

**Fish and Fish Habitat Inventory  
for  
Operational Areas  
Fulton River Watershed  
in the Tanglechain IRM Unit:  
CP 454-1**

Prepared by

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for

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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 <sup>2</sup>
Stream Order	5
NTS Maps (1:250,000)	93L
TRIM Maps	93L098
BEC Zone	SBS mc <sup>2</sup>

### Sampling Design

Number of Reaches Sampled	12
Total Sample Sites	12
Field Sampling Dates	July 17, 1997; July 22, 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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## **1.0 INTRODUCTION**

The study area is located in the Fulton River watershed of the Babine 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 permit CP 454-1.

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 and relative abundance in the related watershed(s),
- 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 planned for forest harvest,
- to provide recommendations for more conservative protection of stream riparian zones that are not adequately protected by the minimum standards of the FPC, 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 454-1. Streams potentially impacted by harvest in CP 454-1 drain via Tanglechain Creek into the Fulton River, and are located in the moist-cold subzone of the sub-boreal spruce biogeoclimatic zone (SBS mc<sup>2</sup>) (MOF 1988).

### **2.2 Access**

All of the stream survey sites were accessed by road and on foot. 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 (93 L) indicating 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. The Lake Babine Nation has “claimed” parts of the Tanglechain IRM Unit, 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 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 454-1 is located in the Fulton Range permit. Guide and outfitter territory in the study area is 608G003. The trapline territory 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, Interim Locational Points (ILP’s) were generated following RIC standards. UTM’s 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 maps.

### **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, 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, 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 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<sub>90</sub>), 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 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<sup>2</sup> 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 sample sites, fish distribution and reach breaks were indicated on existing 1:20,000 maps for future mapping by Western Geographic Ltd. The following is indicated on all maps: 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 Tanglechain Creek Tributary

Watershed code: 480-6972-334  
Date surveyed: July 17, 1997, July 22, 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 moderate 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 (*Catostomus macrocheilus*), longnose suckers (*Catostomus catastomus*), and northern squawfish (*Ptychocheilus oregonensis*). Doris Lake is known to have lake whitefish, peamouth chub, rainbow trout, lake trout (*Salvelinus namayacush*), mountain whitefish, cutthroat trout, largescale suckers, longnose suckers, redbase shiners (*Richardsonius balteatus*), burbot (*Lota lota*) and northern squawfish. Longnose suckers, peamouth chub, redbase shiners and cutthroat trout have also been documented in Boomerang Lake. Prickly sculpin (*Cottus asper*), peamouth chub, redbase shiners, northern squawfish, cutthroat trout, rainbow trout and longnose suckers have been found in Pine Lake.

No previous fisheries information for the tributary of interest could be located at BC Environment, FISS or SISS. However, the mainstem of the system upstream of the lake located approximately 1.5 km to the south southeast of CP 454-1 was inventoried for operational inventory of CP 439 (SKR 1997). Stream surveys in this system indicated the presence of cutthroat trout upstream of the lake (Appendix 2 Unnamed Creek #4, 480-6972-334-358).

##### 4.1.1 Unnamed Creek (480-6972-334-358-553)

Watershed Code: 480-6972-334-358-553-550  
Map # / ILP #: 93L098 / N.A.  
UTM (at mouth): to be provided by Western Geographics Ltd.  
Length surveyed: 1150 m  
Estimated number of reaches: 4  
Number of reaches examined: 4

This stream is an unnamed tributary to Tanglechain Creek. The drainage pattern of this system deviates from that indicated on the 1:50,000 NTS map sheet, and reach 1 of this

stream is indicated as belonging to the mainstem (480-6972-334-358-553) in the watershed code dictionary. However, field observations indicate that this reach is actually part of the tributary stream 480-6972-334-358-553-550. Two reaches were identified in this creek from air photo interpretation. This creek is referred to as Creek G on the SP map.

### *Reach 1*

NID # / NID Map #:	02045 / 93L098	Site #:	1
Length of Reach:	800 m	Stream Order:	2
Length surveyed:	200 m	Channel Width:	no well defined channel
		Gradient:	1%

Initial sampling: July 22, 1997  
Fish presence: no defined channel

Reach Classification: no well defined channel  
Recommended Reach Classification: **S6 / W5**

This reach was surveyed approximately 650 m upstream of the lake located to the south of CP 454-1. The reach was located in a wetland, and consisted of extensively braided sections. The creek was unconfined (10+ valley to channel ratio), with sections of undefined channels and underground seepage. No fish habitat was identified in this reach.

S6 and wetland classification is recommended for this reach, due to the presence of a defined channel in reach 2. The potential for downstream impacts on fish and fish habitat is minimal due to the presence of the reach in a wetland, low gradient, and the lake located downstream of the site.

### *Reach 2*

NID # / NID Map #:	02046 / 93L098	Site #:	2
Length of Reach:	500 m	Stream Order:	2
Length surveyed:	200 m	Channel Width:	1.2 m
		Gradient:	2%

Initial sampling: July 17, 1997  
Fish presence: barrier downstream

Reach Classification: S6  
Recommended Reach Classification: **S6**

This reach exhibited a defined channel. No fish were captured in 23 hrs of minnow trapping and 430 s. of electroshocking. Some good potential fish spawning habitat, and rearing

habitat was identified in this reach, but the reach is not accessible to fish due to the lack of a defined channel in reach 1.

### *Reach 3*

NID # / NID Map #:	02047 / 93L098	Site #:	3
NID # / NID Map #:	02048 / 93L098	Site #:	4
Length of Reach:	1000 m	Stream Order:	2
Length surveyed:	450 m	Channel Width:	1.2 m, 1.3 m
		Gradient:	4%

Initial sampling: July 17, 1997  
Fish presence: barrier downstream

Reach Classification: S6  
Recommended Reach Classification: **S6**

Two sites, located 150 m (NID 02047) and 250 m (NID 02048) upstream of the Granisle cutoff road crossing, were inventoried in this reach. Both sites exhibited a defined channel. Good potential fish rearing habitat, and some excellent fish spawning habitat was identified in this reach.

S6 stream classification is recommended due to the lack of fish access to this reach (undefined channel in reach 1).

### *Reach 4*

NID # / NID Map #:	02049 / 93L098	Site #:	5
Length of Reach:	not determined	Stream Order:	1
Length surveyed:	300 m	Channel Width:	1.2 m
		Gradient:	13%

Initial sampling: July 22, 1997  
Fish presence: barrier downstream

Reach Classification: S6  
Recommended Reach Classification: **S6**

A sample site was established at the proposed road crossing. Some potential fish rearing, and limited potential fish spawning habitat was identified in this reach.

S6 stream classification is recommended due to the lack of fish access to this reach. Culvert installation at the road crossing to ensure adequate drainage is recommended. There is no

potential for downstream impacts on fish and fish habitat due to the wetland and lake located downstream of this site.

#### 4.1.1.1 Unnamed Creek (ILP 02017)

Watershed Code: 480-6972-334-358-553-550-BB1  
Map # / ILP #: 93L098 / 02017  
UTM (at mouth): 9.663179.6088929  
Length surveyed: 710 m  
Estimated number of reaches: 4  
Number of reaches examined: 4

This stream is not shown on the 1:50,000 NTS map sheet, or on 1:20,000 Forest Cover maps. Consequently, no watershed code exists for this stream, and one was generated for it. This stream is the mainstem to streams B to F identified on the SP for CP 454-1.

##### *Reach 1*

NID # / NID Map #:	02050 / 93L098	Site #:	6
Length of Reach:	100 m	Stream Order:	1
Length surveyed:	100 m	Channel Width:	no well defined channel
		Gradient:	0.5%

Initial sampling: July 22, 1997  
Fish presence: no defined channel

Reach Classification: no defined channel  
Recommended Reach Classification: **S6 / W5**

The sample site was established approximately 500 m downstream of the Granisle cut off road crossing. This reach is located in a wetland, and consists of multiple side channels with extensive braiding. No main channel could be identified, and some of the drainage was sub-surface. This reach was identified as a barrier to fish migration, and no fish habitat was identified in this reach.

S6 stream classification and W5 wetland classification is recommended for this reach, due to the presence of a defined channel in reach 2.

##### *Reach 2*

NID # / NID Map #:	02052 / 93L098	Site #:	7
Length of Reach:	500 m	Stream Order:	1
Length surveyed:	450 m	Channel Width:	1.3 m
		Gradient:	1.5%

Initial sampling: July 22, 1997  
Fish presence: none captured; no defined channel in reach 1

Reach Classification: S6  
Recommended Reach Classification: **S6**

The sample site was located approximately 50 m downstream of the Granisle Cut-off road crossing. Some good potential fish rearing habitat, and no potential fish spawning habitat was identified in this reach. Sections of the reach appear to have been re-routed as a result of the Granisle Cut-off road. Fish access to this reach is impeded by the lack of a defined channel in reach 1. No fish were captured in 400 seconds of electroshocking (60 m<sup>2</sup>).

### *Reach 3*

NID # / NID Map #:	02053 / 93L098	Site #:	8
Length of Reach:	1100 m	Stream Order:	1
Length surveyed:	100 m	Channel Width:	1.6 m
		Gradient:	16%

Initial sampling: July 22, 1997  
Fish presence: no defined channel in reach 1

Reach Classification: S6  
Recommended Reach Classification: **S6**

This reach was sampled approximately 50 m downstream of the southern boundary of CP 454-1. Good potential fish rearing habitat was noted in this reach, although the steep gradient in this reach, and the undefined nature of reach 1 limits fish access. The gradient increased to 34% for 50 m downstream of the southern boundary of CP454-1. A 20 meter section of mass wasting was noted approximately 60 m downstream of the southern boundary of CP 454-1 (NID 02013, 93L098).

Retention in the riparian management zone is recommended due to the steep nature of the reach, and the evidence of mass wasting present near the site.

### *Reach 4*

NID # / NID Map #:	02051 / 93L098	Site #:	9
Length of Reach:		Stream Order:	1
Length surveyed:	60 m	Channel Width:	1.2
		Gradient:	3.5%

Initial sampling: July 22, 1997



Fish presence: barrier downstream

Reach Classification: S6

Recommended Reach Classification: S6

Some good potential fish habitat, and limited potential spawning habitat was identified in this reach. Fish access is restricted by the lack of a defined channel in reach 1, and steep gradients in reach 3. A spring located at the southern boundary of CP 454-1 contributes 5-10% of the flow to this stream. No electroshocking was conducted in this reach due to the presence of definite barrier to fish migration, and the lack of fish downstream of this reach.

#### **4.1.1.2 Unnamed Creek (ILP 02018)**

Watershed Code: 480-6972-334-358-553-550-BB3

Map # / ILP #: 93L098 / 02018

UTM (at mouth): 9.663804.6089553

Length surveyed: 450 m

Estimated number of reaches: 2

Number of reaches examined: 2

This stream is not shown on the 1:50,000 NTS map sheets, but is indicated on 1:20,000 scale. Consequently, no watershed code exists for this stream, and one was generated for it. The stream drains along the western boundary of CP 452-1. Two reaches were identified in this stream, and a road crossing has been proposed in the second reach.

##### *Reach 1*

NID # / NID Map #: 02055 / 93L098

Site #: 11

Length of Reach: 550 m

Stream Order: 1

Length surveyed: 100 m

Channel Width: no well defined channel

Gradient: 16%

Initial sampling: July 22, 1997

Fish presence: none, barrier downstream

Reach Classification: S6

Recommended Reach Classification: S6

A sample site was established at the upper extent of this reach. This reach consisted of a 5-10 m wide wetted area with some seepage. No evidence of a stream could be located upstream of this reach (see reach 2). Some alluvial material was noted in the area, however, no well defined channel could be located.

S6 stream classification is recommended for this reach due to the lack of fish access (reach 1 of mainstem has been identified as a barrier), and the lack of fish habitat in this reach.



### *Reach 2*

NID # / NID Map #:	02054 / 93L098	Site #:	12
Length of Reach:	not determined	Stream Order:	1
Length surveyed:	100 m	Channel Width:	no stream identified
		Gradient:	32%

Initial sampling: July 22, 1997  
Fish presence: no stream identified

Reach Classification: no stream identified  
Recommended Reach Classification: no stream identified

A sample site was established at the proposed road crossing, and evidence of a stream could be identified at the site, or downstream of the site within reach 2.

Culvert installation at the road crossing to ensure adequate drainage is recommended. No stream classification is required. There is no potential for downstream impacts due to the lack of stream characteristics in this reach, the lack of a well defined channel downstream, and the wetland nature of reach 1 in the mainstem.

#### **4.1.1.3 Unnamed Creek (ILP 02019)**

Watershed Code:	480-6972-334-358-553-550-BB4
Map # / ILP #:	93L098 / 02019
UTM (at mouth):	9.663753.6090197
Length surveyed:	450 m
Estimated number of reaches:	2
Number of reaches examined:	2

This stream is not shown on the 1:50,000 or 1:20,000 scale, however, it is mapped on the 1:5,000 SP map for CP 454-1 (stream A). Consequently, no watershed code exists for this stream, and one was generated for it. Two reaches were identified in this stream, and a road crossing has been proposed in the second reach.

### *Reach 1*

NID # / NID Map #:	- / -	Site #:	-
Site # / NID #:		Stream Order:	1
Length of Reach:	250 m	Channel Width:	0.1-0.6 m
Length surveyed:		Gradient:	13%

Initial sampling: July 22, 1997  
Fish presence: none, barrier downstream

Reach Classification: S6  
Recommended Reach Classification: **S6**

No sample site was established in this reach, due to known barriers to fish migration located in the mainstem downstream. However, cursory notes regarding this reach were taken. The stream ranged between 0.1 and 0.6 m wide, and a gradient of 13% was observed at the winter road crossing.

S6 stream classification is recommended due to the lack of fish access to this reach.

### *Reach 2*

NID # / NID Map #:	02056 / 93 L098	Site #:	10
Length of Reach:	500 m	Stream Order:	1
Length surveyed:	450 m	Channel Width:	no well defined channel
		Gradient:	0.5%

Initial sampling: July 22, 1997  
Fish presence: none, barrier downstream

Reach Classification: S6  
Recommended Reach Classification: **S6**

A sample site was established at the proposed road crossing. No defined channel was observed at the crossing, however some evidence of alluvial material was observed. The area was primarily dry, with 1-2 meter stretches of occasional flow.

Culvert installation to allow adequate drainage is recommended at the road crossing. Potential for downstream impacts on fish and fish habitat are minimal due to the wetland located in the mainstem downstream.

## **5.0 SUMMARY OF RECOMMENDATIONS FOR STREAM RESAMPLING**

No re-sampling is recommended for streams surveyed near CP 454-1.

## 6.0 REFERENCES

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## **APPENDIX 1 - SITE CARDS**

Site cards for all streams inventoried in 1997 relevant to cutting permit CP 454-1.







Unnamed Creek (480-6972-334-358-553-550) - Reach 1

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





Unnamed Creek (480-6972-334-358-550) - Reach 2

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





Unnamed Creek (480-6972-334-358-553-550) - Reach 3

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







Unnamed Creek (480-6972-334-358-553-550) - Reach 3

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





Unnamed Creek (480-9672-334-358-553-550) - Reach 4

**Plate 5.** Reach 4 - sample site 5. Upstream view (above) and downstream view (below) at 200 m below the proposed road crossing for CP 454-1.





Unnamed Creek (ILP 02017; ILP map 93L098) - Reach 1

**Plate 6.** Reach 1 - sample site 6. Upstream view (above) and downstream view (below).







Unnamed Creek (ILP 2017; ILP map 93L098) - Reach 2

**Plate 7.** Reach 2 - sample site 7. Upstream view (above) and downstream view (below).







Unnamed Creek (ILP 02017; ILP map 93L098) - Reach 3

**Plate 8.** Reach 3 - sample site 8. Upstream view (above) and downstream view (below).  
Note steep gradient

Unnamed Creek (ILP 02017; ILP map 93L098) - Reach 3

**Plate 9.** Reach 3 - sample site 8. Views of mass wasting on east bank of stream, approximately 70 - 75 m downstream of southern boundary of CP 454-1.









Unnamed Creek (ILP 2017; ILP map 93L098) - Reach 4

**Plate 10.** Reach 4 - sample site 9. Upstream view (above) and downstream view (below).





Unnamed Creek (ILP 02018; ILP map 93L098) - Reach 1

**Plate 11.** Reach 1 - sample site 11. Upstream view (above) and downstream view (below).







Unnamed Creek (ILP 02018; ILP map 93L098) - Reach 2

**Plate 12.** Reach 2 - sample site 12. Upstream view (above) and downstream view (below).





Unnamed Creek (ILP 02019; ILP map 93L098) - Reach 2

**Plate 13.** Reach 2 - sample site 10. Upstream view (above) and downstream view (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

Please note:

- draft report includes a hand sketched map of the inventoried area. The final version of the map will be appended to the report once all sites have been mapped by Western Geographics Ltd.