# Fish and Fish Habitat Inventory for Operational Areas Fulton River Watershed

**in the Tanglechain IRM Unit**

**CP 439-1 and CP 439-2**


Prepared by

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June 1998

## Disclaimer

The Province has not accepted the contents of this product for the purposes of the Forest Practices Code, and reserves the right to dispute the validity of summarized results. The province does not necessarily agree with the classification assigned to any individual stream reach, for use in logging plans, silviculture prescriptions or any other application.

# Project Summary Sheet

## Project Reference Information

| | |
|---|---|
| MELP Contract Number | CSK 3070 |
| FDIS Project Number | none |
| MELP Region | Skeena Region (06) |
| FW Management Unit | 06-08 |
| DFO Subdistrict | Prince Rupert (8) |
| Forest Region | Prince Rupert |
| Forest District | Morice |
| Forest Licensee | Houston Forest Products |
| First Nations Claim Area | Lake Babine Nation |

## Watershed Information

| | |
|---|---|
| Watershed Group | Babine River |
| Watershed Name | Fulton River |
| Watershed Code | 480-6972 |
| UTM at Mouth | 9.6079110.685874 |
| Watershed Area | 3900 $km^2$ |
| Stream Order | 5 |
| NTS Maps (1:250,000) | 93L |
| TRIM Maps | 93L098 |
| BEC Zone | SBS $mc^2$ |

## Sampling Design

| | |
|---|---|
| Number of Reaches Sampled | 10 |
| Total Sample Sites | 10 |
| Field Sampling Dates | Sept. 19, 1996 and July 13 & 17, 1997 |
| Fish Species in Watershed | CH, CO, SK, KO, CT, PK, RB, MW, LW, DV, BB, CSU, NSC, LT, CC, PMC |

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## Acknowledgments

This inventory project was funded by Forest Renewal B.C., and the contract was administered by Deidre Quinlan. Field work was conducted by Ron Saimoto, Mark LeRuez, Matthew Jessop, Greg Tamblyn and Todd Johnston. Data entry was completed by Todd Johnston, Mark LeRuez, Regina Saimoto and Matthew Jessop. Mark LeRuez completed the draft mapping, and digital mapping was conducted by Western Geographics Information System Inc. Draft reports were completed by Regina Saimoto, and reviewed by Ron Saimoto. Quality control checks were conducted by Mark LeRuez and Regina Saimoto. Krista Morten, Cyril Thacker, Melissa Todd, and Paul Giroux provided helpful editorial comments on the drafts of the report.

# 1.0 INTRODUCTION

The study area is located in the upper portion of the Babine River drainage in north-central British Columbia (Figure 1). Selected streams in the area were inventoried for Forest Practice Code (FPC) stream classification and evaluation of requirements for appropriate management of stream/wetland riparian zones related to cutting permits CP 439-1 and CP 439-2.

The main objectives of this project were:

- to complete a detailed literature review of historical fisheries information for related areas,
- to conduct field visits and appropriate fish sampling at representative sites to determine fish species distribution in the related watershed,
- to recommend FPC stream classification for all stream reaches in contact with planned forest harvest,
- to describe management concerns for stream/wetland and lake riparian zones in the relevant areas,
- to provide recommendations to ensure adequate protection of stream riparian zones in cases where minimum standards of the FPC do not appear to be sufficient, and
- to provide recommendations for appropriate structures, designs and installation of planned road/stream crossings with regard to concerns for fish, fish migration, and fish habitat.

# 2.0 STUDY AREA

## 2.1 Location

The Tanglechain Integrated Resource Management (IRM) Unit 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 Unit is the Fulton River, which drains into Babine Lake. The study area for this project focused around proposed harvest in CP 439-1 and CP 439-2, and is located in the moist-cold subzone of the sub-boreal spruce biogeoclimatic zone (SBS $mc^2$) (MOF 1988). Streams potentially impacted by harvest in the area drain via Tanglechain Creek or directly into the Fulton River.

## 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.

**Figure 1.** 1:250,000 NTS map (93L) showing the general location of the study area.

## 2.3 Resource Use

The study area is utilized for Forestry purposes, with active logging being proposed for the next 2 years in the immediate study area. A Land Use Planning Document was not available at the time of writing. The study area has some recreational value, including snow mobiling, a BC Forest Service (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 Unit. There are no mineral tenures, placer stakes or coal licences in the study area, however, a mineral tenure was noted to the southwest of 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). CP 439-1 and CP 439-2 are located in the Fulton Range permit. Guide and outfitter territories in the study area are 608G003 and 608G006. Trapline territories relevant to the study is 608T012.

The B.C. Environment Water Management Branch was contacted to document water licences and water rights for the study area. 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 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 1:20,000 TRIM map sheets.

## 3.2 Reach Break Identification

Reach breaks were tentatively identified and mapped by examining 1:20,000 TRIM maps, and air photographs (approx. 1:16,000). The identification of reach breaks followed RIC standards (RIC 1997). 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 or confirmed, reaches were identified alphabetically in ascending order up the stream.

### 3.3 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, were visited and reach breaks were verified. In addition, lower reaches of systems were assessed to determine the extent of fish distribution in relevant areas. This information was required to allow interpretation of potentials for downstream impacts on fish and fish habitat. At representative sites, the following stream characteristics were measured: channel width, wetted width, pool depth, riffle depth, pool:riffle ratio, gradient (Suunto clinometer), temperature (ambient and water), pH (Oaktron pH.Tstr2, pHep 3), substrate composition (including $D_{90}$), aspect, valley:channel ratio, bank stability, bank material, and cover. Conductivity was recorded with a hand held Hanna HI 9033 conductivity meter for every reach in which electroshocking was conducted. All data were collected on MOE/DFO stream survey cards, following RIC standards, and data were entered into an MsAccess database. 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, barriers to fish migration, and other points of interest. Photographs were compiled into a photodocumentation document.

### 3.4 Map Production

All mapping was conducted by Western Geographic Ltd. The following is indicated on the map in Appendix 2: watershed codes, reach breaks and reach numbers, sample sites, stream classifications, and fish distribution. Codes for fish species present follow those outlined in FISS, and are indicated on applicable maps.

## 4.0 RESULTS AND DISCUSSION

The results section describes the streams surveyed to the reach level. General information for relevant mainstems and tributaries are summarized, followed by a more detailed description for each reach inventoried. Reach descriptions include recommended stream, wetland and/or lake classifications (identified following the FPC standards), comments describing fish habitat types and fish captured at the sites sampled, and recommendations for proposed stream/road crossings and riparian management. Recommendations for riparian management generally fall into one of three types:

1. No additional recommendations are made in cases when FPC standards for riparian management are expected to provide adequate protection to fish and fish habitat.

2. Recommendations for riparian management are provided in cases where FPC standards appear to provide insufficient protection of fish habitat based on
    - reach characteristics, including stream gradient, stream substrate, bank material, and surrounding topography (e.g. wetland, sideslope, valley:channel ratio),
    - fisheries resources in immediate and downstream reaches and/or mainstems,
    - influences of riparian vegetation on fish habitat (e.g. nutrients, LOD, stream temperature, bank stability),
    - potential flood conditions, and
    - forest type and values within riparian reserve and management zones.

3. Recommendations with explanations for S6 classification of streams with S4 default classification under FPC standards. This is exemplified at reaches where:
    - a definite barrier to fish migration exists with no available habitat for resident fish populations upstream (e.g. no potential spawning habitat above barrier or channel width of less than 1.5 m in the Central Interior Region), or
    - a single season's sampling in good fish habitats, and good sampling conditions confirms fish absence above definite barriers to fish migration, or
    - a single season's sampling in available habitat confirms fish absence above a potential barrier in a reach that contains limited fish habitat, or
    - no potential fish habitat was identified in the reach, and no valuable fish habitat is present upstream (e.g. no well defined channel).

Note: various levels of forest retention in riparian management zones are commonly recommended for these S6 streams to protect downstream fisheries values,

Completed stream survey cards and sample site photographs are located in Appendix 1. A stream classification map with study site/NID numbers is included in Appendix 2.

**Note: Only fisheries values are taken into consideration when recommending special riparian reserve management zones. Other ecological contexts or wildlife values were not considered in this study, and are thus not reflected on in the results, discussions, or recommendations**.

## 4.1 Fulton River Tributary

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

In addition to a tributary to Tanglechain Creek (see section 4.2), 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. The stream was previously inventoried in 1996 (SKR 1997a) and re-sampled in 1997 (SKR 1997b). Cursory information for Fulton River and Fulton Lake are summarized below to place the Unnamed tributary surveyed into context.

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 SKR (1997a). 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). The presence of the barrier indicates that fish populations are either lacustrine-adfluvial or stream resident. Based on the number of lakes present throughout the system, most of the trout, char and whitefish populations are likely lacustrine-adfluvial.

### 4.1.1 Unnamed Creek (480-6972-296)

| | |
|---|---|
| Watershed Code: | 480-6972-296 |
| Map # / ILP #: | 93L088 / N.A. |
| 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 (Appendix 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 in 1996 to evaluate potential impacts on fish and fish habitat from harvesting in CP 435-1 (previously CP 435-2). The stream was re-sampled in 1997, and re-sampling results are summarized below. For further detail, please refer to SKR (1997b).

*Reach 1*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02017 / 93L088 | Site #: | 1 |
| Length of Reach: | 200 m | Stream Order: | 2 |
| Length surveyed: | 200 m | Channel Width: | 2.0 m |
| | | Gradient: | 4% |

| | |
|---|---|
| Initial sampling: | Sept. 19, 1996 |
| Re-sampling: | July 13, 1997 |
| Fish presence: | no fish present |

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

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 the fall survey (Sept. 19, 1996), but some discharge was noted at the culvert. The entire reach from Fulton River to the road crossing was walked in the spring of 1997. No barriers to fish migration were encountered. Although suitable fish habitat was identified during spring sampling (spring rearing habitat), no fish were captured in 600 s. of electroshocking.

The culvert at the road crossing had been identified as a barrier to fish migration during fall sampling in 1996. However, the lack of fish in two seasons of sampling downstream of the culvert indicates that the stream is not fish bearing, and can be classified as S6. Due to the proximity of the lower reach to the Fulton River which presents high fisheries and wildlife values, 100 % retention in the riparian management zone is recommended.

S6 classification is recommended for all reaches upstream of this section of stream (SKR 1997a, 1997b).

#### 4.1.1.1 Unnamed Creek (480-6972-296-675)

| | |
|---|---|
| Watershed Code: | 480-6972-296-675 |
| Map # / ILP #: | 93 L 088 / N.A. |
| 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. 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 the previously proposed block (previously CP 435-1). Reach 3 is the upper reach of this stream, and is located in the western portion of the block previously named CP 435-1 (SKR 1997a).

*Reach 2*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02059 / 93L088 | Site #: | 1 |
| Length of Reach: | 1700 m | Stream Order: | 1 |
| Length surveyed: | 1060 m | Channel Width: | 1.1 m |
| | | Gradient: | 3% |

| | |
|---|---|
| Initial sampling: | Sept. 19, 1996 |
| Re-sampling: | N.A. |
| Fish presence: | no fish present in mainstem |

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

This reach forms the eastern boundary of the harvested block CP 433-1, and runs just west of the western boundary of the previously proposed block CP 435-1. The reach was dry at the time of survey (Sept. 1996).

The potential for downstream impacts is minimal due to the location of the wetland in reach 1. This reach can be classified as S6 due to the lack of fish in Reach 1 of the mainstem of this tributary (see section 4.1.1).

*Reach 3*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02060 / 93L088 | Site #: | 2 |
| Length of Reach: | 640 m | Stream Order: | 1 |
| Length surveyed: | 200 m | Channel Width: | 0.63 m |
| | | Gradient: | 5% |

| | |
|---|---|
| Initial sampling: | Sept. 19, 1996 |
| Re-sampling: | N.A. |
| Fish presence: | no fish present in mainstem |

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

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 on fish and fish habitat.

#### 4.1.1.1.1 Unnamed Creek (02021)

| | |
|---|---|
| Watershed Code: | 480-6972-296-675-AA1 |
| Map # / ILP #: | 93 L 098 / 02021 |
| UTM (at mouth): | 9.6085920.659450 |
| Estimated number of reaches: | 1 |
| Number of reaches examined: | 1 |

*Reach 1*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | - / - | Site #: | - |
| Length of Reach: | | Stream Order: | 1 |
| Length surveyed: | | Channel Width: | not defined |
| | | Gradient: | |

Fish presence: no stream located

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

This “stream” drains in a south-western direction along the southern boundary of CP 439-2. Although the entire section of the mainstem (Unnamed Creek 2a, reach 3) was walked in the area identified to be the confluence of this creek, 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 on fish and fish habitat. If no defined channel is located during block lay out, the classification can be reduced to “no stream identified”.

## 4.2 Tanglechain Creek Tributary

Watershed code: 480-6972-334
Date surveyed: July 17, 1997

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.

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.

Populations of trout and char are likely either stream resident or lacustrine-adfluvial. Since the barrier at the mouth of the Fulton River prevents fish access to the river, fluvial-adfluvial populations are likely not present in the system. The number of lakes present throughout the system indicates that most of the populations are likely lacustrine adfluvial.

No previous fisheries information for the tributary of interest could be located at BC Environment, FISS or SISS.

### 4.2.1 Tanglechain Creek (480-6972-334)

| | |
|---|---|
| Watershed Code: | 480-6972-334 |
| Map # / ILP #: | 93 L 088 / N.A. |
| UTM (at mouth): | 9.6084147.656184 |
| Length surveyed: | 300 m |
| Estimated number of reaches: | |
| Number of reaches examined: | 1 |

The mainstem of Tanglechain Creek forms the western boundary of CP 439-1. The creek was surveyed at the north-western tip of CP 439-1.

*Reach 3*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02038 / 93L098 | Site #: | 1 |
| Length of Reach: | | Stream Order: | 3 |
| Length surveyed: | 300 m | Channel Width: | 6.8 m |
| | | Gradient: | 1.5% |

Initial sampling: July 17, 1997
Fish presence: rainbow trout, northern squawfish

Reach Classification: S2
Recommended Reach Classification: **S2**

This reach was surveyed along the west side of CP 439-1, approximately 3000 m downstream of Tanglechain Lake. Electroshocking for 519 s. in 200 $m^2$ habitat resulted in the capture of 9 rainbow trout and 2 northern squawfish. Two other fish were observed, but not identified. The reach offered some excellent potential spawning and excellent fish rearing habitat.

#### 4.2.1.1 Unnamed Creek (ILP 02014)

| | |
|---|---|
| Watershed Code: | 480-6972-334-BB1 |
| Map # / ILP #: | 93 L 098 / 02014 |
| UTM (at mouth): | 9.657945.6086460 |
| Length surveyed: | 300 m |
| Estimated number of reaches: | 1 |
| Number of reaches examined: | 1 |

This stream is not shown on the 1:50,000 NTS map sheet. Consequently, no watershed code exists for this stream, and one was generated for it. This stream forms the southern boundary of CP 439-1. One reach was identified by air photo interpretation.

*Reach 1*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02040 / 93L098 | Site #: | 2 |
| Length of Reach: | | Stream Order: | 1 |
| Length surveyed: | 300 m | Channel Width: | 0.8 |
| | | Gradient: | 16% |

Initial sampling: July 17, 1997
Fish presence: none captured

| | |
|---|---|
| Reach Classification: | S4 default |
| Recommended Reach Classification: | **S6** |

This very poorly defined stream consists of small step pools separated by sections of underground flow. The channel is undefined at the confluence with Tanglechain Creek. Electroshocking of all available habitat from Tanglechain Creek to 200 m upstream did not result in the capture of any fish. Limited potential fish habitat was identified in the reach. Also, the habitat may not be accessible to fish due to the lack of a defined channel at the confluence with Tanglechain Creek and sections of underground flow.

Some potential for downstream impacts exist due to the steep gradient in the stream, and the fisheries values in Tanglechain Creek. S6 classification is recommended due to the intermittent nature and high gradient of the stream. Partial retention in the riparian management zone is recommended to minimize impacts on the stream, and on fisheries resources located downstream (in Tanglechain Creek).

#### 4.2.1.2 Unnamed Creek (480-6972-334-196)

| | |
|---|---|
| Watershed Code: | 480-6972-334-196 |
| Map # / ILP #: | 93 L 098 / N.A. |
| UTM (at mouth): | 9.6086550.685033 |
| Length surveyed: | 380 m |
| Estimated number of reaches: | 2 |
| Number of reaches examined: | 2 |

This stream is located within CP 439-1. Two reaches were identified in the system during field observations.

*Reach 1*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02039 / 93L098 | Site #: | 3 |
| Length of Reach: | 180 m | Stream Order: | 1 |
| Length surveyed: | 180 m | Channel Width: | 1.2 |
| | | Gradient: | 1.5% |

| | |
|---|---|
| Initial sampling: | July 17, 1997 |
| Fish presence: | none captured |

| | |
|---|---|
| Reach Classification: | S4 default |
| Recommended Reach Classification: | **S6** |

The entire reach was sampled, and appeared to offer limited potential spawning habitat. Some fish rearing habitat was noted. However, a 15 m long section of undefined channel at the confluence with Tanglechain Creek likely restricts fish access to this small stream. 180

seconds of electroshocking in 100 $m^2$ of habitat did not result in the capture or observation of any fish.

S6 classification is recommended due to the presence of only limited suitable fish habitat, and the limited access to fish. Partial retention in the riparian management zone is recommended to ensure adequate shading of the stream, and to minimize potential downstream impacts on fisheries resources in Tanglechain Creek.

*Reach 2*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02057 / 93L098 | Site #: | 4 |
| Length of Reach: | not determined | Stream Order: | 1 |
| Length surveyed: | 200 m | Channel Width: | no defined channel |
| | | Gradient: | <0.5% |

| | |
|---|---|
| Initial sampling: | July 17, 1997 |
| Fish presence: | unlikely; no defined channel |

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

This reach is located in a wetland, and no defined channel could be located. Only very limited and inaccessible fish habitat was identified in this reach.

The potential for downstream impacts on fish and fish habitat is limited.

#### 4.2.1.3 Unnamed Creek (ILP 02020)

| | |
|---|---|
| Watershed Code: | 480-6972-334-AA1 |
| Map # / ILP #: | 93 L 098 / 02020 |
| UTM (at mouth): | 9.6087270.657930 |
| Length surveyed: | 205 m |
| Estimated number of reaches: | 2 |
| Number of reaches examined: | 2 |

This unnamed tributary to Tanglechain Creek was surveyed in 1996 to establish potential impacts from CP 435-1 (SKR 1997 a). The system was re-sampled in 1997 (SKR 1997 b). This system forms the northern boundary of CP 439-1 and CP 439-2. Results pertinent to CP 439-1 and CP 439-2 are summarized below.

*Reach 1*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02058 / 93L098 | Site #: | 6 |
| Length of Reach: | 1350 m | Stream Order: | 1 |
| Length surveyed: | 125 m | Channel Width: | 1.2 m |
| | | Gradient: | 0.5% |

| | |
|---|---|
| Initial sampling: | Sept. 19, 1996 |
| Re-sampling: | July 13, 1997 |
| Fish presence: | none in 2 seasons |

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

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 the fall survey (Sept. 19, 1996). 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. Spring re-sampling confirmed that the stream is intermittent, with some sub-surface flow even at high run off periods. No fish were captured in 700 s. of electroshocking, confirming that the cascade is a barrier to fish migration.

Partial retention is recommended in the riparian management zone to minimize potential downstream impacts on fisheries resources in Tanglechain Creek.

*Reach 2*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02061 / 93L098 | Site #: | 3 |
| Length of Reach: | 1900 m | Stream Order: | 1 |
| Length surveyed: | 80 m | Channel Width: | 0.87 m |
| | | Gradient: | 8 |

| | |
|---|---|
| Initial sampling: | Sept. 19, 1996 |
| Re-sampling: | N.A. |
| Fish presence: | no fish present |

| | |
|---|---|
| Reach Classification: | S6 |
| Recommended Reach Classification: | **S6** |

The second reach of this stream was considerably steeper in nature than the first reach. This section of stream was dry at the time of survey (Sept. 19, 1997), and no potential fish spawning habitat was identified at the site examined.

The potential for downstream impacts on fish and fish habitat is limited due to the low gradient and intermittent nature of reach 1.

#### 4.2.1.4 Unnamed Creek (ILP 02022)

| | |
|---|---|
| Watershed Code: | 480-6972-334-BB3 |
| Map # / ILP #: | 93 L 098 / 02022 |
| UTM (at mouth): | to be provided by Western Geographics Ltd. |
| Length surveyed: | |
| Estimated number of reaches: | |
| Number of reaches examined: | |

This unnamed tributary to Tanglechain Creek does not appear on the 1:50,000 NTS map sheet. The stream is not directly impacted by proposed harvest in CP 439-1 or CP 439-2, but a road to access the two cutting permits crosses this stream. The stream was not surveyed in the 1997 field season, and S4 default classification is recommended.

#### 4.2.1.5 Unnamed Creek (ILP 02015)

| | |
|---|---|
| Watershed Code: | 480-6972-334-BB2 |
| Map # / ILP #: | 93 L 098 / 02015 |
| UTM (at mouth): | 9.658185.6088313 |
| Length surveyed: | 200 |
| Estimated number of reaches: | 2 |
| Number of reaches examined: | 1 |

This unnamed tributary to Tanglechain Creek does not appear on the 1:50,000 NTS map sheet. The stream is not directly impacted by proposed harvest in CP 439-1 or CP 439-2, but a road to access the two cutting permits crosses this stream. A portion of this stream is located within CP 402-1.

*Reach 2*

| | | | |
|---|---|---|---|
| NID # / NID Map #: | 02041 / 93L098 | Site #: | 6 |
| Length of Reach: | | Stream Order: | 1 |
| Length surveyed: | 200 | Channel Width: | 0.9 m |
| | | Gradient: | 8.0% |

Initial sampling: July 17, 1997
Fish presence: stream dry

Reach Classification: S4
Recommended Reach Classification: **S4**

This reach was sampled approximately 100 m downstream of the road crossing. There was no evidence of surface flow approximately 200 m downstream of the road crossing, and no electroshocking was conducted at the sample site. Some potential fish rearing and spawning habitat was identified in the reach. The culvert at the current road crossing is a potential barrier to fish migration, due to a 1 m drop on the downstream side.

Sampling in a second season downstream of the road crossing may change stream classification to S6.

## 5.0 SUMMARY OF RECOMMENDATIONS FOR STREAM RESAMPLING

### 5.1 CP 439-1 and CP 439-2

Unnamed Creek (ILP 02015)

| | | | |
|---|---|---|---|
| Refer to Report Section: | 4.2.1.5 | Reach / Site: | 2 / 6 |
| NID #: | 02041 | NID map #: | 93L098 |

This intermittent reach offers some potential fish rearing and spawning habitat, but was dry at the time of survey. The culvert at the road crossing is a potential barrier to fish migration. Re-sampling in a second season downstream of the road crossing may allow for a change in stream classification from S4 to S6. If fish are captured downstream of the crossing, additional sampling upstream of the crossing should be conducted to document if the culvert is a barrier to fish migration.

## 6.0 REFERENCES


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## APPENDIX 1 - SITE CARDS

Site cards for all streams inventoried 1997 relevant to cutting permits CP 439-1 and CP 439-2.

Unnamed Creek (480-6972-296-675) - Reach 2

Mark - insert old card from 1996 report (for CP 435-1)

Tanglechain Creek (480-6972-334) - Reach 3

**Plate 1.** Reach 3 - sample site 1. Upstream view (above) and downstream view (below).

**Plate 2.** Reach 3 - sample site 1. Rainbow trout (above) and northern squawfish (below) captured at the site.

Unnamed Creek (ILP 02014) - Reach 1

**Plate 3.** Reach 1 - sample site 2. Upstream view (above) and downstream view (below).

Unnamed Creek (480-6972-334-196) - Reach 1

**Plate 4.** Reach 1 - sample site 3. Upstream view (above) and downstream view (below).

Unnamed Creek (480-6972-334-196) - Reach 2

**Plate 5.** Reach 2 - sample site 4. Upstream view (above) and downstream view (below).

Unnamed Creek (ILP 02020; ILP map 93L098) - Reach 2

Mark - please insert card from 1996 report (CP 435-1)

Unnamed Creek (ILP 02015; ILP map 93L098) - Reach 2

**Plate 6.** Reach 2 - sample site 6. Upstream view (above) and downstream view (below).

**Plate 7.** Reach 2 - sample site 6. Culvert at access road crossing (above), and barrier to fish migration approximately 100 meters upstream of road crossing (below).

## APPENDIX 2 - 1:20,000 TRIM MAPS

1 map (93L098) illustrating the reach breaks, sampling sites with NID's, ILP's and stream classification for applicable watersheds