

Executive Summary

Triton Environmental Consultants Ltd. was retained by Repap Smithers Inc. in partnership with the Ministry of Environment, Lands and Parks (MOELP) in Smithers to conduct reconnaissance level fish and fish habitat inventories in the Kispiox Forest District. The information obtained from existing information was limited to several mainstem records, the majority of the study area is lacking known fish distribution data. The records indicate that Dolly Varden and rainbow trout are scattered throughout the study area. Coho and chinook salmon are found in lower Shedon Creek and coho are recorded in Kuldo Creek. The analysis of the maps for the study areas indicates the general morphology of the watershed, which is defined by steep valley walls, icefields and mountainous regions. A total of 118 sites were sampled between September 10 and 18, 1996. It was originally thought that the majority of tributaries to the Skeena would be too steep to support fish populations but rainbow trout and/or Dolly Varden were captured at 7 sites that had gradients greater than 20%.

Acknowledgements

Triton Environmental Consultants Ltd.'s project team for this inventory project included:

Mr. Adam Lewis, M.Sc., R.P. Bio.	Project Manager/Crew Leader
Ms. Julie Pavey, B.Sc., R.P. Bio.	Project Manager/Chief Crew Leader
Mr. Guy Martel, Ph.D.	Crew Leader
Mr. Darrel Davis	Fisheries Technician
Ms. Karla Graf	Crew Leader/Fisheries Technician
Mr. Jean-Francois Patenaude	Field Technician
Mr. Dave Warburton	GIS Coordinator
Mr. Derik Woo, B.A.	GIS Specialist
Ms. Robyn Shortt, B.Sc.	Database Coordinator

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1.0 INTRODUCTION

1.1 Background

Repap Smithers Inc. (Repap) retained Triton Environmental Ltd. (Triton) to conduct reconnaissance level fish and fish habitat inventory in the Skeena mainstem tributaries (between Sicintine R. and Kuldo Cr., and between Deep Canoe Cr. and Babine R.), Tommy Jack, Upper Shedin, Kuldo, Deep Canoe, Sam Green and Lower Shedin watershed areas within the Kispiox Forest District.

1.2 Objectives

In partnership with MELP and Repap Smithers, Forest Renewal BC (FRBC) is implementing fish and fish habitat inventories to provide information required for resource planning. Triton's goal was to describe fish distributions and habitat characteristics, and provide stream classifications according to the Forest Practices Code. Fish and fish habitat operational inventories consist of:

- reconnaissance-level species and habitat surveys to determine values and sensitivities in areas subject to or affected by forest harvesting;
- identification of fish and fish habitat values that require special designation under the Forest Practices Code (e.g. sensitive areas); and
- new, reinterpreted, or augmented data to meet Forest Practices Code requirements for classification of areas (e.g. fish stream classification).

Stream classification is now required under *the Forest Practices Code (FPC) of British Columbia Act* (Bill 40 - 1994) and the associated *Operational Planning Regulation* enacted in June 1995. One of the objectives of the FPC is to integrate fisheries and forestry resource management in areas proposed or approved for logging to ensure that fish habitat is protected. Stream classification is designed to identify the presence of sensitive fish habitat and species, and to assist in the determination of the appropriate riparian management areas in order to develop a responsible management strategy required for Operational Plans.

2.0 STUDY AREA

2.1 Location and General Morphology

The Kispiox Forest District is located in north-central British Columbia and contains several major tributaries to the Skeena River including the Sicintine, Babine, Suskwa, Kispiox, Kitwanga and Kitseguecla rivers. The 1:20,000 TRIM maps that cover the study area are 93M071, 93M072, 93M073, 93M081, 93M091, 93M092, 94D001, 94D002, and 104A010. Due to the late date of the request for proposal, the watershed coverage focused on sections that are included in Repap's Five Year Development Plans.

The watersheds surveyed are located within the Interior Cedar Hemlock biogeoclimatic zone (Ketcheson et al. 1991). This low to middle elevation zone is the most productive in the interior and has cool/wet winters and warm/dry summers. Western hemlock, western red cedar, white-Engelmann spruce hybrids and subalpine fir are the dominant trees. At higher elevations, the biogeoclimatic zone is Engelmann Spruce-Subalpine Fir (Ketcheson et al. 1991). The landscape at higher elevations is open parkland with trees interspersed with meadow, heath, and grassland. Englemann spruce, subalpine fir and lodgepole pine are the dominant trees.

The streams studied include Skeena mainstem tributaries (between Sicintine R. and Kuldo Cr., and between Deep Canoe Cr. and Babine R.) and partial or complete coverage of the Tommy Jack, Upper Shedin, Kuldo, Deep Canoe, Sam Green and Lower Shedin drainages (**Figure 1**). Specifically, the following streams were inventoried:

2.1.1 Tommy Jack Creek

The headwaters of Tommy Jack Creek lie on the slopes of Mount Tommy Jack and it flows north and northeast into the Sicintine River. The watershed ranges in elevation from 840 m to 1400 m. Based on a 1:50,000 NTS map, Tommy Jack Creek has a mainstem length of 19 km long stream with 6 tributary streams. The total length of the tributaries studied is 25 km for an total length classified of 43 km (compared to a proposed 23 km to be inventoried).

2.1.2 Upper Shedin Creek and Lower Shedin Creek

The headwaters of Shedin Creek flow south into Babine River near its junction with Skeena River. The watershed ranges in elevation from 330 m to 1320 m. Based on a 1:50,000 NTS map, Shedin Creek is a 45 km long stream with 32 tributary streams. The total length of the tributaries is 215 km for a total inventoried length of 260 km (compared to a proposed 66 km to be inventoried).

2.1.3 Kuldo Creek

Kuldo Creek flows south-east into Skeena River, south of Kuldo. The watershed ranges in elevation from 366 m to 460 m and has a mainstem length of 10.5 km measured to the edge of NTS map 93M13. Twelve tributaries were inventoried with a length of 51 km for a total inventoried length of 62 km (compared to a proposed 24 km to be inventoried).

2.1.4 Deep Canoe Creek

Deep Canoe Creek flows east into the Skeena River. Deep Canoe was not sampled due to the increased sampling effort in other watersheds.

2.1.5 Sam Green Creek

Sam Green Creek flows into the Babine River just upstream of its confluence with the Skeena River. The elevation of the watershed ranges from 320 to 1555 m and it has a mainstem length of 17.5 km. The watershed had 32 tributaries with a total length of 58 km. The inventoried length of 75 km is significantly greater than the proposed 9 km.

2.2 Access

Portions of the Kuldo Creek and Deep Canoe Creek watersheds are partially accessible by road. Access is from Highway 16 traveling to Hazelton then north from Kispiox on the Kuldo Creek Forest Service road. This allows access by truck to several sites. The majority of the sites were accessed via helicopter and foot; in many instances the access was quite difficult due to the steep terrain.

2.3 Resource Use

The dominant resource activity in the watersheds studied will be the proposed logging. No farming or ranching activities were observed. This area is difficult to access and is probably used only for recreational purposes such as hunting, fishing and camping.

2.4 Summary of Existing Information and Sources Consulted

The first task in stream classification was to collect existing information on fish distribution within the watersheds under investigation. Data from the provincial and federal government sources such as the Stream Information Summary System (SISS) and the evolving Fisheries Information Summary System (FISS) were researched for information. However, for the most part the streams that were investigated were 1st, 2nd, and 3rd order streams mapped at 1:20,000 scale which are not reported in the government databases.

In the 1970's, B.C. Hydro proposed to build the Cutoff Mountain Dam on the Skeena River immediately upstream of the confluence with the Babine River. A pre-feasibility study exists but any data collected would be included on the FISS maps.

The extent of existing information is minimal and summarized by watershed.

2.4.1 Tommy Jack Creek

Tommy Jack Creek flows northeast into the left bank of the Sicintine Creek. Dolly Varden were observed at approximately 3 km from the creek mouth.

2.4.2 Upper Shedrin Creek and Lower Shedrin Creek

Shedin Creek flows south into the Babine River, near its junction with Skeena River. Existing SISS information notes that coho salmon are present. Chinook salmon, Dolly Varden, Rocky Mtn. whitefish, and rainbow trout have been observed at 0.2 km. The SISS records show an 8 m falls that is impassable to all species located 3.5 km upstream. There is also a 20 m fall recorded at 12.0 km upstream. The stream summary catalogue for Subdistrict 4C has a distribution summary that notes rainbow trout at 15 and 26 km on the mainstem and rainbow trout in Damsumlo Lake.

2.4.3 Kuldo Creek

Kuldo Creek flows south-east into Skeena River, south of Kuldo. Cascades are located at 34.0 km, and a 15.0 m rock falls at 41.0 km which is the first of two major barriers which is impassable. The other major barrier is not detailed in the records. Coho salmon were observed at 15 km and Dolly Varden have been observed throughout the system.

2.4.4 Deep Canoe Creek

Deep Canoe Creek flows east into the Skeena River. No specific data was located for Deep Canoe Creek.

2.4.5 Sam Green Creek

Sam Green Creek flows into the Babine River just upstream of its confluence with the Skeena River. No specific information was found for Sam Green Creek except that Dolly Varden and rainbow trout were suspected species according to a record attached to the mouth of the creek.

3.0 METHODS

3.1 Physical

Prior to the start of the field program 1:20,000 TRIM maps were used to estimate the location of reach breaks, determine the length of the reaches and identify potential sampling sites. The locations of these reach breaks were subsequently confirmed or modified during the field studies.

The survey was conducted by a four person field crew working in two teams. Sites at the top of the watershed were done first to determine fish presence whenever possible. DFO/MELP Stream Inventory Survey forms were filled out for each site (Department of Fisheries and Oceans and Ministry of Environment, 1989). Channel widths were measured with a measuring tape and depths were measured with a meter stick. Stream classifications, whether fish bearing or non fish bearing, require the measurement of a minimum of six channel widths. Stream gradients were measured using a Suunto clinometer. In order to allow for future verification of sampling sites, all sampling sites were permanently marked with unique flagging tape (blue and white striped) and the GPS locations of all sites were noted.

Photos were taken at each site to document field data and conditions. Canon Sure Shot A1 Prima AS-1 cameras were used for this purpose. The camera is an automatic, 32 mm lens requiring 35 mm, 200 ISO film. Photos were usually taken of both the upstream and downstream view of the stream and any characteristic features such as beaver dams. Photos were often taken of fish captured at the site. **Appendix 1** documents these photos.

The report maps were generated using 1:20,000 scale TRIM base maps provided by MELP. Using ARC Info, these files were projected into UTM and coverages were created from the field sampling and stream classification data.

3.2 Biological

Triton obtained fish sampling permits from the appropriate DFO and MOELP offices which are included in **Appendix 2**. Fish presence/absence was determined by electrofishing and/or minnow trapping. Electrofishing was conducted at all sites where it was deemed necessary. That is, where fish presence had not been determined upstream or habitat characteristics were sufficiently different from other sites. A minimum area of approximately 100 m² was sampled where fish were present. The effort, or shocking time and distance shocked, was recorded for each sample site. Electrofishing was done by one person operating the shocking device and the second person collecting stunned fish with a dip net and placing them in a bucket. The fork length of each fish collected was then measured and, whenever necessary, voucher specimens were collected and stored in a

10% formaldehyde solution in plastic bags. These specimens were delivered to the Smithers office of the BC Environment.

3.3 Stream Flow and Water Quality

The hydrological records were reviewed from existing sources, namely Water Survey of Canada (WSC) records. An estimate of daily flows (m^3/s) was based on Water Survey of Canada Daily maximums, minimums, and maximum instantaneous flows were also summarized from existing records if available. Mean annual discharge (m^3/s) was calculated from existing hydrological records.

As agreed with the Ministry Representative, water samples were not collected for chemical analyses. The parameters that were measured for each site, however, were turbidity, pH and conductivity. Conductivity was measured with a handheld LaMotte TDSTestr 3™ conductivity meter with a range of 0 to 1990 μS . The acceptable values of conductivity for electroshocking purposes must exceed 30 μS . The pH at each site was measured with a handheld LaMotte pHTestr 2™ pH meter. Turbidity was determined subjectively, although it was stipulated by the ministry representative during the quality assurance phase of the project that the depth of the deepest pool would be the default value in the database when the water was clear to the bottom.

3.4 Reporting

Using 1:20,000 scale TRIM maps meant that some of the first order (headwater) streams marked on the map were not necessarily stream channels. Under the FPC's *Operational Planning Regulation* (June 1995) a stream is defined as:

“... a watercourse, having an alluvial sediment bed, formed when water flows on a perennial or intermittent basis between continuous definable banks;”

During the field classification, crews would define a watercourse as “not a creek” if there were no alluvial sediments and no continuous, definable banks. Watercourses that had a substrate that consisted entirely of organic material were not considered to have an alluvial sediment bed.

The data collected from existing sources and during the field program were used to determine the riparian class as defined under the *Forest Practices Code*. **Table 1** provides the FPC definition of each riparian class:

Draft procedures are also outlined in the guidebook to determine the riparian management areas (RMA) for lakes (L1 - L4), wetlands (W1 - W5) and fisheries sensitive zones.

The summary table for all sites within the study area includes:

- the results of fish sampling;
- the average channel width (m);
- the average gradient (%); and
- the riparian class according to the FPC. .

A stream survey card and photograph(s) are presented for each sampling site following the order in which they are listed in the summary table. The stream survey data, for each site, is an electronic duplication of the stream survey forms completed in the field and provides additional information used by the field crew to designate a stream as non-fish bearing.

An S5 or S6 classification was based on electrofishing results, substrate composition, stream gradient, general fish habitat characteristics and location of barriers that may preclude fish use in the area. The absence of fish during sampling did not rule out an S1 to S4 designation. At sites where no fish were collected but there was no reason to conclude that fish would not use the segment of creek, the reach was classified as fish bearing and given the appropriate S1 to S4 classification. Additional sampling, at different times of the year, would be required to confirm that fish do not utilize a stream reach before an S5 or S6 final designation would be accepted. The rationale for S5 and S6 designations was summarized in coordination with recommended sites for further sampling.

4.0 RESULTS - PHYSICAL CHARACTERISTICS

4.1 Stream Flow

There was no recorded information available for any watersheds in the study area except for the mainstem Skeena River. Water Survey of Canada stations were located on the Skeena River above the Babine River confluence for the period between 1979 to 1994 (08EB005) and on the Skeena River at Glen Vowell between 1960 to 1985 (08EB003). The station at the Skeena River above Babine River encompasses a drainage of 12,400 km² while the station for the Skeena River at Glen Vowell measures the flow from a drainage area of 25,900 km².

Figure 2 compares average daily average flow for the period of record, 1970 to 1994 at the Water Survey of Canada station located on the Skeena River above the Babine River (WSC Station 08EB005). In the month of September at the time of sampling, the typical average flow is approximately 500 m³/s on the Skeena at this location.

Figure 3 compares average daily average flow for the period of record, 1960 to 1985 at the Water Survey of Canada station located on the Skeena River at Glen Vowell (WSC Station 08EB003). In the month of September at the time of sampling, the typical average flow is approximately 1000 m³/s on the Skeena at this location.

The discharge of the following main creeks were measured using the floating chip method and appear to be fairly comparable at sites where more than one reach was sampled.

Kuldo Creek

(Reach 3, Site B14): flow estimate of 12.5 m³/s at an estimated medium discharge level.

Sam Green Creek

(Reach 1, Site B45): flow estimate of 1.8 m³/s at an estimated medium discharge level

(Reach 6, Site B44): flow estimate of 0.4 m³/s at an estimated medium discharge level

Sheladamus Creek

(Reach 2, Site A49): flow estimate of 1.3 m³/s at an estimated medium discharge level

Tommy Jack Creek

(Reach 3, Site B38): flow estimate of 0.03 m³/s at an estimated high discharge level

Willowflat Creek

(Reach 1, Site B65): flow estimate of 1.2 m³/s at an estimated medium discharge level.

(Reach 2, Site B64): flow estimate of 1.3 m³/s at an estimated medium discharge level.

4.2 Water Quality

Water temperatures during this period ranged between 4 and 13°C. **Table 2** summarizes the temperature, pH, conductivity and turbidity measures collected during the course of this inventory project. The average water temperature was 8°C. pH values ranged from 6.6 to 9.3, with an average pH of 8.0. The turbidity values are not discussed here as the values were defaulted on request of the QA/QC monitor to the depth of the deepest pool when turbidity was recorded as clear to the bottom. This value is not considered indicative of the stream turbidity by Triton and will not be discussed further. The conductivity ranged from 10 to 270 (umhos/cm) with an average value of 80. The low values are considered questionable given the successful application of electrofishing to most sites and are considered to be a result of equipment error.

5.0 RESULTS AND DISCUSSION

The survey took place between September 10 and 18, 1996. The weather at the time of survey was variable with general overcast/rainy conditions with morning fog. The air temperatures ranged from 7 to 17°C. A total of 118 sites were sampled and only 3 sites were classified as “Not a creek” due to a lack of defined channel. The stage at the time of sampling was Medium-High which allowed for fish sampling at the majority of sites. An item of note was the difficult access into many sites. This resulted in a larger than normal percentage of sites that were surveyed from the air as denoted by AE (aerial estimate) in the methodologies section.

The summary information for all sites is listed in **Table 3**. The table is organized by watershed whenever possible. The stream summaries and accompanying photos are in the same order as the summary table. Photocopies of the original field cards are included in **Appendix 3**. **Figure 4** includes histograms of the fish species sampled during the study. Only species which had frequencies greater than 10 were included as a histogram with only two fish sampled is not informative. The fish collection data including site location and water temperature is summarized in **Appendix 4**.

5.1 Tommy Jack Creek (94D002)

5.1.1 Physical

Only the upper portion of Tommy Jack Creek was included within the scope of this survey. Twelve sites were sampled including the mainstem which has a gradient of 5%. Several falls and cascades were observed in the mainstem.

5.1.2 Fish

Fish sampling was conducted by electrofishing at most of the sites which resulted in the capture of fish at five sites. Dolly Varden were captured at A23, A24, and A25. Both Dolly Varden and rainbow trout were captured at A26 and A27. There is an unnamed lake upstream of B40 which has a low probability of resident fish but should be checked.

5.1.3 Stream Classification

The mainstem of Tommy Jack Creek is classified as S2 based on an average channel width of 10.2 m at Site B40. No fish were captured in the mainstem but Dolly Varden and rainbow trout were captured in the tributaries.

5.1.4 Tributaries

The majority of tributaries sampled were S3. Dolly Varden were captured in 22% gradient at Site A24 which is an S4. A tributary at Site A30 is not shown on the TRIM

map and is classified as S4. Site B39 is a headwater tributary that has a 10m falls downstream and was considered to lack overwintering habitat. Site B38 is located in a reach above a 4m cascade and is classified as S5 due to the presence of an impassable barrier and lack of overwintering habitat.

5.2 Upper Shedin Creek (93M092, 94D002)

It is noted that there is a gap in data collection between Upper and Lower Shedin Creek due to the limited scope of the inventory. Any future surveys should include 93M082/93

5.2.1 Physical

Upper Shedin Creek was sampled as well as Damsumlo Lake and its tributaries. Twenty-three sites were sampled including the mainstem of Upper Shedin Creek. There is a 15 m falls downstream of all the sites sampled in the Upper Shedin as well as a 25 m falls near the headwaters. The watershed has several small lakes upstream of the 25 m falls that are above the treeline which are classified as non-fish bearing. The mainstem of Shedin Creek appears to have a high debris transport potential which is indicated by the large log jam observed at B20 in a side channel.

5.2.2 Fish

Despite fairly intensive sampling at twenty three sites and minnow traps in Damsumlo Lake, no fish were captured in this area. Damsumlo Lake has historical records of rainbow trout according to the SISS map although no fish were captured or visually observed. There were also historical records of rainbow trout at 15 and 26 km in Shedin Creek. It is recommended that the area be selectively re-sampled as it may be possible that the entire watershed above the 15 m falls is non-fish bearing. It is noted that there is a gap in the fish distribution data as the study did not include the entire Shedin watershed.

5.2.3 Stream Classification

The mainstem of Upper Shedin Creek is classified as S1 due to the historical records of rainbow trout within the study area. The mainstem of Upper Shedin Creek is considered to be non fish-bearing upstream of the 25 m falls due to the lack of overwintering habitat.

5.2.4 Tributaries

5.3 Lower Shedin Creek

Shedin Creek flows south into the Babine River, near its junction with Skeena River. Existing SISS information notes that coho salmon are present. Chinook salmon, Dolly Varden, Rocky Mtn. whitefish, and rainbow trout have been observed at 0.2 km. The

SISS records show an 8 m falls that is impassable to all species located 3.5 km upstream. There is also a 20 m fall recorded at 12.0 km upstream. The stream summary catalogue for Subdistrict 4C has a distribution summary that notes rainbow trout at 15 and 26 km on the mainstem and rainbow trout in Damsumlo Lake.

5.3.1 Physical

5.3.2 Fish

5.3.3 Stream Classification

5.3.4 Tributaries

5.4 Kuldo Creek

Kuldo Creek flows south-east into Skeena River, south of Kuldo. Cascades are located at 34.0 km, and a 15.0 m rock falls at 41.0 km which is the first of two major barriers which is impassable. The other major barrier is not detailed in the records. Coho salmon were observed at 15 km and Dolly Varden have been observed throughout the system.

5.4.1 Physical

5.4.2 Fish

5.4.3 Stream Classification

5.4.4 Tributaries

5.5 Deep Canoe Creek

Deep Canoe Creek flows east into the Skeena River. No specific data was located for Deep Canoe Creek.

5.6 Sam Green Creek

Sam Green Creek flows into the Babine River just upstream of its confluence with the Skeena River. No specific information was found for Sam Green Creek except that Dolly Varden and rainbow trout were suspected species according to a record attached to the mouth of the creek.

5.6.1 Physical

5.6.2 Fish

5.6.3 Stream Classification

5.6.4 Tributaries

5.7 Tributaries to Skeena River

5.7.1 Physical

5.7.2 Fish

5.7.3 Stream Classification

5.7.4 Tributaries

5.8 Wildlife Observations

Wildlife species observed included a frog near Damsumlo Lake. Tracks were observed at several sites including moose, white-tailed deer, black bear. The region near Damsumlo Creek was observed to contain sections of excellent moose habitat.

Mountain goat were observed in a tributary to Shedin Creek at sites

Wildlife that inhabit this region are adapted to either survive or avoid the deep snows of winter. Grizzly and black bears are the most common large mammals with bears being well adapted to survive the long winters by hibernating (Ketcheson et al. 1991).

6.0 CONCLUSION AND RECOMMENDATIONS

Rainbow trout were found to be present throughout Bambrick Creek and many of its tributaries. Farming and cattle activity seem to have effected the stream and its bank integrity in many spots, particularly in the lower three reaches, but probably has not caused any overall degradation to fish habitat. Mitigating this concern would require the construction of cattle fences and crossings throughout a large area.

Beaver activity is also extensive in the watershed. Dams create temporary barriers to fish migration but can also create large pools used as refuge by fish and can add to the LOD used as cover.

Fish densities in the Bambrick watershed ranged between 0.01 and 1.86 fish/m² (Table 2). The highest density involved juvenile rainbow trout and was related to good, complex habitat for juvenile fish including cut banks, LOD and boulders dispersed throughout the channel.

Table 3 provides a summary of the tributaries surveyed. All first order tributaries were dry and as a consequence were not sampled. Two out of seven second order tributaries or 29% were dry in mid-September. Due to the relatively flat topography of the Bambrick watershed there are usually no significant barriers (except beaver dams) restricting fish movement. Therefore, fish would be able to move into the dry creek channels during spring run-off. The degree of fish utilization of first order tributaries should be assessed in May or June when water levels would allow fish access to these tributaries.

We recommend that further sampling for fish be conducted at several sites in the watershed to confirm fish use. Sites 1, 11, 12, 17 and 18 should be resampled during appropriate periods of flow or fish life history, e.g. spawning. Willan Creek is a major tributary to Bambrick Creek and fish presence was not determined in a large section of the system. Approximately 1000 m of Willan Creek above Willan Lake were electroshocked and no fish were found. Large sections were dry and many areas of the riparian zone appeared impacted by cattle activity. Table 4 summarizes the sampling done on all these sites and suggests appropriate resampling times.

6.0 CONCLUSION AND RECOMMENDATIONS

The Riparian Management Areas (RMA) around streams, lakes and wetlands consist of a riparian management zone, the width which is determined by the presence of fish species and channel width. The retention of streamside vegetation is required to protect water quality, stabilize stream banks, regulate water temperature, and supply woody debris to the stream channel. The RMA can consist of both a management zone and of a reserve zone. Timber harvesting is not permitted within the reserve zone of the RMA and there are recommended management practices for the management zone.

Table 3 summarizes the specified Riparian Management Area (RMA) which is adjacent to the stream. The RMA extends from the top of the stream bank to the slope distance specified in the table.

The recommended management practices for these classifications are as follows:

S1, S2 and S3 Streams (fish-bearing)

The RMA adjacent to these creeks contain a reserve zone and management zone whose objective is to reduce the risk of windthrow to the reserve zone and provide opportunities for meeting wildlife tree objectives.

S4 Streams (fish-bearing)

S4 streams have a management zone of 30 m and do not have a reserve zone, with the exception of a 10 m reserve zone required in the interior where the risk of windthrow is considered low. The management objectives are to reduce the risk of windthrow to the reserve zone and retain all high valued wildlife trees contained in the reserve zone.

S5 and S6 Streams (non fish-bearing)

S5 and S6 streams do not have a reserve zone. The management zone should maintain wildlife habitat, provide a source of large woody debris and root networks for bank stability, and shading for stream temperature control.

Gullies or “Not a creek”

It is also noted that several waterways shown on the maps were classified as “not a creek” as they did not meet the definition of a stream. A stream is a watercourse formed when water flows between continuous definable banks. These drainages are usually gullies and will need to be included in the gully assessment procedure.

Gullies are defined in the Forest Practices Code by channel dimensions. A gully channel has:

- greater than 25% overall stream gradient from the fan apex to the top of the headwall; and,
- from the fan apex to the top of the headwall, at least one stream reach greater than 100 m long, with
 - ≥ 40 % sidewall slope
 - ≥ 20 % channel gradient
 - ≥ 3 m gully height.

A stream channel must have both of these attributes to be defined as a gully. The majority of field observations were of transport zones which is often a confined, V-notch ravine. The sediment transported from gullies can have detrimental effects on fish habitat in downstream channels. Gully management goals should maintain channel stability and the natural rates of erosion and transport of sediment and debris.

7.0 REFERENCES

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- Province of British Columbia. 1995c. Gully Assessment Procedure Guidebook, April 1995.
- Province of British Columbia. 1995d. Resource Inventory Committee (RIC): BC Standards, Specifications and Guidelines for Resource Surveys Using Global Positioning Systems (GPS) Technology.
- Province of British Columbia. 1993. Resource Inventory Committee (RIC): Field Key to the Freshwater Fishes of British Columbia.

Table 1

Summary of the Forest Practices Code riparian classifications for streams.

Riparian Class	Fish Presence	Stream Width
S1	fish present and/or stream gradient <20%	>20 m
S2	fish present and/or stream gradient <20%	5 - 20 m
S3	fish present and/or stream gradient <20%	1.5 - 5 m
S4	fish present and/or stream gradient <20%	<1.5 m
S5	fish not present and/or stream gradient >20%	>3 m
S6	fish not present and/or stream gradient >20%	<3 m

Table 2. Water Quality Data for the Kispiox Fish Habitat Inventory (values in italics are questionable).

Watershed Code	Stream Name "Local"	Site Number	pH	Temperature (°C)	Turbidity (cm)	Conductivity (umhos/cm)
4006362556000000000000	Trib. to Tommy Jack Cr.	A23	8.1	6.0	48	90
4006362556000000000000	Trib. to Tommy Jack Cr.	A24	8.3	7.0	27	140
4006362556000000000000	Trib. to Tommy Jack Cr.	A25	8.2	8.0	26	120
4006362556000000000000	Trib. to Tommy Jack Cr.	A26	8.2	7.0	22	140
4006362556000000000000	Trib. to Tommy Jack Cr.	A27	7.7	6.0	37	90
4006362556000000000000	Trib. to Tommy Jack Cr.	A28	8.0	6.0	15	110
4006362556000000000000	Trib. to Tommy Jack Cr.	A30	8.0	6.0	14	100
4006362556000000000000	Trib. to Tommy Jack Cr.	B40	8.0	7.0	60	
4006362556000000000000	Trib. to Tommy Jack Cr.	B39	7.6	7.0	120	
4006362556000000000000	Tommy Jack Cr.	B38	8.3	7.0	36	
4800278000000000000000	Trib. to Shedin Cr.	B21	7.7	9.0	17	20
4800278000000000000000	Shedin Cr.	B20	8.2	9.0	40	40
4800278000000000000000	Trib. to Shedin Cr.	B28	7.6	9.0	34	30
4800278000000000000000	Trib. to Shedin Cr.	B27	7.6	8.0	22	30
4800278000000000000000	Trib. to Shedin Cr.	B23	8.4	8.5	42	60
4800278000000000000000	Trib. to Shedin Cr.	B32		9.0	60	
4800278657000000000000	Trib. to Damsumlo L.	B24	6.6	13.0	100	60
4800278657000000000000	Trib. to Damsumlo L.	B25	6.9	10.0	35	20
4800278000000000000000	Trib. to Shedin Cr.	B26	7.1	9.0	35	20
4800278657000000000000	Trib. to Damsumlo L.	B29	8.1	8.5	60	60
4800278000000000000000	Trib. to Shedin Cr.	B30	8.3	8.5	38	80
4800278657000000000000	Trib. to Damsumlo L.	A22	6.9	9.0	53	10
4800278657000000000000	Trib. to Damsumlo L.	A20	7.6	9.0	63	40
4800278657000000000000	Trib. to Damsumlo L.	A21	7.6	9.0	82	40
4800278657000000000000	Trib. to Damsumlo L.	A18	7.8	9.0	64	50
4800278657000000000000	Trib. to Damsumlo L.	A19	8.0	9.0	29	20
4800278000000000000000	Trib. to Shedin Cr.	B31	8.0	8.5	70	40
4800278000000000000000	Trib. to Shedin Cr.	B22	8.2	9.0	50	40
4800278000000000000000	Trib. to Shedin Cr.	B34	8.0	9.0	100	30
4800278000000000000000	Shedin Cr.	B33	8.2	9.0	80	50
4800278000000000000000	Trib. to Shedin Cr.	B35	8.2	7.0	26	40
4800278000000000000000	Shedin Cr.	B36	8.2	6.5	100	40
4800278000000000000000	Trib. to Shedin Cr.	B37	8.3	9.0	70	40
4800278000000000000000	Trib. to Shedin Cr.	B56			40	
4800278000000000000000	Trib. to Shedin Cr.	B55			40	
4800278000000000000000	Trib. to Shedin Cr.	B52	7.1	9.0	80	
4800278000000000000000	Trib. to Shedin Cr.	A32	8.0	6.0	40	70
4800278000000000000000	Trib. to Shedin Cr.	B54			40	
4800278000000000000000	Trib. to Shedin Cr.	B53			80	
4800278000000000000000	Trib. to Shedin Cr.	A40				
4800278000000000000000	Trib. to Shedin Cr.	B50	7.1	9.0	24	
4800278000000000000000	Trib. to Shedin Cr.	B51				
4800278000000000000000	Trib. to Shedin Cr.	A38	8.0	6.0	50	100
4800278000000000000000	Trib. to Shedin Cr.	B49	8.7	7.0	50	
4800278000000000000000	Trib. to Shedin Cr.	A39	8.0	8.0	24	70
4005903000000000000000	Kuldo Cr.	B14	8.6	11.0	100	80
4005903000000000000000	Trib. to Kuldo Cr.	B13	8.6	9.5	70	90
4800129000000000000000	Sam Green Cr.	B45	8.4	7.0	100	
4800129000000000000000	Trib. to Sam Green Cr.	B43	8.1	7.0	80	
4800129000000000000000	Trib. to Sam Green Cr.	B42	8.0	6.5	70	
4800129000000000000000	Trib. to Sam Green Cr.	B41	8.0	6.5	60	
4800129000000000000000	Sam Green Cr.	B44	8.3	6.0	60	
4006366000000000000000	Sheladamus Cr.	A50	8.2	9.0	55	60
4006366000000000000000	Trib. to Sheladamus Cr.	A47	7.4	8.0	12	10
4006366000000000000000	Sheladamus Cr.	A49	8.1	7.0	34	60
4006366000000000000000	Trib. to Sheladamus Cr.	A48	7.8		28	40
4006366000000000000000	Sheladamus Cr.	B67	7.1	7.0	40	
4006360000000000000000	Guish Cr.	B60	7.1	7.5	40	
4006360000000000000000	Guish Cr.	B61	7.1	7.0	40	

Table 2. Water Quality Data for the Kispiox Fish Habitat Inventory (values in italics are questionable).

Watershed Code	Stream Name "Local"	Site Number	pH	Temperature (°C)	Turbidity (cm)	Conductivity (umhos/cm)
4006294000000000000000	Willowflat Cr.	B65	7.1	9.0	80	60
4006294000000000000000	Willowflat Cr.	B64	7.6	9.0	60	
4000000000000000000000	Trib. to Skeena R.	B46	8.7	9.0	40	
4800278000000000000000	Trib to Shedn Cr.	B48			30	
4000000000000000000000	Trib. to Skeena R.	A41	8.4	8.0	23	270
4000000000000000000000	Trib. to Skeena R.	B58	8.9	8.0	29	
4000000000000000000000	Trib. to Skeena R.	B59	8.4	8.5	47	
4000000000000000000000	Trib. to Skeena R.	A45	8.2	8.0	26	140
4000000000000000000000	Trib. to Skeena R.	A44	8.3	7.0	20	220
4000000000000000000000	Trib. to Skeena R.	A43	7.4	4.0	60	250
4000000000000000000000	Trib. to Skeena R.	A42	7.2	5.0	34	70
4000000000000000000000	Trib. to Skeena R.	A46	8.1	8.0	21	140
4000000000000000000000	Trib. to Skeena R.	B15	8.4	9.0	20	160
4000000000000000000000	Trib. to Skeena R.	B16	9.3	7.0	18	220
4000000000000000000000	Trib. to Skeena R.	B19	8.6	9.0	10	210
4000000000000000000000	Trib. to Skeena R.	B18	8.3	10.0	15	50
4000000000000000000000	Trib. to Skeena R.	B17	7.9	10.0	16	50
4000000000000000000000	Swift Cr.	A17	8.1	9.0	53	100
4000000000000000000000	Trib. to Skeena R.	A15	8.2	7.0	16	190
4000000000000000000000	Trib. to Skeena R.	A14	8.0	9.0	34	150
4000000000000000000000	Trib. to Skeena R.	A12	8.2	9.0	26	120
4000000000000000000000	Trib. to Skeena R.	A11	8.2	12.0	22	70
4000000000000000000000	Trib. to Skeena R.	B12	8.4	9.0	30	80
4000000000000000000000	Nancy Cr.	B11	8.3	9.0	60	80
4000000000000000000000	Nancy Cr.	B10	8.5	10.0	52	70
4000000000000000000000	Trib. to Skeena R.	B2		8.0	82	
4000000000000000000000	Trib. to Skeena R.	B4		9.5	74	
4000000000000000000000	Trib. to Skeena R.	B3		9.0	20	
4000000000000000000000	Trib. to Skeena R.	B1		8.0	66	
4000000000000000000000	Trib. to Skeena R.	A9	8.3	8.0	150	40
4000000000000000000000	Trib. to Skeena R.	A3		8.0	20	
4000000000000000000000	Trib. to Skeena R.	A2		9.0	26	
4000000000000000000000	Trib. to Skeena	A1		8.0	48	
4000000000000000000000	Trib. to Skeena R.	A4		8.0	18	
4000000000000000000000	Trib. to Skeena R.	A5		9.0	26	
4000000000000000000000	Trib. to Skeena R.	A6	8.2	9.0	37	40
4000000000000000000000	Trib to Skeena R.	A8	7.7	9.0	200	
4000000000000000000000	Trib. to Skeena R.	A7	7.6	10.0	45	
4000000000000000000000	Trib. to Skeena R.	A10	8.0	9.0	29	50
4000000000000000000000	Trib. to Skeena R.	B6	8.1	9.0	100	40
4000000000000000000000	Trib. to Skeena R.	B5		9.0	100	
4000000000000000000000	Trib. to Skeena R.	B9	8.2	10.0	22	
4000000000000000000000	Trib. to Skeena R.	B8	8.5	10.0	70	60
4000000000000000000000	Trib. to Skeena R.	B7	8.2	9.0	70	50
4000000000000000000000	Trib. to Skeena R.	B66	7.6	8.0	80	
4000000000000000000000	Trib. to Skeena R.	B63	7.6	8.0	55	
4000000000000000000000	Trib. to Skeena R.	B62	6.6	12.0	40	
4000000000000000000000	Trib. to Skeena R.	A51	7.8	7.0		80

Table 3. Summary of sampling sites for the Kispiox Fish Habitat Inventory.

Watershed Code	Stream Name "Local"	Site Number	Average Channel	Gradient (%)	Stream Classification	Fish Species	Sampling Method
400636600000000000	Trib. to Sheladamus	A48	4.5	39	S5	NF	EL
400636600000000000	Sheladamus Cr.	B67	8.5	2	S5	NF	EL
400636000000000000	Guish Cr.	B60	4.9	8	S3	DV,RB	EL
400636000000000000	Guish Cr.	B61	6.6	9	S5	NF	EL
400629400000000000	Willowflat Cr.	B65	12.3	5	S2	DV,RB	EL
400629400000000000	Willowflat Cr.	B64	15.7	5	S5	NF	EL
400000000000000000	Trib. to Skeena R.	B46	4.1	22	S3	RB	EL
400000000000000000	Trib. to Skeena R.	B47	3.0	10	S3	(RB)	VO
400000000000000000	Trib. to Skeena R.	A41	3.1	13	S3	RB	EL
400000000000000000	Trib. to Skeena R.	B58	2.0	30	S6	NF	EL
400000000000000000	Trib. to Skeena R.	B59	3.8	17	S3	DV,RB	EL
400000000000000000	Trib. to Skeena R.	A45	3.4	26	S3	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A44	8.3	9	S2	RB,DV	EL
400000000000000000	Trib. to Skeena R.	A43	8.3	22	S2	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A42	1.3	4	S4	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A46	5.0	11	S2	RB,DV	EL
400000000000000000	Trib. to Skeena R.	B15	2.2	24	S3	DV,RB	EL
400000000000000000	Trib. to Skeena R.	B16	1.5	20	S6	NF	EL
400000000000000000	Trib. to Skeena R.	B19	2.0	15	S3	(RB)	EL
400000000000000000	Trib. to Skeena R.	B18	2.7	22	S3	LKC	MT
400000000000000000	Trib. to Skeena R.	B17	1.1	2	S4	LKC	EL
400000000000000000	Trib. to Skeena R.	A16	1.5	75	S6	NF	VO
400000000000000000	Swift Cr.	A17	3.9	22	S5	NF	EL
400000000000000000	Trib. to Skeena R.	A15	1.9	22	S6	NF	EL
400000000000000000	Trib. to Skeena R.	A14	2.1	3	S3	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A13	NA	1	NC	NF	NA
400000000000000000	Trib. to Skeena R.	A12	3.7	26	S3	CT,DV,RB	EL
400000000000000000	Trib. to Skeena R.	A11	1.6	5	S3	(DV, RB)	EL
400000000000000000	Trib. to Skeena R.	B12	3.8	25	S3	DV	EL
400000000000000000	Nancy Cr.	B11	7.0	25	S2	DV, RB	EL
400000000000000000	Nancy Cr.	B10	6.2	17	S2	DV, (ST)	EL
400000000000000000	Trib. to Skeena R.	B2	6.0	12	S5	NF	EL
400000000000000000	Trib. to Skeena R.	B4	6.5	8	S2	CH,DV,PK	EL
400000000000000000	Trib. to Skeena R.	B3	3.2	3	S5	NF	EL
400000000000000000	Trib. to Skeena R.	B1	5.4	5	S5	NF	EL
400000000000000000	Trib. to Skeena R.	A9	6.2	10	S2	SA	VO
400000000000000000	Trib. to Skeena R.	A3	0.5	23	S6	NF	VO
400000000000000000	Trib. to Skeena R.	A2	1.3	23	S6	NF	EL
400000000000000000	Trib. to Skeena R.	A1	6.0	4	S2	(DV)	EL
400000000000000000	Trib. to Skeena R.	A4	0.6	18	S6	NF	EL
400000000000000000	Trib. to Skeena R.	A5	2.5	6	S3	(DV)	EL
400000000000000000	Trib. to Skeena R.	A6	2.6	9	S3	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A8	2.4	1	S3	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A7	4.2	4	S3	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	A10	2.9	40	S6	NF	EL
400000000000000000	Trib. to Skeena R.	B6	3.8	10	S3	DV,RB	EL
400000000000000000	Trib. to Skeena R.	B5	3.4	3	S5	NF	EL
400000000000000000	Trib. to Skeena R.	B9	4.1	3	S3	(RB)	VO
400000000000000000	Trib. to Skeena R.	B8	12.1	4	S2	RB	EL
400000000000000000	Trib. to Skeena R.	B7	14.8	5	S2	(DV,RB)	EL
400000000000000000	Trib. to Skeena R.	B66	3.1	3	S3	(DV,RB)	VO
400000000000000000	Trib. to Skeena R.	B63	2.9	3	S6	NF	VO
400000000000000000	Trib. to Skeena R.	B62	1.4	2	S6	NF	EL
400000000000000000	Trib. to Skeena R.	A51	0.9	6	S6	NF	VO

Table 3. Summary of sampling sites for the Kispiox Fish Habitat Inventory.

Watershed Code	Stream Name "Local"	Site Number	Average Channel	Gradient (%)	Stream Classification	Fish Species	Sampling Method
40063625560000000	Trib. to Tommy Jack	A23	4.4	10	S3	DV	VO
40063625560000000	Trib. to Tommy Jack	A24	1.3	22	S4	DV	VO
40063625560000000	Trib. to Tommy Jack	A25	1.4	11	S3	DV	EL
40063625560000000	Trib. to Tommy Jack	A26	1.9	5	S3	DV, RB	EL
40063625560000000	Trib. to Tommy Jack	A31	NA	0	NC	NF	VO
40063625560000000	Trib. to Tommy Jack	A27	3.6	9	S3	DV, RB	EL
40063625560000000	Trib. to Tommy Jack	A28	1.3	11	S6	NF	EL
40063625560000000	Trib. to Tommy Jack	A29	NA	2	NC	NF	NA
40063625560000000	Trib. to Tommy Jack	A30	0.9	7	S4	(DV, RB)	EL
40063625560000000	Trib. to Tommy Jack	B40	10.2	12	S2	(DV, RB)	EL
40063625560000000	Trib. to Tommy Jack	B39	4.6	12	S5	NF	EL
40063625560000000	Tommy Jack Cr.	B38	3.8	5	S5	NF	EL
48002780000000000	Trib. to Shedin Cr.	B21	1.5	22	S6	NF	EL
48002780000000000	Shedin Cr.	B20	23.1	5	S1	(RB)	EL
48002780000000000	Trib. to Shedin Cr.	B28	1.0	1	S4	(RB)	EL
48002780000000000	Trib. to Shedin Cr.	B27	1.1	8	S4	(DV)	EL
48002780000000000	Trib. to Shedin Cr.	B23	2.8	7	S3	(RB)	EL
48002780000000000	Trib. to Shedin Cr.	B32	4.3	5	S5	NF	EL
48002786570000000	Trib. to Damsumlo L.	B24	2.5	1	S3	(RB)	EL
48002786570000000	Trib. to Damsumlo L.	B25	1.5	4	S3	(RB)	EL
48002780000000000	Trib. to Shedin Cr.	B26	0.9	4	S4	(DV, RB)	EL
48002786570000000	Trib. to Damsumlo L.	B29	2.4	2	S3	(DV, RB)	EL
48002780000000000	Trib. to Shedin Cr.	B30	2.0	6	S3	(DV, RB)	EL
48002786570000000	Trib. to Damsumlo L.	A22	2.0	7	S3	(RB)	EL
48002786570000000	Trib. to Damsumlo L.	A20	3.4	3	S3	(RB)	EL
48002786570000000	Trib. to Damsumlo L.	A21	4.9	2	S2	(DV, RB)	EL
48002786570000000	Trib. to Damsumlo L.	A18	4.2	2	S3	(RB)	EL
48002786570000000	Trib. to Damsumlo L.	A19	6.5	1	S2	(RB)	EL
48002780000000000	Trib. to Shedin Cr.	B31	3.9	2	S5	NF	EL
48002780000000000	Trib. to Shedin Cr.	B22	10.3	5	S5	NF	EL
48002780000000000	Trib. to Shedin Cr.	B34	2.6	4	S6	NF	EL
48002780000000000	Shedin Cr.	B33	14.5	2	S5	NF	EL
48002780000000000	Trib. to Shedin Cr.	B35	1.8	5	S6	NF	EL
48002780000000000	Shedin Cr.	B36	9.0	7	S5	NF	EL
48002780000000000	Trib. to Shedin Cr.	B37	1.5	4	S6	NF	EL
48002780000000000	Trib. to Shedin Cr.	B49	6.3	18	S2	DV	EL
48002780000000000	Trib. to Shedin Cr.	B57	5.0	15	S3	(DV, RB)	VO
48002780000000000	Trib. to Shedin Cr.	B56	5.0	33	S3	(DV, RB)	VO
48002780000000000	Trib. to Shedin Cr.	B55	5.0	30	S3	(DV, RB)	VO
48002780000000000	Trib. to Shedin Cr.	B52	4.0	15	S3	(DV)	VO
48002780000000000	Trib. to Shedin Cr.	A32	18.7	4	S2	DV	EL
48002780000000000	Trib. to Shedin Cr.	B54	5.0	18	S2	(DV, RB)	VO
48002780000000000	Trib. to Shedin Cr.	B53	5.0	12	S3	(DV, RB)	VO
48002780000000000	Trib. to Shedin Cr.	A40	3.0	10	S3	(DV, RB)	VO
48002780000000000	Trib. to Shedin Cr.	B50	2.8	2	S3	DV	EL
48002780000000000	Trib. to Shedin Cr.	B51	3.0	1	S5	NF	NA
48002780000000000	Trib. to Shedin Cr.	A38	11.5	3	S2	DV	EL
48002780000000000	Trib. to Shedin Cr.	A36	10.0	7	S5	NF	VO
48002780000000000	Trib. to Shedin Cr.	A37	7.0	13	S5	NF	VO
48002780000000000	Trib. to Shedin Cr.	A34	2.0	60	S6	NF	VO
48002780000000000	Trib. to Shedin Cr.	A35	2.0	60	S6	NF	VO
48002780000000000	Trib. to Shedin Cr.	A33	5.0	60	S5	NF	VO
48002780000000000	Trib. to Shedin Cr.	B48	21.2	8	S1	(DV)	EL
48002780000000000	Trib. to Shedin Cr.	A39	1.9	4	S3	DV	EL
40059030000000000	Kuldo Cr.	B14	50.0	2	S1	CH, DV	EL
40059030000000000	Trib. to Kuldo Cr.	B13	6.3	10	S5	NF	EL
48001290000000000	Sam Green Cr.	B45	25.3	8	S1	DV	EL
48001290000000000	Trib. to Sam Green Cr.	B43	8.7	14	S5	NF	EL
48001290000000000	Trib. to Sam Green Cr.	B42	5.5	18	S5	NF	EL
48001290000000000	Trib. to Sam Green Cr.	B41	2.1	12	S6	NF	EL
48001290000000000	Sam Green Cr.	B44	10.2	8	S5	NF	EL
40063660000000000	Sheladamus Cr.	A50	13.2	4	S2	MW, SA	EL
40063660000000000	Trib. to Sheladamus	A47	1.1	42	S6	NF	VO
40063660000000000	Sheladamus Cr.	A49	11.7	3	S5	NF	EL

Table 4. Summary of S5 and S6 sites for the Kispiox Fish Habitat Inventory.

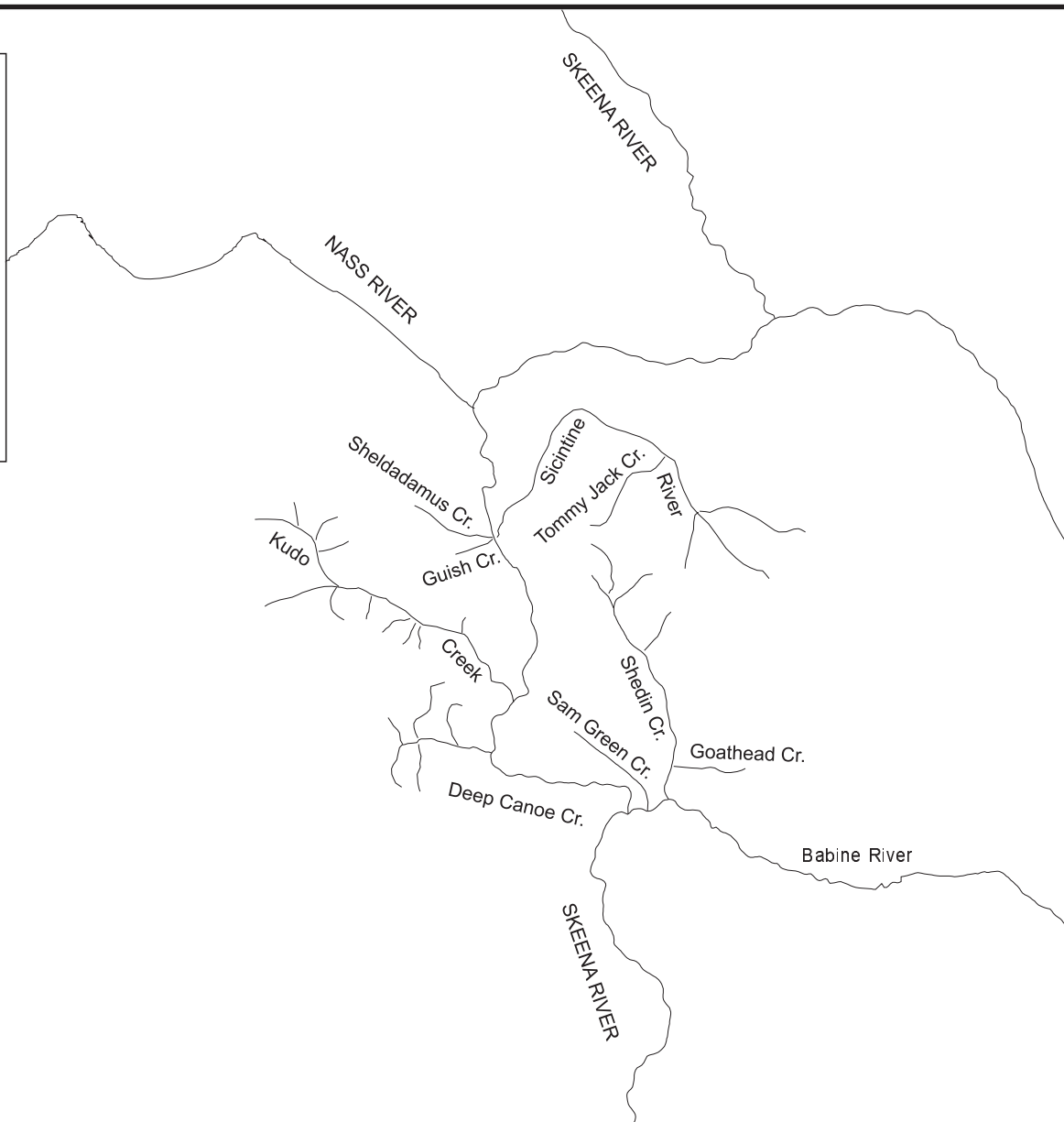
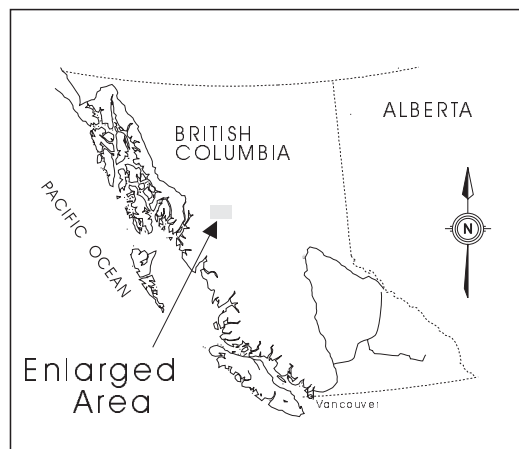
Site Number	Classification	Comment
A28	S6	Some very nice rearing habitat, with a lot of LOD cover, was observed at this site. However, the falls at the mouth of this stream appear to prevent fish access upstream, resulting in the S6 classification.
B39	S5	The 10 meter falls located downstream of the sampling area and the lack of overwintering habitat make the presence of fish at this site unlikely. As a result this reach has been classified as non fish bearing.
B38	S5	This reach has been classified as non fish bearing because of a 4 m cascade (located downstream of the sampling area), which appears to prevent fish passage upstream and a lack of lakes which could support resident populations.
B21	S6	This site has been classified as an S6 because of the steep gradient and lack of suitable fish habitat. The absence of holding pools in particular was noted by the crew.
B32	S5	No fish were caught at this site which is located 1.2 km upstream of the 25m falls and 2.0 km upstream of the 6m falls. As a result this reach has been classified as non fish bearing.
B31	S5	This reach has been classified as non fish bearing because it is located above a 25m and a 6m falls and no evidence of a resident population was found in the electroshocking trial.
B22	S5	No fish were caught in the sampling area, which occurs upstream of an impassable 25 meter falls. As a result this reach has been classified as non fish bearing.
B34	S6	No fish were caught at this site, which is located above the 25 meter falls on Shed in Creek. As a result this stream has been given a non fish bearing classification.
B33	S5	The creek flows from a shallow alpine lake in which fish would be subject to winter kill. The falls below would also prevent fish passage upstream. As a result this section of Shed in Creek has been classified as non fish bearing.
B35	S6	This site could provide rearing habitat and limited spawning habitat. However, there is a lack of overwintering habitat in this stream above the 25 meter falls. As such it is classified as non fish bearing.
B36	S5	Some very nice deep pool cover was observed at this site. However, it is extremely unlikely that this site, which is located above a 25 meter falls, would support a resident population.
B37	S6	Reach 1 has a gradient of 50% and has cascades up to 5 meters in height. Reach 2 has a lower gradient and some pool habitat. It is also connected to a small, shallow lake. The entire area has been classified as non fish bearing as a result.
B51	S5	Suitable fish habitat does not occur in this intermittent channel. As a result a non fish bearing classification was assigned. Future sampling is recommended at high flow.
A36	S5	This stream was classed as non fish bearing. The large falls on this system would prevent fish access from the main creek and it is unlikely that a resident population would reside between the two large falls on this stream.
A37	S5	This stream occurs above a large falls. In addition, the gradient in reach 2 of this stream is far too steep to accommodate fish. As a result this stream has been classified as non fish bearing.
A34	S6	No fish habitat exists at this site. The gradient is too steep to accommodate fish.
A35	S6	This site provides no fish habitat. The gradient is too steep to accommodate fish.
A33	S5	The steep gradient at this site precludes the presence of fish.
B13	S5	The steep gradient and 7 meter falls would prevent fish access into this stream from Kuldo Creek. A resident population is not expected upstream of the barrier system due to the lack of overwintering habitat.
B43	S5	There is a very low probability of the presence of a resident population above the 10 meter falls on this stream and as such this reach has been classified as non fish bearing. An additional 8 and 4 meter cascade was also noted.
B42	S5	The 5 m and 4m falls would prevent fish access upstream. Upstream of the falls lacks overwintering habitat which resulted in a non fish bearing classification.
B41	S6	The 7, 5 and 3m cascades, as well as the lack of overwintering habitat have resulted in this stream being classed as non fish bearing.
B44	S5	There are several falls downstream of the site which bar fish passage upstream. There is also a low probability of a resident fish population. As a result this stream has been classified as non fish bearing. Future sampling is recommended however.
A47	S6	This stream has been classified as an S6 because it does not contain suitable fish habitat and has a steep gradient at the mouth, which would impede fish passage upstream.
A49	S5	Great rearing cover and spawning habitat occurs at this site, located above an impassable 10m falls. No evidence of a resident fish population was found in the electroshocking trial at this site or at B67, hence the non fish bearing classification.
A48	S5	This stream was given a non fish bearing classification because of the steep gradient and lack of suitable fish habitat observed in the sampling area. Water was sheeting over bedrock at the mouth of the stream.
B67	S5	Some good spawning and rearing habitat was observed at this site. However, the 10 meter falls below the sampling area would prevent fish passage into this reach and there is a lack of overwintering habitat.
B61	S5	The series of falls and the low probability of a resident population has resulted in the classification of this reach as non fish bearing. Future sampling is recommended to confirm the absence of fish at this site.
B64	S5	A 10 meter falls was observed 50 meters downstream of the road crossing. No fish were caught at this site, which is located above a 7 meter falls. As such this reach is classified as non fish bearing.
B58	S6	This stream has been classified as non fish bearing because of the steep gradient, lack of overwintering habitat and the presence of falls and cascades near the mouth. An aerial reconnaissance revealed that large sections of blowdown occur in this area.
B16	S6	Fish were not caught at this site which was at high flow at the time of sampling. The steep gradient in this reach would preclude the presence of fish, hence the non fish bearing classification.

Table 4. Summary of S5 and S6 sites for the Kispiox Fish Habitat Inventory.

Site Number	Classification	Comment
A16	S6	The falls at the mouth of this stream are an obstruction to fish passage upstream. As a result the stream was classified as an S6.
A17	S5	The cascades noted at the confluence of this stream with the Skeena River would be significant barriers to fish passage. A large falls was observed at the road crossing at this site.
A15	S6	Some nice step pool habitat was noted at this site, upstream of the road crossing. However, there is a 3 meter cascade 100 meters from the confluence with the Skeena and the series of cascades (some up to 1 meter in height).
B2	S5	This stream has been classified as non fish bearing because of the series of falls and cascades on this creek, which would prevent fish passage upstream.
B3	S5	This stream has been classified as non fish bearing because of the 8 meter falls located downstream of the sampling area.
B1	S5	This reach has been classified as non fish bearing because it is located above an impassable 8 meter falls and it lacks overwintering habitat. Future sampling is recommended to confirm that the reach is non fish bearing.
A3	S6	No fish habitat was observed at this site. This stream is currently running over a moss bed and contains much debris which will likely wash out at higher flow. The lack of suitable habitat has resulted in this stream being classified as an S6.
A2	S6	This tributary is located above a 7m and two, 3m falls on the main tributary and has steep gradient and numerous cascades which would make fish use improbable, hence the non fish bearing classification.
A4	S6	This creek did not appear on the field map and is most likely ephemeral. It does not contain suitable fish habitat and as a result has been classified as an S6.
A10	S6	This stream has been given a non fish bearing classification because the 2 meter high cascade located 45 meters from the mouth and the 40% gradient noted in the sampling area would prevent fish passage upstream.
B5	S5	This reach has been given a non fish bearing classification because the 3m falls located approximately 150m upstream of the confluence with the Skeena River, prevent fish passage upstream.
B62	S6	Poor fish habitat was observed at this site and the steep gradient downstream of the sampling area would prevent fish passage upstream. As a result this reach has been classified as non fish bearing.
A51	S6	This is an ephemeral creek with no suitable fish habitat. The channel is ill defined at the outlet of the small lake to which this stream is attached. Steep gradient and chutes were noted at the mouth

Table 5 Summary of the Riparian Management Area for streams based on riparian class.

Riparian Class	Channel Width (m)	Reserve Zone Width (m)	Management Zone Width (m)	Total RMA Width (m)
S1 Large Rivers	>100	0	100	100
S1	>20	50	20	70
S2	>5 - 20	30	20	50
S3	1.5 - 5	20	20	40
S4	<1.5	0	30	30
S5	> 3	0	30	30
S6	<3	0	20	20



Kispiox Stream Inventory	Not to Scale	Map # 24880001	Created by: HDW 3/31/97 Revised by: Source: BC Rec. Atlas
FIGURE 1. LOCATION OF STREAMS INVENTORIED IN THE KISPIOX WATERSHED		 TRITON Environmental Consultants Ltd.	

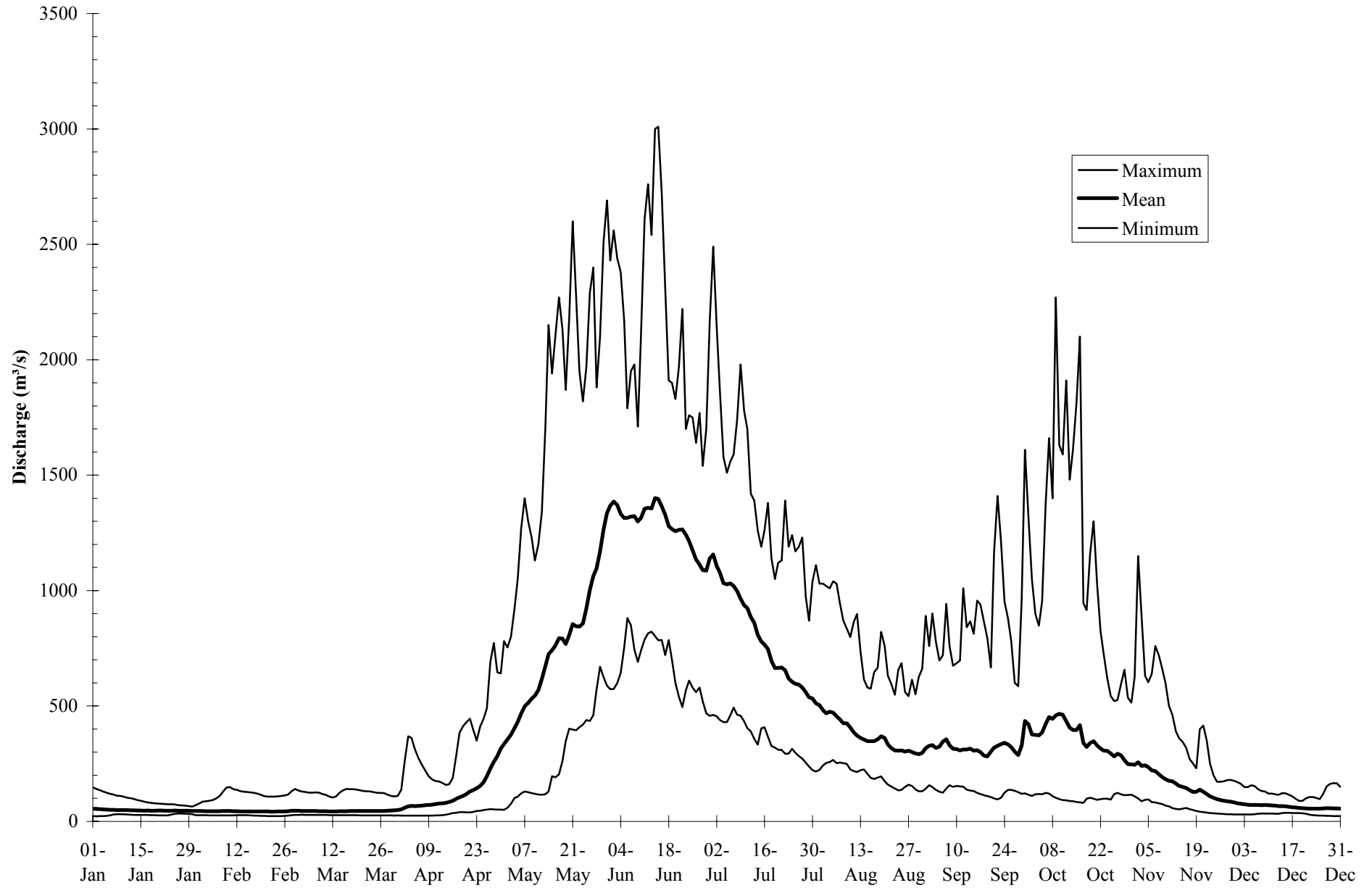
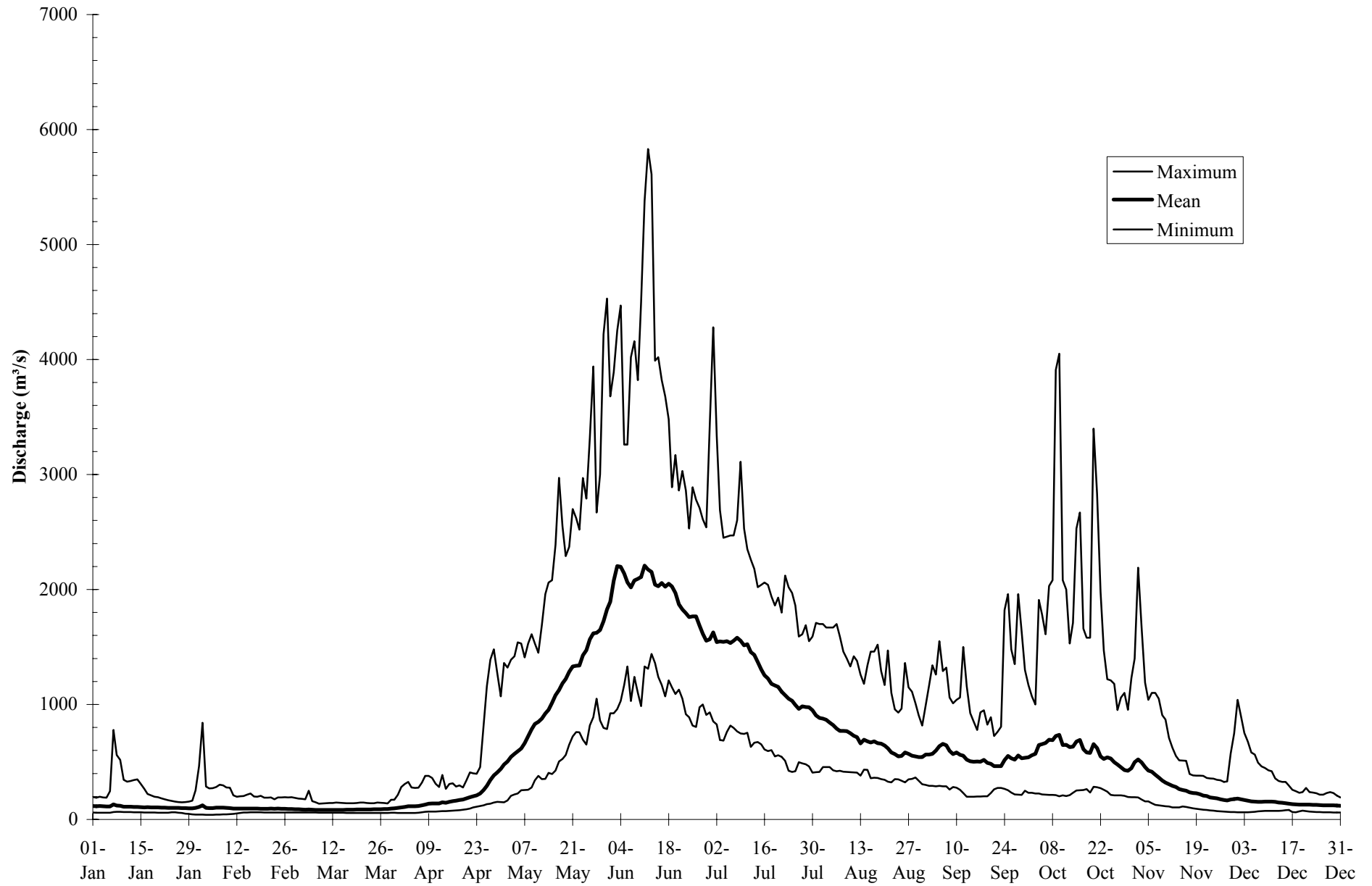
Figure 2. Skeena River above the Babine River, 1970 to 1994

Figure 3. Skeena River at Glen Vowell, 1960 to 1985

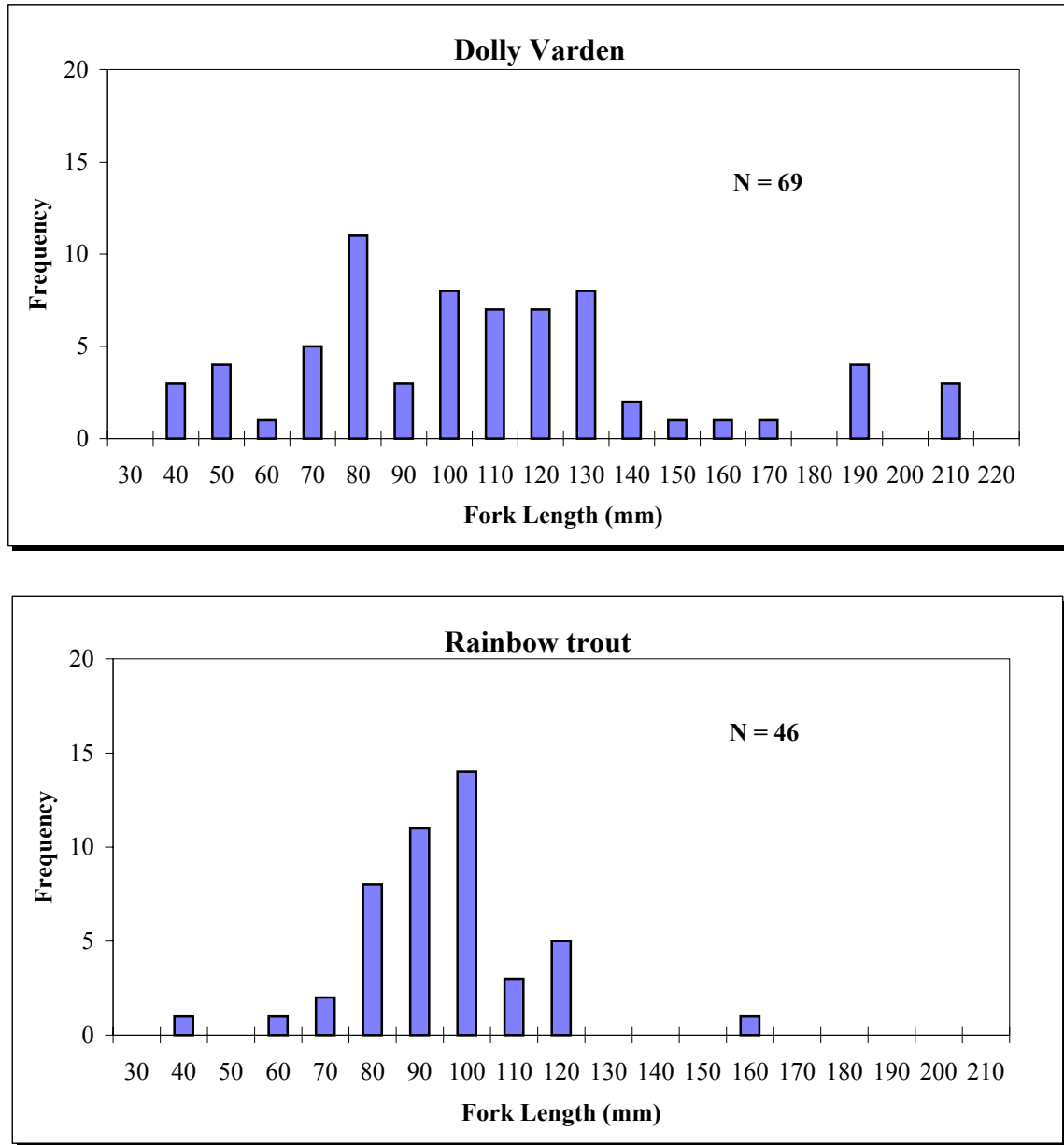


Figure 4. Fork length frequencies of two main salmonid species caught in the Skeena watershed. Data principally from Skeena River, Tommy Jack Creek and Shedin Creek, with some specimens from Willowflat Creek, Guish Creek, Kuldo Creek, Nancy Creek, and Sam Green Creek.

It appears that the Dolly Varden population is made up of at least two, possibly three, age groups, whereas the rainbow trout population is made up of individuals belonging to one age group.

Appendix 1

Photodocumentation

Page 1

[illegible]

Appendix 4

DV - Dolly Varden, RB - Rainbow Trout, CH - Chinook Salmon, MW - Mountain Whitefish, SA - Salmonid, LKC - Lake Chub, PK - Pink Salmon

Location (Watershed)	Creek	Watershed Code	UTM	Site	Water temp °C	Species	Fork Length (mm)
Guish Creek	Guish Creek	400-6360-000	9. 5647. 62111	B60	7.5	DV	130
Guish Creek	Guish Creek	400-6360-000	9. 5647. 62111	B60	7.5	RB	65
Guish Creek	Guish Creek	400-6360-000	9. 5647. 62111	B60	7.5	RB	69
Guish Creek	Guish Creek	400-6360-000	9. 5647. 62111	B60	7.5	RB	80
Guish Creek	Guish Creek	400-6360-000	9. 5647. 62111	B60	7.5	RB	103
Guish Creek	Guish Creek	400-6360-000	9. 5647. 62111	B60	7.5	RB	120
Kuldo Creek	Kuldo Creek	400-5903-000	9. 5642. 61921	B14	11	CH	78
Kuldo Creek	Kuldo Creek	400-5903-000	9. 5642. 61921	B14	11	CH	80
Kuldo Creek	Kuldo Creek	400-5903-000	9. 5642. 61921	B14	11	DV	100
Kuldo Creek	Kuldo Creek	400-5903-000	9. 5642. 61921	B14	11	DV	120
Kuldo Creek	Kuldo Creek	400-5903-000	9. 5642. 61921	B14	11	DV	122
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61992	B10	10	DV	188
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61994	B11	9	RB	79
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61994	B11	9	RB	83
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61994	B11	9	RB	88
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61994	B11	9	RB	88
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61994	B11	9	RB	91
Nancy Creek	Nancy Creek	400-0000-000	9. 5689. 61994	B11	9	RB	96
Sam Green Creek	Sam Green Creek	480-0129-000	9. 5833. 61776	B45	7	DV	96
Sam Green Creek	Sam Green Creek	480-0129-000	9. 5833. 61776	B45	7	DV	128
Sam Green Creek	Sam Green Creek	480-0129-000	9. 5833. 61776	B45	7	DV	183
Sam Green Creek	Sam Green Creek	480-0129-000	9. 5833. 61776	B45	7	DV	210
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	40
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	43
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	45
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	45
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	55
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9.5910. 61834	A38	6	DV	65
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9.5910. 61834	A38	6	DV	65
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	75
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	75
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	85
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9.5910. 61834	A38	6	DV	99
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5910. 61834	A39	8	DV	100

Appendix 4

DV - Dolly Varden, RB - Rainbow Trout, CH - Chinook Salmon, MW - Mountain Whitefish, SA - Salmonid, LKC - Lake Chub, PK - Pink Salmon

Location (Watershed)	Creek	Watershed Code	UTM	Site	Water temp °C	Species	Fork Length (mm)
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5885. 61846	B50	9	DV	35
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5885. 61846	B50	9	DV	50
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61854	A32	6	DV	75
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61854	A32	6	DV	75
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61854	A32	6	DV	75
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5885. 61846	B50	9	DV	77
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	80
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5885. 61846	B50	9	DV	99
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5885. 61846	B50	9	DV	104
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61854	A32	6	DV	105
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	108
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61854	A32	6	DV	132
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	135
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	150
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	188
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	210
Shedin Creek	Unnamed trib to Shedin Creek	480-0278-000	9. 5874. 61782	B49	7	DV	210
Sheladamus Creek	Sheladamus Creek	400-6366-000	9. 5645. 62115	A50	9	(SA)	57
Sheladamus Creek	Sheladamus Creek	400-6366-000	9. 5645. 62115	A50	9	MW	340
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9.5696. 620155	A9	8	(SA)	20
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 62000	B4	9.5	CH	57
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5705. 61964	A12	9	CT	154
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5712. 61778	A44	7	DV	64
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 61899	B15	9	DV	76
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	DV	76
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5712. 61778	A44	7	DV	79
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	DV	100
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	DV	105
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 62000	B4	9.5	DV	105
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5705. 61964	A12	9	DV	110
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	DV	120
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	DV	122
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	DV	155
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5695. 61990	B12	9	DV	188

Appendix 4

DV - Dolly Varden, RB - Rainbow Trout, CH - Chinook Salmon, MW - Mountain Whitefish, SA - Salmonid, LKC - Lake Chub, PK - Pink Salmon

Location (Watershed)	Creek	Watershed Code	UTM	Site	Water temp °C	Species	Fork Length (mm)
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5689. 61929	B18	10	LKC	80
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5689. 61929	B18	10	LKC	120
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 62000	B4	9.5	PK	400
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 62000	B4	9.5	PK	600
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5705. 61964	A12	9	RB	32
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5705. 61964	A12	9	RB	75
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	78
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	RB	79
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	80
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	RB	81
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	RB	81
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	85
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	RB	86
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5678. 62045	B8	10	RB	88
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5788. 61770	B46	9	RB	90
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	90
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 61899	B15	9	RB	92
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	RB	92
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5694. 61899	B15	9	RB	93
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	RB	95
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	RB	96
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	96
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5756. 61796	A41	8	RB	97
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	97
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5705. 61964	A12	9	RB	98
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5698. 61778	A46	8	RB	99
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	100
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5705. 61964	A12	9	RB	105
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	108
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	113
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5729. 61769	B59	8.5	RB	118
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	120
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5685. 62032	B6	9	RB	120
Skeena River	Unnamed trib to the Skeena River	400-0000-000	9. 5712. 61778	A44	7	RB	153

Appendix 4

DV - Dolly Varden, RB - Rainbow Trout, CH - Chinook Salmon, MW - Mountain Whitefish, SA - Salmonid, LKC - Lake Chub, PK - Pink Salmon

Location (Watershed)	Creek	Watershed Code	UTM	Site	Water temp °C	Species	Fork Length (mm)
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9.5805. 62168	A24	7	(DV)	120
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9.5808. 62177	A23	6	(DV)	130
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	40
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	64
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	70
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	75
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	89
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5805. 62162	A26	7	DV	90
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 580 . 62168	A25	8	DV	92
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 580 . 62168	A25	8	DV	100
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	110
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 580 . 62168	A25	8	DV	114
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 580 . 62168	A25	8	DV	118
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	118
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	120
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	121
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	124
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	124
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	DV	124
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5802. 62149	A27	6	RB	80
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5805. 62162	A26	7	RB	90
Tommy Jack Creek	Unnamed trib to Tommy Jack Creek	400-6362-556	9. 5805. 62162	A26	7	RB	100
Willowflat Creek	Willowflat Creek	400-6294-000	9. 5661. 62075	B65	9	DV	120
Willowflat Creek	Willowflat Creek	400-6294-000	9. 5661. 62075	B65	9	DV	170
Willowflat Creek	Willowflat Creek	400-6294-000	9. 5661. 62075	B65	9	RB	60
Willowflat Creek	Willowflat Creek	400-6294-000	9. 5661. 62075	B65	9	RB	80