Aquatic Stream Inventory:
Operational Stream Inventory
in the Tanglechain IRM Unit

1996

CP 416-12, CP 416-13, CP 416-16, CP 416-24, CP 416-26
CP 416-28, CP 416-71, CP 435-1, CP 435-2 and CP 453-1

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Acknowledgments

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1.0 INTRODUCTION

Background

The inventory of fish and fish habitat distribution is one of the objectives of the Forest Renewal Program. A basic knowledge of fish distribution is needed to accommodate requirements for stream classification and the protection of aquatic habitat and fisheries resources under the Forest Practices Code (FPC). The inventory of fisheries resources in watersheds is a labor intensive, long term project. However, there is a need for information on aquatic resources in sub-watersheds containing proposed development to meet current operational needs for licencees and to identify the upper limits of fish distribution. In coordination with B.C. Environment, Houston Forest Products (HFP) has identified operational areas in the Tanglechain Integrated Resource Management Area (IRM) for inventory in 1996. SKR Consultants Ltd. (SKR) was retained to conduct operational level inventory of fish and fish habitat in identified sub-watersheds of the Tanglechain IRM. Inventory of the remainder of the overall watershed will be completed at a later date and under a separate contract.

Objectives

The overall purpose of this project was to conduct fisheries inventory (to Resource Inventory Committee (RIC) standards) in operational areas identified by HFP in the Tanglechain IRM. The objectives of this project were:

- to conduct a literature review of inventory activities previously conducted in the area;
- to conduct stream inventory (to RIC standards) and to recommend stream classification in accordance with guidelines in the Fish-stream Identification guidebook (FPC);
- to produce a summary report, detailing results of literature review and field sampling;
- to give recommendations for protection of fisheries resources identified throughout the project;
- to give recommendations for further sampling, if required.

2.0 STUDY AREA

2.1 Location

The Tanglechain IRM is located in north-central British Columbia (Figure 1), and forms part of the Morice Forest District (Prince Rupert Forest Region). The main drainage in the Tanglechain IRM is the Fulton River, which drains into Babine Lake. The study area for this project focused around proposed harvest locations, with harvest scheduled for 1997 and 1998. Most of the streams surveyed drain into Tanglechain Creek (a major tributary to the Fulton River), the Fulton River or Babine Lake near the Fulton River. These streams are located to the west and north of the village of Granisle.

2.2 Access

All of the stream survey sites were accessed by road and on foot. No helicopter access was required. The area can be accessed from the Granisle Highway (connecting the village of Granisle to Topley), or the Babine Lake Road to 42 km. A road runs along the northern shore of Fulton Lake and joins the Babine Lake Road at 42 km. This road can also be accessed from the Granisle Highway between Topley Landing and the village of Granisle.

2.3 Resource Use

The study area is utilized for Forestry purposes, with active logging being proposed for the next 3 years in the immediate study area. No range use plans or range permits were noted for the study area, and a Land Use Planning Document was not available at the time of writing. The study area has some recreational value, including snow mobiling, a BCFS recreation trail and cross country skiing near the village of Granisle, a BCFS Recreation Site located at the Bear Island View Point Trail (about 6 km north of the village of Granisle), a BCFS Recreation Site located approximately 15 km north of the village of Granisle, and BCFS Recreation Sites at Tanglechain Lake, Doris Lake, and Pine Tree Lake (MOF Morice Forest District Recreation Maps 1994). No Protected Areas Strategy (PAS) sites have been identified in the Tanglechain IRM. The Lake Babine Nation has "claimed" parts of the Tanglechain IRM, but no settlements were in process at the time of writing. There are no mineral tenures, placer stakes or coal licences in the study area, however, a mineral tenure was noted adjacent to the Tanglechain area inventoried. The Mineral Tenure is located on NTS map 93L/16W, Mineral Tenure "Cart 1" (240207 or old # 10006), and is located on the west side of CP 435-1 (Files at Ministry of Energy, Mines and Petroleum Resources, updated Feb. 6, 1996). Guide and outfitter territories in the study area are 608G003 and 608G006. Trapline territories relevant to the study are 608T008 and 608T012.

The B.C. Environment Water Management Branch was contacted to document water licences and water rights for the study area. Several water licences have been recorded for Babine Lake (see Appendix 1), and two water licences exist for the Fulton River (both for Department of Fisheries and Oceans). No community watersheds are located in the study area (Meredith pers.com.).

3.0 METHODS

3.1 Physical

The physical description of each of the three study areas includes water flow and water quality. Flow data available for Water Survey of Canada Stations for the areas inventoried were evaluated. Environment Canada was contacted to obtain precipitation records of the area, if available. The B.C. Environment SEAM database was accessed for water quality information, and water quality data was compared to provincial and federal standards.

Terrain Stability Maps were not available for the Morice Forest District at the time of writing, and terrain stability for the study area is therefore not documented. However, Biogeoclimatic Classification Maps were consulted to document the biogeoclimatic zones represented in the study area.

FPC access management plans were also not available at the time of writing. The Tanglechain IRM is expected to have a number of non-status roads, in addition to status roads indicated on Forest Development Plans, due to it's proximity to towns, and due to the long term use of these areas. A level 1 assessment for the FPC access management plan in the Tanglechain IRM is scheduled for the summer of 1997. Land Use Planning Documents were also not available for the Tanglechain IRM.

3.2 Biological

Literature Review

All pertinent literature on the streams inventoried in this project were collected and summarized. Existing data pertaining to stream classification in the Fisheries Information Summary System (FISS), and rivers and lakes files at the B.C. Environment Office (Skeena Region) were summarized and mapped. The information of concern pertained primarily to fish distribution. Existing watershed codes were assigned to streams. For streams where no watershed codes exist, codes were generated following guidelines in "A guide to the hierarchical watershed coding system for British Columbia". UTMs at the

mouth of each stream were determined from the watershed code dictionary or from 1:50,000 or 1:20,000 maps. Stream order was determined from 1:50,000 NTS map sheets.

Reach break identification

Reach breaks were tentatively identified and mapped by examining 1:50,000 NTS map sheets, and air photographs (approx. 1:16,000). The identification of reach breaks followed RIC standards. Reach breaks were confirmed in the field, when feasible. Reaches are numbered from the mouth of the stream in ascending order. Where the number of reaches from the mouth was not determined, reaches were identified alphabetically in ascending order up the stream.

Stream assessment

All sites were accessible by road and on foot. No helicopter access was required. Sections of streams in areas of development identified by HFP, with no previous indication of fish presence, were walked and reach breaks were verified. In addition, lower reaches of some systems were assessed to determine the extent of fish distribution in relevant areas. This information was required to allow interpretation of potential downstream impacts on fish habitat. At representative sites, the following stream characteristics were measured: channel width, wetted width, pool depth, riffle depth (or bankful depth for dry streams), pool:riffle ratio, gradient (suunto clinometer), temperature (ambient and water), pH (Oaktron pH.Tstr2, pHep 3), substrate composition (including D_{90}), aspect, channel:valley ratio, bank stability, bank material, and cover. Conductivity was recorded with a hand held Hanna HI 9033 conductivity meter for all sites in which electroshocking was conducted. All data were collected on MOE/DFO stream survey cards, following RIC standards. Fish presence was ascertained by electroshocking with a Smith-Root Model 15C backpack electroshocker. An area of approximately 100 m^2 was sampled by electroshocking, and fish captured were identified to species, measured (fork length) and released. Potential or known barriers to fish migration, sensitive sites, and critical fish habitat were identified and mapped, when possible. A photographic record was taken for sample locations, barrier, and other points of interest.

Map production

All sections of streams examined were digitized using a Kurta XGT digitizer. Maps were produced in Corel Draw version 5.0. The following is indicated on all maps: watershed codes, reach breaks and reach number, sample sites, stream classification, and fish distribution. The location of each stream classification map has been indicated on a reference map sheet (see Appendix 6). Codes for fish species present follow those outlined in FISS, and are indicated on applicable maps.

4.0 RESULTS AND DISCUSSION

This section details stream survey results, recommended classifications and recommendations. Completed stream survey cards and sample site photographs are located in Appendices 3-5. Stream classification maps with study sites identified are included in respective sections. A reference map of the area is located Appendix 6 to display general location of work areas.

The streams and the tributaries inventoried in this project are described to the reach level. The mainstems are described, followed by a description of each of the reaches inventoried. Stream classification, as determined following FPC fish-stream identification guidelines, are recommended. Where appropriate, wetland and lake classification have been tentatively assigned. The minimum riparian reserve and management zones are given for each reach. These have been determined from the FPC riparian management guidebook. Recommended riparian reserve and management zones are also given. The recommended riparian reserve and management zones are either equal to or greater than the minimum riparian reserve and management zones. A larger recommended riparian reserve and/or management zone indicates a concern for potential downstream or immediate impacts on fish habitat, and are explained in the comments presented for each reach. Comments also include a brief description of the fish habitat present, and any fish captured at the reach. Tributaries surveyed are described in a fashion similar to the mainstem. Notes related to fish age, growth and biology, rare and endangered species observations, and wildlife observations are summarized following the reach descriptions, where appropriate. Requirements for follow up sampling are given in the comments pertinent to each reach described, and are reiterated in the recommendations section.

Only fisheries values are taken into consideration in identifying minimum and recommended riparian reserve and management zones. Other values (e.g. wildlife) were not evaluated in this study, and are thus not reflected in the recommendations and results.

4.1 Babine Lake Inlet Stream (CP 453-1)

Watershed code: 480-02
Date surveyed: Sept. 17, 1996

One small, first order tributary system to Babine Lake was inventoried for this project. This small stream enters the west shore of Babine lake at a point located approximately 6 km north of the village of Granisle. Very little specific information was available for this system at the time of survey. A cursory summary of known fisheries information for the Babine River is presented in this section to place the new information for the tributary stream examined into context.

Physical Information

Babine Lake is located in the Moist-Cold Subzone of the Sub-Boreal Spruce Biogeoclimatic zone (MoF 1988). The small tributary to Babine Lake inventoried for this project is located in the same biogeoclimatic zone and sub-zone. Terrain Stability maps were not available at the time of writing.

Precipitation data for the study area are available for one nearby stations. Station #6321, located near Chapman Lake (54^{o} 54': 127^{o} 42') is operated by the Ministry of Forests Fire Protection Branch. Precipitation data has been collected at this station since 1992. No Environment Canada stations were located nearby.

No flow data was available for the small tributary stream to Babine Lake inventoried for this project. Nearby Water Survey of Canada Stations is the Fulton River station at the narrows (WSC08EC005). The data collected for this station from 1960 to 1963 is summarized in section 4.2.

B.C. Environment was contacted to obtain water quality information. However, the current conversion of the SEAM database to the new EMS database presented difficulty in obtaining historical data, as well as current water quality data. B.C. Environment is still in the process of retrieving available information for us. Any information available prior to the completion of the project will be included in the final report.

Biological Information

Babine Lake is a large lake at the headwaters of the Babine River. Chinook (*Oncorhynchus tsawytscha*), coho (*O. kisutch*), cutthroat trout (*O. nerka*), rainbow trout (*O. mykiss*), pink salmon (*O. gorbusha*), mountain whitefish (*Prosopium williamsoni*), lake whitefish (*Coregonus clupeaformis*), largescale sucker (*Catastomus macrocheilus*). northern squawfish (*Ptychocheilus oregonensis*), lake trout (*Salvelinus namyacush*) and sculpins (*Cottus sp.*) are known to utilize Babine Lake (FISS). Two spawning channels were installed on Babine Lake in 1969 (SISS), one on the Fulton River, and one on the Pinkut River, in an effort to enhance sockeye salmon stocks. Annual enumeration of adult salmon at the Department of Fisheries and Oceans Babine River fish weir are being conducted. Enumeration of emigrating sockeye smolts are completed annually in the spring. The number of steelhead spawners (*O. mykiss*) have been estimated at the weir since the spring of 1994. Available escapement data from the Department of Fisheries and Oceans is summarized in Appendix 1. Extensive studies have been conducted to evaluate the effectiveness of the sockeye enhancement projects at Babine Lake. No specific information could be located for the first order tributary to Babine Lake which was inventoried for this project.

Land use Information

The stream inventoried for this project is near proposed harvest in CP 453-1. Aside from forestry tenure, a mining tenure exists for an area to the west of CP 453-1. The Ministry of Energy Mines and Petroleum Resources files (updated Feb. 6, 1996) indicate a Mineral Tenure ("Cart 1" 240207 or old # 10006) located on NTS map 93L16W adjacent to CP 453-1. No other placer stakes or coal licences were recorded for the area of interest.

No water rights information exists for the small tributary to Babine Lake inventoried, however, several water licences were recorded at the B.C. Environment office, Skeena Region. Water licence data for Babine Lake is summarized in Appendix 1. No community watersheds were recorded for the area near the unnamed tributary to Babine Lake described in this report.

No range use plans or permit could be located for the study area at the Ministry of Forests Morice District Office. CP 453-1 is located within the Fulton Lake Range Territory. The streams inventoried near CP 453-1 are within Trapline Territory 608T008. The majority of the area is in Guide Territory 608G003, however, the southern tip of CP 453-1 is within Guide Territoriy 608G006.

4.1.1 Unnamed Creek #1 (CP 453-1)

Watershed Code:	480-6386
UTM (at mouth):	9.6091328.676715
Length surveyed:	360 m
Estimated number of reaches:	not evaluated
Number of reaches examined:	2

This stream is a first order tributary to Babine Lake, and drains into the western shore of Babine Lake (Figure 1) at a point located approximately 6 km north of the village of Granisle. No fisheries information could be located for this stream at the Fisheries Branch, B.C. Environment, Smithers, B.C.. Reaches of this stream and one of it's tributaries near the proposed harvest in CP 453-1 were inventoried. The lower two reaches of the mainstem were assessed to document the presence of fisheries values and evaluate the potential for downstream impacts of harvesting in CP 453-1.

Reach 1

Length of Reach:	2.2 km	Stream Order:	1
Length surveyed:	300 m	Channel Width:	4.03
		Gradient:	6%

Stream Classification: **S3**

Minimum Riparian Reserve/Management Zones:	20/20 m
Recommended Riparian Reserve/Management Zones:	**20/20 m**

This reach was examined at a site located approximately 150 m downstream of the Granisle Road crossing. The culvert at the Granisle Road crossing was identified as a barrier to fish migration, due to a 0.8 m drop on the downstream side of the culvert. Electroshocking for 368 s. downstream of the culvert did not result in the capture of any fish. However, good fish rearing habitat and some potential fish spawning habitat was observed. No natural barriers to fish migration were identified in the section of stream surveyed. The stream should be classified as S3 until a natural barrier and/or the absence of fish can be conclusively established in the spring. It is recommended that re-sampling in the spring be conducted to assess the necessity for replacement of the culvert at the Granisle Road crossing to allow for fish passage to fish habitat upstream of the culvert. Fish passage at the second culvert (on the Fulton Mainline) in reach 2 should also be ascertained.

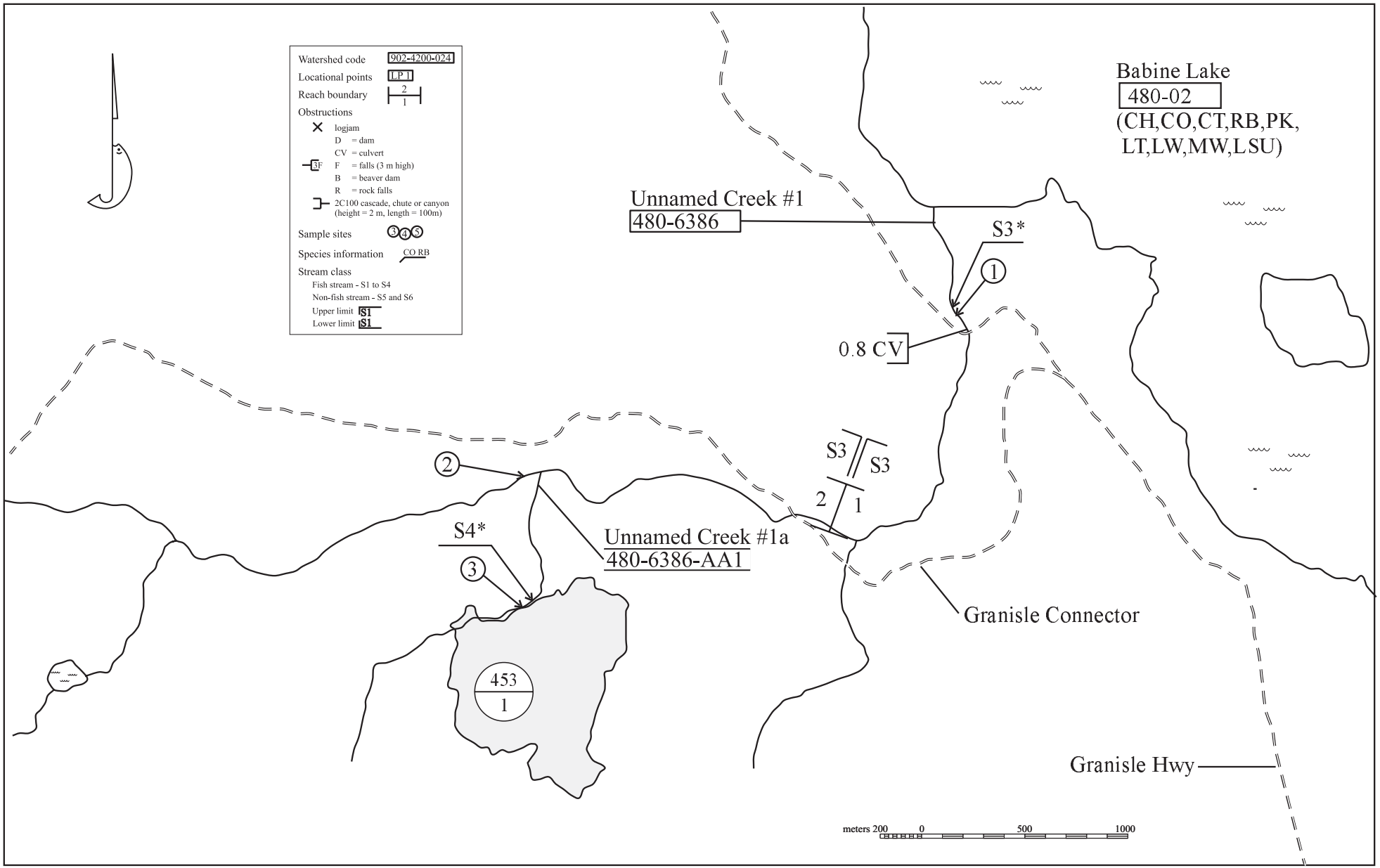

Figure 1. Stream inventory and classification for a Babine Lake inlet stream (480-6386) that is in contact with a planned harvest area in the Tanglechain IRM Unit. For descriptions of tributaries to Babine Lake see section 4.1 (*pages* 8-11).

Reach 2

Length of Reach:	not established	Stream Order:	1
Length surveyed:	60 m	Channel Width:	2.2 m
		Gradient:	1.5%

Stream Classification: **S3**

Minimum Riparian Reserve/Management Zones:	20/20 m
Recommended Riparian Reserve/Management Zones:	**20/20 m**

The second reach of this stream was sampled at a location approximately 50 m upstream of the confluence with an Unnamed tributary stream (480-6386-AA1). The length of this reach was not evaluated. No electroshocking was conducted at this site due to the identification of a barrier to fish migration in reach 1, and the lack of fish captured downstream. This reach had some potential fish rearing and spawning habitat. The reach should be classified as S3 until fish absence below the first road crossing in reach 1 has been established.

4.1.1.1 **Unnamed Creek #1a** (CP 453-1)

Watershed Code:	480-6386-AA1
UTM (at mouth):	9.6088450.673300
Length surveyed:	820 m
Estimated number of reaches:	1
Number of reaches examined:	1

This stream is a small tributary to Unnamed Creek #1 (480-6386), and does not appear on the 1:50,000 NTS map sheet. This stream has not been assigned a watershed code in the watershed code dictionary. The generated watershed code for the system is 480-6386-AA1. Only one reach was identified for this stream from air photo and topographic map interpretation.

Reach 1

Length of Reach:	1.9 km	Stream Order:	1
Length surveyed:	820 m	Channel Width:	1.1 m
		Gradient:	3%

Stream Classification: **S4**

Minimum Riparian Reserve/Management Zones:	0/30 m
Recommended Riparian Reserve/Management Zones:	**0/30 m**

This stream drains through the northwestern portion of block CP 453-1 (Figure 1). One road crossing has been proposed for this reach. Some potential fish spawning habitat and limited fish rearing habitat was identified in this reach. No electroshocking was conducted due to the identification of an unnatural barrier to fish migration on the mainstem downstream of this stream. The stream should be classified as S4 until fish absence downstream of the culvert crossing in reach 1 of the mainstem has been determined.

4.2 Fulton River Tributary (CP 435)

Watershed code: 480-6972
Date surveyed: Sept. 19, 1996

In addition to portions of Tanglechain Creek (see section 4.3), one tributary stream to the Fulton River was also inventoried. This tributary stream drains into the Fulton River approximately 3.3 km downstream of Tanglechain Creek. No physical or biological information could be located for this system. Cursory information for Fulton River and Fulton Lake are summarized below to place the Unnamed tributary surveyed into context.

Physical Information

Fulton Lake, and the tributary to Fulton Lake described in this section fall within the moist-cold subzone of the sub-boreal spruce biogeoclimatic zone (MoF 1988). No terrain stability maps were available for the area at the time of writing.

Precipitation data for the study area are available for one nearby stations. Station #6321, located near Chapman Lake (54° 54': 127° 42') is operated by the Ministry of Forests Fire Protection Branch. Precipitation data has been collected at this station since 1992. No Environment Canada stations were located nearby.

Two Water Survey of Canada (WSC) Stations are located on the Fulton River. WSC station 08EC005 is located at the narrows of Fulton River (Lat. 54°48'25"; Long. 126°18'00"), and WSC 08EC008 is located at the outlet of Chapman Lake (Lat. 54°54'00"; Long. 126°39'00") . Both stations have been discontinued. Data collected for these stations between 1960 and 1963 are summarized in Table 1.

Table 1. Summary of flow regime for Fulton River at narrows (WSC 08EC005) and at the outlet of Chapman Lake (WSC 08EC008) (Water Survey of Canada 1989).

	WSC 08EC005	WSC 08EC008
Coordinates (Lat:Long)	54°48'25"N:126°18'00"W	54°54'00"N:126°39'00"W
Years data recorded	1960-1963	1960-1963
Number of records	31	4
Drainage area	1340 km^2	332 km^2
Mean flow	14.7 m^3/s	not available
estimated daily flow	not available	not available
max. daily discharge	113 m^3/s (May 23, 1961)	not available
min. daily discharge	0.56 m^3/s (May 12, 1961)	not available
max. instantenous discharge	not available	not available

B.C. Environment was contacted to obtain water quality information. However, the current conversion of the SEAM database to the new EMS database presented difficulty in obtaining historical data, as well as current water quality data. B.C. Environment is still in the process of retrieving available information for us. Any information available prior to the completion of the project will be included in the final report.

Biological Information

The presence of chinook (*Oncorhynchus tsawytscha*), coho (*O. kisutch*), cutthroat trout (*O. clarki*), pink salmon (*O. gorbusha*), sockeye (*O. nerka*), rainbow trout (*O. mykiss*), mountain whitefish (*Prosopium williamsoni*), lake whitefish (*Coregonus clupeaformis*), largescale suckers (*Catastomus macrocheilus*), northern squawfish (*Ptychocheilus oregonensis*), lake trout (*Salvelinus namyacush*), and sculpin (*Cottus sp.*) in Fulton River have been documented (FISS). Escapement data for Fulton River, available from the Department of Fisheries and Oceans is summarized in Appendix 1. An 18 m high water fall at the outlet of Fulton Lake has been identified as a barrier to fish migration for anadromous fish.

The watershed inventoried for this project drains into Fulton River upstream of Fulton Lake, and is therefore not accessible to anadromous salmonids. However, fisheries data for Chapman Lake (located along the Fulton River, upstream of Fulton Lake) indicates that burbot (*Lota lota*), cutthroat trout (*Oncorhynchus clarki*), lake trout (*Salvelinus namyacush*) and lake whitefish (*Coregonus clupeaformis*) are found upstream of the barrier. In addition to these species, the presence of rainbow trout (*Oncorhynchus mykiss*), and mountain whitefish (*Prosopium williamsoni*) have been documented in other tributaries to the Fulton River upstream of Fulton Lake (FISS).

Land use Information

The Unnamed tributary to Fulton Lake inventoried for this study is located within the Fulton Lake Range Territory, the 608T012 Trapline Territory, and the 608G006 Guide Territory. Several angling guides have permits for Babine Lake. No current range permits or range use plans were located at the Ministry of Forests Morice District office at the time of writing. In addition, no land use planning documents were available for the area. No records of mineral tenures, placer stakes or coal licences were recorded for the area at the Ministry of Mines and Petroleum Resources. Forestry activities are present in the area, and proposed harvesting in the study area extends to 1998.

Two water licences, both for the Department of Fisheries and Oceans have been granted for Fulton River. Particulars of both of these licences are located in Appendix 1. No community watersheds were located in the area at the time of writing.

4.2.1 Unnamed Creek #2 (CP 435-1 and 435-2)

Watershed Code:	480-6972-296
UTM (at mouth):	9.6082566.657976
Length surveyed:	408 m
Estimated number of reaches:	not determined
Number of reaches examined:	3

This Unnamed Creek drains into the Fulton River just upstream of Fulton Lake (Figure 2). The watershed drained by this tributary is relatively extensive, and lies to the immediate east of the Tanglechain drainage basin. The mainstem of this stream was inventoried to evaluate potential impacts on fish and fish habitat from harvesting in CP 435-1 and CP 435-2.

Reach 1

Length of Reach:	200 m	Stream Order:	2
Length surveyed:	200 m	Channel Width:	2.0 m
		Gradient:	4%

Stream Classification: **S3**

Minimum Riparian Reserve/Management Zones:	20/20 m
Recommended Riparian Reserve/Management Zones:	**20/20 m**

The lower reach of this stream was sampled to establish the presence of downstream fisheries values and fish habitat. The stream was sampled at a site located 25 m downstream of the road crossing of the Fulton Mainline. The creek bed was dry at the time of survey, but some discharge was noted at the culvert. A potential of seasonal use by spawning cutthroat trout (*Oncorhynchus clarki*) or rainbow trout (*Oncorhynchus mykiss*) was noted at the site, and re-sampling in the spring is recommended. The culvert at the road crossing presents an unnatural barrier to fish migration. However, replacement of the culvert should be postponed until spring sampling results have been taken into consideration.

Reach 2

No sample site was established for this reach. The stream has similar stream bed characteristics as found in reach 1, however, the channel is located in a gully with relatively steep side slopes.

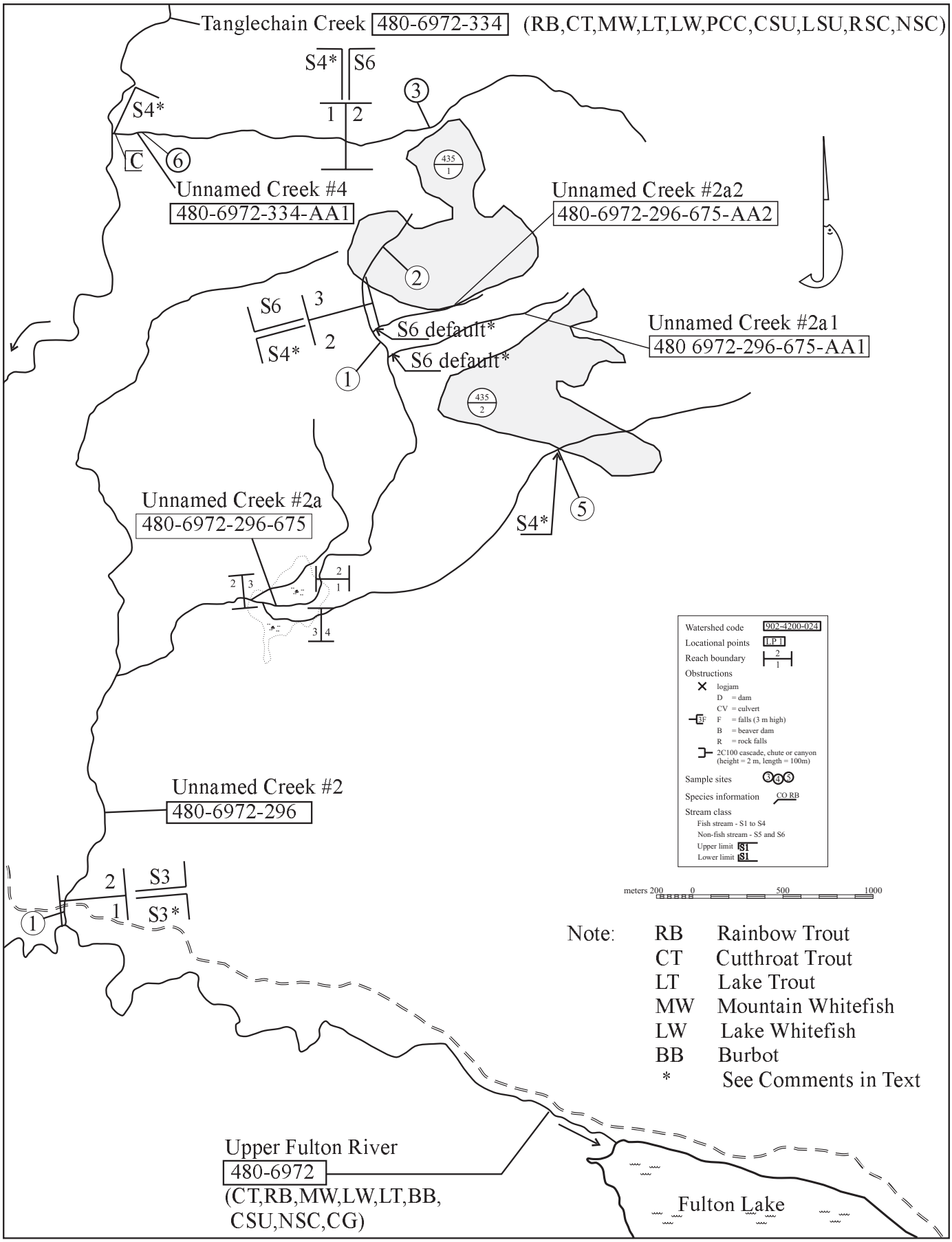

Figure 2. Stream inventory and classification at an unnamed tributary (480-6972-296) to Fulton River and at a small unnamed tributary (480-6972-334-AA1) to Tanglechain Creek which are in contact with planned forest harvest areas in the Tanglechain IRM unit. For descriptions of tributaries to Fulton River see section 4.2.1 (*pages* 14-18) and section 4.3.2 (*pages* 22, 23).

Reach A

Length of Reach:	not evaluated	Stream Order:	1
Length surveyed:	200 m	Channel Width:	1.1 m
		Gradient:	5%

Stream Classification: **S4**

Minimum Riparian Reserve/Management Zones:	0/30 m
Recommended Riparian Reserve/Management Zones:	**0/30 m**

This reach was sampled at site 5 (Figure 2), and is located in the southern half of CP 435-2. No electroshocking was conducted in this reach due to the low water level, and the presence of an unnatural barrier to fish migration located downstream (culvert in reach1). Some fish habitat was observed in this section, however, the culvert in reach 1 prevents seasonal fish access to this habitat. Re-sampling of reach 1 in the spring may allow for a reduction in classification of the entire drainage to S6, or may indicate a necessity for replacement of the road crossing which currently forms a barrier.

4.2.1.1 Unnamed Creek #2a (CP 435-1 and CP 435-2)

Watershed Code:	480-6972-296-675
UTM (at mouth):	9.6084430.658690
Length surveyed:	1165 m
Estimated number of reaches:	3
Number of reaches examined:	2

The confluence of this unnamed stream with 480-6972-296 is located in an extensive wetland (Figure 2). Reach 1 of this stream is located in the wetland, and was not surveyed. Reach 2 drains in a north-south direction, and lies between existing block CP433-1 and proposed block CP 435-1. Reach 3 is the upper reach of this stream, and is located in the western portion of CP 435-1.

Reach 2

Length of Reach:	1700 m	Stream Order:	1
Length surveyed:	1060 m	Channel Width:	1.1 m
		Gradient:	3%

Stream Classification: **S4**

Minimum Riparian Reserve/Management Zones:	0/30 m
Recommended Riparian Reserve/Management Zones:	**0/30 m**

This reach forms the eastern boundary of the harvest block CP 433-1, and runs just west of the western boundary of CP 435-1. Sections of the channel of this stream appeared to be located in areas impacted by previous operations CP 433-1. It could not be determined if the operations in CP 433-1 impacted the stream, or if the stream bed has moved since operations in CP 433-1 have ceased. The reach was dry at the time of survey. Some potential fish habitat was identified, and may be used by fish on a seasonal basis. The potential for downstream impacts is minimal due to the location of the wetland in reach 1. The reach should be classified as fish bearing unless re-sampling in reach 1 at the mainstem (see section 4.2.1) indicates that the entire drainage is not utilized by fish. Re-sampling in this reach is not recommended at this time, since the culvert in reach 1 of the mainstem has been identified as an unnatural barrier to fish migration.

Reach 3

Length of Reach:	640 m	Stream Order:	1
Length surveyed:	200 m	Channel Width:	0.63 m
		Gradient:	5%

Stream Classification: **S6**

Minimum Riparian Reserve/Management Zones:	0/20 m
Recommended Riparian Reserve/Management Zones:	**0/20 m**

This reach was dry at the time of survey, and does not offer any suitable fish habitat. The channel was undefined 100 m downstream of the sample site. This reach can be classified as S6 with limited potential for downstream impacts.

4.2.1.1.1 Unnamed Creek #2a1 (CP 435-1 and CP435-2)

Watershed Code:	480-6972-296-675-AA1
UTM (at mouth):	9.6085920.659450
Length surveyed:	
Estimated number of reaches:	1
Number of reaches examined:	1

Reach 1

Length of Reach:		Stream Order:	1
Length surveyed:		Channel Width:	not defined
		Gradient:	

Stream Classification: **S6 default**

This "stream" drains in a south-western direction between proposed harvest areas CP 435-1 and CP 435-2 (Figure 2). Although the entire section of the mainstem (Unnamed Creek 2a, reach 3) was walked in the area identified to be the confluence of these two creeks, no defined channel could be located. More defined channels further upstream can be classified as S6 due to the lack of fish access and limited potential for downstream impacts. If no defined channel is located during block lay out, the classification can be reduced to "no stream identified".

4.2.1.1.2 Unnamed Creek #2a2 (CP 435-1)

Watershed Code:	480-6972-296-675-AA2
UTM (at mouth):	9.6086090.659350
Length surveyed:	
Estimated number of reaches:	1
Number of reaches examined:	1

Reach 1

Length of Reach:		Stream Order:	1
Length surveyed:		Channel Width:	not defined
		Gradient:	

Stream Classification: **S6 default**

This "stream" drains in a south-western direction along the southern boundary of CP 435-1 (Figure 2). Although the entire section of the mainstem (Unnamed Creek 2a, reach 3) was walked in the area identified to be the confluence of these two creeks, no defined channel could be located. More defined channels further upstream can be classified as S6 due to the lack of fish access and limited potential for downstream impacts. If no defined channel is located during block lay out, the classification can be reduced to "no stream identified".

4.3 Tangelchain Creek Tributaries (CP 435 and CP 416)

Watershed code: 480-6972-334
Date surveyed: Sept. 17 - Sept. 19, 1996

Tanglechain Creek forms a major tributary to Fulton River, and drains into the Fulton River approximately 6.5 km upstream of Fulton Lake. Tanglechain Creek drains a series of small to moderates sized lakes. The four lower lakes are Tanglechain Lake, Doris Lake, Boomerang Lake, and Pine Lake.

Physical Information

The majority of the Tanglechain Creek drainage, including the systems inventoried for this project, are located in the moist-cold subzone of the sub-boreal spruce biogeoclimatic zone (MoF 1988). Terrain stability maps were not available at the time of writing.

Environment Canada was contacted in an effort to obtain precipitation records for the area, or for a nearby system of similar topography. No precipitation records relevant to the area could be obtained through Environment Canada. Although the Ministry of Forests, Prince Rupert Region does collect precipitation data, the data could not be obtained prior to the preparation of the draft report.

No stream flow data exists for Tanglechain Creek. However, Water Survey of Canada Stations are present on the Fulton River upstream (WSC 08EC008) and downstream (WSC 08EC005) of Tanglechain Creek. Data for these stations collected from 1960 - 1963 are sparse, and are summarized in Table 1 of Section 4.2.

B.C. Environment was contacted to obtain water quality information. However, the current conversion of the SEAM database to the new EMS database presented difficulty in obtaining historical data, as well as current water quality data. B.C. Environment is still in the process of retrieving available information for us. Any information available prior to the completion of the project will be included in the final report.

Biological Information

The presence of cutthroat trout (*Oncorhynchus clarki*), rainbow trout (*Oncorhynchus mykiss*), mountain whitefish (*Prosopium williamsoni*), and lake whitefish (*Coregonus clupeaformis*) in Tanglechain Creek has been documented (FISS). In addition to these species, Tanglechain Lake is known to contain Dolly Varden (*Salvelinus malma*; could be bull trout (*S. confluentus*)), peamouth chub (*Mylocheilus caurinus*), largescale suckers (*Catastomus macrocheilus*), longnose suckers (*Catastomus catastomus*), and northern

squawfish (*Ptychocheilus oregonensis*). Doris Lake is known to have lake whitefish, peamouth chub, rainbow trout, lake trout (*Salvelinus namyacush*), mountain whitefish, cutthroat trout, largescale suckers, longnose suckers, redside shiners (*Richardsonius balteatus*), burbot (*Lota lota*) and northern squawfish. Longnose suckers, peamouth chub, redside shiners and cutthroat trout have also been documented in Boomerang Lake. Prickly sculpin (*Cottus asper*), peamouth chub, redside shiners, northern squawfish, cutthroat trout, rainbow trout and longnose suckers have been found in Pine Lake.

Land use Information

Land Use of the Tanglechain Creek watershed include forest harvesting (proposed to the year 1998), and recreation. Three BCFS recreation sites are located in the watershed, one at Tanglechain Lake, one Doris Lake, and one at Pine Tree Lake. Angling guides in the area are identical to those listed in section 4.2. Other pertinent land use information is summarized in section 4.2.

4.3.1 Unnamed Creek #3 (CP 416)

Watershed Code:	480-6972-334-223
UTM (at mouth):	9.6087425.658000
Length surveyed:	50 m
Estimated number of reaches:	not evaluated
Number of reaches examined:	1

This tributary to Tanglechain Creek drains a small lake through a series of connected wetlands. Four reaches were identified in the section of stream between Tanglechain Creek and the small lake located approximately 2200 m upstream through air photo interpretation (Figure 3). The fourth reach was surveyed to document fish presence. This stream was not examined upstream of the small lake.

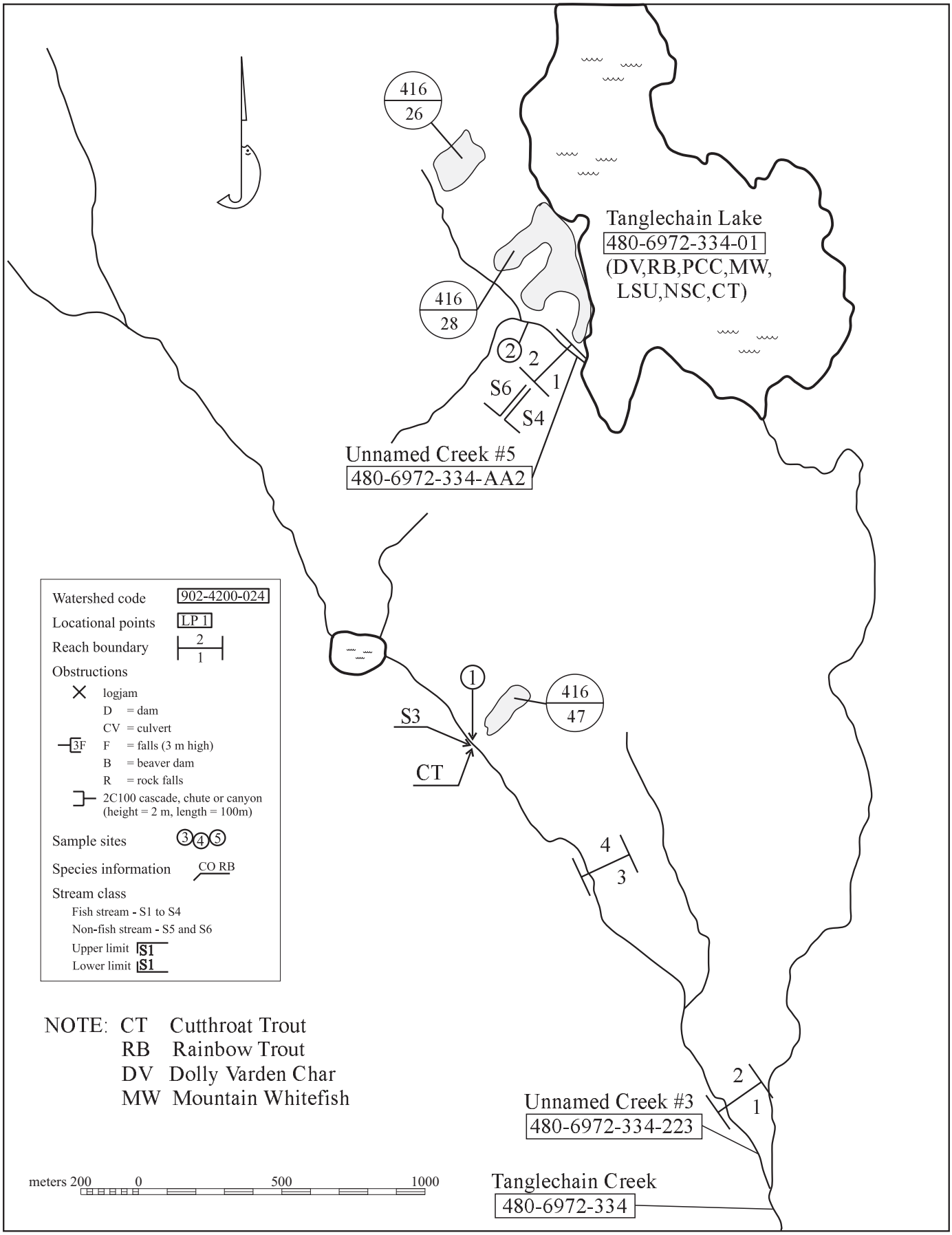

Figure 3. Stream inventory and classification at an inlet stream (480-6972-334-AA2) to Tanglechain Lake and a tributary (480-6972-334-223) to Tanglechain Creek that are in contact withplanned harvest areas in the Tanglechain IRM Unit. For descriptions of tributaries to Tanglechain Creek and Tanglechain Lake see section 4.3.1 (*pages* 20-22) and section 4.3.3 (*pages* 23, 24).

Reach 4

Length of Reach:	2200 m	Stream Order:	2
Length surveyed:	50 m	Channel Width:	2.1 m
		Gradient:	1.0%

Stream Classification: **S3**

Minimum Riparian Reserve/Management Zones:	20/20 m
Recommended Riparian Reserve/Management Zones:	**20/20 m**

This reach is located near the southern boundary of CP 416-47. 120 s. of electroshocking resulted in the capture of 2 juvenile cutthroat trout (*Oncorhynchus clarki*). The stream exhibited some fish rearing and spawning habitat. Due to the presence of FPC listed species, this reach should be classified as S3.

4.3.2 Unnamed Creek #4 (CP 435-1)

Watershed Code:	480-6972-334-AA1
UTM (at mouth):	9.6087270.657930
Length surveyed:	205 m
Estimated number of reaches:	2
Number of reaches examined:	2

This stream is an unnamed tributary to Tanglechain Creek, which drains into the eastern shore of the creek just upstream of Unnamed Creek 480-6972-334-223 (Figure 2). Two reaches were identified in this creek from air photo interpretation.

Reach 1

Length of Reach:	1350 m	Stream Order:	1
Length surveyed:	125 m	Channel Width:	1.2 m
		Gradient:	0.5%

Stream Classification: **S4**

Minimum Riparian Reserve/Management Zones:	0/30 m
Recommended Riparian Reserve/Management Zones:	**0/30 m**

This reach was surveyed just above its confluence with Tanglechain Creek. A 3 m high cascade was located at the mouth of the stream. The cascade exhibited a gradient of 14% for 15 m, and was identified as a potential barrier to fish migration. Upstream of the

cascade, the gradient leveled quickly, and the area surrounding the reach was characteristic of a wetland. The stream was dry at the time of survey. No fish habitat was noted in the section surveyed. The reach appeared to consist of a series of large ponds, which would allow for settling of sediments resulting from freshets and potential impacts of proposed harvesting upstream. This reach should be classified as S4 until re-sampling in the spring confirms that the cascade is a barrier to fish migration.

Reach 2

Length of Reach:	1900 m	Stream Order:	1
Length surveyed:	80 m	Channel Width:	0.87 m
		Gradient:	8%

Stream Classification: **S6**

Minimum Riparian Reserve/Management Zones:	0/20 m
Recommended Riparian Reserve/Management Zones:	**0/20 m**

The second reach of this stream was considerably steeper in nature than the first reach. The second reach forms the northern boundary of CP 435-1. This stream was also dry at the time of survey, and no potential fish spawning habitat was identified at the site examined. The potential for downstream impacts is limited due to the low gradient and ponded nature of the reach 1.

4.3.3 Unnamed Creek #5 (CP 416)

Watershed Code:	480-6972-334-AA2
UTM (at mouth):	9.6089810.657190
Length surveyed:	450 m
Estimated number of reaches:	2
Number of reaches examined:	2

This stream is an unnamed inlet stream to Tanglechain Lake (Figure 3), and is not drawn on the 1:50,000 NTS map sheet. Two reaches were identified in this stream, following air photo interpretation and field surveys.

Reach 1

Length of Reach:	150 m	Stream Order:	1
Length surveyed:	150 m	Channel Width:	no defined channel
		Gradient:	

Stream Classification: **S4**

Minimum Riparian Reserve/Management Zones:	0/20 m
Recommended Riparian Reserve/Management Zones:	**0/20 m**

The lower reach of this stream is located in a wetland, and did not have a well defined channel. No site was established in this reach which contained a few deep pools that may occassionally be flooded during high water levels in Tanglechain Lake. The reach was dry at the time of survey, and was a barrier to fish migration upstream to reach 2.

Reach 2

Length of Reach:	600 m	Stream Order:	1
Length surveyed:	300 m	Channel Width:	1.2
		Gradient:	1.5

Stream Classification: **S6**

Minimum Riparian Reserve/Management Zones:	0/20 m
Recommended Riparian Reserve/Management Zones:	**0/20 m**

This reach was dry at the time of survey, and no fish habitat was identified at the sample site. Fish access is limited due to the wetland characteristics of reach 1.

4.3.4 Unnamed Creek #6 (CP 416)

Watershed Code:	480-6972-334-544
UTM (at mouth):	9.6091892.65644
Length surveyed:	1545 m
Estimated number of reaches:	not evaluated
Number of reaches examined:	3

This stream is an unnamed inlet stream to Doris Lake (Figure 4). Three reaches were identified in this stream near CP 416, following air photo interpretation. Two of these reaches were surveyed in the field.

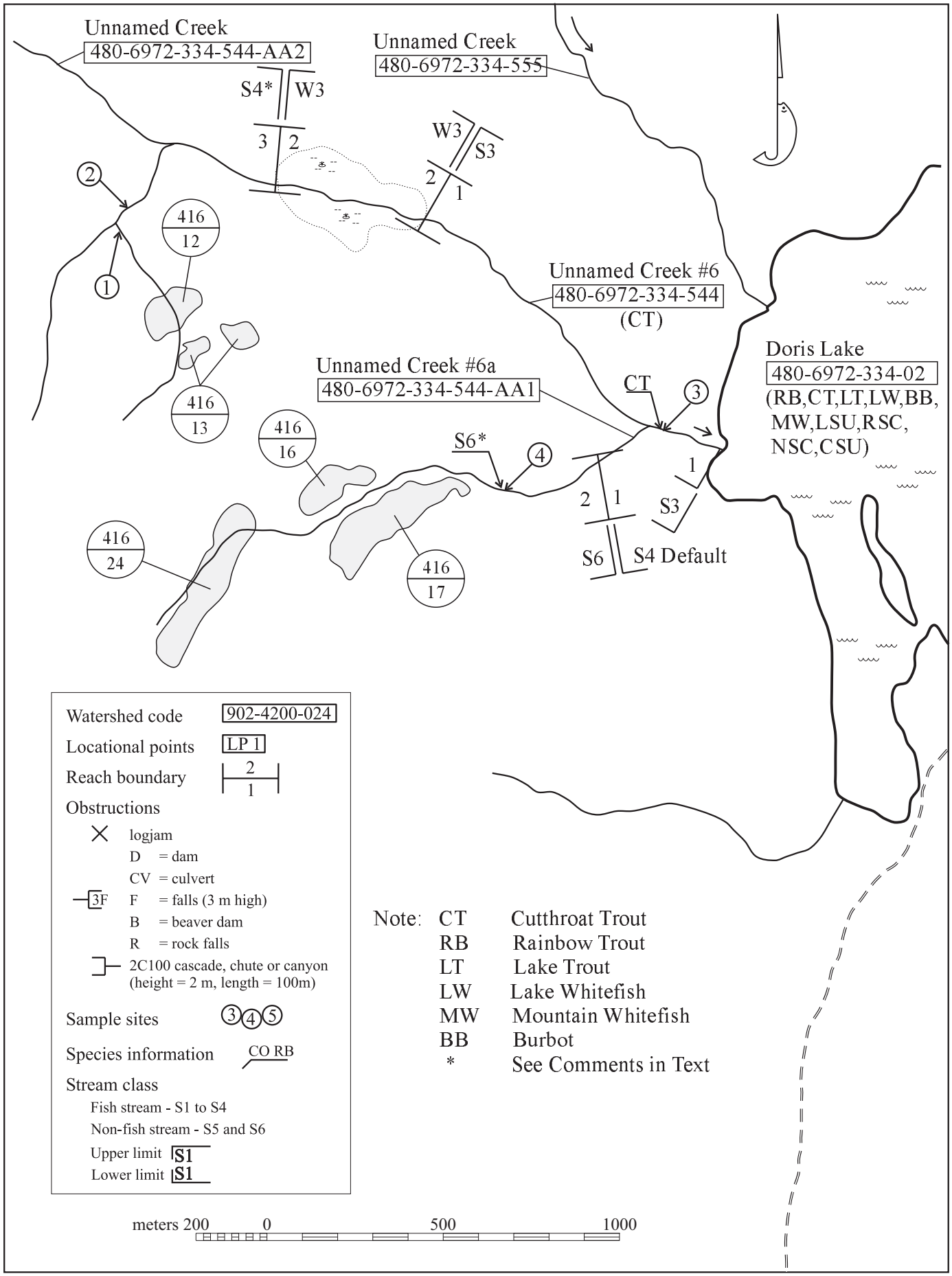

Figure 4. Stream inventory and classification at an inlet stream (480-6972-334-544) to Doris Lake that is in contact with planned harvest areas in the Tanglechain IRM Unit. For descriptions of tributaries to Doris Lake see section 4.3.4 (*pages* 24-27).

Reach 1

Length of Reach:	1205 m	Stream Order:	1
Length surveyed:	1205 m	Channel Width:	2.43 m
		Gradient:	2%

Stream Classification: **S3**

Minimum Riparian Reserve/Management Zones:	20/20 m
Recommended Riparian Reserve/Management Zones:	**20/20 m**

This reach was sampled approximately 10 m downstream of the confluence with Unnamed Creek #6a (480-6972-334-544-AA1). One juvenile cutthroat trout (*Oncorhynchus clarki*) was captured in 160 s. of electroshocking. Some fish rearing and spawning habitat was noted for this reach.

Reach 2

This reach is located in a wetland, and no sample site was established in this reach. The reach requires wetland classification.

Reach 3

Length of Reach:	not evaluated	Stream Order:	1
Length surveyed:	340 m	Channel Width:	0.93 m
		Gradient:	3%

Stream Classification: **S4**

Minimum Riparian Reserve/Management Zones:	0/30 m
Recommended Riparian Reserve/Management Zones:	**0/30 m**

Two sample sites were established for this reach, located just upstream of the wetland. No electroshocking was conducted in this reach, due to the low water level, and lack of discharge. Some potential fish spawning and rearing habitat was identified in this reach. This reach should be classified as S4 until re-sampling conclusively indicates no seasonal use of this reach by fish.

4.3.4.1 Unnamed Creek #6a (CP 416)

Watershed Code:	480-6972-334-544-AA1
UTM (at mouth):	9.692383.654784
Length surveyed:	880 m
Estimated number of reaches:	2
Number of reaches examined:	1

This stream drains into an unnamed inlet stream to Doris Lake approximately 210 m upstream of Doris Lake (Figure 4). Two reaches were identified in this stream from air photo interpretation.

Reach 1

Stream Classification: **S4 (default)**

Minimum Riparian Reserve/Management Zones:	0/30 m
Recommended Riparian Reserve/Management Zones:	**0/30 m**

No samples site was established in this reach since to barriers to fish migration were identified. Some potential rearing habitat was identified in this reach.

Reach 2

Length of Reach:	1650 m	Stream Order:	1
Length surveyed:	880 m	Channel Width:	0.67 m
		Gradient:	2%

Stream Classification: **S6**

Minimum Riparian Reserve/Management Zones:	0/20 m
Recommended Riparian Reserve/Management Zones:	**0/20 m**

CP 416-5 and CP 416-16 are located to the north of this reach, and CP 416-4 and CP 416-17 are located to the south of the stream. The upper extent of the reach is located in CP 416-24. No electroshocking was conducted in this stream due to the low water level and discharge at the time of survey. Limited fish habitat was identified at the road crossing. Potential downstream impacts are limited due to the wetland located immediately downstream of the road crossing. The channel is undefined in this wetland. Upper sections of this reach lacking stream characteristics (i.e. defined channel, fluvial deposits) may not require stream classification.

5.0 RECOMMENDATIONS

Recommendations are given throughout the report for applicable reaches. The need for re-sampling to establish the extent of fish distribution in systems inventoried is summarized below (see individual sections for details).

Babine Lake Inlet Stream

- Unnamed Creek #1 (480-6386) should be re-sampled to establish if fish from Babine Lake utilize this stream. If fish presence is confirmed, the culvert at the Granisle Road Crossing should be replaced to ensure fish passage, and reaches located upstream should be sampled once fish access is established.

Fulton River Tributary

- Unnamed Creek #2 (480-6972-296) should be sampled in the spring to establish seasonal use of this stream by fish. If fish utilize this reach, the culvert at the road crossing in reach 1 should be replaced to ensure fish passage, and reaches located upstream should be sampled once fish access is established.

Tanglechain Creek Tributaries

- Unnamed Creek #4 (480-6972-334-AA1) should be re-sampled in the spring to confirm that the cascade present in this stream is a barrier to fish migration.
- Reach 3 of Unnamed Creek #6 (480-6972-334-544) should be re-sampled to conclusively establish the lack of seasonal use by fish.

6.0 REFERENCES

B.C. Environment. Water Management Branch. November 1996. pers. com. Water licence and community watershed information.

B.C. Environment. Fish and Wildlife Branch. November 1996. pers. com. Guide outfitters, trap line operators, stream and lake files.

B.C. Environment. Environmental Protection Branch. January 1997. pers. com. Water quality information.

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Ministry of Energy, Mines and Petroleum Resources. 1996. Coal licence, placer stakes and mineral tenure files.

Ministry of Forests. 1994. Morice Forest District Recreation Map.

Ministry of Forests. 1988. Biogeoclimatic and ecoregion units of the Prince Rupert Forest Region.

Water Survey of Canada. 1989. Historical streamflow summary: British Columbia to 1988. Inland Waters Directorate, Water Resources Branch, Ottawa.

APPENDICES

Appendix 1 - Water Licence Information

Appendix 1. Water Licence information for selected areas in the Tanglechain IRM (* File numbers preceded by C indicate approved water licences, file number preceded by Z indicate applications for water licences) (B.C. Environment, Skeena Region, 1996).

Date	File # *	Operator	Amount	Comments
1965/02/05	C06026 0260256	Granisle Mine	12,000 GD	Babine Lake (MacLaren Forest Products Camp)
1966/02/14	C033232 0267760	Granisle Village	18,250,000 GY	Babine Lake
1970/05/25	C039262 0296492	Fisheries & Oceans	25.00 CS	Babine Lake (Temperature Control)
1971/10/05	C107981 0309115	Bell Mine	7,500.00 GD	Babine Lake (MacLaren Forest Products Camp)
1972/02/19	C040898 0310575	McNeil, H. & W.	1,500.00 GD	Babine Lake
1972/17/19	C040898 0310575	Village of Granisle	36,500,000 GY	Babine Lake (all lands within village boundary)
1985/06/27	C065492 600265	HFP	2,500 GD	Babine Lake
1986/02/18	C065491 6000295	Lake Babine Band	15,000.00 GD	Babine Lake
1991/11/29	Z103978 600684	Village of Granisle	336,000.00 GY	Babine Lake
1993/07/16	Z106871 6000812	Lake Babine Band	5,000.00	Babine Lake
1965/10/22	C031323 0265862	Fisheries & Oceans	200.00 CS	Fulton River
1965/10/22	C031325 0265860	Fisheries & Oceans	76,000.00 AF	Fulton River

Appendix 2 - Salmon Escapement Data

Appendix 2. Salmon Escapement Data for the Babine Watershed (DFO pers.com.).

Babine Lake

Year	Sockeye	Coho	Pink	Chum	Chinook
1985	1071685	Unknown	Unknown	Unknown	Unknown
1986	175871	Unknown	Unknown	Unknown	Unknown
1987	603797	Unknown	Unknown	Unknown	Unknown
1988	687074	Unknown	Unknown	Unknown	Unknown
1989	479232	Unknown	Unknown	Unknown	Unknown
1990	154819	Unknown	Unknown	Unknown	Unknown
1991	159063	Unknown	Unknown	Unknown	Unknown
1992	5000	Unknown	Unknown	Unknown	Unknown
1993	275941	Unknown	Unknown	Unknown	Unknown
1994	218736	3930	94950	2	395

Babine River - Upper

Year	Sockeye	Coho	Pink	Chum	Chinook
1985	500000	2129	Unknown	Unknown	Unknown
1986	120000	2757	Unknown	Unknown	Unknown
1987	175000	1951	Unknown	Unknown	Unknown
1988	185000	3027	Unknown	Unknown	Unknown
1989	100000	Unknown	Unknown	Unknown	Unknown
1990	150000	Unknown	Unknown	Unknown	Unknown
1991	350000	Unknown	Unknown	Unknown	Unknown
1992	500000	not surveyed	Unknown	Unknown	Unknown
1993	475000	Unknown	Unknown	Unknown	Unknown
1994	5000	3785	91883	2	435

Fulton River

Year	Sockeye	Coho	Pink	Chum	Chinook
1985	321860	Unknown	Unknown	Unknown	Unknown
1986	190436	300	Unknown	Unknown	Unknown
1987	265148	500	Unknown	Unknown	24
1988	317956	327	45	Unknown	8
1989	381300	300	70	Unknown	Unknown
1990	447193	500	360	Unknown	1
1991	181487	475	80	Unknown	none observed
1992	564742	140	57	Unknown	4
1993	387427	114	5	Unknown	none observed
1994	496500	113	55	Unknown	none observed

PHOTO SURVEY FORM 1 - EQUIPMENT DETAILS

Survey start date (yyyymmdd): Sept. 17/96 Agency: *SKR Cons. Ltd.*
Survey end date (yyyymmdd): Oct.17/96 Crew: RS/GT/KM/MJ

Camera #1

Make and model: *Canon Sure Shot Prima AS-1*	Lenses: A
Format: *135 mm film*	
Resolution (for digital and video cameras): *n/a*	
Output file type (for digital and video cameras): *n/a*	

Lenses

Lense #	Focal Length
A	32 mm

Roll and/or batch details

Roll # or Batch #	Camera #	Output medium	For film cameras	
			Film type	ISO
HFP3A	1	negative & print	color	100
HFP3B	1	negative & print	color	100
HFP3C	1	negative & print	color	100
HFP3D	1	negative & print	color	100
HFP3E	1	negative & print	color	100
HFP3F	1	negative & print	color	100
HFP3G	1	negative & print	color	100
HFP3H	1	negative & print	color	100
HFP3I	1	negative & print	color	100
HFP3J	1	negative & print	color	200
HFP3K	1	negative & print	color	200
HFP3L	1	negative & print	color	100
HFP3M	1	negative & print	color	100
HFP3N	1	negative & print	color	400
HFP3O	1	negative & print	color	100
HFP3P	1	negative & print	color	100
HFP3Q	1	negative & print	color	200
HFP3R	1	negative & print	color	200
HFP3S	1	negative & print	color	200
HFP3T	1	negative & print	color	400

Photodocumentation List- Roll HFP3A

Survey start date (yyyymmdd): 1996/09/17	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #1	Reach/Site card(s): Y
Watershed Code: 480-6386	Fish card(s): Y

Roll#: HFP3A	Counter #: 1	Neg. #: 1A	Up	W	35mm
Date: 1996/09/17	Reach #: 1	Site #: 1	Scale: Ron		St
Map: 93L/15&16	Easting: 675632		Northing: 6089306		
Source: GPS Zone: 9	Plate #1: photo on lower right in Tanglechain report				
CH	Note: 0.8m drop from culvert to stream.				

Roll#: HFP3A	Counter #: 2	Neg. #: 2A	Up	W	35mm
Date: 1996/09/17	Reach #: 1	Site #: 1	Scale: none		St
Map: 93L/15&16	Easting: 675632		Northing: 6089306		
Source: GPS Zone: 9	Plate #1: photo above-left in Tanglechain report				
CH					

Roll#: HFP3A	Counter #: 3	Neg. #: 3A	Dn	E	35mm
Date: 1996/09/17	Reach #: 1	Site #: 1	Scale: none		St
Map: 93L/15&16	Easting: 675632		Northing: 6089306		
Source: GPS Zone: 9	Plate #1: photo above-right in Tanglechain report.				
CH					

Survey start date (yyyymmdd): 1996/09/17	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #1	Reach/Site card(s): Y
Watershed Code: 480-6386	Fish card(s): N

Roll#: HFP3A	Counter #: 4	Neg. #: 4A	Up	W	35mm
Date: 1996/9/17	Reach #: 2	Site #: 2	Scale: none		St
Map: 93L/15&16	Easting: 676420		Northing: 6088580		
Source: map Zone: 9	Plate #2: photo above in Tanglechain report.				
CH					

Roll#: HFP3A	Counter #: 5	Neg. #: 5A	Dn	E	35mm
Date: 1996/09/17	Reach #: 2	Site #: 2	Scale: none		St
Map: 93L/15&16	Easting:		Northing:		
Source: map Zone: 9	Plate #2: photo below in Tanglechain report				
CH					

Survey start date (yyyymmdd): 1996/09/17	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local):	Reach/Site card(s): N
Watershed Code:	Fish card(s): N

Roll#: HFP3A		Counter #: 6	Neg. #: 6A			35mm
Date: 1996/09/17		Reach #:	Site #:	Scale:		St
Map: 93L/15&16		Easting:		Northing:		
Source: none	Zone: 9	Disregard this photo: incorrest creek				
CH		photo not used in report				

Roll#: HFP3A		Counter #: 7	Neg. #: 7A			35mm
Date: 1996/09/17		Reach #:	Site #:	Scale:		St
Map: 93L/15&16		Easting:		Northing:		
Source: none	Zone: 9	Disregard this photo: incorrect creek				
CH		photo not used in report				

Survey start date (yyyymmdd): 1996/09/17	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #1a	Reach/Site card(s): Y
Watershed Code: 480-6386-AA1	Fish card(s): N

Roll#: HFP3A		Counter #: 8	Neg. #: 8A	Dn	NE	35mm
Date: 1996/09/17		Reach #: 1	Site #: 3	Scale: none		St
Map: 93L/099		Easting: 673587		Northing: 6088222		
Source: GPS	Zone: 9	Plate #3: photo below in Tanglechain report				
CH		Note: site at CP453-1 boundary and road crossing				

Roll#: HFP3A		Counter #: 9	Neg. #: 9A	Up	SW	35mm
Date: 1996/09/17		Reach #: 1	Site #: 3	Scale: none		St
Map: 93L/099		Easting: 673587		Northing: 6088222		
Source: GPS	Zone: 9	Plate #3: photo above in Tanglechain report				
CH		Note: site at CP453-1 boundary and road crossing				

Survey start date (yyyymmdd): 1996/09/17	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #5	Reach/Site card(s): Y
Watershed Code: 480-6972-334-AA2	Fish card(s): N

Roll#: HFP3A	Counter #: 10	Neg. #: 10A	Up	WNW	35mm
Date: 1996/09/17	Reach #: 2	Site #: 1	Scale: none		St
Map: 93L/15	Easting: 656926		Northing: 6090058		
Source: GPS Zone: 9	Plate #11: photo above in Tanglechain report.				
CH/VE	In area of CP416's				

Roll#: HFP3A	Counter #: 11	Neg. #: 11A	Dn	ESE	35mm
Date: 1996/09/17	Reach #: 2	Site #: 1	Scale: none		St
Map: 93L/15	Easting: 656926		Northing: 6090058		
Source: GPS Zone: 9	Plate #11: photo below in Tanglechain report.				
CH/VE	In area of CP416's				

Survey start date (yyyymmdd): 1996/09/17	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #3	Reach/Site card(s): Y
Watershed Code: 480-6972-334-223	Fish card(s): Y

Roll#: HFP3A	Counter #: 12	Neg. #: 12A	Up	NNW	35mm
Date: 1996/09/17	Reach #: 1	Site #: 4	Scale: none		St
Map: 93L/15	Easting: 656800		Northing: 6088239		
Source: GPS Zone: 9	Plate #8: photo above in Tanglechain report				
CH	Site S of CP 416-47.				

Roll#: HFP3A	Counter #: 13	Neg. #: 13A	Dn	SSE	35mm
Date: 1996/09/17	Reach #: 1	Site #: 4	Scale: none		St
Map: 93L/15	Easting: 656800		Northing: 6088239		
Source: GPS Zone: 9	Plate #8: photo below in Tanglechain report				
CH	Site S of CP 416-47.				

Survey start date (yyyymmdd): 1996/09/18	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #6	Reach/Site card(s): Y
Watershed Code: 480-6972-334-544	Fish card(s): N

Roll#: HFP3A	Counter #: 14	Neg. #: 14A	Up	SSW	35mm
Date: 1996/09/18	Reach #: 3	Site #: 1	Scale: Ron		St
Map: 93L/15	Easting: 654050		Northing: 6092480		
Source: Map Zone: 9	Plate #13: photo above in Tanglechain report.				
CH/VE	Site at old road crossing.				

Roll#: HFP3A	Counter #: 15	Neg. #: 15A	Dn	NNE	35mm
Date: 1996/09/18	Reach #: 3	Site #: 1	Scale: none		St
Map: 93L/15	Easting: 654050		Northing: 6092480		
Source: Map Zone: 9	Plate #13: photo above in Tanglechain report.				
CH	Site at old road crossing.				

Survey start date (yyyymmdd): 1996/09/18	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #6	Reach/Site card(s): Y
Watershed Code: 480-6972-334-544	Fish card(s): N

Roll#: HFP3A	Counter #: 16	Neg. #: 16A	Up	NW	35mm
Date: 1996/09/18	Reach #: 3	Site #: 2	Scale: none		St
Map: 93L/15	Easting: 653966		Northing: 6092692		
Source: GPS Zone: 9	Plate #14: photo above in Tanglechain report.				
CH/VE	Site d/s of CP416 12&13.				

Roll#: HFP3A	Counter #: 17	Neg. #: 17A	Dn	SE	35mm
Date: 1996/09/18	Reach #: 3	Site #: 2	Scale: none		St
Map: 93L/15	Easting: 653966		Northing: 6092692		
Source: GPS Zone: 9	Plate #14: photo below in Tanglechain report.				
CH/VE	Site d/s of CP416 12&13.				

Survey start date (yyyymmdd): 1996/09/18	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #6	Reach/Site card(s): Y
Watershed Code: 480-6972-544	Fish card(s): Y

Roll#: HFP3A	Counter #: 18	Neg. #: 18A	Up	WNW	35mm
Date: 1996/09/18	Reach #: 1	Site #: 3	Scale: none		St
Map: 93L/15	Easting: 655578		Northing: 6091995		
Source: GPS Zone: 9	Plate #12: photo above in Tanglechain report.				
CH	Site 10m d/s of -544-AA2.				

Roll#: HFP3A	Counter #: 19	Neg. #: 19A	Dn	ESE	35mm
Date: 1996/09/18	Reach #: 1	Site #: 3	Scale: none		St
Map: 93L/15	Easting: 655578		Northing: 6091995		
Source: GPS Zone: 9	Plate #12: photo below in Tanglechain report.				
CH	Site 10m d/s of -544-AA2.				

Survey start date (yyyymmdd): 1996/09/18	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #6a	Reach/Site card(s): Y
Watershed Code: 480-6972-344-544-AA1	Fish card(s): N

Roll#: HFP3A	Counter #: 20	Neg. #: 20A	Up	SW	35mm
Date: 1996/09/8	Reach #: 2	Site #: 4	Scale: none		St
Map: 93L/15	Easting: 654784		Northing: 6092383		
Source: GPS Zone: 9	Plate #15: photo above in Tanglechain report.				
CH					

Roll#: HFP3A	Counter #: 21	Neg. #: 21A	Dn	NE	35mm
Date: 1996/09/8	Reach #: 2	Site #: 4	Scale: none		St
Map: 93L/15	Easting: 654784		Northing: 6092383		
Source: GPS Zone: 9	Plate #15: photo below in Tanglechain report.				
CH					

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #2	Reach/Site card(s): Y
Watershed Code: 480-6972-296	Fish card(s): N

Roll#: HFP3A		Counter #: 22	Neg. #: 22A	Up	N	35mm
Date: 1996/09/19		Reach #: 1	Site #: 1	Scale: none		St
Map: 93L/15		Easting: 657750		Northing: 6082800		
Source: GPS	Zone: 9	Plate #4: photo above-left in Tanglechain report.				
CH		Site 25m d/s of road crossing.				

Roll#: HFP3A		Counter #: 23	Neg. #: 23A	Dn	S	35mm
Date: 1996/09/19		Reach #: 1	Site #: 1	Scale: none		St
Map: 93L/15		Easting: 657750		Northing: 6082800		
Source: GPS	Zone: 9	Plate #4: photo above-right in Tanglechain report.				
CH		Site 25m d/s of road crossing.				

Roll#: HFP3A		Counter #: 24	Neg. #: 24A	Up	N	35mm
Date: 1996/09/19		Reach #: 1	Site #: 1	Scale: Kerrith and ms		St
Map: 93L/15		Easting: 657750		Northing: 6082800		
Source: GPS	Zone: 9	Plate #4: photo below-right in Tanglechain report.				
CH		Note: culvert above current water level.				

Roll#: HFP3A		Counter #: 25	Neg. #: 2A	Up	N	35mm
Date: 1996/09/19		Reach #: 1	Site #: 1	Scale: none		St
Map: 93L/15		Easting: 657750		Northing: 6082800		
Source: GPS	Zone: 9	Photo not used in report.				
CH						

Photodocumentation List - HFP3B

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #2a	Reach/Site card(s): Y
Watershed Code: 480-6972-296-675	Fish card(s): N

Roll#: HFP3B	Counter #: 1	Neg. #: 1A	Up	NE	35mm
Date: 1996/09/19	Reach #: 3	Site #: 2	Scale: none		St
Map: 93L/15&16	Easting: 659520		Northing: 6087031		
Source: GPS Zone: 9	Plate #7: photo above in Tanglechain report.				
CH					

Roll#: HFP3B	Counter #: 2	Neg. #: 2A	Dn	SW	35mm
Date: 1996/09/19	Reach #: 3	Site #: 2	Scale: none		St
Map: 93L/15&16	Easting: 659520		Northing: 6087031		
Source: GPS Zone: 9	Plate #7: photo below in Tanglechain report.				
CH					

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #4	Reach/Site card(s): Y
Watershed Code: 480-6972-334-AA1	Fish card(s): N

Roll#: HFP3B	Counter #: 3	Neg. #: 3A	Up	E	35mm
Date: 1996/09/19	Reach #: 2	Site #: 3	Scale: Kerrith		St
Map: 93L/15&16	Easting: 659590		Northing: 6087534		
Source: GPS Zone: 9	Plate #10: photo above in Tanglechain report.				
CH/VE	Site at N boundary of CP 435-1.				

Roll#: HFP3B	Counter #: 4	Neg. #: 4A	Dn	W	35mm
Date: 1996/09/19	Reach #: 2	Site #: 3	Scale: none		St
Map: 93L/15&16	Easting: 659590		Northing: 6087534		
Source: GPS Zone: 9	Plate #10: photo below in Tanglechain report.				
CH/VE	Site at N boundary of CP 435-1.				

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local):	Reach/Site card(s):
Watershed Code: none	Fish card(s):

Roll#: HFP3B	Counter #: 5	Neg. #: 5A	-	-	35mm
Date: 1996/09/19	Reach #: -	Site #: -	Scale: none		St
Map: 93L/15	Easting: -		Northing: -		
Source: none Zone: 9	Disregard photo.				
VE/O	Not used in report.				

Roll#: HFP3B	Counter #: 6	Neg. #: 6A	-	-	35mm
Date: 1996/09/19	Reach #: -	Site #: -	Scale: none		St
Map: 93L/15	Easting: -		Northing: -		
Source: none Zone: 9	Disregard photo.				
VE/O	Not used in report.				

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #2a	Reach/Site card(s): Y
Watershed Code: 480-6972-296-675	Fish card(s): N

Roll#: HFP3B	Counter #: 7	Neg. #: 7A	Up	N	35mm
Date: 1996/09/19	Reach #: 2	Site #: 4	Scale: none		St
Map: 93L/15&16	Easting: 659528		Northing: 6086102		
Source: GPS Zone: 9	Plate #6: photo above in Tanglechain report.				
CH					

Roll#: HFP3B	Counter #: 8	Neg. #: 8A	Dn	S	35mm
Date: 1996/09/19	Reach #: 2	Site #: 4	Scale: none		St
Map: 93L/15&16	Easting: 659528		Northing: 6086102		
Source: GPS Zone: 9	Plate #6: photo below in Tanglechain report.				
CH					

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #2	Reach/Site card(s): Y
Watershed Code: 480-6972-296-AA1	Fish card(s): N

Roll#: HFP3B	Counter #: 9	Neg. #: 9A	Up	NNE	35mm
Date: 1996/09/19	Reach #: A	Site #: 5	Scale: none		St
Map: 93L/15&16	Easting: 660183		Northing: 6085372		
Source: GPS Zone: 9	Plate #5: photo above in Tanglechain report.				
CH/VE					

Roll#: HFP3B	Counter #: 10	Neg. #: 10A	Dn	SSW	35mm
Date: 1996/09/19	Reach #: A	Site #: 5	Scale: Kerrith		St
Map: 93L/15&16	Easting: 660183		Northing: 6085372		
Source: GPS Zone: 9	Plate #5: photo below in Tanglechain report.				
CH/VE					

Roll#: HFP3B	Counter #: 11	Neg. #: 11A	Up	NNE	35mm
Date: 1996/09/19	Reach #: A	Site #: 5	Scale: none		St
Map: 93L/15&16	Easting: 660183		Northing: 6085372		
Source: GPS Zone: 9	Photo not used in report.				
CH/VE					

Survey start date (yyyymmdd): 1996/09/19	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #4	Reach/Site card(s): Y
Watershed Code: 480-6972-334-AA1	Fish card(s): N

Roll#: HFP3B	Counter #: 12	Neg. #: 12A	Up	SE	35mm
Date: 1996/09/19	Reach #: 1	Site #: 6	Scale: none		St
Map: 93L/15&16	Easting: 657995		Northing: 6087500		
Source: Map Zone: 9	Plate #9: photo above in Tanglechain report.				
CH/VE					

Roll#: HFP3B	Counter #: 13	Neg. #: 13A	Dn	NW	35mm
Date: 1996/09/19	Reach #: 1	Site #: 6	Scale: Kerrith		St
Map: 93L/15&16	Easting: 657995		Northing: 6087500		
Source: Map Zone: 9	Plate #9: photo below in Tanglechain report.				
CH/VE					

Survey start date (yyyymmdd): 1996/09/23	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/GT
Stream name (local): "Glacier Creek"	Reach/Site card(s): Y
Watershed Code: 180-3740-952-995-734	Fish card(s): Y

Roll#: HFP3B		Counter #: 14	Neg. #: 14A	Up	SW	35mm
Date: 1996/09/23		Reach #: 4	Site #: 1	Scale: none		St
Map: 93E/085		Easting: 618930		Northing: 5966700		
Source: GPS	Zone: 9	Plate #13: photo above in Nadina report.				
CH						

Roll#: HFP3B		Counter #: 15	Neg. #: 15A	Dn	NE	35mm
Date: 1996/09/23		Reach #: 4	Site #: 1	Scale: Greg		St
Map: 93E/085		Easting: 618930		Northing: 5966700		
Source: GPS	Zone: 9	Plate #13: photo below in Nadina report.				
CH		Note: eroding banks of creek.				

Roll#: HFP3B		Counter #: 16	Neg. #: 16A	Up	SW	35mm
Date: 1996/09/23		Reach #: 4	Site #: 1	Scale: none		St
Map: 93E/085		Easting: 618930		Northing: 5966700		
Source: GPS	Zone: 9	Photo not used in report.				
CH		Redundant with view of eroding bank.				

Survey start date (yyyymmdd): 1996/09/23	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/GT
Stream name (local): Unnamed Creek #16	Reach/Site card(s): Y
Watershed Code: 180-3740-952-995-734-668-AA1-aa3	Fish card(s): Y

Roll#: HFP3B		Counter #: 17	Neg. #: 17A	Up	SE	35mm
Date: 1996/09/23		Reach #: 1	Site #: 13	Scale: none		St
Map: 93E/084		Easting: 613985		Northing: 5967248		
Source: GPS	Zone: 9	Plate #51: photo above in Nadina report.				
CH		Site 50m d/s of road crossing.				

Roll#: HFP3B		Counter #: 18	Neg. #: 18A	Dn	NW	35mm
Date: 1996/09/23		Reach #: 1	Site #: 13	Scale: none		St
Map: 93E/084		Easting: 613985		Northing: 5967248		
Source: GPS	Zone: 9	Plate #51: photo below in Nadina report.				
CH		Site 50m d/s of road crossing.				

Survey start date (yyyymmdd): 1996/09/23	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/GT
Stream name (local): Unnamed Creek #15	Reach/Site card(s): Y
Watershed Code: 180-3740-952-995-734-668-AA1-aa2	Fish card(s): Y

Roll#: HFP3B		Counter #: 19	Neg. #: 19A	Dn	N	35mm
Date: 1996/09/23		Reach #: 1	Site #: 12	Scale: none		St
Map: 93E/084		Easting: 619690		Northing: 5967280		
Source: GPS	Zone: 9	Plate #47: photo below in Nadina report.				
CH						

Roll#: HFP3B		Counter #: 20	Neg. #: 20A	Up	S	35mm
Date: 1996/09/23		Reach #: 1	Site #: 12	Scale: none		St
Map: 93E/084		Easting: 619690		Northing: 5967280		
Source: GPS	Zone: 9	Plate #47: photo above in Nadina report.				
CH						

Survey start date (yyyymmdd): 1996/09/23	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/GT
Stream name (local): Unnamed Creek #17	Reach/Site card(s): Y
Watershed Code: 180-3740-952-995-734-726	Fish card(s): Y

Roll#: HFP3B		Counter #: 21	Neg. #: 21A	Dn	N	35mm
Date: 1996/09/23		Reach #: A	Site #: 2	Scale: none		St
Map: 93E/084		Easting: 617529		Northing: 5967110		
Source: GPS	Zone: 9	Plate #52: photo below in Nadina report.				
CH		Site 200m below proposed road crossing.				

Roll#: HFP3B		Counter #: 22	Neg. #: 22A	Up	S	35mm
Date: 1996/09/23		Reach #: A	Site #: 2	Scale: bucket		St
Map: 93E/084		Easting: 617529		Northing: 5967110		
Source: GPS	Zone: 9	Plate #52: photo above in Nadina report.				
CH		Site 200m below proposed road crossing.				

Survey start date (yyyymmdd): 1996/09/24	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #6a	Reach/Site card(s): Y
Watershed Code: 480-5985-425	Fish card(s): N

Roll#: HFP3B		Counter #: 23	Neg. #: 23a	Up	WSW	35mm
Date: 1996/09/24		Reach #: A	Site #: 1	Scale: none		St
Map: 93M/19		Easting: 666660		Northing: 6113199		
Source: GPS	Zone: 9	Plate #23: photo above in Morrison report.				
CH		Site on N boundary of CP535-3.				

Roll#: HFP3B		Counter #: 24	Neg. #: 24a	Dn	ENE	35mm
Date: 1996/09/24		Reach #: A	Site #: 1	Scale: none		St
Map: 93M/19		Easting: 666660		Northing: 6113199		
Source: GPS	Zone: 9	Plate #23: photo below in Morrison report.				
CH		Site on N boundary of CP535-3.				

Survey start date (yyyymmdd): 1996/09/24	Agency: *SKR Cons. Ltd.*
Stream name (gazetted): Unnamed Creek	Crew: RS/KM
Stream name (local): Unnamed Creek #6b1	Reach/Site card(s): Y
Watershed Code: 480-5985-483-AA1	Fish card(s): N

Roll#: HFP3B		Counter #: 25	Neg. #: 23A	Up	W	35mm
Date: 1996/09/24		Reach #: 1	Site #: 2	Scale: Kerrith		St
Map: 93M/19		Easting: 667035		Northing: 6112743		
Source: GPS	Zone: 9	Photo not used in report.				
CH		Redundant with HFP3C-1.				