2585.06/WP#T-399

Reconnaissance (1:20,000) Fish and Fish Habitat Stream Inventory of Kitsuns Creek

Watershed Code: 450 - 318200

Kispiox Forest District Fish and Fish Habitat Inventory Project

Final Report

Prepared for:

Skeena Cellulose Inc.
Box 2237
Smithers, B.C.
V0J 2N0
and
Ministry of Environment, Lands and Parks
Bag 5000
Smithers, B.C.
V0J 2N0

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Prepared by: Arne Lorenz, B.Sc.

TRITON
Environmental Consultants Ltd.

Box 88, Terrace, BC V8G 4A2

PROJECT REFERENCE INFORMATION

Project Code:	06-KISP-3068-0002-1998
Proponent:	Ministry of Environment, Lands and Parks
Inventory Program:	Forest Renewal BC
Contract Number:	Section of CSK 3068, Skeena Region
FRBC Project Number:	SB96120

WATERSHED INFORMATION

Stream Names:	Kitsuns Creek
Watershed Codes:	450 318200
TRIM map sheets	93L.081, 93L.082, 93L.091, 93L.092
Total Number of Reaches:	368
Number of Reaches/Sites Sampled:	33
Fish Species Present:	ST, PK, CH, CO, DV, BT
Biogeoclimatic Zone(s):	CWH, ESSF
Survey Dates:	September 15-17, 1997.
MELP Region:	Skeena Region (6)
Management Units:	6-9
Forest District:	Kispiox Forest District
Forest Licensee:	Skeena Cellulose Inc.

CONTRACTOR INFORMATION

Survey Agency:	Triton Environmental Consultants Box 88, Terrace, B.C., V8G 4A2 (250) 635-1494 C172
Project Director:	Adam Lewis, M.Sc., R.P.Bio.
Project Manager:	Arne Lorenz, B.Sc.
Field Crew:	Arne Lorenz, B.Sc., Sam Buchanan, D. Tech., Lloyd Dallyn and Chris Collins
Data Entry:	Lloyd Dallyn and Sam Buchanan, D. Tech.,
Inventory Mapping:	Shannon Shields, B.A., and Michele Patterson, D. Tech.,

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.

ACKNOWLEDGMENTS

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We would like to thank Todd Mahon, Skeena Cellulose Inc. representative who was the contract administrator and provided valuable input throughout the contract, and Paul Giroux, Fisheries Inventory Specialist, Ministry of Environment, Lands and Parks, Skeena Region, who acted as contract monitor and provided technical expertise as well as valuable input throughout the project.

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1. INTRODUCTION

1.1 Project Objectives

Triton Environmental Consultants Ltd. was contracted by the British Columbia Ministry of Environment, Lands and Parks, Fisheries Branch to conduct stream inventories in select watersheds within the Kispiox Forest District. Information was collected on the biological and physical stream characteristics, fish species assemblage, and fish distribution. The purpose of the Reconnaissance (1:20 000) Fish and Fish Habitat Inventory is to describe watershed-wide fish distributions and habitat characteristics for the project area.

1.2 Study Area

The project area is within the Kispiox Forest District in northwestern central British Columbia (Figure 1). The project area included 11 discrete working areas (Table 1). This report covers Kitsuns Creek, Project Working Area #4 (Table 1). Kitsuns Creek flows north into the Kitseguecla River approximately 46 km northwest of Smithers (Figure 1). Access to this area was by helicopter from Hazelton, B.C..

Table 1. Watershed working areas within the Kispiox Forest District

Working Area #	Working Area	Stream Network	Watershed Code
1	Shedin Creek	Unnamed Creeks, Sperry Creek, Rosenthal Creek, Damsumlo Creek ⇒ Shedin Creek ⇒ Babine River ⇒ Skeena River ⇒ Pacific Ocean	480 027800
2	Goathead Creek	Unnamed Creeks ⇒ Goathead Creek ⇒ Shedin Creek ⇒ Babine River ⇒ Skeena River ⇒ Pacific Ocean	480 027800 11600
3	West Kitsuns Creek Tributary	Unnamed Creeks ⇒ Unnamed Creek ⇒ Kitsuns Creek ⇒ Kitseguecla River ⇒ Skeena River ⇒ Pacific Ocean	450 318200 18200 45700
4	Kitsuns Creek	Unnamed Creek ⇒ Kitsuns Creek ⇒ Kitseguecla River ⇒ Skeena River ⇒ Pacific Ocean	450 318200
5	Larkworthy Creek	Unnamed Creeks ⇒ Larkworthy Creek ⇒ Skeena River ⇒ Pacific Ocean	400 593800
6	Cranberry River Tributaries	Unnamed Creeks ⇒ Cranberry River ⇒ Nass River ⇒ Pacific Ocean	530-000000
7	Carrigan Creek Tributaries	Unnamed Creeks ⇒ Carrigan Creek ⇒ Skeena River ⇒ Pacific Ocean	400 519600
8	Skeena River Tributaries (S. of Larkworthy Cr.)	Unnamed Creeks ⇒ Skeena River ⇒ Pacific Ocean	400-
9	Deep Canoe Creek	Unnamed Creeks ⇒ Deep Canoe Creek ⇒ Skeena River ⇒ Pacific Ocean	400 574200
10	Skeena River Tributaries (S. of Sicintine R.)	Unnamed Creeks ⇒ Skeena River ⇒ Pacific Ocean	400
11	Moonlit Creek	Unnamed Creeks ⇒ Moonlit Creek ⇒ Kitwanga River ⇒ Skeena River ⇒ Pacific Ocean	400 694900 48600

Figure 1. Project overview map

1.3 Review of Existing Information

The Fisheries Information Summary System (FISS) Map 93M/04 indicate steelhead (*Oncorhynchus mykiss*), pink (*O. gorbuscha*), chinook (*O. tshawytscha*), and coho (*O. kisutch*) salmon spawning in the lower 2 km of Kitsuns Creek. Map 93L/13 indicates Dolly Varden char (*Salvelinus malma*) in Kitsuns Creek.

2. METHODS

Standard methodology as outlined in Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures (RIC 1997) for performing stream inventories were followed. The reconnaissance level fish and fish habitat inventory is a sample-based survey covering whole watersheds as defined from 1:20,000 scale maps and air photos. The project includes 6 phases as listed below:

Phase 1: Data Review: A review of all available background information was completed. All known fisheries information is summarized in this report; new data were transcribed onto the 1:20,000 TRIM maps, and 1:50,000 NTS maps to update Fisheries Information Summary System (FISS) database (DFO).

Phase 2: Classification and Sampling Design: A comprehensive map and air photo review was completed for all waterbodies identified on 1:20,000 TRIM maps. Reach characteristics (gradient, order, pattern, confinement) were recorded for all streams within the project area and recorded on the Reach Table (RIC,1997). The Reach Table was used to generate a sample size (a subset of reaches to be sampled) within the working area based on RIC guidelines. The Reach Totals and Sample Size Sheet (RIC, 1997) was generated which provides a summary of the number of reaches of each type (based on gradient class, size and pattern/confinement) to be sampled. Detailed Reach Forms were completed for selected reaches to be sampled.

Phase 3: Project Plan: A field sampling plan was developed to sample sites in a variety of stream gradients and stream orders. The purpose of the plan was to describe watershed wide fish distribution, not necessarily to sample all potential fish bearing reaches. Data from Phases 1 and 2, and the Project Plan were presented to and approved by Paul Giroux, MELP Fisheries Inventory Specialist.

Phase 4: Field Inventory: Field sampling of selected sites was completed from September 15-17, 1997.

Phase 5: Data Entry and Analysis: Field sampling data (including site cards, fish cards, and photodocumentation) were entered into the FDIS database. 1:50,000 scale NTS maps of the study area were updated with new information as per the FISS Data Compilation and Mapping Procedures (DFO, 1997).

Phase 6: Reporting and Final Mapping: Field and office data were mapped using Arc View and Arc Info software, photographs were scanned and printed, and draft and final reports were completed.

2.1 Changes To Methodology

2.1.1 Phase 2

The required number of sample sites as determined by the Reach Sampling Summary were chosen with bias (rather than randomly) to incorporate biological concerns (fish distribution) and access issues. Additional reaches were chosen upstream and downstream of known barriers to determine limits of fish distribution.

2.1.2 Phase 4

All sample site locations (except for no visible channel sites) were marked in the field with flagging tape and with the ILP and site numeric identifier (NID) on a steel tag fixed to a blaze on a tree.

2.1.3 Phase 5

Photographic data were edited when entered into FDIS from the original field data forms to reduce duplication of photographs and to eliminate poor quality photographs. Field data forms remain unaltered as a permanent record for the sample site. All photos were taken with 35mm slide film, and scanned using a Nikon LS-1000 film scanner. Slides were scanned at 300 dpi, and saved as *.JPG files (.8 compression). Stored photo files are about 300kb, and uncompress to about 5mg each. Digital photos were printed as thumbnails using Corel Mosaic. All site photos were copied to CD, 2 copies have been sent to MELP Smithers, and Triton will retain 1 copy on file.

2.1.4 Phase 6

The inventory and interpretative maps were combined to produce one map. The working area is indicated by blue coloured stream lines. Fish presence is represented by light red highlighting over stream lines (sampled: solid or inferred: dashed) and no fish presence is represented by light blue highlighting over stream lines (sampled: solid or inferred: dashed). Stream classifications are provided for sampled reaches only. Stream summary symbols provide the following information for each sampled site:

- sample site ID,
- fish species presence, not sampled or no fish caught,
- stream or wetland,
- reach confinement,
- reach gradient,
- reach pattern,
- site gradient,
- site channel width,
- site morphology,
- site dominant substrate type,
- site disturbance(s) if applicable, and
- stream classification.

2.2 Field Assessments

The Kitsuns Creek watershed was surveyed on September 15-17th, 1997. Field assessments followed procedures outlined in Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures (RIC, 1997). Generally, the process we followed in the field was to:

- assess the watershed during a helicopter overflight to confirm reach boundaries, identify access points, and photograph reaches at a watershed scale,
- assess each reach on the ground by completing a standard site card, sampling for fish presence, completing a fish collection card and photographing representative habitats, and
- identify dey features such as barriers to fish migration, spawning locations and bridges; photograph and recorded features on site cards with a unique numeric identifier (NID).

Sample site lengths were equal to the greater of 100m or 10 bankfull widths. Stream widths were determined by measuring the channel width with a tape measure, or by visual estimate. At least 6 channel width measurements were made within each reach, each one at least one channel width distance apart. These measurements were averaged

to determine the average channel width. Stream gradients were measured using a clinometer. Stream morphology was determined using the *Channel Assessment Procedures Guidebook* (MOF 1996). Depths were measured using a folding meter stick. Water quality (pH and conductivity) was assessed using a Hannah pHTestr2^{TM} and TDSTestr3^{TM}. Turbidity was assessed by ground estimate. Habitat quality was assessed for rearing, spawning, overwintering and cover, each of these habitat types was rated as either Good, Fair, Moderate or Poor. Wildlife observations were noted.

2.3 Fish Sampling

Fish presence was determined by electrofishing at least 100m^2 or the equivalent of 10 bankfull widths of habitat in each reach using a Smith Root Model 12B electroshocker. Captured fish were measured (nose-fork length) and keyed out to species (if necessary) using the *Field Key to the Freshwater Fishes of British Columbia* (McPhail and Carveth, 1994). Bull trout and Dolly Varden char were identified to species based on Haas and McPhail (1991) which describe distinguishing meristict characteristics. Fish collection forms were completed for each site where fish sampling occurred.

3. INVENTORY DATA

3.1 Survey Information

A total of 368 reaches were identified within the Kitsuns Creek working area. A total of 33 sample sites were visited for inventory purposes.

Project inventory maps are presented in Appendix A - Inventory Map. Individual site card information and fish collection data is presented in Appendix B - Stream Site Data from FDIS and Fish Collection Data. Individual site photographs and contact sheets are presented in Appendix C - Photograph Captions and Contact Sheets.

3.1.1 Problems

Watershed codes were not available at the time of mapping and have therefore not been included. All streams were identified with a numeric interim locational point (ILP), ILP's are used throughout this report to identify specific streams.

3.2 Fish Distribution

Dolly Varden (*Salvelinus malma*) and bull trout (*S. confluentus*) were captured in Kitsuns Creek. A pair of spawning bull trout were captured in a small, left bank, third order tributary to Reach 1 of Kitsuns Creek (ILP 00042 map sheet 93L.092).

No barriers were apparent on the mainstem of Kitsuns Creek and it is fish bearing to the headwaters. Fish distribution within the major tributaries is limited by barriers. The most notable limits to fish distribution are:

- a 4.5m waterfall barrier approximately 1.8 km upstream of the mouth in Reach 1 of the major left bank tributary (ILP 00001 map sheet 93L.092, and
- a 3m waterfall barrier approximately 0.9 km upstream from the mouth in Reach 1 of the major right bank tributary (ILP 00018 map sheet 93L082).

Generally, fish distribution is limited to the mainstem of Kitsuns Creek and in tributaries up to the first impassable barrier where suitable habitat exists.

3.3 Fish Habitat

Fish habitat exists in Kitsuns Creek and in its major tributaries. Glacial input affects two of the major tributaries and Kitsuns Creek becomes glacial downstream of the first major left bank tributary. The best rearing habitat for Dolly Varden was found in Reach 1 of ILP 00002, ILP 00012, and ILP 00027 all on map sheet 93L.092, as well as the mainstem of Kitsuns Creek upstream of glacial tributaries.

A pair of adult spawning bull trout were captured in ILP 00042 (map sheet 93L.092) at the base of a chute barrier in a pool with suitable spawning gravels approximately 60m upstream from the mouth. No other definitive spawning areas were observed although spawning habitat exists throughout mainstem and tributaries to Kitsuns Creek.

3.4 Fish Condition

All captured fish appeared to be healthy. Bull trout ranged in size from 160mm - 420mm; and Dolly Varden ranged in size from 32mm - 180mm; all were considered to be rearing. No attempt was made to examine captured fish internally for the determination of maturity. A Dolly Varden measuring 170mm in length, caught at the mouth of ILP 00018 (map sheet 93L.082), was exibiting spawning colouration. Two bull trout, measuring 400mm and 420mm in length were captured at the time of spawning and were exibiting spawning colouration.

3.5 Rehabilitation/Enhancement Opportunities

There are no rehabilitation or enhancement opportunities for this working area.

3.6 Follow-up Sampling

Follow-up sampling is recommended for Reach 1 in ILP 00035 map sheet 93L.092 upstream of the sample location to determine the end of fish use as no barriers were

encountered during this inventory. Fish presence was inferred beyond where fish had been captured up to the reach break. Where forest harvesting is planned adjacent to inferred fish bearing or non-fish bearing stream reaches with average reach gradient less than 20%, 1:5,000 scale riparian area classifications should be performed to confirm fish presence or absence.

3.7 Other Concerns/Interest Points

The Kitsuns Creek watershed contains sympatric populations of bull trout and Dolly Varden. No hybrids of the two species were encountered during our sampling. Genetic testing in sympatric populations of bull trout and Dolly Varden in western Washington found no evidence of hybridization or introgression (Leary and Allendorf, 1997). Recent research indicates that sympatric populations of bull trout and Dolly Varden are not as uncommon as once believed (Gordon Haas, pers. comm. 1998). More intensive research is required to determine the frequency of this occurrence and the ecological importance.

Bull trout are identified as a wildlife species at risk by the Forest Practices Code and are blue listed by the British Columbia Conservation Data Centre.

3.8 Non-Fish Bearing Reaches

Non-fish bearing reach reports are provided for relevant reaches including intermittent streams (Table 2). The most downstream reach of a stream which was determined to be non-fish bearing is identified in the report. All subsequent reaches upstream are non-fish bearing by default and are not identified separately. No reports are provided for the TRIM anomaly of a no visible channel - a channel that appears on a TRIM map but was not found in the field.

Table 2. Non-Fish Bearing Status Report for the Kitsuns Creek Watershed

Initial Sampling Date	Follow-up Sampling Date	Watershed Code or ILP Number	Stream Name	Reach Number	Site Number	Map Sheet Number	Capture Method (elecrofishing settings)	Area Covered (m^2)	Sampling Effort	Cond. (µS)	Water Temp. (deg. Celsius)	Flow Stage (VO)	Turbidity (V0)	Known Fish Presence (u/s-d/s)	Obstructions to Fish Migration	Seasonal Habitat Availability	Seasonal Fish Use
17/09/1997	-	9	Unnamed	1	3079	93L.092	no habitat to sample for fish	-	-	-	-	-	Clear	DV, BT downstream in Kitsuns Creek	Flows over eroding bank into Kitsuns Creek	None	None
17/09/1997	-	27	Unnamed	1	3082	93L.091	EF, 300/60/8	300	471 seconds	120	7	Low	Clear	DV downstream below barrier	4m falls 800m upstream of mouth	All	None
15/09/1997	-	44	Unnamed	1	3072	93L.092	no habitat to sample for fish	-	-	130	9	Low	Clear	DV, BT downstream in Kitsuns Creek	39% gradient from mouth	None	None
15/09/1997	-	42	Unnamed	2	3071	93L.092	EF, 400/60/8	400	290 seconds	90	9	Low	Clear	DV, BT downstream below chute barrier	Chute barrier 60m upstream of mouth	All	None
15/09/1997	-	47	Unnamed	1	3069	93L.092	no habitat to sample for fish	-	-	70	7	Low	Clear	DV, BT downstream in Kitsuns Creek	26% gradient from mouth	None	None
15/09/1997	-	49	Unnamed	2	3068	93L.092	no habitat to sample for fish	-	-	50	8	Low	Clear	DV, BT downstream in Kitsuns Creek	20% gradient	None	None
15/09/1997	-	57	Unnamed	1	3066	93L.092	EF, 200/60/8	50	88 seconds	150	7	Low	Clear	DV, BT downstream in Kitsuns Creek	31% gradient from mouth	None	None
15/09/1997	-	1	Unnamed	2	1089	93L.091	EF, 400/70/6	160	320 seconds	120	5	Low	Lightly Turbid	DV, BT downstream below falls barrier	4.5m waterfall 1.8km upstream from mouth	All	None
16/09/1997	-	18	Unnamed	1	3073	93L.082	EF, 300/60/8	680	404 seconds	-	7	Low	Clear	DV, BT downstream in Kitsuns Creek	3m waterfall 800m from mouth	All	None
16/09/1997	-	46	Unnamed	1	3075	93L.082	EF, 300/60/8	85	146 seconds	-	7	Low	Clear	DV, BT downstream in Kitsuns Creek	25% gradient for first 50m	No overwintering habitat	None

4. REFERENCES

Department of Fisheries and Oceans. 1997. Fisheries Information Summary System Data Compilation and Mapping Procedures.

Haas, G.R. and J.D. McPhail. 1991. Systematics and distributions of Dolly Varden (*Salvelinus malma*) and bull trout (*Salvelinus confluentus*) in North America. Can. J. Fish. Aquat. Sci. 48:2191-221.

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Appendix A - Inventory Map

Appendix B - Stream Site Data from FDIS and Fish Collection Data

Appendix C - Photograph Captions and Contact Sheets

Photo Date	Watershed/ Working area	Stream Name or ILP	ILP Mapsheet	Card Site #	Site or Feature NID	NID Mapsheet #	Roll #	Frame #	CD#	Folder	Image	Focal Length (St, Wd, Te)	Dir (Up, Dn, Xs, Fish, Ae)	Comments (Description and/or scale item)
97-Sep-15	Kitsuns	00001	93L.092	1088	01088	93L.091	101	18	KISPIOX	101	18	St	Up	Large boulder, cobble bar.
97-Sep-15	Kitsuns	00001	93L.092	1088	01088	93L.091	101	19	KISPIOX	101	19	St	Dn	Leaning log in channel on left.
97-Sep-15	Kitsuns	00001	93L.092	1088	01088	93L.091	101	20	KISPIOX	101	20	St	Up	Wide channel, cobble bar.
97-Sep-15	Kitsuns	00001	93L.092	1088	01088	93L.091	101	21	KISPIOX	101	21	St	Up	Eroding bank.
97-Sep-15	Kitsuns	00001	93L.092	1089	02102	93L.091	101	22	KISPIOX	101	22	St	Ae	Aerial view of falls at u/s end Reach 2. 40m.
97-Sep-15	Kitsuns	00001	93L.092	1089	02102	93L.091	101	24	KISPIOX	101	23	St	Ae	Aerial view of falls at u/s end Reach 2. 40m.
97-Sep-15	Kitsuns	00001	93L.092	1089	01089	93L.091	101	26	KISPIOX	101	24	St	Dn	Riffle, cobbles on bank.
97-Sep-15	Kitsuns	00001	93L.092	1089	01089	93L.091	101	27	KISPIOX	101	25	St	Up	Helicopter in background.
97-Sep-15	Kitsuns	00001	93L.092	1089	01089	93L.091	101	28	KISPIOX	101	26	St	Ae	Aerial view of site.
97-Sep-16	Kitsuns	00001	93L.092	1092	02104	93L.082	101	29	KISPIOX	101	27	St	Ae	Aerial view of log jam, slide/avalanche path on walls.
97-Sep-16	Kitsuns	00001	93L.092	1092	02105	93L.082	101	30	KISPIOX	101	28	St	Ae	Aerial view of falls in Reach 1.
97-Sep-16	Kitsuns	00001	93L.092	1092	01092	93L.082	101	32	KISPIOX	101	29	St	Ae	Aerial view of confluence with Kitsuns mainstem.
97-Sep-16	Kitsuns	00005	93L.081	1090	01090	93L.081	23	1	KISPIOX	23	1	St	Up	Tree fallen across channel.
97-Sep-16	Kitsuns	00005	93L.081	1090	01090	93L.081	23	2	KISPIOX	23	2	St	Up	Riffle, root wad on photo right.
97-Sep-16	Kitsuns	00005	93L.081	1090	01090	93L.081	23	3	KISPIOX	23	3	St	Dn	Boulder on left, snag in bacground.
97-Sep-16	Kitsuns	00144	93L.091	1091	01091	93L.091	23	4	KISPIOX	23	4	St	Dn	Channel widening below steps.
97-Sep-16	Kitsuns	00144	93L.091	1091	01091	93L.091	23	5	KISPIOX	23	5	St	Up	LWD steps full channel width.
97-Sep-16	Kitsuns	00001	93L.092	1092	01092	93L.082	23	6	KISPIOX	23	6	St	Up	Unstable/eroding bank.
97-Sep-16	Kitsuns	00001	93L.092	1092	02104	93L.082	23	7	KISPIOX	23	7	St	Up	Log jam from ground
97-Sep-16	Kitsuns	00001	93L.092	1092	01092	93L.082	23	8	KISPIOX	23	8	St	Up	Upstream from top of log jam.
97-Sep-16	Kitsuns	00001	93L.092	1092	01092	93L.082	23	9	KISPIOX	23	9	St	Dn	Downstream, large boulder on right.
97-Sep-16	Kitsuns	00001	93L.092	1092	01092	93L.082	23	10	KISPIOX	23	10	Te	Fish	DV 185mm
97-Sep-16	Kitsuns	00001	93L.092	1092	01092	93L.082	23	11	KISPIOX	23	11	Te	Fish	DV 185mm
97-Sep-16	Kitsuns	Kitsuns Creek		1093	01093	93L.092	23	12	KISPIOX	23	12	St	Up	Eroding bank in background
97-Sep-16	Kitsuns	Kitsuns Creek		1093	01093	93L.092	23	13	KISPIOX	23	13	St	Dn	Run with riffle in background.
97-Sep-16	Kitsuns	00037	93L.082	1094	01094	93L.082	23	14	KISPIOX	23	14	St	Up	Upstream from confluence.
97-Sep-16	Kitsuns	00037	93L.082	1094	01094	93L.082	23	15	KISPIOX	23	15	St	Up	LWD steps.

Photo Date	Watershed/ Working area	Stream Name or ILP	ILP Mapsheet	Card Site #	Site or Feature NID	NID Mapsheet #	Roll #	Frame #	CD#	Folder	Image	Focal Length (St, Wd, Te)	Dir (Up, Dn, Xs, Fish, Ae)	Comments (Description and/or scale item)
97-Sep-16	Kitsuns	00037	93L.082	1094	01094	93L.082	23	16	KISPIOX	23	16	St	Dn	Dead trees/branches in channel.
97-Sep-16	Kitsuns	00037	93L.082	1094	01094	93L.082	23	17	KISPIOX	23	17	Te	Fish	DV 124mm
97-Sep-16	Kitsuns	00037	93L.082	1094	01094	93L.082	23	18	KISPIOX	23	18	Te	Fish	DV 124mm
97-Sep-16	Kitsuns	Kitsuns Creek		1095	01095	93L.082	23	20	KISPIOX	23	19	St	Up	Cobble/boulder riffle
97-Sep-16	Kitsuns	Kitsuns Creek		1095	01095	93L.082	23	21	KISPIOX	23	20	St	Dn	Log in foreground.
97-Sep-16	Kitsuns	Kitsuns Creek		1095	01095	93L.082	23	22	KISPIOX	23	21	St	Dn	Failing right bank.
97-Sep-17	Kitsuns	00064	93L.081	1096	01096	93L.081	24	2	KISPIOX	24	1	Te	Fish	DV 82mm.
97-Sep-17	Kitsuns	00064	93L.081	1096	01096	93L.081	24	3	KISPIOX	24	2	Te	Fish	DV 97mm
97-Sep-17	Kitsuns	00064	93L.081	1096	01096	93L.081	24	4	KISPIOX	24	3	St	Up	LWD step.
97-Sep-17	Kitsuns	00064	93L.081	1096	01096	93L.081	24	5	KISPIOX	24	4	St	Dn	Boulder/cobble steps
97-Sep-17	Kitsuns	00061	93L.081	1097	01097	93L.081	24	6	KISPIOX	24	5	St	Dn	Small logs/branches across channel.
97-Sep-17	Kitsuns	00061	93L.081	1097	01097	93L.081	24	7	KISPIOX	24	6	St	Up	Large log step.
97-Sep-17	Kitsuns	00061	93L.081	1097	01097	93L.081	24	8	KISPIOX	24	7	St	Up	LWD in channel, person's head in lower left.
97-Sep-17	Kitsuns	00005	93L.081	1098	01098	93L.081	24	9	KISPIOX	24	8	St	Dn	Riffle, overhanging alder.
97-Sep-17	Kitsuns	00005	93L.081	1098	01098	93L.081	24	10	KISPIOX	24	9	St	Up	Riffle, person walking on right.
97-Sep-17	Kitsuns	00005	93L.081	1098	01098	93L.081	24	11	KISPIOX	24	10	St	Ae	Aerial view of valley upstream
97-Sep-17	Kitsuns	00005	93L.081	1098	01098	93L.081	24	12	KISPIOX	24	11	St	Ae	Aerial view of valley downstream
97-Sep-17	Kitsuns	00005	93L.081	1098	02106	93L.081	24	13	KISPIOX	24	12	St	Ae	Falls 20m at Reach 2/Reach 3 break.
97-Sep-17	Kitsuns	00005	93L.081	1098	02107	93L.081	24	15	KISPIOX	24	13	St	Ae	Chutes on Reach 1.
97-Sep-17	Kitsuns	00013	93L.082	1100	01100	93L.082	24	22	KISPIOX	24	14	St	Up	Intermittent channel, limited flow, devil's club.
97-Sep-17	Kitsuns	00013	93L.082	1100	01100	93L.082	24	23	KISPIOX	24	15	St	Dn	Person standing in channel, vegetation in foreground.
97-Sep-17	Kitsuns	00008	93L.082	1099	01099	93L.082	24	26	KISPIOX	24	16	St	Up	Hat in foreground, mossy banks.
97-Sep-17	Kitsuns	00008	93L.082	1099	01099	93L.082	24	27	KISPIOX	24	17	St	Dn	Mossy banks, small channel.
97-Sep-17	Kitsuns	00008	93L.082	1099	01099	93L.082	24	28	KISPIOX	24	18	St	Up	Blaze on tree back right, moss.
97-Sep-17	Kitsuns	00008	93L.082	1099	01099	93L.082	24	29	KISPIOX	24	19	St	Up	Exposed clay bank on left
97-Sep-17	Kitsuns	00041	93L.082	1101	01101	93L.082	24	30	KISPIOX	24	20	St	Dn	Mossy log across channel.
97-Sep-17	Kitsuns	00041	93L.082	1101	01101	93L.082	24	31	KISPIOX	24	21	St	Up	Mossy LWD in channel.

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97-Sep-17	Kitsuns	00041	93L.082	1101	01101	93L.082	24	32	KISPIOX	24	22	St	Up	Small conifers in foreground, ferns in bacground.
97-Sep-17	Kitsuns	00035	93L.092	1102	01102	93L.090	24	34	KISPIOX	24	23	Te	Fish	DV 108mm.
97-Sep-17	Kitsuns	00035	93L.092	1102	01102	93L.090	24	35	KISPIOX	24	24	St	Up	Some moss on boulders, fallen tree in background.
97-Sep-17	Kitsuns	00035	93L.092	1102	01102	93L.090	24	36	KISPIOX	24	25	St	Dn	Person sitting on right.
97-Sep-17	Kitsuns	00035	93L.092	1102	01102	93L.090	24	37	KISPIOX	24	26	St	Up	Confluence with Kitsuns.
97-Sep-15	Kitsuns	Kitsuns Rea	N/A	3065	03065	93L.092	21	1	KISPIOX	21	1	St	Fish	BT and DV in bucket.
97-Sep-15	Kitsuns	Kitsuns Rea	N/A	3065	03065	93L.092	21	2	KISPIOX	21	2	St	Fish	BT on fry board.
97-Sep-15	Kitsuns	Kitsuns Rea	N/A	3065	03065	93L.092	21	4	KISPIOX	21	3	St	U	Person upstream beside water.
97-Sep-15	Kitsuns	Kitsuns Rea	N/A	3065	03065	93L.092	21	5	KISPIOX	21	4	St	Xs	Eroding bank
97-Sep-15	Kitsuns	Kitsuns Rea	N/A	3065	03065	93L.092	21	6	KISPIOX	21	5	St	D	Bend in creek, boulders foreground.
97-Sep-15	Kitsuns	Kitsuns Rea	N/A	3065	03065	93L.092	21	7	KISPIOX	21	6	St	D	Eroding bank in background
97-Sep-15	Kitsuns	00057	93L.092	3066	03066	93L.092	21	8	KISPIOX	21	7	St	U	View from mouth, across Kitsuns mainstem.
97-Sep-15	Kitsuns	00057	93L.092	3066	03066	93L.092	21	9	KISPIOX	21	8	St	D	Downstream towards mainstem, LWD.
97-Sep-15	Kitsuns	00054	93L.092	3067	03067	93L.092	21	10	KISPIOX	21	9	St	Xs	View from road.
97-Sep-15	Kitsuns	00049	93L.092	3068	03068	93L.092	21	11	KISPIOX	21	10	St	U	Person upstream, branches across channel.
97-Sep-15	Kitsuns	00049	93L.092	3068	03068	93L.092	21	12	KISPIOX	21	11	St	D	Notebook mid channel.
97-Sep-15	Kitsuns	00047	93L.092	3069	03069	93L.092	21	13	KISPIOX	21	12	St	U	Person beside small channel.
97-Sep-15	Kitsuns	00047	93L.092	3069	03069	93L.092	21	14	KISPIOX	21	13	St	U	Person in orange upstream, devil's club.
97-Sep-15	Kitsuns	00047	93L.092	3069	03069	93L.092	21	15	KISPIOX	21	14	St	D	Yellow ribbon tied around tree near channel.
97-Sep-15	Kitsuns	00042	93L.092	3070	03070	93L.092	21	16	KISPIOX	21	15	St	Fish	Spawning pair of BT in bucket.
97-Sep-15	Kitsuns	00042	93L.092	3070	03070	93L.092	21	19	KISPIOX	21	16	St	Fish	BT
97-Sep-15	Kitsuns	00042	93L.092	3070	03070	93L.092	21	20	KISPIOX	21	17	St	Fish	DV on fry board.
97-Sep-15	Kitsuns	00042	93L.092	3070	03070	93L.092	21	21	KISPIOX	21	18	St	Fish	Pair of bulltrout in water beside bucket.
97-Sep-15	Kitsuns	00042	93L.092	3070	04034	93L.092	21	22	KISPIOX	21	19	St	U	Pool with falls where BT found spawning.
97-Sep-15	Kitsuns	00042	93L.092	3070	04032	93L.092	21	23	KISPIOX	21	22	St	U	Chute 10m upstream of BT spawning pool, 60m upstream of mouth.
97-Sep-15	Kitsuns	00042	93L.092	3071	03071	93L.092	21	24	KISPIOX	21	21	St	U	Person for scale, boulders, eroding bank.

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97-Sep-15	Kitsuns	00042	93L.092	3071	03071	93L.092	21	25	KISPIOX	21	23	St	D	Person on log across channel.
97-Sep-15	Kitsuns	00042	93L.092	3070	3070	93L.092	21	26	KISPIOX	21	24	St	D	View to mouth, person on left.
97-Sep-15	Kitsuns	00042	93L.092	3070	3070	93L.092	21	27	KISPIOX	21	25	St	U	View to chute, step pool.
97-Sep-15	Kitsuns	00044	93L.092	3072	03072	93L.092	21	28	KISPIOX	21	26	St	U	Person on boulder at mouth of stream.
97-Sep-15	Kitsuns	00044	93L.092	3072	03072	93L.092	21	29	KISPIOX	21	27	St	D	View downstream to mainstem confluence.
97-Sep-16	Kitsuns	00018	93L.082	3073	3073	93L.082	21	30	KISPIOX	21	28	St	U	Bucket and pool.
97-Sep-16	Kitsuns	00018	93L.082	3073	3073	93L.082	21	31	KISPIOX	21	29	St	D	Bucket mid channel.
97-Sep-16	Kitsuns	00018	93L.082	3073	3073	93L.082	21	32	KISPIOX	21	30	St	U	Log across channel.
97-Sep-16	Kitsuns	00048	93L.082	3074	03074	93L.082	21	33	KISPIOX	21	31	St	U	Bucket and burnt log.
97-Sep-16	Kitsuns	00048	93L.082	3074	03074	93L.082	21	34	KISPIOX	21	32	St	D	Bucket mid channel.
97-Sep-16	Kitsuns	00046	93L.082	3075	03075	93L.082	21	35	KISPIOX	21	33	St	D	Striped red flagging on tree.
97-Sep-16	Kitsuns	00046	93L.082	3075	03075	93L.082	21	36	KISPIOX	21	34	St	U	Small stable channel. Vertical photo.
97-Sep-16	Kitsuns	Kitsuns Rea	N/A	3076	03076	93L.082	17	1	KISPIOX	17	1	St	Fish	Fish in bucket.
97-Sep-16	Kitsuns	Kitsuns Rea	N/A	3076	03076	93L.082	17	2	KISPIOX	17	2	St	Fish	DV 180 mm
97-Sep-16	Kitsuns	Kitsuns Rea	N/A	3076	03076	93L.082	17	3	KISPIOX	17	3	St	Fish	DV 78 mm
97-Sep-16	Kitsuns	Kitsuns Rea	N/A	3076	03076	93L.082	17	4	KISPIOX	17	4	St	D	Eroding bank in background.
97-Sep-16	Kitsuns	Kitsuns Rea	N/A	3076	03076	93L.082	17	5	KISPIOX	17	5	St	U	Person with shocker on bank.
97-Sep-16	Kitsuns	00018	93L.082	3073	04033	93L.082	17	8	KISPIOX	17	6	St	Ae	Falls 3m, u/s limit to fish use.
97-Sep-17	Kitsuns	00027	93L.092	3077	03077	93L.092	17	11	KISPIOX	17	7	St	Fish	DV 54mm on fry board.
97-Sep-17	Kitsuns	00027	93L.092	3077	03077	93L.092	17	13	KISPIOX	17	8	St	D	View to mouth
97-Sep-17	Kitsuns	00027	93L.092	3077	03077	93L.092	17	14	KISPIOX	17	9	St	D	Person in orange downstream.
97-Sep-17	Kitsuns	00027	93L.092	3077	03077	93L.092	17	15	KISPIOX	17	10	St	U	Boulders and logs in channel, note algae in small pool.
97-Sep-17	Kitsuns	00027	93L.092	3077	03077	93L.092	17	16	KISPIOX	17	11	St	U	Person beside small step falls.
97-Sep-17	Kitsuns	00027	93L.092	3077	03077	93L.092	17	17	KISPIOX	17	12	St	X	Person beside eroding bank.
97-Sep-17	Kitsuns	00002	93L.092	3078	03078	93L.092	17	18	KISPIOX	17	13	St	Fish	Fish in bucket
97-Sep-17	Kitsuns	00002	93L.092	3078	03078	93L.092	17	19	KISPIOX	17	14	St	Fish	2 fish on fry board.
97-Sep-17	Kitsuns	00002	93L.092	3078	04035	93L.092	17	20	KISPIOX	17	15	St	U	Chute 2 m X 5 m with person for scale.

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97-Sep-17	Kitsuns	00002	93L.092	3078	03078	93L.092	17	21	KISPIOX	17	16	St	Fish	Fish on anode net.
97-Sep-17	Kitsuns	00002	93L.092	3078	03078	93L.092	17	22	KISPIOX	17	17	St	U	Small channel with log steps.
97-Sep-17	Kitsuns	00002	93L.092	3078	03078	93L.092	17	23	KISPIOX	17	18	St	D	Person with bucket in channel.
97-Sep-17	Kitsuns	00009	93L.092	3079	03079	93L.092	17	24	KISPIOX	17	19	St	D	Notebook, no visible channel.
97-Sep-17	Kitsuns	00064	93L.092	3080	03080	93L.092	17	26	KISPIOX	17	20	St	U	Black camera case in photo. No visible channel.
97-Sep-17	Kitsuns	00012	93L.092	3081	03081	93L.092	17	27	KISPIOX	17	21	St	Fish	Fish in bucket.
97-Sep-17	Kitsuns	00012	93L.092	3081	03081	93L.092	17	28	KISPIOX	17	22	St	Fish	2 DV (large and small) on fry board.
97-Sep-17	Kitsuns	00012	93L.092	3081	03081	93L.092	17	29	KISPIOX	17	23	St	U	Anode pole resting against log across stream.
97-Sep-17	Kitsuns	00012	93L.092	3081	03081	93L.092	17	30	KISPIOX	17	24	St	U	Person in background in orange, upstream.
97-Sep-17	Kitsuns	00012	93L.092	3081	03081	93L.092	17	31	KISPIOX	17	25	St	D	Person on bank, tree fallen across channel.
97-Sep-17	Kitsuns	00002	93L.092	3078	03078	93L.092	17	32	KISPIOX	17	26	St	Ae	Aerial view.
97-Sep-17	Kitsuns	00027	93L.091	3082	03082	93L.091	17	33	KISPIOX	17	27	St	D	Shrubs growing on bars, cobbles.
97-Sep-17	Kitsuns	00027	93L.091	3082	03082	93L.092	17	34	KISPIOX	17	28	St	U	Person walking over logs in channel.
97-Sep-17	Kitsuns	00027	93L.091	3082	03082	93L.092	17	35	KISPIOX	17	29	St	U	Person shocking below logs across channel.