

**2021 Fish Habitat Assessment
in the BCTS Babine Business Area
Smithers Field Unit
Block TA1756**

Prepared for:
Oak Tree Forestry Services Ltd.
1738 Carnegie Street
Kelowna, BC, V1P 1T3

Prepared by:
Mac Jedrzejczyk, M.Sc., R.P.Bio.
FINS Consulting Ltd.
4206 Eby St.
Terrace, BC, V8G 2E5



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1 Introduction

In May 2021, FINS Consulting Ltd. (FINS) was retained by Oak Tree Forestry Ltd. to assess the fish habitat of select streams in the proposed block TA1756 located within BC Timbers Sales (BCTS) – Babine Business Area, Smithers Field Unit. The overall purpose of the assessments was to determine the fish presence or absence and evaluate fish habitat to assign the streams' riparian classifications and alleviate forest management activities in the Nilkitwa Operating Area.

Fieldwork took place on August 26 – 28, 2021.

2 Location of the Proposed Block TA1756

The proposed block TA1756 (Figure 1) is located approximately 115 km NNE of Smithers, BC.

The area was reached by a 4X4 vehicle, while specific stream reaches for assessment were accessed on foot.

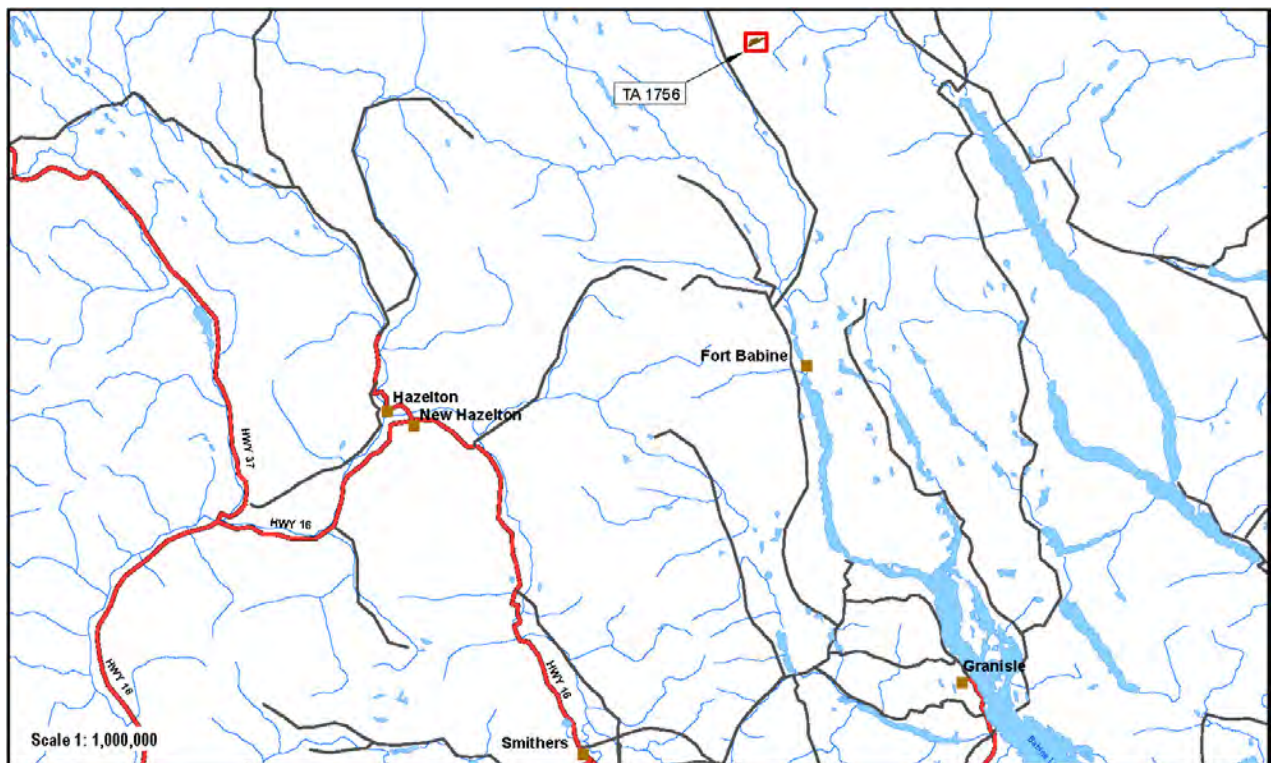


Figure 1: Location of the Project Area.

3 Methods

The methodology used throughout this project was consistent with the standards and methods outlined in the following publications:

- Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures. Version 2.0. (RIC, 2001)
- Fish-stream Identification Guidebook, Second Edition (FSID) (FPC, 1998)
- Riparian Management Area Guidebook (FPC, 1995)
- Modernized Fisheries Act (FA, 2019)

All streams requiring assessments were identified by Oak Tree Forestry Ltd. personnel before the field trip.

3.1 Review of Existing Fisheries Information

The streams in question are within the unnamed stream watershed 480-360200-59800, a tributary to the left bank of Nilkitwa River. The basin was inventoried by Triton Environmental Consultants Ltd. (Triton) in 1996 during Reconnaissance Level Fish and Fish Habitat Inventory in Working Unit 1 (Nilkitwa River Watershed).

Triton documented that stream 480-360200-59800 is populated by Dolly Varden char (DV) (*Salvelinus malma*), while no fish were captured in stream 59811.

3.2 Imagery Interpretation

Air photos, orthophotos, and LiDAR images were used (IMIN) to:

- delineate stream reaches for all indicated drainages for assessment,
- identify potential barriers to fish migration, which would be later verified in the field,
- assess if potential overwintering habitat is present above these obstructions,
- ascertain the location of streams in question.

During the IMIN process, all indicated streams for assessments appeared to enter the wetland adjacent to stream 480-360200-59800. Based on the size of streams, it was suspected that all of them would likely dissipate before reaching the parent stream. No potential perennial habitat presence was visible except for stream 59811, where a small wetland with a pond was adjacent to Reach 2 was noted.

3.3 Stream Data Collection

Stream data were collected on Site Cards and Fish Collection Forms. These field cards are the currently accepted method of collecting data for stream evaluation. Printout of all field data collected is provided in Appendix I. Abbreviations used in the Site Data Form are provided in the List of Abbreviations on page 10.

3.4 Fish Sampling

During the assessment, electrofishing and dip netting was employed as the methods used for fish sampling, supplemented by visual observation of fish movement.

3.5 Measurements, Calculations, and In-Field Markings

Stream channel and wetted widths were determined using a meter tape. Generally, a minimum of six channel width (CW) measurements were made within the site vicinity at a distance of approximately 15-20 m apart and were rounded to two decimal places. In cases where the channel was close to riparian class boundaries (i.e. 1.5m, 3m, etc.), more measurements at equal spacing were taken to determine a precise location of transition between riparian classes. Stream depth measurements were determined using a meter stick or were estimated if the channel was inaccessible due to treacherous conditions. Stream gradient measurements were determined using the Abney level along several site sections and were rounded to a whole number. In some instances, where the stream slope was close to 0%, the level readings were rounded to 0.5% to indicate flowing water. Site lengths were determined using a professional GPS unit or GIS software. Stream water temperatures, conductivity, and pH were determined using a portable Hanna water chemistry multi-meter, calibrated using standardized solutions. Water velocities for the velocity barrier were calculated using a modified Manning formula. Roughness factors were derived from Manning's and Cowan's coefficients (McCuen, R. H., 1989), adjusted by analyzing stream morphology data collected by FINS during the past 25 years. Heights and lengths of linear obstructions (cascades, velocity barriers, etc.) were determined using a meter tape and Abney level and then applying slope/distance tables to verify the vertical height.

Riparian class transitions (i.e., from S4 to S6, etc.) were marked in-field by a red and white flagging tape tied up to the opposite banks and above the transition point. From the center of the created "gate," another red-white ribbon was hung down and was labelled using a permanent marker with the stream ID, class transition, date, and the consultant's name (FINS).

3.6 GPS Recording

Existing drainages, survey sites, and any critical features affecting fish habitat and fish distribution were recorded using professional GPS. All point features were logged for 150 seconds.

Collected raw data were not post-processed.

3.7 Stream and Site Referencing

All watercourses without a gazetted name or watershed code were assigned a Temporary Watershed Code (or adopted existing one) consisting of five unique digits (known as Interim Location Points (ILP)) - as recommended in the FSID.

If available, parent streams were identified by a combination of a gazetted name with a WSC or just by a WSC.

Existing and non-existing drainages were then referenced using gazetted names with TWC or a reduced WSC. A reduced WSC contains the last digit group of the parent stream and the last digit group of the stream in question.

Site numbers for this project have been assigned in ascending order based on the survey sequence.

3.8 Photographs

Representative site photographs and any significant site or relevant features are presented in Appendix I. A standard field book (20x15 cm) was used for scale to reference the channel's size or features in pictures.

Photos have been reduced in size to present multiple images on one page. Each picture is labelled with a site number and the direction in which the photo was taken.

3.9 Fish Habitat Value

Fish habitat values represent the importance of existing habitat in sustaining a fish population in a specific watershed, as suggested by Fish-stream Crossing Guidebook (Revised Edition, 2012). Abbreviation "CR" indicates critical habitat value, "IM" – important, "MG" – marginal, and "NA" - not applicable, was added to show that there is no fish habitat in a specific stream.

The applicable values for the assessed stream reaches were presented in the "Stream Assessment Summaries" table in the "Results" section to indicate that additional steps in preserving and protecting fish habitat may be warranted during forest management activities.

3.10 Mapping

The mapping convention for this project generally follows the standards as recommended in the FSID Guidebook. GIS software was used to produce one 1:10,000 scale map from shapefiles obtained from the BC Land and Resource Data Warehouse, GPS unit, the client, or created in the office from imagery interpretation. The map is included in Appendix II at the end of this report.

Project map depicts current and any pertinent earlier site information, barriers to fish migration, evaluated streams with an indication of their fish status and classification, sections of assessed streams during the present and past visits, TRIM2 stream network, existing fish observation points, road network, and basic topographic features. This information is presented using unique symbols explained in the map's legend.

3.11 Field Equipment

All field equipment used is listed below:

- GPS unit Ashtech MM100
- 1 Hanna water chemistry multi-meter
- 1 Pentax Optio W80 digital camera
- 1 Smith-Root model 12B POW Backpack Electrofisher
- assorted fish sampling equipment (measuring trough, fish anesthetic, collapsible bucket, fish bait, dip net, safety equipment)
- various other equipment including meter tape, meter stick, level, and compass
- Two personal First Aid kits, as per WorkSafe BC requirements
- Satellite telephone

4 Results

The following "Stream Assessment Summaries" table summarizes all surveyed reaches.

It provides pertinent physical site-specific data, sampling method and effort, relevant historical information, and comments that provide a rationale to support derived riparian classifications for assessed watercourses.

In the table, the symbol "*" in all columns indicates that no data were collected. In the column "Habitat Value Rating," the abbreviation "NA" means that a riparian classification does not apply to non-fish bearing reaches, "MG" – marginal habitat, "IM" – important habitat, and "CR" – critical fish habitat. In the column "Flow Stage," the abbreviation "L" means that the flow was in low levels (< 30% of bankfull), and "M" that flow was in moderate levels (30 – 80% of bankfull), "H" that flow was in high levels (80 – 100% of bankfull), and "Flood" that flow inundated immediate riparian area. In the column "Turbidity," the abbreviation "C" indicates that water was clear during assessments. In the column "Sampling Method," the "DN" indicates the use of dip net to capture fish, the "EF" means that electrofishing was employed for fish sampling, "VO" that the visual observation of fish movement was applied, and "NS" means that fish sampling was not performed. In the column "Sampling Results,"; "DV" – indicates the capture of Dolly Varden char, "RB" that rainbow trout was caught, and "NFC" that no fish were captured during sampling.

Site details can be found in the field form in Appendix I.

Table 1: Stream Assessment Summaries.

Area	Stream ID (Name, TWC or WSC)	Reach #	Site #	Date	Riparian Class	Habitat Value	Channel Slope (%)	Channel Width (m)	Channel Depth (m)	Flow Stage	Water Temperature (°C)	Conductivity (µS/cm)	Turbidity	Sampling Method	Sampling Results	Effort (EF - sec/ dist; MT #/Hrs)	EF Specs (V/ Hz/ µs)	Comments
TA1756	Stream 1-A 59813	1	4	26- Aug-21	S6	NA	4	1.17	0.15	INT	9.0	75	C	EF	NFC	67/15	600/ 70/6	No fish habitat - small, seasonal and isolated stream with no perennial fish habitat to support any isolated fish population. It disperses in the forest and completely disappears at the UTM 9. 641439. 6184851. The proposed crossing is at UTM 9.641422.6184974.
TA1756	Stream 1-C 59811	1	5	27- Aug-21	S4/ S6	M G/ NA	1	1.20	0.15	INT	8.8	86	C	EF	NFC	259/ 180	500/ 70/6	The stream is potentially accessible to DV for ~220m from stream 480-360200-59800 during seasonal flows in spring up to the 40m long ground flow barrier located at UTM 9. 640682. 6184276. The barrier marks riparian class transition S4 to S6. Sections of terrestrial mosses growing in not very well-developed channel indicate ephemeral flows lasting 6-8 weeks. The stream was sampled by Triton in 1996; however, no fish was captured at that time. The stream is mismapped by TRIM - flows near forest/wetland boundary and through the wetland.
TA1756	Stream 1-C 59811	2& 3	6	27- Aug-21	S6	NA	3	1.78	0.27	INT	8.8	86	C	EF	NFC	130/ 100	500/ 70/6	No fish habitat - this seasonal stream is inaccessible to fish from the parent stream due to a ground flow barrier in R1. There is no perennial habitat to support any isolated fish population. The proposed road crossing is at UTM 9.640752.6184435.
TA1756	Stream 1-F 59808	1& 2	7	27- Aug-21	S6/ NCD	NA	8	1.13	0.18	INT	*	*	C	NS	*	NS	*	No fish habitat - tiny, seasonal, isolated and shallow stream, which disperses near wetland at UTM 9.640669. 6184311. It has no perennial habitat to support any isolated fish population. The stream becomes NCD at UTM 9. 640673. 6184444. The proposed crossing is at UTM 9.640404.6184332.
TA1756	Stream 1-I 59807	1	8	27- Aug-21	S6	NA	6	1.18	0.15	DRY	*	*	*	NS	*	NS	*	No fish habitat - the stream is seasonal, isolated, and shallow. No perennial habitat is present to support any isolated fish population, and the stream is inaccessible to fish from stream 480-360200-59800. The stream dissipates onto the forest ~200m away from the parent stream at UTM 9.640446.6184158. Proposed crossing is at UTM 9. 640635. 6184402.
TA1756	Stream 1-L 59804	2	9	28- Aug-21	S6	NA	8	1.18	0.15	INT	9.0	85	C	NS	*	NS	*	No fish habitat - this seasonal stream is isolated upstream of 3.5m high and 15m long cascade barrier located at UTM 9.640269. 6184161. There is no isolated fish population present upstream of the barrier due to the lack of perennial habitat. The proposed crossing is at UTM 9. 640188. 6184232.

5 List of Abbreviations

REPORT

C	Clear (turbidity)	MG	Marginal Fish Habitat Value Rating
dist.	Distance	MT	Minnow trap
EF	Electrofishing	NA	Not applicable
FPC	Forest Practices Code	NCD	Not Classified Drainage
FRPA	Forest and Range Practices Act	RIC	Resource Inventory Committee
FSID	Fish-stream Identification Guidebook	S1 - S6	Riparian classes (streams)
GIS	Geographic Information System	sec	seconds
GPS	Global Positioning System	TRIM	Terrain Resource Information Management
Hz	Hertz	TWC	Temporary Watershed Code
ID	Identifier	UTM	Universal Transverse Mercator
IM	Important Fish Habitat Value Rating	V	Volts
LiDAR	Light Detection and Ranging	WBID	Waterbody Identifier
m	meter	WSC	Watershed Code
M	Moderately turbid	°C	Degree Celsius
		µS	micro-Siemens

SITE DATA FORM

SITE REFERENCE	FT - foot, GIS - Geographic Information System, GP2 - GPS unit with differential correction, Lg - length, TWC - Temporary Watershed Code, UTM - Universal Transverse Mercator, V4 - 4x4 vehicle, WSC - Watershed Code, ZEN - Zone. Easting. Northing
CHANNEL	Avg - average, Chan. - channel, Dp - depth, DW - dewatered (water under alluvium), DRY - dry channel, H - high flow (>80% bankfull), INT - intermittent flow, L - low flow (<30% bankfull), m - meter, M - moderate flow (30-80% bankfull), ND - no watercourse exists, NVC - no visible channel, Res. - residual
WATER	C - clear water, Cond - conductivity in micro-Siemens, L - low turbidity, M - moderately turbid, pH - acidity (<7) or alkalinity (>7), T - turbid water, Temp - temperature in °Celsius
COVER	Cover Total: A - abundant, B - boulder cover, CB - cutbanks, D - dominant, DP - deep pools, IV - instream vegetation, LWD - large woody debris, M - moderate, N - none, OV - overstream vegetation, S - sub-dominant, SWD - small woody debris, T - trace Banks: LB - left bank, O - overhanging, RB - right bank, S - sloping, U - undercut, V - v-shaped Bank texture: A - anthropomorphic, B - boulders, C - cobbles, F - fines, G - gravels, R - bedrock Riparian vegetation: C - coniferous, D - deciduous, G - grasses, M - mixed C and D, N - none, S - shrubs, W - wetland Riparian Vegetation Stage: INIT - initial, MF - mature forest, NA - not applicable, PS - pole sapling, SHR - shrub, YF - young forest LWD Function & Distr (Distribution): A/C - abundant and clumped, A/E - abundant and even, F/C - few and clumped, F/E - few and even, N - none IV Type: A - algae, M - mosses, N - none, V - vascular.
MORPHOLOGY	Stream Bed Substrate: B - boulders, C - cobbles, D - largest movable particle, Dom - dominant, D95 - largest 5% of particles, F - fines, G - gravels, NA - not applicable, R - bedrock, Subdom - sub-dominant, Substr - substrate Channel Morphology: CP - cascade-pool, CPb - cascade-pool with boulders, CPcw - cascade-pool with cobbles and functioning LWD, LC - large channel (≥100 particles per channel width), RP - riffle-pool, RPPcw - riffle-pool with cobbles and functioning LWD, RPPgw - riffle-pool with gravels and functioning LWD, SP - step-pool, SPb - step-pool with boulders, SPbw - step-pool with boulders and functioning LWD, SPPr - step-pool through bedrock StrmPatt (Stream pattern): IM - irregular meandering, IR - irregular wandering, ME - regular meandering, SI - sinuous, ST - straight, TM - tortuous meandering Confinment (Confinement): CO - confined, EN - entrenched, FC - frequently confined, NA - not applicable, OC - occasionally confined, UN - unconfined Coupling: CO - coupled, DC - decoupled, PC - partially coupled Islands: AN - anastomosing, F - frequent, I - irregular, N - none, O - occasional, S - split Bars: BR - braided, DIAG - diagonal, MID - mid-stream, N - none, SIDE - intermittent along the channel, SPAN - continuous along the channel Disturbance Indicators (most common): B2 - eroded banks, C1 - extensive riffles, C2 - no pools, C3 - elevated mid-channel bars, C4 - multi-channels, D2 - parallel logs, O1 - beaver dams, S3 - frequent sediment wedges
FEATURES (most common)	BD - beaver dam, C - cascades/chute, CN - canyon, CV - culvert, F - waterfall, FLD - dewatering, FSB - subsurface flow/ dissipation/ dispersion, H - height, L - length, SP - spring, U - undefined obstruction, UC - underground channel (conduit), VB - velocity barrier, X - log jam, XW - sediment wedge
SAMPLING (most common)	BB - burbot, BMC - brassy minnow, BT - bull trout or bottom habitat, CSU - largescale (coarsescale) sucker, CT - cutthroat trout, CO - coho, d - days, DN - dip netting, DV - Dolly Varden, EB - eastern brook trout, EF - electrofishing, freq - frequency, h - hours, Hab - habitat, KO - kokanee, LKC - lake chub, LNC - longnose dace, LSU - longnose sucker, Max L - maximum length, MD - midwater, min - minutes, Min L - minimum length, MT - minnow trap, MW - mountain whitefish, NFC - no fish capture, NFP - no fish present, NS - not sampled, NSC - northern pike minnow, O - other, PCC - peamouth chub, PS - pole seining, R - rearing, RB - rainbow trout, RSC - reddsider shiner, S - spawning, Samp L - sampling length, sec - seconds, SK - sockeye, SP - species unidentified, ST - steelhead, SU - suckers or surface habitat, TR - trout unknown, VO - visual observation, VR - variable, WSU - white sucker

6 References

Data BC, Geographic Data Discovery Service website (<https://apps.gov.bc.ca/pub/geometadata/>)

Ecological Reports Catalogue website (<http://www.env.gov.bc.ca/ecocat/>)

Fish Inventories Data Queries website (<http://a100.gov.bc.ca/pub/fidq/>)

Habitat Wizard website (<http://www.env.gov.bc.ca/habwiz/>)

iMap BC website (<http://maps.gov.bc.ca/ess/sv/imapbc/>)

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List of Appendices

Appendix I: Site Data Forms and Photos

Appendix II: Map

Appendix I: Site Data Forms and Photos

SITE DATA

2021 Fish Habitat Assessment in the BCTS Babine Business Area - Smithers Field Unit - Block TA1756

Site: 4

SITE REFERENCE															
Gazetted Name:		WSC:		Map: 093M.077		Access: FT		Riparian Class: S6							
Local Name: Stream 1-A		TWC: 59813		Reach: 1		Assessed Lg: 200								Crew: MJ	
UTM Z.E.N: 9 641439 6184851		Method: GP2		Survey Date: 2021-08-26		Time: 12:30								Agency: C016	
CHANNEL															
Measurement	1	2	3	4	5	6	7	8	9	10	11	12	Avg:	Temp: 9 pH: 7.6 Cond: 75 Turbidity: C	
Channel Width (m):	1.2	1.2	0.8	1.3	1.3	1.2							1.17		
Wetted Width (m):	0	0	0	0	0	0							0		
Res. Pool Dp (m):	0.2	0.25	0.17	0.31	0.14	0.16	0.18						0.2		
Bankfull Depth (m):	0.15	0.15	0.15										0.15		
Chan. Gradient (%):	3	4	4	5									4		
Flow Stage: INT		Channel Conditions:		Flood Signs: None											
COVER															
CoverTotal:	SWD	LWD	B	CB	DP	OV	IV	Canopy: 21-40%		LWD Function & Distr: F/E		IV Type: MV			
T	N	T	N	T	D	S	N								
LB Shape: V		LB Texture: F		LB Riparian Vegetation: C		LB Riparian Vegetation Stage: MF									
RB Shape: U		RB Texture: F		RB Riparian Vegetation: C		RB Riparian Vegetation Stage: MF									
CHANNEL MORPHOLOGY															
Dom Substrate: F		D95 (cm): 2		Morphology: RP		Strm Patt: IR		Confmnt: UN		Coupling: DC		Islands: O			
Subdom Substr: G		D (cm): 2		Bars: SIDE DIAG		Disturbance Indicators:									
FEATURES															
Feature	H (m)	L (m)	Comment									UTM Z.E.N			
GF			Completely dissipates into the forest floor.									9 641439 6184851			
SAMPLING															
Method	EF sec	Samp L (m)	EF Volt	EF freq	EF pulse	Traps	Nets	Duration	Depth (m)	Hab					
EF	67	15	600	70	6										
Species	Stage	Total #	Min L	Max L	Act	Sampling Comments									
NFC			0			Sampled 11 watered pools in combined length, everything else was dry.									
COMMENTS															
Comm 1	No fish habitat - small, seasonal and isolated stream with no perennial fish habitat to support any isolated fish population.														
Comm 2	Disperses in the forest and completely disappears at site UTM.														
Comm 3	Several pools watered within 100m of upper surveyed section; pools are drying out however; mosquito larvae present.														
Comm 4	Proposed crossing UTM 9.641422.6184974.														
Comm 5															
Comm 6															
Comm 7															
Comm 8															

Site 4: view across - dispersion



Site 4: view d/s



Site 4: view u/s



Site 4: view d/s



SITE DATA

2021 Fish Habitat Assessment in the BCTS Babine Business Area -
Smithers Field Unit - Block TA1756

Site: 5

SITE REFERENCE															
Gazetted Name:		WSC:		Map: 093M.077		Access: FT		Riparian Class: S4/S6							
Local Name: Stream 1-C		TWC: 59811		Reach: 1		Assessed Lg: 400								Crew: MJ	
UTM Z.E.N: 9 640614 6184093		Method: GP2		Survey Date: 2021-08-27		Time: 10:30								Agency: C016	
CHANNEL															
Measurement	1	2	3	4	5	6	7	8	9	10	11	12	Avg:		
Channel Width (m):	1.2	1.2											1.2		
Wetted Width (m):	0	0											0		
Res. Pool Dp (m):	0	0	0.28	0.34									0.16		
Bankfull Depth (m):	0.15	0.15											0.15		
Chan. Gradient (%):	0.5	2											1.25		
Flow Stage: INT Channel Conditions: Flood Signs: None															
COVER															
CoverTotal:	SWD	LWD	B	CB	DP	OV	IV	Canopy: 1-20% LWD Function & Distr: N IV Type: MV							
T	D	T	N	T	N	S	N								
LB Shape: U		LB Texture: F		LB Riparian Vegetation: W		LB Riparian Vegetation Stage: NA									
RB Shape: U		RB Texture: F		RB Riparian Vegetation: W		RB Riparian Vegetation Stage: NA									
CHANNEL MORPHOLOGY															
Dom Substrate: F		D95 (cm): 1		Morphology: RP		Strm Patt: IR		Confmnt: OC		Coupling: DC		Islands: N			
Subdom Substr: G		D (cm): 1		Bars: N		Disturbance Indicators:									
FEATURES															
Feature	H (m)	L (m)	Comment									UTM Z.E.N			
GF		40	Seeps through wetland.									9 640682 6184276			
UC	0.5	4	Underground channel for 4m @11%									9 640738 6184371			
SAMPLING															
Method	EF sec	Samp L (m)	EF Volt	EF freq	EF pulse	Traps	Nets	Duration	Depth (m)	Hab					
EF	259	180	500	70	6										
Species	Stage	Total #	Min L	Max L	Act	Sampling Comments									
NFC			0			Sampled watered upper 110m near R2 and lower 70m near parent stream. Stream dry in-between.									
COMMENTS															
Comm 1	Stream is accessible to fish from parent stream (beaver pond) for ~220m up to the ground flow barrier during seasonal flows in spring.														
Comm 2	Mismatched by TRIM - flows near forest/wetland boundry in the mid section.														
Comm 3	Ephemeral flows lasting 6-8 weeks, indicated by sections of not very well developed channel and terrestrial mossed.														
Comm 4															
Comm 5															
Comm 6															
Comm 7															
Comm 8															

Site 5: view d/s



Site 5: ground flow barrier



SITE DATA

2021 Fish Habitat Assessment in the BCTS Babine Business Area - Smithers Field Unit - Block TA1756

Site: 6

SITE REFERENCE															
Gazetted Name:		WSC:		Map: 093M.077		Access: FT		Riparian Class: S6							
Local Name: Stream 1-C		TWC: 59811		Reach: 2&3		Assessed Lg: 400								Crew: MJ	
UTM Z.E.N: 9 640735 6184372		Method: GP2		Survey Date: 2021-08-27		Time: 12:45								Agency: C016	
CHANNEL															
Measurement	1	2	3	4	5	6	7	8	9	10	11	12	Avg:	Temp: 8.8 pH: 7.3 Cond: 86 Turbidity: C	
Channel Width (m):	1.7	1.7	1.7	1.7	1.8	2.1							1.78		
Wetted Width (m):	0	0	0	0	0	1.2							0.2		
Res. Pool Dp (m):	0.31	0.37	0.28	0.34									0.33		
Bankfull Depth (m):	0.2	0.3	0.3										0.27		
Chan. Gradient (%):	5	2	1										2.67		
Flow Stage: INT		Channel Conditions:		Flood Signs: None											
COVER															
CoverTotal:	SWD	LWD	B	CB	DP	OV	IV	Canopy: 1-20%		LWD Function & Distr: F/E		IV Type: MV			
T	N	T	N	S	D	T	N								
LB Shape: U		LB Texture: F		LB Riparian Vegetation: C		LB Riparian Vegetation Stage: MF									
RB Shape: U		RB Texture: F		RB Riparian Vegetation: C		RB Riparian Vegetation Stage: MF									
CHANNEL MORPHOLOGY															
Dom Substrate: F		D95 (cm): 45		Morphology: RP		Strm Patt: IR		Confmnt: OC		Coupling: DC		Islands: N			
Subdom Substr: G		D (cm): 4		Bars: N		Disturbance Indicators:									
FEATURES															
Feature	H (m)	L (m)	Comment									UTM Z.E.N			
SAMPLING															
Method	EF sec	Samp L (m)	EF Volt	EF freq	EF pulse	Traps	Nets	Duration	Depth (m)	Hab					
EF	130	100	500	70	6										
Species	Stage	Total #	Min L	Max L	Act	Sampling Comments									
NFC			0			Sampled the only watered 50m d/s of confluence with small W and 50m in W, otherwise stream was dry.									
COMMENTS															
Comm 1	No fish habitat - seasonal stream, inaccessible to fish from parent stream d/t ground flow barrier in R1.														
Comm 2	Watered only in 50m section d/s of inflow from small wetland.														
Comm 3	No perennial habitat to support any isolated fish population.														
Comm 4	Second visit, originally sampled by Triton in 1996 with negative results.														
Comm 5	Upstream of confluence with the small wetland (Reach 3) the stream is seasonal with alluvial deposits within swale and no distinct channel.														
Comm 6	Proposed crossing UTM 9.640752.6184435.														
Comm 7															
Comm 8															



SITE DATA

2021 Fish Habitat Assessment in the BCTS Babine Business Area -
Smithers Field Unit - Block TA1756

Site: 7

SITE REFERENCE															
Gazetted Name:		WSC:		Map: 093M.077		Access: FT		Riparian Class: S6/NCD							
Local Name: Stream 1-F		TWC: 59808		Reach: 1		Assessed Lg: 200								Crew: MJ	
UTM Z.E.N: 9 640654 6184344		Method: GP2		Survey Date: 2021-08-27		Time: 14:00								Agency: C016	
CHANNEL															
Measurement	1	2	3	4	5	6	7	8	9	10	11	12	Avg:		
Channel Width (m):	1.3	1	1	1.2	1.1	1.2							1.13		
Wetted Width (m):	0.4	0.7	0.7	0	0.5	0.1							0.4		
Res. Pool Dp (m):	0												0		
Bankfull Depth (m):	0.15	0.2											0.18		
Chan. Gradient (%):	4	7	11	11									8.25		
Flow Stage: INT		Channel Conditions:		Flood Signs: None											
COVER															
CoverTotal:	SWD	LWD	B	CB	DP	OV	IV	Canopy: 1-20%		LWD Function & Distr: F/E		IV Type: M			
N	N	N	N	N	N	N	N								
LB Shape: U	LB Texture: FB		LB Riparian Vegetation: C		LB Riparian Vegetation Stage: MF										
RB Shape: U	RB Texture: FB		RB Riparian Vegetation: C		RB Riparian Vegetation Stage: MF										
CHANNEL MORPHOLOGY															
Dom Substrate: C		D95 (cm): 40		Morphology: CP		Strm Patt: SI		Confmnt: CO		Coupling: CO		Islands: N			
Subdom Substr: G		D (cm): 10		Bars: N		Disturbance Indicators: C2									
FEATURES															
Feature	H (m)	L (m)	Comment									UTM Z.E.N			
GF			Disperses into the forest floor.									9 640669 6184311			
SAMPLING															
Method	EF sec	Samp L (m)	EF Volt	EF freq	EF pulse	Traps	Nets	Duration	Depth (m)	Hab					
NS															
Species	Stage	Total #	Min L	Max L	Act	Sampling Comments									
COMMENTS															
Comm 1	No fish habitat - tiny, seasonal, isolated and shallow stream.														
Comm 2	No perennial habitat to support any isolated fish population.														
Comm 3	Too shallow to sample.														
Comm 4	Proposed crossing UTM 9.640404.6184332.														
Comm 5															
Comm 6															
Comm 7															
Comm 8															

Site 7: view d/s- dispersion



Site 7: view u/s



Site 7: view d/s



Site 7: view u/s



SITE DATA

2021 Fish Habitat Assessment in the BCTS Babine Business Area -
Smithers Field Unit - Block TA1756

Site: 8

SITE REFERENCE

Gazetted Name: WSC: Map: 093M.077 Access: FT
Local Name: Stream 1-I TWC: 59807 Reach: 1 Assessed Lg: 300 Crew: MJ
UTM Z.E.N: 9 640446 6184158 Method: GP2 Survey Date: 2021-08-27 Time: 15:25 Agency: C016

Riparian
Class:

S6

CHANNEL

Measurement	1	2	3	4	5	6	7	8	9	10	11	12	Avg:
Channel Width (m):	1.1	1.4	1.2	1.2	1	1.2							1.18
Wetted Width (m):	0	0	0	0	0	0							0
Res. Pool Dp (m):	0												0
Bankfull Depth (m):	0.15	0.15	0.15										0.15
Chan. Gradient (%):	6	7	4	5									5.5

WATER

Temp:

pH:

Cond:

Turbidity:

Flow Stage: DRY Channel Conditions: Flood Signs: None

COVER

CoverTotal:	SWD	LWD	B	CB	DP	OV	IV
N	N	N	N	N	N	N	N

Canopy: 21-40%

LWD Function & Distr: F/E

IV Type: N

LB Shape: U LB Texture: FG LB Riparian Vegetation: C LB Riparian Vegetation Stage: MF

RB Shape: U RB Texture: FG RB Riparian Vegetation: C RB Riparian Vegetation Stage: MF

CHANNEL MORPHOLOGY

Dom Substrate: G D95 (cm): 8 Morphology: CP Strm Patt: IR Confmnt: OC Coupling: DC Islands: N
Subdom Substr: F D (cm): 6 Bars: N Disturbance Indicators:

FEATURES

Feature	H (m)	L (m)	Comment	UTM Z.E.N
GF			Dissipates into the forest floor.	9 640446 6184158

SAMPLING

Method	EF sec	Samp L (m)	EF Volt	EF freq	EF pulse	Traps	Nets	Duration	Depth (m)	Hab
NS										

Species	Stage	Total #	Min L	Max L	Act	Sampling Comments

COMMENTS

Comm 1	No fish habitat - seasonal, isolated and shallow stream.
Comm 2	No perennial habitat to support any isolated fish population.
Comm 3	Dissipates ~200m away from the parent stream - inaccessible to fish.
Comm 4	Proposed crossing UTM 9.640635.6184402.
Comm 5	
Comm 6	
Comm 7	
Comm 8	

Site 8: view u/s



Site 8: view d/s



Site 8: view d/s- dispersion



SITE DATA

2021 Fish Habitat Assessment in the BCTS Babine Business Area - Smithers Field Unit - Block TA1756

Site: 9

SITE REFERENCE

Gazetted Name: WSC: Map: 093M.077 Access: FT
Local Name: Stream 1-L TWC: 59804 Reach: 2 Assessed Lg: 250 Crew: MJ
UTM Z.E.N: 9 640269 6184161 Method: GP2 Survey Date: 2021-08-28 Time: 10:00 Agency: C016

**Riparian
Class:**

S6

CHANNEL

Measurement	1	2	3	4	5	6	7	8	9	10	11	12	Avg:
Channel Width (m):	1.1	1	1	1.5	1.3	1.2							1.18
Wetted Width (m):	0	0	0	0	0	0							0
Res. Pool Dp (m):	0												0
Bankfull Depth (m):	0.15	0.15	0.15										0.15
Chan. Gradient (%):	10	11	5	6									8

WATER

Temp: 9
pH: 7
Cond: 85
Turbidity: C

Flow Stage: INT Channel Conditions: Flood Signs: None

COVER

CoverTotal:	SWD	LWD	B	CB	DP	OV	IV
N	N	N	N	N	N	N	N

Canopy: 21-40% LWD Function & Distr: F/E IV Type: M

LB Shape: U LB Texture: FCB LB Riparian Vegetation: C LB Riparian Vegetation Stage: MF
RB Shape: V RB Texture: FCB RB Riparian Vegetation: C RB Riparian Vegetation Stage: MF

CHANNEL MORPHOLOGY

Dom Substrate: G D95 (cm): 45 Morphology: CP Strm Patt: SI Confmnt: CO Coupling: CO Islands: N
Subdom Substr: C D (cm): 9 Bars: N Disturbance Indicators: C1S3

FEATURES

Feature	H (m)	L (m)	Comment	UTM Z.E.N
C	3.5	15	15m @24% over rock rubble - impassable to fish.	9 640269 6184161

SAMPLING

Method	EF sec	Samp L (m)	EF Volt	EF freq	EF pulse	Traps	Nets	Duration	Depth (m)	Hab
NS										

Species	Stage	Total #	Min L	Max L	Act	Sampling Comments

COMMENTS

Comm 1	No fish habitat - seasonal stream isolated above cascade barrier.
Comm 2	No isolated fish population present above the barrier d/t lack of perennial habitat.
Comm 3	Stream with intermittent flow u/s of proposed crossing and dry d/s.
Comm 4	Proposed crossing UTM 9.640188.6184232
Comm 5	
Comm 6	
Comm 7	
Comm 8	

Site 9: view u/s



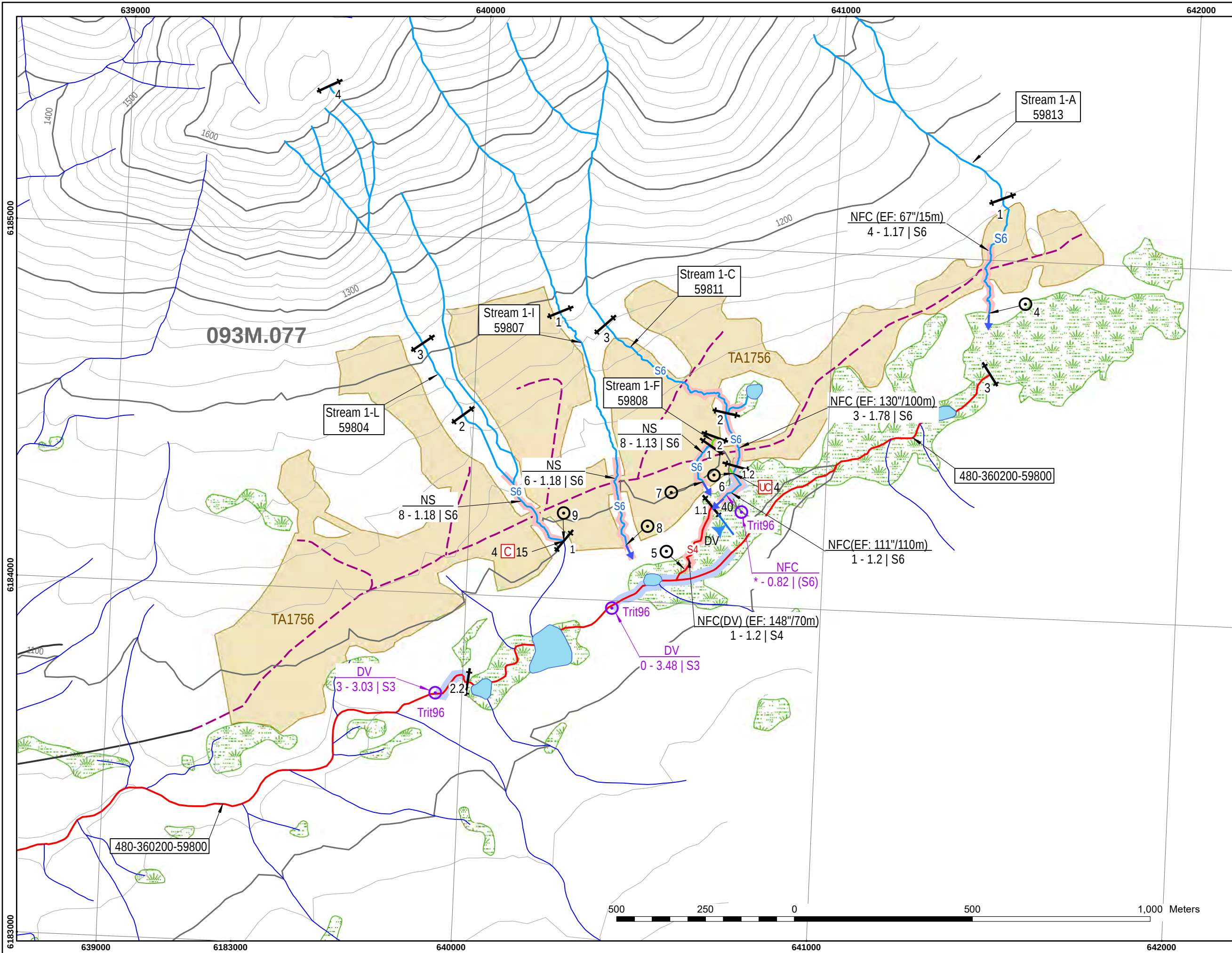
Site 9: view d/s



Site 9: view u/s - 3.5x15m cascade



Appendix II: Map



Fish Habitat Assessments in BCTS Babine Business Area Smithers Field Unit



Block TA 1756

Scale 1:10,000

Projection: BC Albers

Datum: NAD 83

Coordinates: UTM Zone 9

Field Survey: August 26 - 28, 2021

Inventory and Mapping by:



- S1 - S4 Game Fish Habitat with Riparian Class
- S5 - S6 Non-Game Fish Habitat with Riparian Class
- S5 - S6 No Fish Habitat with Riparian Class
- Fisheries Sensitive Zone
- Non-Classified Drainage
- No Watercourse Found
- Other Streams
- Past Assessment
- Current Assessment

Fish Info (Inferred)

NFC(RB)

1 - 2.3 | S3

Slope (%)

Channel Width (m)

Riparian (Inferred)

(Inferred)

Stream Assessment Info (past assessments in purple)

O₂

Site with ID

Past Assessment Site with Reference Source and Year

Stream Reach with ID

Stream ID (Name and/or WSC and/or TWC)

Stream Name 123-456000-78900

- Beaver Dam
- Cascade
- Dam
- Dewatering
- Sediment Wedge
- Underground Channel
- Alluvial Fan
- Spring
- Canyon
- Culvert
- Debris Jam
- Falls
- Undefined Barrier
- Velocity Barrier
- Ground Flow
- Tributary
- GF Observed (Current)
- GF Present (Historical)
- GF Distribution Limit
- NGF Observed (Current)
- NGF Present (Historical)
- NGF Distribution Limit

Feature Parameters

Height (m)

Length (m)

Highways

Paved Roads

Gravel Roads

Proposed Roads

1:20K Map Tile

1:20K Map Tile Label

20 m Contours and 100 m Labels

092N.055

Proposed Cutblock with ID

01234ABCD

Lakes/Rivers with ID

01234ABCD

Wetlands

Abbreviations:

- DN Dip netting
- DV Dolly Varden char
- EF Electrofishing
- FINS FINS Consulting Ltd.
- FSR Forest Service Road
- GF Game fish
- KC Kiohn-Crippen Cons. Ltd.
- m Meter(s)
- NA Not applicable
- NFC No fish captured
- NGF Non-game fish
- NS Not sampled
- RB Rainbow trout
- Trit Triton Environ. Cons. Ltd.
- TWC Temporary Watershed Code
- WSC Watershed Code
- ' Minute(s)
- " Second(s)