 5      | 37          | 093M.009 | S-37          |
| 10115 | 8      | 38          | 093M.009 | S-38          |
| 10118 | 1      | 39          | 093M.019 | S-39          |
| 10125 | 1      | 40          | 093M.019 | S-40          |
| 10125 | 2      | 41          | 093M.019 | S-41          |
| 10126 | 1      | 42          | 093M.019 | S-42          |
| 10126 | 2      | 43          | 093M.019 | S-43          |
| 10131 | 1      | 44          | 093M.019 | S-44          |

## SITE CARD INDEX

Sorted in Ascending Order of ILP, then Reach Number

| ILP   | REACH | SITE | TRIM MAP | Page # |
|-------|-------|------|----------|--------|
| 10134 | 1     | 45   | 093M.019 | S-45   |
| 10180 | 1     | 49   | 093M.018 | S-49   |
| 10182 | 1     | 50   | 093M.028 | S-50   |
| 10182 | 2     | 51   | 093M.018 | S-51   |
| 10182 | 2     | 52   | 093M.018 | S-52   |
| 10183 | 1     | 53   | 093M.018 | S-53   |
| 10184 | 1     | 54   | 093M.018 | S-54   |
| 10218 | 1     | 55   | 093M.018 | S-55   |
| 10218 | 3     | 56   | 093M.018 | S-56   |
| 10231 | 1     | 57   | 093M.018 | S-57   |
| 10231 | 2     | 58   | 093M.018 | S-58   |
| 10269 | 1     | 59   | 093M.018 | S-59   |
| 10271 | 1     | 60   | 093M.028 | S-60   |
| 10274 | 1     | 61   | 093M.028 | S-61   |
| 10284 | 1     | 62   | 093M.028 | S-62   |
| 10284 | 2     | 63   | 093M.028 | S-63   |
| 10284 | 7     | 64   | 093M.028 | S-64   |
| 10284 | 9     | 65   | 093M.028 | S-65   |
| 10289 | 2     | 66   | 093M.028 | S-66   |
| 10296 | 1     | 67   | 093M.028 | S-67   |
| 10342 | 1     | 68   | 093M.028 | S-68   |
| 10346 | 1     | 69   | 093M.028 | S-69   |
| 10347 | 1     | 70   | 093M.028 | S-70   |
| 10349 | 1     | 71   | 093M.028 | S-71   |
| 10350 | 1     | 72   | 093M.028 | S-72   |
| 10352 | 1     | 73   | 093M.028 | S-73   |
| 10355 | 1     | 74   | 093M.028 | S-74   |
| 10359 | 1     | 75   | 093M.028 | S-75   |
| 10844 | 1     | 12   | 093M.008 | S-12   |
| 10844 | 2     | 13   | 093M.008 | S-13   |
| 10844 | 4     | 14   | 093M.018 | S-14   |
| 10854 | 1     | 76   | 093M.018 | S-76   |
| 10858 | 1     | 15   | 093M.018 | S-15   |
| 10858 | 3     | 16   | 093M.018 | S-16   |

Note: Digital versions of all forms are available on the Field Data Information System (FDIS) databases delivered to B.C. Environment, Skeena Region and Houston Forest Products, Houston, B.C..

**Appendix 2. Photodocumentation Forms 1 and 2. Negatives and digital images of photos (2 copies) were submitted to B.C. Environment.**

**Photo Survey Form 1 – Equipment Details**

Survey Start Date: 1999/07/19                      Survey End Date: 1999/10/26  
Agency: C141  
Crew: RS/ ML/ LS/ JK

**Camera:**

Make and Model: Canon Sureshot A1  
Lense: 35 mm  
Format: 135 mm, Kodak CD Rom, TIFF files

**Roll and or Batches Detail:**

| Roll # | CD # | Output Medium   | Film Type    | ISO |
|--------|------|-----------------|--------------|-----|
| M1     | 1    | negative/CD Rom | colour print | 200 |
| M2     | 1    | negative/CD Rom | colour print | 200 |
| M3     | 1    | negative/CD Rom | colour print | 200 |
| M4     | 1    | negative/CD Rom | colour print | 200 |
| M5     | 2    | negative/CD Rom | colour print | 200 |
| M6     | 2    | negative/CD Rom | colour print | 200 |
| M8     | 2    | negative/CD Rom | colour print | 200 |
| M9     | 3    | negative/CD Rom | colour print | 200 |
| M13    | 3    | negative/CD Rom | colour print | 200 |
| M15    | 3    | negative/CD Rom | colour print | 200 |
| M21    | 4    | negative/CD Rom | colour print | 200 |
| M22    | 6    | negative/CD Rom | colour print | 200 |
| M24    | 5    | negative/CD Rom | colour print | 200 |
| M25    | 5    | negative/CD Rom | colour print | 200 |
| M26    | 5    | negative/CD Rom | colour print | 200 |
| M29    | 14   | negative/CD Rom | colour print | 200 |
| M35    | 6    | negative/CD Rom | colour print | 200 |

**Appendix 3.** List of DNA samples submitted to B.C. Environment.

| Stream name | ILP   | Reach | Site | Genetic sample | Voucher | Species ID | Fork Length (mm) | Maturity | Verified ID | Comments    |
|-------------|-------|-------|------|----------------|---------|------------|------------------|----------|-------------|-------------|
| Unnamed     | 10844 | 2     | 59   | CT 1           |         | CT         | 210              | M        |             | adipose fin |

**Appendix 4.** 1:20,000 Fisheries Project Maps for Sub-basins I, II, and III in the Babine Lake watershed.

Fisheries Project Maps

093M.008

093M.009

093M018

093M.019

093M.028

**Appendix 5. 1:20,000 Fisheries Interpretive Maps for Sub-basins I, II, and III in the Babine Lake watershed.**

Fisheries Interpretive Maps

093M.008

093M.009

093M018

093M.019

093M.028